

# CommunicatorPQA® and MeterManagerPQA® Software



**Version 6**  
**User Manual**  
V.4.01  
March 1, 2024



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CommunicatorPQA® and MeterManagerPQA® Version 6 Software User Manual  
V. 4.01

Published by:

Electro Industries/GaugeTech (EIG)

1800 Shames Drive

Westbury, NY 11590

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E134749 Rev 1.05  
2/16/2021

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## Revision History

The following table lists revision information for this manual, Doc #E107707, the *CommunicatorPQA®*, *MeterManagerPQA®*, and *EnergyPQA.com® Software User Manual*.

Version Number	Revision Date	Summary of Changes
V.0.0	9/17/1999	First version released
V.1.16	1/25/2000	Various updates throughout manual
V.1.17	7/13/2000	Various updates throughout manual
V.1.18	11/8/2000	Internal Modem card added
V.1.19	4/25/2001	Ethernet, Modem, and Scheduler added
V.1.20	10/12/2001	Various updates throughout manual
V.1.21	4/24/2002	Various updates throughout manual
V.1.22	8/14/2002	Various screen and functionality updates throughout manual
V.1.23	3/27/2003	Energy Pulse Outputs, and Billing Module added
V.1.24	7/24/2003	Nexus® 1252/1262/1272 meter information added; Flicker, new Polling screens, DNP Level 2, Power and Q readings added
V.1.25	8/27/2004	Software and manual name changed (Nexus® Communicator 2.0 changed to Communicator EXT™ 3.0); updates throughout manual
V.1.26	11/01/2004	Shark® 100 meter added
V.1.27	1/14/2005	HHF added; screen and functional updates throughout manual
V.1.28	11/11/2005	EN50160 added; Sealing Switch information added; screen and functional updates throughout manual
V.1.29	12/21/2005	Freeze period selection feature added
V.1.30	Internal release only - canceled due to design changes	
V.1.31	4/9/2007	Screen and functional updates throughout manual

<b>Version Number</b>	<b>Revision Date</b>	<b>Summary of Changes</b>
V.1.32	8/31/2007	Shark® 200 meter added; updates throughout manual
V.1.33	12/20/2007	Updates throughout manual
V.1.34	5/20/2008	Updates throughout manual
V.1.35	8/11/2008	Updates throughout manual
V.1.36	8/20/2008	Nexus® 1500 meter added
V.1.37	9/15/2011	Enhanced functionality documented for the Nexus® 1252/1272/1500 meters and the Shark® 200 meter; Total Web Solutions added; external digital inputs added
V.1.38	3/15/2012	Updates throughout manual
V.1.39	9/30/2012	Chapter 5: Shark® 200 meter information updated for new features; Shark® 50 and Shark® 100B meters added to chapter
V.1.40	1/08/2013	Chapter 5: added settings for DNP over Ethernet for the Network card
V.1.41	3/4/2013	MP200 Metering System added
V.1.42	6/24/2013	Chapter 20 revised
V.1.43	7/23/2013	Chapters 3, 4, and 6 revised
V.1.44	9/10/2013	Chapters 6 and 19 updated
V.1.45	4/15/2014	Updates throughout manual
V.1.46	5/21/2014	Changes to chapters 6, 8, and 19
V.2.01	11/4/2014	Software changed to Communicator EXT™ 4.0; manual re-formatted and rewritten throughout, updated screen captures throughout, MeterManager EXT added
V.2.02	12/11/2014	Added supported meters to Chapter 1
V.2.03	7/31/2015	Added Nexus® 1500+ meter to Chapter 11; added information to chapters 15, 18, and 20.
V.2.04	10/20/2015	Edits to several chapters.
V.2.04	11/15/2015	Edits to chapters 1 and 8.
V.2.05	2/2/2016	Edits to Chapter 18.
V.2.06	7/27/2016	Edits to chapters 1 and 18.

<b>Version Number</b>	<b>Revision Date</b>	<b>Summary of Changes</b>
V.2.07	9/19/2016	Chapter 26 added; edits to chapters 5, 6, 15, and 20.
V.2.08	2/28/2017	Edits to chapters 8, 11, 18, 19, 20, 21, 26 and minor corrections.
V.2.09	5/3/2017	Edits to chapters 8 and 26.
V.2.10	9/6/2017	Edits to chapters 2, 6, 7, 20, and 26.
V.2.11	10/11/2017	Edits to Chapter 18.
V.2.12	12/11/2017	Chapter 27 added and edits to chapters 1, 3, 4, 5, 6, 7, 8, 11, 12, 13, 14, 15, 26, and Appendix A.
V.2.13	3/16/2018	Edits throughout.
V.2.14	4/16/2018	Minor edits in chapters 19 and 27.
V.2.15	5/10/2018	Edits to chapters 11 and 21.
V.2.16	7/11/2018	Added Chapter 28 and Shark® 250 Meter information throughout the manual.
V.2.17	8/21/2018	Edits to chapters 11, 15, 19, 20, and 25.
V.2.18	9/5/2018	Edits to Chapter 18.
V.2.19	9/26/2018	Edits to chapters 6, 11, 15, 18, and 27.
V.2.20	10/12/2018	Edits to chapters 18, 26 and 28.
V.2.21	11/5/2018	Edits to Chapter 10.
V.2.22	4/15/2019	Edits to chapters 2, 11, 19, 21, 25, 27, and the Glossary.
V.2.23	6/20/2019	Edits to chapters 1, 3, 19, 20, 25, 26, and 28.
V.2.24	8/15/2019	Edits to chapters 18, 20, 21, and 27.
V.2.25		Chapter 29 added; edits to Chapter 18.
V.3.0	2/14/2020	Rebranding of software throughout; edits to chapters 5, 6, 7, 16, 18, 20, 21, 22, 14, 26, and 27.
V.3.1	3/23/2020	Updated EULA.
V.3.2	5/10/2020	Updates to chapters 7, 11, 12, 13, 16, 19, 26, 27, 28. Chapter 29 added.
V.3.3	7/10/2020	Updates to chapters 1, 2, 18, and 29.
V.3.4	8/19/2020	Added Chapter 30.

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Version Number	Revision Date	Summary of Changes
V.3.5	10/2/2020	Edits to Chapter 29.
V.3.6	12/10/2020	Appendix F added.
V.3.7	2/10/2021	Changes to chapters 1-5, 8-10, 12, 16-20, and 29.
V.3.8	3/31/2021	Changes to chapters 6, 11, 20, and 21.
V.3.9	4/27/2021	Changes to Chapter 29.
V.3.10	5/20/2021	Edits to chapters 5, 18, and 26.
V.3.11	7/27/2021	Edits to chapter 20 and 28.
V.3.12	12/21/21	Edits to chapters 8, 9, 29, and 30.
V.3.13	3/7/22	Edits to chapter 1, 11. 21, 27; added App. G
V.3.14	5/23/22	Edits to chapters 4, 6, 8, 11, 18, 20, 28.
V.3.15	7/19/2022	Edits to chapters 2 and 30.
V.3.16	8/4/2022	Edits to chapters 6, 20, 25, 26, 28.
V.3.17	1/20/2023	Edits throughout manual.
V.3.18	10/09/2023	Edits to chapters 2, 3, 18, 19, 20, 21, 25, 26, 28.
V.4.01	3/01/2024	Release for Version 6 of the software.



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## **Glossary GL-1**

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# 1: Installing the CommunicatorPQA®/Meter-ManagerPQA® V6 Application

## 1.1: Overview

The CommunicatorPQA® application and its MeterManagerPQA® automation component, let you discover and group meters, configure meter settings, set up trending logs and automatic log retrieval, view real time readings, set system security, register meters with the EnergyPQA.com® system, and perform related meter activities. This manual explains how to use CommunicatorPQA® and MeterManagerPQA® software version 6. For earlier versions of the software, see the manual embedded in your version of the CommunicatorPQA® application (Help>Contents from the main screen).

You have three options for using the CommunicatorPQA® application:

- You can use the Lite Mode version of the software, which doesn't allow you to access the MeterManagerPQA® automation component. This version is designed mostly for basic metering.
- You can purchase a software license and use the Professional version of the application, which activates the MeterManagerPQA® automation component and all its features.
- You can sign up for the EnergyPQA.com® system directly and get access to all of the software, including EIG's EnergyReporterPQA™ application. This version allows you to access all the Cloud functionality, including energy management, AI, and power quality. See the EnergyPQA.com system webpage for documentation and additional information:

<https://www.electroind.com/products/energypqa-com-energy-management-system/>.

In all three cases, you will install the CommunicatorPQA® application the same way (see [1.3: Installation Procedure, on page 1-11](#)).

### 1.1.1: New Features in Version 6

Version 6 (V6) of the CommunicatorPQA®/MeterManagerPQA® software has a significant number of changes centered around a new meter log database design. These changes include:

- MS Access log databases are replaced with PostgreSQL. If you are currently using the old meter log MS Access databases, contact Electro Industries for the updated database documentation.
- PostgreSQL is upgraded to v15.
- Log retrieval now uses a common architecture, which means some of the old debug files (such as .nbl, .sbl, and .csv) may be deprecated. See the Log Retrieval tab instructions in [18.11.1: System Options, on page 18-142](#) for replacement file types.
- LogViewer, LogConverter, and LogRetrieval application (specific to the Nexus® 1500/1500+ meter) have been deprecated. All retrieval and viewing is done using the common libraries.
- Meter log data that is older than 12 months can now be archived, and later loaded on demand, without removing recent data.
- Database backup tools have been improved, allowing the backup and restoring of individual databases, including meter log data.
- Database encryption is now supported. Contact Electro Industries Tech Support for the procedure to enable this.
- CommunicatorPQA® Connection databases and Script & Scheduler are being deprecated. They will continue to operate on upgrades, but may not work on new installations.

Additional changes in V6 include:

- LogViewer has been replaced with LogViewerPQA, which provides a new interface and features. See [Chapter 19: Viewing Logs, on page 19-1](#) for details.

- The MeterManager Monitor UI has been updated for ease of use. See [Chapter 18: MeterManagerPQA® Application, on page 18-1](#) for details.

## 1.2: Installation Requirements

The CommunicatorPQA®/MeterManagerPQA® application must be run on a computer with one of the following operating systems:

- Windows 10 or 11 Operating System.
- Windows® Server 2016.
- Windows ®Server 2019.
- Windows Server 2022.

If you are running Remote Desktop Host Server, you need to put it into Install mode before installing the CommunicatorPQA® software. See [1.2.1: Instructions for Remote Desktop \(RD\) Session Host Server, on page 1-8](#).

In addition, the following are minimum hardware requirements:

- 16 GB RAM.
- 1TB storage.
- 1440 x 768 display resolution.

Also, note that the CommunicatorPQA® and MeterManagerPQA® applications need .NET Framework 4.8 and .NET 6 to be installed on the PC running the applications. If you do not have those versions, the setup will install them and then exit. You will need to restart the PC if a message instructs you to do so. Whether or not you restart your PC, you will still need to restart the CommunicatorPQA® software setup.

CommunicatorPQA®/MeterManagerPQA® software supported meters are:

- Nexus® 1250/1252, 1262/1272, 1450, and 1500/1500+ meters.
- Shark® 50/100/200/100S/200S/250/270/MP200/ST40 meters.

Note that Futura+ CPU1000 and DMMS models are not supported. We recommend that you upgrade DM Series and Futura+ CPU1000 Series products to Nexus® or Shark® Series products if you wish to use CommunicatorPQA® application.

This section explains the requirements for:

- System resources for the full usage of the CommunicatorPQA/MeterManagerPQA® applications and the EnergyReporterPQA™ application run on a single computer.
- The PostgreSQL database server version 15, which is the version of the database server used by the CommunicatorPQA/MeterManagerPQA® V6 software.

**Optimum System Resource Requirements for the CommunicatorPQA/Meter-ManagerPQA® Software (Concurrently, on One PC)**

- Storage: The storage requirements for running and storing meter data and reports depends on a number of factors. The majority of these factors are affected by the number of meters in the system. Items that are stored consist of:
  - Reports
  - Meter Log Databases
  - Retrieval Logs
  - EnergyReporterPQA™ Databases
  - Internal Logs
- The EnergyReporterPQA™ application uses approximately 25 MB per year, per meter configured in the application. Meter log databases use approximately 6 MB per year for each historical channel. Different meters can have more or less configured channels, so the amount used per meter will differ between a Shark® 200 meter and a Nexus® 1500+ meter, for example.
- See the below table for examples.

# of Meters	EnergyReporterPQA™ Usage (MB)	Meter Log Database Usage for 40 Channels (MB)	Meter Log Database Usage for 300 Channels (MB)
1	25	240	1800
10	250	2400	18000
50	1250	12000	90000
100	2500	24000	180000
500	12500	120000	900000

- To calculate your estimated usage, find the usage for your expected number of points in the EnergyReporterPQA™ application and add it to the expected usage for meter log databases. For example, if you have 10 billed meters in the EnergyReporterPQA™ application, five Shark® 200S with 40 channels being logged, and three Nexus® 1500+ meters with 450 channels being logged, your estimated usage would be:  
$$10 \times 25 \text{ MB} + 5 \times 40 \times 6 \text{ MB} + 3 \times 450 \times 6 \text{ MB} = \sim 9.5 \text{ GB per year.}$$
- System: The amount of system resources needed for running the various components of the system depends both on the specific configuration of the system and on how it is being used. The majority of system usage occurs during log retrieval, importing data into the EnergyReporterPQA™ application, and generating reports. The different usage loads are as follows:
  - Idle
  - Viewing: Each CommunicatorPQA® software screen, MeterManager Monitor, EnergyReporterPQA™ Settings Editor, and EnergyReporterPQA™ Dashboard Viewer that is open, puts a load on the system, due to the functions of reading data from the database and refreshing the UI. The primary system usage is by the CPU, and it is caused by refreshing the UI. These open components (monitor, editor, dashboard) also occur in parallel, so their usage can result in cumulative loads on the system.
  - Retrieval: Retrieval of meter logs involves downloading the meter data and converting it to a local file database. This occurs at the retrieval interval specified by the user. These functions also occur in parallel, so they can result in cumulative loads on the system. A large amount of disk usage occurs while the log databases are converted and data is being written to the local database files.
  - Importing: Meter logs are checked every hour for new data to be imported into the EnergyReporterPQA™ database. If there is no new data, only regular viewing usage occurs. When new data is found, the peak load of Importing occurs. While importing, a large amount of network and disk usage occurs while the new data is written to the database.
  - Reporting: Reports are checked every 12 hours. While checking, only regular viewing usage occurs. Once a month, multiple reports are generated for the

various EnergyReporterPQA™ locations. At this time, the peak load of Reporting occurs. While generating reports, a large amount of disk usage occurs while data that needs to go into the reports is read from the database.

- System requirements are given in the following table. The usage requirements that are shown should be considered the Peak usage (the highest values seen on a normal basis).

		<b>Peak</b>					
	<b>idle</b>	<b>viewing (per user)</b>	<b>viewing (10 users)</b>	<b>retrieval (per meter)</b>	<b>retrieval (10 meters)</b>	<b>importing</b>	<b>reporting</b>
RAM	50 MB	140 MB	1000 MB	60 MB	600 MB	150 MB	500 MB
CPU (one thread)	0.24%	40%	400%	100%	1000%	150%	100%
Disk	2 kB/s	40 kB/s	400 kB/s	3,000 kB/s	30,000 kB/s	7,500 kB/s	3,000 kB/s

- CPU: The CPU usage is given as a percent across the entire system, and can vary based on the number of threads (which determine how the CPU handles multiple software processes). For example, with 10 viewers, there are 11 softwares running, resulting in a cumulative usage of 400%. If there are 16 threading contexts, then each will only see a usage peak of 40% (with 5 contexts free for other tasks). However, if only 4 threading contexts are available, each will be loaded with 100% usage. See the Recommendations section, which follows.
- Usage overflow: RAM, CPU, and Disk rely on each other, and overflowing one can lead to increased usage on the others. The numbers given above are dependent on enough free usage/space to accommodate the given tasks.
- Other System Usage: If there are any other tasks running on the system at the same time (such as other applications), these can take system resources away from the CommunicatorPQA/MeterManagerPQA® software, which will cause all tasks to run more slowly.

- Computer Resources Recommendation:

Disk Space	1 TB
CPU	4 core, 3 G Hz: Preferably Intel® I7 or greater
RAM	16 GB
Disk Throughput	200 MB/s

- CPU: As multi-threaded systems, the CommunicatorPQA/MeterManagerPQA® application and the EnergyReporterPQA™ software can benefit from multiple CPU cores and threading contexts. It is recommended that the CPU have at least 4 cores and 8 threading contexts (for example, the Intel I7 processor).
- Disk Throughput: The greatest load on the system is reading from and writing to the databases on the disk. Because the entire system relies on reading from and writing to the disk, a slow disk will cause the entire system to run slowly. Under peak load, 50 MB/s can be read/written to the disk, so it is recommended that a High Performance Hard-Drive, such as a Solid State Drive, be used for database storage.

**NOTES:**

- This system is complex and runs multiple, simultaneous tasks. It is important to NOT try to run the system on less than capable hardware.
- The meter log retrieval and report generation components of the software have heavy usage requirements when running. For an optimal system, it is recommended that the CommunicatorPQA/MeterManagerPQA® application be run on a dedicated server, reserved solely for that purpose.

### PostgreSQL Version 15 Requirements

- PostgreSQL server version 15 requires a 64-bit operating system. Chapter 1 contains details about the MeterManagerPQA® application installation, including the PostgreSQL server 15 installation/upgrade. Note that supported Windows® operating systems are 10+, 2016, and 2019.
- Storage Space - To upgrade the database from 9.5 to 15, enough space must exist on the hard drive for both databases to exist simultaneously, which is slightly more than double the size of the 9.5 database. Before upgrading, make sure this space is available on the destination drive. The installer will warn you if there might not be enough space.
- Security - The installed databases will only be accessible through the MeterManagerPQA® application. Enhanced passwords are assigned during install or upgrade, and cannot be changed.



**IMPORTANT!** The end user(s) of the CommunicatorPQA® software must have read and write permissions for the following directory:

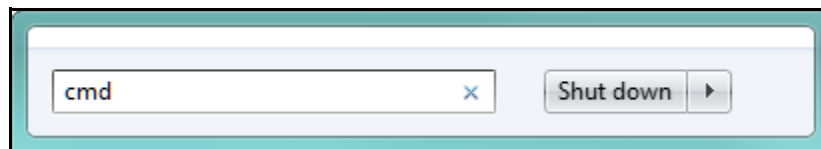
C:\Users\Public\Documents\Electro Industries

and its sub directories for the software to work correctly. Please ensure that the permissions are granted before the end user's first use of the software.

#### 1.2.1: Instructions for Remote Desktop (RD) Session Host Server

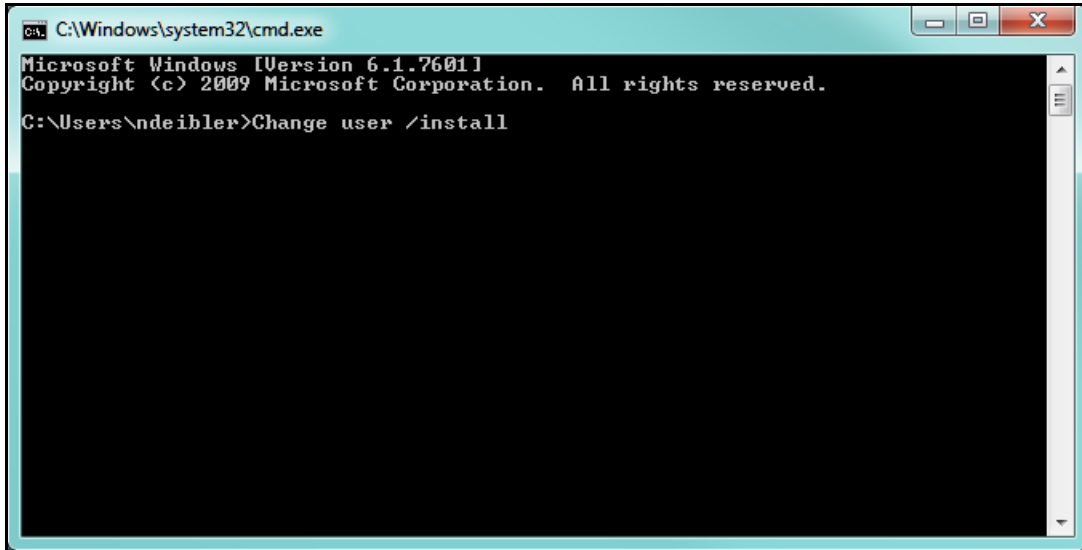
If you are running the RD Session Host Server on the PC that CommunicatorPQA® software will be installed on, you first need to put the RD Session Host Server into Install mode. Follow these instructions:

1. Click Start, type cmd in the search field, and press Enter.





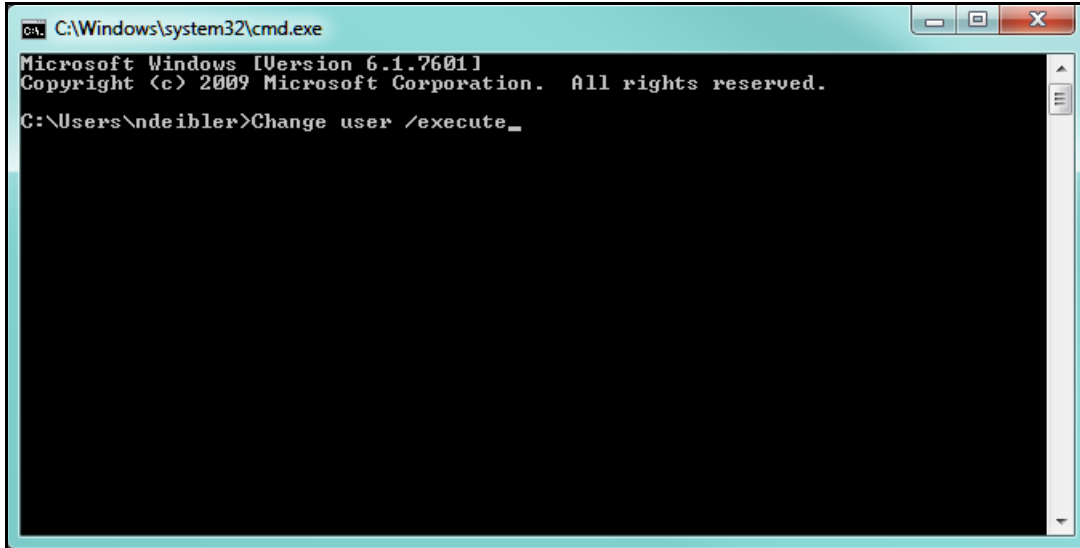
2. In the command line window, enter Change user /install at the C prompt. See the example screen, below.



A screenshot of a Windows command prompt window. The title bar reads 'C:\Windows\system32\cmd.exe'. The window content shows the following text: 'Microsoft Windows [Version 6.1.7601] Copyright (c) 2009 Microsoft Corporation. All rights reserved. C:\Users\ndeibler>Change user /install'. The command prompt is currently at the end of the command line.

3. Install the CommunicatorPQA® software application (see [1.3: Installation Procedure, on page 1-11](#)).

4. When you have finished installing the CommunicatorPQA® software, repeat step 1 to open the command line window and enter `Change user /execute` at the C prompt to put the RD Session Host Server back into normal, execute mode. See the example screen, below.



A screenshot of a Windows Command Prompt window. The title bar reads "C:\Windows\system32\cmd.exe". The window content shows the following text: "Microsoft Windows [Version 6.1.7601] Copyright (c) 2009 Microsoft Corporation. All rights reserved. C:\Users\ndeibler>Change user /execute\_". The cursor is positioned at the end of the command line.

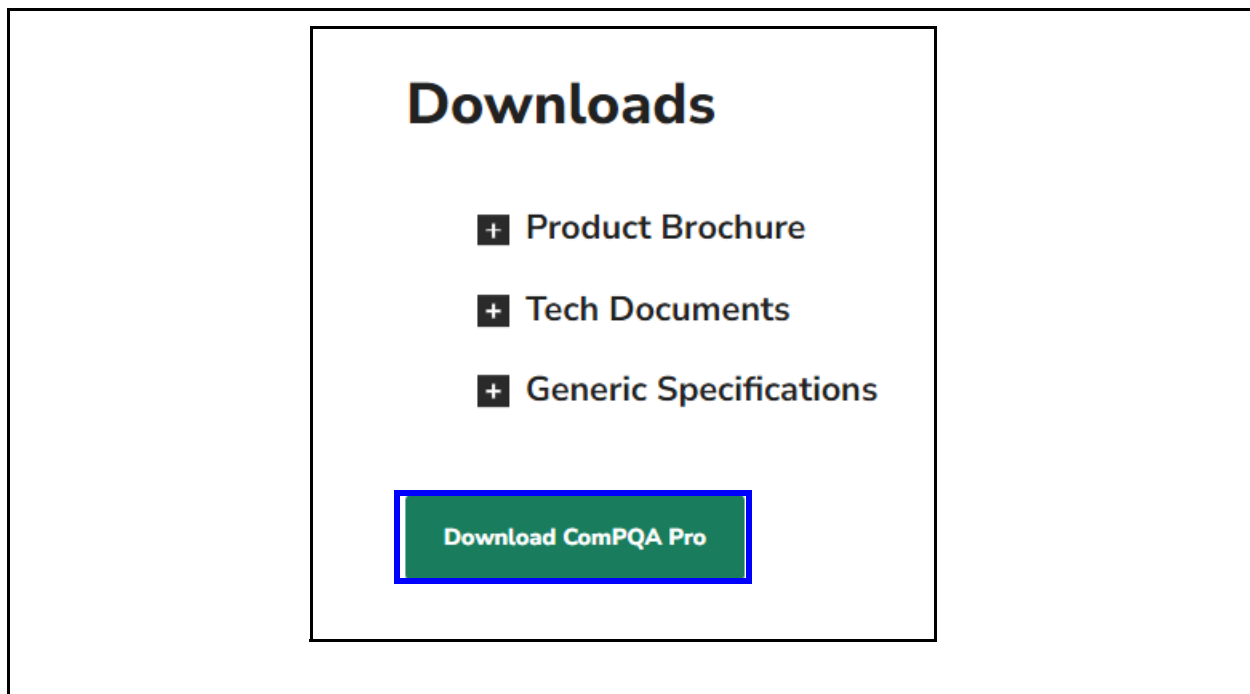
### 1.3: Installation Procedure

The procedure shown here is the normal installation procedure. For instructions on silent mode installation, see [1.3.1: Silent Mode Installation, on page 1-22](#).

**NOTE:** Software applications in addition to the CommunicatorPQA® application also use Windows Installer (MSI) to install their product. It is possible for one of these processes to be running in the background of your PC and not visible. If this happens, the installation of the CommunicatorPQA® application will fail, because only one MSI can run at a time. If the setup says it was interrupted, please restart your computer.

1. Download the link to the Professional version of CommunicatorPQA® software from EIG's website:

<https://www.electroind.com/products/communicatorpqa-power-monitoring-software/>. In the CommunicatorPQA® application webpage, click the Downloads tab.



- If you want to purchase the CommunicatorPQA® application, click the Buy Now button toward the top of the webpage. As soon as your purchase is processed, you will receive a card with your software license and the link shown above.

2. You will see a page asking for contact information. At the bottom of the page there is the following note and two radio buttons:

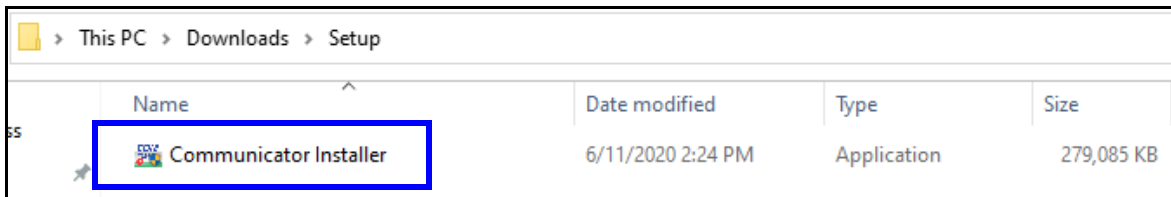
**Note:** the software requires a license to be fully functional. The unlicensed version is limited to basic meter programming only. Automated retrieval, meter management and reporting are available with the license.

You understand that capabilities are limited without a license.\*

- ☐ I understand.
- ☐ Please have someone sell me a license.

Submit

- As mentioned before, the CommunicatorPQA® application can be installed in either Lite Mode or Professional Mode. In order to use all of its features, you need a license. You can select Please Have Someone Send Me a License if you know you want the Professional version. If you want to try the software first, select I Understand.
3. Fill out the form completely and click Submit. The Setup.zip folder is downloaded to your PC.
4. Open the folder and extract the Communicator Installer file. Double-click the file to begin installation.



5. If you are prompted to give the Communicator Installer permission to make changes, click Yes to continue.
6. You may see messages regarding Microsoft applications that need to be installed. These applications are necessary for the CommunicatorPQA® application. Click Install in the message windows to continue with the CommunicatorPQA® application installation.

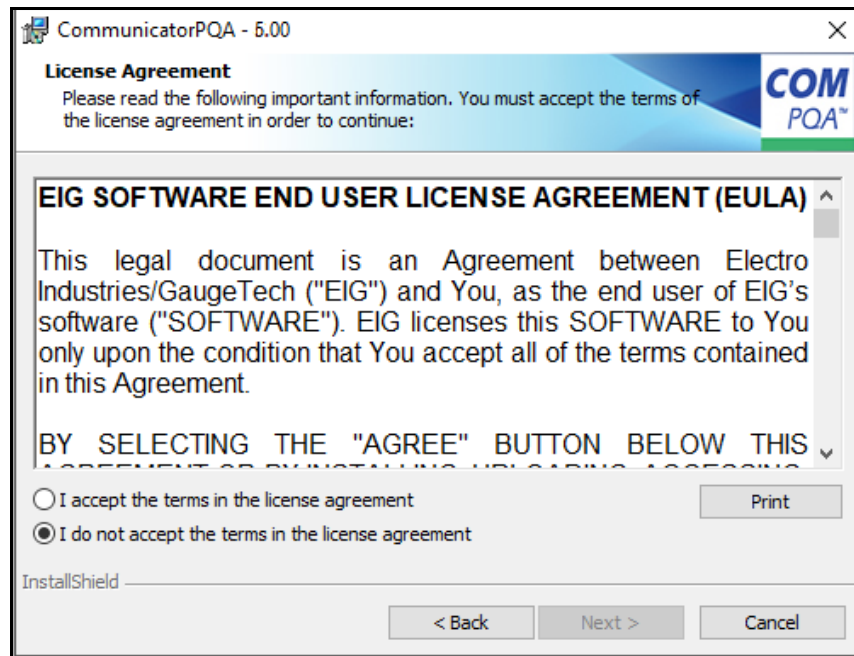
7. You will see the following screen.



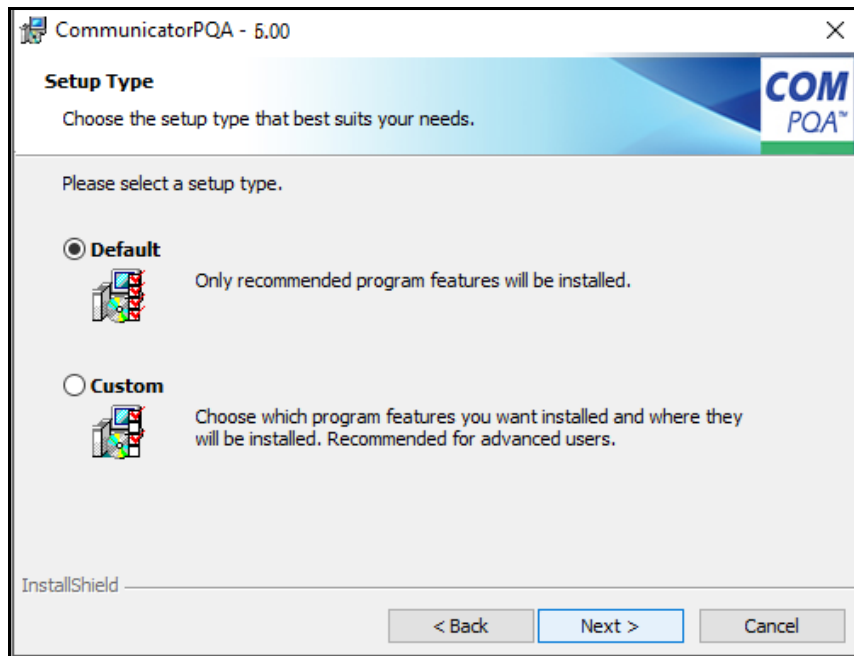
8. Next, you will see the screen below.



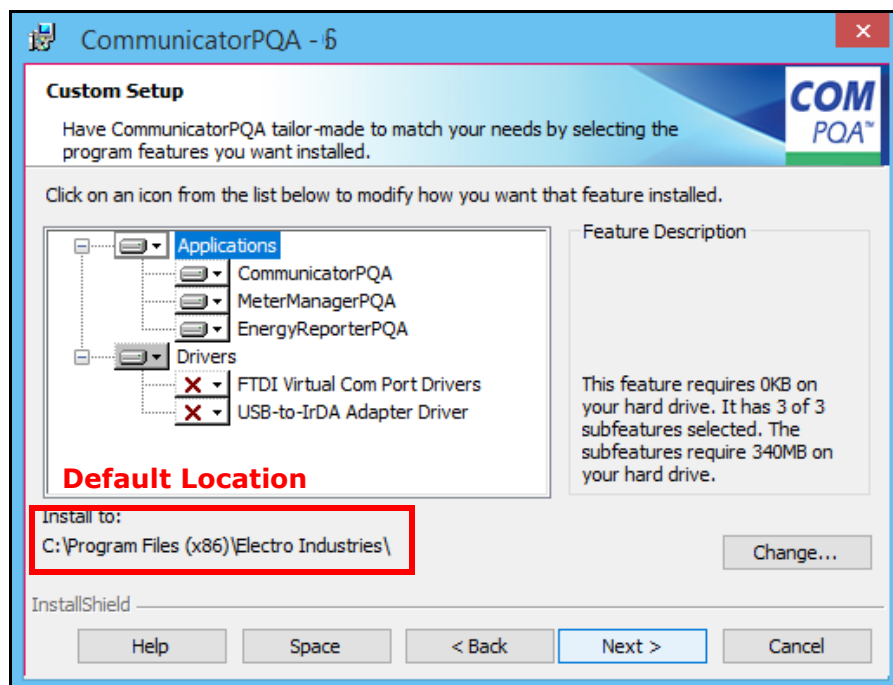
9. Click Next to continue with the installation. You will see the Software End User License Agreement.



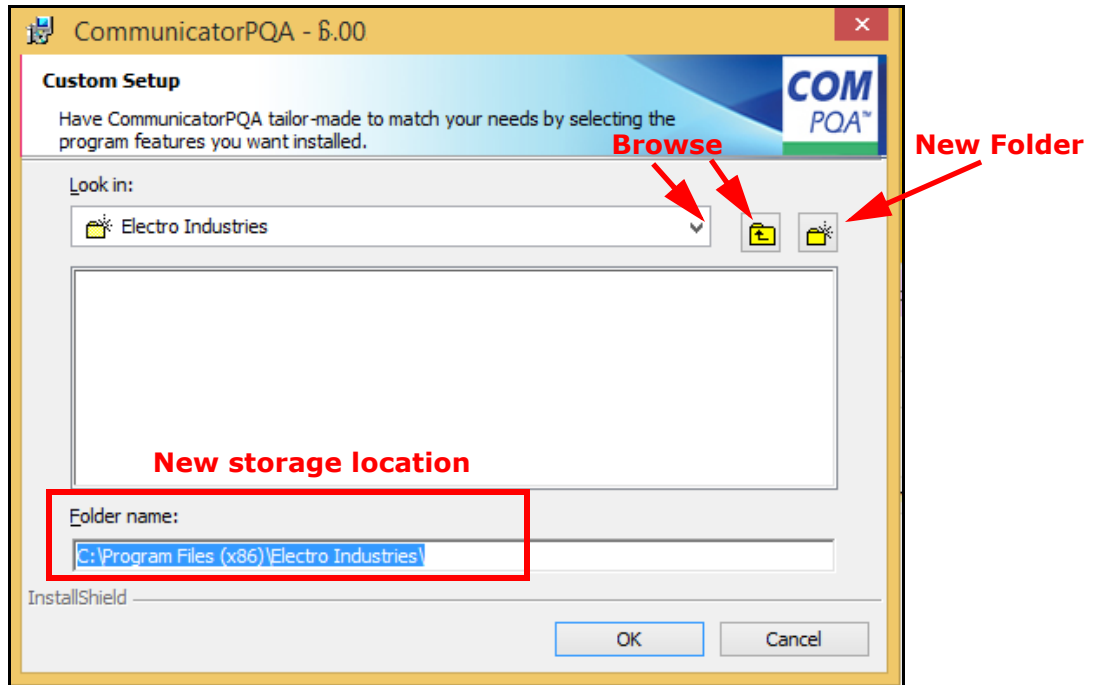
10. Use the scroll bar to view the entire document. Please make sure you read the terms of the Software End User License Agreement. To continue the installation, click I accept the terms in the License Agreement. By doing so, you are agreeing to the full terms of this Software User End License Agreement. (If you do not accept the terms, you will not be able to install the application.)



11. In the above screen, for a regular installation, leave the Default button selected and select Next. Then proceed to step 12. If you need to customize the installation, such as selecting a new location for files, or not installing certain parts of the application, click the Custom button and continue with step 11a.
- a. After selecting Custom, you will see the screen below.



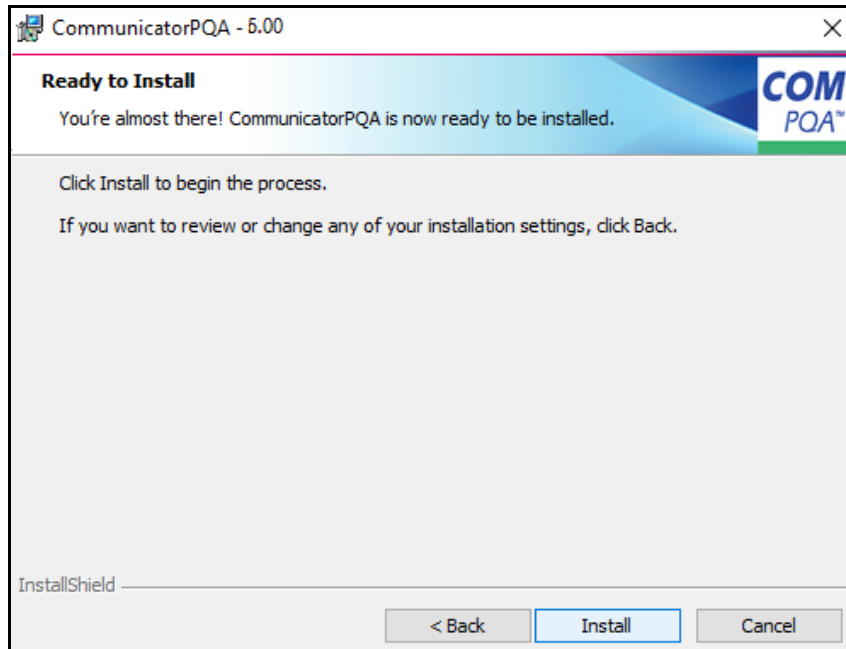
- b. The default location that files will be stored to, is shown. To save to a different file location, click Change. You will see the screen shown below.



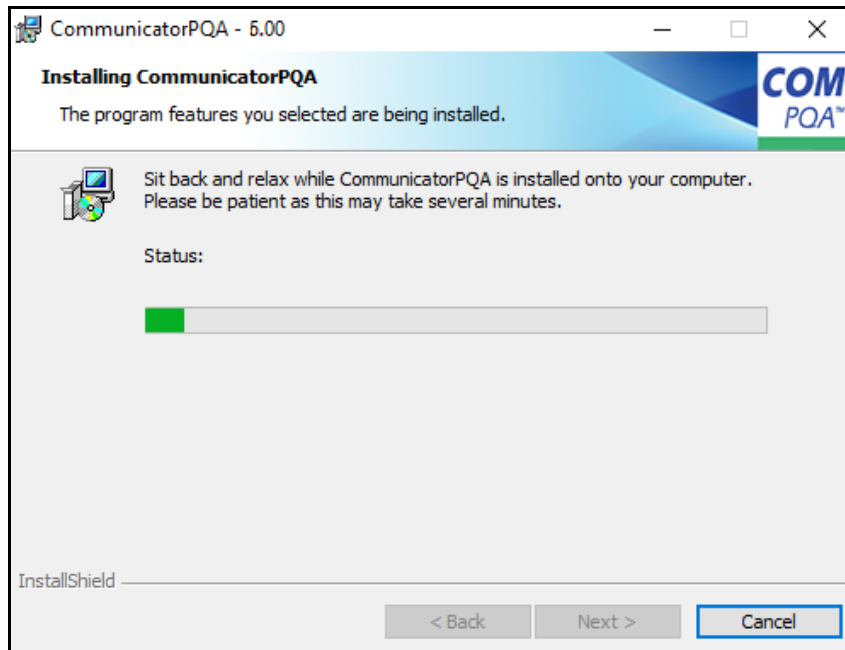
- Browse to the location where you want to store the application files.
  - You can create a new folder if you want.
  - Click OK to close this screen and return to the Custom Setup screen.
- c. From the Custom Setup screen, click on any of the applications and/or drivers you want to install and click Next to continue.



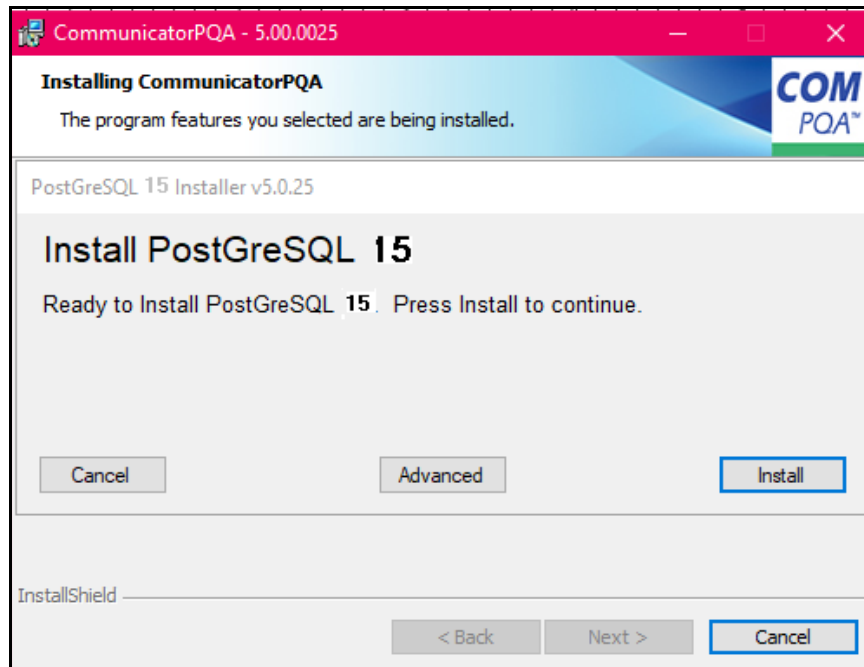
12. You will see the screen below; click Next to begin installation.



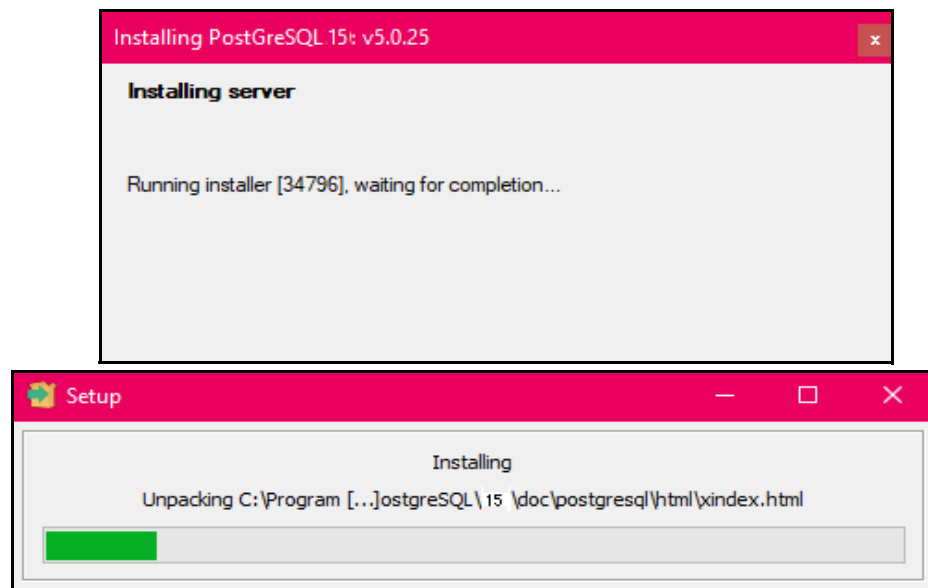
13. You will see the screen below as files are being installed.



14. You will see this message when installing MeterManagerPQA® software, if you don't have the PostgreSQL Server 15 on your PC.



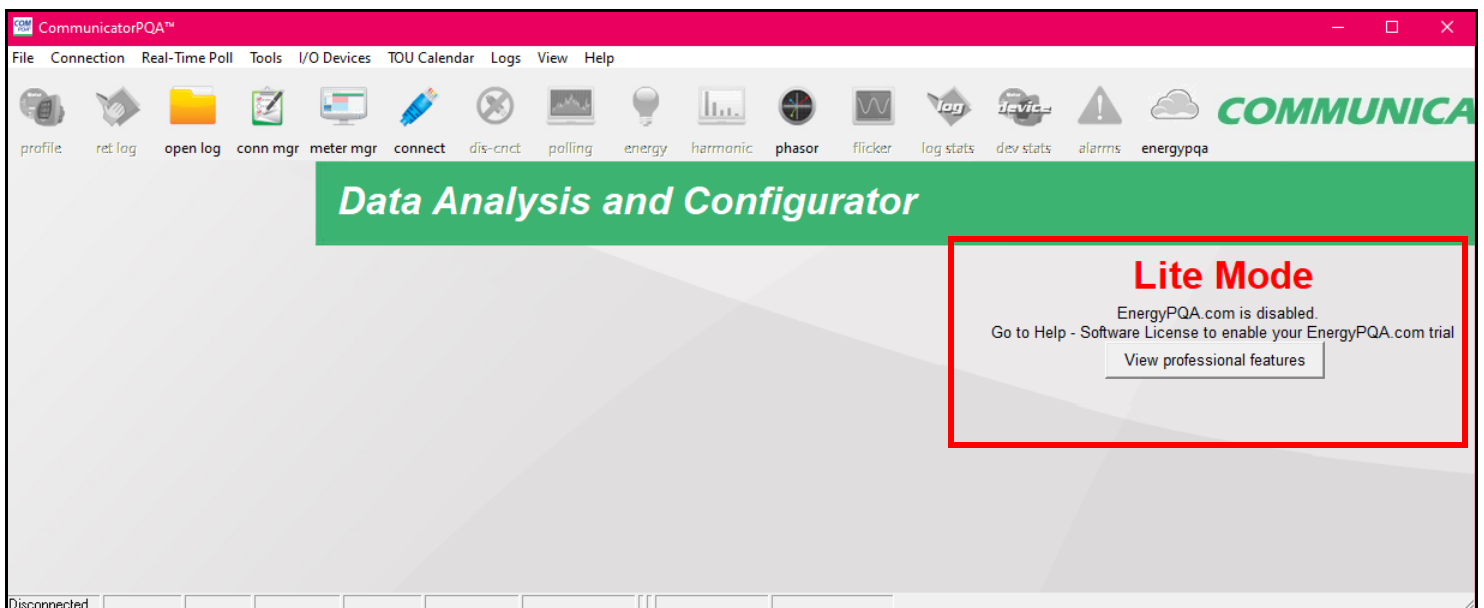
15. Click Install to continue. You will see the messages below as the MeterManager-PQA® application is installed.



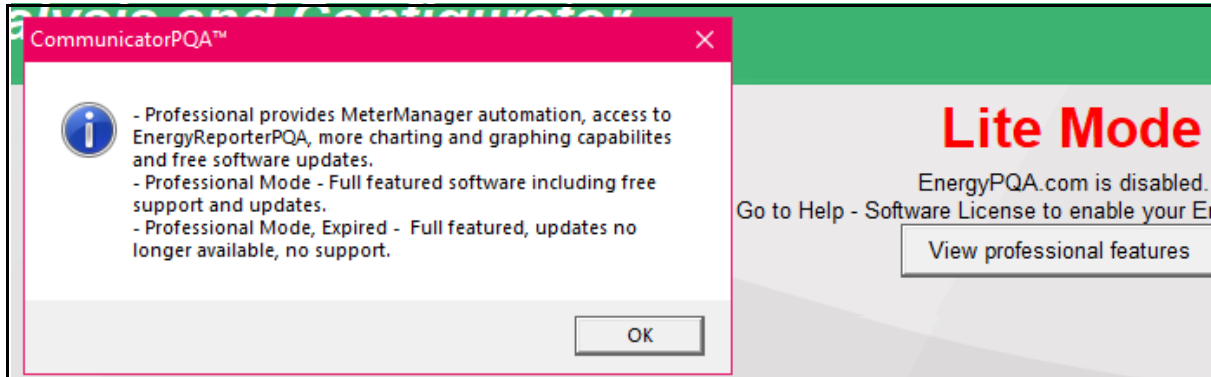
16. You will see the screen below, indicating that the CommunicatorPQA® application installation is complete. Check the first box to launch the application. You can check the second box if you want to see a log with installation details. Click the Finish button to close this screen



17. When you open the CommunicatorPQA® application for the first time, it will be in Lite Mode.

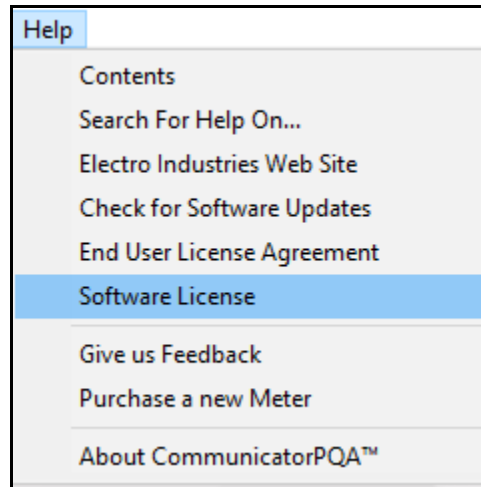


18. The messages underneath Lite Mode tell you that the EnergyPQA.com® system is disabled and tell you how to enable a Trial for it. The button View Professional Features lets you see what is different in the Professional Mode as opposed to the Lite Mode. See the screen below.

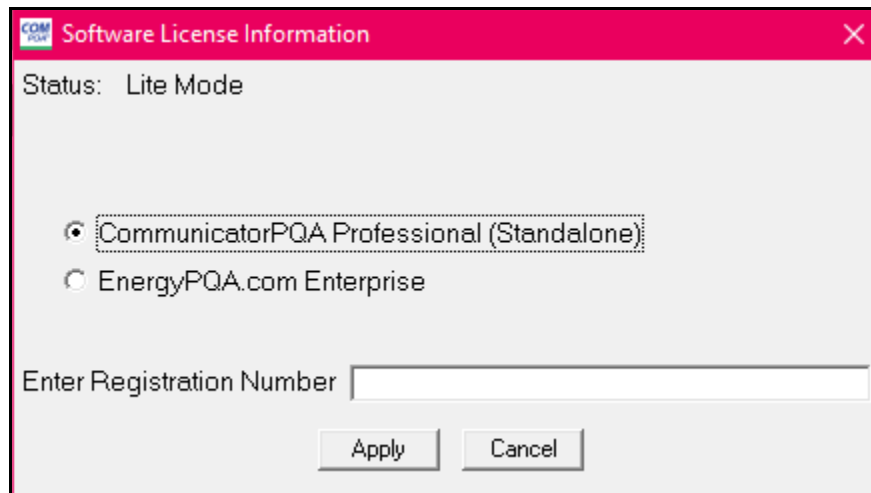


- As you can see, if you have the Professional Mode, you have full software, along with free updates and support. If your license expires, you will no longer be able to get updates or support for the software, until you renew your software license.
19. You now have two options:
- You can continue to use the Lite Mode of the software - in this case, you do not need to do anything else. You will find instructions for using the software in the rest of this manual (note that some chapters, e.g., Chapter 18 on MeterManagerPQA® software, will not apply to the Lite Mode).
  - You can access the Professional version of the CommunicatorPQA® application. To do so:
    - a. Contact EIG to buy a software license: call 1-516-334-0870 or email sales @electroind.com.

- b. Once you receive the license, click Help>Software License from the top of the CommunicatorPQA® software's Main screen.



- c. In the screen below, click the button next to CommunicatorPQA® Professional and enter your license number in the Enter Registration Number field.



- d. Click Apply. You will now be able to use all of the features of the CommunicatorPQA® application with the MeterManagerPQA® automation software. See [1.5: Using the Application, on page 1-29](#), for a description of the other chapters in this manual.

### 1.3.1: Silent Mode Installation

If you want to install the CommunicatorPQA® and MeterManagerPQA® applications without requiring any user intervention, i.e., responding to prompts and making selections, follow these instructions to perform installation in “silent mode.”

In the PCs command line, key:

Setup.exe /s

If you find that the MeterManagerPQA® application is not being installed in silent mode, follow this two step process:

1. In the PC's command line, key:

Setup.exe /s /e\_inst\_mtr\_mgr=no

2. Once CommunicatorPQA® software has been installed, key the following in the PCs command line:

Metermanagerinstaller.exe /s /v/qn

**NOTE:** If MeterManagerPQA® software is being updated, the command shown here will install the application silently. Note that for a new installation, the MeterManagerPQA® application can't be installed without user intervention.

## 1.4: Meter Database Migration - V5 to V6

CommunicatorPQA® V6 uses a PostgreSQL database rather than the MS Access database used by earlier versions of the software. The MS Access databases will no longer be supported. You have the option of migrating up to two years of log data to the PostgreSQL database when you are updating from CommunicatorPQA® V5 to CommunicatorPQA® V6. This section explains how to perform the migration.

- Note that database migration is not necessary. If you don't need the older log data there is no reason to migrate it. Also, you have the option of retrieving the log data again once you have installed the CommunicatorPQA® V6 application.
- New data available will be retrieved as normal into the V6 database whether or not you perform database migration.
- Note that the original V5 database is left untouched. It will still be available for auditing and review purposes, regardless of whether or not the data has been migrated.
- While the V6 LogViewerPQA® cannot access the V5 database, the V5 Log Viewer will be left on the computer to provide access to the data. However, note that the legacy V5 Log Viewer is deprecated, so it will not be supported even though it is available for use. Also note, if the original databases are not required, you will need to manually delete them to free up the disk space. See [Chapter 16: Databases and Log Data, on page 16-1](#) for information on locating log files.

**NOTE:** Database migration is only available when performing an upgrade from V5 to V6. It can't be used for new CommunicatorPQA® V6 installations, i.e., installing the application on a new machine.

Migration is only strongly recommended in the following circumstances:

- Meter logging has less than two years of data, but the meter has been in service longer than that. This can occur if the logs were reset or rolled over. Migration will ensure you don't lose the database records.
- You are using a Shark® 100 meter with the MeterManagerPQA®'s software poller feature, which is used because those meters do not have logging (see [18.11.1: System Options, on page 18-142](#) for details).

Following are some considerations when you are migrating meter log databases:

- Since migration can take quite a long time and take up a large amount of memory, you should consider which meters and/or logs you want to migrate data for.
- Log retrieval is disabled for all meters that are eligible for migration until the meter's log database migration is finished (or canceled).
- Any configured reports, such as ReportExporter™ or Custom Reports, will also be disabled during the meter's log database migration process.
- As each meter finishes migration, log retrieval will be enabled again and meter data will begin to be retrieved. The meter log retrieval will begin where the V5 database left off. Once retrieval is completed, a report will be available for the migrated data. See [1.4.2: View Migration Status/History, on page 1-27](#).

Note the following restrictions on migrating databases:

- Only meters configured in the MeterManagerPQA® Meter List at the time of upgrade, may be migrated. Any meter which is unassigned, or has meter log databases which are not active, will not be available for migration.
- Any meter added to the system after upgrade to V6, but before migration, cannot be migrated.
- Once a meter has been migrated, it cannot be selected for automatic migration again. This is only relevant if you migrated less than the full set of available data from that meter.
- Retrieval and reports will be blocked until migration successfully completes or is canceled. Make sure to cancel migration if you decide not to continue with it, or logging will not take place.

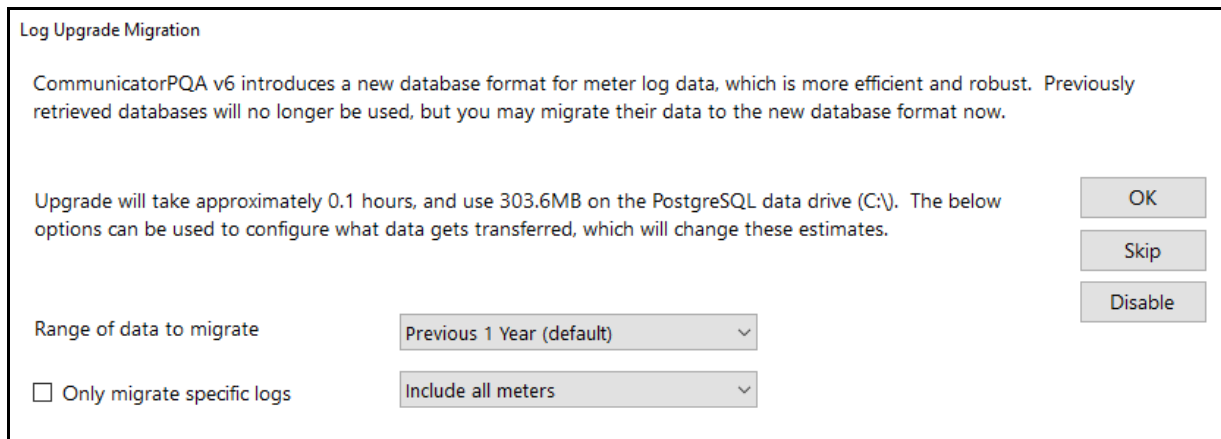


### 1.4.1: Migration Procedure

1. Install CommunicatorPQA® V6. After the installation is finished, MeterManager-PQA® will scan your system for meters that can be migrated. This process can take a while. Log retrieval is not available while the system is being scanned.

**NOTE:** If you are upgrading from CommunicatorPQA® V4 rather than V5, contact EIG customer support to confirm the best upgrade path.

2. Open MeterManagerPQA® if it is not already open. When the scan is complete, you will see the following screen in MeterManager Monitor.



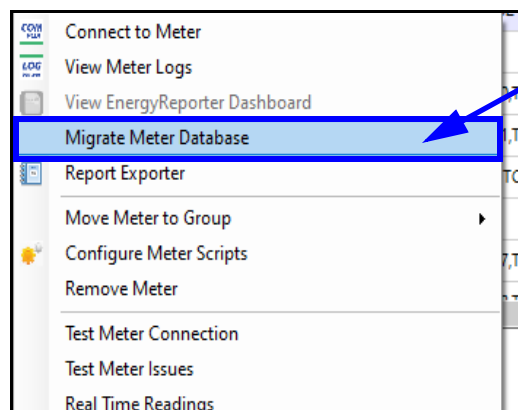
The screenshot shows a dialog box titled "Log Upgrade Migration". The text inside reads: "CommunicatorPQA v6 introduces a new database format for meter log data, which is more efficient and robust. Previously retrieved databases will no longer be used, but you may migrate their data to the new database format now." Below this, it states: "Upgrade will take approximately 0.1 hours, and use 303.6MB on the PostgreSQL data drive (C:\). The below options can be used to configure what data gets transferred, which will change these estimates." There are three buttons on the right: "OK", "Skip", and "Disable". On the left, there are two options: "Range of data to migrate" with a dropdown menu set to "Previous 1 Year (default)", and a checkbox labeled "Only migrate specific logs" which is unchecked, followed by a dropdown menu set to "Include all meters".

3. This screen lets you specify the migration options you want:
  - a. Range of data to migrate - you may select one (which is the default selection) or two years of data to migrate. The migration is for calendar years (Jan.-Dec.), so it will include data from January 1 of the year.
  - b. Only migrate specific logs - if you only need certain logs to be migrated, you can speed up migration (and possibly reduce storage space requirements), by only migrating the logs that you need.
  - c. Include meters - select which meters to migrate at this time. You do not need to migrate all meters at one time. You can migrate some and then migrate others later if you need to. The options for this field are:
    - Include all meters - All available meters will be migrated. Only one meter will be migrated at a time, so this can safely be selected in most circumstances.

- Include only selected meters - this option lets you process meters in groups, or only migrate specific meters. A list of all meters will be displayed, from which you can select the meters to migrate.
  - Exclude selected meters - this option lets you select which meters you do not want to be migrated. Note that all meters that are not selected will be migrated.
4. Click OK to start migration.
- If you don't want to migrate at this time, you can click Skip.
  - If you have migrated all the meters you want, click Disable to cancel any additional migrations.

**NOTES:**

- If you chose to migrate only a few meters at a time or if you selected Skip, you can open the Log Upgrade Migration screen again from the Migration Summary window to continue migrating meters - see
- You can also migrate meters individually from the Meter List screen. Right click on a meter in the list and select Migrate Meter Database. You will only see this option if the meter is available to migrate.





When you click here you will have two options:

1. Migrate Old Database - migration for this meter will start after other meters have been migrated.
2. Start New Database - migration will not take place. A new database will be created and logs will be downloaded to it from the meter.

5. During migration, you can view its progress in MeterManagerPQA® in several ways:

- Meters being migrated and blocked from log retrieval will have a Locked icon in the Meter List.

- When migration begins, the Next Action column in the Meter List will display the status.

test		
1800ShamesDr		012399
1700ShamesDr		DB Migration: [1/39] Writing historical channel [201586] 012332
unassigned		

Locked icon

Next Action message

### 1.4.2: View Migration Status/History

You can see information about the migrations you have performed in two places:

- From MeterManager Monitor, click Scripts>Log Actions>View Logs. The migrations are listed in the Actions History field.

## Log Actions History

**Actions Status**  
Queue 0  
**Status**  
DB Migration: Writing log [WAVEFORM]  
  
**Report Type** Migrating next device  
ID  
  
**Progress** 46.90%

**Actions History**  
1 Report(s) [Run Log](#)  

Action Start	Action	Name	Duration	Data Start	Data End	Description	Error #
07/24/2023 10:41	ScanAll	[ScanAll]	00:00:41.0004978				

- Click the Migration icon in the Status bar to open the Migration Summary screen.

**Status Bar**

Meters Online	6
Meters Offline	40
Meter Warnings	0
Scripts Status	1/20
Script Errors	7
Searching IP	Not Scanning

Migration icon

**Migration Summary**

Migration Status: Migration has been completed. Migration began at [2023/07/24 10:48:00.1043] and completed at [2023/07/24 10:52:11.7397]. View the Migration Report below to get an overview of the results, and click Acknowledge to the right to close out

Start Migration Acknowledge

**Migration Report**

Group	Meter	Meter Type	Online
1700ShamesDr			

**Migration Errors**

Group	Meter	Meter Type	Online
1700ShamesDr			

**Migration Pending**

Group	Meter	Meter Type	Online
1700ShamesDr			

The Migration Summary screen displays the following information:

- Migration Status - the current status of the migration.
- Migration Report - a report of the success or failure of each meter that was migrated, including when migration started, and how long it took.
- Migration Errors - a list of issues encountered during scanning and migrating. Note that some issues listed may not be a problem, for example, "Database not found" may only indicate that log retrieval was not performed for the meter in the past. However, the issues listed in this field will be helpful if the migration failed.

- Migration Pending - a list of all meters that are waiting to be migrated.
- The buttons on the screen are as follows:
  - Start Migration - opens the Migration Prompt screen, which you can use to begin the pending migrations.
  - Acknowledge - When all pending migrations have been completed, click this button.
  - Disable - Cancels migration for all remaining meters.

## 1.5: Using the Application

The remainder of this manual explains how to use the CommunicatorPQA® and its related applications.

Chapter 2 contains an overview of the application, including an explanation of the Main screen's Menu Bar, icons, etc.

Chapter 3 contains detailed instructions for connecting to a meter, including direct connection through a serial port, network, or modem; using Connection Manager; and using the MeterManagerPQA® application.

Chapter 4 contains detailed information on the Device Status screen, in general and for specific meters.

Chapter 5 contains information on all of the polling screens.

Chapter 6 contains security information - password protection and sealing switch.

Chapter 7 explains how to configure your meter, explaining the Device Profile screen and its features.

Chapter 8 contains detailed instructions for configuring the Shark® 200/200S meter.

Chapter 9 contains detailed instructions for configuring the Shark® 100/100S/100B/50 meter.

Chapter 10 contains detailed instructions for configuring the MP200™ metering system.

Chapter 11 contains detailed instructions for configuring the Nexus® 1500/1500+ meter.

Chapter 12 contains detailed instructions for configuring the Nexus® 1272/1272 meter.

Chapter 13 contains detailed instructions for configuring the Nexus® 1250/1252 meter.

Chapter 14 contains detailed instructions for configuring external I/O Devices.

Chapter 15 contains detailed instructions for configuring the Time of Use (TOU) feature.

Chapter 16 contains detailed instructions for retrieving meter logs and detailed explanation of the CommunicatorPQA® application's databases.

Chapter 17 contains detailed information on using EIG's Script & Scheduler.

Chapter 18 contains detailed information on MeterManagerPQA® software.

Chapter 19 explains EIG's LogViewerPQA and gives detailed instructions for viewing the meters' logs.

Chapter 20 contains detailed instructions for using additional CommunicatorPQA® application screens and functions, including using the Tools menu, the Options screen, and using the application's Help function.

Chapter 21 contains detailed instructions for configuring a meter's Network card and using Total Web Solutions™.

Chapter 22 contains instructions for customizing DNP3 configuration.

Chapter 23 contains detailed information on EN 50160/IEC 61000-4-30 Power Quality standards.

Chapter 24 contains instructions for configuring the modem Dial In/Dial Out settings.

Chapter 25 contains instructions for performing Flash updates.

Chapter 26 contains instructions for configuring the Shark® 270 meter.

Chapter 27 contains instructions for configuring the Nexus® 1450 meter.

Chapter 28 contains instructions for configuring the Shark® 250 meter.

Chapter 29 contains information on the EnergyPQA.com® Cloud-based system's documentation.

Chapter 30 contains detailed instructions for configuring the ST40 meter.

Appendix A contains information on Transformer/Line Loss Compensation (TLC) and the TLC worksheets.

Appendix B contains CommunicatorPQA® 4.0 software Command Line Arguments.

Appendix C contains a list of Ethernet Network error codes.

Appendix D contains instructions for TFTP Server Program setup.

Appendix E contains troubleshooting information.

Appendix F contains information on the Landis + Gyr Server Custom Reports feature.

There is a Glossary at the end of this manual.

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## 2: Overview of the Application

### 2.1: Meter Comparisons

Settings for the meters vary depending on the meter model you are connected to. For example, certain meters support Flicker measurement while others do not. See the following tables for a comparison of meter features.

Note that some of these features are optional, or are determined by V-Switch™ key. Refer to your meter's Installation and Operation Manual for the capabilities associated with your meter's options and V-Switch™ key.

In the following tables, y=yes, and n=no.

**Table 1: Shark® Series Feature Comparison**

<b>Shark® Meter Features</b>	<b>50</b>	<b>50B</b>	<b>100</b>	<b>100S</b>	<b>100B</b>	<b>200</b>	<b>200S</b>	<b>250</b>	<b>270</b>	<b>MP200</b>
<b>Measurements</b>										
Multifunction Measurement	y	y	y	y	y	y	y	y	y	y
Single phase W, VAR	n	n	n	n	n	y	y	y	y	y
Total W, VAR	y	y	y	y	y	y	y	y	y	y
# of 3 Phase Circuits	1	1	1	1	1	1	1	1	1	8
Accuracy Class	0.5	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.5
<b>Communication</b>										
Modbus	y	y	y	y	y	y	y	y	y	y
Modbus TCP	n	y	y	y	y	y	y	y	y	y
DNP3 Serial	n	n	y	y	n	y	y	y	y	n
DNP3 over Ethernet	n	n	n	n	n	y	n	y	y	n
BACnet MS/TP	n	y	n	n	n	n	n	n	n	n
BACnet /IP	n	n	n	n	y	n	n	n	n	n
IEC61850	n	n	n	n	n	y	n	y	y	n
RS485 Ports	1	1	1	1	1	1	1	2	1	2
Ethernet Ports	n	1	1	1	1	2	1	1	1	1
Fiber Ports	n	n	n	n	n	2	n	1	n	n
IRDA Ports/Optical Port (270)	n	n	1	1	1	1	1	n	1	n
Cellular Modem	n	n	n	n	n	n	n	n	1	n
USB Ports	n	n	n	n	n	n	n	1	n	1
WIFI Capable	n	n	n	y	n	n	y	n	n	y
0-1mA Outputs	n	n	n	n	n	y	n	y	y	n
4-20mA Outputs	n	n	n	n	n	y	n	y	y	n
<b>Features</b>										
Load Profiling	n	n	n	n	n	y	y	y	y	y
Limits	n	n	y	y	y	y	y	y	y	y
Control Outputs	n	n	n	n	n	y	y	y	y	y
THD/TDD	n/n	n/n	y/n	y/n	y/n	y/n	y/n	y/y	y/y	y/n
Harmonic Components	n	n	n	n	n	y	y	y	y	y
Waveform Recording	n	n	n	n	n	y	n	y	y	n
Transformer Compensation	n	n	n	n	n	y	y	y	y	n
Line Loss Compensation	n	n	n	n	n	y	y	y	y	n
Time of Use	n	n	n	n	n	n	n	y	y	n
Programmable Display	n	n	n	n	n	n	n	n	y	n

**NOTE:** The number of available communication ports includes both standard and optional.

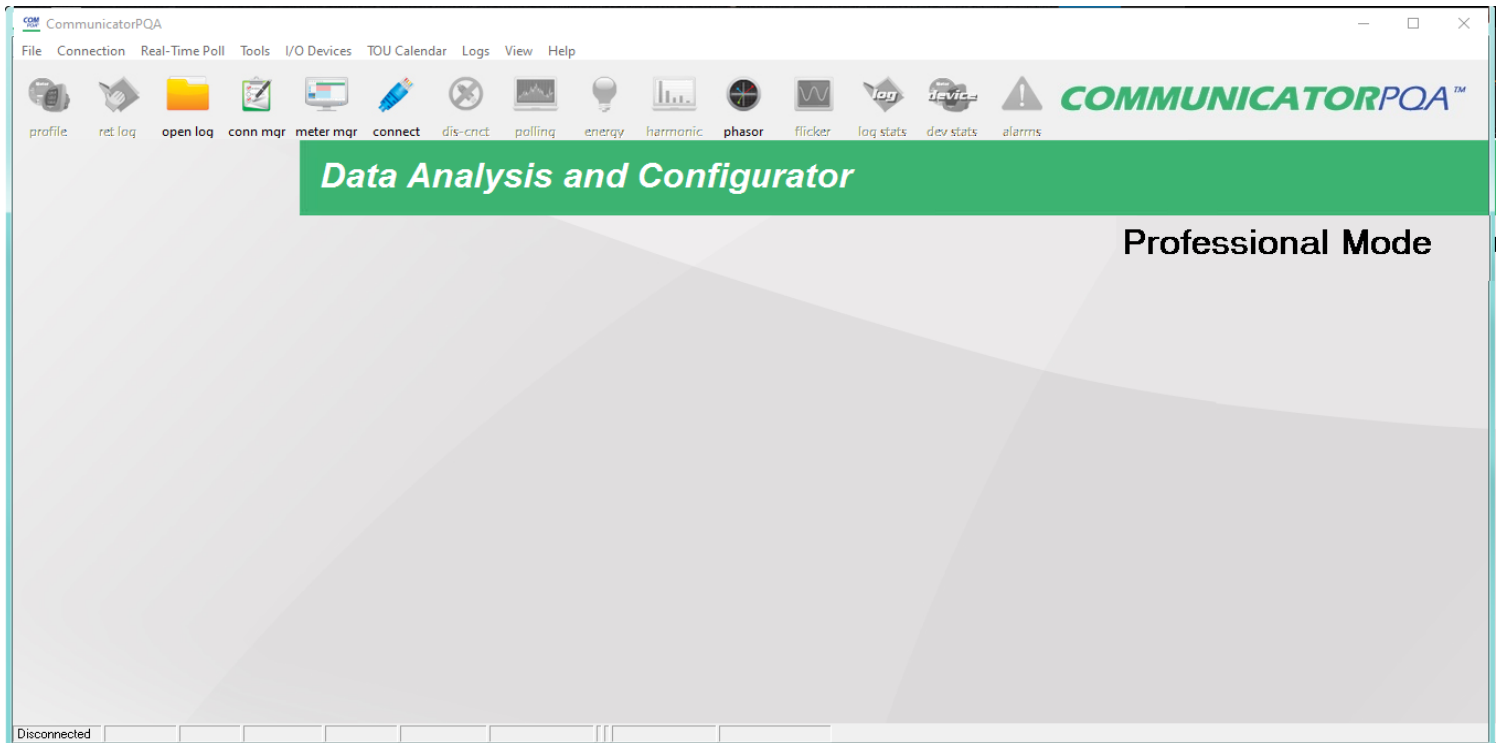
**Table 2: Nexus® Series Features Comparison**

Nexus® Meter Features	1250	1252	1262	1272	1450	1500	1500+
<b>Measurements</b>							
Multifunction Measurement	y	y	y	y	y	y	y
Single Phase Watt, VAR Readings	y	y	y	y	y	y	y
Total Watt, VAR	y	y	y	y	y	y	y
Number of 3 Phase Circuits	1	1	1	1	1	1	1
Accuracy Class	0.04	0.06	0.06	0.06	0.06	0.06	0.06
Auto-Calibrating	y	y	y	y	y	y	y
<b>Communication</b>							
Modbus	y	y	y	y	y	y	y
Modbus TCP	y	y	y	y	y	y	y
DNP3 Serial							
DNP3 Ethernet	y	y	y	y	y	y	y
IEC 61850	n	n	n	n	y	y	y
IEC 61850 GOOSE	n	n	n	n	y	n	y
RS485 Ports	4	4	2	2	4	2	2
Ethernet Ports	1	1	1	1	1	2	2
Fiber Ports	n	n	n	n	1	1	1
ANSI Optical Port	n	n	1	1	n	1	1
USB Ports	n	n	n	n	n	1	1
WIFI Capable	n	n	n	n	n	n	n
0-1mA Outputs	y	y	y	y	y	y	y
4-20mA Outputs	y	y	y	y	y	y	y
<b>Features</b>							
Load Profiling	y	y	y	y	y	y	y
Limits	y	y	y	y	y	y	y
Control Outputs	y	y	y	y	y	y	y
THD	y	y	y	y	y	y	y
Harmonic Components	y	y	y	y	y	y	y
Waveform Recording	y	y	y	y	y	y	y
Waveform Capture Response to GOOSE msg	n	n	n	n	y	n	y
Transient Capture	n	n	n	n	n	y	y
Transformer/Line Loss Compensation	y	y	y	y	y	y	y
Test Mode	n	n	y	y	y	y	y
Full IEC 61000-4-30 Class A Compliance	n	n	n	n	y	y	y
EN 50160 Reporting	n	y	n	n	y	y	y
TOU	y	y	y	y	y	y	y
PMU (Synchrophasors)	n	n	n	n	n	n	y

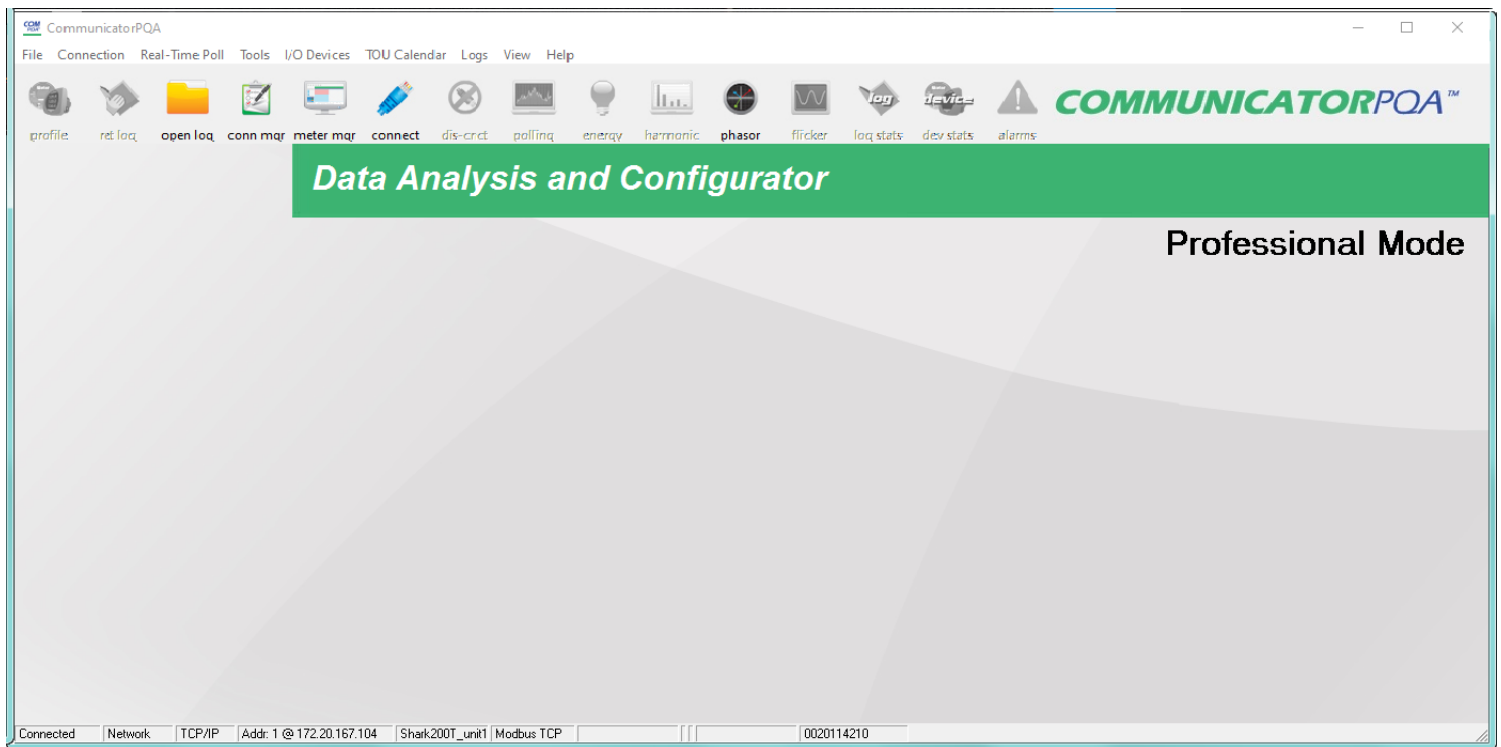
**NOTE:** The number of available communication ports includes both standard and optional.

## 2.2: Main Screen

When you open the CommunicatorPQA® application, either from the Start menu, or by connecting to a meter through MeterManagerPQA® software, you see the software's Main screen.



- You will see the above screen if you open the application from the Start menu and are not yet connected to a meter. The screen says Professional Mode when you are using a fully licensed version of the software. Notice that the Connect, Open Log, Conn Mgr, and Meter Mgr icons are available, but the other icons are grayed out and not selectable.



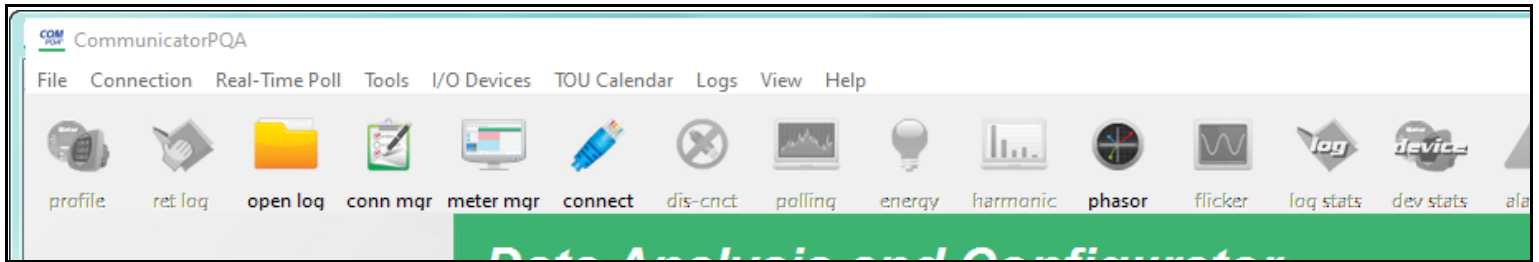
- You will see the above screen once you have connected to a meter (see Chapter 3 for instructions), or if you have accessed CommunicatorPQA® from MeterManager-PQA® software. All of the icons in the Icon Bar are available for use, except for the Connect icon, since you are already connected to a meter.

The Main screen gives you access to all of the features of the software. Its basic components are:

- Icon Bar - contains icons that open specific screens
- Status Bar - gives you information about the connected meter
- Menu Bar - provides access to all of the software screens

These components are explained in the following sections.

### 2.2.1: Main Screen's Icon Bar



From left to right, the icons in the Icon Bar and the actions they perform are as follows:

- Profile - click this icon to open the Device Profile screen for the connected meter. See Chapter 7 for details on the Device Profile and the individual meter chapters for instructions for configuring your meter's Device Profile.
- Ret Log - click this icon to open a screen that lets you retrieve meter logs. See Chapter 16 for details on log retrieval.
- Open Log - click to open the Log Viewer application, which gives you access to log data. See Chapter 19 for details on using the Log Viewer.
- Conn Mgr - click this icon to open Connection Manager. See Chapter 3 for instructions on using this feature.
- Meter Mgr - click this icon to open the MeterManager monitor screen. MeterManager is explained in detail in Chapter 18.
- Connect - when you are not connected to a meter, click this icon to open the Connect screen. See Chapter 3 for connection instructions.
- Disconnect - click this icon to disconnect from the meter you are currently connected to.
- Polling - click this icon to open the Real Time polling screen for the meter you are connected to.
- Energy - click this icon to open the Power and Energy polling screen for the meter you are connected to.

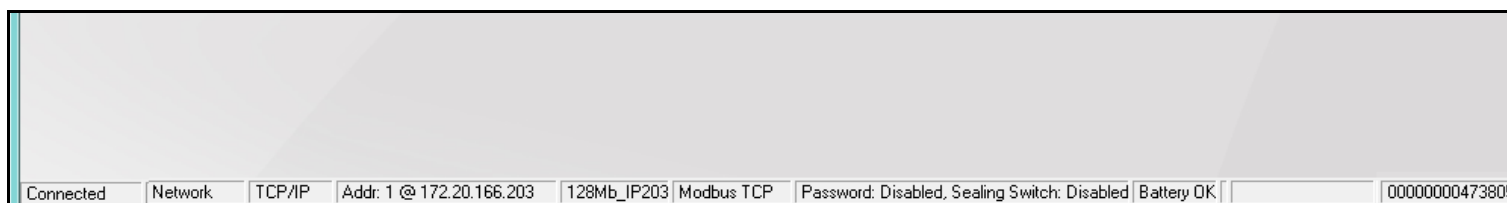
- Harmonic - if the meter you are connected to supports Harmonic magnitude measurement, click this icon to open the Harmonics polling screen. If your meter does not support Harmonic magnitude measurement, this icon will be grayed out and unselectable.
- Phasor - click this icon to open the Phasor polling screen for the meter you are connected to.
- Flicker - if the meter you are connected to supports Flicker measurement, click this icon to open the Flicker polling screen. If your meter does not support Flicker measurement, this icon will be grayed out and unselectable.
- Log Stats - click this icon to open the Log Statistics screen for the meter you are connected to. See Chapter 16 for additional information about this screen.
- Dev Stats - click this icon to open the Device Status screen. See Chapter 4 for an explanation of this screen.
- Alarms - if the meter you are connected to supports Limits setting, click this icon to open the Limit Status polling screen. If your meter does not support Limits setting, this icon will be grayed out and unselectable.

### 2.2.2: Main Screen's Status Bar

The status bar is located at the bottom of the Main screen. The details of the information shown depends on your meter connection - through a Network or a serial port.

**NOTE:** If you are not connected to a meter, the first field will say Disconnected and the other fields will be blank; and if you have tried to connect to a meter that the software can't locate, the first field will say Not Found and the other fields will be blank.

#### Status Bar for a Network Connection

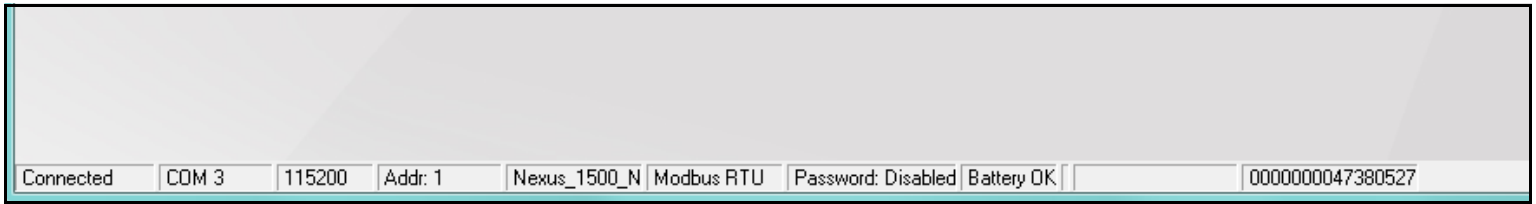


The information shown in the Status Bar, from left to right, is:

- Connection Status
- Type of Connection
- Network Protocol
- Meter's Modbus address and IP address
- Meter's ID
- Communication Protocol
- Security Status: Password and Sealing Switch (if available for the meter) Enabled or Disabled
- Battery Status (if applicable to the meter)\*
- Memo Field- If anything was entered into this field in the Labels or System settings screens, it is displayed here. Refer to your meter's programming chapter for instructions.
- Meter's serial number



### Status Bar for a Serial Port Connection



The information shown in the Status Bar, from left to right, is:

- Connection status: Connected or Disconnected
- Serial Port
- Baud Rate
- Meter's Modbus address
- Meter's ID
- Communication Protocol
- Security Status: Password and Sealing Switch (if available for the meter) Enabled or Disabled
- Battery Status (if applicable to the meter)\*
- Memo Field - For Nexus® meters, if anything was entered into this field in the Labels setting screen, it is displayed here. Refer to your meter's programming chapter for instructions.
- Meter's Serial Number

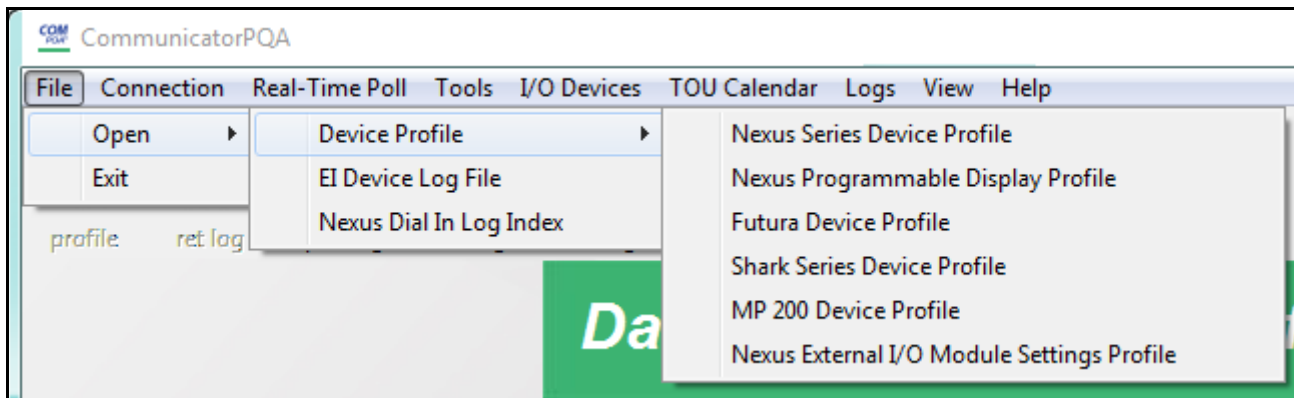
**\*NOTES:**

- For a Nexus® 1262/1272 meter, the Battery Status field displays Low Bat Nexus when the Internal or Modem battery is low, dead or missing.
- For a Nexus® 1500/1500+ meter, the Battery Status field displays Low Batt when the battery backing up the meter's clock is at 1.3 volts (1500)/2.55 volts (1500+). For the 1500+ meter, you can enable the battery status display from the Options screen - see 20.2.4: Miscellaneous, on page 20-68 for instructions.

### 2.2.3: Main Screen's Menu Bar

The Menu Bar, located at the top of the CommunicatorPQA® application's Main screen, has the following options: File, Connection, Real-Time Poll, Tools, I/O Devices, TOU Calendar, Logs, View, and Help. Each of these options open menus and sub-menus when you click on them, giving you access to application features.

- File: If you are not connected to a meter this is the menu you will see; if you are connected to a meter, you will **only** see the Open>EI Device Log File and Exit options. You can click Exit to close the application.



- Click Open>Device Profile and then one of the Profiles to edit the profile of a meter or device that you are not connected to. See Chapter 7 for more information on programming Device Profiles.

- Click Open>EI Device Log File to open the screen shown below if you have the Professional version of the CommunicatorPQA® application. To open a log, click on the meter you want to see the log for and click Select. If you have the Lite version of the software, you will be prompted to select the log database file directly from the Database directory. See Chapter 16 for information on retrieving logs and Chapter 19 for information on viewing logs.

Pick Meter to Open Log

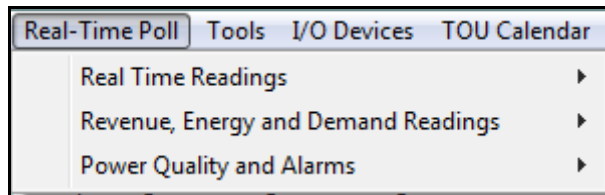
Meter Name	Meter Type	Online Status	Next Action
<input type="checkbox"/> Nexus 1450 Meter			
0168028631	Nexus 1450	Online	8/8/2023
0220696833	Nexus 1450	Online	8/8/2023
<input type="checkbox"/> Nexus 1500+			
Mechanical Load	Nexus 1500+	Online	8/8/2023
<input type="checkbox"/> Shark 200			
0090258428	Shark 200	Online	8/8/2023
1800ShamesDr	Shark 200	Online	8/8/2023
Line_6_Green	Shark 200	Online	8/8/2023
Manufacturing	Shark 200	Online	8/8/2023
<input type="checkbox"/> unassigned			
0000000020375017	Nexus 1252	Online	
0251125521	Shark 270_2	Online	
172.20.167.219	Nexus 1450	Online	
Accounting	Nexus 1500+	Online	
MP200 Unit 6	MP200	Online	

Log Location      location...

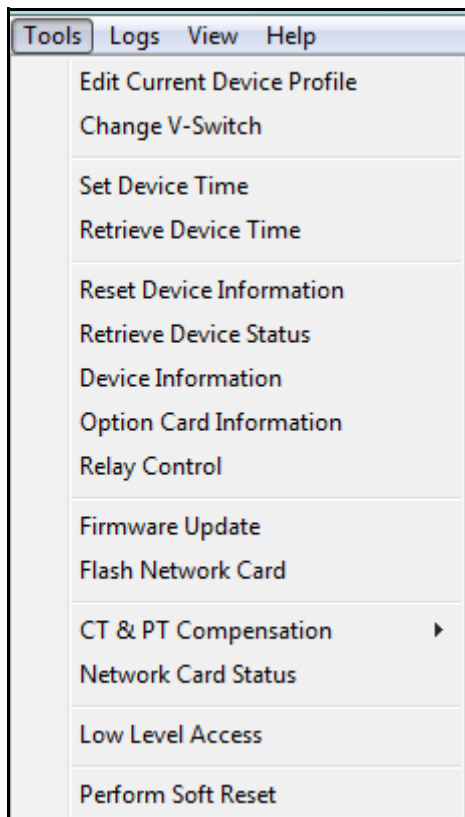
Select Log      Select      Cancel

- Click Open>Nexus Dial-In Log Index to open a window that lets you browse for the log index file. See Chapter 24 for information on this log.

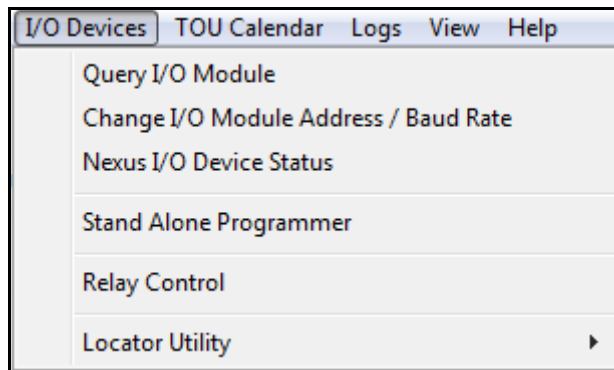
- **Real-Time:** This menu gives you access to all of the polling screens for the connected meter. Depending on the meter you are connected to, you may see some different options than the ones shown in the example below. See Chapter 5 for details on the polling screens.



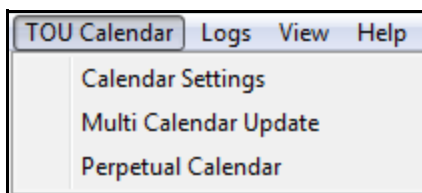
- **Tools:** This menu gives you access to additional actions. Depending on the meter you are connected to, you may see some different options than the ones shown in the example below. See Chapter 20 for details on the Tools options.



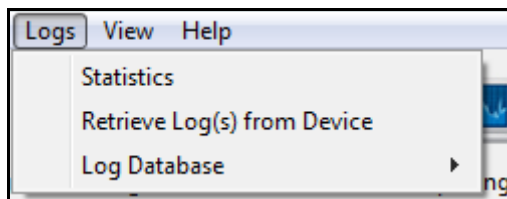
- I/O Devices: You will see this menu if you are connected to a Nexus® meter. It gives you access to programming and control screens for the meter's optional external I/O modules. See Chapter 14 for detailed instructions on programming the external I/O devices.



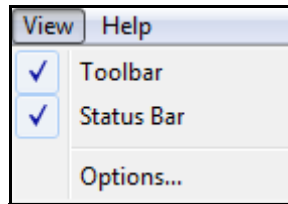
- TOU: You will see this menu if you are connected to a Nexus® meter. It gives you access to the Time of Use (TOU) Calendar settings. See Chapter 15 for instructions on configuring TOU settings.



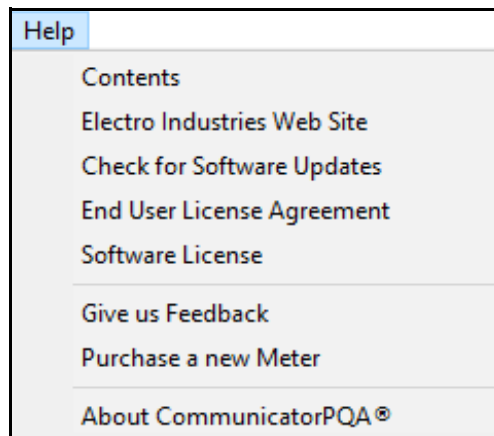
- Logs: This menu gives you access to information about the connected meter's log status, lets you retrieve meter logs, and lets you load a saved log database file for viewing. See Chapter 16 for details on log databases and retrieving logs; and Chapter 19 for details on viewing meter logs.



- View: This menu lets you choose to hide the Tool Bar and/or the Status Bar. It also gives you access to the Options menu, which is explained in Chapter 20.

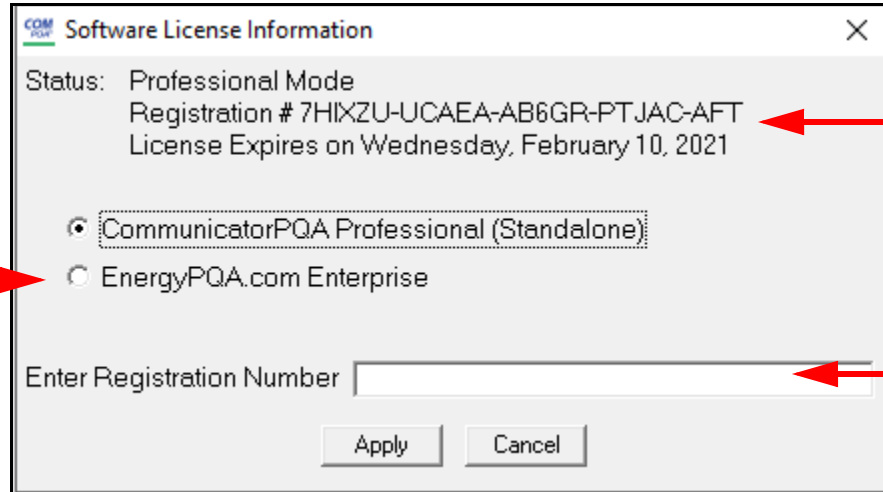


- Help Menu: This menu gives you access to additional information:



- Contents - click to open the *CommunicatorPQA®*, *MeterManagerPQA®*, and *EnergyPQA.com® Software User Manual*.
- Electro Industries Web Site - click to open the EIG website in your Web browser.
- Check for Software Updates - click to run a check for any updates to your software.  
**NOTE:** Whenever you open the Professional (licensed) version of the software application, there is an automatic check for updates to it - see the next page for information on the software license.
- End User License Agreement - click to view the EULA for this application.

- Software License - click to see the screen below. It gives you information about the status of your license for the application. To upgrade to the Professional version from the Lite version of the software, or to renew a license, enter your Registration number and click Apply.



If you already have a license, it is shown with its expiration date


See Chapter 29 for details on the EnergyPQA.com® Enterprise, EIG's Cloud Solution

For a new license, enter your software license key here and click Apply

**NOTE:**

- To purchase a software license, either:
  - Call Sales at EIG - (516) 334-0870
  - Email sales@electroind.com
  - Contact your Regional sales representative
- Give us Feedback - click to open EIG's Customer Satisfaction survey in your browser.
- Purchase a new meter - click to access EIG's Web store.

- About CommunicatorPQA® software - click to view the screen shown below, which lists software version information. You will see the portion on the right when you click View Version Info on the bottom of the screen. That button turns to Hide Version Info once you click on it, now you can click it to close the detailed version information on the right side of the screen.



Setup Version 5.00.0000 Release: 2020/02/03 09:32:35

**COMMUNICATORPQA™**

Version 5.0.0 Release: February 03, 2020 09:18

v5.0.0000:  
-Re Branded software with new logo and images.  
-Added: new CommunicatorPQA logo.

v4.0.0516:  
-Added: Nexus 1450: Firmware Version 3 support.

Version Info OK

File	Version	FileDate	FileSize
CommExt.exe	4.00.0021	2014/08/15 15:02:30	21.97 MB
Logviewer.exe	4.00.0010	2014/08/15 14:52:06	4.87 MB
Logconverter.exe	4.00.0006	2014/08/15 14:48:54	2.45 MB
Nexus Script & Scheduler.exe	4.00.0000	2014/08/05 15:57:42	1.09 MB
HHFCConverter.exe	3.00.0003.00	2014/05/19 16:27:22	63.49 KB
EN50160.exe	1.00.0019	2012/03/20 11:50:38	116.00 KB
LogRetrieval.exe	1.01.0024.15	2014/08/15 12:41:28	2.50 MB
SoftwareUpdateChecker.exe	1.00.0005	2014/08/05 15:07:14	72.50 KB
help_launcher.exe	1.00.0005	2014/04/18 07:52:32	64.50 KB
sharkUtils.dll	1.01.0003.03	2012/09/17 12:29:02	117.00 KB
FlashLib.dll	1.01.0001.00	2012/03/07 16:05:48	87.00 KB
nxmath.dll	1.01.0000	2012/03/20 11:47:06	60.50 KB

As you can see, there are many different applications that make up the CommunicatorPQA® application suite. The Installer package automatically builds all of the software applications and the user generally does not need to know about these software versions. The main version of the software on the splash page (above, left) is the most important reference version.

Click OK to close the About screen.



## 3: Connecting to Your Meter

### 3.1: Overview

There are three methods for connecting to your meters:

- Direct Connect - through serial port, network, IrDA, or USB
- Through Connection Manager - used for modem communication, multiple meters on a bus, and a gateway communication
- Using MeterManagerPQA® software- automatically connects to meters in your network

When connecting through an Ethernet network, using the MeterManagerPQA® application as your primary launchpad is the most convenient way to use the system.

Depending on your meter type and the options it is configured with, you will have one or more ways of connecting to your specific meter. There are two aspects of connecting to a meter:

- The meter's communication port settings
- The connection settings from your PC to the meter

Both of these are set through CommunicatorPQA® software. This chapter concerns the latter connection; see the programming chapter for your meter for the communication port settings:

- Chapter 8 for the Shark® 200/200S meter
- Chapter 9 for the Shark® 50/100/100B/100S meter
- Chapter 10 for the MP200™ metering system
- Chapter 11 for the Nexus® 1500/1500+ meter
- Chapter 12 for the Nexus® 1262/1272 meter
- Chapter 13 for the Nexus® 1252 meter
- Chapter 26 for the Shark® 270 meter.

- Chapter 27 for the Nexus® 1450 meter.
- Chapter 28 for the Shark®250 meter.
- Chapter 30 for the ST40 meter.

The following tables summarize the recommended settings for the EIG meters.

**NOTES:**

- Except where specified, the Device Address field can be 1-247.
- The following tables shows you the settings needed in a PC to enable successful communication with the meter.
- If specific settings are not given in the table, make settings that match your installation requirements.

**Table 1: Shark® Meter Connection Settings**

<b>Connection Type</b>	<b>Shark® 50</b>	<b>Shark® 100/100S</b>	<b>Shark® 100B</b>	<b>Shark® 200/250/200S/270</b>	<b>MP200</b>	<b>ST40</b>
IrDA	NA	Device Address: 1 Port: the PC's USB Port Baud Rate: 57600 Protocol: Modbus ASCII; Flow Control: Hardware. The Shark® T meters do not support IrDA.	Device Address: 1 Port: the PC's USB Port Baud Rate: 57600 Protocol: Modbus ASCII; Flow Control: Hardware. The Shark® T meters do not support IrDA.	Device Address: 1 Port: the PC's USB Port Baud Rate: 57600 Protocol: Modbus ASCII; Flow Control: Hardware. The Shark® T meters and the 270 do not support IrDA (the 270 has an ANSI Optical port).	NA	NA
ANSI Optical Port	NA	NA	NA	Device Address: 1 Port: PC's RS232 or USB Port Baud Rate: Up to 57600 Protocol: Modbus RTU	NA	NA

Connection Type	Shark® 50	Shark® 100/100S	Shark® 100B	Shark® 200/250/200S/270	MP200	ST40
RS485	Baud Rate: 9600; 19200; 38400; 57600 Port: COM 1 - COM 256 (OS dependent) Protocol: Modbus ASCII or RTU Flow Control: None or Hard- ware	Baud Rate: 9600; 19200; 38400; 57600 Port: COM 1 - COM 256 (OS dependent) Protocol: Mod- bus ASCII or RTU Flow Control: None or Hard- ware	NA	Baud Rate: 1200*, 2400*, 4800*, 9600, 19200, 38400, 57600 (for Shark® 200/ 200S/270 meters' RS485 connection, Port: COM 1 - COM 256 (OS dependent) Protocol: Modbus ASCII or RTU Flow Control: None or Hard- ware	Protocol: Modbus ASCII or RTU	Baud Rate: 57600 Protocol: Modbus RTU
Ethernet/WiFi	NA	Default Settings are: Device Address:1 IP Address: 10.0.0.1 Port: 502 Protocol: Modbus TCP	Default Settings are: Device Address:1 IP Address: 10.0.0.1 Port: 502 Protocol: Modbus TCP	Default Settings are: Device Address:1* IP Address: 10.0.0.2 Port: 502 Protocol: Modbus TCP, and for Shark® 200/ 200S/270 meters: DNP3 over Ethernet (for 200/250/270 the device address must be 1)	Default Settings are: Device Address:1 IP Address: 10.0.0.1 Port: 502 Protocol: Modbus TCP	Ethernet/ BACnet Default Settings are: Device Address:1 IP Address: 10.0.0.1 Port: 502 Protocol: Modbus TCP

Connection Type	Shark® 50	Shark® 100/100S	Shark® 100B	Shark® 200/250/200S/270	MP200	ST40
Fiber Optic	NA	NA	NA	Baud Rate: 9600, 19200, 38400, 57600 Port: COM 1 - COM 256 (OS dependent) Protocol: Modbus ASCII or RTU, DNP3 Flow Control: None or Hard- ware Echo Mode: No Echo or Static Echo. Static Echo should only be used when con- necting to Fiber Optic devices that are configured for Echo. Parity: None Shark® 270 meter doesn't offer Fiber Optic communication.	NA	NA
USB	NA	NA	NA	250 meter: Port: the PC's USB port Baud Rate: 57600 Protocol: ASCII Flow Control: None Echo Mode: No Echo Parity: None,	Port: the PC's USB port Baud Rate: 57600 Protocol: ASCII 8 Data Bits, Parity None, 1 Stop Bit, Flow Control None	Port: Front panel micro- USB Baud Rate: 57600 Protocol: ASCII
4GLTE Cell Modem	NA	NA	NA	270 meter: Use cell modem's IP address to make a Network connection.	NA	NA

\* With Runtime Firmware version 26 or higher

**Table 2: Nexus® Meter Connection Settings**

<b>Connection Type</b>	<b>Nexus® 1252/1450</b>	<b>Nexus® 1262/1272</b>	<b>Nexus® 1500/1500+</b>
ANSI Optical Port	NA	Port: the PC's USB Port Baud Rate up to 57600	Port: the PC's USB port Baud Rate up to 57600
RS485	Baud Rate: up to 115200 Protocol: Modbus RTU/ASCII, DNP3	Baud Rate: up to 115200 Protocol: Modbus RTU/ASCII, DNP3	Baud Rate: up to 115200 Protocol: Modbus RTU/ASCII, DNP3
Ethernet/WiFi/ Fiber Optic (Fiber Optic is available only with the Nexus® 1450/1500/1500+meter)	Default Settings are: Device Address:1 IP Address: 10.0.0.1 Port: 502 Protocol: Modbus TCP	Default Settings are: Device Address:1 IP Address: 10.0.0.1 Port: 502 Protocol: Modbus TCP	Default Settings are: Device Address:1 IP Address: 10.0.0.1 (10.0.0.2 for the second Ethernet card) Port: 502 Protocol: Modbus TCP
Internal Modem	1252: Protocol: Modbus ASCII Device Address: 1	Protocol: Modbus ASCII Device Address: 1	NA
USB	N/A	NA	Port: the PC's USB port Baud Rate: up to 115200 Protocol: Modbus RTU

### 3.2: Connecting Directly to Your Meter

You can connect directly to your meter in one of three ways:

- Through a Serial Port (Section 3.2.1)
- Through a Network (Section 3.2.2)
- Through an IrDA Port (refer to your meter's user manual for instructions)

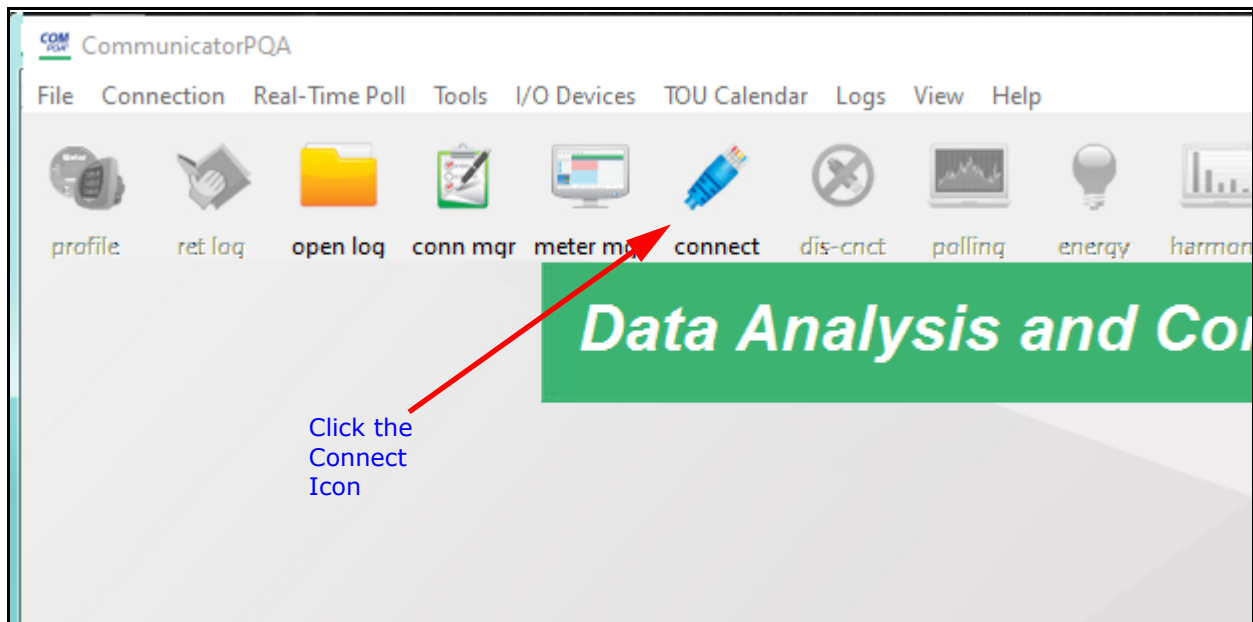
#### 3.2.1: Connect through a Serial Port

When you connect to a meter through a serial port, you make a direct, wired connection between one of your PC's ports and one of the meter's ports. Depending on the meter, you will be using either the PC's USB port or RS232 port to connect to either the USB port or RS485 port of the meter.

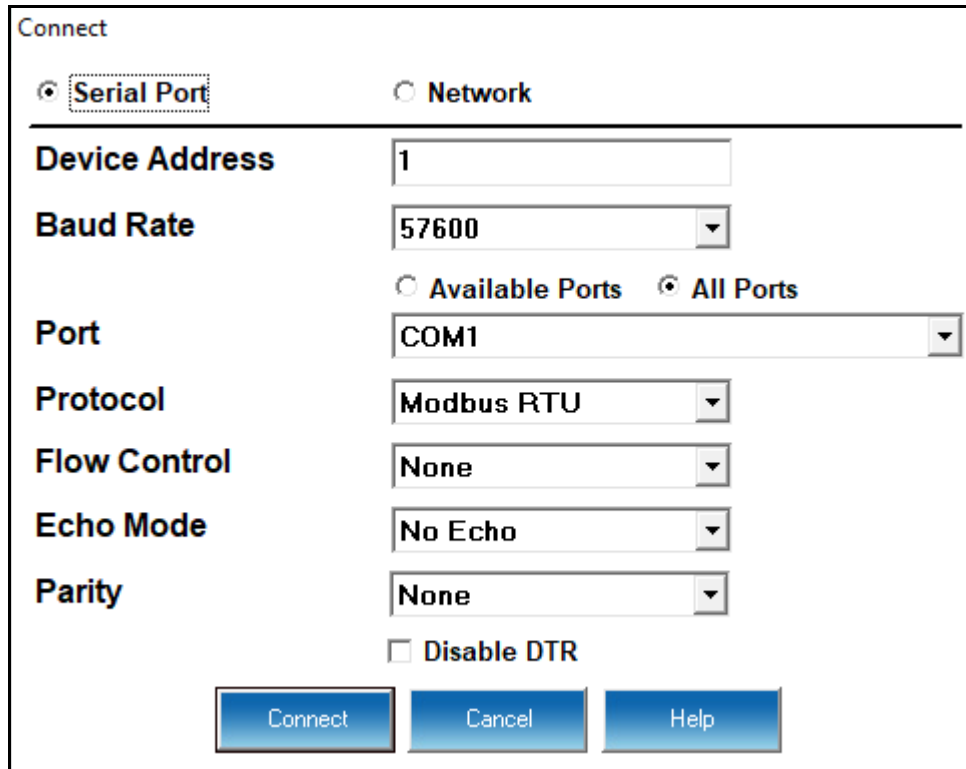
Since many newer PC's don't have RS232 ports, you may need an adapter to convert your USB port to RS485 communication. If you do have an RS232 connection, you will need to use an RS232 to RS485 converter. EIG manufactures an RS485 to RS232 converter, model number Unicom 2500, that can be used for this purpose.

Irrespective of the type of serial connection, the screens you use to connect to the meter with ® software are the same. Refer to your meter's Installation and Operation manual for wiring details for the serial connection you'll be using.

1. From the CommunicatorPQA® application's Mains screen, click on the Connect icon. (You can also click Connection>Quick Connect from the Menu Bar.)



2. The Connect screen opens. You will use this screen to specify your serial connection settings.



The screenshot shows a 'Connect' dialog box with two tabs: 'Serial Port' (selected) and 'Network'. The 'Serial Port' tab contains the following settings:

- Device Address:** 1
- Baud Rate:** 57600
- Port:** COM1 (selected under the 'All Ports' radio button)
- Protocol:** Modbus RTU
- Flow Control:** None
- Echo Mode:** No Echo
- Parity:** None
- Disable DTR:** (unchecked checkbox)

At the bottom are three buttons: 'Connect', 'Cancel', and 'Help'.

3. Note that the Serial Port button is selected. Enter the following information (see the tables in 3.1: Overview, on page 3-1, for specific settings):

- Device Address - the Modbus address of the meter; you can change this address to any number 1-247.
- Baud Rate - the speed that data bits are sent; select from the pull-down menu.
- Click the Available Ports button and select the port to use from the pull-down menu. This button causes the software to search for the port it thinks will be appropriate for your use.
- Protocol - select the protocol you are using from the pull-down menu.
- Flow Control - select None or Hardware.
- Echo Mode - select No Echo or Static Echo. Static Echo should only be used when connecting to Fiber Optic devices that are configured for Echo.



- Parity - indicates whether a data integrity check is included and how it is configured; select from None, Even, or Odd.
  - Disable DTR - check to ignore data terminal ready control signal.
4. Click Connect to connect to the meter with these settings. Once you are connected, the Device Status screen for the meter opens. See Chapter 4 for details on this screen.

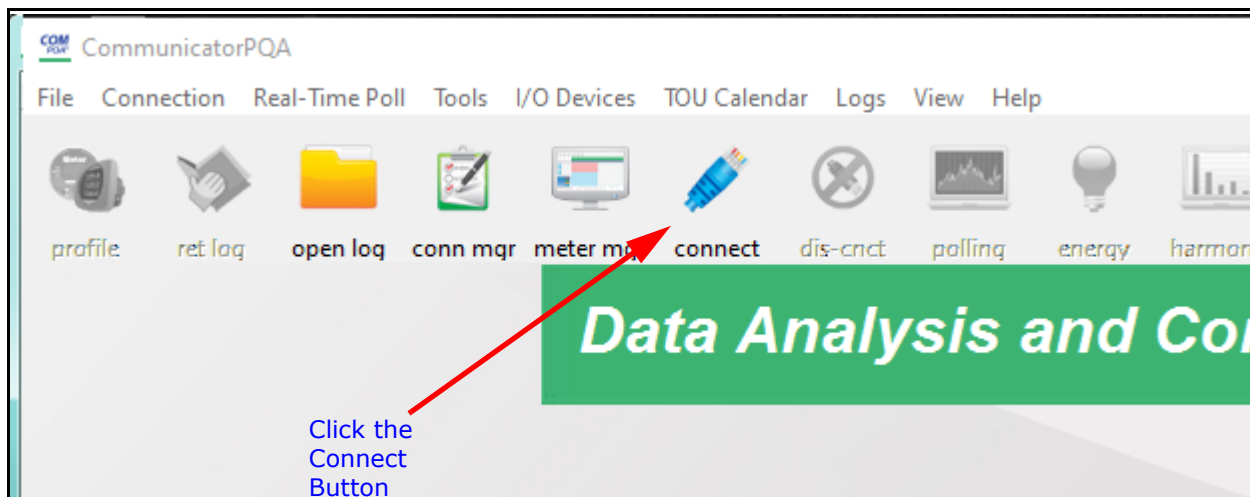
EIG meters default to Modbus protocol and Parity: None. The user can change the baud rate as desired. The default protocol is almost always Modbus RTU, unless communicating using the Shark® meters' IrDA port, or through the modem, in which case the protocol defaults to Modbus ASCII.

### 3.2.2: Connect through a Network

When you connect to a meter through a network you are not wired directly to the meter. Your network can be wireless or wired, depending on the meter you are connecting to.

All of the EIG meters offer either optional or standard 10/100BaseT Ethernet wired (RJ45) Network connections.

1. From the CommunicatorPQA® application's Main screen, click the Connect button. (You can also click Connection>Quick Connect from the Menu Bar.)



2. The Connect screen opens. Click the Network button to change to the Network connection screen. You will use this screen to specify your network connection settings.

The screenshot shows the 'Connect' dialog box with the 'Network' radio button selected. The fields are as follows:

Field	Value
Device Address	1
Host	172.20.166.130
Network Port	502
Protocol	Modbus TCP

At the bottom are three buttons: 'Connect', 'Cancel', and 'Help'.

IPv4 Address

The screenshot shows the 'Connect' dialog box with the 'Network' radio button selected. The fields are as follows:

Field	Value
Device Address	1
Host	[fc00:1::166:64]
Network Port	502
Protocol	Modbus TCP

At the bottom are three buttons: 'Connect', 'Cancel', and 'Help'.

IPv6 Address

3. Enter the following information (see the tables in [3.1: Overview, on page 3-1](#) for specific settings):
- Device Address - the Modbus address of the meter; you can change this address to any number 1-247.
  - Host - enter the meter's IP address, i.e., the address of the Ethernet card or cell modem. The example above on the left is for an IPv4 address; the example on the right is for an IPv6 address (supported by the Nexus® 1450 and Shark® 270 Gen 2 meters).
  - The Network Port's default is 502 - you can change this if necessary.
  - The default protocol is Modbus TCP. You can select Modbus ASCII, Modbus RTU, or EI protocol from the pull-down menu if necessary for your connection.
4. Click Connect to connect to the meter with these settings. Once you are connected, the Device Status screen for the meter appears. See Chapter 4 for details on this screen.
- Connecting to a device through Quick Connect automatically adds the device to the MeterManagerPQA® application. This is a convenient way to connect to gateway devices and Internet devices.

### 3.3: Using the MeterManagerPQA® Application

MeterManagerPQA® software gives you an easy method of connecting to your meters. The software automatically finds the meters on your network and lists them by meter type, so that you can manage them and view their data, easily. You can also add meters with a serial connection to the software's Meter List - see Chapter 18 for details.

1. From the MeterManagerPQA® application Monitor right-click on the meter you want to connect to.

**Meter Manager Monitor**

View Configure Connections Help

Meter List Configure Meter Scripts Configure Group Scripts Script Status Auto Scan Meter Issues Navigate Back Navigate Forward

**METERMANAGERPQA®**

**Meter List**

Meter Name	Meter Type	Online Status	Next Action	Connection
[-] Nexus 1450 Meter				
..... 0168028631	Nexus 1450	Online	8/2/2023	
..... 0220696833	Nexus 1450	Online	8/2/2023	
[-] Nexus 1500+				
..... Mechanical Load	Nexus 1500+	Online	8/2/2023	
[-] unassigned				
..... 0000000020375017	Nexus 1252	Online		
..... 0000000174444226	Nexus 1272	Online		
..... 0000000202609524	Nexus 1500+	Online		
..... 0000000213531419	Nexus 1450	Online		
..... 0000000229118225	Nexus 1500+	Online		
..... 00005821	Nexus 1250	Online		
..... 00774292	Nexus 1250	Online		
..... 0090258428	Shark 200	Online		
..... 0101672118	Shark 100	Online		
..... 0101673725	Shark 100	Online		
..... 0101675424	Shark 100	Online		
..... 0120637625	Shark 100	Online		
..... 0167969341SOMHAI	Shark 270_2	Online		
..... 0194607229	MP200	Online		

**Status Bar (admin)**

Meters Online 224

Meters Offline 0

Meter Warnings 0

Scripts Status 2/20

Script Errors 46

Searching IP 172.20.160.152:502

CommunicatorPQA Professional

Right-click on a meter

2. You will see the submenu shown below. The submenu provides you with a list of the different apps that can be launched, giving you multiple options for viewing the selected meter's data.

**Meter Manager Monitor**

View Configure Connections Help

Meter List Configure Meter Scripts Configure Group Scripts Script Status Auto Scan Meter Issues Navigate Back Navigate Forward

**METERMANAGERPQA®**

### Meter List

Meter Name	Meter Type	Online Status	Next Action	Connection
Nexus 1450 Meter				
0168028631	Nexus 1450	Online	8/7/2023 12:00 PM	mnz/172.20.167.129:502
0220696833	Nexus 1450	Online	8/7/2023 12:00 PM	mnz/172.20.167.222:502
Nexus 1500+				
Mechanical Load	Nexus 1500+	Online	8/7/2023 12:00 PM	mnz/mynexusmeter.com:511
unassigned				
000000020375017	Nexus 1200	Online		mnz/172.20.167.150:502
0000000174444226	Nexus 1200	Online		mnz/172.20.166.107:502
0000000202609524	Nexus 1200	Online		mnz/172.20.165.250:502
0000000213531419	Nexus 1200	Online		mnz/172.20.167.54:502
0000000229118225	Nexus 1200	Online		mnz/172.20.160.150:502
00005821	Nexus 1200	Online		Nexus 1450 Meter 20.167.132:502
00774292	Nexus 1200	Online		Nexus 1500+ 20.167.188:502
0090258428	Shark 20	Online		unassigned 20.167.57:502
0101672118	Shark 10	Online		
0101673725	Shark 10	Online		mnz/172.20.167.249:502
0101675424	Shark 10	Online		mnz/172.20.167.245:502
0120637625	Shark 10	Online		mnz/172.20.167.247:502
0167969341SOMHAI	Shark 27	Online		mnz/172.20.167.139:502
0194607229	MP200	Online		mnz/172.20.166.60:502
0231753425	Shark 27	Online		mnz/172.20.167.117:502
				mnz/172.20.166.61:502

**Status Bar**

Meters Online: 229

Meters Offline: 0

Meter Warnings: 0

Scripts Status: 1/20

3. Click on Connect to Meter. The CommunicatorPQA® application opens and automatically software connects to the meter. You will see the Main screen. If you want to view meter data right away, you can click Real Time Readings from the submenu to open the Real Time polling screen. See Chapter 5 for information on polling.

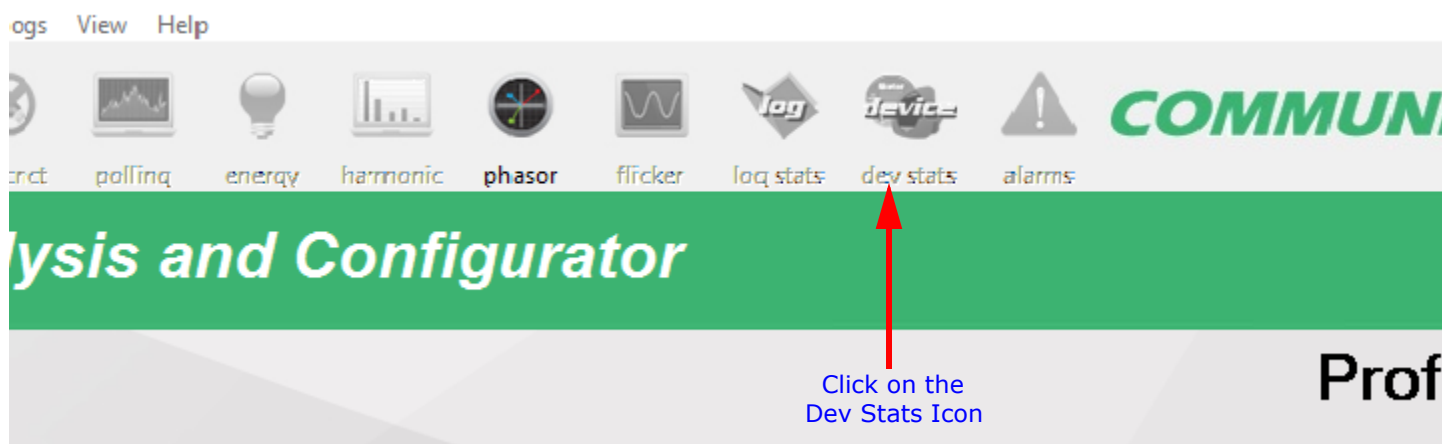
**NOTE:** See Chapter 18 for a complete explanation of the MeterManagerPQA® application.

## 4: Viewing Device Status

### 4.1: Device Status Screen

When you connect to a meter with CommunicatorPQA® software (see Chapter 3 for instructions), the Device Status screen of the meter you are connected to opens. You can also open the meter's Device Status screen by clicking on the Dev Stats icon or clicking Tools>Retrieve Device Status. (See Chapter 20 for more information on the Tools menu options.)

The only exception to this is if you connect to a meter through MeterManagerPQA® software, the Device Status screen does not automatically open.



The Device Status screen displays information about the meter: device ID, device type, device serial number, V-Switch™ key, and firmware version. In addition, some of the meter's Device Status screens display additional information.

All of the Device Status screens have buttons at the bottom of the screen:

- OK - all of the screens have this button; click it to close the screen.
- Copy - some of the screens have this button; click it to copy the information on the screen to the clipboard, from which you can paste it into another application, e.g., a document.
- Help - some of the screens have this button; click it to open information on this screen.

The following sections show all of the meters' Device Status screens, with an explanation of the fields they contain.

### 4.1.1: Shark® 200/200S Meter

Device	Device Type	Serial Number
Shark200T_unit1	Shark200 T	0020114210

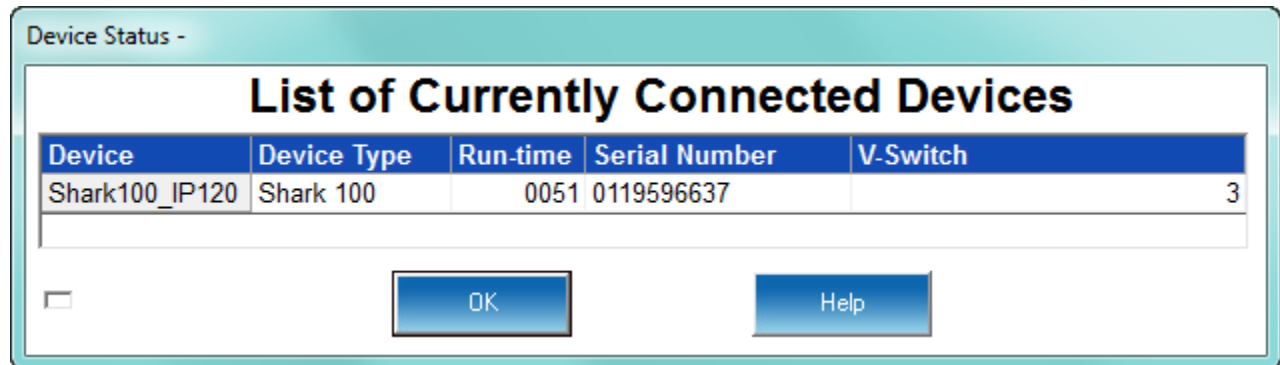
Item	Value
Boot	0002
Run	0029
ASIC	2
State	Run Mode   Logging Enabled
V-Switch	4
On Time	Thursday, July 24, 2022 08:17:59

☐ Polling Shark200T\_unit1      **OK**      **Copy**

The Shark® 200/200S meter's Device Status screen displays:

- Device Name - the name assigned to the meter in the System Settings screen (see Chapter 8)
- Device Type - e.g., Shark200T - a Shark® 200 transducer
- Meter's Serial Number
- Boot - the version of the Boot firmware of the meter
- Run - the version of the Runtime firmware of the meter
- State - information about the meter, e.g., shown above Run Mode, Logging Enabled, means that the meter is running and logging is enabled for the meter
- V-Switch: the number of the V-Switch™ key currently installed in the meter
- On Time: the date and time the meter was last powered on
- ASIC - the Shark® 200 meter has some specialized circuitry to provide its advanced accuracy: this field is the internal chip's hardware version

### 4.1.2: Shark® 50/100/100B/100S Meter



The Shark® 50/100/100B/100S Device Status screen displays:

- Device Name - the name assigned to the meter in the Settings screen (see Chapter 9)
- Device Type - e.g., Shark 100 - a Shark® 100 meter
- Run-time - the version of the Runtime firmware of the meter
- Meter's Serial Number
- V-Switch™ key

### 4.1.3: MP200™ Metering System

Device	Device Type	Serial Number
MP200_2	MP200	0116560423

Item	Value
Boot	000D
Run	0001
State	Run Mode   Logging Enabled   Battery Ok
V-Switch	3
On Time	Wednesday, August 27, 2014 09:38:06

■ Polling MP200\_2
 OK
Copy

The MP200™ metering system's Device Status screen displays:

- Device Name - the name assigned to the CPU in the System Settings screen (see Chapter 10)
- Device Type - i.e., MP200
- Meter's Serial Number
- Boot - the version of the Boot firmware of the meter
- Run - the version of the Runtime firmware of the meter
- State - information about the meter, e.g., shown above Run Mode, Logging Enabled, Battery OK means that the meter is running, logging is enabled for the meter, and the meter battery has sufficient operating power
- V-Switch - the number of the V-Switch™ key currently installed in the meter
- On Time - the date and time the meter was last powered on



#### 4.1.4: Nexus® 1500/1500+ Meter

**NOTE:** Since the Nexus® 1500/1500+ meter's Device Status screen shows so many fields, 3 screen captures are shown to include them all.

Device Status

Device	Device Type	Serial Number	Item	Value
128Mb_IP203	Nexus 1500	0000000113599230	Comm Boot	4.6004
			Comm Run	4.6017
			DSP2 Run	B.0000
			FPGA	10.10
			DSP2 Run ID	9161
			DSP2 Run Type	DR
			V-Switch	3
			Comm State	IEC-61850 Server On, IEC 61850 Goose
			DSP2 State	Healthy
			Protection	Full Access - Password Protection Disabled and Sealing Switch Disabled
			On Time	Thursday, July 24, 2014 08:27:09.95

☐ Polling 128Mb\_IP203

OK Copy


Device Status

Device	Device Type	Serial Number	Item	Value
128Mb_IP203	Nexus 1500	0000000113599230	CF Serial #	AF CF 26D48A51
			CF FAT Type	FAT32
			CF Model #	ATP COMPACT FLASH
			Comm Boot Variation Strings	0005 192k Run 0006 SCL ENERGY 0007 xRAM 0008 -DSP1 0009 Cache/UPM
			Comm Run Variation Strings	0005 192k Run 0006 SCL ENERGY 0007 128M 0008 -DSP1 0009 Cache/UPM 0010 Class A 00 0011 IEC61850SV
			DSP2 Run	9161DT000B.0043 Multi-phasefreq

☒ Polling 128Mb\_IP203

OK Copy

Device	Device Type	Serial Number	Item	Value
246191932	Nexus 1500+	0000000246191932	Comm Run Variation Strings	0005 192k Run 0006 SCL ENERGY 0007 128M 0008 -DSP1 0009 Cache/UPM 0010 Class A 00 0011 IEC61850SV
			DSP Run Variation Strings	9161RE0018.0000 Multi-phasefreq Harmonics/inter @16:50/06/11/19
			Current Class	20
			Flags	Bit 0: 1 SNTP: No Fall Date: No Spring Date: No Cold Load: No Line Sync: No DST: No IRIG Active: No Bit 8: 0 IRIG Year Available: No Time Change: No Test Mode: Out Profile Change: No Internal Failure: No User Current Threshold: No
			Security Features	Max Password Length: 10

 Polling 0000000246191932
 OK Copy

The Nexus® 1500/1500+ meter's Device Status screen displays:

- Device Name - the name assigned to the meter in the Labels screen (see Chapter 11)
- Device Type - i.e., Nexus 1500+
- Meter's Serial Number
- Comm Boot - the version of the Boot firmware of the meter's Communication processor
- Comm Run - the version of the Runtime firmware of the meter's Communication processor
- DSP1 Boot - the version of the Boot firmware of the meter's first digital signal processor - Nexus® 1500 meter only

- DSP1 Run/DSP2 Run - the version of the Runtime firmware of the meter's first and second digital signal processor - Nexus® 1500 meter only
- DSP Run - the version of the Runtime firmware of the meter's digital signal processor - Nexus® 1500+ meter only
- FPGA - the version of the FPGA firmware of the meter: FPGA is field programmable gate array, which is used in the Nexus® 1500/1500+ meter for the very high-speed sampling
- DSP2 Run ID - the version of the DSP2 Run ID firmware - Nexus® 1500 meter only
- DSP Run ID - the version of the DSP Run ID firmware - Nexus® 1500+ meter only
- DSP2 Run Type - the version of the DSP2 Run Type firmware - Nexus® 1500 meter only
- DSP Run Type - the version of the DSP Run Type firmware - Nexus® 1500+ meter only
- V-Switch - the number of the V-Switch™ key currently installed in the meter
- Comm State - the state of the meter's Communication Processor, e.g., Healthy or IEC 61850 Goose (Nexus® 1500+ meter only)
- DSP1 State/DSP 2 State - the state of the meter's first and second digital signal processor, e.g., Healthy - Nexus® 1500 meter only
- DSP State - the state of the meter's DSP - Nexus® 1500+ meter only
- Protection - information about the meter's password protection - e.g., partial access via Administrator password
- On Time - the date and time the meter was last powered on
- CF Serial # - the manufacturer's serial number for the compact flash
- CF FAT Type - the file system type used on the compact flash for storage of log files
- CF Model # - the manufacturer's model number for the compact flash
- Comm Boot Variation Strings - field used to indicate the configuration and functionality supported by the Boot firmware (for developer use)
- Comm Run Variation Strings- field used to indicate the configuration and functionality supported by the Run firmware (for developer use)
- DSP1 Boot Variation Strings - the minimum hardware version needed to support the firmware (for developer use) - Nexus® 1500 meter only

- DSP1 Run Variation Strings - the minimum hardware version needed to support the firmware (for developer use) - Nexus® 1500 meter only
- DSP2 Run Variation strings - field used to indicate hardware and firmware configuration (for developer use)
- DSP Run Variation Strings - the minimum hardware version needed to support the firmware (for developer use) - Nexus® 1500+ meter only
- Current Class - the Current Class supported by this meter
- Flags - state of various meter settings, e.g., IRIG-B.
- Security Features: additional information concerning the meter's security settings - Nexus® 1500+ meter only

#### 4.1.5: Nexus® 1252/1262/1272 Meter

##### NOTES:

- The Nexus® 1252/1262/1272 Device Status screens show the same fields.
- Since the Device Status screen is very long, two screen captures are shown for it.

**Device Status -**

**List of Currently Connected Devices**

Device	Device Type	Boot	Run-time	DSP Boot	DSP Run-time	Comm State	DSP State	On Time	Serial #
1272_Unit1	Nexus 1272	602	626	600	644	Healthy	Healthy	7/24/2014 08:26:55.55	0000000090000007

**Currently Connected Devices**

NVRAM	Protection	Xilinx DSP	Xilinx COM
000007 2 MB	Full Protection - Password Protection Enabled and Sealing Switch Disabled	6	2

The Nexus® 1252/1262/1272 meter's Device Status screen displays:

- Device Name - the name assigned to the meter in the Labels screen (see chapters 12 and 13)
- Device Type - e.g., Nexus 1272

- Boot - the version of the Boot firmware of the Communication Processor of the meter
- Runtime - the version of the Runtime firmware of the Communication Processor of the meter
- DSP Boot - the version of the Boot firmware the of meter's digital signal processor
- DSP Runtime - the version of the Runtime firmware of the meter's digital signal processor
- Comm State - the state of the meter's Communication Processor, e.g., Healthy
- DSP State - the state of the meter's digital signal processor, e.g., Healthy
- On Time - the date and time the meter was last powered on
- Meter's Serial Number
- NVRAM - the amount of non-volatile RAM memory in the meter
- Protection - information about the meter's password protection and sealing switch  
- whether they are enabled or disabled
- Xilinx DSP - the build version of the gate array for the digital signal processor
- Xilinx COM - the build version of the gate array for the communication processor

### 4.1.6: Shark® 250/270 Meter

Device Status

Device	Device Type	Serial Number
ETP 110 - TC 7x	Shark 250	0209443931

Item	Value
Boot Firmware Ver.	00AB
Run Firmware Ver.	dA02
ASIC Revision	3
State	Run Mode   Logging Enabled     CT/PT Compensation in use
V-Switch	4
Power On Time	Monday, September 5, 2022 10:32:18
Assembly Date	5/9/2018 10:42:32
Temperature	45.25 °C   113.45 °F
Option Card 1	Network Card HW: m   BFW: 3.10   RFW: EB 4
Option Card 2	Not Installed
Protection	Security: Passwords Disabled
Modbus Map Version	4

■ Polling ETP 110 - TC 7x
OK
Copy

The Shark® 250/270 meter's Device Status screen displays:

- Boot Firmware Version.
- Run Firmware Version.
- ASIC Revision: the meter has some specialized circuitry to provide its advanced accuracy - this field is the internal chip's hardware version.
- State: information about the meter, e.g., shown in the example screen, Run Mode, Logging Enabled, means that the meter is running and logging is enabled for the meter.
- V-Switch: the current V-Switch™ key level.
- Power On Time: the date and time the meter was last powered on.
- Assembly Date: the date and time of meter manufacture.
- Temperature: temperature of the meter, in Celsius.
- Option Card 1/Option Card 2: information about any option cards in the meter.
- Protection: the Security status of the meter; e.g., Security: Passwords Enabled.
- Modbus Map Version: the meter's Modbus map version number.

### 4.1.7: Nexus® 1450 Meter

Device Status				
Device	Device Type	Serial Number	Item	Value
172.20.167.47	Nexus 1450	0177961637	Comm Run	0005.0001
			Web Run	0005.0001
			DSP Run	0001.0019
			V-Switch	2
			Comm State	Healthy, IEC 61850 GOOSE Running, IEC 61850 GOOSE Enabled, IEC 61850 Server Enabled
			DSP State	Healthy
			Protection	Full Access - Password Protection Disabled and Sealing Switch Disabled
			On Time	Friday, October 14, 2022 14:36:21.00
			CF Serial #	99007140429130200303
			Current Class	20
			FPGA Serial #	0044304524203C05
			Internal Temperature	43.0 C
Polling 172.20.167.47			OK	Copy

The Nexus® 1450 meter's Device Status screen displays:

- Comm Run firmware version.
- Web Run firmware version.
- DSP Run Firmware version.
- Comm State - the state of the meter's Communication Processor, e.g., Healthy, IEC 61850 Goose Running.
- DSP State - the state of the meter's digital signal processor, e.g., Healthy.
- Protection: the 1450 meter's screen shows the status of Security for the meter; e.g., Security: Passwords Enabled.
- On Time - the date and time the meter was last powered on.

- CF Serial # - the manufacturer's serial number for the compact flash.
- Current Class - the Current Class supported by this meter.
- FPGA Serial # - the Serial number of the FPGA chip in the meter
- Internal Temperature - temperature of the meter, in Celsius.

#### 4.1.8: ST40 Meter

Device Status

Device	Device Type	Serial Number
ST40SW001	ST40	ST40SW001

Item	Value
Boot	0002
Run	00AA
ASIC	3
State	Run Mode   Logging Enabled
V-Switch	6
On Time	Wednesday, May 11, 2022 13:28:52

■

Polling ST40SW001

OK

Copy

**NOTE:** If your ST40 meter is the mV option, the Device Type will say ST40 mV.

The ST40/ST40 mV meter's Device Status displays:

- Boot firmware version.
- Runtime firmware version.
- ASIC - the ST40/ST40 mV meter has some specialized circuitry to provide its advanced accuracy: this field is the internal chip's hardware version
- State - information about the meter, e.g., shown in the example screen, Run Mode, Logging Enabled, means that the meter is running and logging is enabled for the meter.
- V-Switch - the current V-Switch™ key level.
- On Time - the date and time the meter was last powered on.



## 5: Polling Your Meter

### 5.1: Overview

The EIG meters offer Real Time polling, which lets you view instantaneous and stored values within one or several EIG meters. CommunicatorPQA® software provides tabular views of metered values, circuit measurements, interval data, power quality values, pulse data and Input/Output status and accumulations. The Real-Time Polling features are divided into three groups, accessed by clicking the Real-Time Poll menu: Real Time Readings; Revenue, Energy and Demand Readings; and Power Quality and Alarms. In addition, the Nexus® 1500/1500+ meter has a feature to view RTU data from connected slave devices. Some Shark® meters also have a feature that allows for real time trends polling.

- Some polling screens are different for the different meter types. Where there are differences, they are explained.
- Depending on your meter type and ordered options, you may not have all of the polling screens shown in this chapter.
- CommunicatorPQA® software receives data from one connected device at a time—the Primary Device. To view polling data from multiple devices, either select Poll Multiple Devices (Section 5.2.4) or change the Primary Device (select Connection>Change Primary Device; see Section 3.6 for instructions).
- Some of the polling screens are directly available by clicking on an icon in the Icon Bar. This is explained in the relevant sections.

#### 5.1.1: Polling Screen Buttons

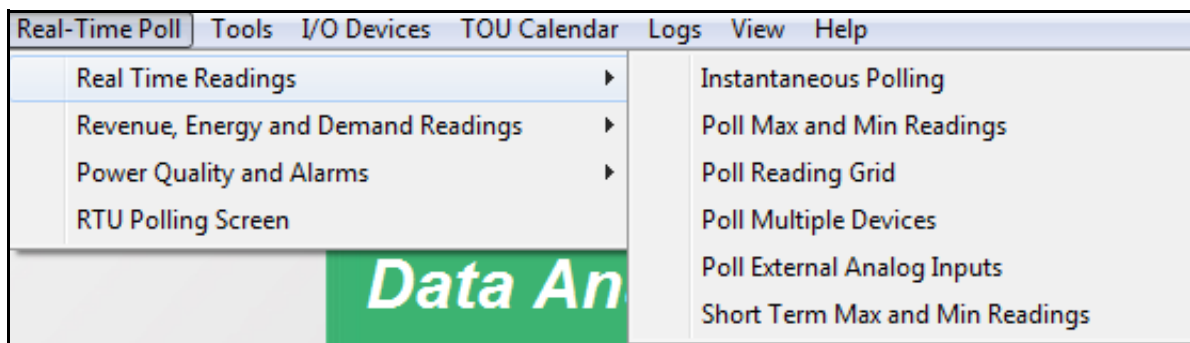
All of the polling screens have buttons at the bottom of the screen that let you perform certain tasks. The buttons and their actions are as follows:

- Print - click to send a copy of the screen to a printer.
- Pause - click to stop polling.
- Resume - click to restart polling which has been stopped.

- Copy - click to copy the data to the clipboard from where it can be brought into another application, e.g., a spreadsheet or an email.
- Export - click to export the data to a file - you will be prompted to set the file name and location.
- Help - click to view instructions for the screen.
- OK - click to return to the Main screen.

**NOTE:** A polling screen will have some combination of the above buttons.

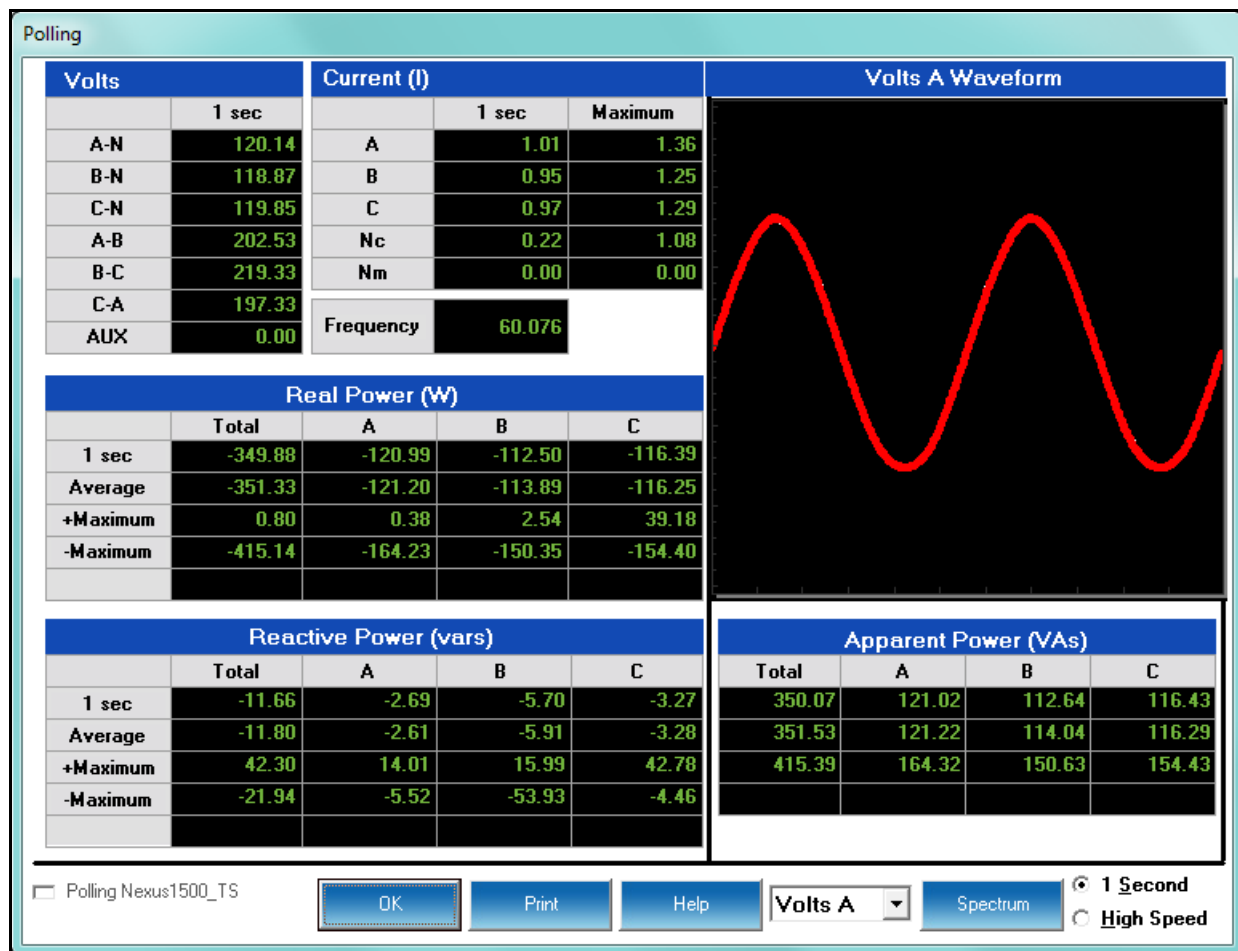
## 5.2: Real Time Readings



The menu above is for a Nexus® 1500/1500+ meter - the menu for your meter may look a bit different.

### 5.2.1: Instantaneous Polling

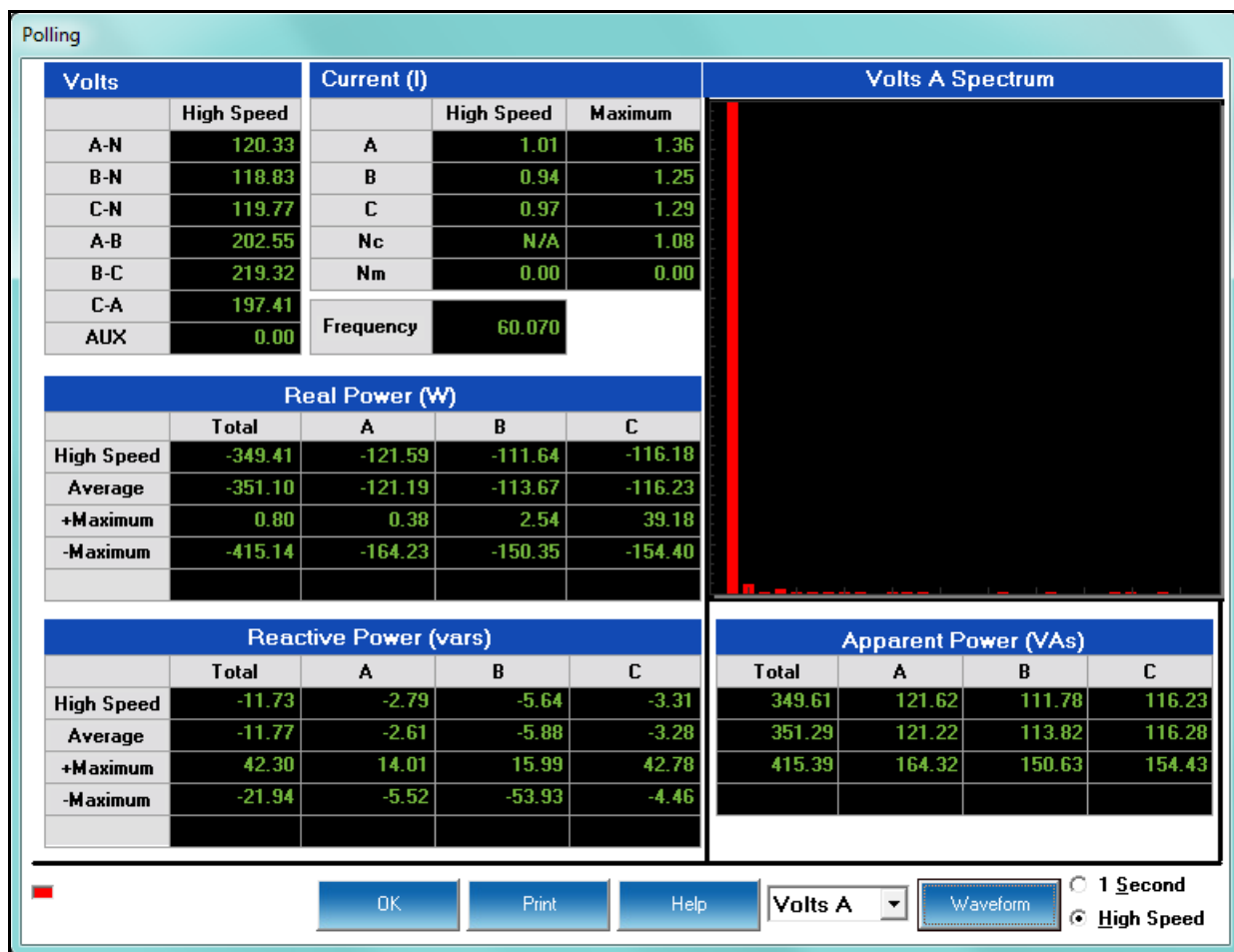
To view instantaneous polling data for the primary device, either select Instantaneous Polling from the Real-Time Poll>Real Time Readings menu, or click the Polling button in the Icon Bar.



If you are connected to a Nexus® device, you will see the screen shown above. If you are connected to a Shark® 200 device, you will see a similar screen, but it will not display the "AUX" or "Nm" readings; and it will display a "-Average" reading for Reactive Power.

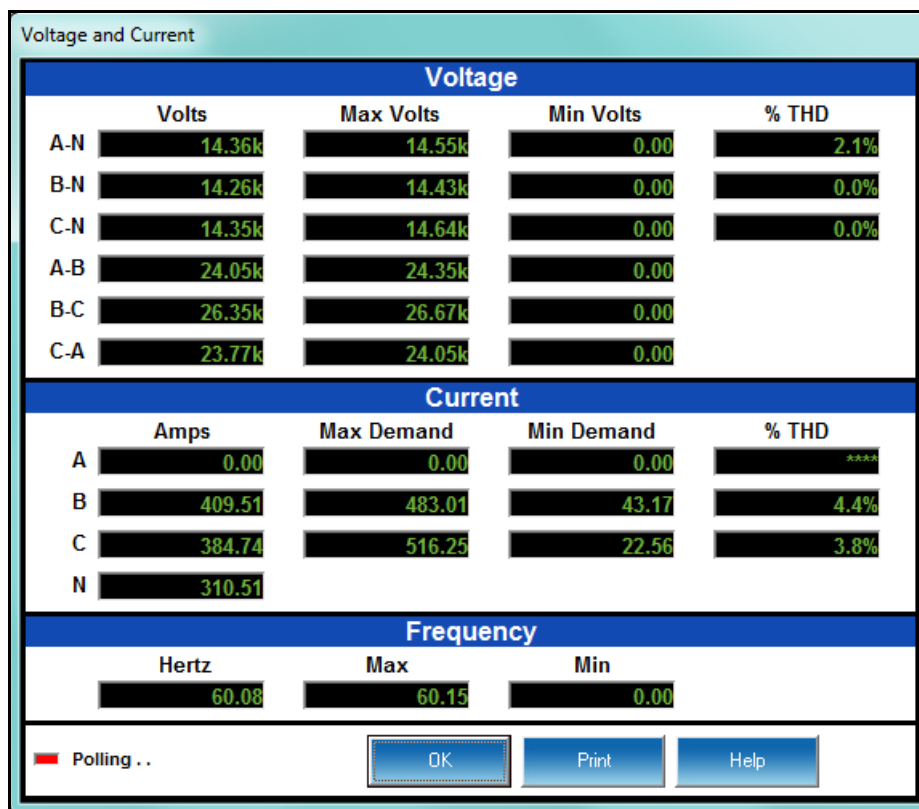
- The graphic representation on the right side of the screen is determined by the option selected from the pull-down menu at the bottom of the screen (Volts A, B,

C; Current A, B, C). Select either spectrum or waveform view by clicking on the Spectrum/Waveform button. An example of the spectrum display is shown below.



- Click the radio button in the lower right corner to select either 1 Second or High Speed measurements for all data. You will not see this option if you are connected to a Shark® 200 meter. This is because the Shark® meter does not contain the high-speed readings as extensively as found in the Nexus® meter.

If you are connected to a Shark® 100 meter, you will see the screen shown below.



It shows:

- Voltage per phase and phase to phase
- Maximum and minimum voltage readings
- THD for voltage
- Amps per phase
- Maximum and minimum Demand
- THD for current
- Frequency, including maximum and minimum frequency

If you are connected to the MP200™ metering system, you will see one of the following screens.

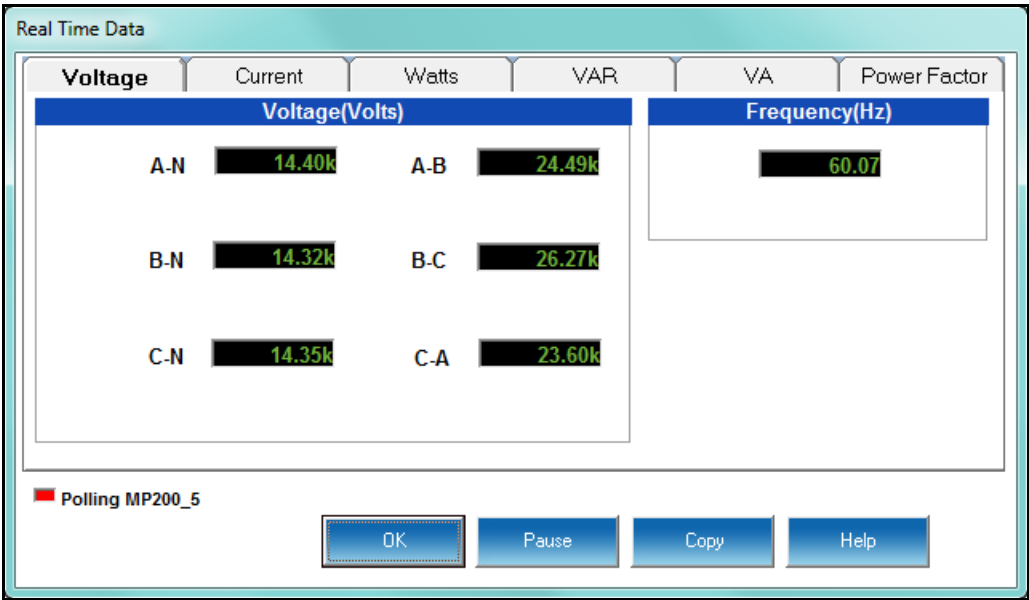
Real Time Data

Voltage		Frequency(Hz)			
14.44k		60.07			
Meter Designation	Current	Watts	VA	VAR	Power Factor
Meter 1	402.63	5824.48k	5826.59k	98.17k	1.00
Meter 2	376.48	5378.08k	5381.95k	257.98k	1.00
Meter 3	389.49	5594.81k	5596.21k	35.37k	1.00
Meter 4	402.63	5825.50k	5825.84k	97.88k	1.00
Meter 5	376.51	5377.16k	5381.37k	253.65k	1.00
Meter 6	389.47	5595.33k	5595.84k	34.78k	1.00
Meter 7	402.63	5824.22k	5824.33k	99.99k	1.00
Meter 8	376.50	5377.69k	5381.86k	261.61k	1.00
Meter 9	389.48	5594.39k	5596.36k	36.15k	1.00
Meter 10	402.62	5825.12k	5825.12k	99.08k	1.00
Meter 11	376.49	5381.65k	5386.44k	255.94k	1.00
Meter 12	389.49	5595.58k	5595.58k	36.71k	1.00
Meter 13	402.65	5824.67k	5824.67k	99.01k	1.00
Meter 14	376.50	5381.74k	5385.43k	259.16k	1.00
Meter 15	389.49	5595.07k	5595.07k	36.30k	1.00
Meter 16	402.63	5824.16k	5825.31k	99.77k	1.00
Meter 17	376.49	5381.37k	5385.56k	260.06k	1.00
Meter 18	389.47	5594.45k	5595.81k	36.35k	1.00
Meter 19	402.63	5823.73k	5824.61k	98.81k	1.00
Meter 20	376.49	5381.37k	5386.51k	257.11k	1.00
Meter 21	389.48	5595.09k	5595.46k	37.74k	1.00
Meter 22	402.63	5822.31k	5824.44k	101.00k	1.00
Meter 23	376.51	5384.41k	5388.35k	259.36k	1.00
Meter 24	389.48	5594.51k	5595.44k	37.63k	1.00

■ Polling MP200\_4

OK Pause Copy Help

You will see the screen shown above if you have the MP200-S single phase configuration; it shows Voltage, Frequency, Current, Watts, VAR, VA, and Power Factor real time readings for all 24 meters.

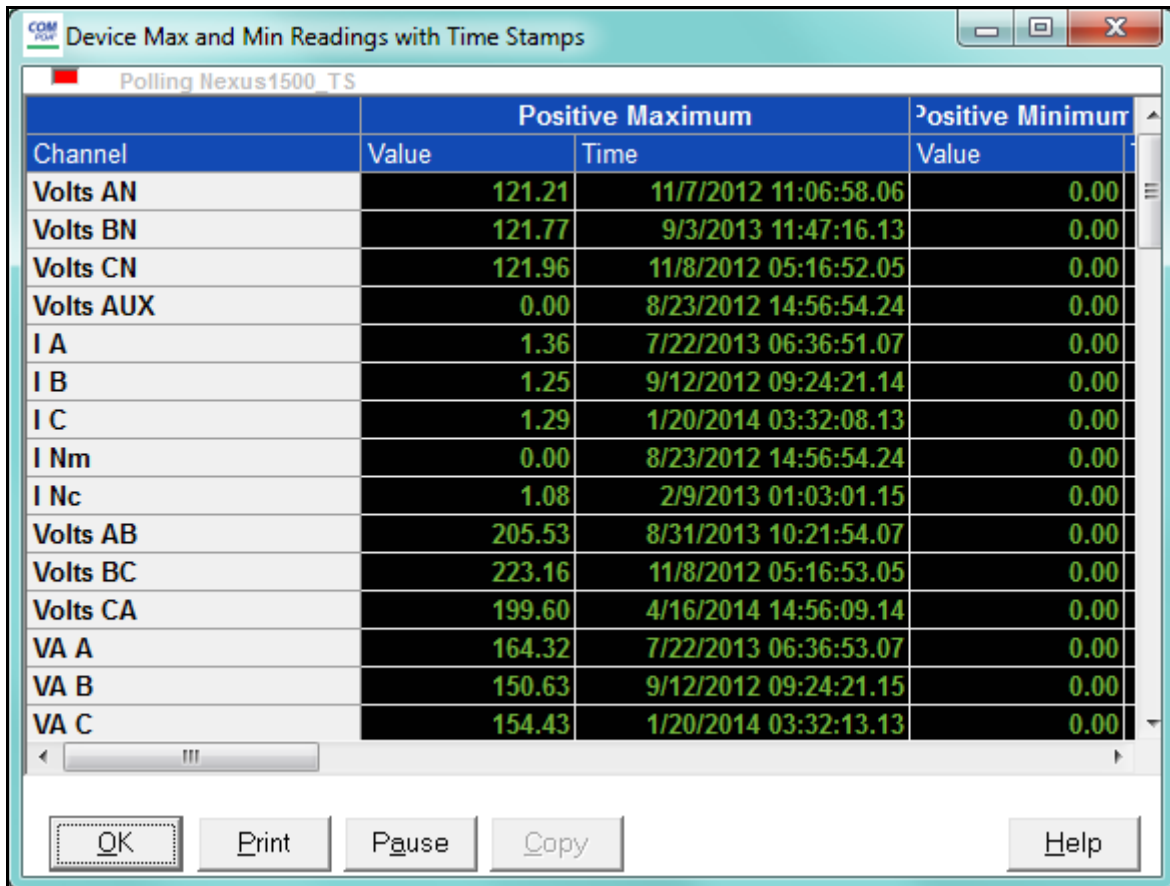


You will see the screen shown above if you have the MP200-Y three phase configuration. The tabs let you see Voltage, Current, Watts, VAR, VA, and Power Factor real time readings.

### 5.2.2: Poll Max and Min Readings

To view the maximum and minimum readings for the currently connected device, select Poll Max and Min Readings from the Real-Time Poll>Real Time Readings menu.

**NOTE:** The Max/Min is the Max/Min of the Thermal Average in the profile.



The screenshot shows a software window titled "Device Max and Min Readings with Time Stamps" with a sub-header "Polling Nexus1500\_TS". It contains a table with four columns: "Channel", "Value", "Time", and "Positive Minimum". The table lists various channels and their corresponding maximum and minimum values along with the time of the reading. At the bottom of the window are buttons for "OK", "Print", "Pause", "Copy", and "Help".

Channel	Positive Maximum		Positive Minimum
	Value	Time	Value
Volts AN	121.21	11/7/2012 11:06:58.06	0.00
Volts BN	121.77	9/3/2013 11:47:16.13	0.00
Volts CN	121.96	11/8/2012 05:16:52.05	0.00
Volts AUX	0.00	8/23/2012 14:56:54.24	0.00
I A	1.36	7/22/2013 06:36:51.07	0.00
I B	1.25	9/12/2012 09:24:21.14	0.00
I C	1.29	1/20/2014 03:32:08.13	0.00
I Nm	0.00	8/23/2012 14:56:54.24	0.00
I Nc	1.08	2/9/2013 01:03:01.15	0.00
Volts AB	205.53	8/31/2013 10:21:54.07	0.00
Volts BC	223.16	11/8/2012 05:16:53.05	0.00
Volts CA	199.60	4/16/2014 14:56:09.14	0.00
VA A	164.32	7/22/2013 06:36:53.07	0.00
VA B	150.63	9/12/2012 09:24:21.15	0.00
VA C	154.43	1/20/2014 03:32:13.13	0.00

You will see the screen shown above if you are connected to a Nexus® meter.

#### NOTES:

- Use the scroll bars to access all data.
- To adjust the column width, position the cursor on a line between columns at the top of the screen. When the cursor changes to a left/right arrow, hold down the left mouse button and drag the column border left or right. Release the button when the column is at the desired width.
- You need to pause polling (click the Pause button) before you can copy the data in this screen.



Maximum and Minimum Readings

Parameters	Maximum		Minimum	
	Value	Time	Value	Time
Voltage	14.57k	4/16/2014 14:57:12	0.00	1/24/2014 14:50:27
Frequency	60.08	1/24/2014 15:24:24	0.00	1/24/2014 14:50:27

☐ Polling

Current	+ Watts	- Watts	VA	+ VAR	- VAR	+ PF	- PF
Meter	Maximum Value	Maximum Time	Minimum Value	Minimum Time			
Meter 1	466.83	4/16/2014 15:15:00	6.14	1/24/2014 15:30:00			
Meter 2	483.00	4/16/2014 15:00:00	3.79	1/24/2014 15:30:00			
Meter 3	515.59	1/23/2014 07:15:00	1.96	1/24/2014 15:30:00			
Meter 4	466.84	4/16/2014 15:15:00	6.14	1/24/2014 15:30:00			
Meter 5	483.02	4/16/2014 15:00:00	3.79	1/24/2014 15:30:00			
Meter 6	515.59	1/23/2014 07:15:00	1.96	1/24/2014 15:30:00			
Meter 7	466.81	4/16/2014 15:15:00	6.14	1/24/2014 15:30:00			
Meter 8	483.01	4/16/2014 15:00:00	3.79	1/24/2014 15:30:00			
Meter 9	515.60	1/23/2014 07:15:00	1.96	1/24/2014 15:30:00			
Meter 10	466.81	4/16/2014 15:15:00	6.14	1/24/2014 15:30:00			
Meter 11	483.00	4/16/2014 15:00:00	3.78	1/24/2014 15:30:00			
Meter 12	515.62	1/23/2014 07:15:00	1.96	1/24/2014 15:30:00			
Meter 13	466.86	4/16/2014 15:15:00	6.14	1/24/2014 15:30:00			
Meter 14	483.04	4/16/2014 15:00:00	3.79	1/24/2014 15:30:00			
Meter 15	515.63	1/23/2014 07:15:00	1.96	1/24/2014 15:30:00			
Meter 16	466.81	4/16/2014 15:15:00	6.14	1/24/2014 15:30:00			
Meter 17	483.00	4/16/2014 15:00:00	3.78	1/24/2014 15:30:00			
Meter 18	515.57	1/23/2014 07:15:00	1.96	1/24/2014 15:30:00			
Meter 19	466.83	4/16/2014 15:15:00	6.14	1/24/2014 15:30:00			
Meter 20	483.02	4/16/2014 15:00:00	3.78	1/24/2014 15:30:00			
Meter 21	515.60	1/23/2014 07:15:00	1.96	1/24/2014 15:30:00			
Meter 22	466.87	4/16/2014 15:15:00	6.14	1/24/2014 15:30:00			
Meter 23	483.05	4/16/2014 15:00:00	3.79	1/24/2014 15:30:00			
Meter 24	515.66	1/23/2014 07:15:00	1.97	1/24/2014 15:30:00			

You will see the screen above if you are connected to an MP200-S metering system. Maximum and minimum value and the time it occurred are shown for each of the readings. Click on the tabs to see readings for all of the 24 meters.

Maximum and Minimum Readings

meter 5		meter 6		meter 7		meter 8	
meter 1		meter 2		meter 3		meter 4	
Reading Name	Maximum		Minimum				
	Value	Time	Value	Time			
Volts A-N	14.57k	4/16/2014 14:40:37	0.00	1/24/2014 14:50:27			
Volts B-N	14.45k	4/16/2014 14:45:34	0.00	1/24/2014 14:50:27			
Volts C-N	14.67k	1/24/2014 15:38:41	0.00	1/24/2014 14:50:27			
Volts A-B	25.06k	4/16/2014 14:42:13	0.00	1/24/2014 14:50:27			
Volts B-C	26.60k	4/16/2014 14:27:36	0.00	1/24/2014 14:50:27			
Volts C-A	23.85k	4/16/2014 14:37:17	0.00	1/24/2014 14:50:27			
Frequency	60.08	8/29/2014 04:32:06	0.00	1/24/2014 14:50:27			
I A	466.91	4/16/2014 15:15:00	6.14	1/24/2014 15:30:00			
I B	483.09	4/16/2014 15:00:00	3.80	1/24/2014 15:30:00			
I C	515.73	1/23/2014 07:15:00	1.99	1/24/2014 15:30:00			
+Watts Total	19.87M	4/16/2014 15:15:00	137.44k	1/24/2014 15:30:00			
+VAR Total	471.86k	4/16/2014 15:30:00	4119.60	1/24/2014 15:30:00			
-Watts Total	-5.71	1/24/2014 15:30:00	0.00	1/14/2014 14:57:33			
-VAR Total	-5084.13	1/14/2014 22:45:00	0.00	1/14/2014 14:57:33			
VA Total	19.88M	4/16/2014 15:15:00	139.83k	1/24/2014 15:30:00			
+Power Factor Total	0.97	1/24/2014 15:45:00	1.00	6/8/2014 22:45:00			
-Power Factor Total	0.00	1/14/2014 14:57:33	0.00	1/24/2014 15:30:00			
I N	591.70	7/7/2014 17:30:00	7.58	1/24/2014 15:30:00			
+Watts A	6782.29k	4/16/2014 15:15:00	0.00	1/24/2014 15:15:00			
+Watts B	6960.36k	4/16/2014 15:00:00	52.42k	1/24/2014 15:30:00			
+Watts C	7378.50k	1/23/2014 07:15:00	0.00	1/24/2014 15:30:00			
+VAR A	117.97k	4/16/2014 15:15:00	0.00	1/24/2014 15:15:00			
+VAR B	316.71k	1/24/2014 15:00:00	2149.74	1/24/2014 15:30:00			
+VAR C	64.44k	1/23/2014 07:15:00	0.00	1/14/2014 23:00:00			
-Watts A	-9.92	1/24/2014 15:30:00	0.00	1/14/2014 14:57:33			
-Watts B	-24.05	1/24/2014 15:45:00	0.00	1/14/2014 14:57:33			
-Watts C	-82.09k	1/24/2014 15:45:00	0.00	1/14/2014 14:57:33			
-VAR A	-393.58	1/24/2014 15:45:00	0.00	1/14/2014 14:57:33			
-VAR B	-77.87	1/24/2014 15:30:00	0.00	1/14/2014 14:57:33			
-VAR C	-84.29k	1/24/2014 15:00:00	0.00	1/14/2014 14:57:33			
VA A	6783.48k	4/16/2014 15:15:00	0.00	1/24/2014 15:15:00			
VA B	6970.27k	4/16/2014 15:00:00	53.62k	1/24/2014 15:30:00			

OK

Copy

Help

Polling

You will see the screen above if you are connected to an MP200-Y metering system or a Shark® 250/270 meter (the 250/270 meter doesn't have the tabs). Maximum and minimum value and the time it occurred are shown for all of the readings. For MP200™ metering system, click on the meter tabs to see data for each of the 8 meters.

The bottom of the Shark® 250/270 screen shows a demand reset counter that can be used to verify the number of resets reported by other systems.

	Demand Reset Counter <span style="border: 1px solid black; padding: 2px;">0</span>	OK	Copy	Help
--	--	----	------	------

### 5.2.3: Poll Reading Grid

This screen is only available for the Nexus® meters. To view all available polling data of the currently connected device, select Poll Reading Grid from the Real-Time Poll>Real Time Readings menu. You will see the screen shown below.



The screenshot shows a software window titled "Polling Grid" with a sub-header "Polling 0x3A00 - 0x3A5D". It contains two tables of data. The first table lists various channels and their readings across four columns: High Speed, 1 second, Average, and +Maximum. The second table shows coincident channel data for Thermal Average VAR, Block Window Average VAR, and Rolling Window Average VAR across five columns: P Max Watt, N Max Watt, P Min Watt, N Min Watt, and an unlabeled column. At the bottom, there are buttons for OK, Print, Pause, Copy, and Help.

Channel	High Speed	1 second	Average	+Maximum
Volts AN	119.89	120.08	120.16	
Volts BN	119.33	119.33	119.09	
Volts CN	119.69	119.62	119.72	
Volts AUX	0.00	0.00	0.00	
I A	1.01	1.01	1.01	
I B	0.99	0.99	0.95	
I C	0.98	0.97	0.97	
I Nm	0.00	0.00	0.00	
I Nc	0.19	0.20	0.22	
Volts AB	202.34	202.36	202.46	
Volts BC	219.57	219.58	219.47	

Coincident Channel	P Max Watt	N Max Watt	P Min Watt	N Min Watt	
Thermal Average VAR	2.25	-14.60	0.00	-0.01	
Block Window Average VAR	0.00	-13.17	0.00	0.00	
Rolling Window Average VAR	0.00	-14.90	0.00	0.00	

- Use the scroll bars to access all data.
- The first two columns are Instantaneous values, column 3 is the Thermal average, columns 4 - 7 are the positive and negative Thermal maximum and minimum values, and column 8 is a single cycle value captured during the last screen update.
- To adjust the column width, position the cursor on a line between columns at the top of the screen. When the cursor changes to a left/right arrow, hold down the left mouse button and drag the column border left or right. Release the button when the column is at the desired width.
- You need to pause polling (click the Pause button) before you can copy the data in this screen.

### 5.2.4: Poll Multiple Devices

To view polled data from multiple devices connected to your computer, select Poll Multiple Devices from the Real-Time Poll>Real Time Readings menu. You will see the screen shown below.

Device	Volts AN	Volts BN	Volts CN	Volts AUX	I A	I B	I C	I Nm	I Nc
1252F_Unit2	14.38k	14.31k	14.36k	0.00k	403.27	388.62	388.31	0.00	82.06
1272_Unit1	14.39k	14.32k	14.36k	0.00k	402.74	396.03	389.07	0.00	75.65
1272_Unit2	14.44k	14.26k	14.37k	0.00k	404.38	392.85	389.07	0.00	80.80

This screen lets you see real time readings for all of the meters you are connected to; not just the primary meter as the other screens show. Click on the tabs to access the following readings:

**NOTE:** If a particular meter does not support a reading or option, there will be no data shown in the unsupported fields.

- High Speed - the following high speed readings for the meter: Volts AN, BN, CN, Aux, IA, B, C, Nm, Volts AB, BC, CA, VA A, B, C, Total, VAR A, B, C, Total, Watt A, B, C, Total, Freq, Power Factor A, B, C, Total, VAN Aux, Update Time.

- 1 Second - the following 1 second readings: Volts AN, BN, CN, Aux, IA, B, C, Nm, Nc, Volts AB, BC, CA, VA A, B, C, Total, VAR A, B, C, Total, Watt A, B, C, Total, Freq, Power Factor A, B, C, Total, Imb V, I, Update Time.
- Average - average value of the following readings: Volts AN, BN, CN, Aux, IA, B, C, Nm, Nc, Volts AB, BC, CA, VA A, B, C, Total, VAR A, B, C, Total, Watt A, B, C, Total, Freq, Power Factor A, B, C, Total, Imb V, I, Update Time.
- Maximum - maximum value of the following readings: Volts AN, BN, CN, Aux, IA, B, C, Nm, Nc, Volts AB, BC, CA, VA A, B, C, Total, P VAR A, B, C, Total, N VAR A, B, C, Total, P Watt A, B, C, Total, N Watt A, B, C, Total, Update Time.
- Minimum - minimum value of the following readings: Volts AN, BN, CN, Aux, IA, B, C, Nm, Nc, Volts AB, BC, CA, VA A, B, C, Total, P VAR A, B, C, Total, N VAR A, B, C, Total, P Watt A, B, C, Total, N Watt A, B, C, Total, Update Time.
- Hour Readings - the following readings: + Watthour, - Watthour, +VARhour, - VARhour, VAhour.
- Device Time - the Device number, Date, and Time.
- Accumulations - the following readings: I Squared T A, I Squared T B, I Squared T C, V Squared T A, V Squared T B, V Squared T C.
- Relay Status - the status of any meter relays.
- Internal Inputs - the status of any meter internal inputs.

Use the scroll bars to access all data.

### 5.2.5: Poll External Analog Inputs

Nexus® Series meters have the capability of receiving information from external analog input modules. These modules can tell a user about many different process values. Such values can include temperature, humidity, flow, and many others.

Shark® meters do not have this feature.

To view readings from any external Analog Input modules connected to your meter, select Poll External Analog Inputs from the Real-Time Poll>Real Time Readings menu. You will see the screen shown below.

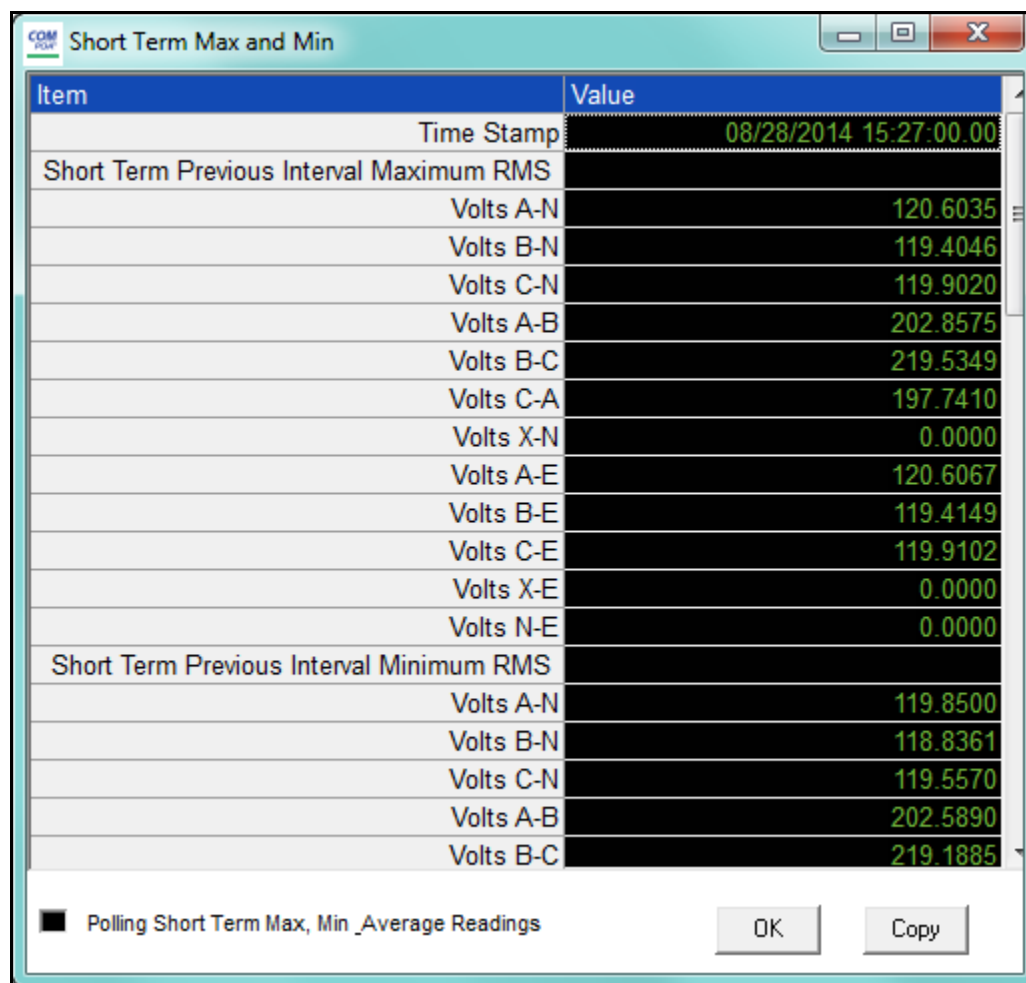
External Analog Inputs					
Input	Name	Raw Value	Primary Value		
1	M 1:	0.013 V	60.150		
2	M 1:	0.010 V	60.120		
3	M 1:	0.004 V	60.042		
4	M 1:	-0.016 V	2.492		
5	M 1:	0.000 V	2.500		
6	M 1:	0.005 V	2.502		
7	M 1:	0.017 V	6.120		
8	M 1:	0.018 V	6.130		

☐ Polling 1252F\_Unit2

- The name, Raw value and primary value are shown for each of the meter's external analog inputs.
- The name can be programmed in the meter's programmable settings. See sections 11.5.1: Configuring the Input/Output Modules, on page 11-113 (Nexus® 1500/1500+ meter), 27.5.1: Configuring the Input/Output Modules, on page 27-80 (Nexus® 1450 meter), 12.5.1: Configuring the Input/Output Modules, on page 12-98 (Nexus® 1262/1272 meter), or 13.5.1: Configuring the Input/Output Modules, on page 13-77 (Nexus® 1252 meter) for instructions.

### 5.2.6: Poll Short Term Max and Min Readings

To see values for short term maximum and minimum readings, select Poll Short Term Max and Min Readings from the Real-Time Poll>Real Time Readings menu. You will see the screen shown below.



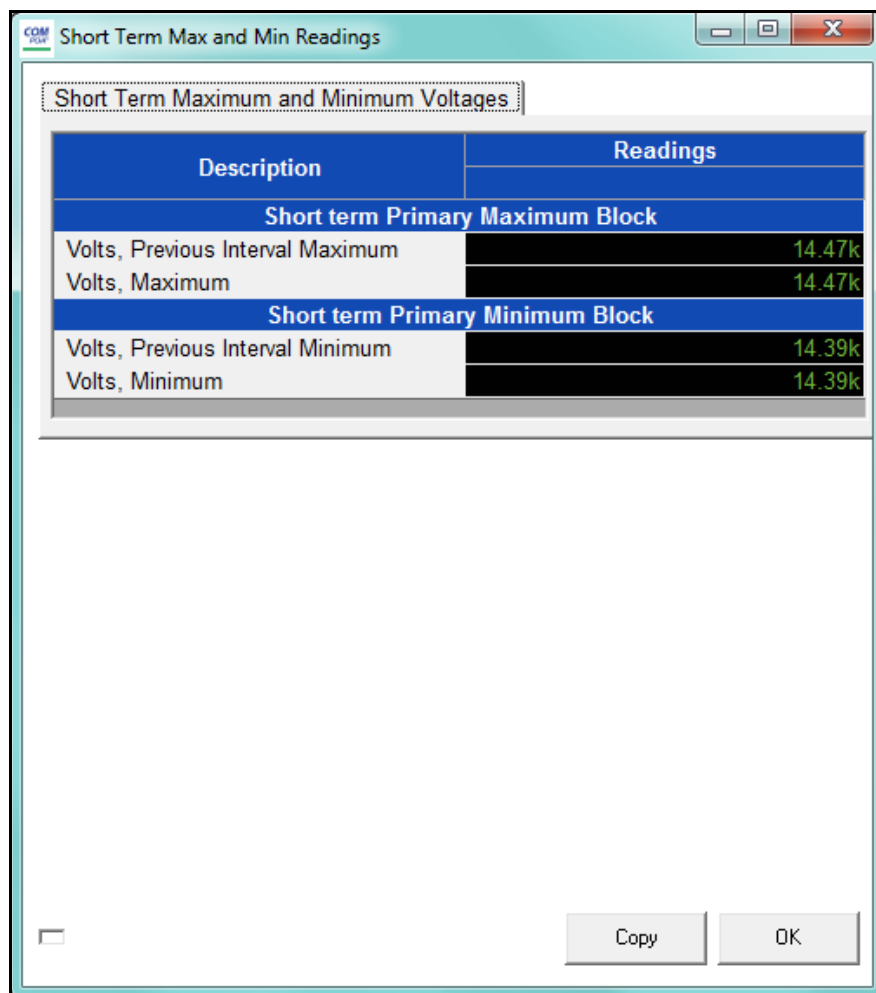
Item	Value
Time Stamp	08/28/2014 15:27:00.00
Short Term Previous Interval Maximum RMS	
Volts A-N	120.6035
Volts B-N	119.4046
Volts C-N	119.9020
Volts A-B	202.8575
Volts B-C	219.5349
Volts C-A	197.7410
Volts X-N	0.0000
Volts A-E	120.6067
Volts B-E	119.4149
Volts C-E	119.9102
Volts X-E	0.0000
Volts N-E	0.0000
Short Term Previous Interval Minimum RMS	
Volts A-N	119.8500
Volts B-N	118.8361
Volts C-N	119.5570
Volts A-B	202.5890
Volts B-C	219.1885

☒ Polling Short Term Max, Min\_Average Readings

OK Copy

This screen shows the maximum, minimum, and average values for the previous interval. The values are updated every second. You will see the screen above if you are connected to a Nexus® 1450/1500/1500+ meter. This feature is used to provide a user with the value of a maximum and minimum within a load profiling interval. This is generally very useful for logging voltage where the greatest excursion value is the only concern.

Note that if you are connected to a Nexus® 1450 meter, you won't see phase to earth readings and the interval for averaging and peak values is set to 15 minutes.

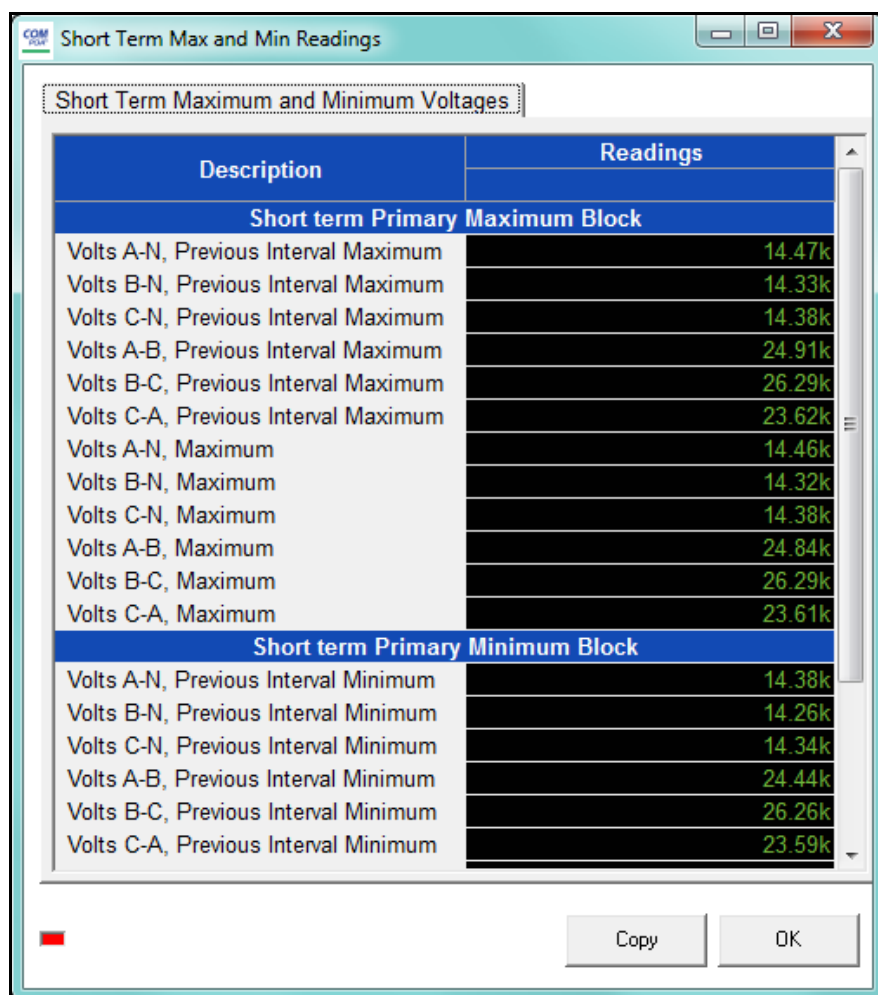


Description	Readings
<b>Short term Primary Maximum Block</b>	
Volts, Previous Interval Maximum	14.47k
Volts, Maximum	14.47k
<b>Short term Primary Minimum Block</b>	
Volts, Previous Interval Minimum	14.39k
Volts, Minimum	14.39k

You will see the screen above if you are connected to an MP200-S metering system. It shows the short term:

- Primary voltage maximum and previous interval maximum values
- Primary voltage minimum and previous minimum values





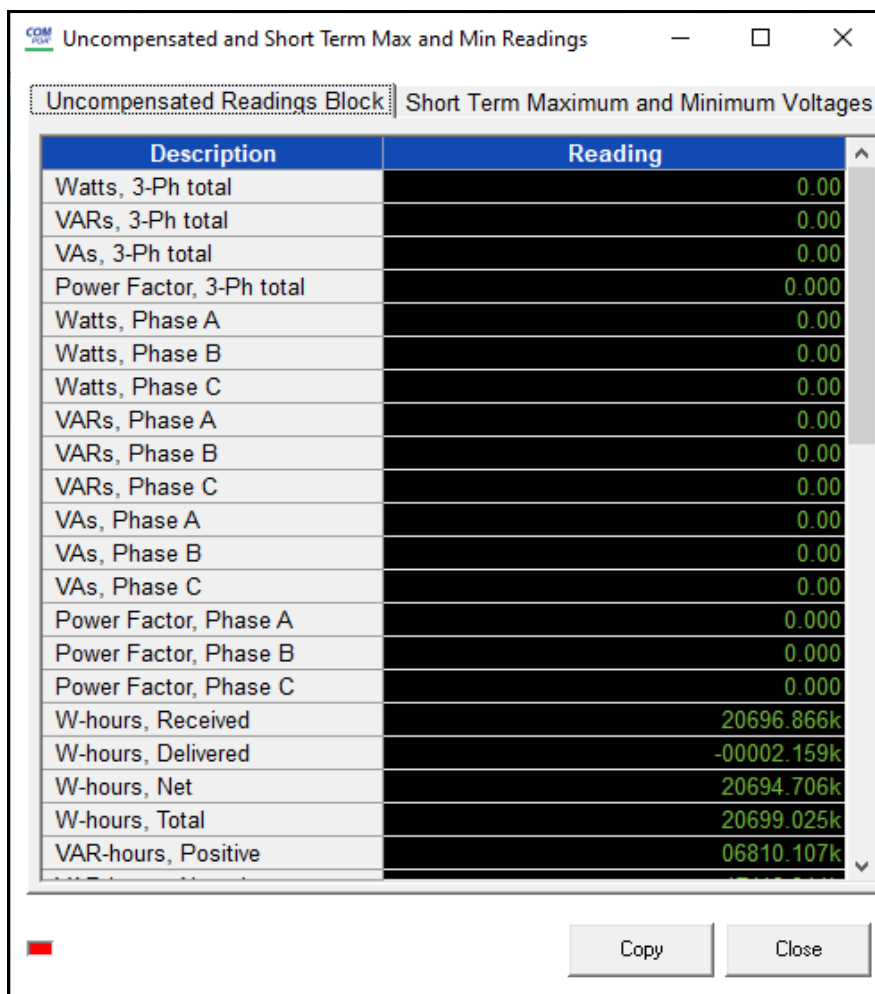
The screenshot shows a software window titled "Short Term Max and Min Readings" with a sub-header "Short Term Maximum and Minimum Voltages". It contains a table with two columns: "Description" and "Readings". The table is divided into two main sections: "Short term Primary Maximum Block" and "Short term Primary Minimum Block". Each section lists voltage readings for phases A-N, B-N, and C-N, both for the "Previous Interval" and "Maximum" (or "Minimum") values. The readings are displayed in green text on a black background. At the bottom of the window, there are "Copy" and "OK" buttons.

Description	Readings
<b>Short term Primary Maximum Block</b>	
Volts A-N, Previous Interval Maximum	14.47k
Volts B-N, Previous Interval Maximum	14.33k
Volts C-N, Previous Interval Maximum	14.38k
Volts A-B, Previous Interval Maximum	24.91k
Volts B-C, Previous Interval Maximum	26.29k
Volts C-A, Previous Interval Maximum	23.62k
Volts A-N, Maximum	14.46k
Volts B-N, Maximum	14.32k
Volts C-N, Maximum	14.38k
Volts A-B, Maximum	24.84k
Volts B-C, Maximum	26.29k
Volts C-A, Maximum	23.61k
<b>Short term Primary Minimum Block</b>	
Volts A-N, Previous Interval Minimum	14.38k
Volts B-N, Previous Interval Minimum	14.26k
Volts C-N, Previous Interval Minimum	14.34k
Volts A-B, Previous Interval Minimum	24.44k
Volts B-C, Previous Interval Minimum	26.26k
Volts C-A, Previous Interval Minimum	23.59k

You will see the screen shown above if you are connected to an MP200-Y metering system. It shows the short term primary voltage maximum and minimum values for phase to phase and phase to reference.

### 5.2.6.1: Uncompensated Power and Energy and Short Term Max and Min Voltage Readings (Shark® 200/250/270/ST40 Meter)

The Shark® 200/250/270/ST40 meter has a screen that displays both short term maximum and minimum voltage readings and uncompensated power and energy readings. Select Uncompensated and Short Term Max and Min Readings from the Real-Time Poll>Real Time Readings menu. You will see the screen shown below.



Description	Reading
Watts, 3-Ph total	0.00
VARs, 3-Ph total	0.00
VAs, 3-Ph total	0.00
Power Factor, 3-Ph total	0.000
Watts, Phase A	0.00
Watts, Phase B	0.00
Watts, Phase C	0.00
VARs, Phase A	0.00
VARs, Phase B	0.00
VARs, Phase C	0.00
VAs, Phase A	0.00
VAs, Phase B	0.00
VAs, Phase C	0.00
Power Factor, Phase A	0.000
Power Factor, Phase B	0.000
Power Factor, Phase C	0.000
W-hours, Received	20696.866k
W-hours, Delivered	-00002.159k
W-hours, Net	20694.706k
W-hours, Total	20699.025k
VAR-hours, Positive	06810.107k

This screen has two tabs.

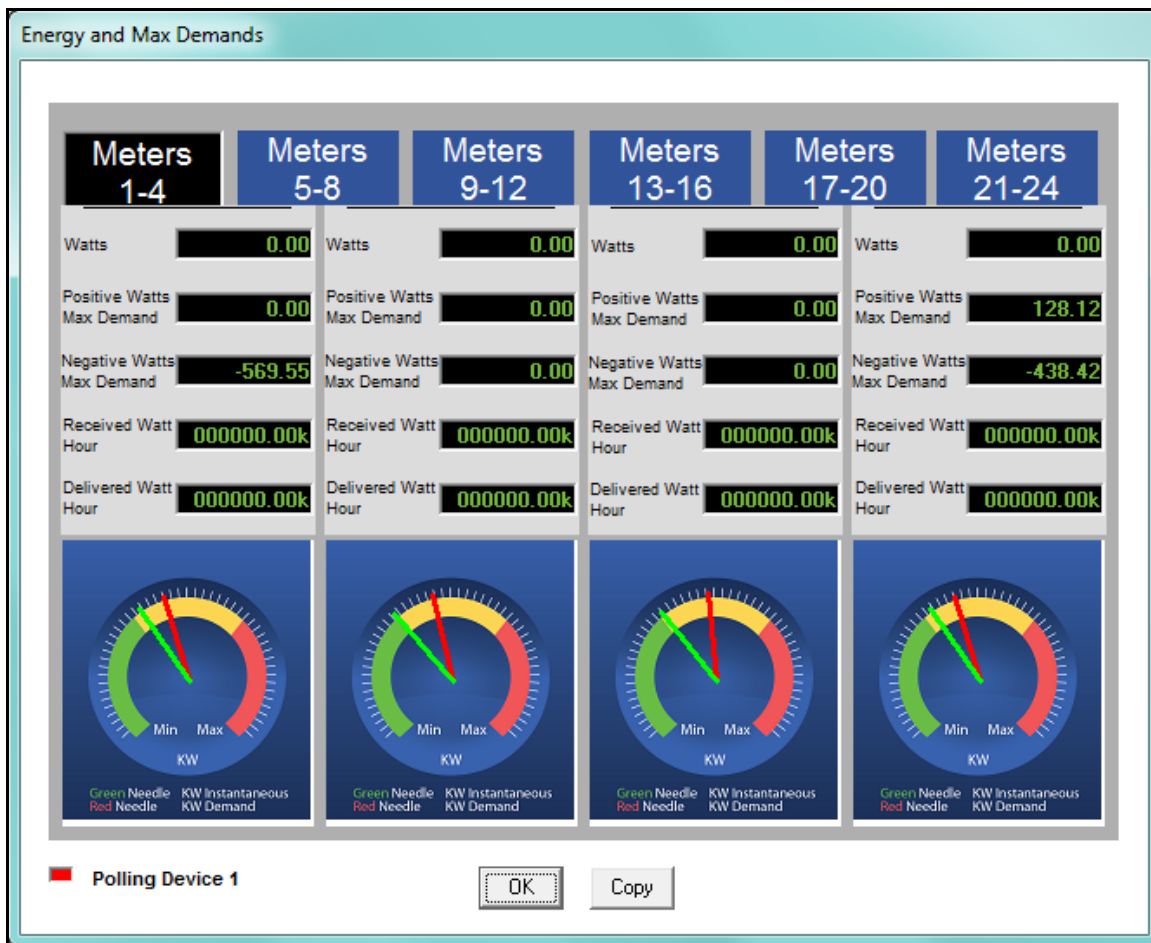
- Uncompensated Readings Block tab, which displays per phase, net, and total Power and Energy values that have not been adjusted by Transformer Loss Compensation. This screen allows the user to view what the uncompensated power and energy is if Transformer Loss Compensation is enabled. This way a log of uncompensated and compensated readings can be kept, at the same time.

Description	Reading
<b>Short term Primary Maximum Block</b>	
Volts A-N, Previous Interval Maximum	0.00
Volts B-N, Previous Interval Maximum	0.00
Volts C-N, Previous Interval Maximum	0.00
Volts A-B, Previous Interval Maximum	0.00
Volts B-C, Previous Interval Maximum	0.00
Volts C-A, Previous Interval Maximum	0.00
Volts A-N, Maximum	0.00
Volts B-N, Maximum	0.00
Volts C-N, Maximum	0.00
Volts A-B, Maximum	0.00
Volts B-C, Maximum	0.00
Volts C-A, Maximum	0.00
<b>Short term Primary Minimum Block</b>	
Volts A-N, Previous Interval Minimum	0.00
Volts B-N, Previous Interval Minimum	0.00
Volts C-N, Previous Interval Minimum	0.00
Volts A-B, Previous Interval Minimum	0.00
Volts B-C, Previous Interval Minimum	0.00
Volts C-A, Previous Interval Minimum	0.00
Volts A-N, Minimum	0.00

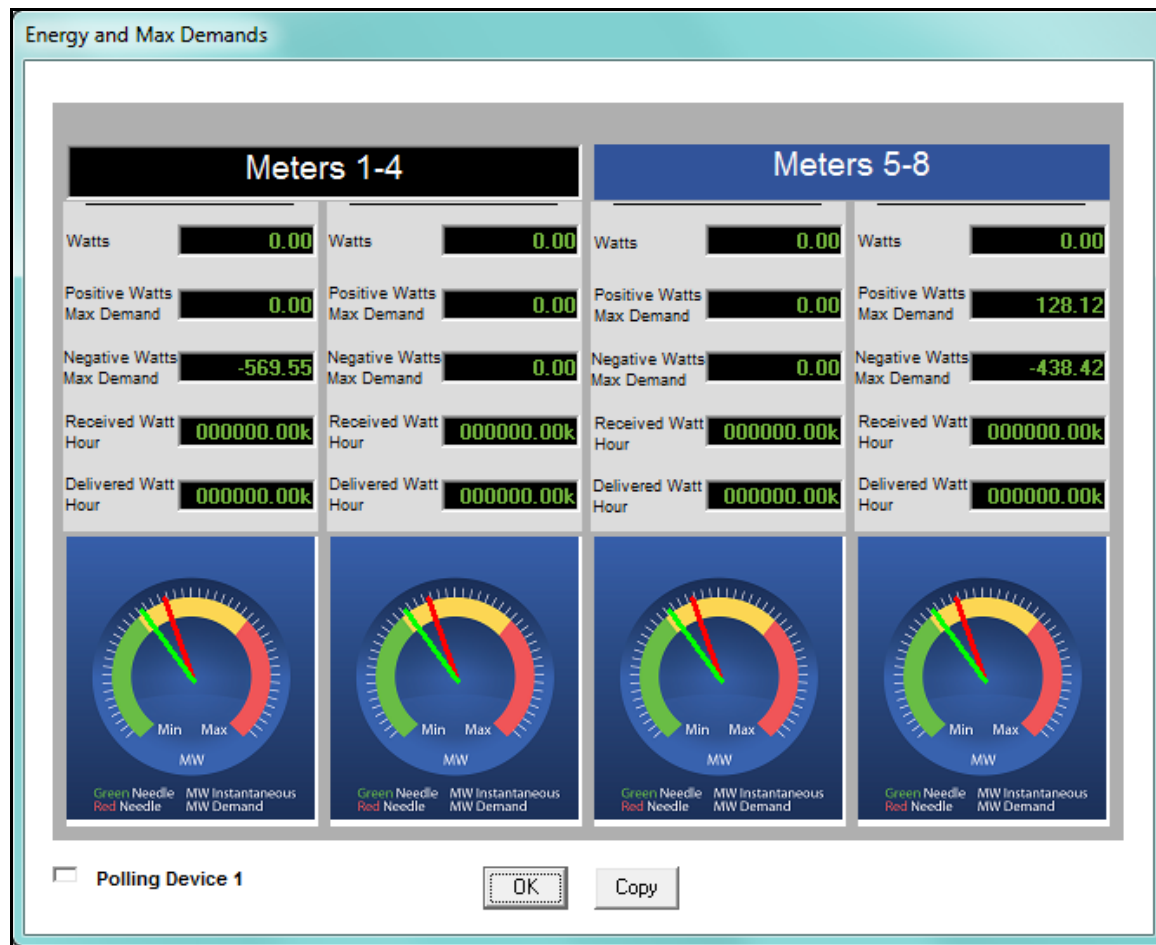
- Short Term Maximum and Minimum Voltages tab (shown above), which displays the Primary Voltage maximum and minimum values, for phase to phase and phase to reference. This reading is the maximum voltage seen within a logging interval and the minimum voltage seen within that same logging interval. This is often used to log in a history log so that a user is seeing the worst voltage excursion during the time period. It is often more useful data than an instantaneous log point or an average of the 15 minute voltage.

### 5.2.7: Poll Energy and Max Demands (MP200 Metering System)

The MP200™ metering system has a unique screen that shows instantaneous Energy and maximum Demand readings. Select Poll Energy and Max Demands from the Real-Time Poll>Real Time Readings menu.



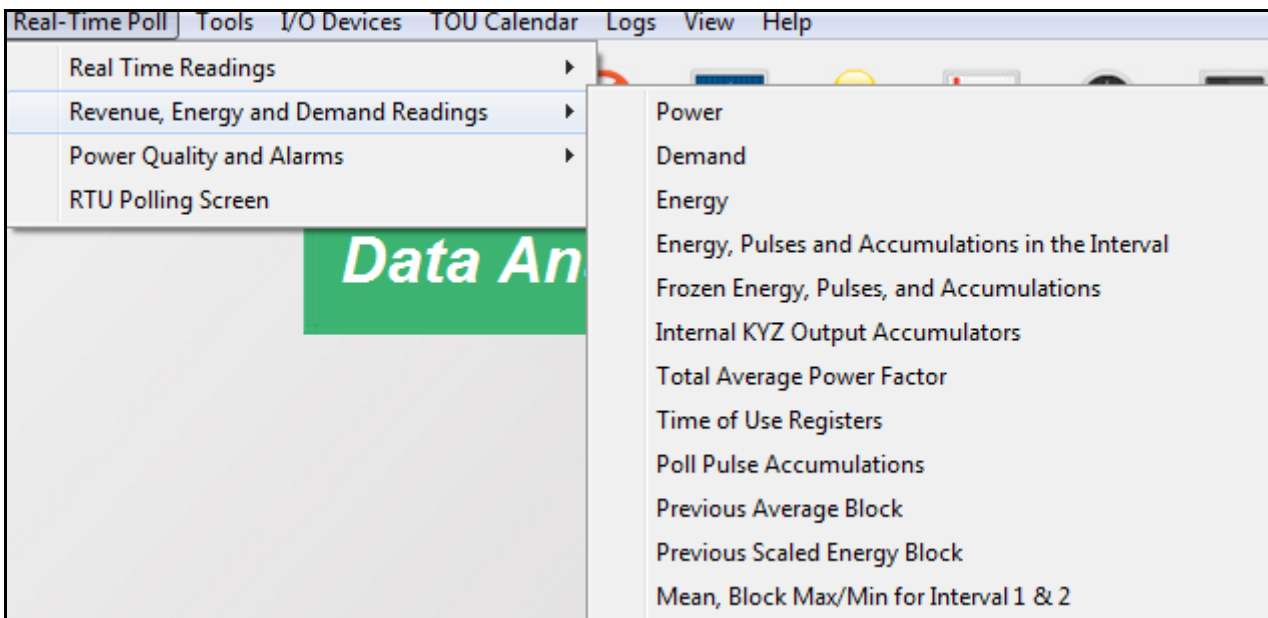
You will see the screen above if you are connected to an MP200-S metering system.



You will see the screen above if you are connected to an MP200-Y metering system.

Click on the tabs to display information the readings for the additional meters.

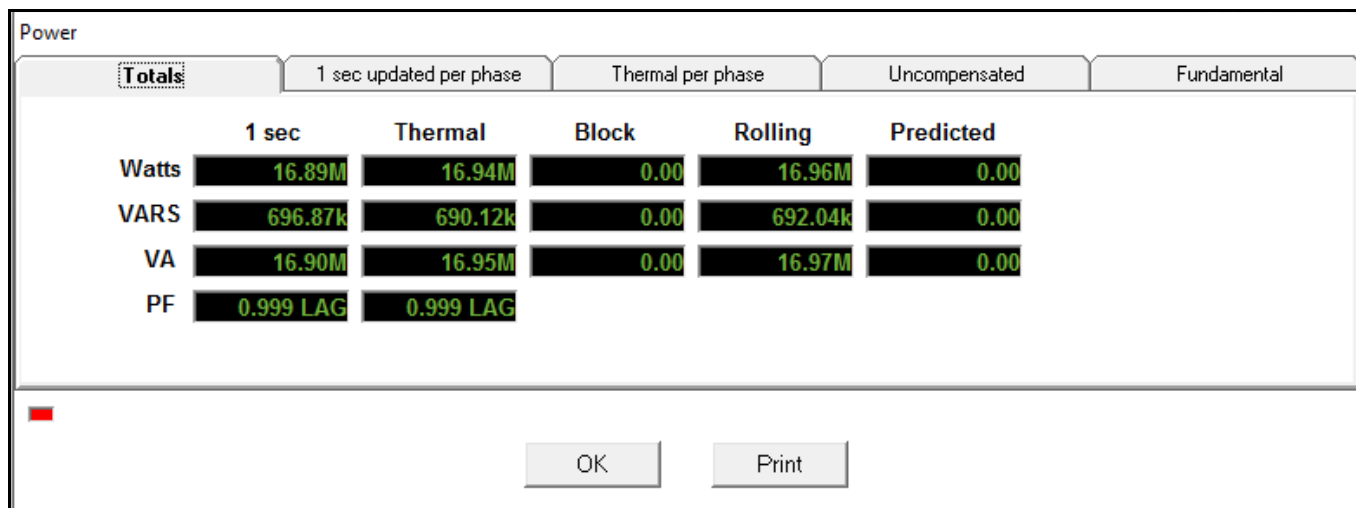
### 5.3: Revenue, Energy, and Demand Readings



The menu above is for a Nexus® 1500/1500+ meter - the menu for your meter may look a bit different.

### 5.3.1: Poll Power

To view Power readings for the currently connected device, select Poll Power from the Real-Time Poll>Revenue, Energy, and Demand Readings menu. You will see the following screen if you are connected to a Nexus® meter.

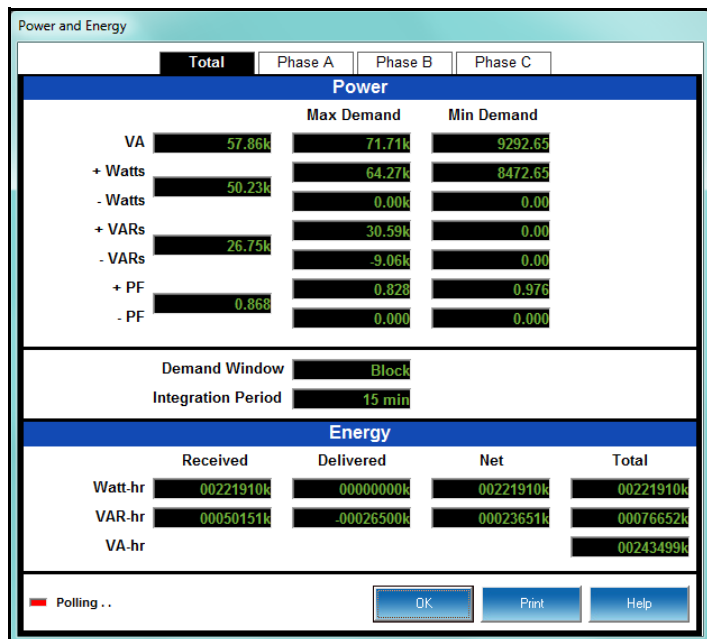


The tabs at the top of the screen let you access the following readings:

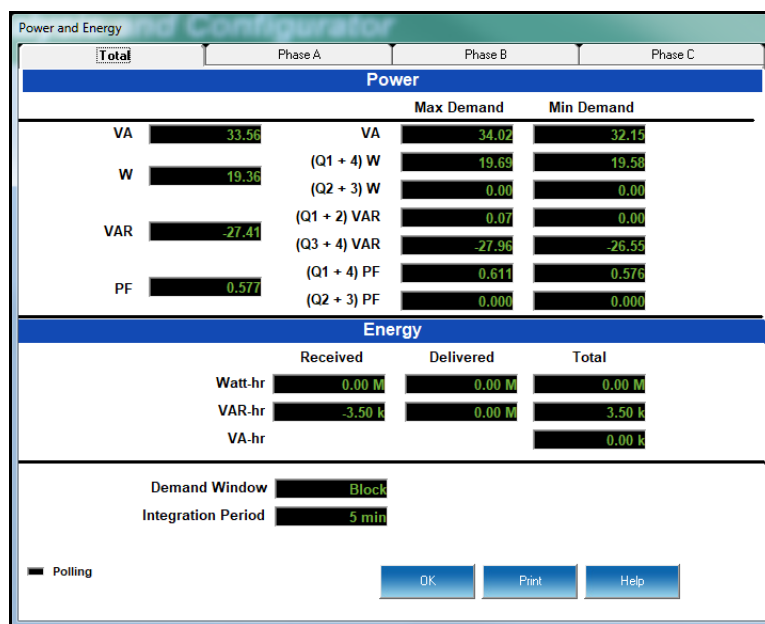
- Totals - 1 second, thermal, block, rolling, and predicted readings for Watts, VARS, VA and PF.
- 1 Second updated per phase - Total and per phase readings updated every second for Watts, VARS, VA and PF.
- Thermal per phase - Total and per phase thermal readings for Watts, VARS, VA and PF.
- Uncompensated - Total and per phase uncompensated readings for Watts, VARS, and VA values that have not been adjusted by Transformer Loss Compensation.
- Fundamental - Total and per phase readings for fundamental Watts, VARs, VA, and PF.

### 5.3.1.1: Poll Power and Energy (Shark® 50/100/200/250/270/ST40 Meters)

Instead of separate Power and Energy polling screens, the Shark® 50/100/200/250/270/ST40 meters have a combined screen that shows both power and energy readings. Click Real-Time Poll>Revenue, Energy and Demand Readings>Power and Energy. See the example screens, below.



**Shark® 200 Meter Example**



**Shark® 250/270 Meter Example**

The tabs at the top of the screen let you access the following readings:

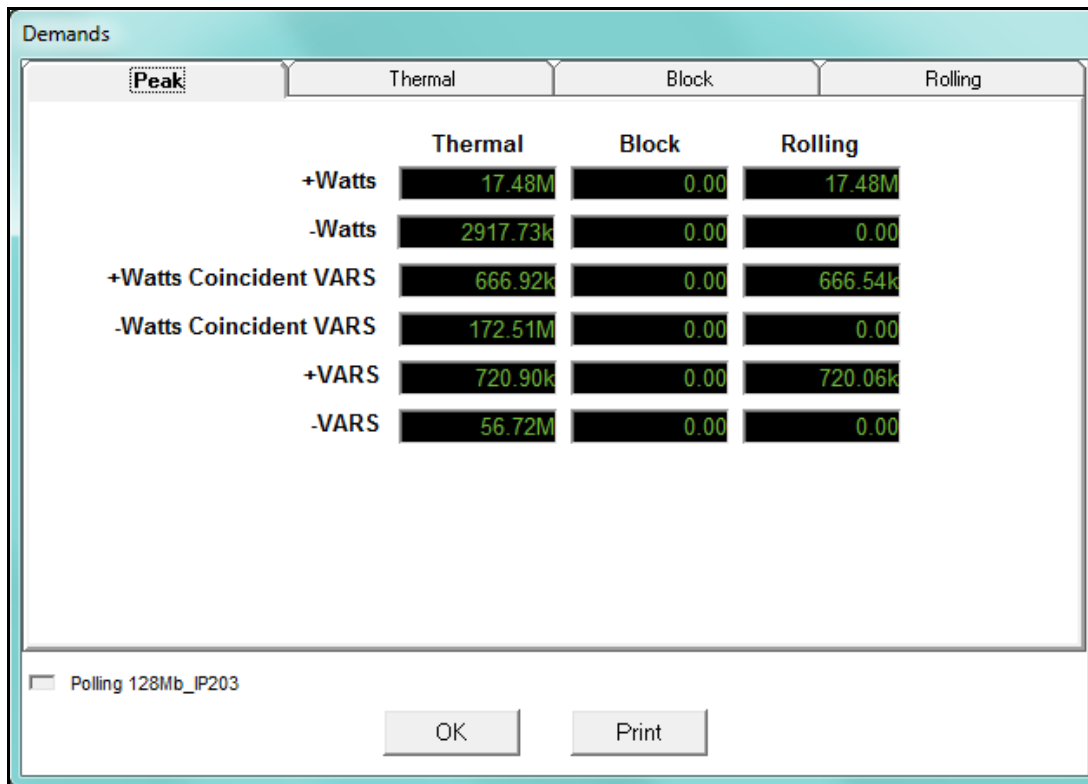
- Total - Displays real time, maximum and minimum for power, energy, and demand for all phases.
- Phase A, B, and C tabs show the same readings as the Total tab, but just for that phase.

**NOTE:** If you are connected to a Shark® 100 meter, you will only see the Total tab.



### 5.3.2: Poll Demand

To view Demand data for the currently connected device, select Demand from the Real-Time Poll>Revenue, Energy, and Demand Readings menu. You will see the screen shown below if you are connected to a Nexus® meter.



The tabs at the top of the screen let you access the following readings:

- Peak - displays the Thermal, Block, and Rolling Peak Demand for +/- Watts, +/- Watts Coincident VARS, and +/- VARS.
- Peak, or Maximum Demand is the largest Average Value for the selected Demand interval.
- Thermal - displays averages, maximum, and minimum readings with timestamps for Watts, VARS, and VA.
- Thermal or Exponential Demand is used to emulate the operation of electromechanical Thermal Demand meters. This measurement responds like lagged thermal heating effects in electrical equipment.

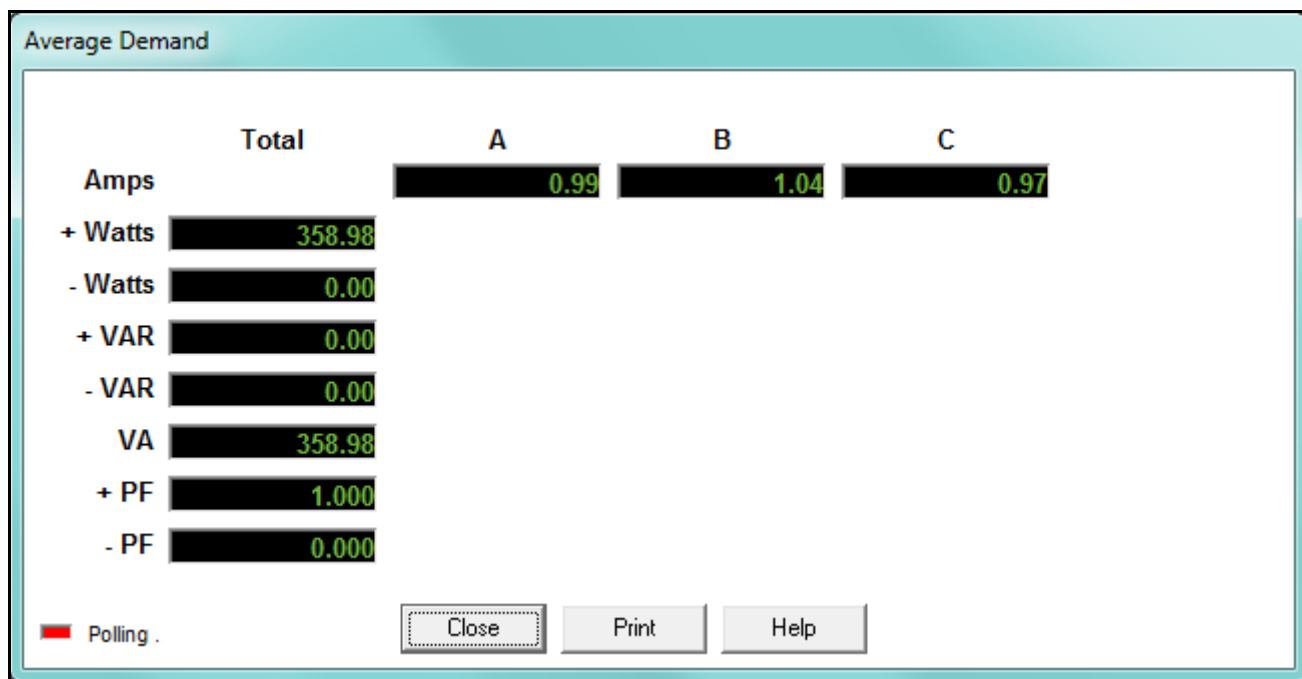
- Thermal Average VARS/VA are the exponential average VARs/VA. Exponential averages are used because they discount older values and respond more like the thermal effects.
- Block - displays averages, maximum, and minimum readings with timestamps for Watts, VARs, and VA; displays + and - Watt Coincident PF.
- Rolling - displays averages, maximum, and minimum readings with timestamps for Watts, VARs, and VA; displays + and - Watt Coincident PF.

Note that the Nexus® 1450 meter's Demands screen has a combined Block/Rolling tab.

Average Demand					
	Total	A	B	C	N
Amps		155.72	65.04	195.03	25.13
+ Watts	50526.05	16150.79	11071.36	23304.66	
- Watts	0.00	0.00	0.00	0.00	
+ VAR	25489.19	10565.72	8733.58	6190.69	
- VAR	0.00	0.00	0.00	0.00	
VA	57544.21	19324.96	14103.77	24116.07	
+ PF	0.878	0.836	0.785	0.966	
- PF	0.000	0.000	0.000	0.000	

☐ Polling

You will see the polling screen above if you are connected to a Shark® 200/250/270 meter.



You will see the polling screen above if you are connected to a Shark® 100 or ST40 meter.

Polling Demand				
Current	Watts	VAR	VA	Power Factor
Meters		Demand values		
		Current		
Meter 1		402.50		
Meter 2		378.17		
Meter 3		388.72		
Meter 4		402.49		
Meter 5		378.18		
Meter 6		388.71		
Meter 7		402.50		
Meter 8		378.18		
Meter 9		388.71		
Meter 10		402.48		
Meter 11		378.16		
Meter 12		388.73		
Meter 13		402.52		
Meter 14		378.17		
Meter 15		388.72		
Meter 16		402.49		
Meter 17		378.18		
Meter 18		388.71		
Meter 19		402.49		
Meter 20		378.17		
Meter 21		388.71		
Meter 22		402.50		
Meter 23		378.16		
Meter 24		388.71		

■ Polling MP200\_4

You will see the screen above if you are connected to an MP200-S metering system. Click the tabs to display Current, Positive Watts, Negative Watts, VAR, VA, and Power Factor Demand readings for the 24 meters.

**Polling Demand**

Current **Watts** VAR VA Power Factor

Positive Watts Negative Watts

	Positive Watts			
	A	B	C	Total
meter 1	5805.42k	5614.45k	5590.51k	17.01M
meter 2	5806.42k	5612.49k	5591.87k	17.01M
meter 3	5806.33k	5610.91k	5591.51k	17.01M
meter 4	5803.17k	5611.14k	5591.33k	17.01M
meter 5	5806.02k	5611.84k	5591.99k	17.01M
meter 6	5807.30k	5611.45k	5592.68k	17.01M
meter 7	5808.00k	5610.80k	5592.82k	17.01M
meter 8	5806.17k	5612.03k	5592.11k	17.01M

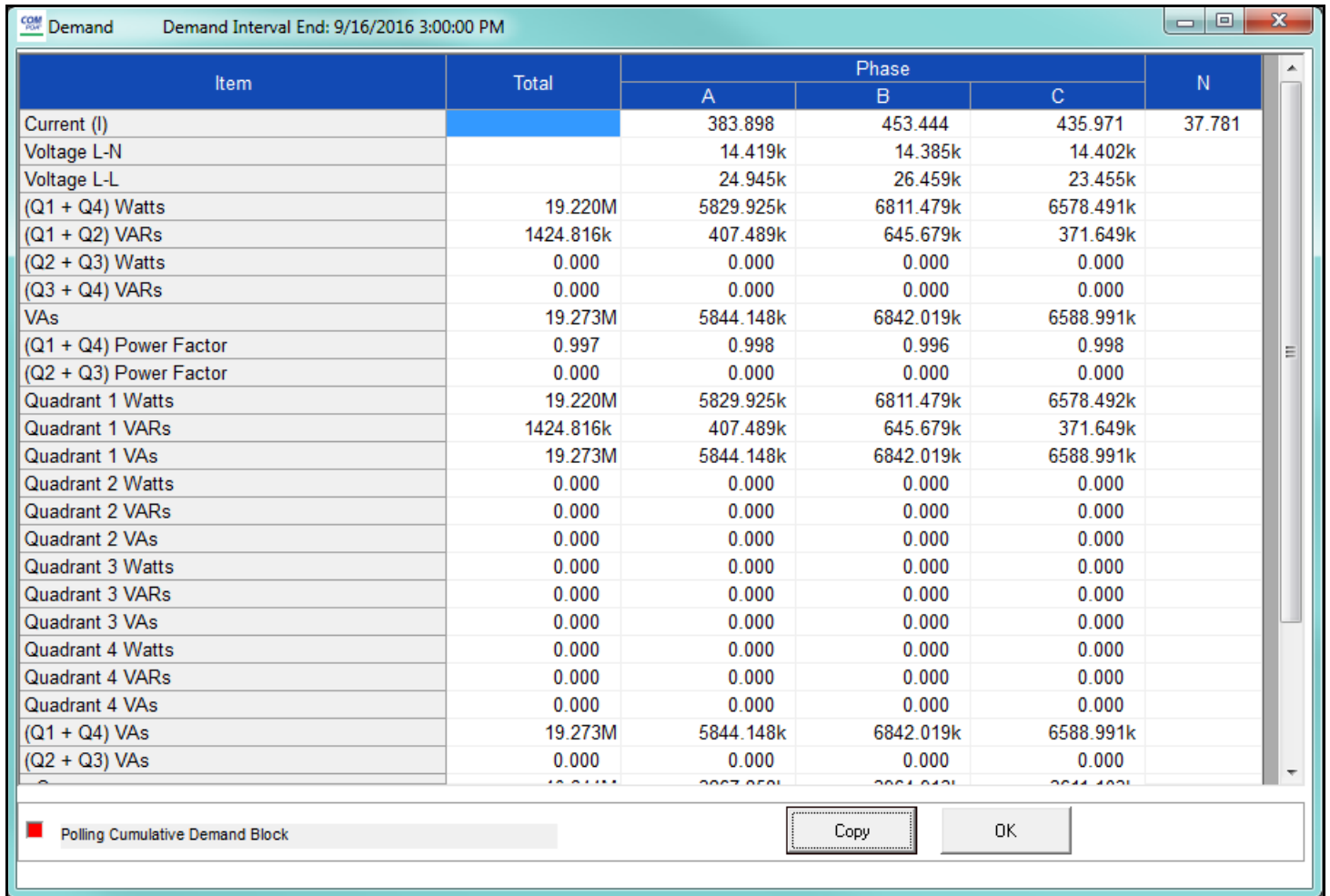
☐ Polling MP200\_5

OK Copy Help

You will see the polling screen above if you are connected to an MP200-Y metering system. Click the tabs to display Current, Positive Watts, Negative Watts, VAR, VA, and Power Factor Demand readings for the 8 meters.

### 5.3.2.1: Poll Demand Grid

The Shark® 250/270 meter has an additional Demand polling screen. Select Demand Grid from the Real-Time Poll>Revenue, Energy, and Demand Readings menu.



Item	Total	Phase			
		A	B	C	N
Current (I)		383.898	453.444	435.971	37.781
Voltage L-N		14.419k	14.385k	14.402k	
Voltage L-L		24.945k	26.459k	23.455k	
(Q1 + Q4) Watts	19.220M	5829.925k	6811.479k	6578.491k	
(Q1 + Q2) VARs	1424.816k	407.489k	645.679k	371.649k	
(Q2 + Q3) Watts	0.000	0.000	0.000	0.000	
(Q3 + Q4) VARs	0.000	0.000	0.000	0.000	
VAs	19.273M	5844.148k	6842.019k	6588.991k	
(Q1 + Q4) Power Factor	0.997	0.998	0.996	0.998	
(Q2 + Q3) Power Factor	0.000	0.000	0.000	0.000	
Quadrant 1 Watts	19.220M	5829.925k	6811.479k	6578.492k	
Quadrant 1 VARs	1424.816k	407.489k	645.679k	371.649k	
Quadrant 1 VAs	19.273M	5844.148k	6842.019k	6588.991k	
Quadrant 2 Watts	0.000	0.000	0.000	0.000	
Quadrant 2 VARs	0.000	0.000	0.000	0.000	
Quadrant 2 VAs	0.000	0.000	0.000	0.000	
Quadrant 3 Watts	0.000	0.000	0.000	0.000	
Quadrant 3 VARs	0.000	0.000	0.000	0.000	
Quadrant 3 VAs	0.000	0.000	0.000	0.000	
Quadrant 4 Watts	0.000	0.000	0.000	0.000	
Quadrant 4 VARs	0.000	0.000	0.000	0.000	
Quadrant 4 VAs	0.000	0.000	0.000	0.000	
(Q1 + Q4) VAs	19.273M	5844.148k	6842.019k	6588.991k	
(Q2 + Q3) VAs	0.000	0.000	0.000	0.000	

☒ Polling Cumulative Demand Block

Copy OK

This screen shows the Total and per Phase Demand for the meter readings, as well as Cumulative and Continuous Cumulative values for the quadrants - use the scroll bar to display those fields.

Change to this screen for the May, 2021 CommunicatorPQA® software release:

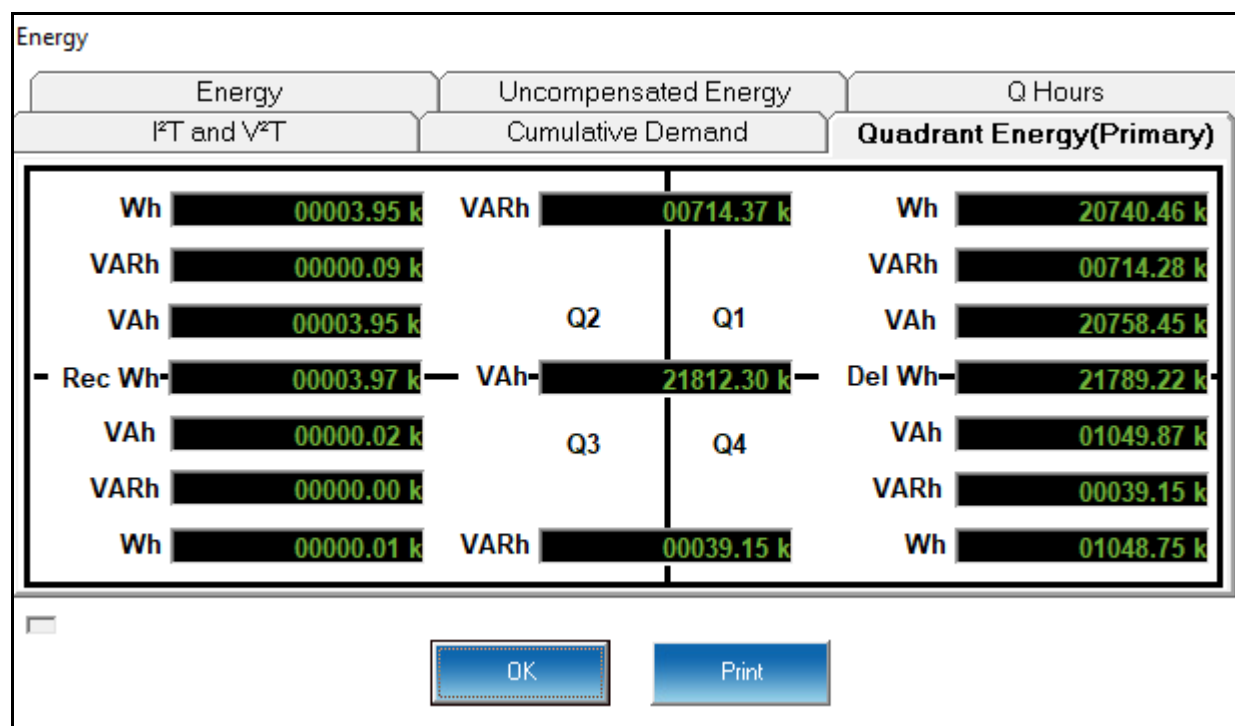
- Q hour positive and negative totals are shown rather than Q hour per phase.

### 5.3.3: Poll Energy

To view Energy data for the currently connected device, select Energy from the Real-Time Poll>Revenue, Energy, and Demand Readings menu.

#### 5.3.3.1: Poll Energy (Nexus® Meter)

You will see the screen shown below if you are connected to a Nexus® meter.



The tabs at the top of the screen let you access the following readings:

- Quadrant Energy (Primary) - displays readings for each quadrant of the four-quadrant Nexus® meter.
- Cumulative Demand - displays Delivered, Received, and Continuous Watts in Secondary and Primary.
- I² & V² T - displays positive readings for phases A, B and C and average of the readings.
- Q Hours - displays positive and negative Qhr readings in Secondary and Primary.

**NOTE:** The Q Hour reading lags the Watt hour reading by 60°. A Q Hour meter measures power between 150° and 270°, which are quadrants 2 and 3. Q is one of the values used in calculating quadergy (VAR hours).

- Uncompensated Energy - displays + and - Wh, + and - VARh, and VAh readings that have not been adjusted by Transformer Loss Compensation, in Secondary and Primary.
- Energy - displays primary and secondary + and - Wh, + and - VARh, and VAh readings.

#### **5.3.3.2: Poll Energy (MP200™ Metering System)**

You will see the Energy and Demand polling screen when you click Revenue and Energy Metering>Energy. See [5.2.7: Poll Energy and Max Demands \(MP200 Metering System\)](#), on page 5-20.



### 5.3.3.3: Poll Energy Grid (Shark® 250/270 Meter)

You will see the screen below if you are connected to a Shark® 250/270 meter. It shows compensated and uncompensated readings for Energy, the Energy in the Interval, and Energy in the Interval (Pulses) based on primary, for all Energy channels. Use the scroll bar to view additional Energy channels.

Energy						
Item	Energy		Energy in the Interval		Energy in the Interval (Pulses) based on Primary	
	Uncompensated	Compensated	Uncompensated	Compensated	Uncompensated	Compensated
Wh Delivered	000059.62 k	000059.62 k	000000.01 k	000000.01 k	00002543	00002668
Wh Received	000000.00 k	000000.00 k	000000.00 k	000000.00 k	00000000	00000000
Wh Net	000059.62 k	000059.62 k	000000.01 k	000000.01 k	00002543	00002668
Wh Total	000059.62 k	000059.62 k	000000.01 k	000000.00 k	00002543	00002669
VARh Delivered	000000.00 k	000000.00 k	000000.00 k	000000.00 k	00000073	00000198
VARh Received	-000086.96 k	-000086.96 k	000000.00 k	000000.00 k	00000000	00000000
VARh Net	-000086.96 k	-000086.96 k	000000.00 k	000000.00 k	00000073	00000198
VARh Total	000086.96 k	000086.96 k	000000.00 k	000000.01 k	00000073	00000198
VAh Total	000105.44 k	000105.45 k	000000.00 k	000000.01 k	00002544	00002675
Wh Delivered A	000019.88 k	000019.88 k	000000.01 k	000000.00 k	00000768	00000809
Wh Delivered B	000019.87 k	000019.87 k	000000.01 k	000000.00 k	00000903	00000946
Wh Delivered C	000019.86 k	000019.86 k	000000.00 k	000000.00 k	00000872	00000913
Wh Received A	000000.00 k	000000.00 k	000000.00 k	000000.00 k	00000000	00000000
Wh Received B	000000.00 k	000000.00 k	000000.00 k	000000.00 k	00000000	00000000
Wh Received C	000000.00 k	000000.00 k	000000.00 k	000000.00 k	00000000	00000000
Wh Net A	000019.88 k	000019.88 k	000000.01 k	000000.00 k	00000768	00000809
Wh Net B	000019.87 k	000019.87 k	000000.01 k	000000.00 k	00000903	00000946
Wh Net C	000019.86 k	000019.86 k	000000.00 k	000000.00 k	00000872	00000913
Wh Total A	000019.88 k	000019.88 k	000000.01 k	000000.00 k	00000768	00000809
Wh Total B	000019.87 k	000019.87 k	000000.01 k	000000.00 k	00000903	00000945
Wh Total C	000019.86 k	000019.87 k	000000.00 k	000000.01 k	00000872	00000913
VARh Delivered A	000000.00 k	000000.00 k	000000.00 k	000000.00 k	00000015	00000057
VARh Delivered B	000000.00 k	000000.00 k	000000.00 k	000000.00 k	00000048	00000089
VARh Delivered C	000000.00 k	000000.00 k	000000.00 k	000000.00 k	00000010	00000051
VARh Received A	-000029.00 k	-000029.00 k	000000.00 k	000000.00 k	00000000	00000000
VARh Received B	-000028.99 k	-000028.99 k	000000.00 k	000000.00 k	00000000	00000000

☒ Polling Primary Uncompensated Energy in the Interval Block

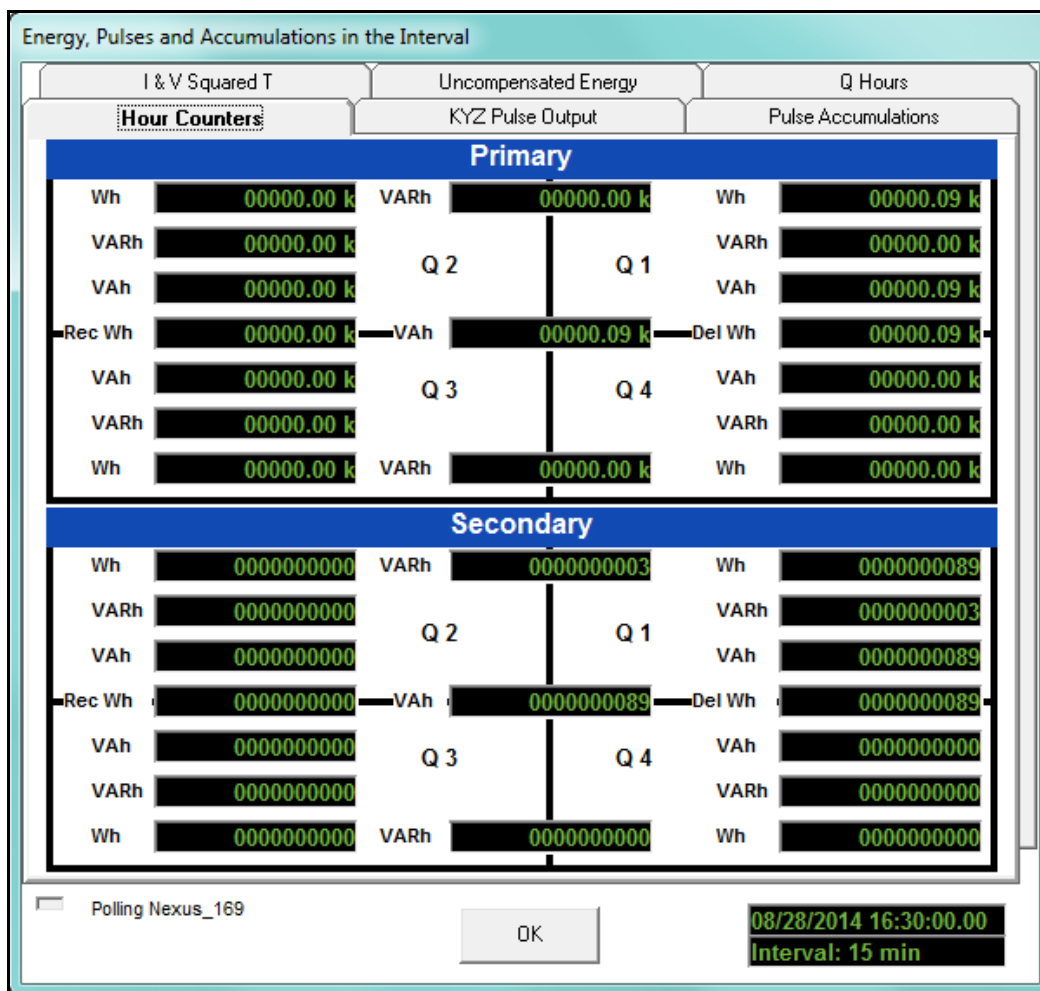
Changes to this screen for the May, 2021 CommunicatorPQA® software release:

- Q hour positive and negative totals are shown rather than Q hour per phase.
- I<sup>2</sup>T and V<sup>2</sup>T values are shown.

### 5.3.4: Poll Energy, Pulses, and Accumulations in the Interval

To view the Energy, Pulse & Accumulations in the Interval of the currently connected device, select Energy, Pulse & Accumulations in the Interval from the Real-Time Poll>Revenue, Energy, and Demand Readings menu. You will see the screen shown below if you are connected to a Nexus® meter.

Energy in the interval is the energy that is accumulated within a load profiling interval. This is often the preferred method for logging because it is a summation of only that particular period of energy.



This screen displays readings from the Interval set on several screens (see chapters 11, 12, 13 for details):

- Demand Integration Intervals

- I and V Squared T Thresholds
- Interval in minutes (15 = Initial setting)
- Internal KYZ Outputs
- Pulse Accumulations

The Interval field at the bottom right of the screen is the interval that the values on the screen represent; in this example, a 15 minute interval. The tabs at the top of the screen let you access the following readings:

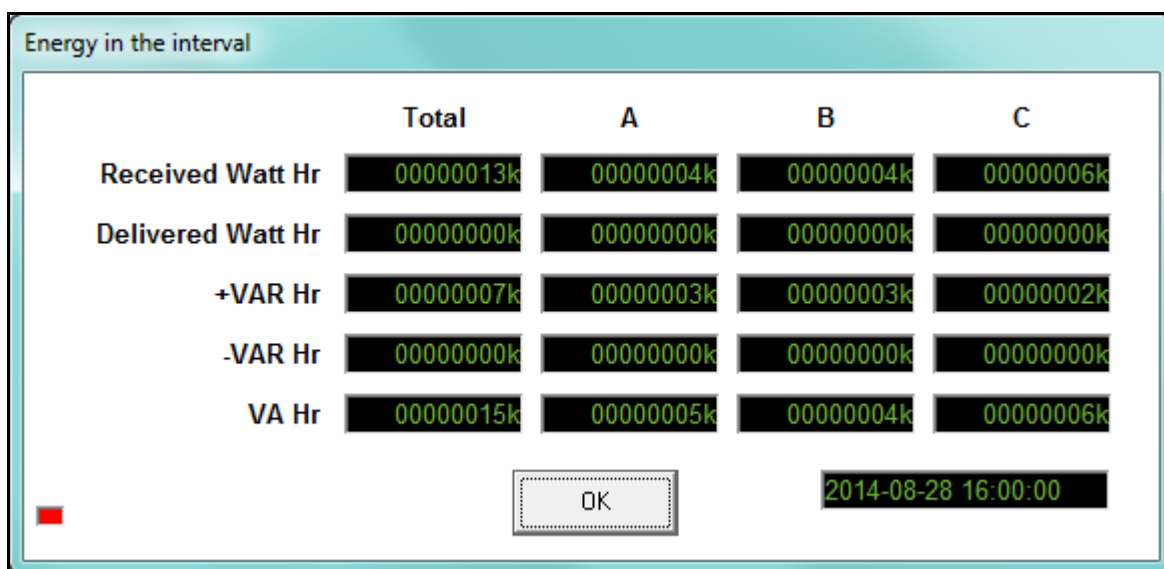
- Hour Counters - displays readings in all four quadrants for the interval programmed in the Device Profile, and displayed at the bottom right of the screen.
- Uncompensated Energy - displays interval readings that are not adjusted by Transformer Loss Compensation.
- Q Hours - displays Qhr interval readings.
  - Q is the quantity obtained by lagging the applied voltage to a Watt meter by 60 degrees.
- I & V Squared T - displays I and V Squared T readings per phase.
- KYZ Pulse Output - displays readings for internal KYZ relays and/or LED.
- Pulse Accumulations - displays readings for the eight high speed internal inputs and aggregators (set up in the Pulse Accumulations screen of the meter's Device Profile).

### 5.3.4.1: Energy in the Interval/Interval Energy

The Shark® 200 meter, ST40 meter, and the MP200™ metering system have a polling screen that shows interval energy readings. The interval is set in the Demand Averaging settings - see chapters 8 and 10 for details.

Energy in the interval is the amount of energy actually accumulated in a logging interval. This is commonly used as a load profiling value, so that the user can see usage without having to subtract energy counters.

- For the Shark® 200 and ST40 meter, select Energy in the Interval from the Real-Time Poll>Revenue, Energy, and Demand Readings menu.
- For the MP200™ metering system, select Interval Energy from the Real-Time Poll>Revenue, Energy, and Demand Readings menu.



You will see the screen above if you are connected to a Shark® 200 meter. The field at the right bottom of the screen tells the time and date that these readings are from; in this example screen, 4 pm on August 28, 2014.

Interval Energy				
Watt Hour		VA Hour		VAR Hour
Meters	VAR Hour			
	Positive	Negative	Net	Total
Meter 1	00000.026M	00000.000M	00000.026M	00000.026M
Meter 2	00000.064M	00000.000M	00000.064M	00000.064M
Meter 3	00000.009M	00000.000M	00000.009M	00000.009M
Meter 4	00000.026M	00000.000M	00000.026M	00000.026M
Meter 5	00000.063M	00000.000M	00000.063M	00000.063M
Meter 6	00000.009M	00000.000M	00000.009M	00000.009M
Meter 7	00000.026M	00000.000M	00000.026M	00000.026M
Meter 8	00000.065M	00000.000M	00000.065M	00000.065M
Meter 9	00000.009M	00000.000M	00000.009M	00000.009M
Meter 10	00000.026M	00000.000M	00000.026M	00000.026M
Meter 11	00000.063M	00000.000M	00000.063M	00000.063M
Meter 12	00000.009M	00000.000M	00000.009M	00000.009M
Meter 13	00000.027M	00000.000M	00000.027M	00000.027M
Meter 14	00000.064M	00000.000M	00000.064M	00000.064M
Meter 15	00000.010M	00000.000M	00000.010M	00000.010M
Meter 16	00000.026M	00000.000M	00000.026M	00000.026M
Meter 17	00000.065M	00000.000M	00000.065M	00000.065M
Meter 18	00000.010M	00000.000M	00000.010M	00000.010M
Meter 19	00000.026M	00000.000M	00000.026M	00000.026M
Meter 20	00000.064M	00000.000M	00000.064M	00000.064M
Meter 21	00000.009M	00000.000M	00000.009M	00000.009M
Meter 22	00000.026M	00000.000M	00000.026M	00000.026M
Meter 23	00000.064M	00000.000M	00000.064M	00000.064M
Meter 24	00000.010M	00000.000M	00000.010M	00000.010M

Polling MP200\_4

OK

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Help

You will see the screen above if you are connected to an MP200-S metering system. Click the tabs to see Watt Hour VA Hour and VAR Hour positive, negative, net and total readings for all 24 meters.

Interval Energy

Watt Hour		VA Hour		VAR Hour	
Watt Hour A	Watt Hour B	Watt Hour C	Watt Hour Total		
Watt Hour A					
	Received	Delivered	Net	Total	
meter 1	00001.451M	00000.000M	00001.451M	00001.451M	
meter 2	00001.451M	00000.000M	00001.451M	00001.451M	
meter 3	00001.451M	00000.000M	00001.451M	00001.451M	
meter 4	00001.450M	00000.000M	00001.450M	00001.450M	
meter 5	00001.451M	00000.000M	00001.451M	00001.451M	
meter 6	00001.452M	00000.000M	00001.452M	00001.452M	
meter 7	00001.452M	00000.000M	00001.452M	00001.452M	
meter 8	00001.452M	00000.000M	00001.452M	00001.452M	

Polling MP200\_5

OK

Copy

Help

You will see the screen above if you are connected to an MP200-Y metering system. Click the tabs to see Watt Hour received, delivered, net and total, per phase and totaled; VA Hour per phase and total; and VAR Hour positive, negative, net and total per phase and totaled.

### 5.3.5: Poll Frozen Energy, Pulses, and Accumulations

To view the Frozen Energy, Pulses, and Accumulations in the for the currently connected Nexus® meter, select Frozen Energy, Pulses, and Accumulations from the Real-Time Poll>Revenue, Energy, and Demand Readings menu. You will see the screen shown below.

The screenshot displays a software interface titled "Frozen Energy, Pulses and Accumulations". It features three tabs at the top: "I & V Squared T", "Uncompensated Energy", and "Q Hours". The "Hour Counters" tab is selected. Below the tabs, there are three sub-sections: "Hour Counters", "KYZ Pulse Output", and "Pulse Accumulations". The "Hour Counters" section is further divided into "Primary" and "Secondary" meter data. Each section contains a table of energy and pulse readings.

Primary			
Wh	00000.00 k	VARh	00630.93 k
VARh	00000.00 k	Q 2	Q 1
VAh	00000.00 k		
Rec Wh	00000.00 k	VAh	22166.94 k
VAh	00000.00 k	Q 3	Q 4
VARh	00000.00 k		
Wh	00000.00 k	VARh	00000.00 k

Secondary			
Wh	0	VARh	73888
VARh	0	Q 2	Q 1
VAh	0		
Rec Wh	0	VAh	2535624
VAh	0	Q 3	Q 4
VARh	0		
Wh	0	VARh	0

At the bottom of the screen, there is a status bar showing "Polling Nexus\_169", an "OK" button, and a timestamp "08/28/2014 16:00:00.00" with "Interval: 1 hour".


This screen shows the same readings as explained in Section 5.3.4 (Poll Energy, Pulses, and Accumulations in the Interval), except that the values shown are frozen from the most recent hour, rather than updated on the programmed interval, e.g., every 15 minutes.

This is designed so that a utility RTU or SCADA system will be able to poll the data after the fact, without it changing, so that there is no risk of losing the data.

Click on the tabs to view additional readings - refer to 5.3.4: Poll Energy, Pulses, and Accumulations in the Interval, on page 5-34, for a description of the tabs.

### 5.3.6: Poll Internal KYZ Output Accumulations

To view the Internal KYZ Output Accumulations of the currently connected Nexus® meter, select Internal KYZ Output Accumulations from the Real-Time Poll>Revenue, Energy, and Demand Readings menu. You will see the screen shown below.

Internal KYZ Output Accumulation				
	Accumulator	Channel	Hour Reading	Wh per pulse
Relay 1	0011162204	Quad (1 + 4) Watthour	22158.13 k	1.8000000
Relay 2	0001127649	Quad (1 + 4) Watthour	22158.13 k	1.8000000
Relay 3	0000834484	Quad (1 + 4) Watthour	22158.13 k	1.8000000
Relay 4	0001867682	Quad (1 + 4) Watthour	22158.13 k	1.8000000
LED	0001867255	Quad (1 + 4) Watthour	22158.13 k	1.8000000
<div>  Polling Nexus_169 </div> <div>OK</div>				

This screen displays the readings from the KYZ Output Relays. Refer to Chapters 11, 12, 13, and 27 for instructions on configuring the Internal KYZ Outputs.

**NOTE:** The screen shown here is from a Nexus® 1272 meter.

- The screen for a Nexus® 1252 meter only shows the Heartbeat LED. On a Nexus® 1252 meter, the heartbeat LED serves a dual purpose. It can be used as a meter heartbeat to signify that the system is working, or switched into a pulse mode to output a KYZ pulse to test and confirm accuracy.
- The screen for the Nexus® 1500/1500+ meter only shows the relays.
- The screen for the Nexus® 1450 meter shows two Test pulse LEDs and two Output pulses.



### 5.3.7: Poll Total Average Power Factor

To view Total Average Power Factor for the Nexus® meter connected to your computer, select Total Average Power Factor from the Real-Time Poll>Revenue, Energy, and Demand Readings menu. You will see the screen shown below.

Total Average Power Factor			
Time Stamp			
Quadrant 1+4	0.9980	08/28/2014 17:22:02.02	
Quadrant 2+3	0.7850		
Equation used to compute the Total Average Power Factor			
$\frac{\begin{matrix} 090261.322 \text{ M} \\ 000000.987 \text{ M} \end{matrix}}{\begin{matrix} 090353.732 \text{ M} + 000005.737 \text{ M} \\ 000001.232 \text{ M} + 000000.026 \text{ M} \end{matrix}} - \frac{\begin{matrix} 000000.000 \text{ M} \\ 000000.000 \text{ M} \end{matrix}}{\begin{matrix} 000000.000 \text{ M} \\ 000000.000 \text{ M} \end{matrix}} = \frac{D}{D} = \text{PF}_{\text{TA}}$			
	Maximum	Time Stamp	Minimum
Quadrant 1+4	0.9980	07/11/2014 09:18:26.02	0.9980
Quadrant 2+3	0.7850	07/11/2014 09:18:26.02	0.7850
Time of Last Total Average Power Factor Reset 00/00/0000 00:00:00.00			
■ Polling 128Mb_IP203			
OK			

The readings on this screen are based on Power Factor settings (maximum and minimum power settings) from the Device Profile of the connected device.

**NOTE:** This feature is only available with the Nexus® meters, though not the Nexus® 1450 meter.

### 5.3.8: Poll Time of Use Registers

To view Time of Use Readings for the meter connected to your computer, select Time of Use from the Real-Time Poll>Revenue, Energy, and Demand Readings menu. You will see the screen shown below if you are connected to a Nexus® 12xx meter or a Nexus® 1500 meter.

**Time of Use Readings**

Status	Group	Start Time	End Time	Register
Active	Current Month	07/02/2014 11:26:15	12/31/2015 23:59:59	Register Totals

Register Accumulations			
VARh	00000.00 k	VARh	00014.92 k
VAh	00000.00 k	Q1 VAh	00480.80 k
Rec Wh	00000.00 k	Del Wh	00480.56 k
VAh	00000.00 k	Q4 VAh	00000.00 k
-VARh	00000.00 k	-VARh	00000.00 k

Register Peak Demand		Block Window
Delivered Watt	364.03	07/17/2014 11:14:59.38
Received Watt	0.00	07/02/2014 11:26:15.46
Delivered VAR	12.37	07/26/2014 04:59:59.43
Received VAR	0.00	07/02/2014 11:26:15.46
Delivered Watt Coincident VAR	10.41	
Received Watt Coincident VAR	0.00	

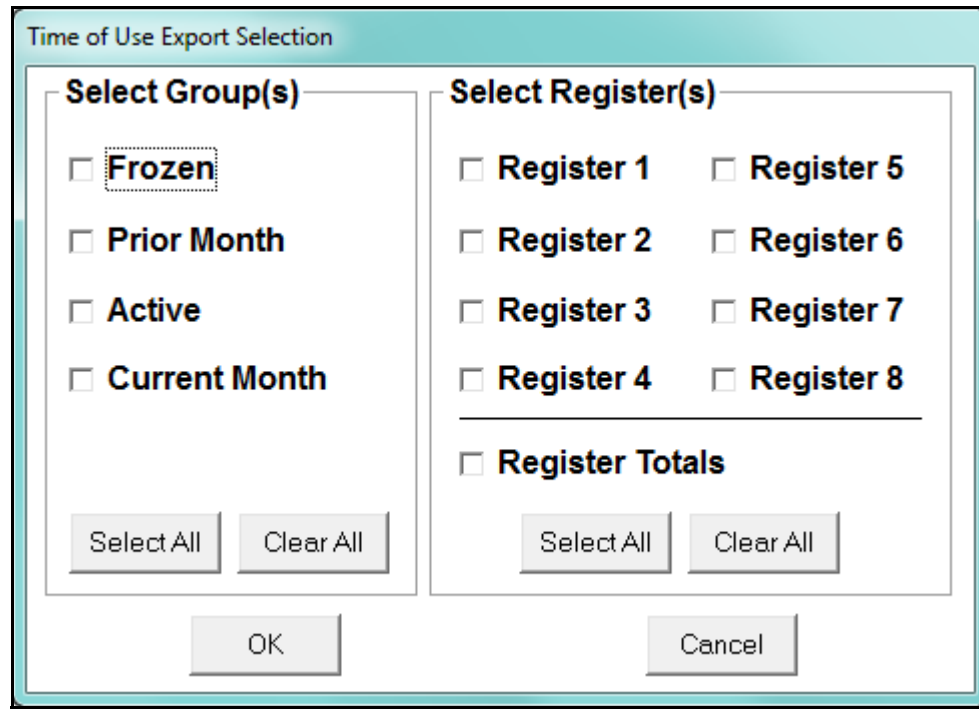
Register Cumulative Demand		
	Continuous	
Delivered Watt	0000001149	0000001513
Received Watt	0000000000	0000000000

☐ Polling Nexus\_169, SN: 0000000000202052

OK Copy Export Print Help

- The readings on this screen are based on the Time of Use settings for the connected device.
- Use the drop-down menus at the top of the screen to view a choice of Groups and Registers.

- To copy the data into another program, click Copy. You will see the screen shown on below. Select Groups and Registers and click OK. You will see a message that your data was copied to the clipboard. You can then paste it into a document.



The image shows a dialog box titled "Time of Use Export Selection". It contains two main sections: "Select Group(s)" and "Select Register(s)".

**Select Group(s)**

- ☐ Frozen
- ☐ Prior Month
- ☐ Active
- ☐ Current Month

Below the list are two buttons: "Select All" and "Clear All".

**Select Register(s)**

- ☐ Register 1
- ☐ Register 2
- ☐ Register 3
- ☐ Register 4
- ☐ Register 5
- ☐ Register 6
- ☐ Register 7
- ☐ Register 8
- ☐ Register Totals

Below the list are two buttons: "Select All" and "Clear All".

At the bottom of the dialog are two buttons: "OK" and "Cancel".

- Click Export to save the data as a CSV text file. You will see the screen above. Select Groups and Registers and click OK. You will be prompted to enter a name and location for the .csv file.

If you are connected to a Nexus® 1450 or 1500+ meter or a Shark® 250/270 meter, you will see the screen shown below.

Time of Use

**TOU Channels**      Status

**Billing Period, Billing Period name**      **Rate, Assigned Rate Name**      **From: 7/1/2015 12:00 AM**  
**To: 7/31/2015 12:00 AM**

Current Billing Period: July      Total: Total

TOU Channel	Accumulator	Peak Demand	Time of Peak Demand	Coincident Demand		Cumulative Demand	
	Value	Value		Type	Value	Type	Value
1:Quadrant 1+4	1997.29	1.000	7/7/2015 6:02:00 PM	VAR	0.000	Continuous	0.000
2:Q1 VAh	000009.724 M	0.000	7/27/2015 9:36:00 AM	PF	0.000	Continuous	0.000
3:Q4VAh	000000.105 M	0.999	7/2/2015 6:28:00 AM	PF	0.000		0.000
4:Q1 VARh	000000.614 M	65.530k	7/3/2015 12:21:00 PM	PF	0.000		0.000
5:Q4 VARh	000000.135 M	65.534k	7/20/2015 12:27:00 PM	PF	0.000		0.000
6:Pulse ACC#1	855954.554 M	0.000	{No Time}	PF	0.000		1191.875M

☐      Export Close

- This screen has two tabs - the one above shows the data for TOU Channels.
- Select the billing period for which you want to view data from the Billing Period pull-down menu.
- Select the rate for which you want to view data from the Rate pull-down menu.
- The following data is displayed for the billing period and rate you selected:
  - TOU channel, e.g., Positive Wh for Quadrants 1 and 4
  - Accumulator value for the channel
  - Peak Demand for the channel
  - Time of Peak Demand
  - Type of Coincident Demand for the channel
  - Coincident Demand value
  - Type of Cumulative Demand
  - Cumulative Demand value

- Click the Status tab to display the screen shown below.

Self Read  
Mode Status  
Screen

Time of Use

TOU Channels **Status**

Billing Period	Assigned Name
Current Billing Period	Sept
Prior Billing Period	Aug
Current Season	Autumn (Season3)
Prior Season	Summer (Season2)

Self Read Status	Time
Self Read Time for Current Billing Period	10/1/2022 12:00:00 AM
Self Read Time for Current Season	12/1/2022 12:00:00 AM
Self Read Time for Prior Billing Period	9/1/2022 12:00:00 AM
Self Read Time for Prior Season	9/1/2022 12:00:00 AM

**TOU Status: Enabled-Running in Self-read mode**

Current Time 9/5/2022 20:07:13

■ Polling TOU Status

Export Close

Manual Read  
Mode Status  
Screen

Time of Use

TOU Channels **Status**

Billing Period	Status
Current Billing Period	Current Month
Prior Billing Period	4/19/2022 9:02:22 AM
Current Season	Current Season
Prior Season	4/19/2022 9:02:23 AM

**TOU Status: Enabled-Running in Manual read mode**

Current Time 9/5/2022 08:05:16

■ Polling Data set of Group Current Billing Period: Current Month, Rate Total: Total Rate

Export Close

- This screen displays information about the current TOU status.
  - The Billing Period fields tell you the current billing period, prior billing period, current season, and prior season.
  - The Self Read Status fields tell you the self read times for the current billing period and season, and the prior billing period and season. You won't see these fields in the Manual Read Status screen.
  - The TOU Status tells you if TOU is currently running and which mode it is in (Self Read or Manual Read).
  - The current time is also displayed.

### 5.3.9: Poll Pulse Accumulations

To view the Pulse Accumulations readings for the currently connected Nexus® meter, select Poll Pulse Accumulations from the Real-Time Poll>Revenue, Energy, and Demand Readings menu. You will see the screen shown below.

Pulse accumulators allow the meter to be used as a totalizer, to count and totalize pulses from external devices. This will allow a user to count pulses from other meters, such as other electric or gas meters.

Pulse Accumulations

Source	Totals	Average	Maximum	Time Stamp	Acc To
Pulse Counter 1	105579544	6000	12.500 k	7/31/2014 08:44:59.14	+1
Pulse Counter 2	000000234	0	0	4/21/2014 08:48:57.17	+1
Pulse Counter 3	000000078	0	0	4/21/2014 08:48:57.17	+2
Pulse Counter 4	000000034	0	0	4/21/2014 08:48:57.17	-2
Pulse Counter 5	000000012	0	0	4/21/2014 08:48:57.17	+3
Pulse Counter 6	000000038	0	0	4/21/2014 08:48:57.17	-3
Pulse Counter 7	002705910	356	1800	6/20/2014 22:59:59.03	+4
Assigned: WAV/PQ	000000851	0	0	4/21/2014 08:48:57.17	None

Watt Hour	Energy	Acc To
1252_KYZ_Monitor	006004135	None

Aggregator	Totals	Average	+Maximum	Time Stamp	
1250	105579778	6000	12.500 k	7/31/2014 08:44:59.14	<input checked="" type="radio"/> + Max
1252	000000044	0	0	4/21/2014 08:48:57.17	<input type="radio"/> - Max
1272	999999974	0	0	4/21/2014 08:48:57.17	
1270	002705910	356	1800	6/20/2014 22:59:59.03	

☒ Polling 1252\_KYZ\_Monitor

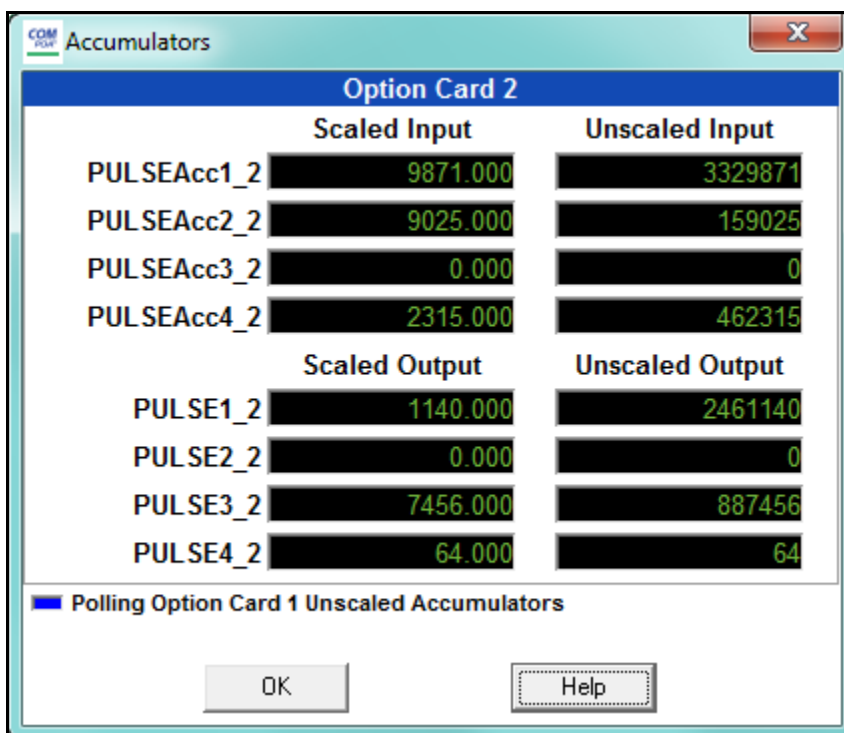
This screen is the result of configuring the Pulse Accumulations setting in the meter's Device Profile - see chapters 11, 12, 13, 27, and 28 for details. The Nexus® meter can be programmed to accumulate and aggregate pulses from any pulse generating device.

This screen displays:

- The scaled pulse accumulations from the Nexus® meter's eight internal digital inputs
- The Fixed Window average and maximum Demand, with timestamp, for the eight pulse accumulations
- The Watt Hour Energy reading
- The Acc To field which indicates the count added to or subtracted from an Aggregator, e.g, in the sample screen, +2 means a count is added to Aggregator 2, and -3 means a count is subtracted from Aggregator 3. The pulse aggregators are set up in the meter's Device Profile, in the Pulse Accumulations setting. See sections [11.2.9: Pulse Accumulations, on page 11-50](#) (Nexus® 1500+ meter), [12.2.10: Pulse Accumulations, on page 12-64](#) (Nexus® 1262/1272 meter), and [13.2.10: Pulse Accumulations, on page 13-42](#) (Nexus® 1252 meter) for details.
- Four totalizers (Aggregators), which are combinations of the eight internal inputs and the Nexus® meter's Watt Hour counter.

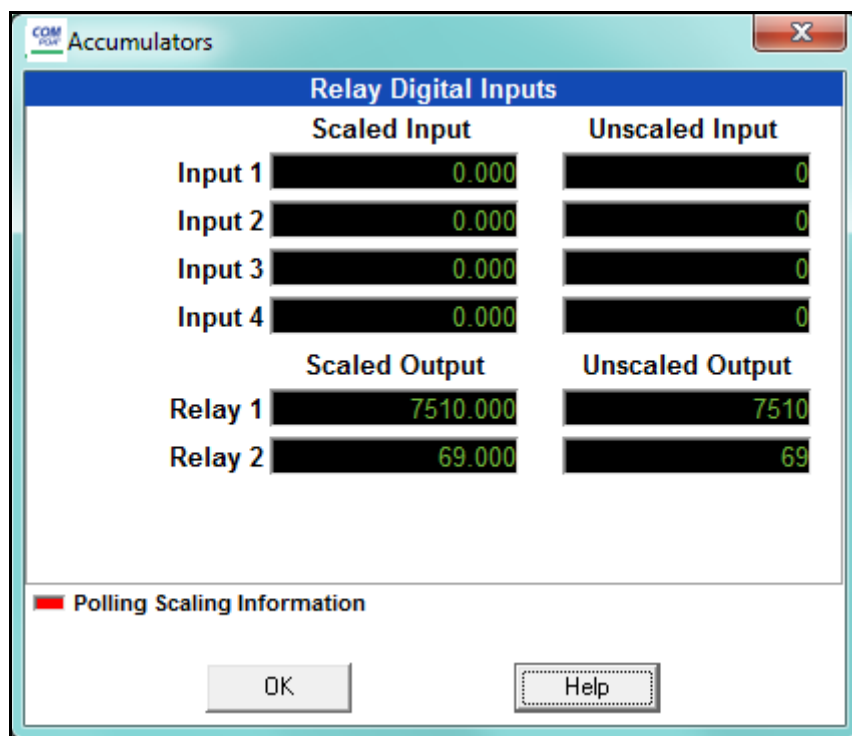
### 5.3.9.1: Poll Pulse Accumulators (Shark® 200/250/270 Meter and the MP200™ Metering System)

The Shark® 200/250/270 meter equipped with a Pulse Output/Digital Input Card and the MP200™ metering system have a polling screen that displays accumulations for the Digital Inputs. Select Poll Pulse Accumulations from the Real-Time Poll>Revenue, Energy, and Demand Readings menu.



You will see the screen above if you are connected to a Shark® 200/250/270 meter with a Relay and/or Pulse Output/Digital Input option card. It displays the current readings for the Input and Output accumulators for the cards. The readings are shown after the configured compression and units/count have been applied. See chapters 8, 10, 26, and 28 for information on setting compression and units/count for accumulators.





You will see the screen above if you are connected to an MP200™ metering system. It shows the scaled and unscaled input and output for the embedded Relay Output/Digital Input card.

### 5.3.10: Poll Previous Average Block

To view the previous Average Block readings for the currently connected Nexus® meter, select Previous Average Block from the Real-Time Poll>Revenue, Energy, and Demand Readings menu. You will see the screen shown below.

Previous Average Block

Previous Block Window Average Block				
Demand Reading	Maximum		Minimum	
	Value	Time Stamp	Value	Time Stamp
VA	18.44M	07/17/2014 10:59:59.09	10.09M	07/09/2014 14:59:59.02
+VAR	1487.42k	07/26/2014 06:14:59.20	845.84k	07/09/2014 14:59:59.02
-VAR	0.00	07/03/2014 00:00:00.14	-1572.86M	07/03/2014 00:00:00.15
+Watt	18.38M	07/17/2014 10:59:59.09	10.06M	07/09/2014 14:59:59.02
-Watt	0.00	07/03/2014 00:00:00.14	-1572.86M	07/03/2014 00:00:00.15
+Q	9186.59k	07/17/2014 11:14:59.11	5064.84k	07/09/2014 14:59:59.02
-Q	0.00	07/03/2014 00:00:00.14	-1572.86M	07/03/2014 00:00:00.15

Coincident Reading	Maximum		Minimum	
	+Watt	-Watt	+Watt	-Watt
VAR	1396.97k	0.00	845.84k	0.00
PF	0.997 LAG	0.000 LAG	0.996 LAG	0.000 LAG

☒ Show Block Window Average Values
 ☐ Show Rolling Window Average Values

☒ Polling Coincident Power Factor

You can view Block Window Average Values or Rolling Window Average Values by clicking the radio button next to either option (this option is not available for the Nexus® 1450 meter).

This is a similar feature to a frozen register in that it provides the ability to capture a previous window of data. In this manner, the data can be polled and collected without risk that the data will be erased.

### 5.3.11: Poll Previous Scaled Energy Block

To view the previous Scaled Energy Block Readings for the currently connected Nexus® meter, select Previous Scaled Energy Block from the Real-Time Poll>Revenue, Energy, and Demand Readings menu. You will see the screen shown below.

Previous Scaled Energy

Wh	000000.103 k	VARh	000000.078 k	Wh	000005.292 k
VARh	000000.001 k	Q 2		VARh	000000.077 k
VAh	000000.104 k	Q 1		VAh	000005.332 k
Rec Wh	000000.103 k	VAh	000005.520 k	Del Wh	000005.376 k
VAh	000000.000 k	Q 3		VAh	000000.084 k
VARh	000000.000 k	Q 4		VARh	000000.001 k
Wh	000000.000 k	VARh	000000.001 k	Wh	000000.084 k

Uncompensated

VAh	000005.519 k
+VARh	000000.078 k
-VARh	000000.001 k
+Wh	000005.375 k
-Wh	000000.103 k

+Qh	000002.755 k
-Qh	000000.051 k

	Phase A	Phase B	Phase C
I Squared T	000000.016 k	000000.016 k	000000.016 k
V Squared T	000224.373 k	000224.372 k	000224.363 k

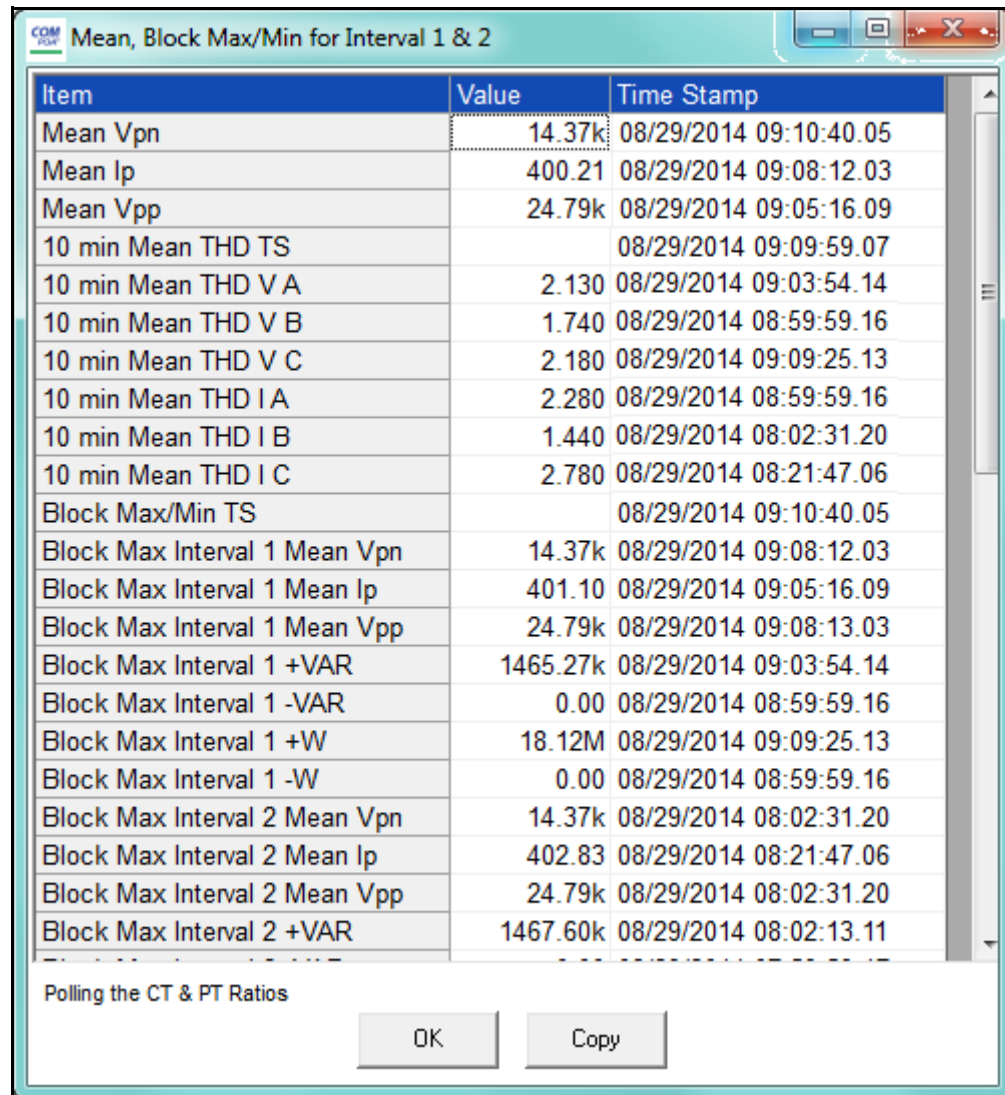
☐ Polling Previous Scaled Energy Block
 

OK

This screen shows scaled compensated and uncompensated energy readings.

### 5.3.12: Poll Mean, Block Max/Min for Interval 1 and 2

To view the Means and Block Max/Min readings for Interval 1 and 2 for the currently connected Nexus® meter, select Mean, Block Max/Min for Interval 1 and 2 from the Real-Time Poll>Revenue, Energy, and Demand Readings menu. You will see the screen shown below.



The screenshot shows a software window titled "Mean, Block Max/Min for Interval 1 & 2". It contains a table with three columns: "Item", "Value", and "Time Stamp". The table lists various meter readings including Mean Vpn, Mean Ip, Mean Vpp, 10 min Mean THD TS, 10 min Mean THD V A, 10 min Mean THD V B, 10 min Mean THD V C, 10 min Mean THD I A, 10 min Mean THD I B, 10 min Mean THD I C, Block Max/Min TS, and Block Max/Min for Interval 1 and 2. The values are displayed in scientific notation (e.g., 14.37k, 400.21, 24.79k). The time stamps are in YYYY-MM-DD HH:MM:SS format. At the bottom of the window, there is a status bar that says "Polling the CT & PT Ratios" and two buttons: "OK" and "Copy".

Item	Value	Time Stamp
Mean Vpn	14.37k	08/29/2014 09:10:40.05
Mean Ip	400.21	08/29/2014 09:08:12.03
Mean Vpp	24.79k	08/29/2014 09:05:16.09
10 min Mean THD TS		08/29/2014 09:09:59.07
10 min Mean THD V A	2.130	08/29/2014 09:03:54.14
10 min Mean THD V B	1.740	08/29/2014 08:59:59.16
10 min Mean THD V C	2.180	08/29/2014 09:09:25.13
10 min Mean THD I A	2.280	08/29/2014 08:59:59.16
10 min Mean THD I B	1.440	08/29/2014 08:02:31.20
10 min Mean THD I C	2.780	08/29/2014 08:21:47.06
Block Max/Min TS		08/29/2014 09:10:40.05
Block Max Interval 1 Mean Vpn	14.37k	08/29/2014 09:08:12.03
Block Max Interval 1 Mean Ip	401.10	08/29/2014 09:05:16.09
Block Max Interval 1 Mean Vpp	24.79k	08/29/2014 09:08:13.03
Block Max Interval 1 +VAR	1465.27k	08/29/2014 09:03:54.14
Block Max Interval 1 -VAR	0.00	08/29/2014 08:59:59.16
Block Max Interval 1 +W	18.12M	08/29/2014 09:09:25.13
Block Max Interval 1 -W	0.00	08/29/2014 08:59:59.16
Block Max Interval 2 Mean Vpn	14.37k	08/29/2014 08:02:31.20
Block Max Interval 2 Mean Ip	402.83	08/29/2014 08:21:47.06
Block Max Interval 2 Mean Vpp	24.79k	08/29/2014 08:02:31.20
Block Max Interval 2 +VAR	1467.60k	08/29/2014 08:02:13.11

Use the scroll bar to view all of the data. The fields in this polling screen are as follows:

- Mean Vpn is the arithmetic average of all 3 phase to neutral voltages ( $V_{an} + V_{bn} + V_{cn} / 3$ ).

- Mean Ip is the arithmetic average of all 3 current phases ( $I_a + I_b + I_c / 3$ ).
- Mean Vpp is the arithmetic average of all 3 phase to phase voltages ( $V_{ab} + V_{bc} + V_{ca} / 3$ ).
- The 10 min Mean THD TS is the date and time of each 10 min intervals.
- The 10 min Mean THD Va,Vb,Vc,Ia,Ib,Ic, I the arithmetic average of each THD value within 10 minutes, sampled each second (e.g., THD Va at 1 second + THD Va 2 seconds....+THD Va at 600 seconds / 600 seconds).
- This polling screen was developed to meet a specific customer need. The concept of INTERVAL 1 and INTERVAL 2 because the application necessitated that some values be averaged within 10 minutes (e.g., THD,V, and I) and some other values be averaged within 5 minutes (e.g., Energy). INTERVAL 1 is equal to 10 minutes and INTERVAL 2 is equal to 5 minutes.
- Block Max / Min TS is the date and time of each interval.
- Block Max interval 1 mean  $V_{pn}/I_p/V_{pp} + VAR/-VAR + W/-W$  is the value of the sample with the highest value, of the 600 samples within 10 minutes.
- Block Max interval 2 mean  $V_{pn}/I_p/V_{pp} + VAR/-VAR + W/-W$  is the value of the sample with the highest value, of the 300 samples within 5 minutes.
- Block Min interval 1 mean  $V_{pn}/I_p/V_{pp} + VAR/-VAR + W/-W$  is the value of the sample with the lowest value, of the 600 samples within 10 minutes.
- Block Min interval 2 mean  $V_{pn}/I_p/V_{pp} + VAR/-VAR + W/-W$  is the value of the sample with the lowest value of the 300 samples within 5 minutes.

### 5.3.13: Poll Pulse Aggregators (Shark® 250/270 Meter)

To view the values for the meter's aggregators values for the meter's, select Poll Pulse Aggregators from the Real-Time Poll>Revenue, Energy, and Demand Readings menu. You will see the screen shown below.

The screenshot shows a software window titled "Aggregators" with a pull-down menu at the top set to "Aggregator 1". The window is divided into several sections:

- Input Source**: A table with two columns, "Input Source" and "Agg\_1\_Label".
 

Input Source	Agg_1_Label
Option Card 1 - No inputs	
Input 1	Input Not Installed
Input 2	Input Not Installed
Input 3	Input Not Installed
Input 4	Input Not Installed
Option Card 2 - Digital Relay	
Acc1_Label	+ 0,000
Acc2_Label	+ 0,000
Input 3	Input Not Enabled
Input 4	Input Not Enabled
- Scaled Energy: Wh Delivered**: A section with a single row:
 

Energy Source	
	+ 0 k
- Total**: A section with a single row:
 

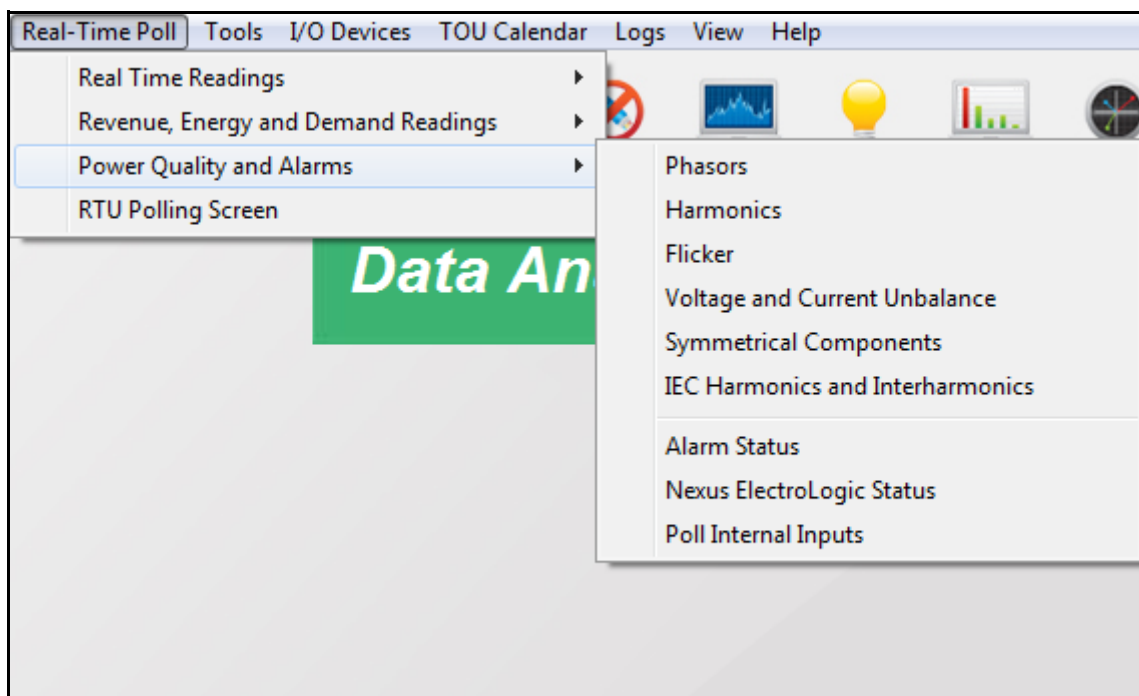
Aggregator	
	= 0

At the bottom, there is a checkbox labeled "Polling Aggregator value" (which is checked), and two buttons: "OK" and "Help".

Select the aggregator you want to view from the pull-down menu at the top of the screen.

- The screen shows any inputs and Energy source used to create the aggregator.
- A plus sign next to the value means the input/energy value is added to the aggregator; a minus sign means it is subtracted from the aggregator.
- The aggregator value is shown in the total field.

## 5.4: Power Quality and Alarms



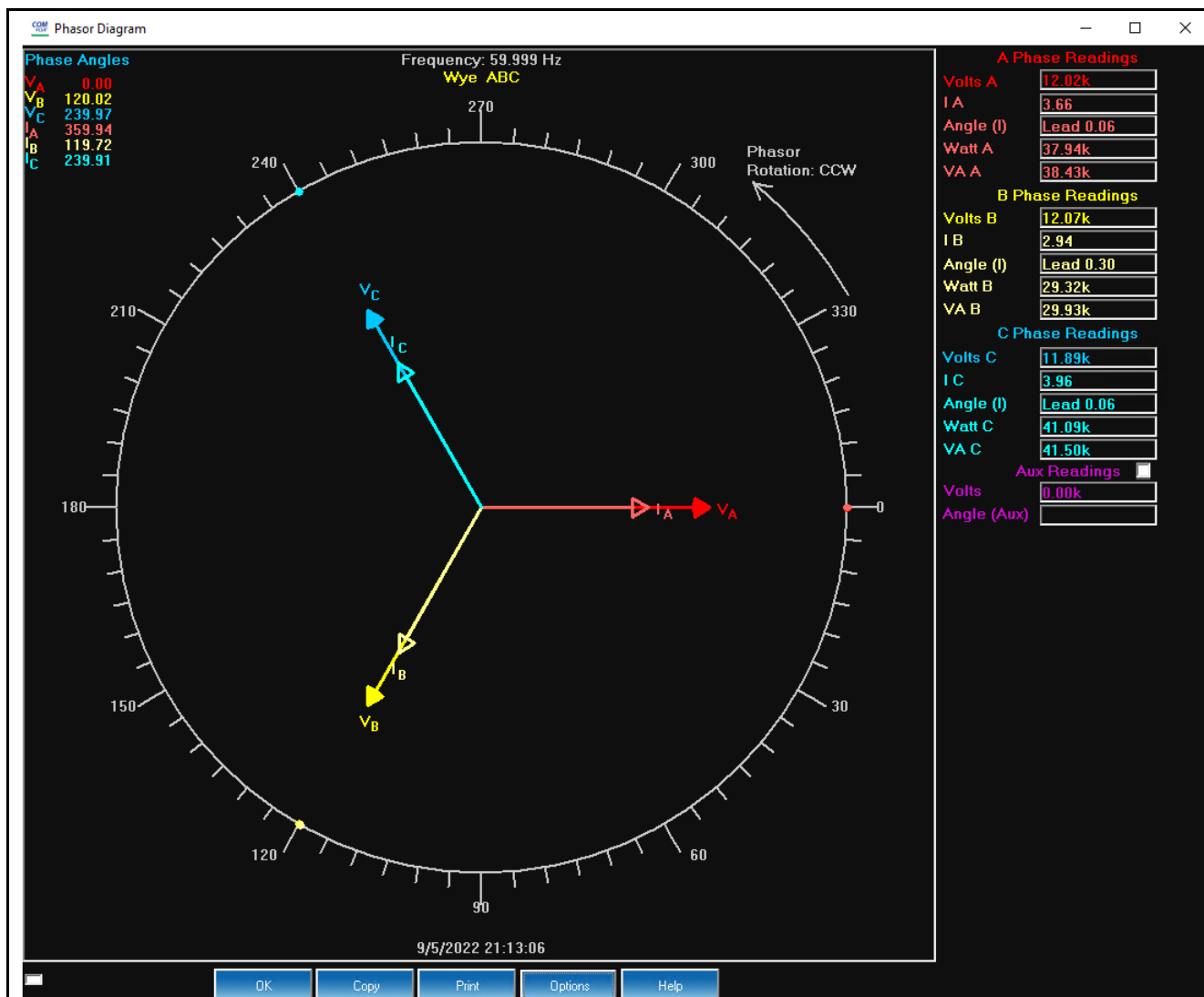
The menu above is an example from a Nexus® 1500+ meter - the menu for your meter may look a bit different. For example, if you have a Nexus® 1500+ meter with a digital input option card, you will see "Poll Digital Input Option cards" after Poll Internal Inputs.

### 5.4.1: Poll Phasors

The Phasors screen displays the phase relationships of the voltages and the currents of the currently connected device. The Frequency, Configuration, and Form (Nexus® 1262/1272 meter, only) are shown at the top of the screen.

**NOTE:** See Section E.1 for information on using the Phasors screen to diagnose wiring errors.

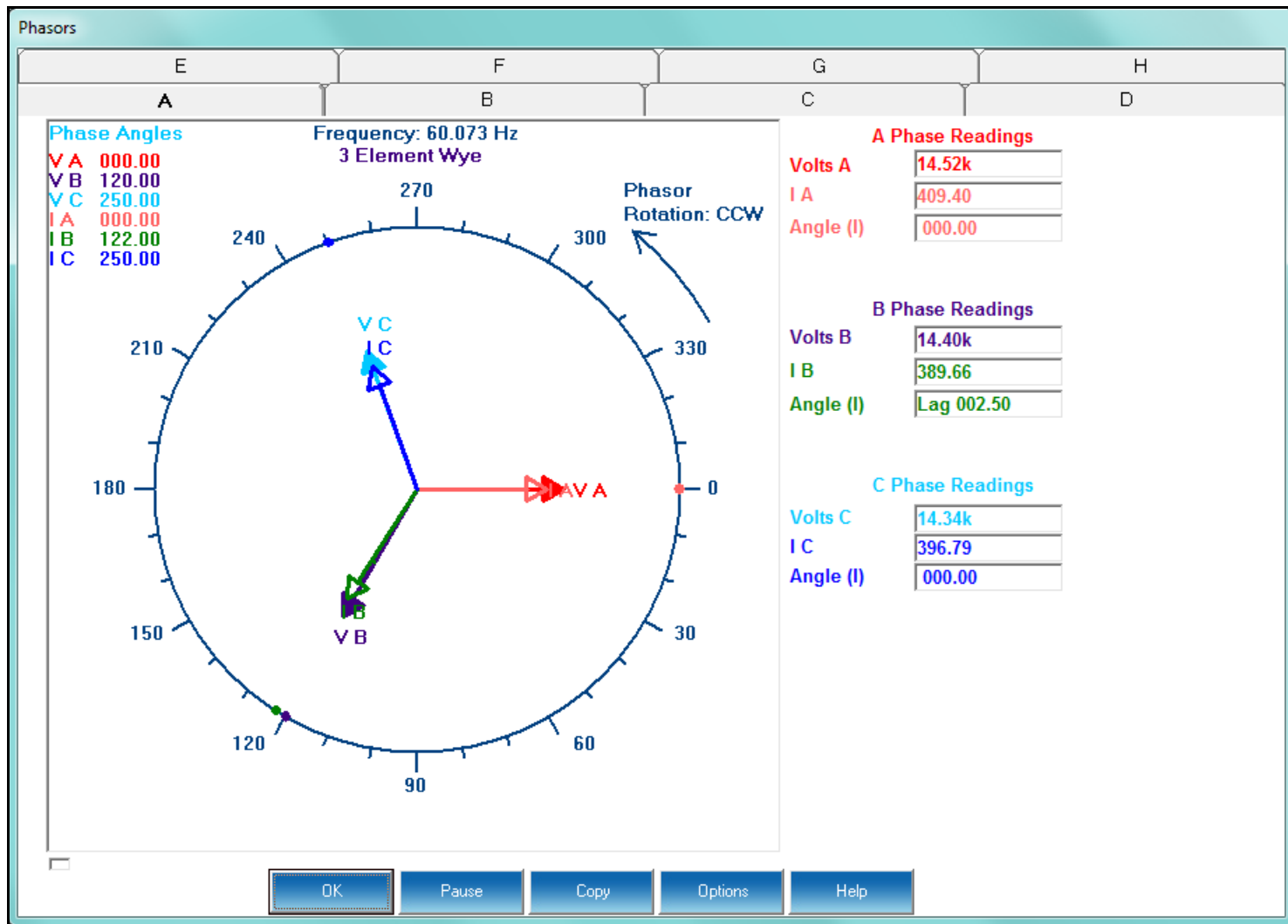
Select Phasors from the Real-Time Poll>Power Quality and Alarms menu, or click the Phasors icon in the Icon Bar. You will see the screen shown below if you are connected to a Nexus® 1500/1500+ meter.





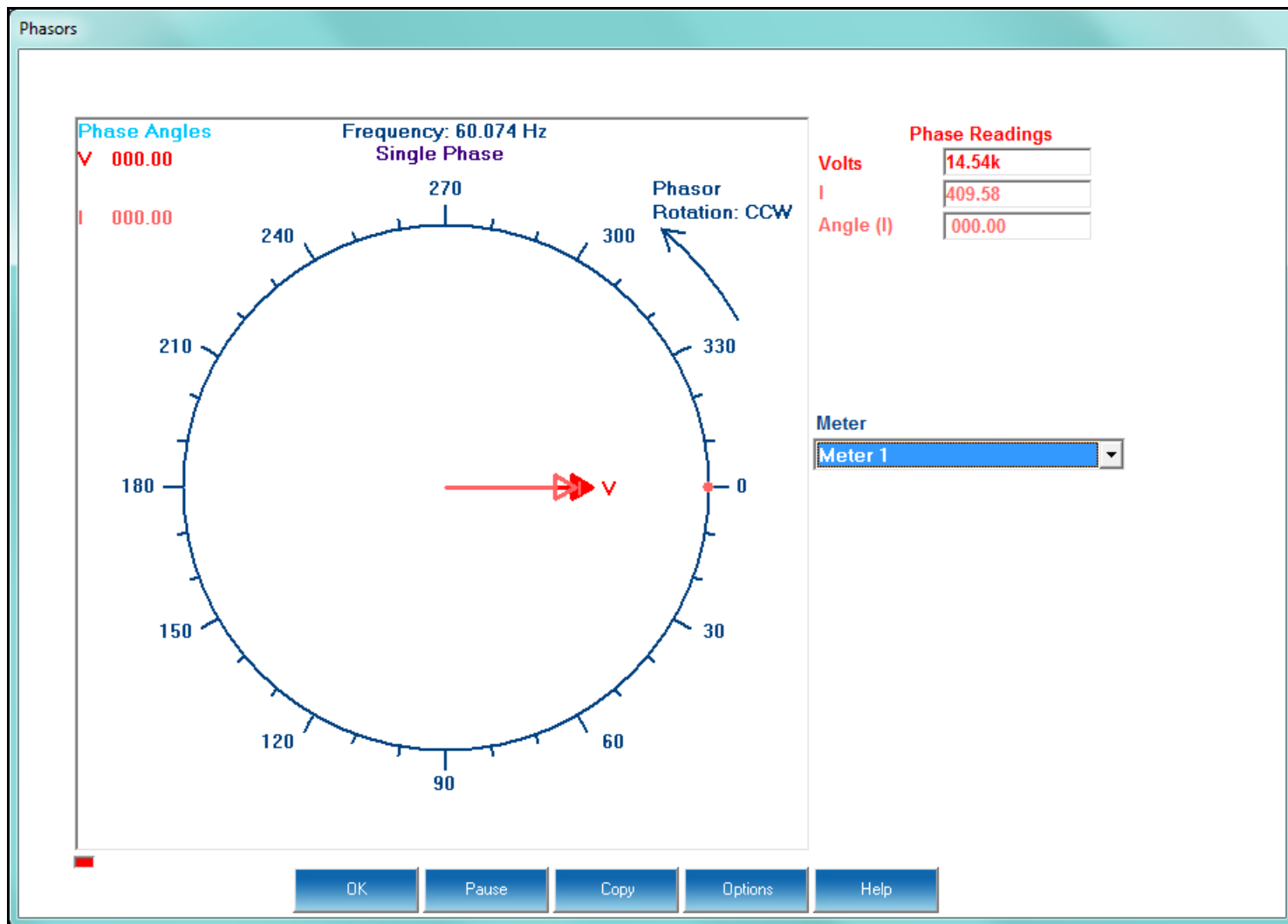
If you have an auxiliary voltage reading (i.e., generator and bus where the VAux is the generator), the Aux box and the VAux Phasor are displayed. The VAux Phasor is referenced to VA phase.

For the MP200 metering system, depending on your circuit configuration, you'll see one of the following screens.



MP200-Y Metering System

Click on the tabs to see the phasor display for each of the 8 meters.



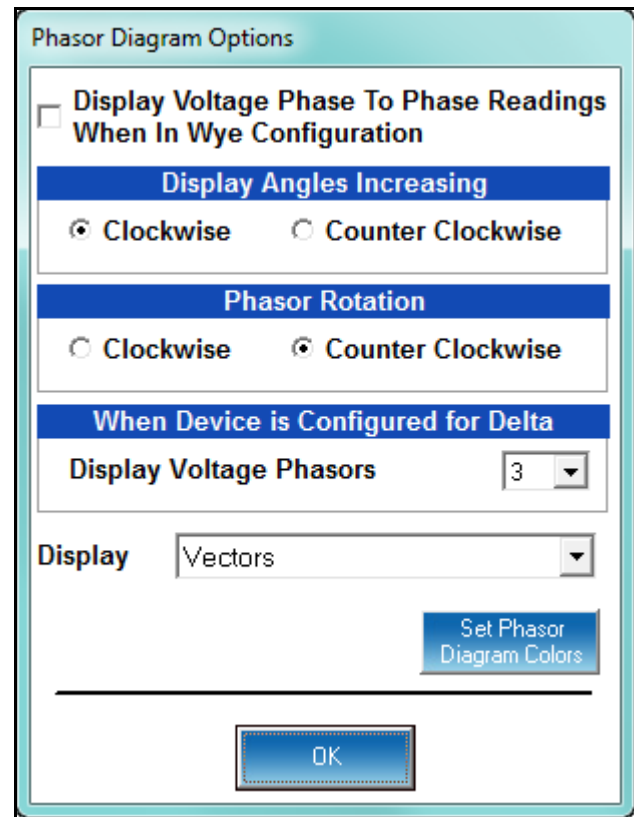
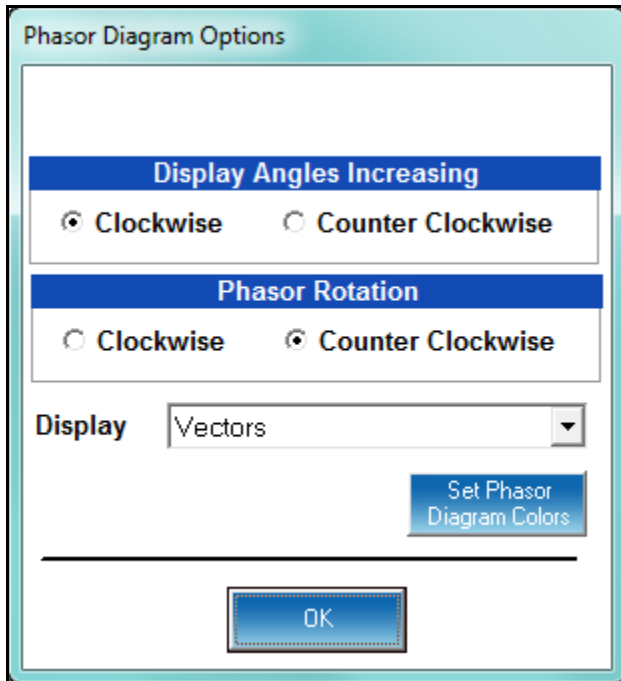
MP200-S Metering System

From the pull-down menu, select which of the 24 meters you want to see the phasor display for.

The Phasor screen is a graphical representation of the voltage and current phase angles. Phase angles are the difference in phase between the voltage and current in an AC electrical system. In addition to the Phasor graphic, there are fields on the screen that give the phase angles and phase values for phases A,B,C of current and voltage and VAUX, if applicable

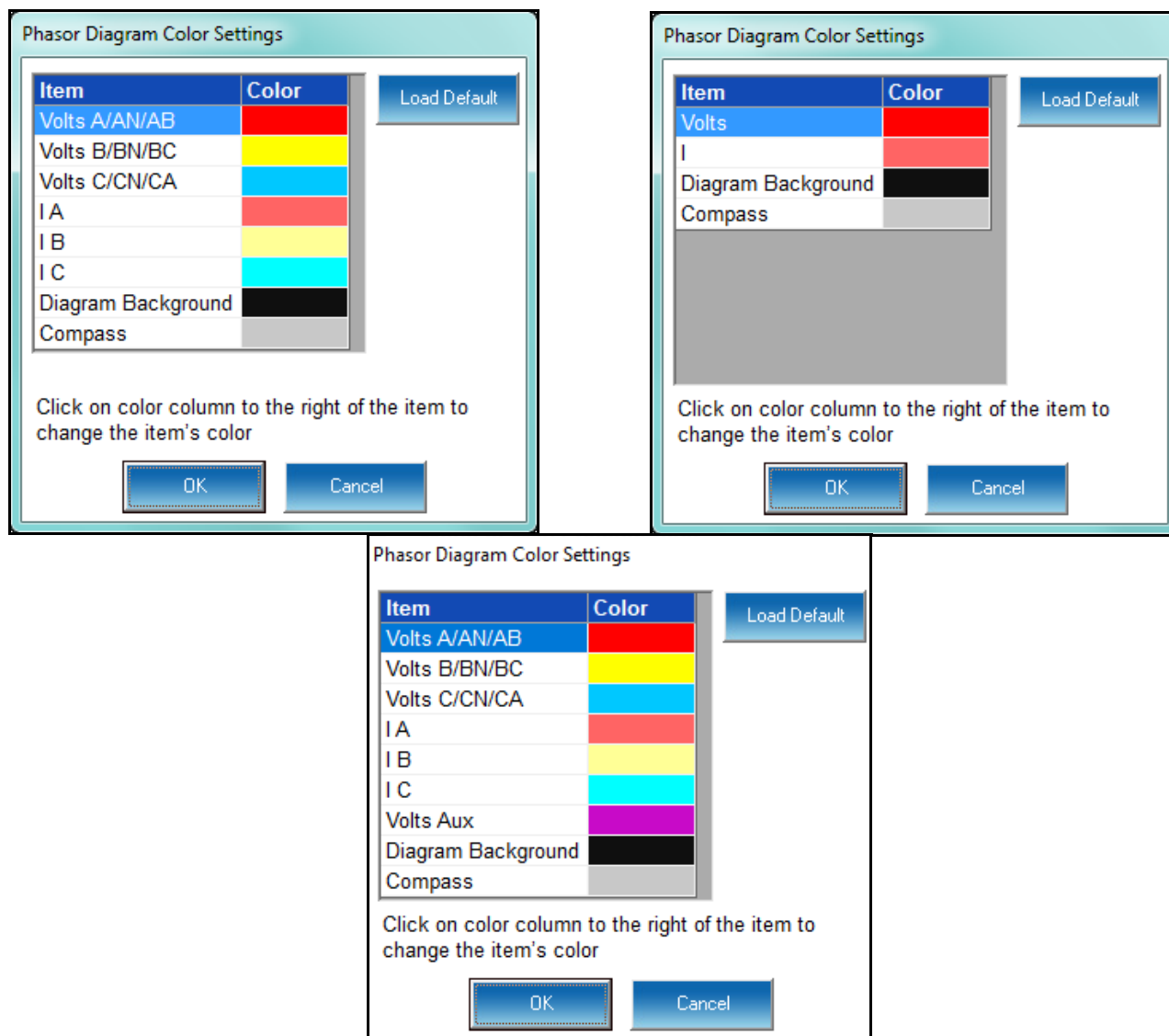
To adjust the Phasor display:

1. Click Options at the bottom of the screen. You will see one of the screens shown below, depending on which EIG device you are connected to.



2. Click the checkbox next to Display Voltage Phase To Phase Readings When In Wye Configuration, if you want to include that reading in the graph. This option is only available for Nexus® meters.
3. In the Display Angles Increasing and Phasor Rotation boxes, select either Clockwise or Counter Clockwise for the display.
4. For a Nexus® meter, from the When Device is Configured for Delta pull-down menu, select 2 or 3 voltage phasors to display.
5. From the pull-down menu next to Display, select Vectors, Triangles, or Vectors and Triangles to change the graphic representation of the data.

6. To change the phasor diagram colors, click the Set Phasor Diagram Colors button. Depending on the meter you are connected to, you will see one of the following screens.



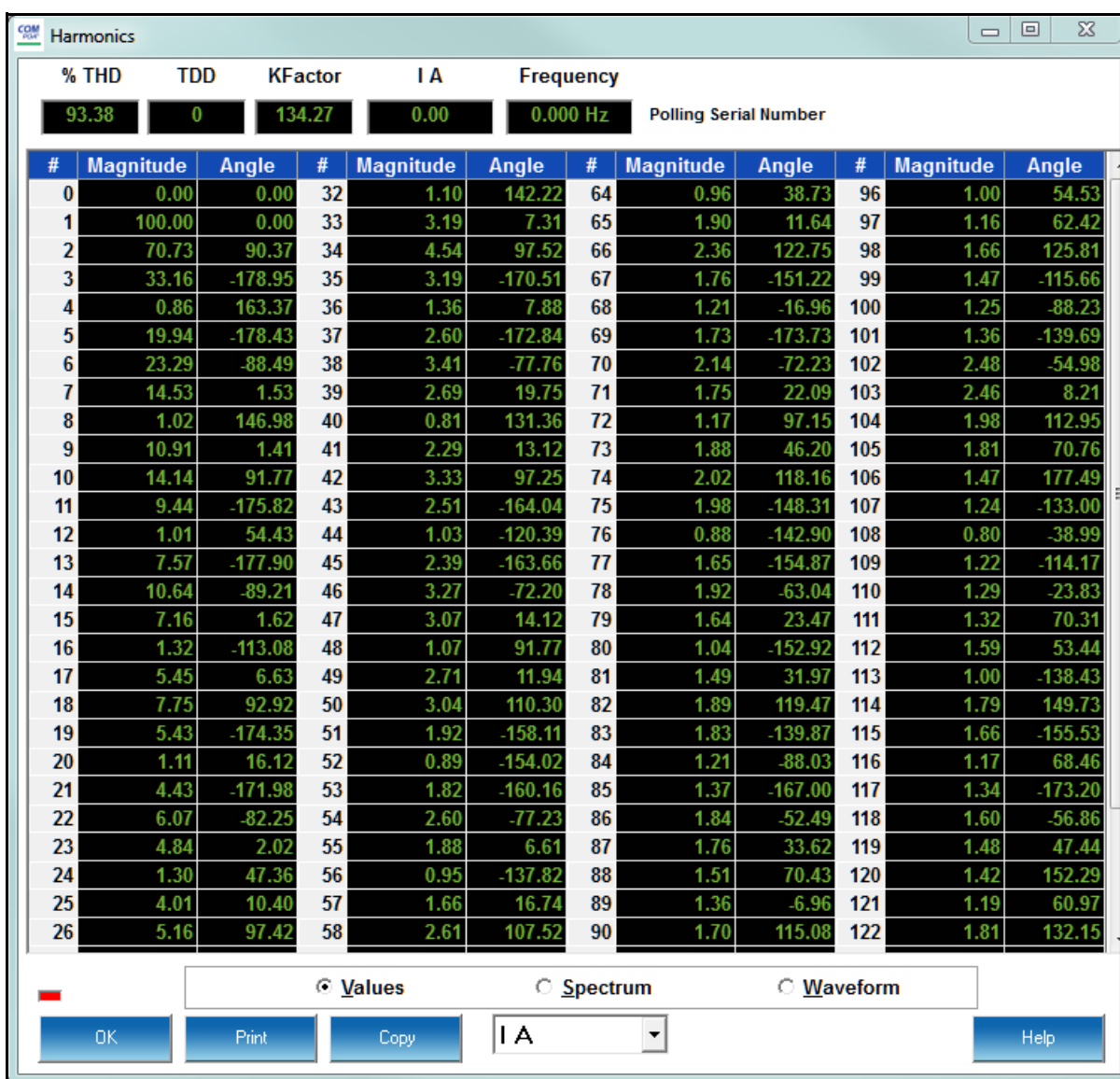
- To change a color for an element, click in the color field to the right of it. A small screen opens that lets you choose colors. Click on the color you want and click OK.
  - To return to the original color scheme, click Load Default.
7. Click OK to close the Color Settings screen.
8. Click OK to close the Options screen and return to the phasor display.

### 5.4.2: Poll Harmonics

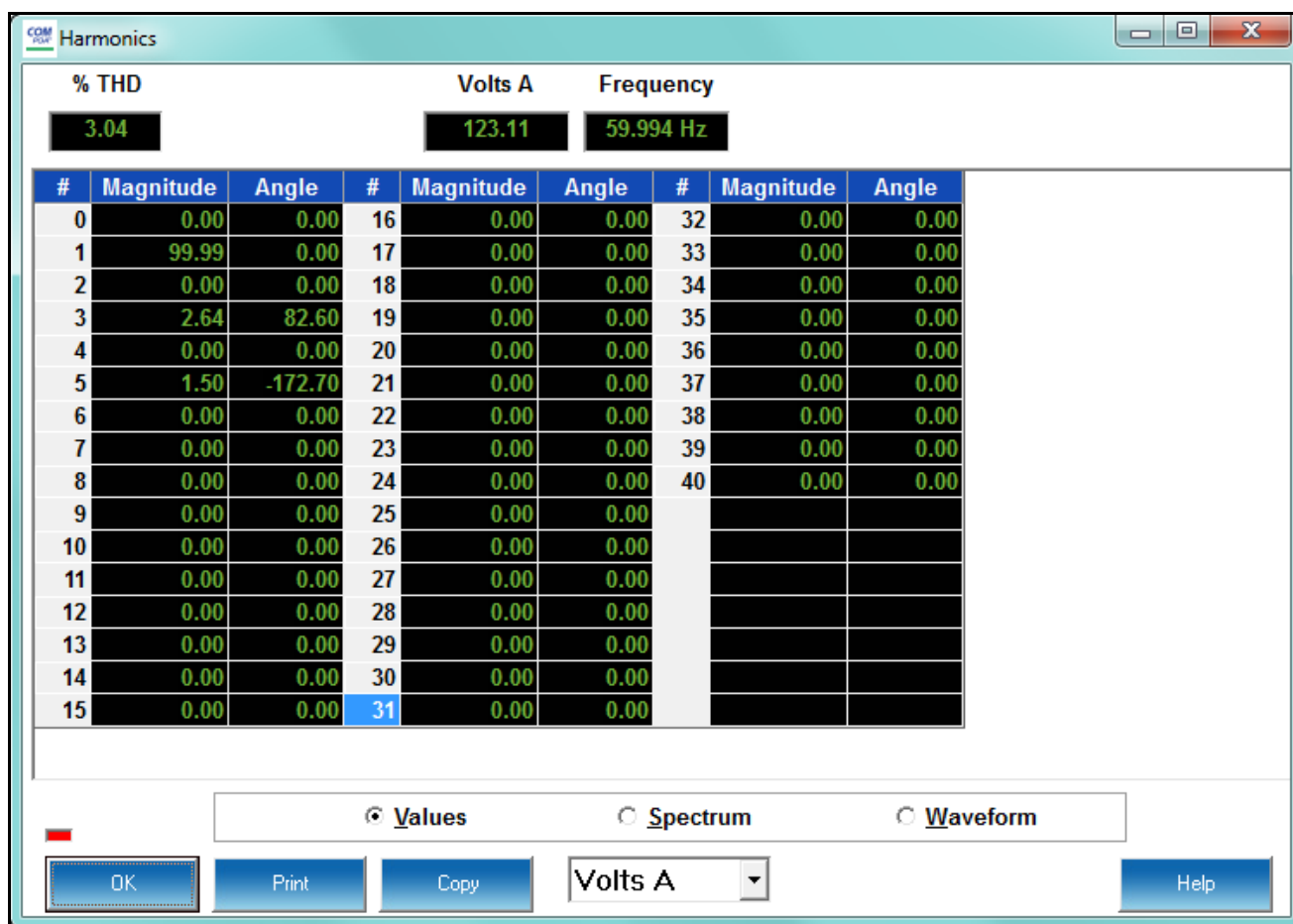
Many of the EIG meters have the ability to calculate the harmonic components of the electrical waveforms. These screens allow a user to conduct a harmonic analysis and view the amount of higher level harmonics on a line.

If Harmonic magnitude measurement is available for the connected meter, select Harmonics from the Real-Time Poll>Power Quality and Alarms menu. You will see the screen shown below.

**NOTE:** You will only see the KFactor field when you are viewing Harmonic Magnitudes for Current.



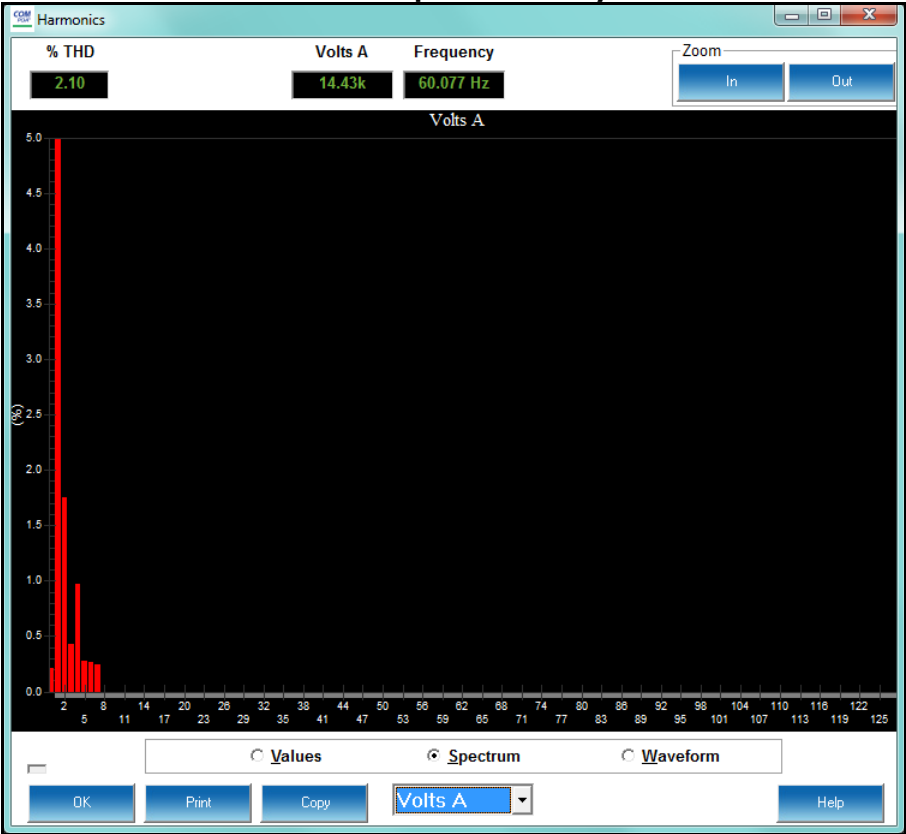
You will see the previous screen if you are connected to a Nexus® meter.



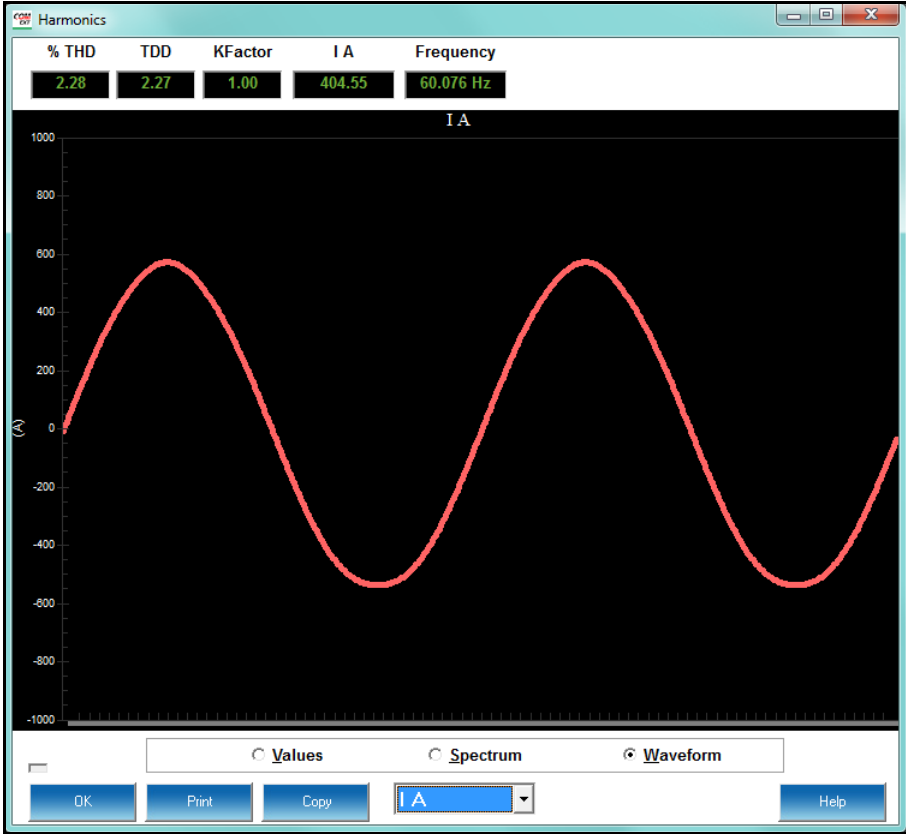
You will see the screen above if you are connected to a Shark® 200/250/270/ST40 meter.

- To change the presentation format, click on the Values, Spectrum or Waveform buttons. The two previous screens are in Values mode. The Spectrum Mode and Waveform Mode screens are shown on the next page.
- The Waveform button works like a real time oscilloscope. It allows a user to view what the waveform would look like for the given harmonics. This is available for each voltage and current channel.

Harmonic Spectrum Analysis



Real Time Waveform View



- To change the channel, use the pull-down menu beneath the Spectrum radio button to select from Volts A, B, C or Current (I) A, B, C.
- Use the scroll bar to view all of the data.

### 5.4.3: Flicker

Flicker is a measurement of visible change of brightness of a lamp due to rapid fluctuations of voltage. If Flicker is beyond a reasonable point, it can cause detrimental effects to people. For this reason, our meters have the capability to measure Flicker.

To view Flicker data for the currently connected Nexus® meter, select Flicker from the Real-Time Poll>Power Quality and Alarms menu. You will see the screen shown below.

EN50160 / IEC 61000-4-30 Flicker

Time		Instantaneous		Short Term		Long Term	
			PINST		Voltage Reading		
Start/Reset	09/03/2014 12:26:36	Volts A	0.149		120.442V		
Stop	00/00/0000 00:00:00	Volts B	0.062		118.965V		
Current	09/03/2014 12:27:04	Volts C	0.017		119.871V		
Next PST	2 min, 58 sec						
Next PLT	212 min, 58 sec						

Status	
Active	

Frequency	
Base	60 Hz
Current	60.076 Hz

Base Voltage	
Base Voltage	120 Volts

Flicker Monitoring		
Start	Stop	Reset

Polling Time

OK Help Print

- To view Short Term or Long Term Flicker data, click on the tabs at the top of the screen. You will see the screens shown on the next page.



- Flicker is generally calculated in EIG meters using the IEC 61000-4-15 and IEC 61000-4-30 Class A standards.

EN50160 / IEC 61000-4-30 Flicker

Time	
Start/Reset	00/00/0000 00:00:00
Current	10/28/2014 14:53:17
Next PST	6 min, 43 sec
Next PLT	66 min, 43 sec

Status	
Active	

Frequency	
Base	60 Hz
Current	60.075 Hz

Base Voltage	120 Volts
--------------	-----------

Flicker Monitoring	
Reset	

Instantaneous	Short Term	Long Term
	PST	Time
Volts A	0.027	10/28/2014 14:50:01.00
Volts B	0.008	10/28/2014 14:50:01.00
Volts C	0.010	10/28/2014 14:50:01.00
Max Volts A	76.417	10/10/2014 16:40:01.00
Max Volts B	76.670	01/00/1640 20:14:09.02
Max Volts C	75.979	10/22/2014 10:30:01.00
Min Volts A	0.000	10/09/2014 10:30:01.00
Min Volts B	0.000	10/09/2014 10:30:01.00
Min Volts C	0.000	10/09/2014 10:30:01.00

Polling Time

OK Help Print

EN50160 / IEC 61000-4-30 Flicker

Time

Start/Reset

00/00/0000 00:00:00

Current

10/28/2014 14:53:29

Next PST

6 min, 31 sec

Next PLT

66 min, 31 sec

Status

Active

Frequency

Base

60 Hz

Current

60.075 Hz

Base Voltage

120 Volts

Flicker Monitoring

Reset

Instantaneous

Short Term

Long Term

PLT

Time

Volts A

0.031

10/28/2014 14:00:01.00

Volts B

0.008

10/28/2014 14:00:01.00

Volts C

0.010

10/28/2014 14:00:01.00

Max Volts A

35.470

10/10/2014 18:00:01.00

Max Volts B

35.195

10/10/2014 18:00:01.00

Max Volts C

35.156

10/10/2014 18:00:01.00

Min Volts A

0.000

10/09/2014 14:00:01.00

Min Volts B

0.000

10/09/2014 14:00:01.00

Min Volts C

0.000

10/09/2014 14:00:01.00

Polling Voltage and Frequency

OK

Help

Print

- Use the Flicker Monitoring buttons to Start or Stop Flicker monitoring or to Reset the meter's Flicker monitoring.

**NOTES:**

- If you are connected to a Nexus® 1450/1500/1500+ meter, you will only see the Reset button.
- If level 2 password protection has been enabled for Flicker Start/Stop and Reset, and you have not signed on with the level 2 password, you will not see any buttons in the Flicker Monitoring section.

#### 5.4.4: Poll Voltage and Current Unbalance

Unbalanced circuits are caused by many factors. A common factor is non-linear switching loads, which produce large amounts of 3rd order harmonics that add up in neutral wires.

To view data concerning unbalance for the currently connected Nexus® meter, select Voltage and Current Unbalance (Nexus® 1450/1500/1500+) or Voltage Unbalance (other Nexus® meters) from the Real-Time Poll>Power Quality and Alarms Menu. (For the Shark® 200 meter, select Symmetrical Components from the menu. See the following section.) You will see the following screen.

**NOTES:**

- The screen is for a Nexus® 1450 or 1500/1500+ meter. There are two tabs which let you view either Voltage or Current unbalance. For the other Nexus® meters, you can only view Voltage unbalance.
- The EN50160/IEC61000-4-30 standards are applied to the voltage.

- In addition to the Positive, Negative, and Zero Symmetrical Components, there is a field called 10 Min Neg Ratio, which is the Negative Sequence reading divided by the Positive Sequence reading.

**Voltage & Current Unbalance**

**Unbalance** EN50160  
IEC 61000-4-30

**Voltage** **Current**

Symmetrical Components			
	Magnitude	Phase Angle	10 Min Avg
Positive	119.02	1.72	119.07
Negative	7.78	-165.74	7.73
Zero	8.57	-11.24	8.76
10 Min Neg Ratio	0.06		

Voltage		
	High speed	10 Min Avg
V A	119.94	120.16
V B	118.96	119.06
V C	119.92	119.79

10 Second Frequency: 60.076

Time Stamp: 08/29/2014 09:38:02.31

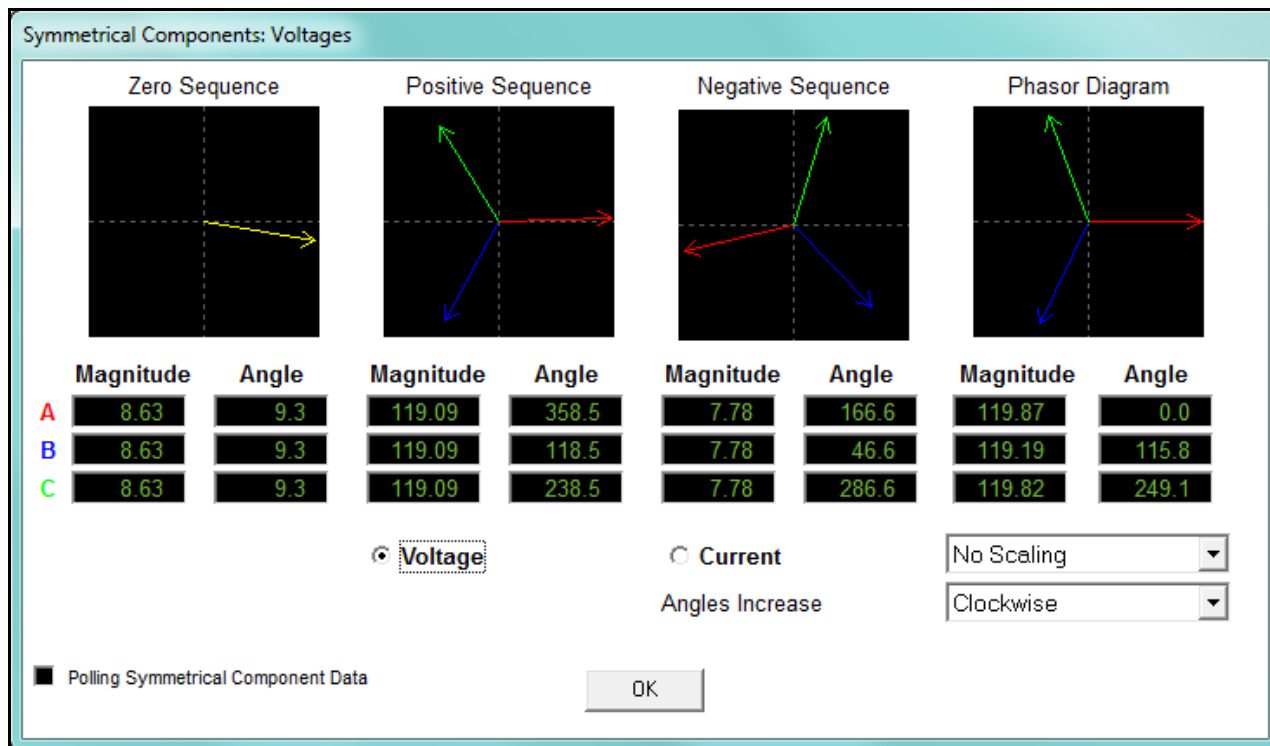
☐ Polling Dynamic Values

OK

- For the Nexus® 1450 or 1500/1500+ meter, click the Current tab to view Current unbalance data.

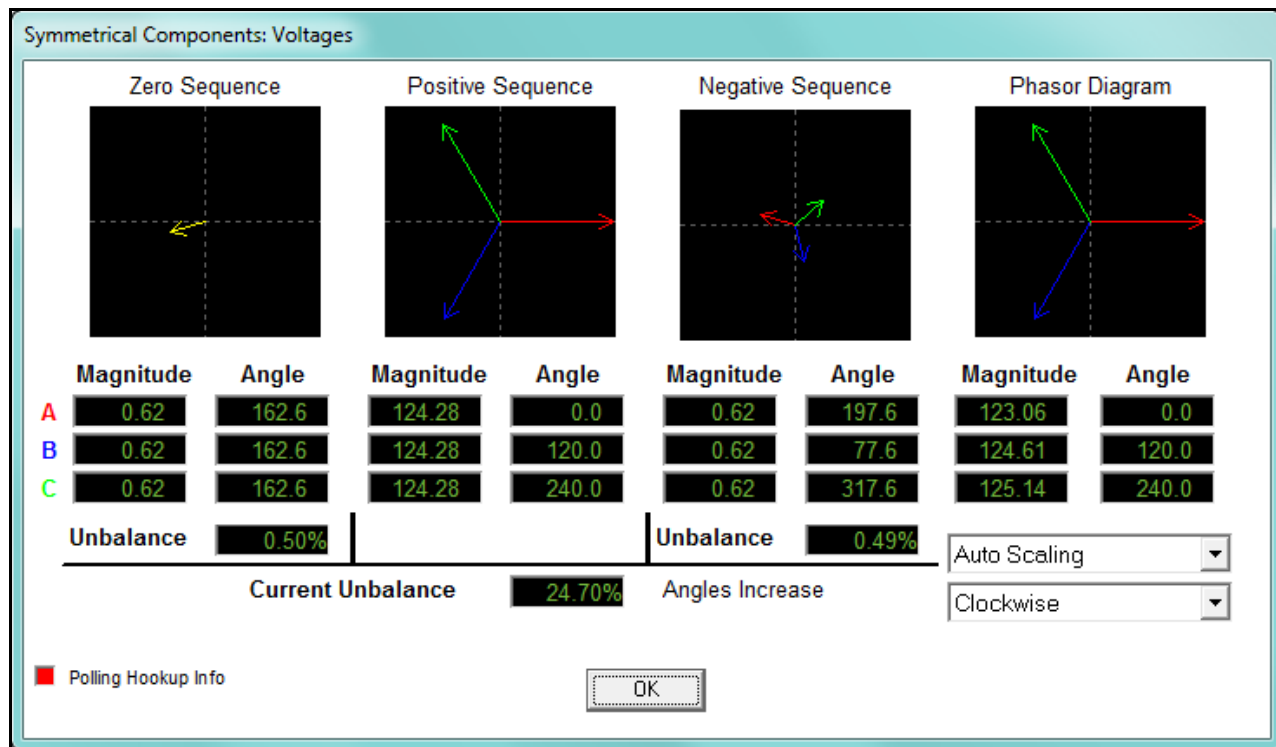
### 5.4.5: Poll Symmetrical Components

Symmetrical components are used to analyze unbalanced three phase power systems. To view Symmetrical Components data for the currently connected device, select Symmetrical Components from the Real-Time Poll>Power Quality and Alarms Menu. You will see the screen shown below if you are connected to a Nexus® meter.



- You can view the symmetrical components for Voltage or Current by clicking the radio button next to either option.

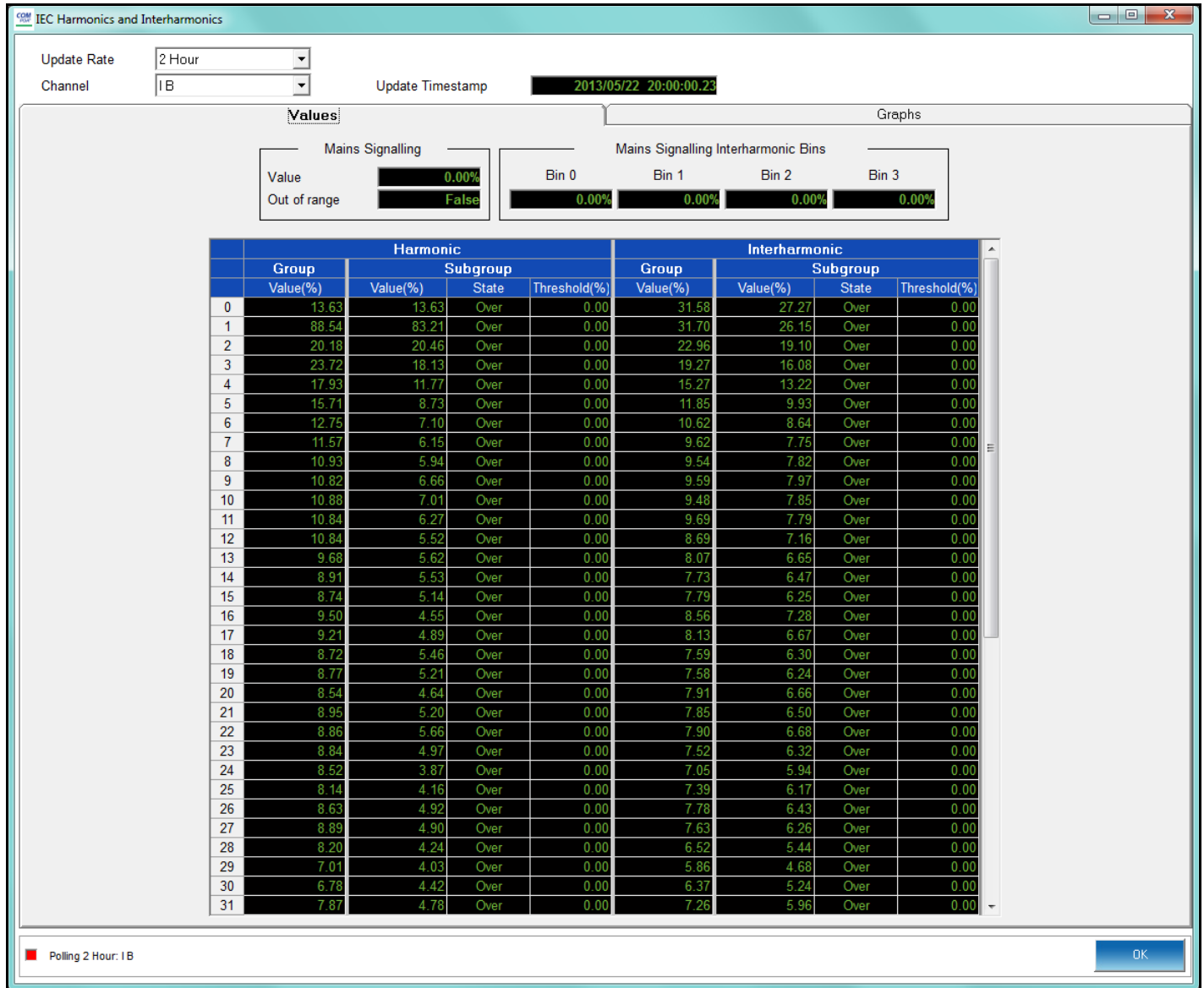
- If you are connected to a Shark® 200/250/270/ST40 meter, you will see a slightly different screen, which also displays Current unbalance and zero sequence and negative sequence Voltage unbalance. See the screen below.



- The drop-down menus allow you to select Scaling and the direction of the displayed angles.

### 5.4.6: Poll IEC Harmonics and Interharmonics (Nexus® 1450 and 1500+Meters)

To view harmonic and interharmonic IEC 61000-4-30 data for the Nexus® 1450 and 1500+ meters, select IEC Harmonics and Interharmonics from the Real-Time Poll>Power Quality and Alarms menu. You will see the screen shown below.

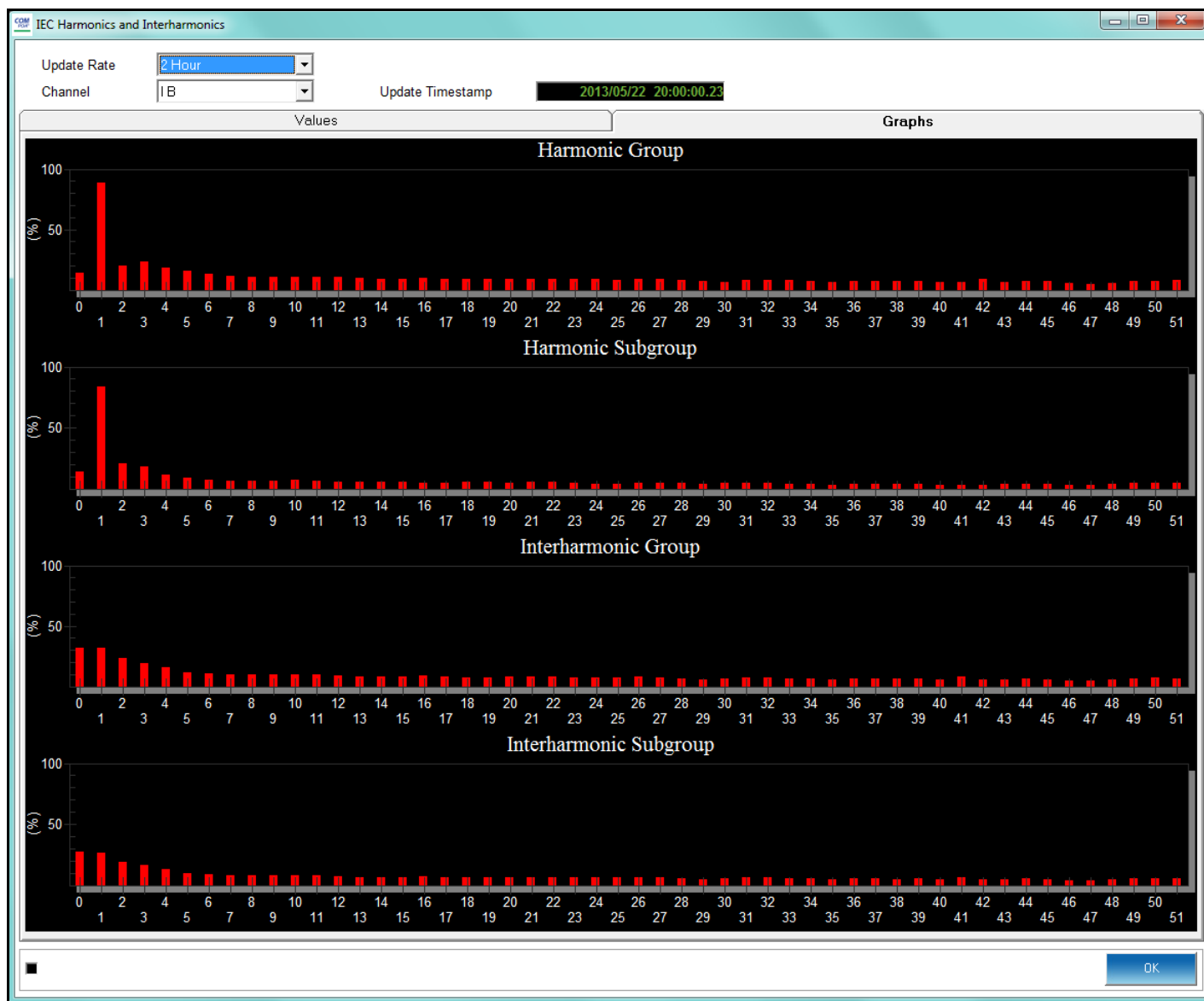


- This screen has two tabs. The first, shown above, shows the values for Mains Signalling and the Harmonic and Interharmonic groups and subgroups depending on the search criteria you enter:
- Update Rate - choose from the pull-down menu:

- 10/12 cycles
- 150/180 cycles
- 10 minutes
- 2 hours
- Channel - choose from the pull-down menu:
  - Volts AN, BN, CN, or Aux
  - Amps IA, IB, IC, or IN




- Click Graph to see the data in graphic format. See the example screen below.



### 5.4.7: Poll Alarm/Limits Status

To view Alarm (Limits) Status data for the currently connected device, select Alarm Status (Nexus® meters) or Limits (Shark® meters and the MP200™ metering system) from the Real-Time Poll>Power Quality and Alarms menu. You will see the screen shown below.

Limit Status										
Limit ID	Item	Value	Status		Limit 1		Limit 2		Combination	
			Limit 1	Limit 2	Setting	Setpoint	Setting	Setpoint	Type	Status
1	High Speed Volts AN	120.44	Out	Out	Below	456.00	Below	361.00	OR	Out
2	High Speed Volts BN	118.91	Out	Out	Below	456.00	Below	361.00	OR	Out
3	High Speed Volts CN	119.71	Out	Out	Below	456.00	Below	361.00	OR	Out
4	High Speed I A	1.02	Out	In	Below	6.50	Below	0.00	OR	Out
5	High Speed I B	1.02	Out	In	Below	6.50	Below	0.00	OR	Out
6	High Speed I C	0.96	Out	In	Below	6.50	Below	0.00	OR	Out
7	High Speed Frequency	60.08	In	Out	Below	50.25	Above	51.00	OR	Out
8		60.08	In	Out	Below	49.75	Above	49.00	OR	Out
9	Flicker Readings Inst V A	0.000	Out	In	Below	0.010	Above	0.010	OR	Out
10	Flicker Readings Inst V B	0.000	Out	In	Below	0.010	Above	0.010	OR	Out
11	Flicker Readings Inst V C	0.000	Out	In	Below	0.010	Above	0.010	OR	Out
12	Flicker Readings PST V A	0.009	In	In	Below	0.000	Above	0.500	OR	In
13	Flicker Readings PST V B	0.008	In	In	Below	0.000	Above	0.500	OR	In
14	Flicker Readings PST V C	0.008	In	Out	Below	0.000	Above	0.000	AND	In
15	Flicker Readings PLT V A	0.010	In	In	Below	0.000	Below	0.000	AND	In
16	Flicker Readings PLT V B	0.008	In	In	Below	0.000	Below	0.000	AND	In
17	Flicker Readings PLT V C	0.008	Out	Out	Above	0.000	Above	0.000	AND	Out
18			In	In						In
19			In	In						In
20			In	In						In
21			In	In						In
22			In	In						In
23			In	In						In
24			In	In						In
25			In	In						In
26			In	In						In
27			In	In						In

 Polling Nexus1500\_TS
 OK Print Help

- This screen displays the status of the Limits set in the connected meter's Device Profile. Refer to the Limits programming section for your meter type:
  - Section 8.3.1 for the Shark® 200/200S meter
  - Section 9.1.5 for the Shark® 100/100S meter with V4
  - Section 10.3.1 for the MP200™ metering system
  - Section 11.3.1 for the Nexus® 1500/1500+ meter

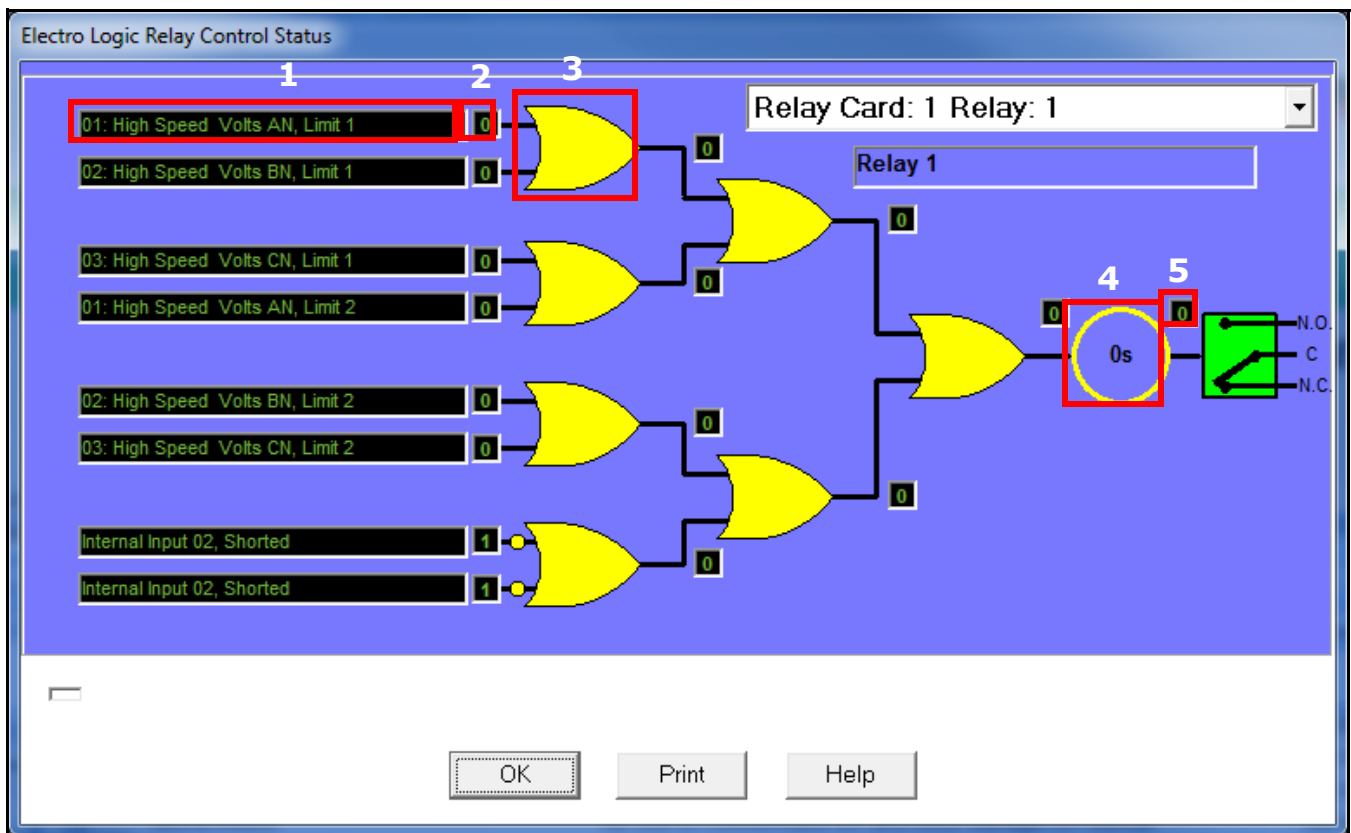
- Section 12.3.1 for the Nexus® 1262/1272 meter
  - Section 13.3.1 for the Nexus® 1252 meter
  - Section 26.3.1 for the Shark® 270 meter
  - Section 27.3.1 for the Nexus® 1450 meter
  - Section 28.3.1 for the Shark® 250 meter
  - Section 30.3.1 for the ST40 meter
- The Item field lists the readings that were programmed with limits in the Limits setting screen; e.g. from the screen above, High Speed Volts AN.
  - The Value field lists the current reading of the item; e.g. from the example screen, 120.44.
  - The Status field lists:
    - Status for Limits 1 and 2: "In" means that the current reading is within the limit range; "Out" means that the current reading is out-of-limits.
    - Settings and Setpoint for Limits 1 and 2: "Above" or "Below" the setpoint reading, also directly from the Limits that were programmed.
    - Combination Type and Status: taken from the Limits setting, the programmed combination field; e.g., OR and the Status "Out" for the first reading in the example screen. A combination type of OR means that if either Limit 1 or Limit 2 is out-of-limit based on the current value of the reading, the combined Status is OUT. If the combination type is AND, unless **both** Limit 1 and Limit 2 are out-of-limit based on the current value of the reading, the combination status is "In." Refer to the programming section for your meter type, given above, for the possible combination settings.
  - The screen above is for a Nexus® meter, which has up to 32 limits. If you are connected to a different meter, you may see a smaller number of limits and different fields. Consult the chapter for your meter to see details about its Limits capabilities.
  - Use the scroll bar to view all of the data.
  - You can adjust the column width. To do so:
    1. Position the cursor on a line between columns at the top of the screen.

2. When the cursor changes to a left/right arrow, hold down the left mouse button and drag the column border left or right.
3. Release the button when the column is at the desired width.

#### 5.4.8: Poll Nexus® Electrologic™ Status

Nexus® meters allow users to set limits and trigger outputs under many desired conditions. These outputs can have logic associated with them that work to provide intelligence in the triggering designs.

To view the status of Relay control for the currently connected Nexus® meter, select Nexus ElectroLogic™ Status from the Real-Time Poll>Power Quality and Alarms menu. You will see the screen shown below.



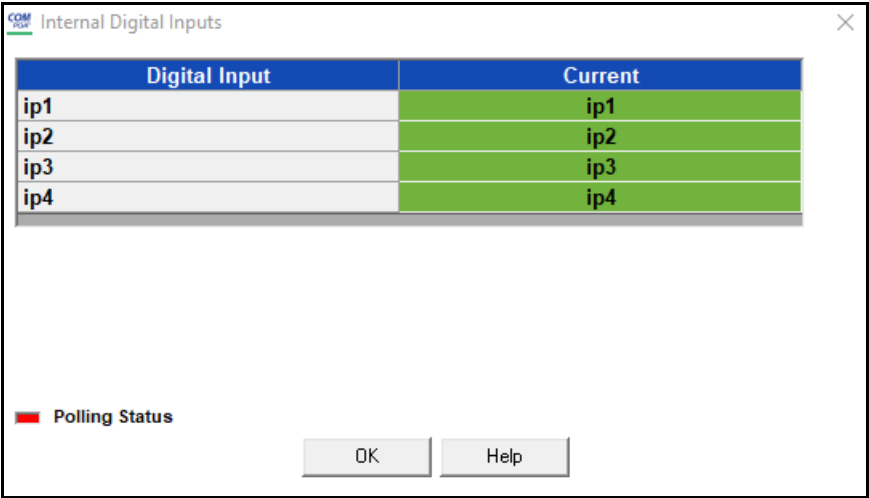
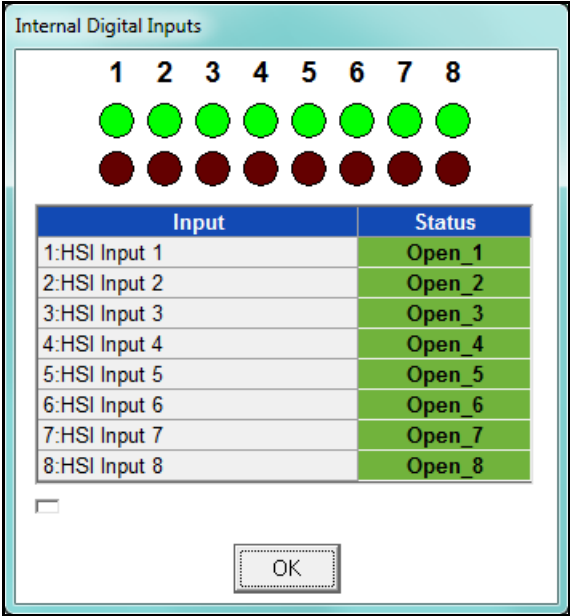
- This screen shows the status of the relay control scheme that was set up through ElectroLogic™ Relay Control. See sections 11.3.2 (Nexus® 1500/1500+ meter), 12.3.2 (Nexus® 1262/1272 meter), 13.3.2 (Nexus® 1252 meter), and 27.3.2 (Nexus® 1450 meter) for detailed instructions for setting up ElectroLogic™ Relay Control.

- Click the drop-down menu to choose the Relay you want to view information for.
- The fields shown are in the screen are:
  1. Assigned Limit or Digital Input
  2. Open (0) or Closed/Shorted (1) state of the Input or within Limit (0) or out-of-limit (1) condition for the Limit
  3. Logic Gate, in this instance for the first two Limits/Digital Inputs: this determines how the logic tree handles the 0 or 1 result of the Limit/Digital Input; e.g., if the gate is AND, the results must both be 1 for the result of the logic gate to be 1; if the gate is OR, either result of 1 will make the logic gate result become 1. Refer to the section for your meter for all of the gate options.
  4. The delay in seconds, programmed in the ElectroLogic™ Relay Logic setting screen.
  5. The result of the entire logic tree - 0 or 1 - which will ultimately control the relay; depending on whether the relay is normally open, or normally closed/shorted. 0 will leave the relay as is, and 1 will impose the opposite condition.

#### **5.4.9: Poll Internal Digital Inputs**

To view data for the internal High Speed inputs of the currently connected Nexus® meter or MP200™ Metering System, select Poll Internal Inputs from the Real-Time Poll>Power Quality and Alarms Menu.

You will see the screen shown on the left for Nexus® meters and the screen shown on the right for the MP200™ metering system. .



See the programming section for your meter type for details on the internal Digital Inputs: [10.5.2: Configuring Digital Input Settings, on page 10-35](#)[11.3.8: High Speed Inputs, on page 11-100](#) (Nexus® 1500/1500+ meter), [12.3.6: High Speed Inputs, on page 12-88](#) (Nexus® 1262/1272 meter), [13.3.7: High Speed Inputs, on page 13-67](#) (Nexus® 1252 meter), or [27.3.6: Digital Inputs, on page 27-70](#) (Nexus® 1450 meter).

### 5.4.10: Poll External Digital Inputs

To see the status of the external digital inputs for the connected Nexus® meter, the Option card digital inputs for Shark® 200 meter, or the embedded digital inputs for the MP200™ metering system, select Poll External Digital Inputs from the Real-Time

Poll>Poll Power Quality and Alarms menu. You will see the screen shown below if you are connected to a Nexus® meter.

**External Digital Inputs**

Input	Name	State	Transitions
1	M 1:1250 Non-Banked	Closed 1	000000000000
2	M 1:1250 Banked	Closed 2	000000000000
3	M 1:1252	Closed 3	000000000000
4	M 1:1252F	Closed 4	000000000000
5	M 1:1272	Closed 5	000000000000
6	M 1:1272	Closed 6	000000000000
7	M 1:1270	Closed 7	000000000000
8	M 1:1270	Closed 8	000000000000
9	M 2:Shark200T	Closed1	000000000000
10	M 2:IQ260	Closed2	000000000000
11	M 2:Shark200_a10	Closed3	000000000000
12	M 2:DI-1-In-4	Closed4	000000000000
13	M 2:DI-1-In-5	Closed5	000000000000
14	M 2:DI-1-In-6	Closed6	000000000000

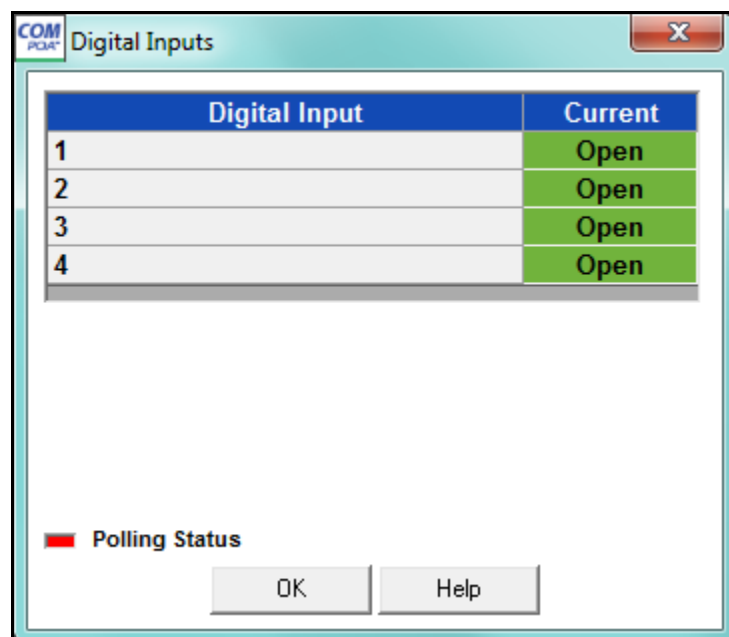
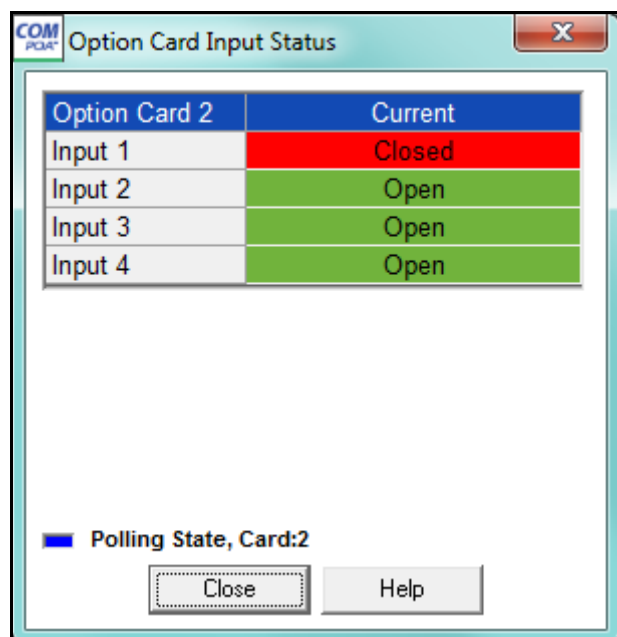
**Reset Counters**

Module 1

☐ Polling 1252\_KYZ\_Monitor

- This screen allows you to view State and Transition Counters data for the external digital inputs. These settings are programmed in the External Digital Inputs setting of the meter's Device Profile; see the programming section for your meter type for details: [11.5.1: Configuring the Input/Output Modules, on page 11-113](#) (Nexus® 1500/1500+ meter), [12.5.1: Configuring the Input/Output Modules, on page 12-98](#) (Nexus® 1262/1272 meter), [13.5.1: Configuring the Input/Output Modules, on page 13-77](#) (Nexus® 1252 meter), or [27.5.1: Configuring the Input/Output Modules, on page 27-80](#) (Nexus 1450 meter).
- To reset the counters, select the counters you want to reset from the pull-down menu and click Reset.
- Use the scroll bars to view all of the data on the screen.

If you are connected to a Shark® 2xx meter or an MP200™ metering system, you will see the screens shown below. The screen on the left is for a Shark® 2xx meter, and the screen on the right is for an MP200™ metering system.



These screens display the status (Open or Closed) of the Digital Inputs of:

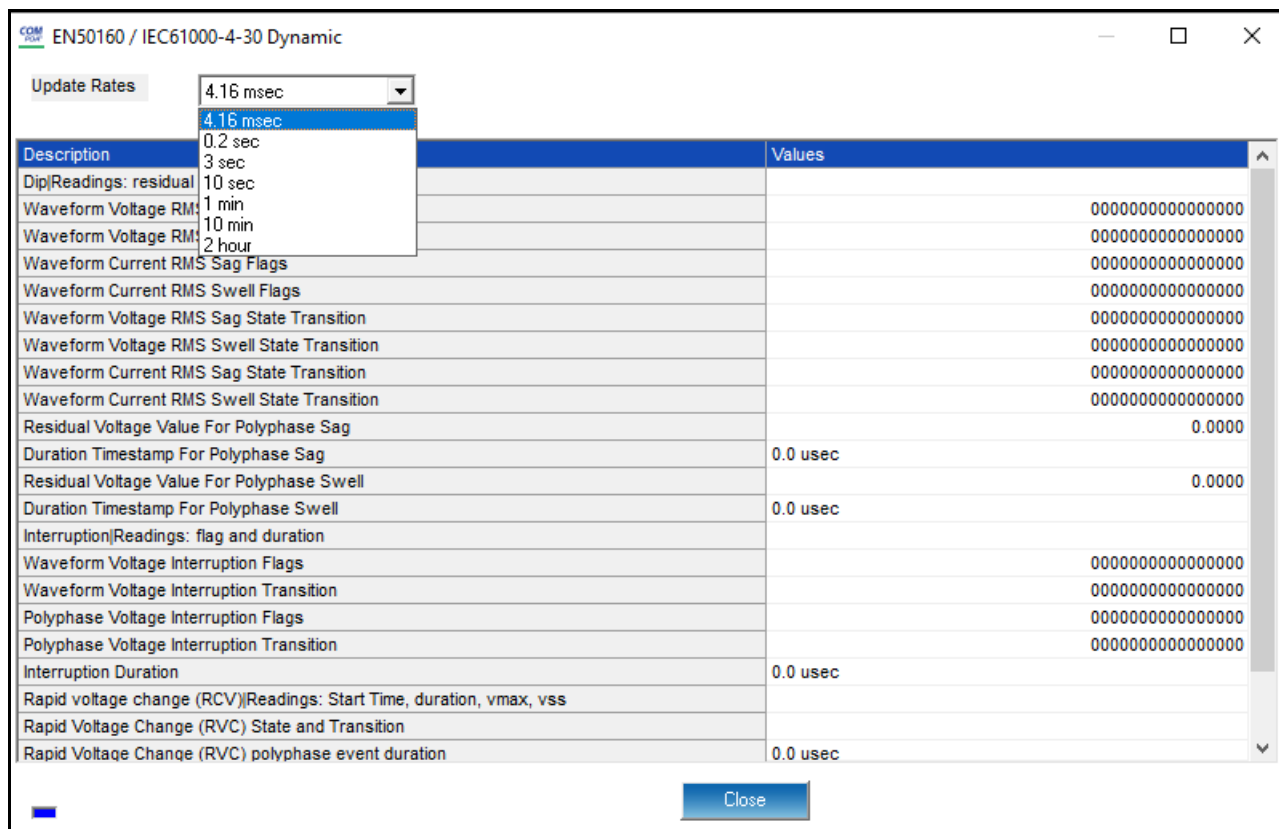
- Any Relay Output/Digital Input or Pulse Output/Digital Input Option card installed in a Shark® 2xx meter.
- The Digital Inputs of the MP200™ metering system's embedded Relay Output/Digital Input card.

These settings are programmed in the Digital Inputs setting of the meter's Device Profile; see the programming section for your meter type for details: 8.5.3: Configuring a Pulse Output/Digital Input Card, on page 8-46 and 8.5.3: Configuring a Pulse Output/Digital Input Card, on page 8-46 (Shark® 200 meter); 10.5.2: Configuring Digital Input Settings, on page 10-35 (MP200™ metering system); 28.5.2: Configuring a Relay Output/Digital Input Card, on page 28-75 and 28.5.3: Configuring a Pulse Output/Digital Input Card, on page 28-81 (Shark® 250 meter); or 26.5.3: Configuring a Digital Relay Card (RO1S), on page 26-98 and 26.5.4: Configuring a Digital Input/Pulse Output Card (PO1S), on page 26-108 (Shark® 270 meter).



### 5.4.11: EN50160/IEC61000-4-30 Dynamic

The Nexus® 1500+ meter with Firmware V20 and above and the Nexus® 1450 meter have a polling screen with real time readings for its EN 50160 IEC 61000-4-30 feature. From the Real Time Poll menu, click EN 50160 / IEC 61000-4-30 Dynamic Readings. The screen from the Nexus® 1500+ meter is shown below.



- Select the update rate you want to use from the pull-down menu.
- The reading description and value are shown. Use the scroll bar to see additional readings.

The EN 50160 / IEC 61000-4-30 Dynamic Readings polling screen for the Nexus® 1450 meter is shown on the next page. Note that it doesn't have an update rate selection.

COM EN50160 / IEC61000-4-30 Dynamic

Description	Values
3 sec Symm Comp Phase (Current PN) - Neg Sequence	-100.33
10 min Symm Comp Phase (Current PN) - Zero Sequence	-169.66
10 min Symm Comp Phase (Current PN) - Pos Sequence	44.97
10 min Symm Comp Phase (Current PN) - Neg Sequence	-100.29
3 sec Symm Comp Ratio (Current PN) - Zero Sequence	0.0542
3 sec Symm Comp Ratio (Current PN) - Neg Sequence	0.0566
3 sec Symm Comp Ratio (Current PP) - Neg Sequence	0.1124
10 min Symm Comp Ratio (Current PN) - Zero Sequence	0.0543
10 min Symm Comp Ratio (Current PN) - Neg Sequence	0.0566
10 min Symm Comp Ratio (Current PP) - Neg Sequence	0.1124
2 hour Symm Comp Ratio (Current PN) - Zero Sequence	0.0548
2 hour Symm Comp Ratio (Current PN) - Neg Sequence	0.0571
2 hour Symm Comp Ratio (Current PP) - Neg Sequence	0.1136
3 sec Unbalance Counter	32568
10 min Unbalance Counter	136
2 hour Unbalance Counter	11
3 sec Symm Comp Ratio (Voltage PN) - Zero Sequence	0.0305
3 sec Symm Comp Ratio (Voltage PN) - Neg Sequence	0.0063
3 sec Symm Comp Ratio (Voltage PP) - Neg Sequence	0.0063
10 min Symm Comp Ratio (Voltage PN) - Zero Sequence	0.0305
10 min Symm Comp Ratio (Voltage PN) - Neg Sequence	0.0062
10 min Symm Comp Ratio (Voltage PP) - Neg Sequence	0.0062
2 hour Symm Comp Ratio (Voltage PN) - Zero Sequence	0.0305
2 hour Symm Comp Ratio (Voltage PN) - Neg Sequence	0.0063
2 hour Symm Comp Ratio (Voltage PP) - Neg Sequence	0.0063

Close

### 5.4.12: 3 Second Updated Harmonics

The Nexus® 1450 meter has an additional Power Quality and Alarms polling screen which shows the three second updated harmonics for the meter. Click Power Quality and Alarms>3 Second Updated Harmonics to see the screen shown below.

Channel		Value	Channel		Value	Channel		Value
THD Even Van		0.09%	THD Even Vab		0.00%	THD Even Ia		0.00%
THD Odd Van		0.31%	THD Odd Vab		0.00%	THD Odd Ia		0.00%
THD Total Van		0.32%	THD Total Vab		0.00%	THD Total Ia		0.00%
THD K Van		0.00%	THD K Vab		0.00%	THD K Ia		0.00%
TDD Total Van		0.00%	TDD Total Vab		0.00%	TDD Total Ia		0.00%
THD Even Vbn		0.08%	THD Even Vbc		0.00%	THD Even Ib		0.00%
THD Odd Vbn		0.24%	THD Odd Vbc		0.00%	THD Odd Ib		0.00%
THD Total Vbn		0.26%	THD Total Vbc		0.00%	THD Total Ib		0.00%
THD K Vbn		0.00%	THD K Vbc		0.00%	THD K Ib		0.00%
TDD Total Vbn		0.00%	TDD Total Vbc		0.00%	TDD Total Ib		0.00%
THD Even Vcn		0.05%	THD Even Vca		0.00%	THD Even Ic		0.00%
THD Odd Vcn		0.19%	THD Odd Vca		0.00%	THD Odd Ic		0.00%
THD Total Vcn		0.20%	THD Total Vca		0.00%	THD Total Ic		0.00%
THD K Vcn		0.00%	THD K Vca		0.00%	THD K Ic		0.00%
TDD Total Vcn		0.00%	TDD Total Vca		0.00%	TDD Total Ic		0.00%
THD Even Vxn		0.00%	THD Even Vne		0.00%	THD Even Ix		0.00%
THD Odd Vxn		0.00%	THD Odd Vne		0.00%	THD Odd Ix		0.00%
THD Total Vxn		0.00%	THD Total Vne		0.00%	THD Total Ix		0.00%
THD K Vxn		0.00%	THD K Vne		0.00%	THD K Ix		0.00%
TDD Total Vxn		0.00%	TDD Total Vne		0.00%	TDD Total Ix		0.00%

☐

## 5.5: RTU Polling (Nexus® 1450/1500/1500+ Meter)

The Nexus® 1450/1500/1500+ meter has the ability to function as an RTU. As such, it can poll Modbus readings from slave devices and take those readings into its memory for users to conduct actions with them. For the meter to act as an RTU, Port 2 must be set as an RTU Master (see 11.5.2: RTU Settings, on page 11-119 [1500/1500+] or 27.5.2: RTU Settings, on page 27-86 [1450] for instructions).

The RTU Polling screen helps the user verify that their application is working correctly, by checking that the information they see on this screen is as expected/needed.

Select RTU Polling Screen from the Real Time Poll menu. You will see the screen shown below.

**RTU Polling Screen** Assigned to RS-485 port 2 Hide Details

#	Description	Device Addr	Start Reg	Num Reg	Data Type	Size (Bytes)	Byte Order	Multiplier		Master Starting Register	Slave Starting Register
								Base	Power		
1	Shark200: V AN	2	1000	100	Float	4	MSB	0	None	414337	401000
2	Shark200: V BN	2	1000	100	Float	4	MSB	0	None	414339	401002
3	Shark200: V CN	2	1000	100	Float	4	MSB	0	None	414341	401004
4	Shark200: V AB	2	1000	100	Float	4	MSB	0	None	414343	401006
5	Shark200: V BC	2	1000	100	Float	4	MSB	0	None	414345	401008
6	Shark200: V CA	2	1000	100	Float	4	MSB	0	None	414347	401010
7	Shark200: I A	2	1000	100	Float	4	MSB	0	None	414349	401012
8	Shark200: I B	2	1000	100	Float	4	MSB	0	None	414351	401014
9	Shark200: I C	2	1000	100	Float	4	MSB	0	None	414353	401016
10	Shark200: Watt T	2	1000	100	Float	4	MSB	0	None	414355	401018
11	Shark200: VAR T	2	1000	100	Float	4	MSB	0	None	414357	401020
12	Shark200: VA T	2	1000	100	Float	4	MSB	0	None	414359	401022

Decimal Places: 3 Register Format: SCADA (4X Format: 400001 - 465536) OK

Meter Polling Diagnostics: Data Refresh Date/Time **10/15/2014 16:08:40.51** Reset Error Counters

The information shown on the screen is as follows:

- Description of the reading
- Nexus® 1500/1500+ meter's Modbus starting register of the reading
- The slave device's Modbus starting register of the reading
- The raw value of the reading in hexadecimal

- The translated value of the reading for the user's application
- The number of decimal places desired to set the degree of resolution needed
- The format the data is needed in; dependent on whether this is for a SCADA or customized application
- The Date and Time stamp of the data shown
- Click Show Details to see more information: Device address; Starting register and number of registers; Data type, size in bytes, byte order; any Multipliers to scale the data; Group ID; Error code; and Data Valid field - either True (a connection was made and data was obtained) or False (no connection was made; no data was received). See the screen below.

RTU Polling Screen

Assigned to RS-485 port 2 Hide Details

#	Description	Device Addr	Start Reg	Num Reg	Data Type	Size (Bytes)	Byte Order	Multiplier		Master Starting Register	Slave Starting Register
								Base	Power		
2	Shark200: V BN	2	1000	100	Float	4	MSB	0	None	414339	401002
3	Shark200: V CN	2	1000	100	Float	4	MSB	0	None	414341	401004
4	Shark200: V AB	2	1000	100	Float	4	MSB	0	None	414343	401006
5	Shark200: V BC	2	1000	100	Float	4	MSB	0	None	414345	401008
6	Shark200: V CA	2	1000	100	Float	4	MSB	0	None	414347	401010
7	Shark200: I A	2	1000	100	Float	4	MSB	0	None	414349	401012
8	Shark200: I B	2	1000	100	Float	4	MSB	0	None	414351	401014
9	Shark200: I C	2	1000	100	Float	4	MSB	0	None	414353	401016
10	Shark200: Watt T	2	1000	100	Float	4	MSB	0	None	414355	401018
11	Shark200: VAR T	2	1000	100	Float	4	MSB	0	None	414357	401020
12	Shark200: VA T	2	1000	100	Float	4	MSB	0	None	414359	401022
13	Shark200: PF T	2	1000	100	Float	4	MSB	0	None	414361	401024

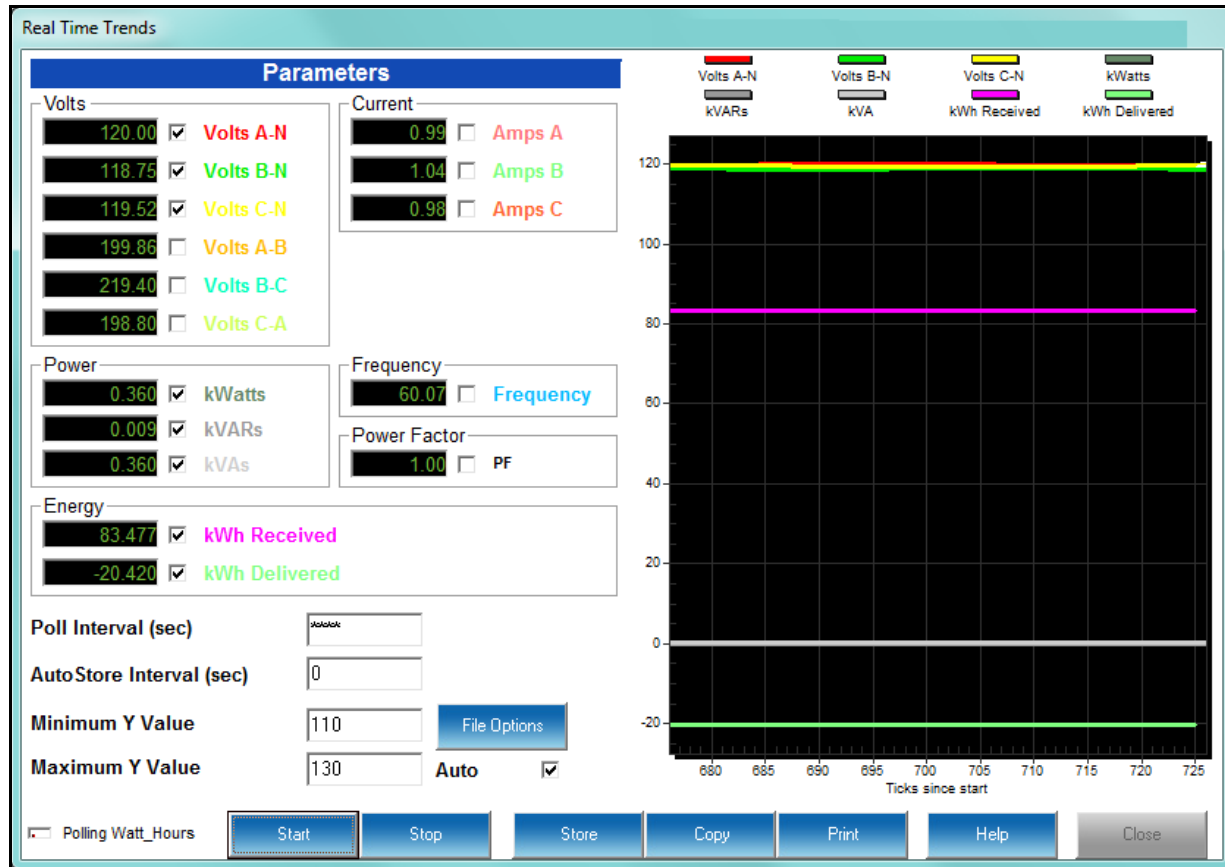
Decimal Places:  Register Format:  OK

Meter Polling Diagnostics: Data Refresh Date/Time 10/15/2014 16:13:50.44 Reset Error Counters

- Click Reset Error Counters if you had errors that you have now addressed.

## 5.6: Poll Real Time Trends (Shark® 50/100/200Meters)

The Shark® 50/100/200 meters have an additional polling screen. Select Real Time Trends from the Real Time Poll menu. You will see the screen shown below.



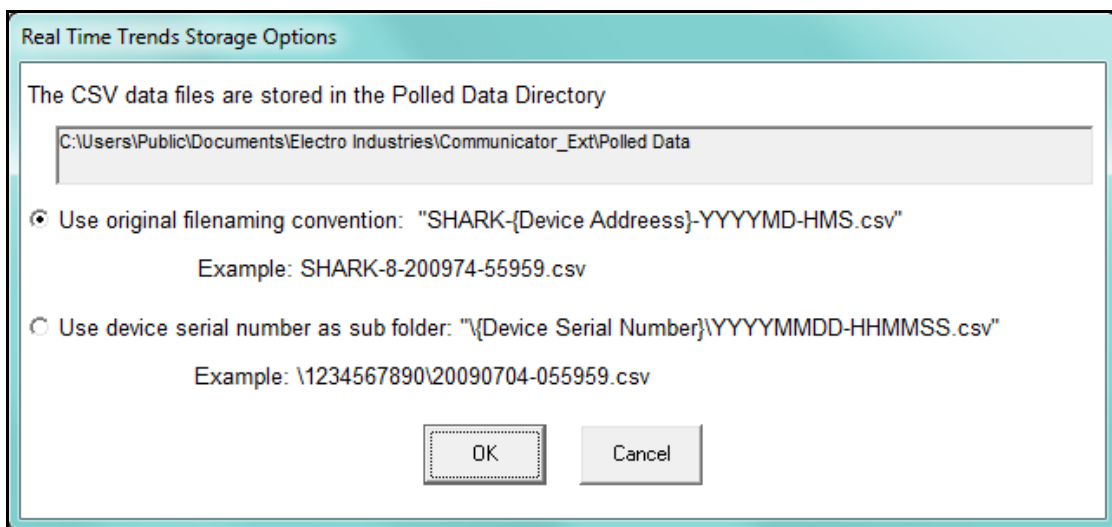
This screen lets you view trending for the selected parameters.

- To view parameters on the graph:
  - Click the check box(es) next to the value(s) you want to display.
  - The Poll Interval can be changed. Set this value to 0 to poll as quickly as possible. (When '0' has been entered, the field displays '\*\*\*\*'.)
  - To create a .csv (Comma Separated Value Excel file) containing a log of the polling values, enter a value greater than 0 in the AutoStore Interval field. The software will store in its directory all polling values (regardless of the selections on the screen) in the .csv file on the interval (in seconds) entered in the AutoStore Interval field.

**NOTE:** To perform manual storage, click the Store button at the bottom of the screen.

4. Either:

- Use the Min and Max Y Values fields to specify the Y Range for the graph.
- Check the Auto Scale box to let the software calculate the best Y Range values for the graph.
- Click File Options to open the window shown below.



- The field at the top shows where the file of this screen's data will be stored. You can double-click in the field to open that directory.
- The selections let you choose how you want the file to be named:
  - Leave the default selection (first radio button) to save the file in the directory with the original file naming convention:  
SHARK-Device Address-year, month, day-hour, minutes, seconds  
**NOTE:** The original file naming convention should no longer be used since multiple Shark® meters on the same network will have the same device address and they could overwrite each other's files.
  - Click the second radio button to use the device's serial number as a sub-folder in the directory, with the date and time as the file name:  
Device Serial Number\year, month, day-hour, minutes, 2 seconds

- Click OK to save your selections. When you click Store the file will be saved as you chose.
- If your desktop is very small, the screen will be divided in half. Click View Graph to see the Graph portion of the screen; click View Settings to see the Settings portion of the screen.
- Click Start to begin polling; click Stop to stop polling.



## 6: Meter Security

### 6.1: Overview

There are four aspects to the security offered by EIG meters through the CommunicatorPQA® software:

- Password protection
- Sealing switch
- Security lock
- Firmware signature

The Nexus® 12XX and 15XX meters (except for Nexus® 1500+ meters with firmware V20 and above) offer the first two features: see [6.2.1: Nexus® Meters' Password Options, on page 6-2](#) through [6.10: View Sealing Switch Status \(Nexus® Meters\), on page 6-21](#). Nexus® 1500+ meters with firmware version 20 and above and V-Switch™ keys 4-6 offer all four features, with advanced security that includes role-based user accounts and firmware encryption - see [6.13: Nexus® 1500+ Meter's Advanced Security - Resilient Cyber Security™ and Firmware Integrity \(Firmware V20 and above with V4-V6\), on page 6-50](#). The Shark® 250/270 meter offers password protection and a physical sealing switch on the meter; the Shark® 270 meter also has firmware authentication - see [6.11: Shark® 250/270 Meter's Security, on page 6-21](#). The Nexus® 1450 meter offers all three features: see [6.12: Nexus® 1450 Meter's Security Features, on page 6-33](#). Note that the other Shark® meters and the MP200™ metering system also offer password protection - see their individual programming chapters, 8-10, for instructions.

### 6.2: Password Overview

Meter password security is designed to protect the unit from unauthorized use. Since the meters are used for primary revenue and/or control functions, the password functionality is designed to be very secure. Password feature usage is recommended if there are security concerns. Note that when using passwords, it is imperative that the password information is stored, to ensure access to the meter. It is also critical that passwords and usernames are stored in a secure location.

The CommunicatorPQA® application's password feature protects the following activities from unauthorized use:

- Changes to an EIG Meter's Device profile
- Setting device date and time
- Resetting Device information (Max/Min/Demand, Hour Counters, Logs and Time of Use (TOU))
- Test Mode entry from software
- Flash upgrades
- Flicker start and stop
- Pulse test
- CT and PT Compensation
- Relay control and I/O Utilities
- TOU accumulations and changes to the TOU calendar settings
- Retrieval of trending and Power Quality logs (for the Nexus® meters, with Extended Passwords only)

### 6.2.1: Nexus® Meters' Password Options

Depending on the meter model and firmware level, the Nexus® meters' (other than the 1450 meter - see [6.12: Nexus® 1450 Meter's Security Features, on page 6-33](#) and the 1500+ meter with Firmware V20 and above - see [6.13: Nexus® 1500+ Meter's Advanced Security - Resilient Cyber Security™ and Firmware Integrity \(Firmware V20 and above with V4-V6\), on page 6-50](#)) Password control consists of either Bi-level only or Bi-level **and** Extended password protection. Each of these methods is explained below.

- Bi-level passwords:
  - Level 1 accesses Time-of-Use Accumulations only - these are Billing functions.
  - Level 2 accesses all password-protected functions. The Level 2 Password also allows a user to enable or disable the password function.

#### NOTES:

- When the password feature is enabled, the CommunicatorPQA® software asks for the appropriate password each time a user attempts to perform a protected operation.

- The Bi-level password feature is on a two-minute timer: after exiting from a password-protected area, the user has two minutes to access another protected area without re-entering the password. If more than two-minutes elapse, the software asks for the appropriate password.
- Extended passwords:
  - This feature allows you to set up to eight different profiles controlled by passwords. This allows you to set up specific password profiles so that users can have limited access to certain meter features. Once you have enabled the Level 2 password, you can then configure the Extended passwords for the meter.
  - Specify which features are allowed or disallowed for each of the eight profiles, choosing from the following functions (as long as they are supported by the meter):
    - Read TOU Calendars/Data – allows the user to view the time of Use Calendars and Registers.
    - External Device Access – allows the user to access and program external devices.
    - Modify Preset Energy – allows the user to access the preset energy capability.
    - Modify CT/PT Compensation – allows the user to change the CT/PT compensation tables.
    - Modify Date/Time – allows the user to set a new date and or time.
    - Modify TOU Calendars – allows the user to modify existing calendars and upload new calendars.
    - Update Firmware – allows the user to change the existing firmware in the meter.
    - Modify Programmable Settings – allows the user to change existing programmable settings and program them to the meter.
    - Retrieve PQ Logs – allows the user to retrieve the Power Quality logs: PQ, Waveform, Alarm, and Flicker.
    - Retrieve Historical Logs – allows the user to retrieve non-PQ logs: Historical and Digital.
    - Reset Demand – allows the user to reset the Demand Registers.

- Reset PQ Logs – allows the user to reset the Power Quality logs: PQ, Waveform, Alarm, and Flicker.
- Reset Logs – allows the user to reset the non-PQ logs: Historical and Digital.
- Reset Energy – allows the user to reset the Energy Accumulators.
- External Relay Control – allows the user to manually fire the External Relays.
- Manual Waveform Capture – allows the user to send the Manual Waveform Capture command, if supported by the meter.
- Other – allows the user to use the Flicker function and any other Level 2 function that is not defined above.

### 6.3: Enable Passwords (Nexus® Meters)

1. From the Main screen's Menu Bar, select Tools>Passwords>Enable/Disable.

**NOTE:** Passwords may contain up to 10 characters and may include the digits 0–9 and/or the letters A–Z. Passwords are not case-sensitive.

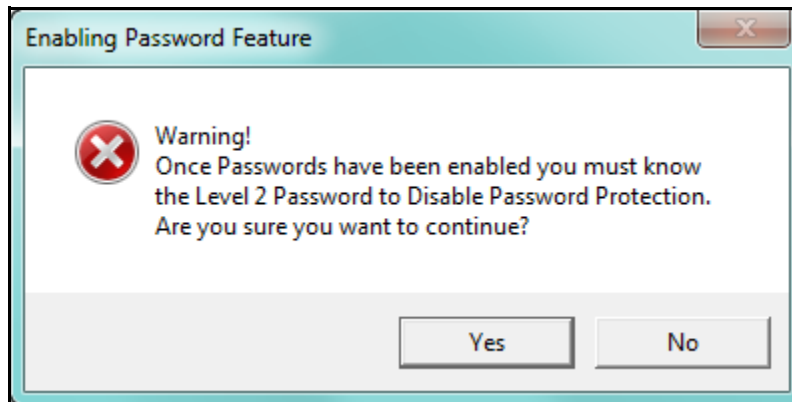
The screenshot shows a dialog box titled "Enable Password Feature". Inside, it says "To Enable Passwords Please Fill In The Following Fields (A Maximum of 10 Characters For Each)". There are four text input fields arranged in two pairs. The first pair is for "Level 1 Password" and "Retype". The second pair is for "Level 2 (Administrator) Password" and "Retype". A horizontal line separates the two pairs. At the bottom, there are "OK" and "Cancel" buttons.

2. Enter the following:

- Password for Level 1 in Level 1 Password and Retype entry fields. The Level 1 password allows viewing of Time of Use (TOU) data.
- Password for Level 2 in Level 2 Password and Retype Entry fields. The Level 2 password restricts user access to all password protected functions listed in Section 6.2. Only by logging in with the Level 2 password can you disable the bi-level password feature.

**NOTE:** You must enter both passwords. If you enter and retype only a Level 1 Password or a Level 2 Password and click OK, you will see an error message.

3. Click OK. You will see the message shown below.



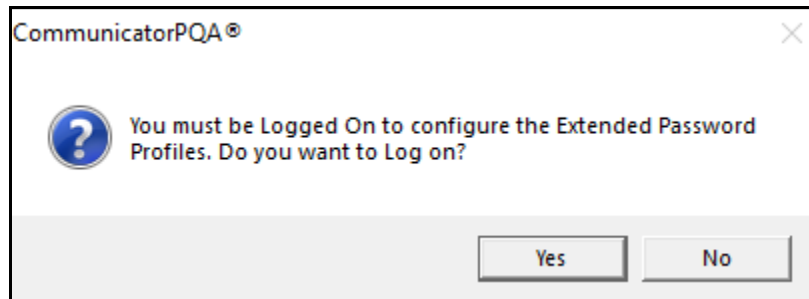
4. Click Yes . The Bi-level Password function is now enabled. The computer status bar at the bottom of the screen now displays "Password: Enabled" and the following message screen is displayed (click OK to close the screen).



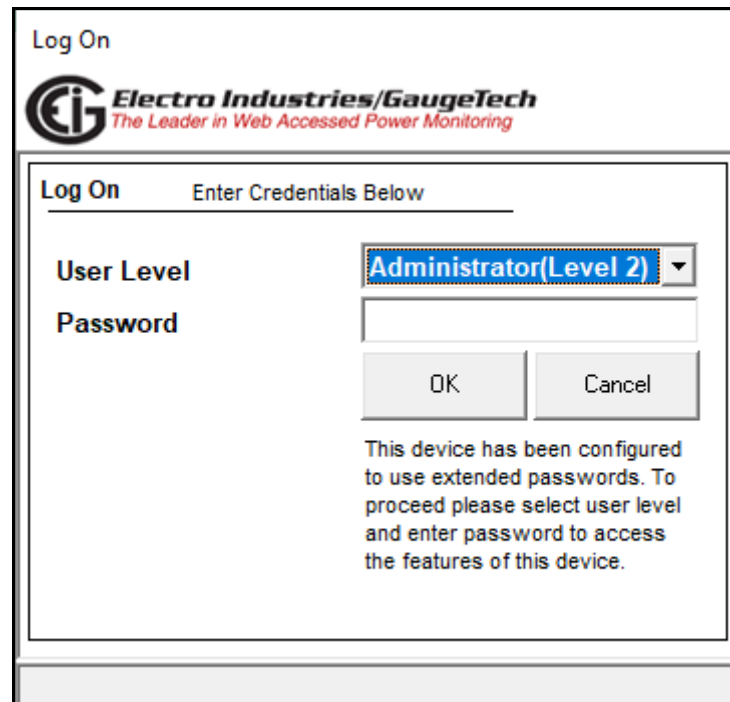
**NOTE:** You can also check Password Status from the Tools menu: click Tools>Passwords>Status to display the Protection Status screen shown above.

5. Now that you have enabled the Level 2 Password, click Tools>Passwords>Extended Passwords to configure the Extended passwords for a meter that supports Extended passwords.

**NOTE:** Only a user signed on with a Level 2 Password will be able to access this function.



6. Click Yes. You will see the following screen.



7. Enter the Level 2 password; (i.e., the administrator password) and click OK.

**NOTE:** For the Nexus® 1500+ meter, you can use either Admin or Administrator in the CommunicatorPQA® software, but if you are using FTP, a third-party software, or Modbus communication, you must use Admin as the username.

**Extended Passwords**

Enable/Disable Device Extended Passwords

☒ Enabled  
☐ Disabled

User Profiles and Configurations

User Level: Administrator(Level 2) ▼

**Security**

To configure the administrative password, use Tools > Passwords > Change.

**Notes:**

Trending and I/O Logs include Historical logs 1 through 8, Event Triggered and Digital Inputs

Power Quality Logs Include Alarm, PQ, Flicker, Waveform, Transient Logs and Relay Output logs.

Report Update Help Cancel

8. The top portion of the screen lets you enable or disable the Extended password function: select the Enabled button to enable it.
9. Select the password profile you want to set up from the pull-down menu next to User Level. You can set up to eight additional profiles (the first profile is the Level 2 administrator password you already set up): each profile can have a different selection of features and capabilities.

**Extended Passwords**

Enable/Disable Device Extended Passwords

☒ Enabled  
☐ Disabled

User Profiles and Configurations

User Level: A

**Security**

Password: \*\*\*\*\* Username:

Re-Enter Password: \*\*\*\*\*

**Features and Capabilities**

<input type="checkbox"/> Read TOU Data	<input type="checkbox"/> Retrieve Trending and I/O Log Data
<input type="checkbox"/> Access External Devices (R/W)	<input type="checkbox"/> Reset Trending and I/O Log Data
<input type="checkbox"/> Modify Preset Energy	<input type="checkbox"/> Retrieve Power Quality Log Data
<input type="checkbox"/> Modify CT/PT Compensation Tables	<input type="checkbox"/> Reset Power Quality Log Data
<input type="checkbox"/> Modify Date/Time	<input type="checkbox"/> External Relay Control
<input type="checkbox"/> Modify TOU Calendars	<input type="checkbox"/> Manual Waveform Capture
<input type="checkbox"/> Update Firmware	<input type="checkbox"/> Additional Features not listed here
<input type="checkbox"/> Modify Programmable Settings	
<input type="checkbox"/> Reset Demand	
<input type="checkbox"/> Reset Energy	

Check All    Uncheck All

**Notes:**  
Trending and I/O Logs include Historical logs 1 through 8, Event Triggered and Digital Inputs  
Power Quality Logs Include Alarm, PQ, Flicker, Waveform, Transient Logs and Relay Output logs.

Report    Update    Help    Cancel

10. In the security section enter the Username and password for this profile. Re-enter the password.

**NOTE:** Username is only displayed and used for the Nexus® 1500/1500+ meter.

11. Click any of the features in the Features and Capabilities section of the screen to enable them for the profile.

- Click Check All to select all of the features.
- Click Uncheck All to de-select all of the features.

**NOTE:** The administrator user level (Level 2 password) is non-configurable. It has all of the features enabled for it. It is the only profile that can set up the other profile levels.



12. Click:

- Update to save your changes
- Cancel to exit the screen without saving any changes.
- Report to create a .csv file listing the password profiles and their enabled features (passwords are not printed in the report). You can open the report in a spreadsheet application.

#### NOTES:

- When the Extended passwords feature has been enabled for a Nexus®1500/15000+ meter, in order to retrieve logs over the Network you must use Connection Manager to connect to the meter with your Username and password. See the screen on the right. Refer to Chapter 3 for instructions on using Connection Manager.
- You must also enter the Username and password to update firmware, for a Nexus® 1500/1500+ meter using Extended passwords.

The screenshot shows the 'Connection Manager Location Device Editor' window. It is divided into two main sections. The top section, 'Device Properties', contains several fields: 'Address' (value: 2), 'Name' (value: Device 2), 'Description' (value: Device 2), 'Protocol' (dropdown: Modbus TCP), 'Device Type' (dropdown: Nexus 1500 Series), 'IP Address' (value: 255.255.255.0), and 'Network Port' (value: 3). A 'Serial' button is located next to the 'Address' field. The bottom section, 'Nexus 1500 Security Settings', includes an unchecked checkbox for 'Use anonymous account'. Below this are 'Username' and 'Password' input fields. A red rectangular box highlights these two fields, with the text 'Enter Username and Password' written in red across them. At the bottom of the window are 'Close' and 'Help' buttons.

## 6.4: Change Passwords (Nexus® Meters)

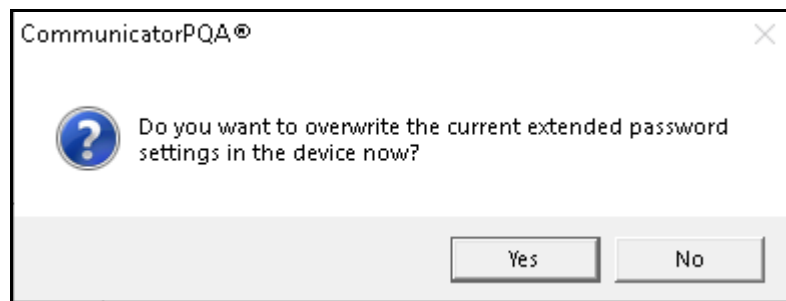
If you are going to use Passwords, it is a good idea to change them from time to time.

- If you have set up Extended password protection, you can use a Level 2/Administrator password profile to change the password profiles by opening the Extended Passwords setting screen; selecting the profile you want to change; and following the instructions already given for adding a new profile (steps 9-12 in the previous section). When you click Update you will be asked to confirm that you want to update the profile and then prompted to enter your Level 2/Administrator password.
- If you want to change the Level 1 password, click Tools>Passwords>Change, enter the current password you want to change (either Level 1 or Level 2) and the new password. You are asked to confirm that you want to change the password and then are told the password has been changed.

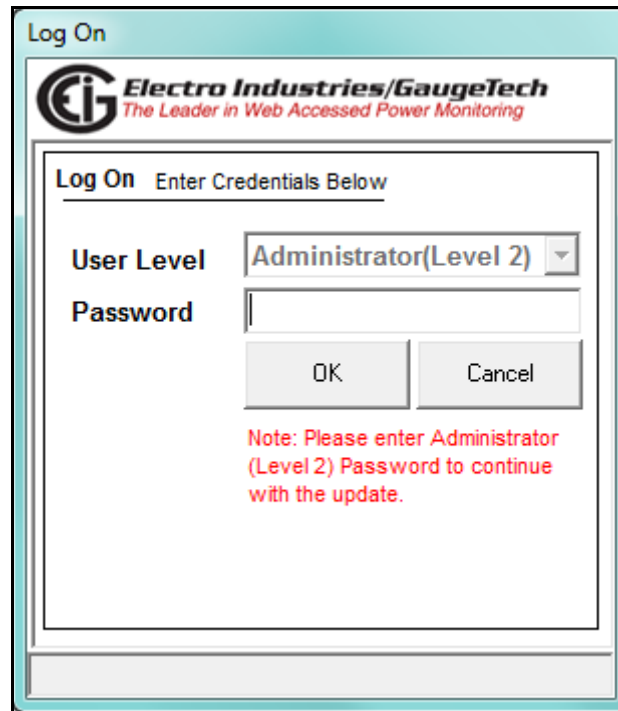
## 6.5: Disable Passwords (Nexus® Meters)

**NOTE:** You must use the Level 2 Password to disable password protection.

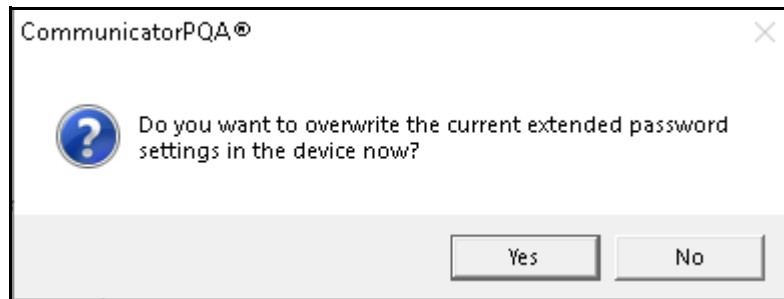
1. If you have enabled the Extended password feature, you need to first disable it. Click Tools>Passwords>Enable/Disabled. The Extended Passwords screen opens - click the Disable button and click Update. You will see the following message.



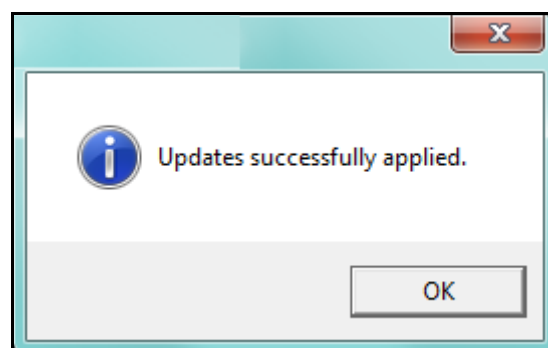
2. Click Yes. You will be prompted to enter your Level 2 password.



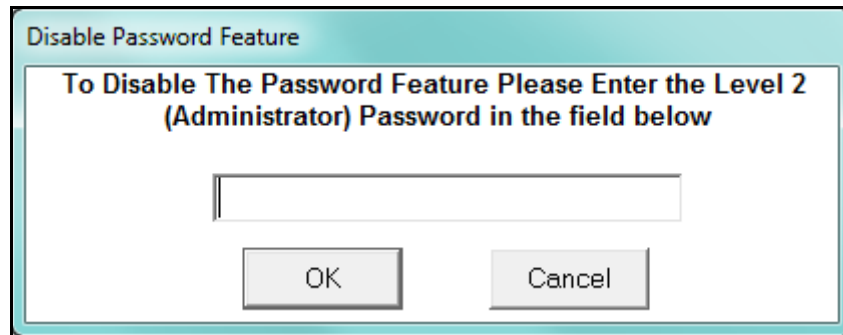
3. Click OK. You will see the message shown below.



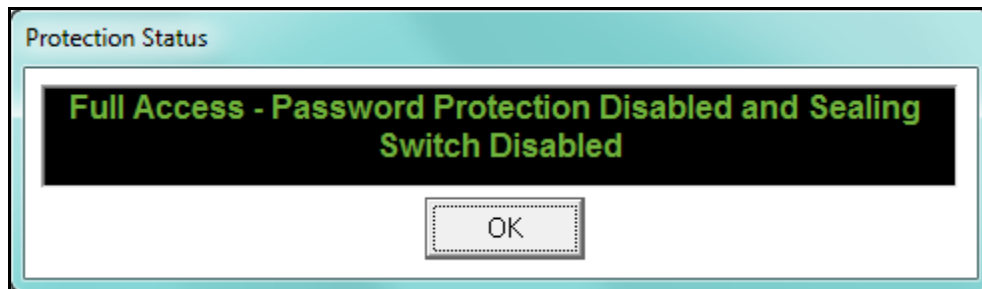
4. Click Yes. The Log On screen (above) will show a message that the profile is being updated and then you will see the following screen. Click OK to close it.



5. Disable the Bi-level password feature, click Tools>Passwords>Enable/Disable. You will now see the screen shown below.



6. Enter the Level 2 Password and click OK. You will see the message shown below.



Note that for some meters the sealing switch status is not displayed in the message window.

7. Click OK. The Bi-level Password function is now disabled. The status bar at the bottom of your screen now displays: "Password: Disabled".

## 6.6: Log On and Off with Passwords(Nexus® Meters)

You can log on with a specific password, or log off from a specific password.

### 6.6.1: Log On/Off with Extended Passwords

When the Extended Passwords feature has been enabled for a meter, you will be prompted to log on with a password when you connect to the meter. See the screen shown below, from a Nexus® 1500/1500+ meter.

1. Enter the Username and password for the profile for which you want to log on.

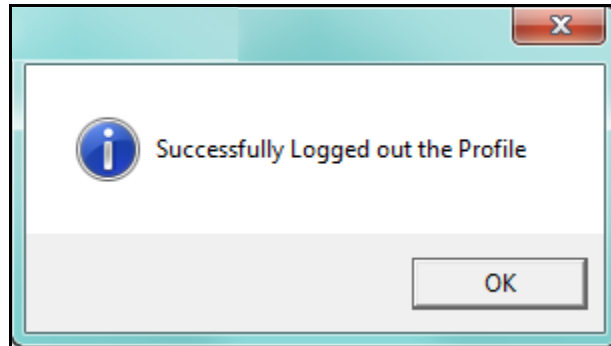
**NOTE:** For the other Nexus® meters, you will enter the user level and password, since they do not have the Username field.

2. Click OK. You will have access to the functions enabled by this password profile.

#### NOTES:

- Click Cancel to exit the Log On screen without logging on. You will be connected to the meter, but at the lowest access level.
- After three failed attempts to log on, the Log On window disappears and you are connected at the lowest access level.

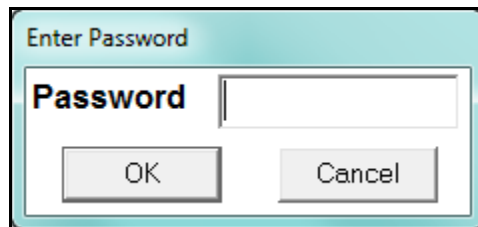
3. To log off, click Tools>Passwords>Log Off. You will a confirmation screen - click Yes to log off or click No to stay logged on.
4. If you click Yes, you will see the message shown below. Click OK to close the message window.



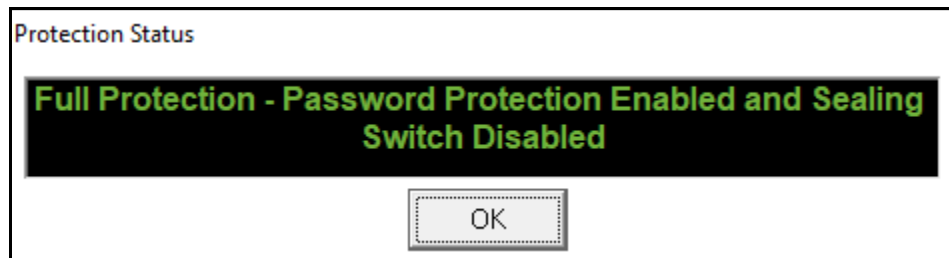
### 6.6.2: Log On/Off with Bi-level Passwords

**NOTE:** You will only be able to log on/off the Bi-level password if the Extended password feature is not enabled.

1. To log on, select Tools>Passwords>Log On.



2. Enter a Level 1 or 2 Password and click OK.
3. To log off, select Tools>Passwords>Log Off. You will see the following message.



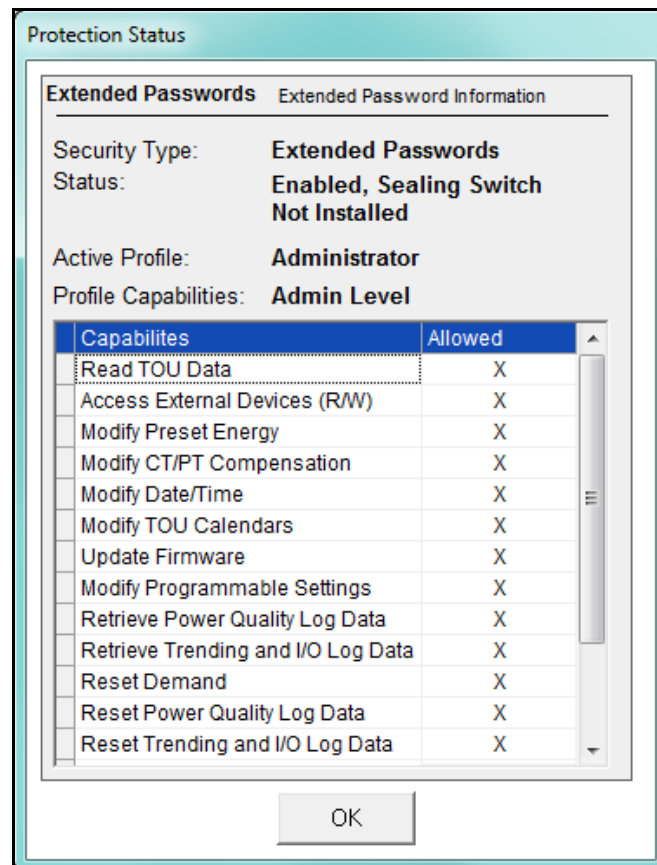
4. Click OK.

## 6.7: View Protection Status (Nexus® Meters)

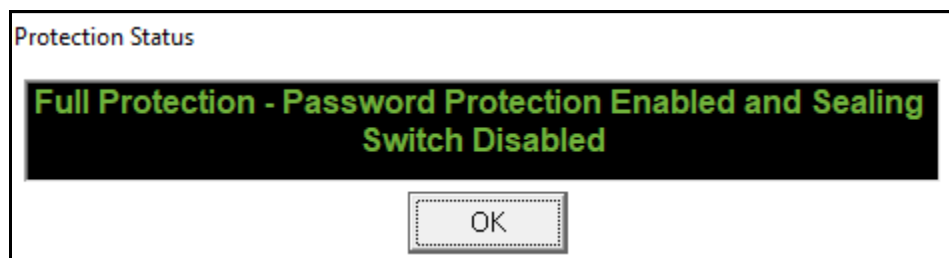
Click Tools>Passwords>Status. The screen you see depends on the protection status that is active. It displays the currently logged in profile, the security status of the meter, and the profile's access permissions.

You will see the following screen if the Extended password protection is enabled.

This is an example of the screen you would see if the Admin password is logged on.



You will see the following screen if only Bi-level password protection is enabled.



## 6.8: Sealing Switch Overview (Nexus® Meters)

The Sealing Switch lets you set additional restriction to functions of the meter. The Sealing Switch acts as a physical barrier, requiring a button to be pressed to allow a user to enter a password and configure the meter. This is an added level of security, since the button is located under an area that can be secured with a physical seal, which would indicate tampering if removed. The Sealing Switch is enabled through the Tools menu. Once enabled, the switch must be activated at the meter. You activate the switch by breaking the physical seal and then:

- Pressing and holding the button (Nexus® 1252/1500/1500+ meter)
- Pressing both the Reset Switch and Test Button at the same time (Nexus® 1262/1272 meter)

You will then be able to perform the restricted function. The restricted functions are as follows:

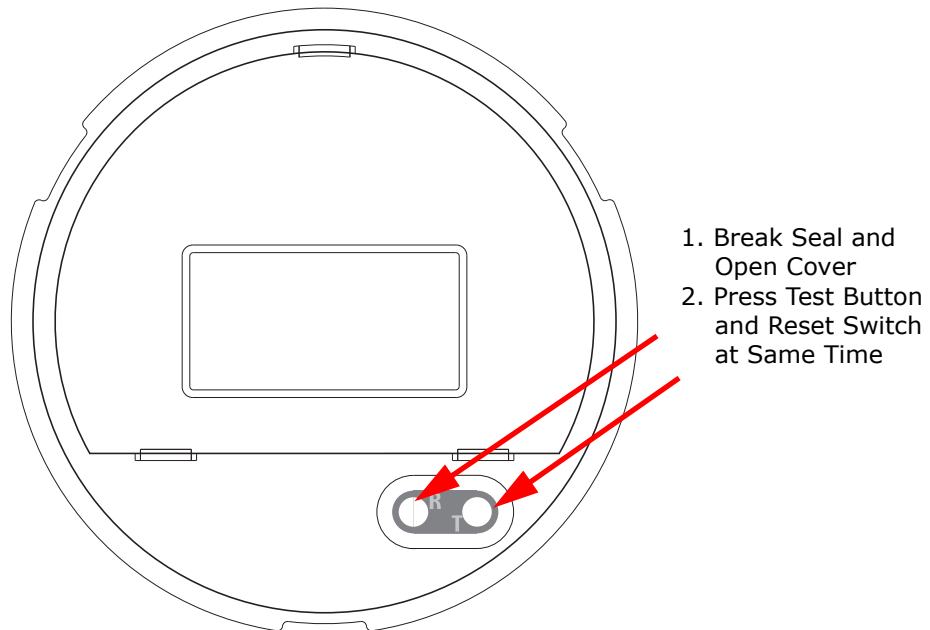
- Nexus® 1252/1262/1272 meters:
  - Reset Logs, Max/Min, Energy, TOU, and related features
  - Enable/Disable Passwords
- Nexus® 1500/1500+ meter:
  - Reset Logs, Energy, TOU, Flicker, and related features
  - Modify TOU Calendars
  - Modify Programmable Settings
  - Calibrate DSP1
  - Calibrate DPS2 Waveform Capture
  - Modify Level 1 Password
  - Modify Level 2 Password
  - Enable/Disable Passwords



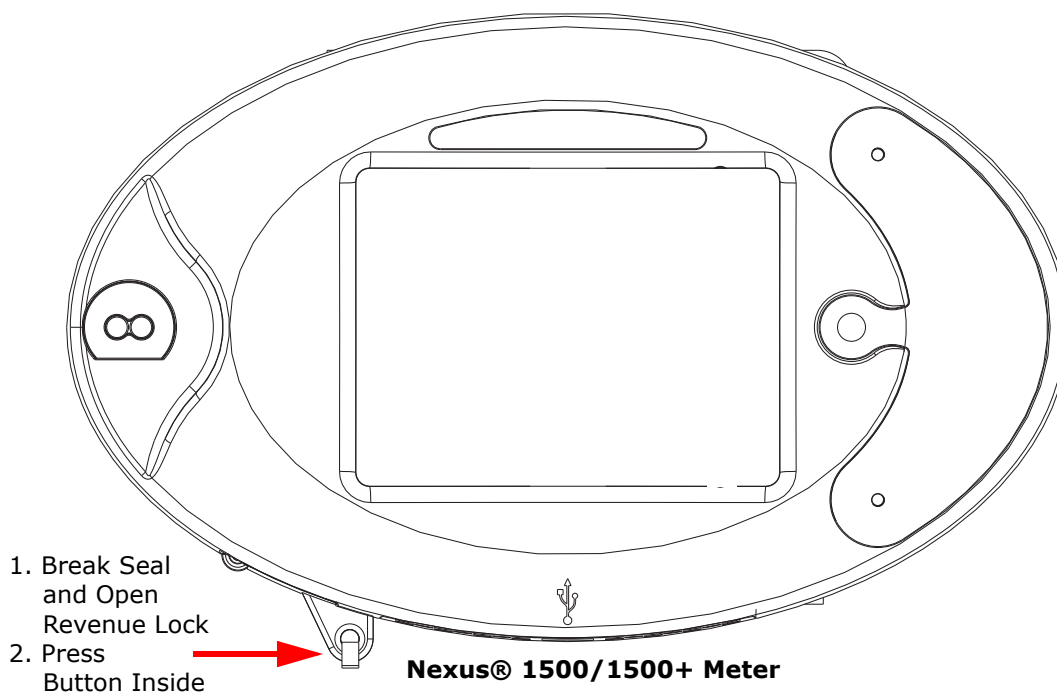
**NOTES:**

- For the Nexus® 1500/1500+ meter, you must break the seal and open the revenue lock on the bottom of the meter, and then press the Sealing Switch button located behind the revenue lock door. You have 30 minutes in which to perform the function once the sealing switch is enabled. You can press the button again to extend the time another 30 minutes.
- For the Nexus® 1262/1272 meter, you must remove the front cover to access the Test button. Once you have pressed the two buttons for a few seconds, a message appears on the display telling you that the Sealing Switch is enabled. You have 30 minutes to implement changes. If you want to re-set the Sealing Switch before the 30 minutes is up, press the two buttons again.
- For the Nexus® 1252 meter, you must hold down the button while performing the restricted functions.

- Refer to the diagrams below for hardware location.



**Nexus® 1262/1272 Meter Without Cover**

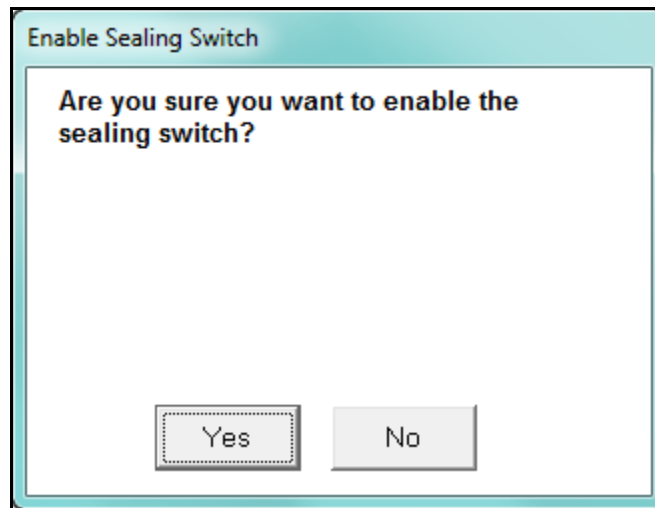


**Nexus® 1500/1500+ Meter**

Figure 6.1: Location of Sealing Switch Buttons

### 6.8.1: Enable Sealing Switch

1. From the Tools Menu, select Sealing Switch>Enable/Disable. You will see the Enable Sealing Switch confirmation screen.

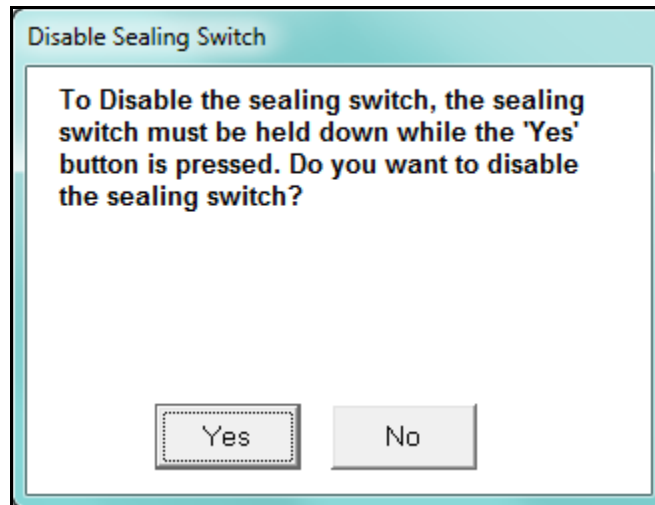


2. Click Yes to enable the Sealing Switch.
3. The Protection Status screen appears, showing Password and Sealing Switch status. Click OK.
4. The status bar at the bottom of your screen now displays: "Sealing Switch: Enabled".

**NOTE:** The screen you see depends on the current status of the Sealing Switch. If the Switch is already enabled, you will see the screen shown in Section 6.9: in that case, click No to keep the Sealing Switch enabled.

## 6.9: Disable Sealing Switch (Nexus® Meters)

1. From the Tools Menu, select Sealing Switch>Enable/Disable. You will see the Disable Sealing Switch confirmation screen.



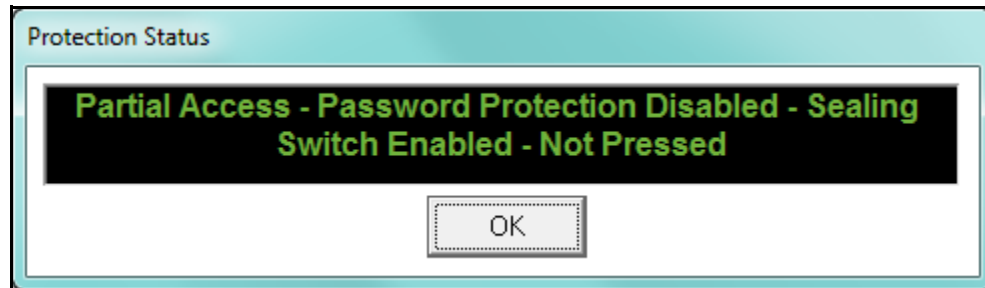
2. Click Yes to Disable the Sealing Switch, at the same time pressing the Sealing Switch button on the Nexus® 1500/1500+ meter.
3. The Protection Status screen appears, showing Password and Sealing Switch status. Click OK.
4. The status bar at the bottom of your screen now displays: "Sealing Switch: Disabled".

**NOTE:** The screen you see depends on the current status of the Sealing Switch. If the Switch is already disabled, you will see the screen shown in Section 6.8: in that case, click No to keep the Sealing Switch disabled.

### 6.10: View Sealing Switch Status (Nexus® Meters)

The Status Bar at the bottom of your screen displays Sealing Switch status. You can also view the status in the following way:

1. From the Tools Menu, select Sealing Switch>Status.
2. You will see the Protection Status screen (example screen shown below), telling you if the Sealing Switch is enabled or disabled.



3. Click OK to close the Protection Status screen.

### 6.11: Shark® 250/270 Meter's Security

The Shark® 250/270 meter has enhanced security features to protect the meter's data.

- The meter's password protection offers one Admin level password that has access to all meter functions, and up to 8 user passwords that can be customized for their access to meter features; for example, resetting logs or accumulators or reading TOU data. Both the username and password are encrypted when they are sent to the meter, to further enhance security. In addition, there is a lockout period of five seconds after an unsuccessful password entry, to prevent brute force hacking.
- Note that if a Shark® 250/270 meter is password protected, you won't be able to log onto the meter unless you enter a correct password.
- The Gen 2 Shark® 270 meter has firmware authentication.
- The Shark® 270 meter with Firmware Version 5 and above offers a Sealing Switch. The Sealing Switch provides additional security for the meter, by requiring someone to perform an action at the meter itself before restricted functions can be performed. The Sealing Switch is locked and unlocked using the Reset and Test but-

tons on the front of the meter. Note that any change to the Sealing Switch state (enabled/disabled/locked/unlocked) is recorded in the System Events log.

- The Sealing Switch is enabled or disabled through CommunicatorPQA® software - see [6.11.4: Enabling/Disabling the Sealing Switch \(Shark® 270 Meter\), on page 6-31](#), for instructions. When the meter's Sealing Switch is enabled, the Reset and Test buttons are used to lock and unlock the Sealing Switch:
    - If the Sealing Switch is locked, press and hold the Reset and Test buttons for between two and five seconds. A message on the display will tell you the Sealing Switch is unlocked - release the buttons when the message appears.
    - If the Sealing Switch is unlocked and you want to re-lock it, press and hold the Reset and Test buttons for between two and five seconds. A message on the display will tell you the Sealing Switch is locked - release the buttons when the message appears.
- NOTE:** Don't hold the buttons for less than two seconds or more than five seconds.
- Once the Sealing Switch is unlocked, the user has 30 minutes to perform the function. After the 30 minute timeout period, the Sealing Switch is automatically locked, again.
    - As mentioned above, if you want to lock the Sealing Switch before the 30 minutes is up, press the Reset and Test buttons for the required, time to lock it.
    - If more time is needed, the Reset and Test buttons can be pressed for the required time once to lock the Sealing Switch, and then pressed for the required time to unlock the Sealing Switch for another 30 minutes. Note that if a file action, e.g., firmware update, is being performed, the Sealing Switch will remain unlocked until the action is completed, even if it takes over 30 minutes.
  - When the Sealing Switch is enabled, the following actions are blocked until the Sealing Switch is unlocked:
    - Reset logs

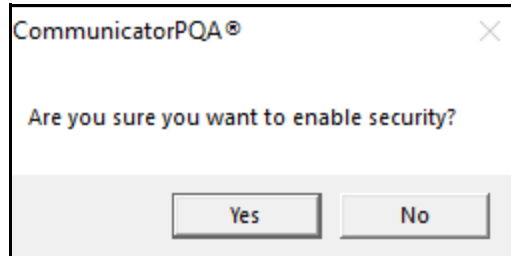
- Reset Max/Min (demand)
- Reset energy (accumulators)
- Reset TOU (All)
- Enable/disable security (you can still create and modify users and assign privileges with Firmware version 0009 and above)
- Modify TOU calendars
- Modify programmable settings (except for the Com 2 port and communication option cards (4GLTE, RS1S, INP100S) settings which can be modified with Firmware version 0009 and above)
- Disable the Sealing Switch
- Modify DNP3 settings
- Reset Option card accumulators
- Reset Cumulative demands
- Manual change of meter's clock time for firmware versions below 0009 (the time may be manually changed with Firmware version 0009 and above - see 20.1.4: Set Device Time, on page 20-5)
- Edit LCD settings
- Write files to the unit
- Soft reset
- Enter Test Mode
- Preset energy
- Load new firmware
- Backup screen/firmware file
- Switch screen file (use a backup)
- Reset of energy or demand through DNP protocol

**NOTE:** If both password protection and the Sealing Switch are enabled, the user must be signed in through a password that allows the action to be performed and then the Reset and Test buttons must be pressed for the required time to unlock the Sealing Switch.

### 6.11.1: Enable and Configure Security

To enable the password feature for the meter, follow these instructions.

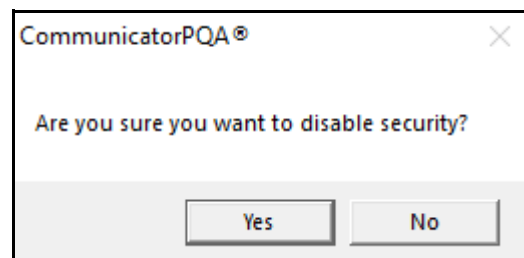
1. From the Tools Menu, select Security>Enable.



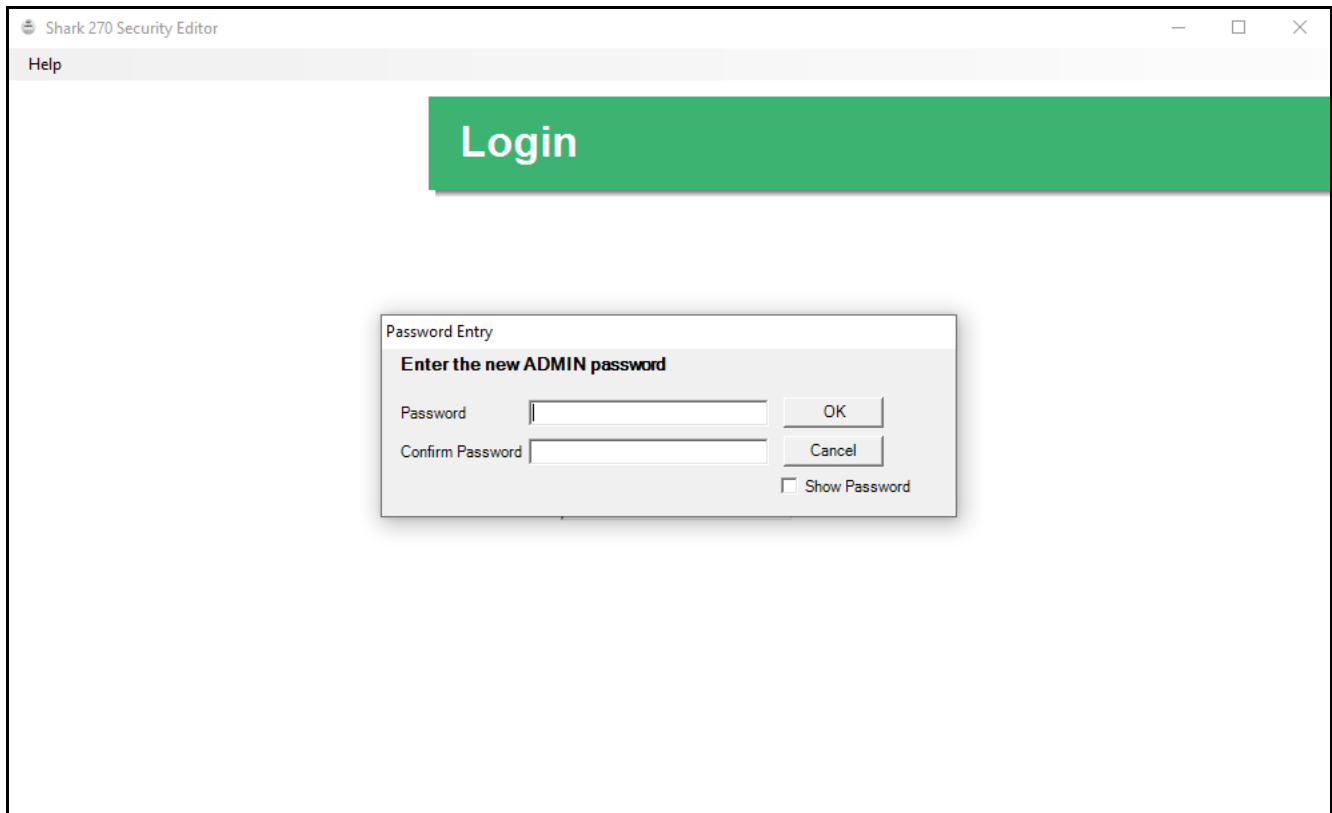
2. Click Yes.

- If password protection is enabled and you want to disable it, select Tools>Security>Disable and click Yes in the confirmation message window.

**NOTE:** You need to be signed in with the Admin password in order to disable security.







3. You will see the Security Editor screen with a window in front of it. This window prompts you to enter a password for the admin user, and to retype the password to confirm it. Once you have done so, click OK to continue. Note that you can click the Show Password box if you want the actual password to be displayed as it is entered, rather than shown as a series of asterisks.

**NOTE:** Admin is the only security user that cannot have a customized username. Admin is the highest level of security and is the only level that can create other users and change or disable security. It is important to keep the Admin password secure, since it enables all password protected functions. It is also recommended that you change the Admin password and other passwords from time to time.

4. You will see messages while security settings are being loaded and then you will see the screen shown below.

**NOTE:** To access this screen again, click Tools>Security>Configure (Admin only).

- The Users field on the left lists the Admin level (0) and User levels 1-8.
- The Security Status is enabled. If you are the Admin, you can disable security by selecting Disabled and then clicking Update.

The screen is then redisplayed with Security Status Disabled and no fields being shown. Click X to close the screen.

- The Admin settings are shown in the main part of the screen.
  - To change the Admin password, enter the new password and then confirm it.

- The Auto Log Out timer is disabled by default. If you want to automatically log out the Admin after a number of minutes, uncheck the Disable box and select the number of minutes for the auto log out timer.
- The Inactivity Timer is enabled by default and set to 300 seconds. This means that after 5 minutes without security activity the system will automatically sign out the Admin. You can increase or decrease the number of seconds in the inactivity timer; or you can disable it completely by checking the Disable box.

5. To set up a user:

- Click on one of the usernames in the Users field.

**Shark 250 Security Editor**

Help

**Configure Users**

Security Status: **Enabled**

**Users**

0	ADMIN
1	User01
2	User02
3	User03
4	User04
5	User05
6	User06
7	User07
8	User08

**User Configuration**

User Name:  ☐ Front Panel User

Password:  User not changed

Confirm Password:  ☐ Show Password ☐ Retain Password

☐ Select/Deselect All   
 ☐ Reset I/O Log   
 ☐ Edit Preset Energy  
☐ Reset Alarm Log   
 ☐ Reset Max/Min   
 ☐ Edit Programmable Settings  
☐ Reset Historical 1 Log   
 ☐ Reset Energy   
 ☐ Edit TOU Calendar  
☐ Reset Historical 2 Log   
 ☐ Reset Cumulative Demand   
 ☐ Retrieve PQ & Waveform Logs  
☐ Reset Historical 3 Log   
 ☐ Reset TOU Demand   
 ☐ Retrieve Historical Logs  
☐ Reset Historical 4 Log   
 ☐ Meter Restart   
 ☐ Retrieve Alarm Log  
☐ Reset Historical 5 Log   
 ☐ Manual Waveform Capture   
 ☐ Retrieve I/O Log  
☐ Reset Historical 6 Log   
 ☐ Upload Firmware   
 ☐ Retrieve System Event Log  
☐ Reset Waveform Log   
 ☐ Edit CT/PT Compensation   
 ☐ Read TOU Data  
☐ Reset PQ Log   
 ☐ Edit Meter Time   
 ☐ Perform Test Actions

Close Editor    Update User

b. You can change the user-name.

c. Enter and confirm a password for the user.  
The password can be up to 30 alphanumeric characters. You can click the checkbox to display the password.

d. Select the functions this user is allowed to perform by clicking in the box next to the function. The functions include: resetting individual logs, retrieving individual logs, resetting max/min, resetting accumulators, restarting the meter, uploading firmware, etc. There is also a Select All checkbox, which when selected gives the user permission to perform all of the listed functions. Once this user is saved, the user is able to perform any allowed functions, e.g., resetting the Alarm log; but if the user attempts to perform a function not allowed for them, e.g., changing the V-Switch™ key, an error message window will be shown and they will not be allowed to perform that function.  
(The example screen is from a Shark® 250 meter. The Shark® 270 meter lists additional functions.)

e. The Shark® 250 meter has an additional setting - Front Panel User. This setting is used to create security for

the meter's front panel functions. You can set up one Front Panel user and password. To do so, check the Font Panel box and enter a username and a four digit password. Note that you will only be able to enter four numbers for the password.

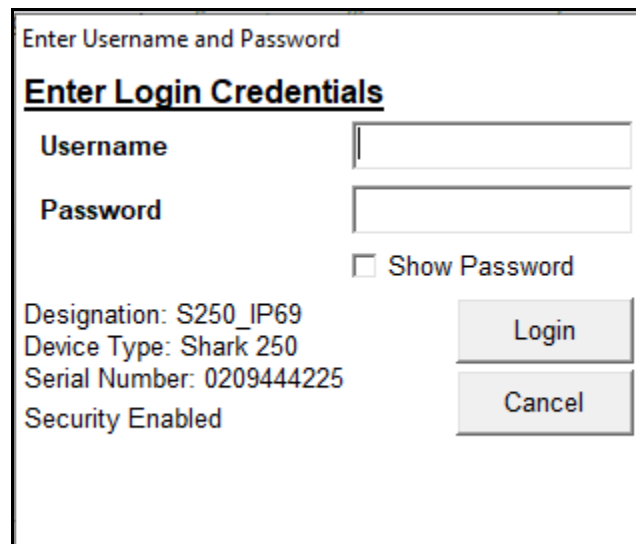
f. Click Update User to save your changes.

g. Repeat steps a-f to create another user.

6. When you are done, click Close Editor.

### 6.11.2: Log On

When password protection is enabled, a login window is presented whenever anyone tries to connect to the meter through software, and also when certain restricted functions are attempted.



Enter Username and Password

**Enter Login Credentials**

Username

Password

☐ Show Password

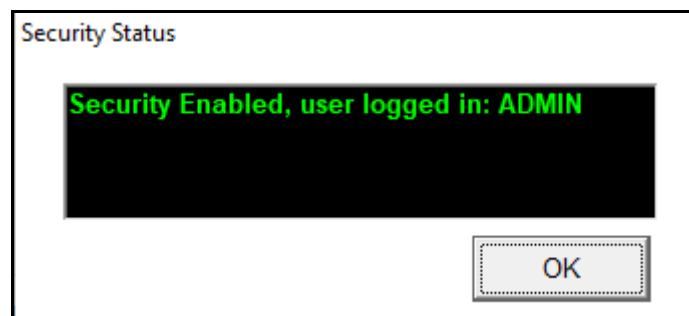
Designation: S250\_IP69  
Device Type: Shark 250  
Serial Number: 0209444225  
Security Enabled

Login

Cancel

Enter username and password and click Login.

- If the username and password are allowed access to the function, e.g., connecting to a meter, you will be able to continue. You will see the window shown below.

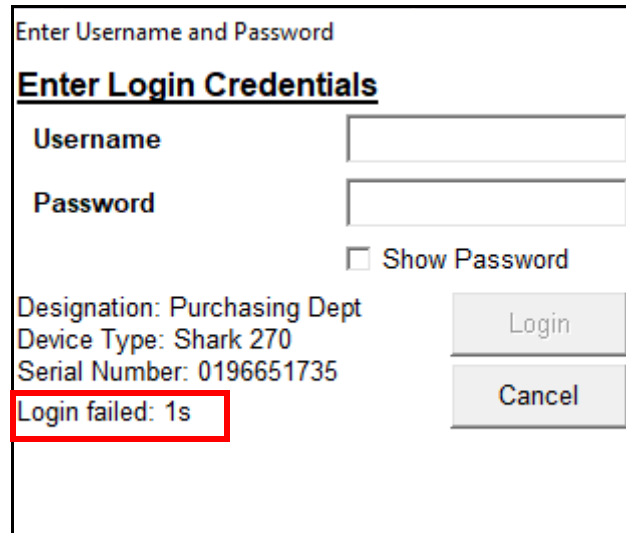


Security Status

**Security Enabled, user logged in: ADMIN**

OK

- If the username and/or password are incorrect, there will be a message that login failed and a 5 second timer will start counting down until you can attempt login in again.

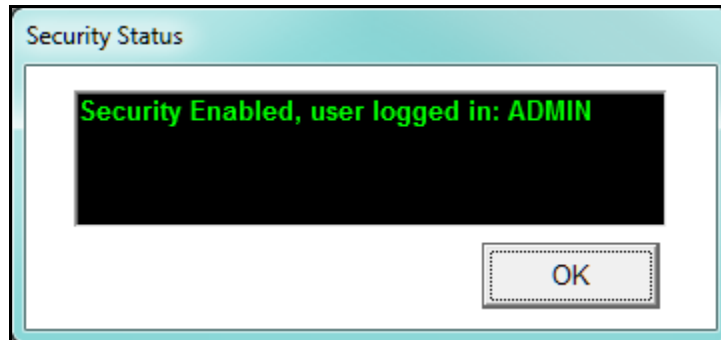


The screenshot shows a login dialog box titled "Enter Username and Password". Inside, there is a section titled "Enter Login Credentials" with two input fields: "Username" and "Password". Below the "Password" field is a checkbox labeled "Show Password". To the left of the "Login" and "Cancel" buttons, the following information is displayed: "Designation: Purchasing Dept", "Device Type: Shark 270", and "Serial Number: 0196651735". A red rectangular box highlights the text "Login failed: 1s" at the bottom left of the dialog.

You can also login when the CommunicatorPQA® application is connected to the meter, for example, if you previously logged out. To do that, click Tools>Passwords>Log On.

### 6.11.3: View Password Status

Click Tools>Passwords>Status to see if password protection is enabled, and who is logged in. See the example screen below.



### 6.11.4: Enabling/Disabling the Sealing Switch (Shark® 270 Meter)

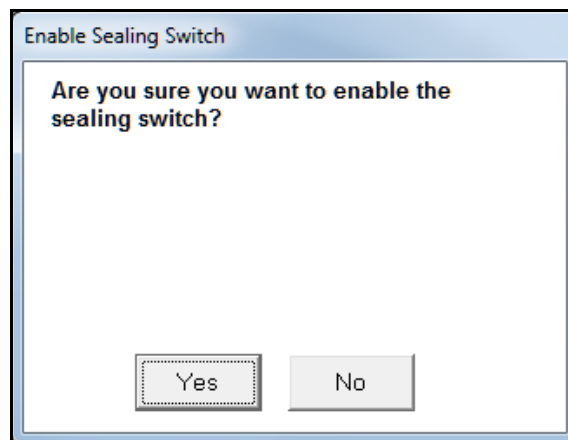
The Sealing Switch adds another layer of security to the meter. When enabled, it blocks access to restricted functions until the Reset and Test buttons on the meter are pressed and held for between two and five seconds. Section [6.11: Shark® 250/270 Meter's Security, on page 6-21](#) contains detailed information on the meter's Sealing Switch.



**CAUTION!** Once the Sealing Switch is enabled, it cannot be disabled unless the Reset and Test buttons are pressed on the meter and, if Password security is enabled, a user with appropriate permissions is signed on.

To enable the Sealing Switch, follow these instructions:

1. From the Tools Menu, select Sealing Switch>Enable/Disable.



2. If you are sure you want to enable the Sealing Switch, click Yes. Once the Sealing Switch is enabled, the Reset and Test buttons on the meter must be pressed in order to perform restricted functions. See [6.11: Shark® 250/270 Meter's Security, on page 6-21](#), for details.
3. To disable the Sealing Switch:
  - a. If Password security is enabled, log on with a password that allows you to disable the Sealing Switch.
  - b. Press (or have someone at the meter press) the Reset and Test buttons for between two and five seconds.
  - c. Within 30 minutes, click Tools>Sealing Switch>Enable/Disable and click Yes in the message window, to disable the Sealing Switch.



## 6.12: Nexus® 1450 Meter's Security Features

The Nexus® 1450 meter's security features include a physical sealing switch, a physical sealing lock and a Security feature that provides password control of meter capabilities as well as the physical sealing switch and lock.

The meter's Security allows setup of up to 12 users:

- The Admin user has access to all of the meter's features. This user is the only one that can enable/disable security and create other users. The Admin user is also the only one who can Reset the System Events log.
- The Legacy user provides backward compatible support. The Legacy user is equivalent to a level 2 user in the older Nexus® meter security system (see the instructions for bi-level passwords in [6.3: Enable Passwords \(Nexus® Meters\)](#), on page 6-4). The Legacy user is not allowed to perform any web actions, except for retrieving historical logs 1 and 2 and the System Events log.
- Ten configurable users.

In addition to setting up users, the meter's Security allows setup of Roles, which are a collection of permissions that can be configured and then assigned to one or more of the ten configurable users.

Another important feature of the meter's Security is that usernames and passwords are encrypted when sent to the meter, both at login time and configuration time. For information on the meter's Web server security, see [21.1: Overview](#), on page 21-1.

The Nexus 1450® meter with firmware version 5.0001 and above also offers firmware integrity through 256-bit digital firmware signature. See [6.13: Nexus® 1500+ Meter's Advanced Security - Resilient Cyber Security™ and Firmware Integrity \(Firmware V20 and above with V4-V6\)](#), on page 6-50 for a description of digital firmware signature.

### 6.12.1: Username and Password

Following are the Nexus® 1450 meter's Username and Password rules:

- Admin user:
  - Has a fixed username of "admin."
  - Has the following password rules:
    - Password is configurable and can be up to 32 characters.
    - Password can contain any printable ASCII character.
    - Password may not contain the username.
- Legacy user:
  - Has a fixed username of "legacy."
  - Password is up to 10 characters.
  - Password enables Level 2 access (see [6.3: Enable Passwords \(Nexus® Meters\)](#), on page 6-4, for information on Level 2 passwords).
  - Access is restricted to backward compatible Modbus features, e.g., resetting energy, reading TOU, and retrieving logs, and cannot be used to log in via the CommunicatorPQA® application as it does not support newer features.
- Ten configurable users:
  - Username is configurable and can be up to 32 characters.
  - Username must be unique and can contain any printable ASCII character.
  - Password rules are the same as for the Admin password.
  - May have one of four roles assigned, to control user permissions.

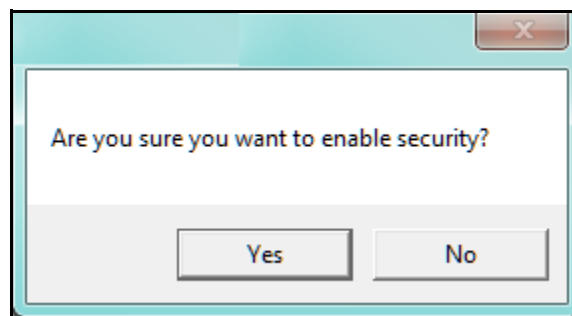
### 6.12.2: Roles

Roles are sets of permissions that can be configured by the Admin user and assigned (one each) to the ten configurable users. A role can be assigned to multiple users, but each user can have only one role. All of the available permissions are shown in the roles setup screen - see [6.12.6: Setting up Roles, on page 6-40](#).

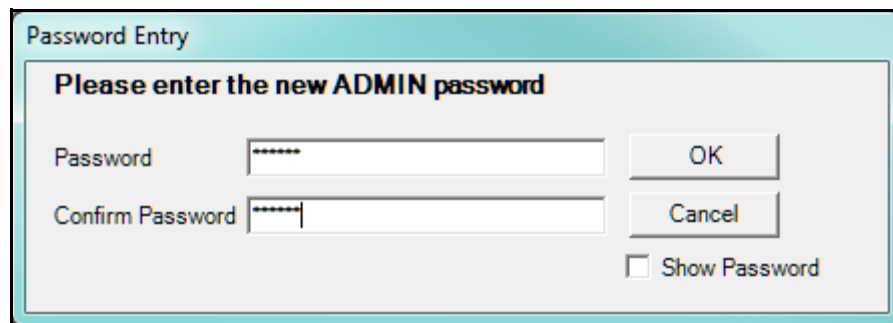
### 6.12.3: Enabling Security

To enable security:

1. From the Tools Menu, click Security>Enable. You will see this message.



2. Click Yes. You will be prompted to enter the Admin password.

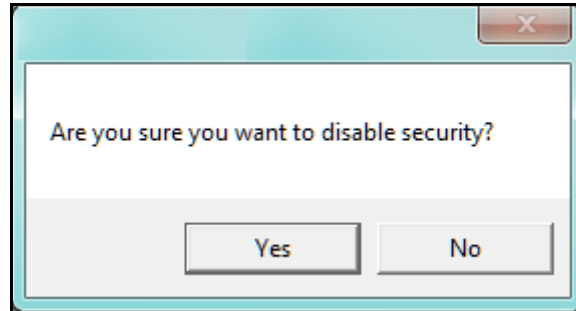


3. Enter and confirm a password for the Admin user (see [6.12.1: Username and Password, on page 6-34](#), for password requirements). Note that you can click Show Password if you want to see the actual password rather than the placeholder asterisks.
4. Click OK. You will see the Security Editor screen, which is explained in [6.12.5: Setting up Users, on page 6-37](#) and [6.12.6: Setting up Roles, on page 6-40](#).

### 6.12.4: Disabling Security

As mentioned earlier, only the Admin user can disable security for the meter.

1. From the Tools Menu, click Security>Disable. You will see this message.



2. Click Yes. You will see status messages as security is being disabled, and then this message once the security has been disabled.



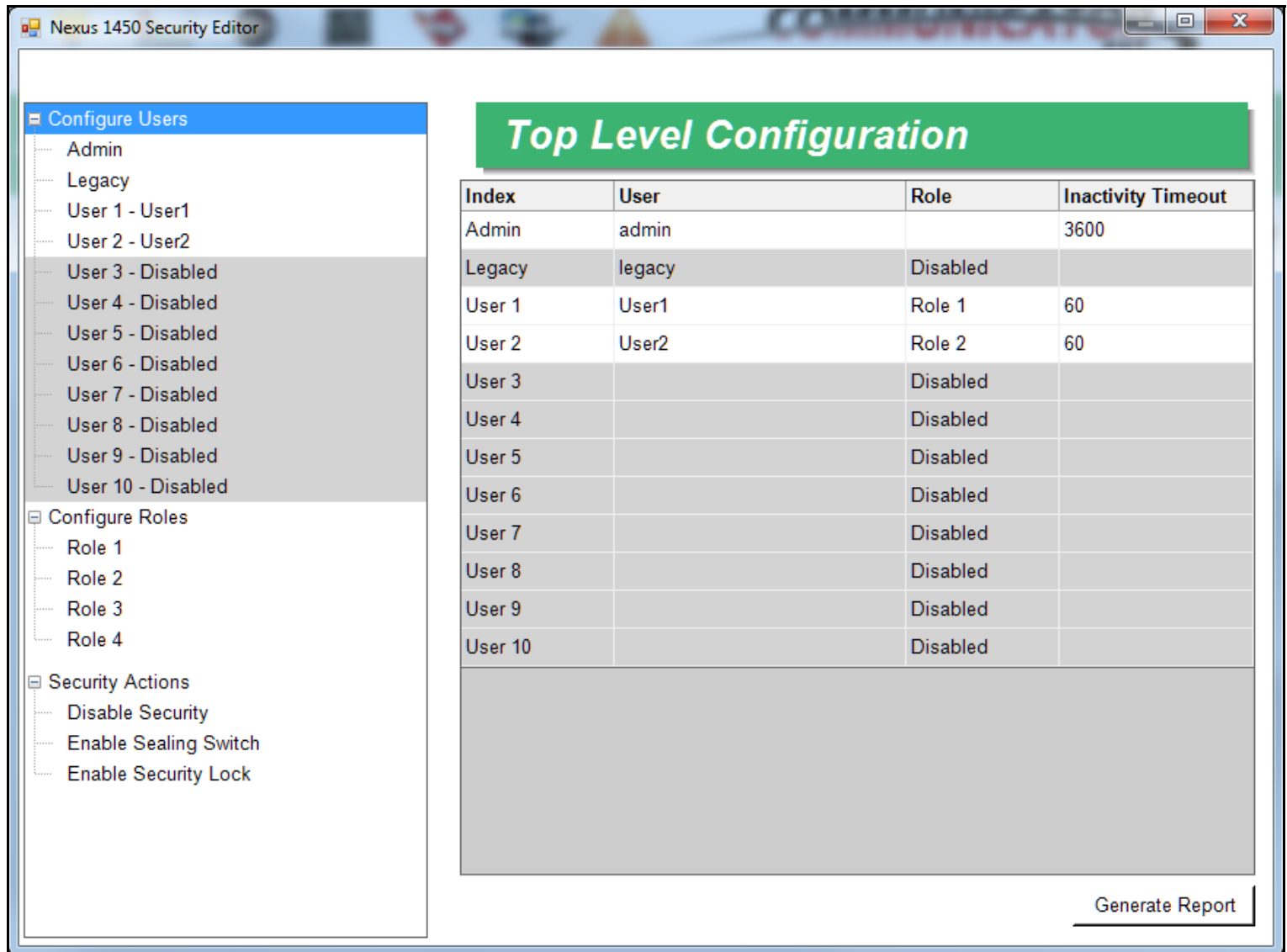
3. Click OK.

### 6.12.5: Setting up Users

As mentioned earlier, only the Admin user can configure the other users.

1. When you first Enable security, after entering the Admin password, the Security Editor opens automatically.

**NOTE:** To set up or edit users at another time, click Tools>Security>Configure.



The screenshot shows the 'Nexus 1450 Security Editor' window. On the left is a sidebar with a tree view containing three main sections: 'Configure Users', 'Configure Roles', and 'Security Actions'. The 'Configure Users' section is expanded, showing a list of users from 'Admin' to 'User 10 - Disabled'. The 'Configure Roles' section shows 'Role 1' through 'Role 4'. The 'Security Actions' section shows 'Disable Security', 'Enable Sealing Switch', and 'Enable Security Lock'. The main area of the window is titled 'Top Level Configuration' and contains a table with the following data:

Index	User	Role	Inactivity Timeout
Admin	admin		3600
Legacy	legacy	Disabled	
User 1	User1	Role 1	60
User 2	User2	Role 2	60
User 3		Disabled	
User 4		Disabled	
User 5		Disabled	
User 6		Disabled	
User 7		Disabled	
User 8		Disabled	
User 9		Disabled	
User 10		Disabled	

At the bottom right of the main area, there is a button labeled 'Generate Report'.

- If this is the first time you are setting up security for the meter, the only enabled user will be Admin; if users have already been configured, they will be listed on the right side of the screen. For each configured user, the username, assigned (configured) role, and timeout setting are displayed.

From this screen you can set up a legacy user, if needed, and ten additional users. You can also configure roles for the users and enable the sealing switch and security lock.

- To set up a user, click on a user in the list on the left side of the screen.

**Nexus 1450 Security Editor**

**Configure User 1**

Configure Users

- Admin
- Legacy
- User 1 - Disabled**
- User 2 - Disabled
- User 3 - Disabled
- User 4 - Disabled
- User 5 - Disabled
- User 6 - Disabled
- User 7 - Disabled
- User 8 - Disabled
- User 9 - Disabled
- User 10 - Disabled

Configure Roles

- Role 1
- Role 2
- Role 3
- Role 4

Security Actions

- Disable Security
- Enable Sealing Switch
- Enable Security Lock

Username: Basic User

Password: \*\*\*\*\* good

Confirm Password: \*\*\*\*\*

Role: Role 1

Inactivity Timeout: 60 Seconds

Clear User

Settings Changed

Update User

4. You configure settings for the user on the right side of the screen. Enter:

- Username
- Password

See [6.12.1: Username and Password, on page 6-34](#) for details of password requirements.

- If the password meets the minimum requirements, you will see a red check mark and the text “weak” to the right of the field; if it meets the recommended strength length of at least 16 characters, you will see a green check mark and the word “good” to the right of the field.
- If you want to see the password you are entering (rather than asterisk placeholders), click the eye icon to the right of the Password or Confirm Password fields.

5. Enter the password again in the Confirm Password field.

6. Select the Role for this user from the Role pull-down menu. You also set up roles; i.e., a collection of permissions, from the Security Editor screen - see [6.12.6: Setting up Roles, on page 6-40](#), for instructions.

7. Select an inactivity timeout from the pull-down menu. This is the number of seconds without security activity that the system will wait before automatically signing out the user.

8. Note that there is a message at the bottom of the screen that says “Settings changed.” Click Update User to save your settings and create the user, or Clear User to delete the user from the security setup. You will see a screen with update messages as your settings are being saved and then the Security Editor is redisplayed. When the user is saved successfully, there is a message at the bottom of the screen that says “Update Successful.”

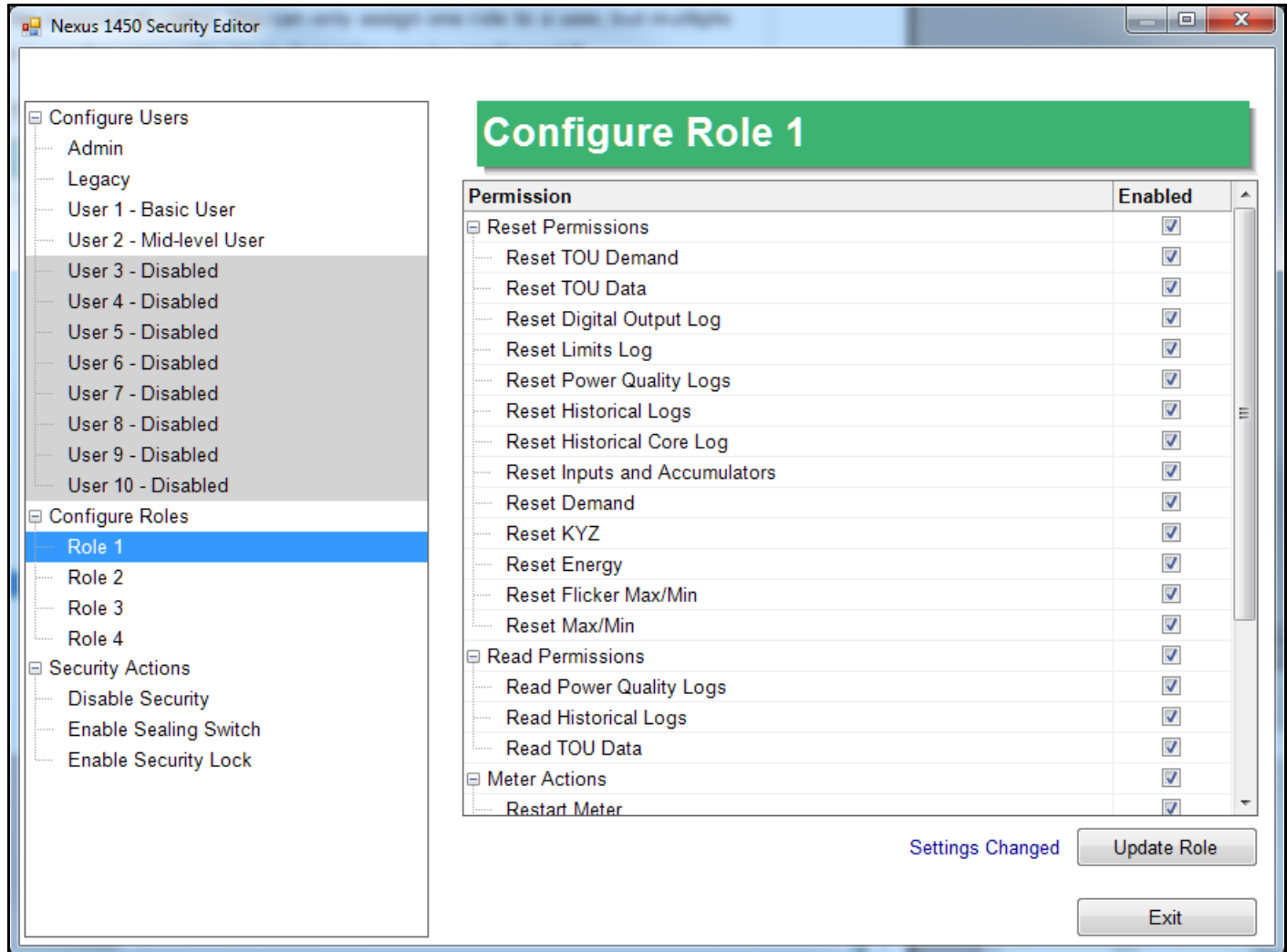
**NOTE:** If the Update button isn’t selectable, make sure that the password and confirmation passwords match, and that the password doesn’t contain the username.

9. Continue to set up as many users as you need. Remember that the Legacy user is a special case that has unique password requirements - see [6.12.1: Username and Password, on page 6-34](#), for details.

### 6.12.6: Setting up Roles

The Security Editor screen is also used to set up the roles, i.e., the set of permissions that will be assigned to users. You can only assign one role to a user, but multiple users can have the same role. Up to four roles can be configured.

1. Click on one of the roles on the left, under the Configure Roles heading.



2. The right side of the screen lists permissions. Use the scroll bar to view all of the available permissions. To assign a permission to a role, click in the Enabled checkbox next to the action, e.g., Read TOU data.

**NOTE:** You can click on the group checkbox, e.g., Read Permissions, to select all of the items in that group - see the example above. You can also right-click in the screen and choose Select All or Select None.



3. When you have finished assigning permissions to the roles, click Update Role. You will see a screen with update messages as the role is being saved and then the Security Editor is redisplayed. You can then assign that role to one or more users.

### 6.12.6.1: Viewing the Role and User Configuration

You can view all of the roles with their permissions, and the users to whom they are assigned by clicking on Configure Roles on the left side of the screen. You will see the Roles Overview screen, shown below.

Each role has a unique color

Users have the same color as their role

The permissions for a user are checked

Scroll to see more information

Permission	Role 1	Role 2	Role 3	Role 4	Admin	User 1	User 2
Reset Permissions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Reset TOU Demand	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Reset TOU Data	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Reset Digital Output Log	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Reset Limits Log	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Reset Power Quality Logs	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Reset Historical Logs	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Reset Historical Core Log	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Reset Inputs and Accumulators	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Reset Demand	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Reset KYZ	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Reset Energy	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Reset Flicker Max/Min	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Reset Max/Min	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Read Permissions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Read Power Quality Logs	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Read Historical Logs	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Read TOU Data	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
Meter Actions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Restart Meter	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		

You can also create a text file with the configured users and their permissions. Click Configure Users on the left side of the Security Editor and then click Generate Report on the bottom right. You will be prompted to enter a name and select a destination for the text file. An example text file is shown on the next page.

```
Report1 - Notepad
File Edit Format View Help
Nexus 1450 Security Report
Connection: mn://172.20.167.218:502
Meter Designation: Serial Number
Meter Serial: 00000000000001234
Meter Type: 0171 Nexus 1450
Generated: 10/30/2017 1:45:57 PM

---- Security ----
Security : Enabled
Sealing Switch: Disabled
Security Lock: Disabled

---- Users ----
- Admin -
  Username: admin
  Role: admin
  Inactivity Timer: 3600 Seconds
- Legacy -
  Disabled
- User 1 -
  Username: User1
  Role: Role 1
  Inactivity Timer: 60 Seconds
- User 2 -
  Username: User2
  Role: Role 2
  Inactivity Timer: 60 Seconds
- User 3 -
  Disabled
- User 4 -
  Disabled
- User 5 -
  Disabled
- User 6 -
  Disabled
- User 7 -
  Disabled
- User 8 -
  Disabled

---- Roles ----
- Role 1 -
  Edit Programmable Settings
- Role 2 -
  Edit Date
- Role 3 -
- Role 4 -
```

### 6.12.7: Security Actions

The Security Editor also lets you enable the meter's sealing switch and security lock and disable security.



When the sealing switch is enabled, a user must physically break the meter seal and press the Reset button in order to perform any password protected meter actions.

- When security lock is enabled, passwords must be used to access any password protected features.



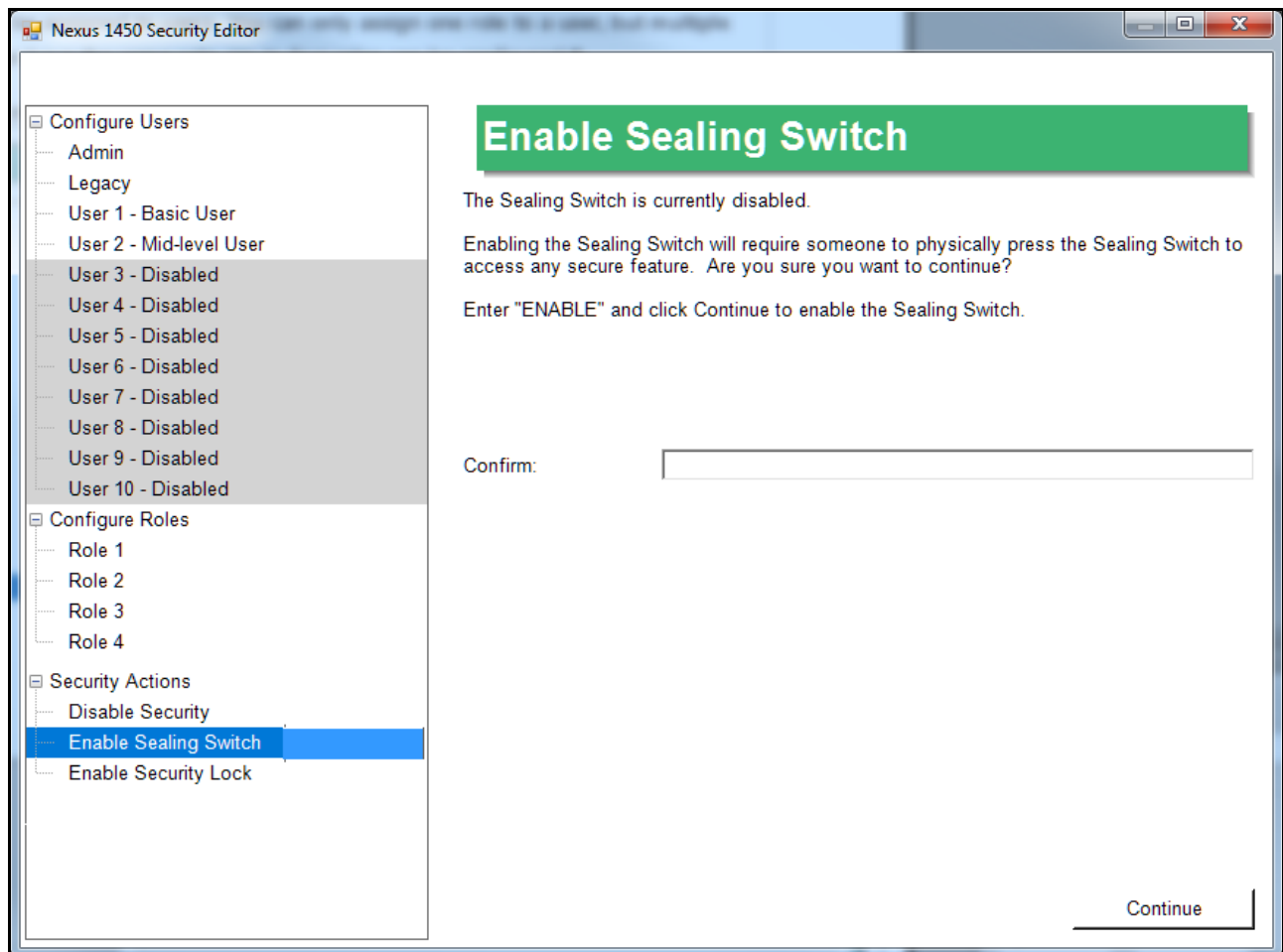
**CAUTION!** Once security lock is enabled, it **cannot be turned off**.

#### 6.12.7.1: Enabling the Sealing Switch

To enable the sealing switch:

1. Under Security Actions on the left side of the screen, click Enable Sealing Switch.

The right side of the screen displays the settings for the sealing switch.



**IMPORTANT!** Once you enable the sealing switch, the physical sealing switch, i.e., the meter's Reset button must be pressed, in order to access any secure features. Pressing the Reset button gives you 30 minutes in which to perform the task.

- Once 30 minutes have passed, you are no longer allowed to make configuration changes. However, if you press the Reset button again **before** the 30 minutes has elapsed, the countdown is restarted, giving you 30 minutes from the second time you pressed the Reset button.

2. Enter the word ENABLE in the Confirm field.

3. Click Continue.

**NOTES:**

- The Admin user can also disable the sealing switch if it has been enabled. The instructions are the same as for enabling the sealing switch, except that the text under Security Actions will say Disable Sealing Switch and you will type the word DISABLE in the Confirm field.
- You can also enable the sealing switch from the Tools menu. Once you have enabled security, click Tools>Enable to enable the sealing switch. Note that you will not see this menu item if security is not already enabled.

Sealing Switch	►	Enable
Device Information		Status

### 6.12.7.2: Enabling Security Lock

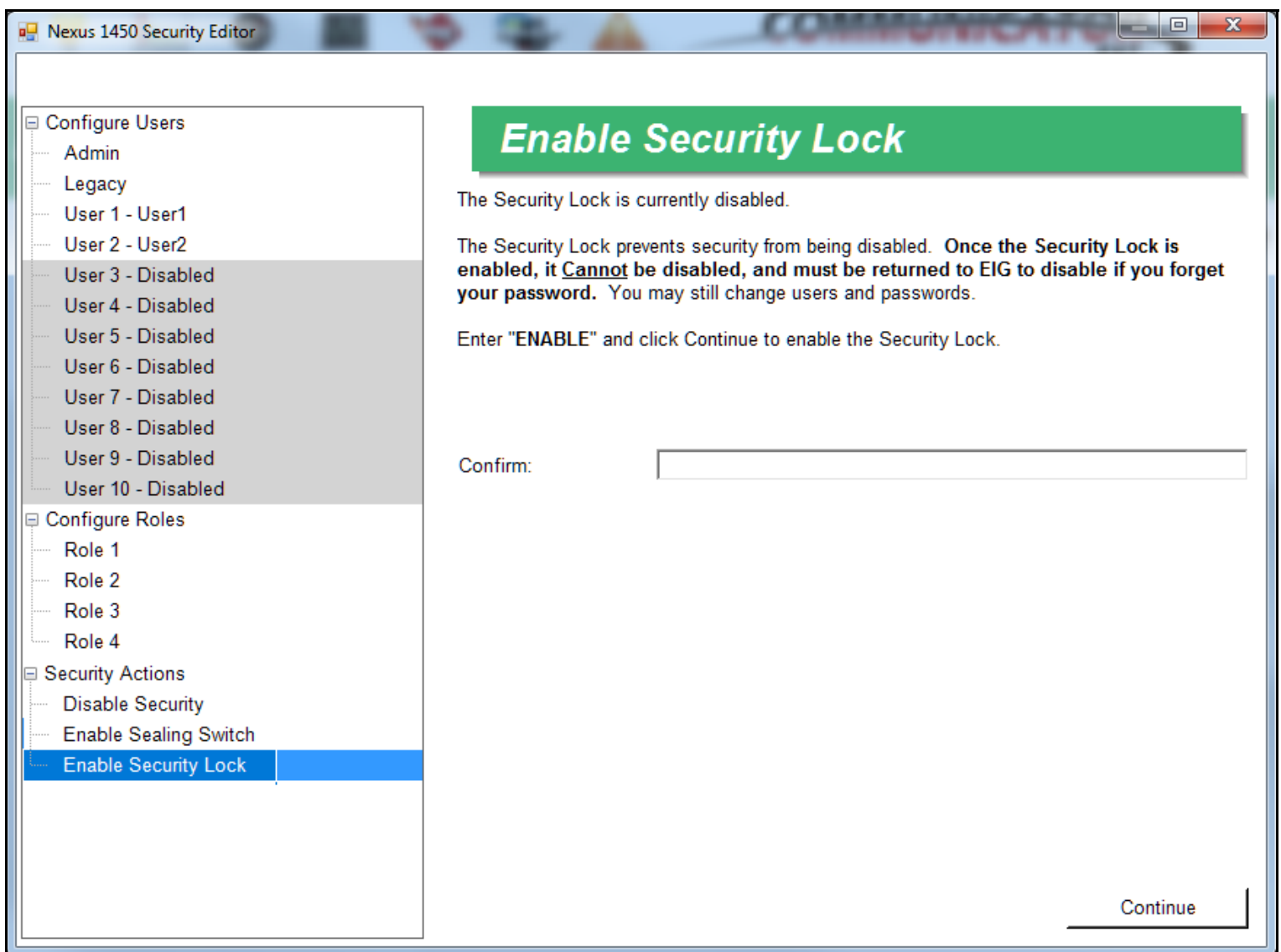
The security lock feature prevents meter security from being disabled.

**IMPORTANT! Make sure you want to implement this setting:** Once you enable the security lock, you **CANNOT DISABLE Security**, though you can still change users and passwords.

To enable the security lock:

1. Under Security Actions on the left side of the screen, click Enable Security Lock.

The right side of the screen displays the settings for the security lock.

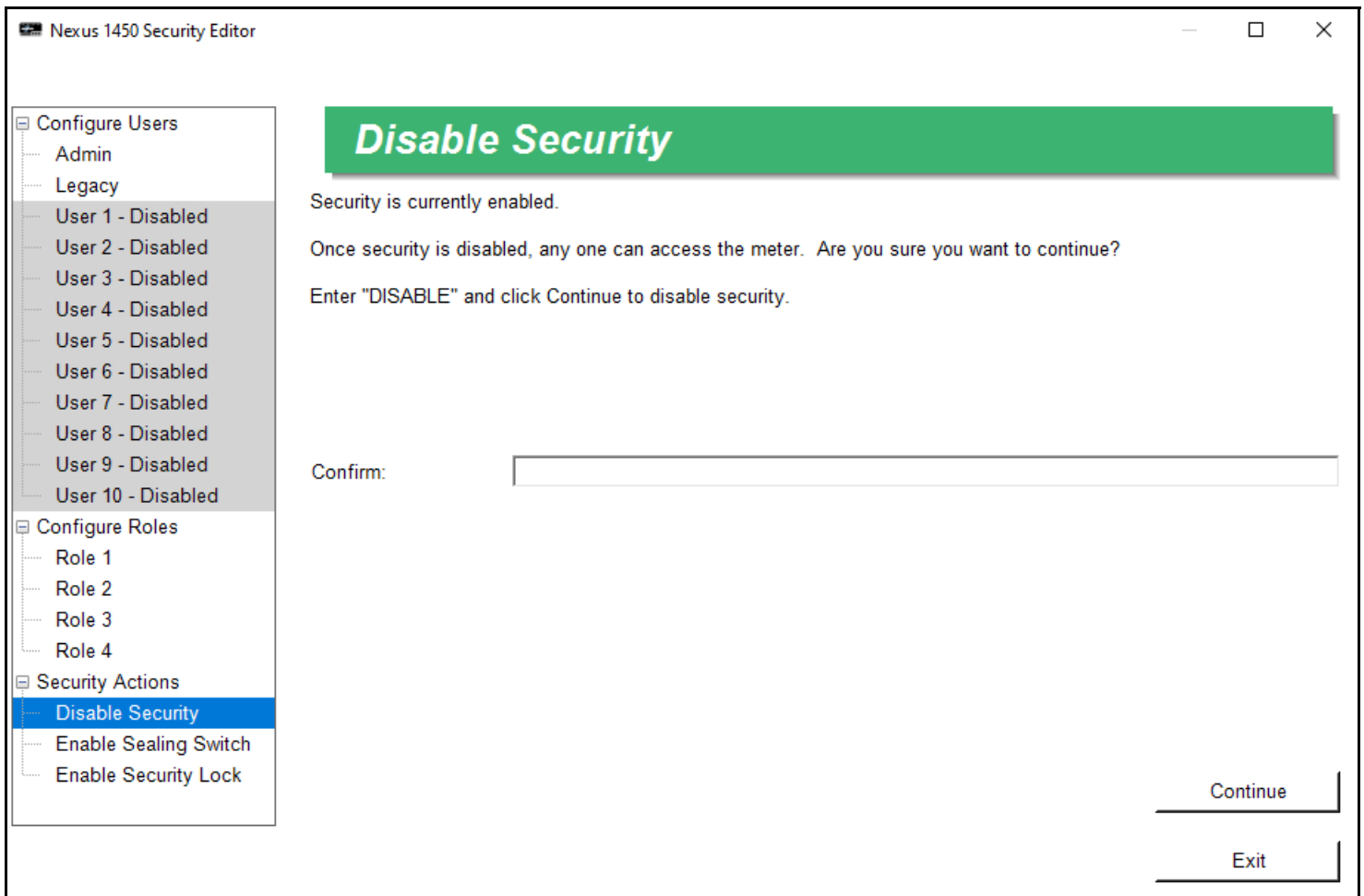


2. If you are sure you want to enable security lock, enter the word ENABLE in the Confirm field.
3. Click Continue.

### 6.12.7.3: Disabling Security

To disable security:

1. Under Security Actions on the left side of the screen, click Disable Security. The right side of the screen displays the settings for disabling security.



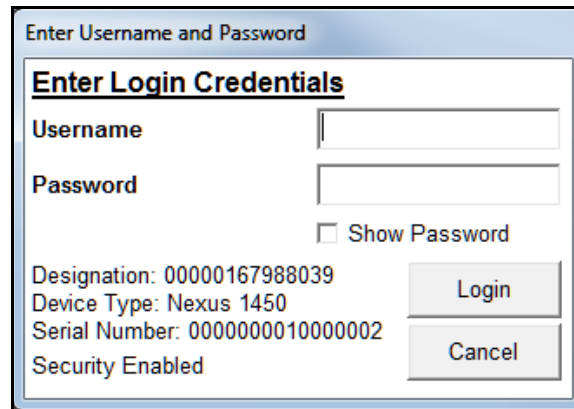
2. Only the Admin can disable security. To do so, enter DISABLE in the Confirm field and then press Continue.



**IMPORTANT!** Once security is disabled, anyone will be able to access the meter until security is enabled again.

### 6.12.8: Logging On and Off

When security is enabled, you will be prompted to enter a password (or press the sealing switch and then enter your password, if sealing switch is enabled) when you connect to the meter.



Enter your username and password and then press Login. Note that you can click the box next to Show Password if you want to see the characters you are entering, rather than the place holding asterisks. If the username and password are correct, you will be able to perform the action. If they are not correct, you will be prompted to enter a new username and password.

You are logged out of the meter when you disconnect.

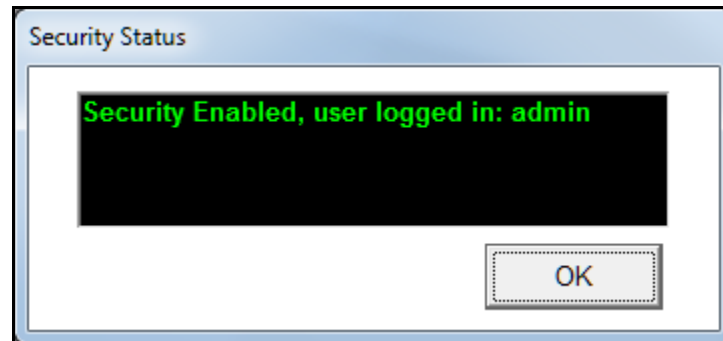
Note that if click Cancel you will be disconnected from the meter.

**NOTE:** When the Device Profile of a Nexus® 1450 meter is updated, the meter reboots. If security was enabled when the meter rebooted, users may need to login again by disconnecting from the meter, reconnecting to it, and logging in again. This is true both for the user that updated the Device Profile and for any other users connected to the meter when it is updated.

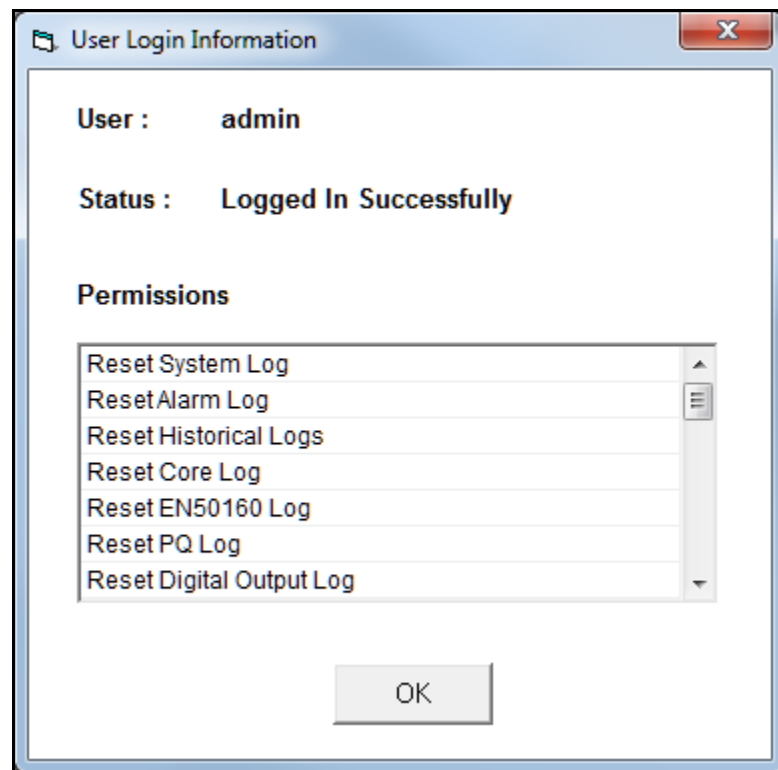


### 6.12.9: Viewing Security Status

When you sign on with a password, you will see a security status screen like the one shown below.



You can also check Security status by clicking Tools>Security>Status. You will see a screen like the one shown below, showing details of the users that are logged in.



### **6.13: Nexus® 1500+ Meter's Advanced Security - Resilient Cyber Security™ and Firmware Integrity (Firmware V20 and above with V4-V6)**

The Nexus® 1500+ meter with Firmware V20 and above and V-Switch™ keys 4-6 offers both the bi-level and extended password protection described earlier in this chapter (see [6.2.1: Nexus® Meters' Password Options, on page 6-2](#)) and an advanced security option - Resilient Cyber Security™, which enables role-based user accounts protected with an encryption key. Some of the features of Resilient Cyber Security™ are:

- An Admin user with full rights and a programmable password of up to 24 characters.
- Ten user IDs with passwords of up to 24 characters.
- Encrypted communication of sensitive data, such as passwords, usernames, roles, and rights.
- Expiration programming of passwords by the Admin user.
- A security lock feature is available to prevent security from being disabled.

In addition to Resilient Cyber Security™, V20 of the meter's firmware provides security to ensure firmware integrity. The Firmware is "signed" with a 512-bit digital signature embedded in the firmware file/package.

- The digital signature is an encryption of a hash value computed over the firmware contents.
- The digital signature is decrypted by the firmware currently in the meter and the hash value is compared to make sure it is as expected.
- Firmware is checked for integrity by the meter on startup and firmware update.
  - On startup, if the firmware integrity check fails, the meter stays in Boot mode, and a System Failure message is displayed on the meter's screen and in the meter's status screen.
  - In firmware update, if the firmware integrity check fails, the meter will not accept the uploaded firmware file.

### 6.13.1: Admin and User Accounts

Resilient Cyber Security™ allows for one administrator account and up to ten role-based user accounts. The administrator account is called Admin (this name can't be changed). The Admin has all rights and is able to create and edit other users, set and change the Admin password, enable and disable security, and set expiration dates for passwords and/or the encryption key.

Usernames and passwords can be up to 24 characters in length. Passwords can consist of any printable characters, except for a colon (:). There is a lockout period of up to 24 hours for incorrect username/password entry: after three failed login attempts, the user is locked out (prevented from signing on) for one minute. After each subsequent set of three failed attempts, the lockout time is doubled; the maximum lockout time is 24 hours. The lockout time is reset after a successful entry.

When Resilient Cyber Security™ is enabled, access to the following actions is restricted to either the Admin or a user whose assigned role gives them rights to the action. When security is disabled, all of the following actions are accessible.

**NOTE:** Some actions may be dependent on others, and if the user's role doesn't allow the other action, the user won't be able to perform the initial action, e.g., being able to set up Preset Energy depends on having Test Mode rights. The Admin should take this into account when setting up user roles.

- File access: read, write, delete, rename, change directory, list directory
- Read TOU data
- Retrieve logs file
- Set CT/PT compensation
- Preset energy
- Set date/time
- Set date/time format
- Set serial number
- Set V-Switch™ key
- Reset max/min and demand
- Reset TOU
- Reset logs

- Reset energy
- Reset meter
- Modbus LDA access
- WEB access
- FTP access
- Update device profile file
- Update TOU profile file
- Update firmware file
- Update SCL file
- Update webpage file
- Update display file
- Access control for external device
- Access control relay
- Manual waveform capture
- Test mode
- Revenue and waveform calibration

The ten user accounts can be assigned any combination of eight roles, which provide specific capabilities. See [6.13.2.3: Setting up Roles, on page 6-61](#), for details.

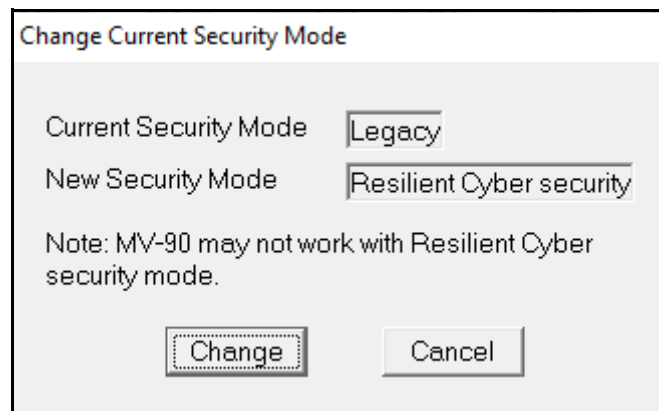
### 6.13.2: Programming Resilient Cyber Security™

The following sections explain the actions involved with implementing the Resilient Cyber Security feature.

#### 6.13.2.1: Upgrading and Enabling Security

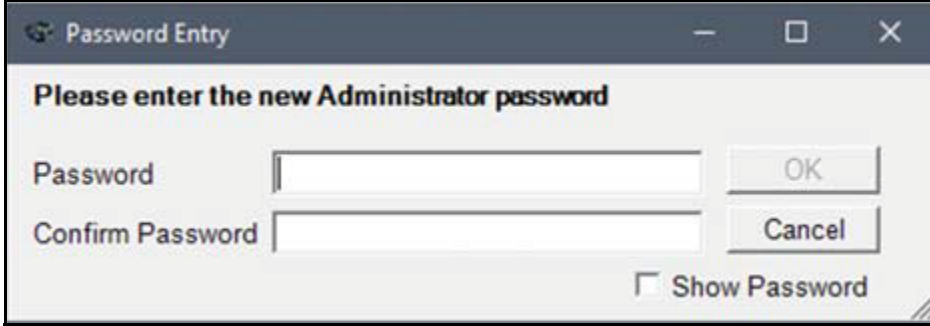
If your meter is in Legacy security mode, you first need to upgrade to Resilient Cyber Security™ mode:

1. If Password protection is enabled, disable it.
2. From the Tools Menu, click Passwords>Change Current Security Mode.



3. To change from the Legacy Mode to the Resilient Cyber Security™ Mode, click Change. (As the message notes, MV90 may not work as expected under the Resilient Cyber Security™ Mode.) **If the current security mode is Resilient Cyber Security™, do not make any changes - click Cancel to close the screen.**
4. You will see a Confirmation window - click Yes to close it. You next need to enable Resilient Cyber Security™.

5. Click Tools>Security>Enable and click Yes in the Confirmation window.

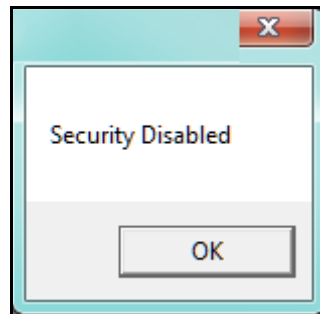
A screenshot of a Windows-style dialog box titled "Password Entry". The dialog has a dark blue header bar with the title and standard window controls (minimize, maximize, close). The main area is light gray and contains the text "Please enter the new Administrator password". Below this text are two text input fields: "Password" and "Confirm Password". To the right of the "Password" field is an "OK" button, and to the right of the "Confirm Password" field is a "Cancel" button. At the bottom right of the dialog is a checkbox labeled "Show Password".

6. Enter and confirm a password for the Admin user (see [6.13.1: Admin and User Accounts, on page 6-51](#), for password requirements). Note that you can click Show Password if you want to see the actual password rather than the placeholder asterisks.
7. Click OK. You will see the Security Editor screen, which is explained in [6.13.2.2: Setting up Users, on page 6-58](#) and [6.13.2.3: Setting up Roles, on page 6-61](#).

### 6.13.2.1.1: Disabling Security

As mentioned earlier, only the Admin user can disable security for the meter. There are two ways to disable security: from the Security menu and from the Security Editor screen.

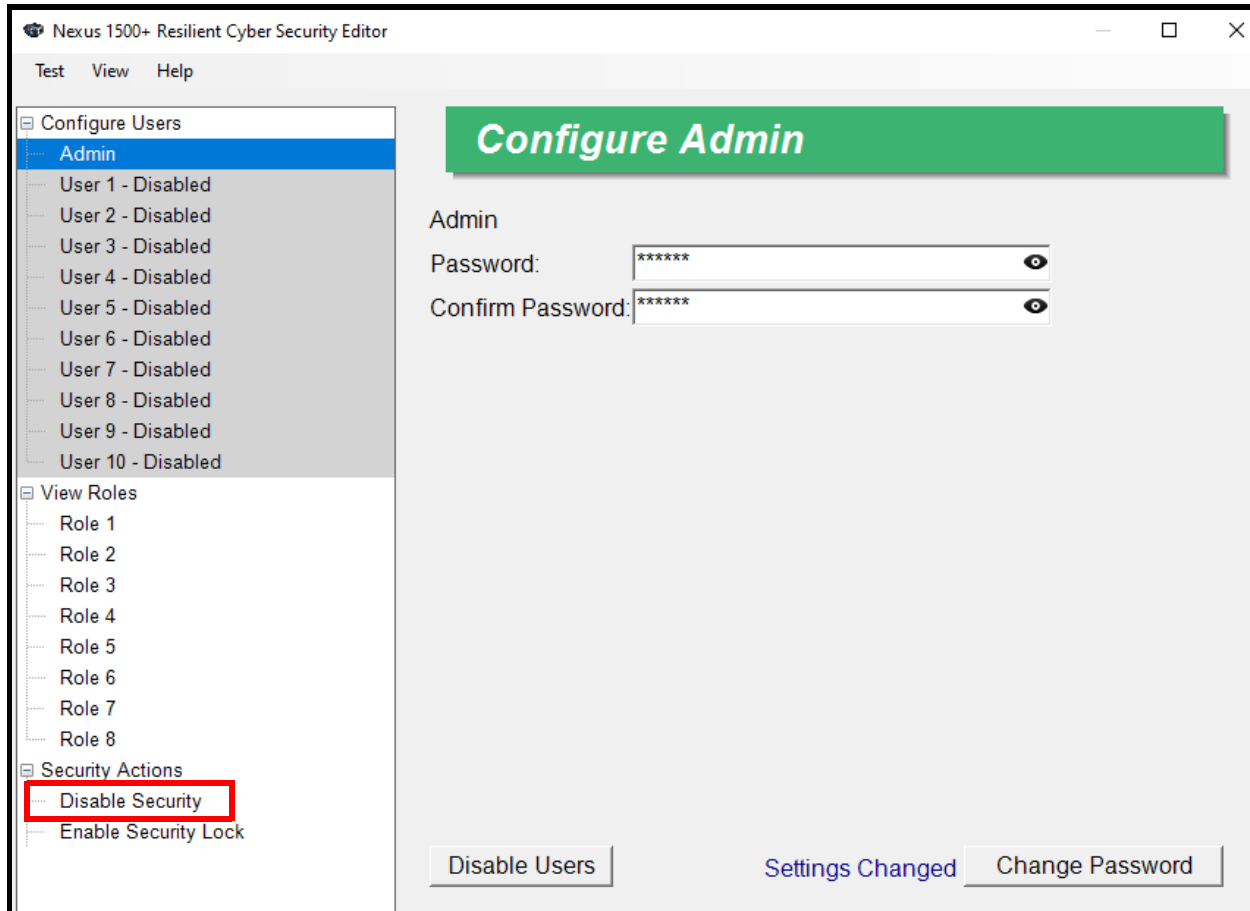
- To disable security from the Security menu:
  1. Click Tools>Security>Disable and click Yes in the Confirmation window.
    - You will see status messages as security is being disabled, and then this message once the security has been disabled.



2. Click OK to close this window.

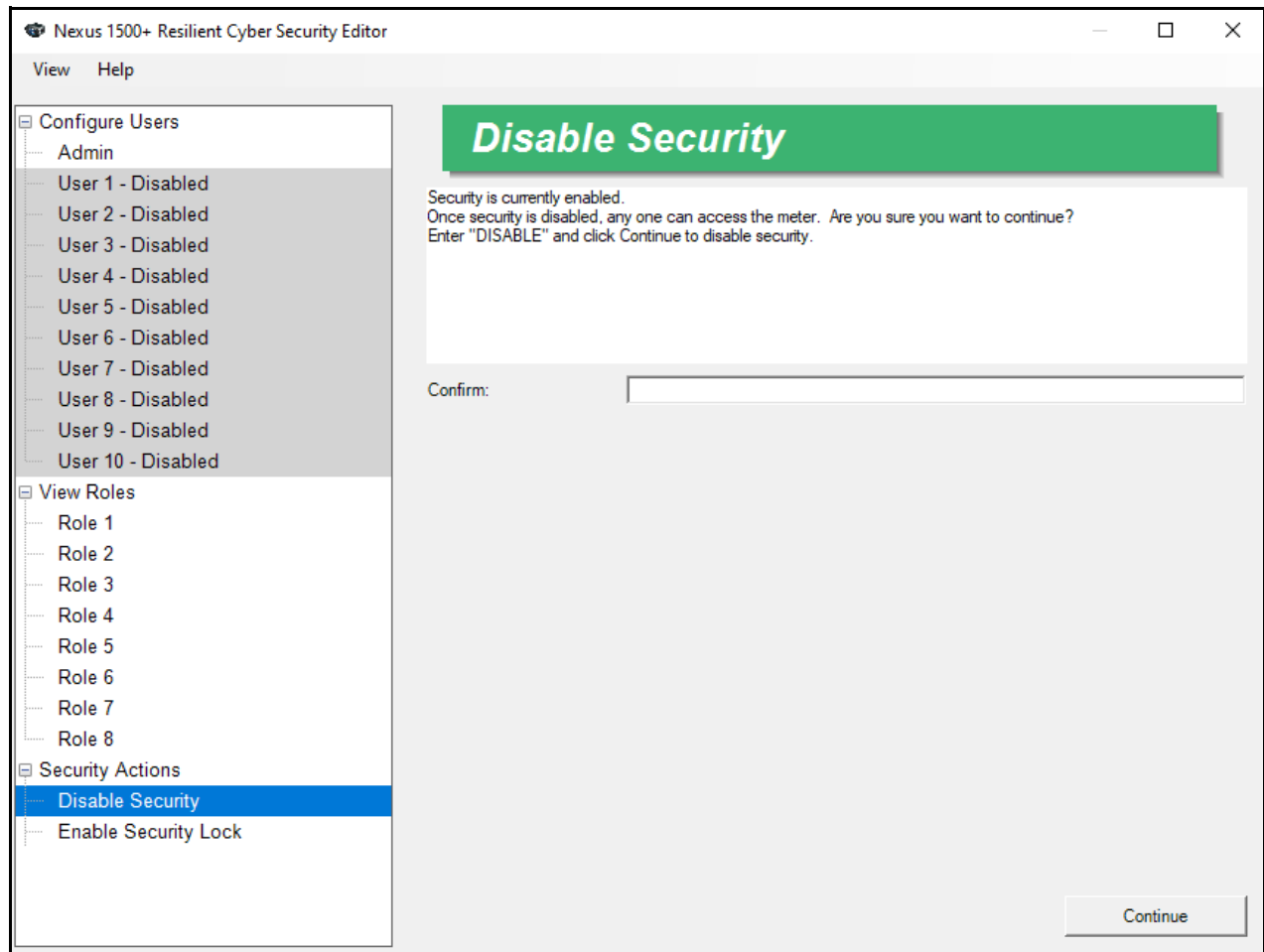
- To disable security from the Security Editor:

1. Click Disable Security on the bottom left side of the screen, under Security Actions.





2.The right side of the screen changes as shown below.



3. Enter DISABLE in the Confirm field and click Continue. Note that DISABLE must be entered in all caps.

4. You will see messages as security is being disabled.

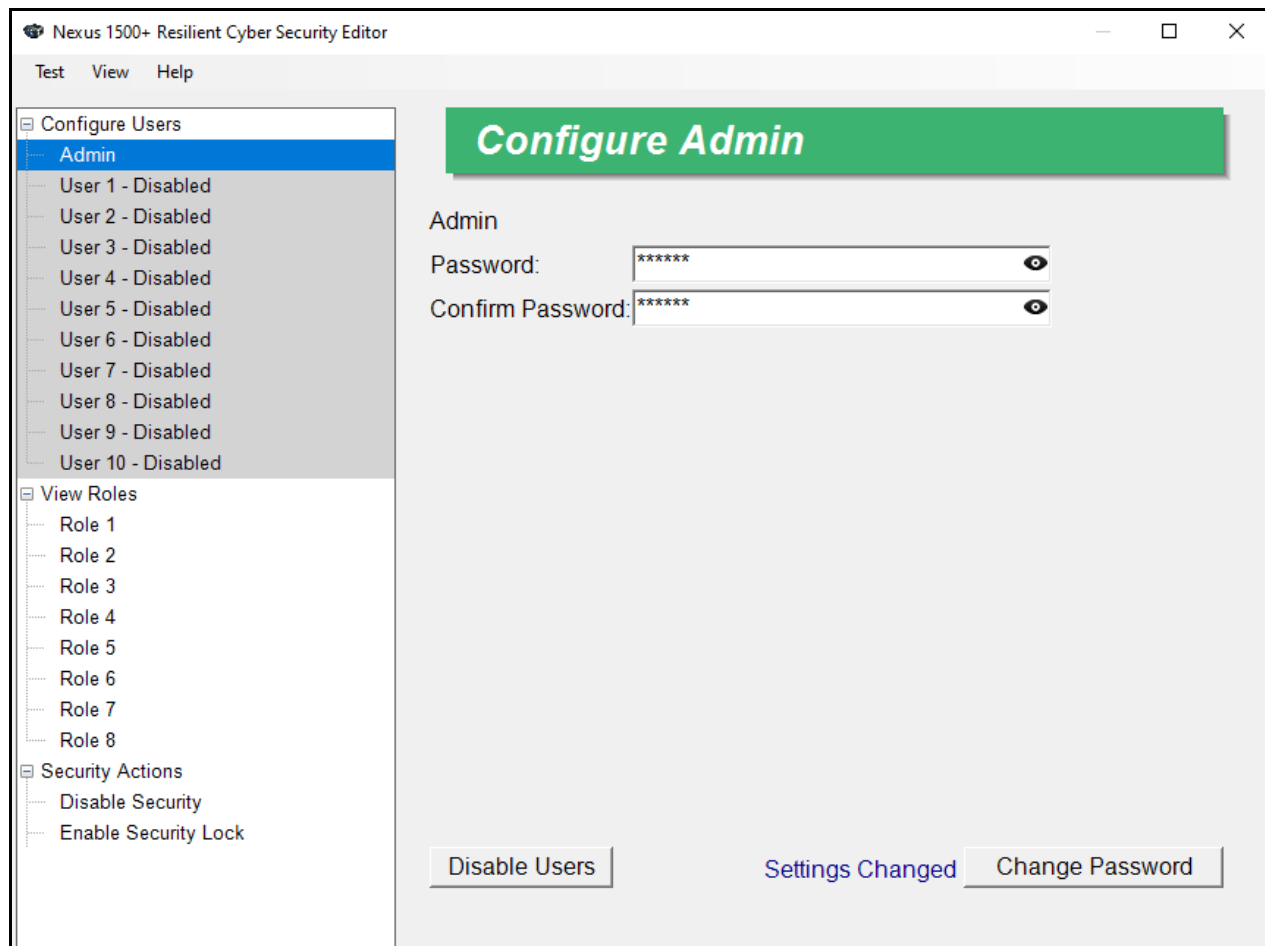
**NOTE:** Even when disabled, the security mode, e.g., Resilient Cyber Security™, is retained. If you re-enable security, that mode will be active again.

### 6.13.2.2: Setting up Users

As mentioned earlier, only the Admin user can configure the other users.

1. When you first Enable security, after entering the Admin password, the Security Editor screen opens automatically.

**NOTE:** To set up or edit users at another time, click Tools>Security>Configure.



2. If this is the first time you are setting up security for the meter, the only enabled user will be Admin; if users have already been configured, they will be listed on the left side of the screen.

From this screen the Admin can set up ten users and configure eight roles; disable security; and disable all users by clicking the Disable Users button and then clicking Yes in the confirmation window.

**NOTE:** Since you must assign role(s) to the user when setting a user up, you may want to set up roles first - see [6.13.2.3: Setting up Roles, on page 6-61](#).

3. To set up a user, click on a user in the list on the left side of the screen.

The screenshot shows the 'Nexus 1500+ Resilient Cyber Security Editor' application window. On the left, a sidebar contains a tree view with three main sections: 'Configure Users', 'View Roles', and 'Security Actions'. Under 'Configure Users', 'User 2 - Disabled' is selected. The main area on the right is titled 'Configure User 2' in a green header. It contains the following fields and controls:

- Username:** A text input field containing 'SusanP'.
- Password:** A password input field with masked characters '\*\*\*\*\*' and a toggle icon.
- Confirm Password:** A password input field with masked characters '\*\*\*\*\*' and a toggle icon.
- Role:** A set of checkboxes for Role 1 through Role 8. 'Role 3' is selected.

At the bottom right of the main area, there is a 'Settings Changed' label and an 'Update User' button.

4. You configure settings for the user on the right side of the screen. Enter:

- Username
- Password

See [6.13.1: Admin and User Accounts, on page 6-51](#) for details of password requirements.

- If the password meets the minimum requirements, you will see a red check mark and the text "weak" to the right of the field; if it meets the recommended strength length of at least 16 characters, you will see a green check mark and the word "good" to the right of the field.

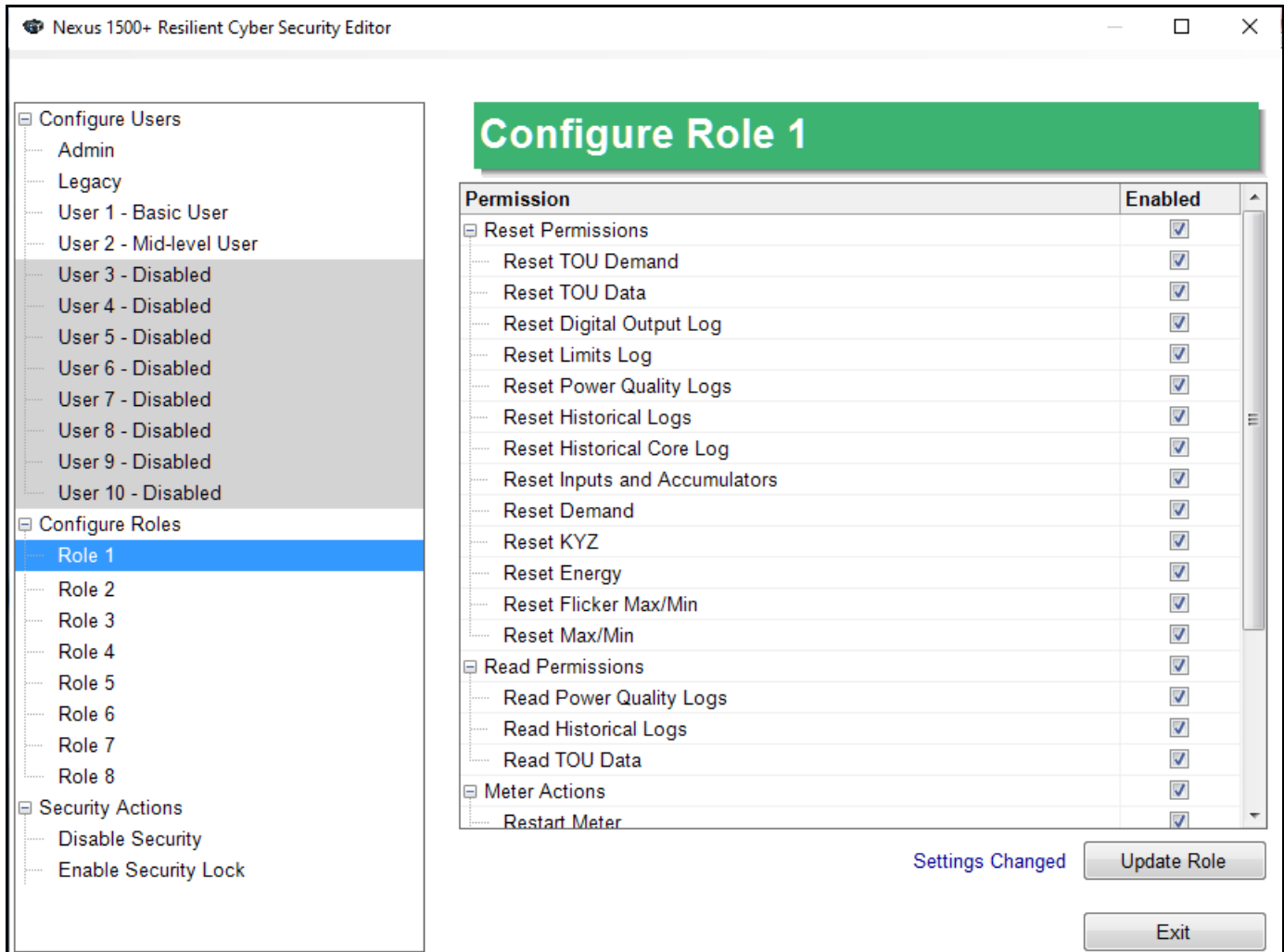
- If you want to see the password you are entering (rather than asterisk placeholders), click the eye icon to the right of the Password or Confirm Password fields.

5. Enter the password again in the Confirm Password field.
6. Check the boxes of the roles you want to assign to the user. You also set up roles; i.e., a collection of permissions, from the Security Editor screen - see [6.13.2.3: Setting up Roles, on page 6-61](#), for instructions.
7. Note that there is a message at the bottom of the screen that says "Settings changed." Click Update User to save your settings and create the user. You will see a screen with update messages as your settings are being saved and then the Security Editor is redisplayed. When the user is saved successfully, there is a message at the bottom of the screen that says "Update Successful."  
**NOTE:** If the Update button isn't selectable, make sure that the password and confirmation passwords match, and that the password doesn't contain the username.
8. Repeat this process to set up additional users.

### 6.13.2.3: Setting up Roles

The Security Editor screen is also used to set up the roles, i.e., the set of permissions that will be assigned to users. You can assign more than one role to a user, and multiple users can have the same role. Up to eight roles can be configured.

1. Click on one of the roles on the left, under the Configure Roles heading.



2. The right side of the screen lists permissions. Use the scroll bar to view all of the available permissions. To assign a permission to a role, click in the Enabled checkbox next to the action, e.g., Read TOU data.

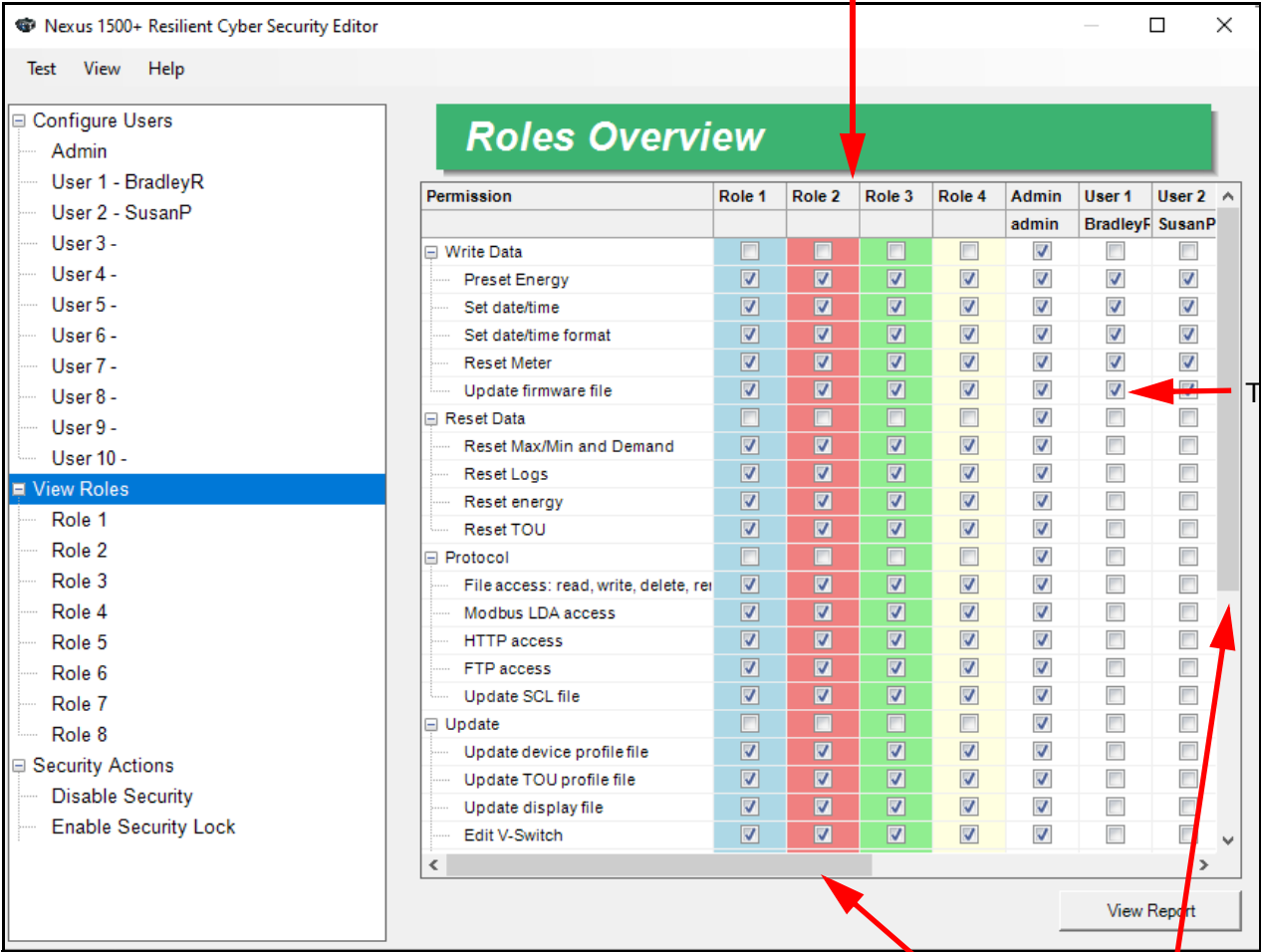
**NOTE:** You can click on the group checkbox, e.g., Read Permissions, to select all of the items in that group - see the example above. You can also right-click in the screen and choose Select All or Select None.

3. When you have finished assigning permissions to the roles, click Update Role. You will see a screen with update messages as the role is being saved and then the Security Editor is redisplayed. You can then assign that role to one or more users.

6.13.2.4: Viewing the Role and User Configuration

You can view all of the roles with their permissions, and the users to whom they are assigned by clicking View Roles on the left side of the screen. You will see the Roles Overview screen, shown below.

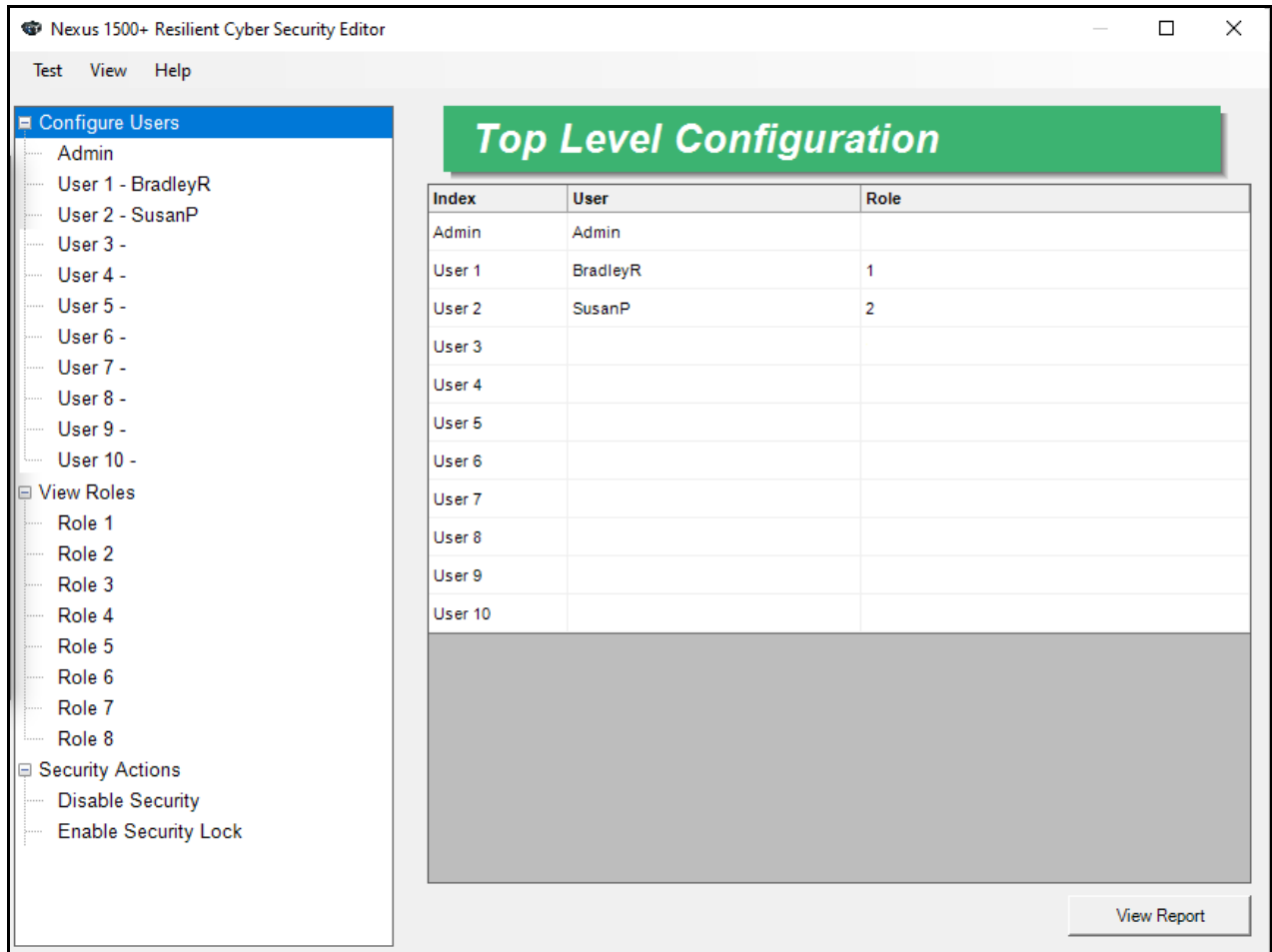
Each role has a unique color



The permissions for a user are checked

Scroll to see more information

You can view a summary of the users by clicking Configure Users from the left side of the Configure screen.



Click View Report from this screen to create a text file with the configured users and their permissions.

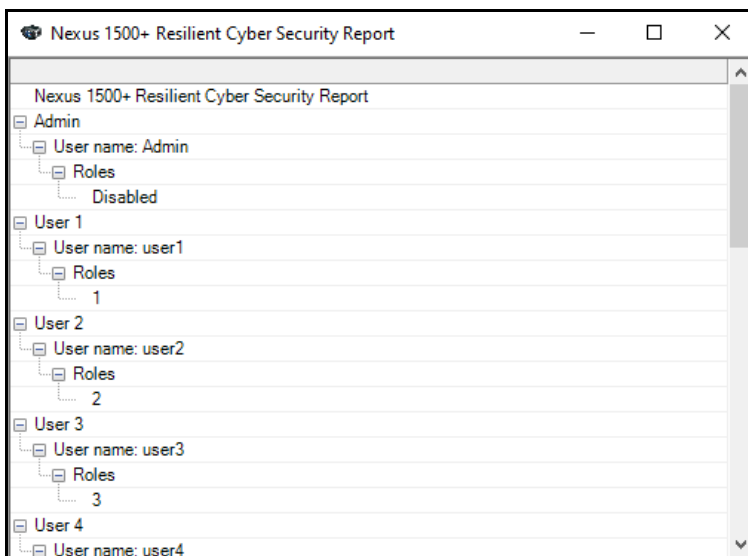
```

C7E6B0A156227A6D - Notepad
File Edit Format View Help
Nexus 1500+ Resilient Cyber Security Report
Connection:                mn://172.20.166.123:502
Meter Designation:         0000000246190830
Meter Serial:              0000000246190830
Meter Type:                0154 Nexus 1500+
Generated:                 8/4/2020 10:07:18 PM

---- Security ----
Security :                 Enabled
Security Lock:             Disabled

---- Users ----
- Admin -
- User 1 -
  
```

You can also click View>Report from the top of the Configure screen to see this screen with users and roles information.



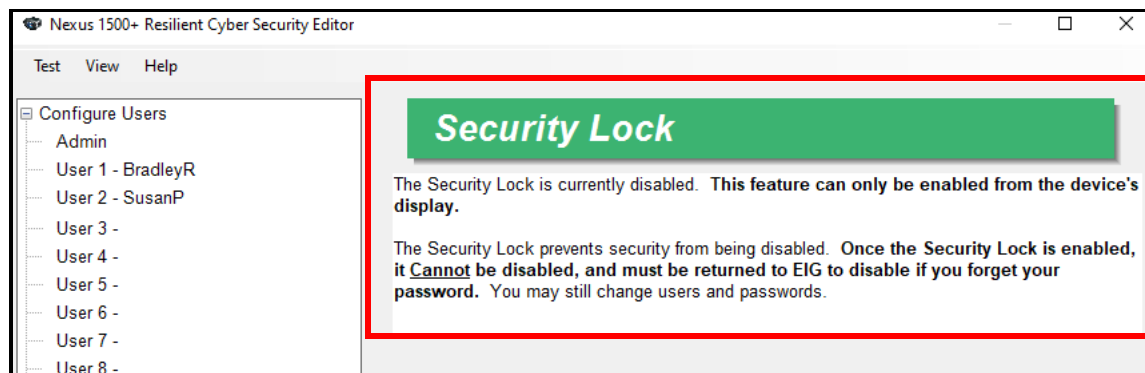


### 6.13.2.5: Security Actions

The Security Editor lets the Admin disable security (see 6.13.2.1.1: Disabling Security, on page 6-55) and displays instructions for enabling the meter's security lock.

The security lock feature prevents meter security from being disabled.

1. Click Enable Security Lock, Under Security Actions on the bottom left side of the screen.



2. The right side of the screen displays information for the security lock.

As a safeguard against enabling the security lock unintentionally, you must enable it at the meter, using the meter's display. See Chapter 6 in the *Nexus® 1500+ Meter User Manual* for instructions.

**IMPORTANT! Make sure you want to implement this setting:** Once the Security lock is enabled, **security cannot be disabled.**

### 6.13.2.6: Configuring Password Expiration

You can enable password expiration and set an expiration time. Note that this applies to ALL passwords, even the Admin's. Once a password expires, only the Admin can create new passwords for a user or for the Admin. If the Admin's password has expired, the Admin will have a limited Admin capability, allowing the Admin to only update passwords and the encryption key).

1. Click Tools>Security>Configure the Password Expiration.

2. To enable password expiration, select Enable from the Password Expires pull-down menu and click Update. You will see a message that the change was successful (Pass) - click OK.
  3. The default expiration time is 12 months. You can change that by selecting a different number of months until expiration, from the Password Expires Every pull-down menu, and then clicking Update. You will see a message that the change was successful (Pass) - click OK.
- NOTE:** If you are enabling the password expiration and setting a password expiration date, you can click Update All.
4. Click Close to close this screen.

#### NOTES:

- You can view the remaining time before expiration - see [6.13.3: Viewing Security Lockout Status, on page 6-67](#).

- Every time a password is changed, the countdown to expiration restarts, i.e, if the default expiration of 12 months is used, and five months have passed when the Admin changes a user's password, the countdown to its expiration will restart and the new password for this user will be valid for 12 months.

### 6.13.3: Viewing Security Lockout Status

You can view the number of days left until password and/or cryptographic key expiration, and also any users in password lockout due to failed log in attempts.

1. Click Tools>Security>Security Lockout Status.

Password Lockout Information			
Account	Remaining Password Lockout Time(minutes)	Password Expires in (Days)	Remaining Key Lockout Time(minutes)
User 1	0	Never	0
User 2	0	Never	0
User 3	0	Never	0
User 4	0	Never	0
User 5	0	Never	0
User 6	0	Never	0
User 7	0	Never	0
User 8	0	Never	0
User 9	0	Never	0
User 10	0	Never	0
Administrator	0	Never	0

Key Expiration: Never

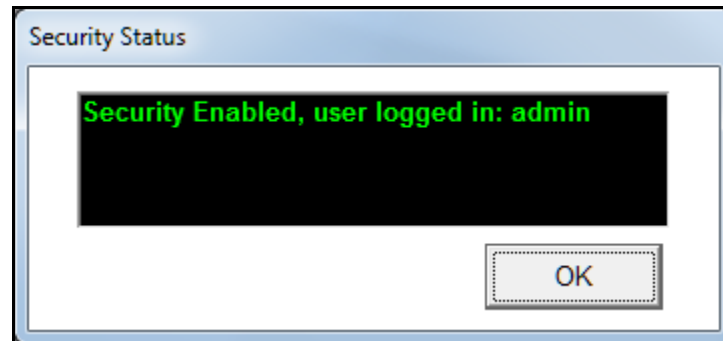
Close

- If any users are in lockout mode, the amount of time left in minutes is shown for the user in Remaining Password Lockout Time column. If the user is not in lockout mode, 0 is shown in the field.
- If password expiration is enabled, the number of days left for the user's password is shown in the Password Expires In column. If there is no expiration time set, Never is shown in the field.
- Remaining Key Lockout Time shows the amount of time in minutes that a user is locked out due to repeated login attempts after the encryption key has expired.
- The amount of time left before the encryption key expires is shown toward the bottom of the screen.

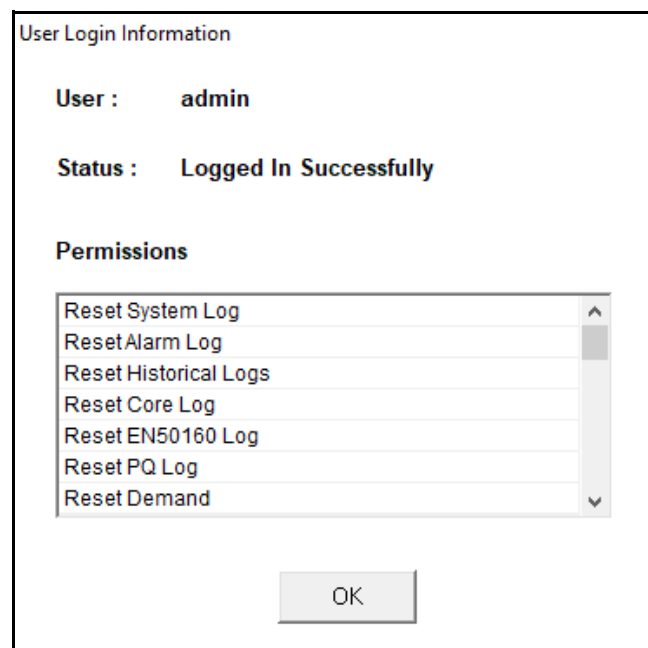
2. Click Close to close this screen.

### 6.13.4: Viewing Security Status

When you sign on with a password, you will see a security status screen like the one shown below.



You can also check Security status by clicking Tools>Security>Status. You will see a screen like the one shown below, showing details of the users that are logged in.



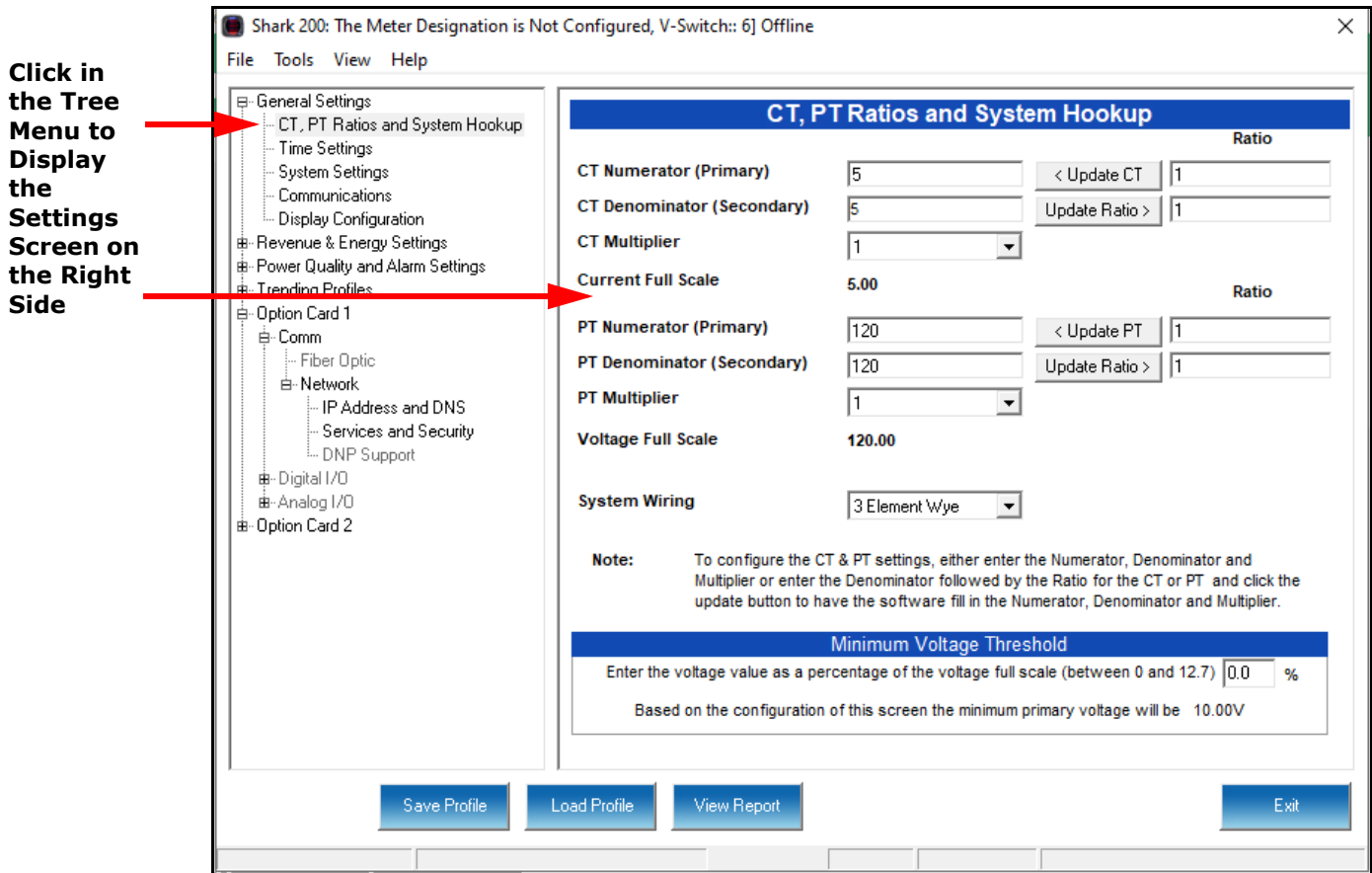
## 7: Configuring Your Meter: the Device Profile Screen

Once you have connected to your meter and closed the Device Status screen, you will use the Device Profile screen to configure settings for your meter.

### 7.1: Device Profile Screen

- The Device Profile screen is the place where most of the meter configuration takes place. You open the meter's Device Profile screen in one of the following ways:
  - By clicking on the Profile icon in the Icon Bar when you are connected to a meter
  - By clicking Tools>Edit Device Profile from the Menu Bar when you are connected to a meter
  - By clicking File>Open>Device Profile> from the Menu Bar and then choosing one of the listed Device Profiles, to configure a stored Device Profile when you are offline (not connected to a meter)
- This chapter explains the Device Profile screen and its features. The following chapters explain the Device Profile settings for specific EIG meters:
  - Chapter 8 has instructions for configuring the Shark® 200/200S meter.
  - Chapter 9 has instructions for configuring the Shark® 50/100/100B/100S meter.
  - Chapter 10 has instructions for configuring the MP200 metering system.
  - Chapter 11 has instructions for configuring the Nexus® 1500/1500+ meter.
  - Chapter 12 has instructions for configuring the Nexus® 1262/1272 meter.
  - Chapter 13 has instructions for configuring the Nexus® 1252 meter.
  - Chapter 26 has instructions for configuring the Shark® 270 meter.
  - Chapter 27 has instructions for configuring the Nexus® 1450 meter.
  - Chapter 28 has instructions for configuring the Shark® 250 meter.
  - Chapter 30 has instructions for configuring the ST 40 meter.

- The appearance of the Device Profile screen depends on the meter type you are connected to. Refer to the following example.



**Shark® 200/200S Meter Device Profile Screen**

- All Device Profiles function basically in the same way. They each have a Tree Menu structure that expands to the specific setting desired.
- The Device Profile is organized by subject matter, so that navigating to a particular setting is intuitive.
- All meters manufactured by EIG can be programmed with CommunicatorPQA® software through their Device Profile.
- CommunicatorPQA® software also provides the ability to store Device Profiles and Load Profiles so that users can keep generic profiles that only need to be slightly modified for a particular use.
- After you finish configuring any or all of the programmable settings (refer to chapters 8-13, 27-28, and 30 for detailed configuration instructions for your meter

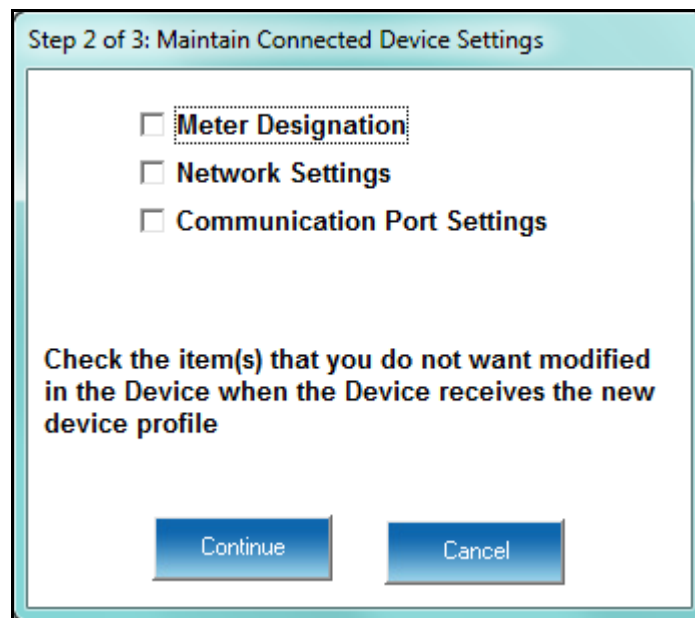
type), use the Buttons at the bottom of the screen to execute the tasks described in the following section.

- The Device Profiles can be configured offline, allowing you to configure a meter when it is not connected, and then update it with the programmed settings at a later time.

## 7.2: Device Profile Screen Buttons

All of the meters' Device Profile screens have the following buttons (though the appearance of the icons and the order in which they appear may vary):

- Update Device - this sends the new Device Profile to the connected meter. **You must update the meter's Device Profile for any changes to the programmable settings to take effect.** When you click Update Device, the meter retrieves the programmable settings. For the Nexus® meters only, the following screen is displayed.



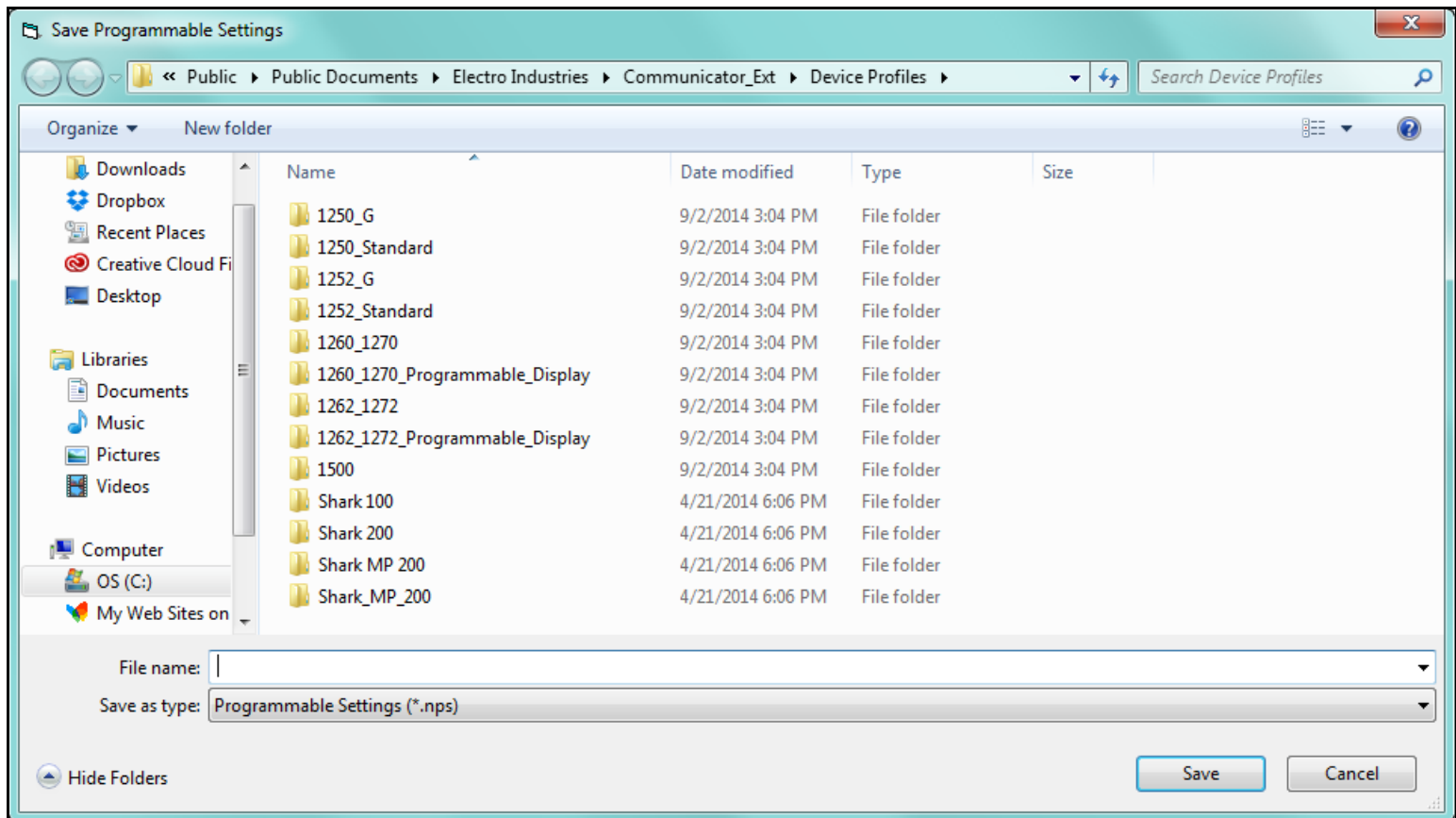
1. Click on any item you do not want to change when the new Device Profile is sent. The purpose of this is if you wish to use a generic Device Profile to update the meter, these device-specific settings will not be over-written when the other programmable parameters are added.

2. Click Continue to update and send the profile to the meter. You will see a progress screen while settings are updated.

**IMPORTANT!** If you change the Communication settings for the meter, you will no longer be able to communicate with it. You will have to sign off and sign on again with the new settings.

**NOTE:** When the Device Profile of a Nexus® 1450 meter is updated, the meter reboots. If security was enabled when the meter rebooted, users may need to login again by disconnecting from the meter, reconnecting to it, and logging in again. This is true both for the user that updated the Device Profile and for any other users connected to the meter when it is updated.

- Save/Save Profile - Click to save the Device Profile settings to a file. You will see the Save Programmable Settings window, shown below. Give a name to the Device Profile and click Save.

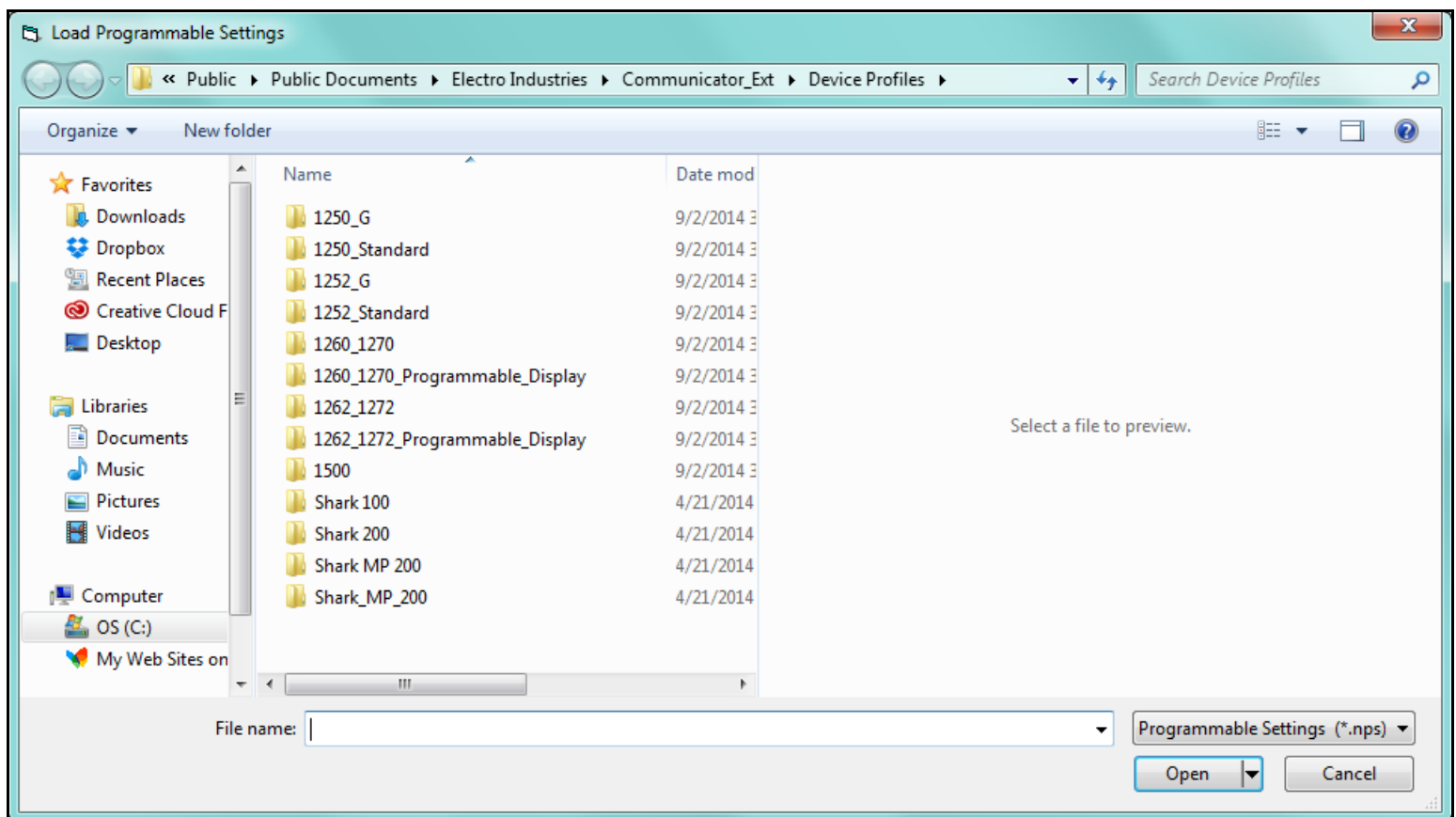


**NOTE: Saving the profile does not update the meter.**



- Load/Load Profile/Open: Click to load a previously saved Device Profile Settings file. You will see the Load Programmable Settings window, shown below. Select the saved Device Profile you want and click Open. The settings from that file will now appear in the Settings Screens; for example, the CT and PT Ratios will be those from the saved Device Profile, rather than from the currently connected meter.

This feature is useful if you want to copy some or all of another meter's settings to the currently connected meter. **Be sure to give the meter a unique identification - see the programming chapter for your meter (see chapters 8-13, 26-28, and 30).**



- Exit/Exit Editor: Click to leave the Device Profile Editor. You will be asked to confirm that you want to exit - click Yes to exit.

### 7.2.1: Device Profile Report

Click Report/View Report to view the Device Profile or print a copy of it.

- For the Nexus® meters, message windows open while the report is being compiled and then you see the following screen.

Device Profile Report

Communicator 4.0.23 Document

#### Device Profile Report

Model:	Nexus 1500			
ID Number:	000000047380527			
Name:	Nexus_1500_NJD			

Firmware Versions

Type	Comm	DSP1	DSP2	FPGA
Boot	3	1		
Runtime	3.0000	3	RE 0046 9061	0_03_0

Communications Settings

Item	Optical Port	USB Serial	RS-485 1	RS-485 2
Address	1	1	3	4
Baud Rate	57600	115200	57600	57600
Data Bits	8	8	8	8
Parity	None	None	None	None
Stop Bits	1	1	1	1
Tx Delay	0ms	0ms	100ms	100ms
Protocol	Modbus RTU	Modbus RTU	Modbus RTU	Modbus RTU
Mode			Slave	Slave

System Setup

CT Ratio:	5.00:	5.00
PT Ratio:	120.00:	120.00
CT Ratio Aux:	5.00:	5.00
PT Ratio Aux:	120.00:	120.00

Time Setup

Time Zone:	-5.0
DST Enabled:	Disabled
DST Start:	
DST End:	
Line Sync	Disable
Frequency	

Hookup:

Frequency Range:

Power Direction Label: Quadrant 1 + 4 = Delivered and Quadrant 2 + 3 = Received

Pwr Factor Display: Method 1 Q1 +Lag, Q2 -Lag, Q3 -Lead, Q4 +Lead

Demand Setup

Thermal Averaging Window:	00h, 15m, 00s
Block Averaging Window:	00h, 15m, 00s
Rolling Averaging Sub-Interval Window:	00h, 05m, 00s
Rolling Sub-Intervals:	3
Predictive Rolling Window Average:	100.00

Block Window Sync

Use Sync Pulse	No
High Speed Input #	N/A
Generate End of Interval Pulse	N/A
Relay #	N/A
Pulse Width (ms)	N/A

Page 1 of 26      09-05-2014    17:18:52

Page 1 of 26    ◀ ▶    Zoom: Whole Page ▼

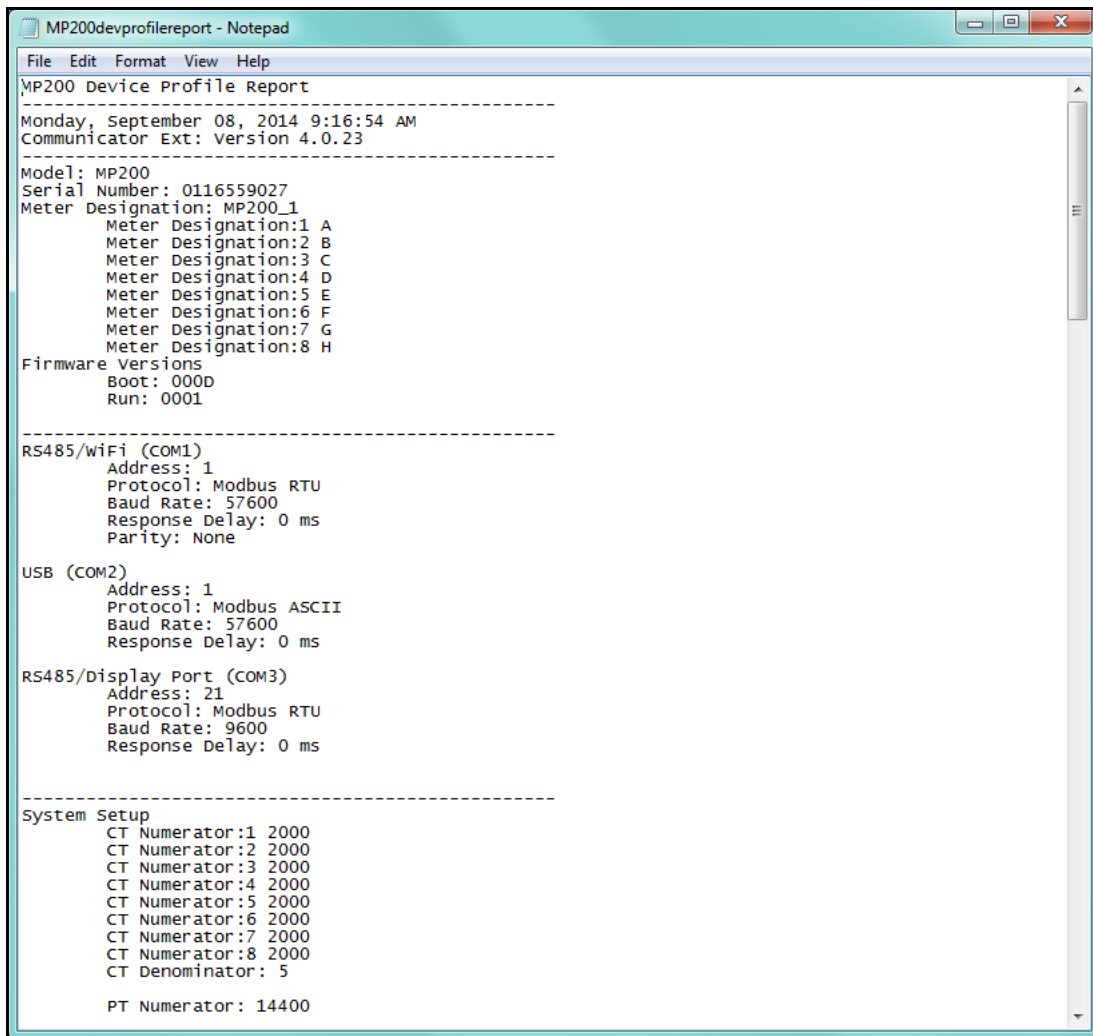
Print Range: 1 to 26    Copies 1

Print Page(s):

Print    Save    Done

- Use the Page arrows to select a page to view.
- Use the Zoom field to adjust the viewing magnification.
- Use the Print Range and Print Pages fields to specify the pages you want printed.

- Use the Copies field to specify number of reports.
- Use the Print button to print the report. You will see a Print Setup screen where you can select printer, properties, paper, and orientation.
- Use the Save button to save the Device Profile report. A window opens, allowing you to specify a location for the saved report.
- Use the Done button to exit the screen and return to the Device Profile screen.
- For the Shark® 200/250/270 meter, ST40 meter, and the MP200™ metering system, the View Report button opens a Notepad window containing the meter's Device Profile settings in a text file. See the example window, shown below.



```
MP200 Device Profile Report
-----
Monday, September 08, 2014 9:16:54 AM
Communicator Ext: Version 4.0.23
-----
Model: MP200
Serial Number: 0116559027
Meter Designation: MP200_1
    Meter Designation:1 A
    Meter Designation:2 B
    Meter Designation:3 C
    Meter Designation:4 D
    Meter Designation:5 E
    Meter Designation:6 F
    Meter Designation:7 G
    Meter Designation:8 H
Firmware Versions
    Boot: 000D
    Run: 0001
-----
RS485/WiFi (COM1)
    Address: 1
    Protocol: Modbus RTU
    Baud Rate: 57600
    Response Delay: 0 ms
    Parity: None

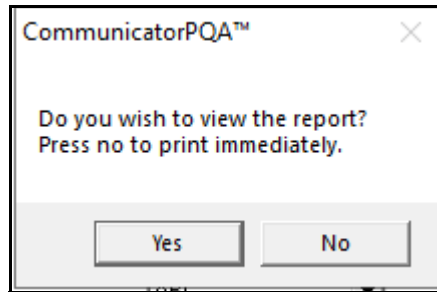
USB (COM2)
    Address: 1
    Protocol: Modbus ASCII
    Baud Rate: 57600
    Response Delay: 0 ms

RS485/Display Port (COM3)
    Address: 21
    Protocol: Modbus RTU
    Baud Rate: 9600
    Response Delay: 0 ms
-----
System Setup
    CT Numerator:1 2000
    CT Numerator:2 2000
    CT Numerator:3 2000
    CT Numerator:4 2000
    CT Numerator:5 2000
    CT Numerator:6 2000
    CT Numerator:7 2000
    CT Numerator:8 2000
    CT Denominator: 5

    PT Numerator: 14400
```

- Print the text file by selecting File>Print from the Notepad Menu Bar.

- Save the text file by selecting File>Save from the Notepad Menu Bar.
- For the Shark® 100 meter, the View Report button opens the following window.



3. You have two choices:

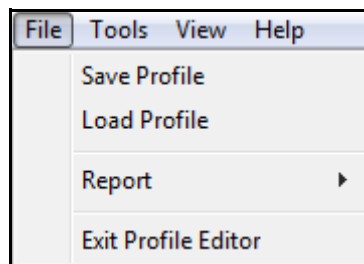
- To view the report on the PC, click Yes. Notepad will open with the report as a text file (see the example on the previous page).
  - Print the text file by selecting File>Print from the Notepad Menu Bar.
  - Save the text file by selecting File>Save from the Notepad Menu Bar.
- To print the report without first viewing it, click No. A screen opens that lets you select the printer you want to use.

## 7.2.2: Shark® 200 Meter/MP200™ Metering System Device Profile Additional Features

The Device Profile screens for the Shark® 200 meter and the MP200™ metering system have some additional features. Three items in the Menu Bar - File, Tools, View - open menus that let you perform functions. These menus and functions are described below.

**NOTE:** When you click **Help** from the Menu bar a PDF file of this manual opens, with instructions for the Device Profile Setting that is active at the current time. For example, if you are on the Display Configuration screen and you click User Manual, the instructions for setting Display Configuration are shown.

- Click File from the Menu Bar to see the menu shown below. The File menu lets you perform functions that can also be performed using the screen Buttons, described on the previous page: Save Profile, Load Profile, Report, and Exit Profile Editor.



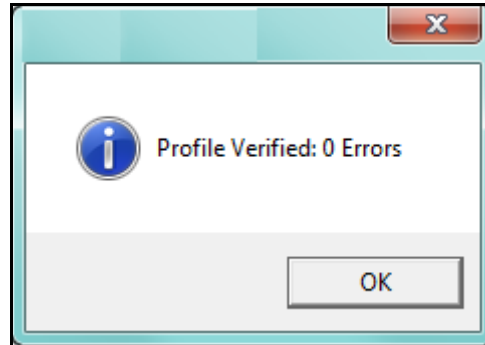
- Click Tools from the Menu bar to see the menu shown below.



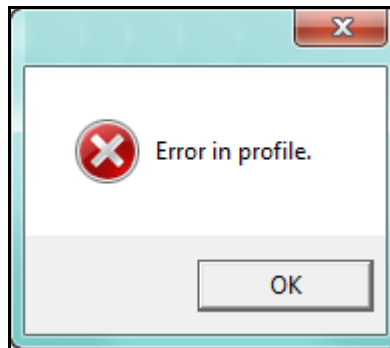
The Tools menu gives you the following options:

- Update Device - performs the same function as the Update Device button at the bottom of the screen: it send the Device Profile settings to the currently connected meter.

- Verify Profile - click to perform a verification of the current Device Profile settings. You will see a window like the one shown below if there are no errors.



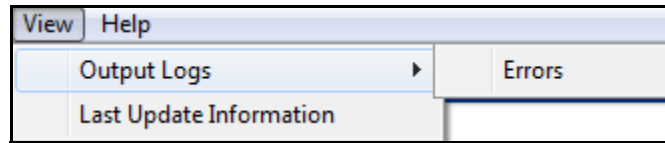
**NOTE:** If there are any errors as you program the profile, the error message shown below will display.



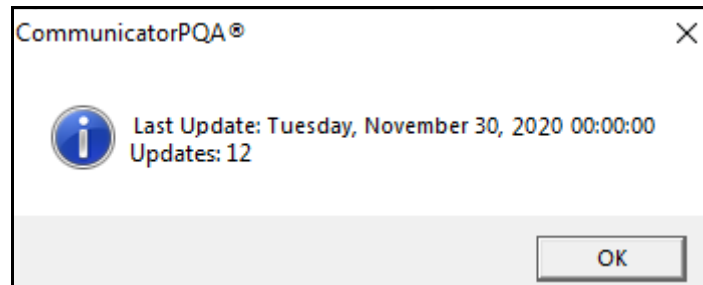


**CAUTION!** If you have made changes to the settings and have not saved them to a file or updated the device, the changes will be lost.

- Click View from the Menu bar to see the menu shown below.



- View Last Update Information - click to view update information for this Device Profile. See the example screen below.

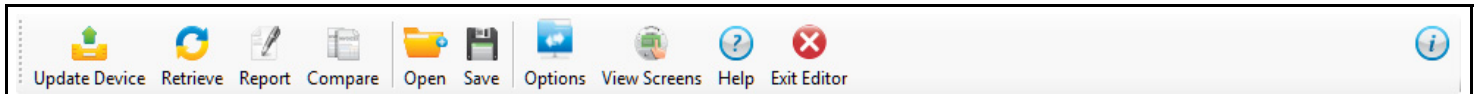


- This window displays the time and date of the last update, and the total number of updates, for this Device Profile.
- Click OK to close the window.



### 7.2.3: Shark® 250/270/ST40 Meter Device Profile Additional Features

The Shark® 250/270/ST40 meter has Device Profile icons that look different from those of the other EIG meters. Most of the icons perform the same function as with the other device profile screens, e.g., the Update Device icon does the same thing as the Update Device button - it sends the new device profile settings to the connected meter.



Following are the unique device profile features for this meter:

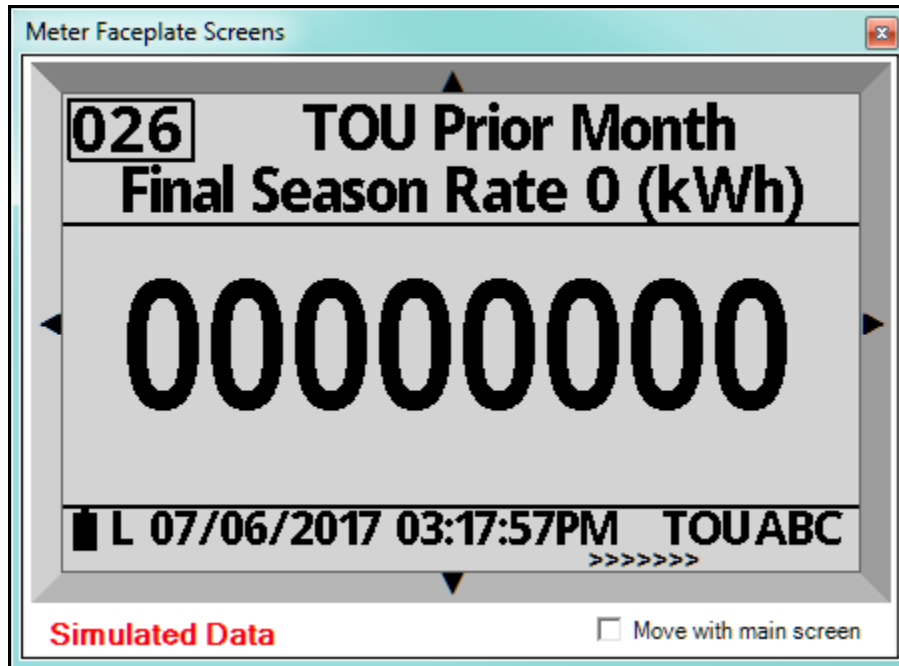
- Click the Help icon to open instructions for the currently active setting.
- Click the i icon to view version information for the device profile software.
- Click the Retrieve icon to load the settings from the currently connected meter.
- Click the Compare icon to display the original settings and any new settings for the device profile.

Programmable Settings Comparer		
Show Differences Only Export Compare Text File Close		
Setting	Edit	Original
Meter Info		
Model	E169 Run T	E169 Run T
V-Switch	4	4
Designation	Feeder 1B	Feeder 1B
Firmware		
Boot	00AB	00AB
Run	0003	0003
Network Card Info (Slot 2)		
Mac Address	00-01-58-00-97-01	00-01-58-00-97-01
General Settings		
CTPT Ratios and System Hookup		
CT Ratio	2000/5	5/5
PT Ratio	120/120	120/120
System Wiring	3 Element Wye	3 Element Wye
Minimum Primary Voltage	4.92	4.92
Maximum Load Current (TDD)	5	5
CT Reversal Phase A	Not Reversed	Not Reversed

The settings in red/pink have been changed from the original settings, and the settings in blue have not been changed.

- Click Show Differences Only to display just the changed settings.

- Click the Export setting to save the information in the screen as an Excel file. You will be prompted to give the file a name.
- Click Compare Text File to open a text file containing the information.
- Click the View Screens icon (Shark® 270 meter - other meters won't show this icon) to display the screens in the currently loaded Screen Profile.

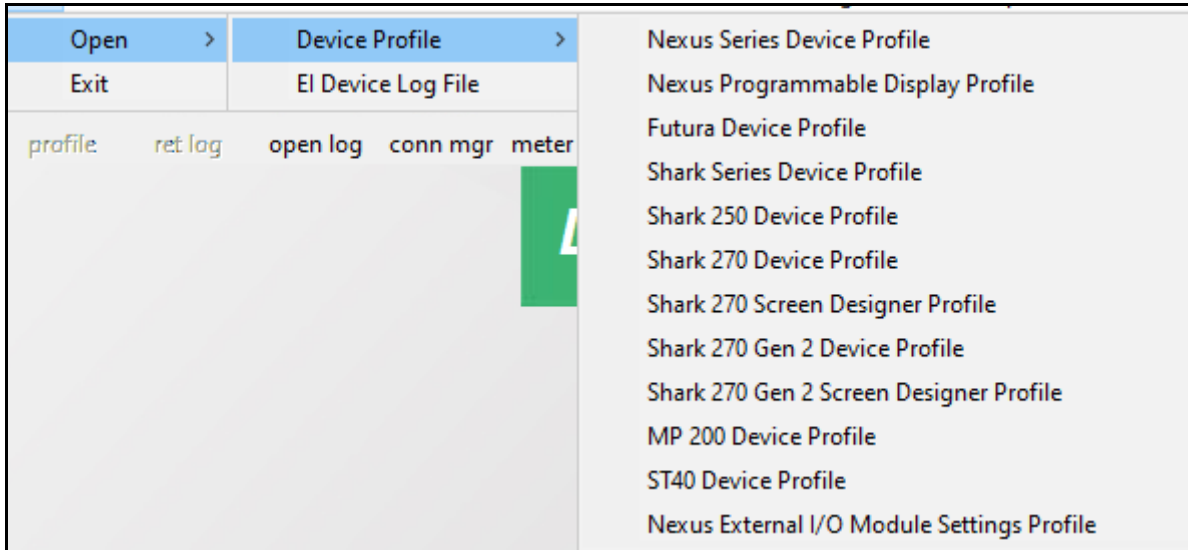


- Use the right arrow to view screens for the next Mode, and the left arrow to view screens for the previous Mode.
- Use the top arrow to view the next screen in the current Mode, and the bottom arrow to view the previous screen in the current Mode.
- Check the Move with main screen button to cause the Meter Faceplate Screen to move in tandem with the Device Profile screen.
- See , on page 26-117, for information on the meter's Screen Profiles.

### 7.3: Device Profile Offline Settings

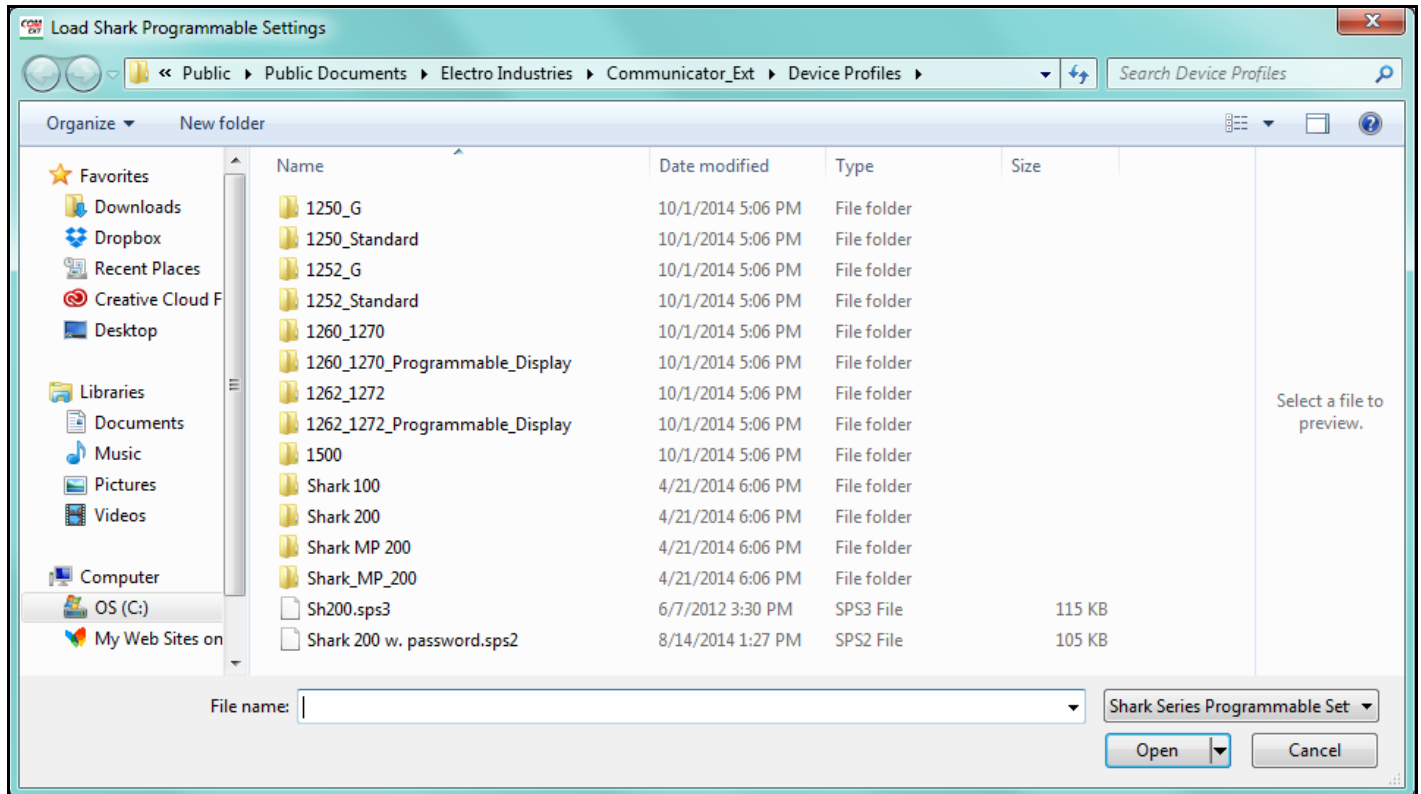
You can configure a device profile without being connected to a meter. Follow these steps.

1. Open the CommunicatorPQA® application, and from the Main screen's Menu Bar, click File>Open>Device Profile. You will see this menu:

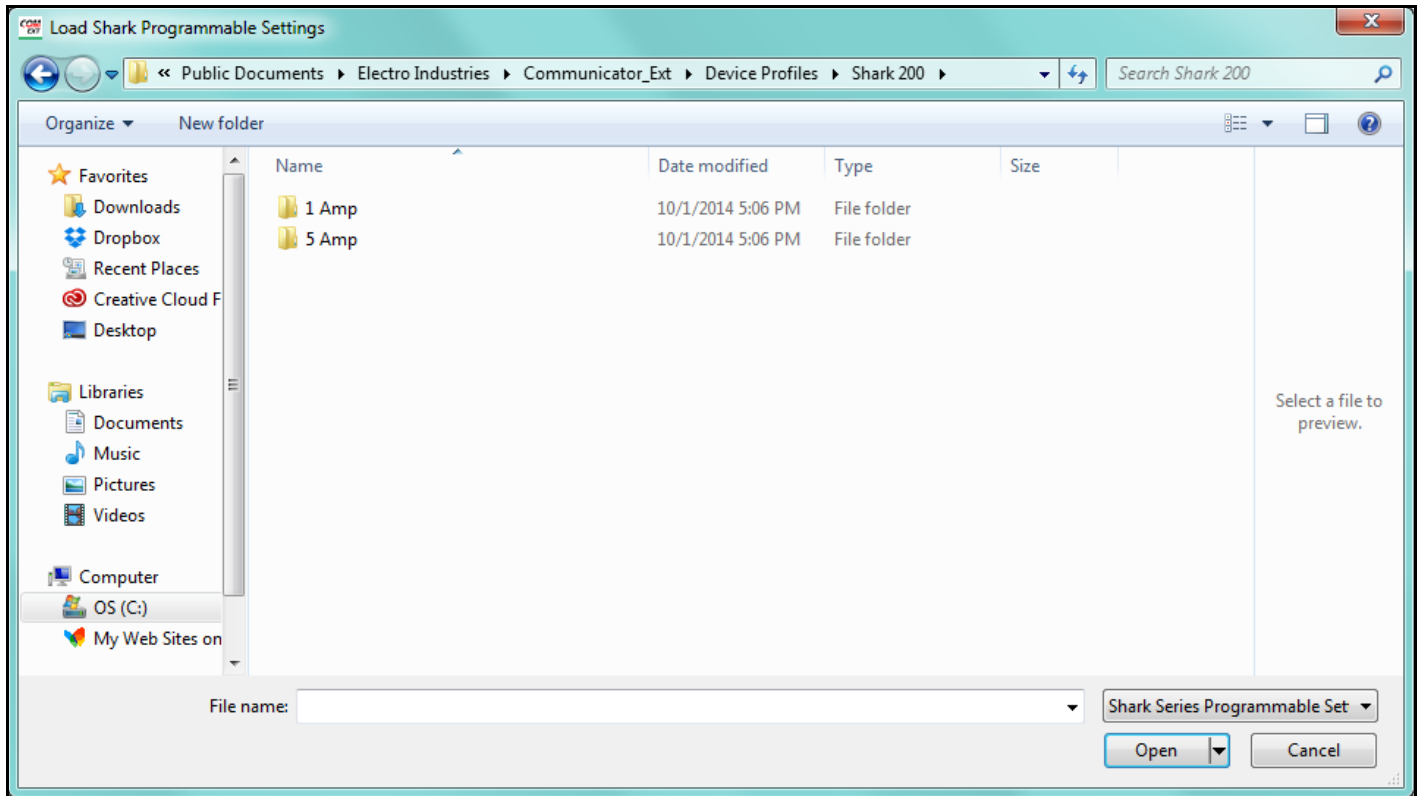


2. Click on the device profile you want to configure:
  - Nexus Series Device Profile for the Nexus® 1252/1262/1272/1450/1500/1500+ meters.
  - Nexus Programmable Display Profile when you also want to modify the Nexus® 1262/1272's LCD display.
  - Futura Device Profile for the legacy device Futura+/CPU1000.
  - Shark Series Device Profile for the Shark® 50/50B/100/100B/100T/100S/200/200T/200S meters.
  - Shark 250 Device Profile.
  - Shark 270 Device Profile for the original Shark® 270 meter.
  - Shark 270 Screen Designer Profile when you also want to modify the embedded display's programmable settings.
  - Shark 270 Gen 2 Device Profile for the Shark® 270 meter Gen 2.
  - Shark 270 Gen 2 Screen Designer Profile when you also want to modify the embedded display's programmable settings.
  - MP200 Device Profile for the MP200-Y or MP200-S metering system.
  - ST40 Device Profile.

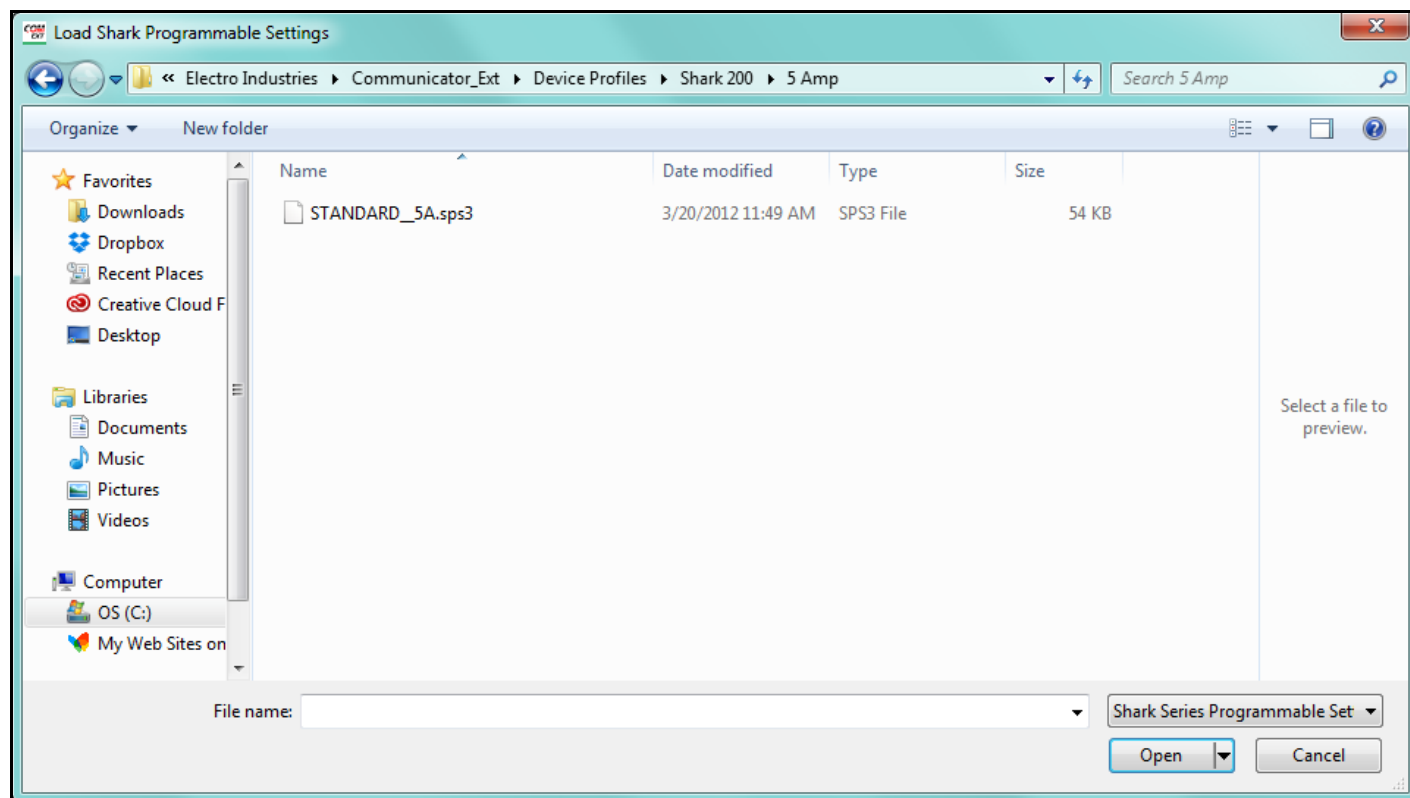
- Nexus External I/O Module Settings Profile for the external I/O modules (see Chapter 14 for details on configuring the external I/O modules).
3. A window opens that lets you browse for the Device Profile you want to configure. You can open an existing Device Profile, or one of the default device profiles that come with the software. See the example below.



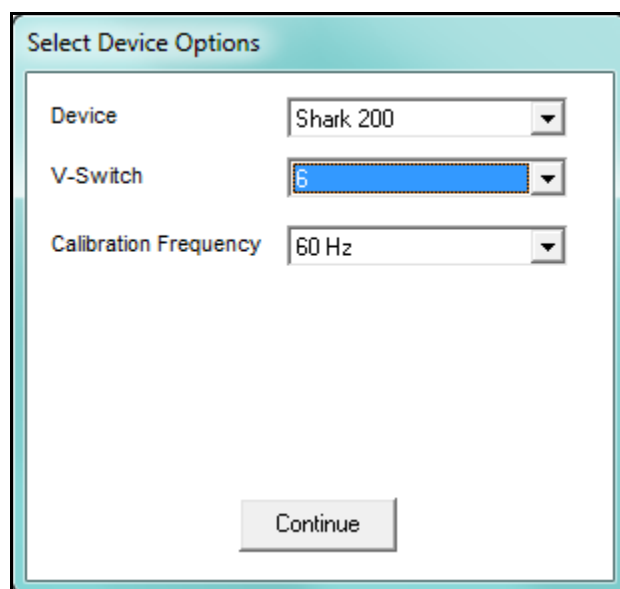
4. Click on the type of the folder with the Device Profile you want to configure, e.g., Shark® 200 meter. A window will open that lets you narrow down your choice - see the example below.



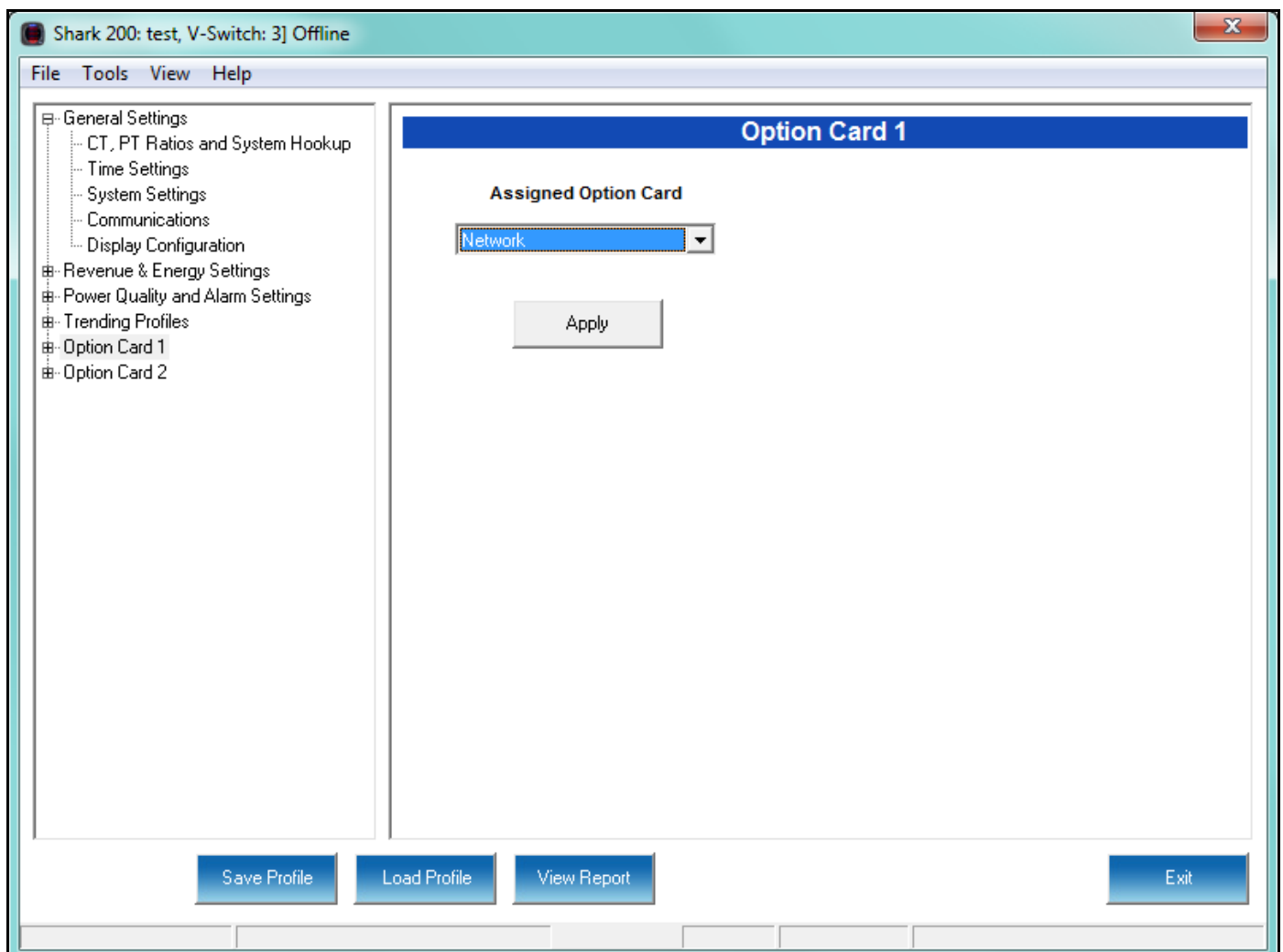
5. Click on whichever Device Profile you want: 1 Amp or 5 Amp. You will see a screen like the one shown below.



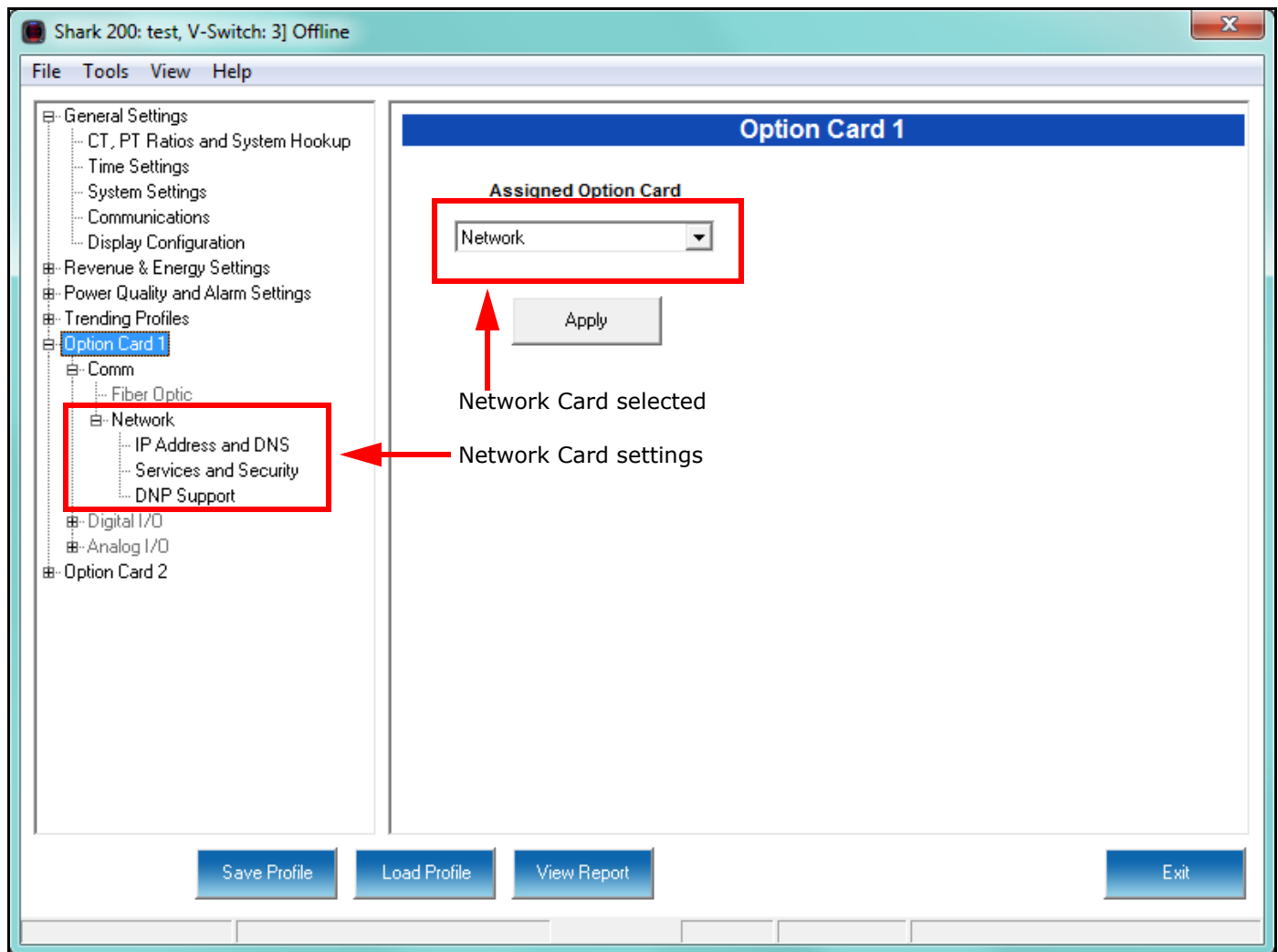
6. Either click on the file name and click Open, or double-click on the file name. You will see a screen like the one shown below.



- Depending on the meter type, you may have choices in the Device field. In this example, you can choose either Shark® 200 or Shark® 200S.
  - Use the V-Switch™ field to choose the V-Switch™ key. Depending on the meter type, the V-Switch™ key enables specific settings. In this example, V-Switch™ key 5 or 6 will enable PQ/Waveform setting for a Shark® 200 meter's Device Profile.
  - Use the Calibration Frequency field to select 50 Hz or 60 Hz.
7. Click Continue to open a Device Profile screen that matches your selections. Follow the instructions in the meter type programming chapters 8-13.
8. Note that for a Shark® 200/250/270 meter, you can edit the I/O Option cards as well as the other settings, when offline. To do so, double-click on Option Card 1 or Option Card 2 in the Device Profile screen Tree menu to see this display:



9. Select the Option card you want from the pull-down menu. The Option card's settings will now be listed in the Tree menu, for you to configure. See the example screen, below.





## 8: Shark® 200/200S Meter

This chapter explains how to configure a Shark® 200/200S meter's programmable settings, which are stored in the unit's Device Profile. Chapter 7 contains detailed information on how to use the Device Profile.

### 8.1: Device Profile General Settings

1. From the Tree Menu on the left side of the Shark® 200/200S meter's Device Profile screen, double-click on the General Settings line or click on the + button next to it. All of the settings in the General Settings group are listed.

Shark 200: The Meter Designation is Not Configured, V-Switch:: 6] Offline

File Tools View Help

General Settings

- CT, PT Ratios and System Hookup
- Time Settings
- System Settings
- Communications
- Display Configuration
- Revenue & Energy Settings
- Power Quality and Alarm Settings
- Trending Profiles
- Option Card 1
- Comm
  - Fiber Optic
  - Network
    - IP Address and DNS
    - Services and Security
    - DNP Support
- Digital I/O
- Analog I/O
- Option Card 2

### CT, PT Ratios and System Hookup

		Ratio
CT Numerator (Primary)	5	< Update CT 1
CT Denominator (Secondary)	5	Update Ratio > 1
CT Multiplier	1	
Current Full Scale	5.00	
		Ratio
PT Numerator (Primary)	120	< Update PT 1
PT Denominator (Secondary)	120	Update Ratio > 1
PT Multiplier	1	
Voltage Full Scale	120.00	
System Wiring	3 Element Wye	

**Note:** To configure the CT & PT settings, either enter the Numerator, Denominator and Multiplier or enter the Denominator followed by the Ratio for the CT or PT and click the update button to have the software fill in the Numerator, Denominator and Multiplier.

### Minimum Voltage Threshold

Enter the voltage value as a percentage of the voltage full scale (between 0 and 12.7)  %

Based on the configuration of this screen the minimum primary voltage will be 10.00V

Save Profile Load Profile View Report Exit

### 8.1.1: Configuring CT, PT Ratios and System Hookup

The first screen you see is the CT, PT Ratios and System Hookup screen, shown on the previous page (to return to this screen from another screen, click General Settings>CT, PT Ratios and Hookup). Use this setting to configure Current Transformer and Potential Transformer ratios and to select the System Hookup.

#### Functional Overview of CT and PT Ratios:

Current and Potential Transformers are used mainly for the following reasons:

- To insulate, and as a result isolate, the meter from high-voltage circuits.
- To change the primary voltage and current to standard values and sizes that the meter can measure.

The CT and PT transformers deliver fractions of the primary voltage and current to the meter. With properly set ratios and multipliers, the readings of the meter can be used to determine the energy, voltage, current, or power of the system.

**IMPORTANT!** You have two options for entering the CT and PT settings. You can either enter CT/PT Numerator, Denominator, and Multiplier manually (see instructions below), or you can enter the Ratios for CT/PT Numerator and Denominator and click the Update CT/Update PT buttons to let the software calculate the Numerator, Denominator, and Multiplier for you. You can then empty the Ratio fields and click the Update Ratio buttons to confirm the calculated settings: you will see the same ratios you initially entered.

**NOTE:** Some ratios cannot be represented in the Shark® 200 meter. The software will try to find the closest value, in that case.

1. For manual entry, make these settings:

- CT Ratios
  - CT Numerator (Primary): 1 - 9999
  - CT Denominator (Secondary): 5 or 1 Amp

**NOTE:** This field is display only. The meter is ordered as a 5 Amp or 1 Amp Current Secondary.

- EITHER CT Multiplier (Scaling): 1, 10 or 100  
Multiplies the CT Numerator by this scale. The display can only read 4 digits, or 9999. Above that range the number must be multiplied to have it read K or M values.
- OR Ratio: the ratio to be applied, and click Update CT
- Current Full Scale: Display only
- PT Ratios
  - PT Numerator (Primary): 1 - 9999
  - PT Denominator (Secondary): 1 - 9999
  - PT Multiplier (Scaling): 1, 10, 100, or 1000
  - Voltage Full Scale: Display only
- System Wiring
  - 3 Element Wye; 2.5 Element Wye; 2 CT Delta  
This value must be set properly for the meter to calculate readings correctly.

#### Example Settings:

For a CT of 2000/5A, set the following CT Ratios in the entry fields:

CT Numerator (Primary)        2000

CT Denominator (Secondary)   5

CT Multiplier                    1

The Current Full Scale field will read 2000.

For a system that has 14400V primary with a 120V secondary line to neutral (PT Ratio of 120:1), set the following PT Ratios in the entry fields:

PT Numerator (Primary) 1440

PT Denominator (Secondary) 120

PT Multiplier    10

The Voltage Full Scale field will read 14.4k.

2. Use the box at the bottom of the screen to enter the minimum voltage threshold, which is a percentage of the voltage full scale. This setting adjusts the pick up threshold for the voltage. You set a percentage of the PT primary (PT numerator X PT multiplier) up to 12.7 in the entry field. This allows a user to configure when the meter will start readings values above 0 voltage. The minimum primary voltage based on the percentage you entered is displayed at the bottom of the screen.
3. To implement any changes, click the Update Device button to send the new profile to the meter.

### 8.1.2: Configuring Time Settings

Use this setting to enable or disable Daylight Savings Time for the meter, to set the beginning and ending times for Daylight Savings Time, and to set up Time Zone information and clock synchronization information.

1. From the Tree Menu, click General Settings>Time Settings.

2. Check the box to Enable Daylight Savings time, or un-check it to Disable Daylight Savings Time.
3. Use the entry fields to set the start and end times for the Daylight Savings Time feature, if enabled. Select the values you want from the Month, Week, Day of the Week, and Hour fields.

**NOTE:** The Hour field uses a 24-Hour clock.

4. You can choose clock synchronization for the meter. If your meter has a Network Option card, you can use it to access a Network Time Protocol (NTP) Server\*\* for time synchronization. You can also select Line Sync for clock synchronization. Use these fields to set up clock synchronization:

- Time Zone: Zone Descriptor - Select the hour and minute of your time zone in relation to Greenwich Mean Time. For example, if your time zone is Eastern Standard time, you would select -5 from the pull-down Hour menu and leave the Minutes field at 0.
- Clock Sync - To enable clock synchronization, select:
  - Yes from the Enable pull-down menu
  - Line (line synchronization) or NTP\*\* from the Method pull-down menu
  - For line synchronization, select 50Hz or 60Hz from the Line Frequency pull-down menu; for NTP select either Option Card in Slot 1 or Option Card in Slot 2 from the Interface pull-down menu.

Line synchronization uses the frequency zero crossings to provide a time reference for the meter. This is the most common method to synchronize a meter's clock. EIG recommends that you always select this method unless there is a specific reason not to select it. If the meter is not synchronized to line frequency or NTP, it will default to internal crystal. Different meters differ in terms of drift, but typically meters with 20 ppm crystals will drift 30 seconds per month when set to internal crystal.

**\*\*IMPORTANT!** You also need to set up the NTP server information for the Network card. See [8.5.6: Configuring a Network Card, on page 8-56](#) for instructions.

5. To implement any changes, click the Update Device button to send the new profile to the meter.

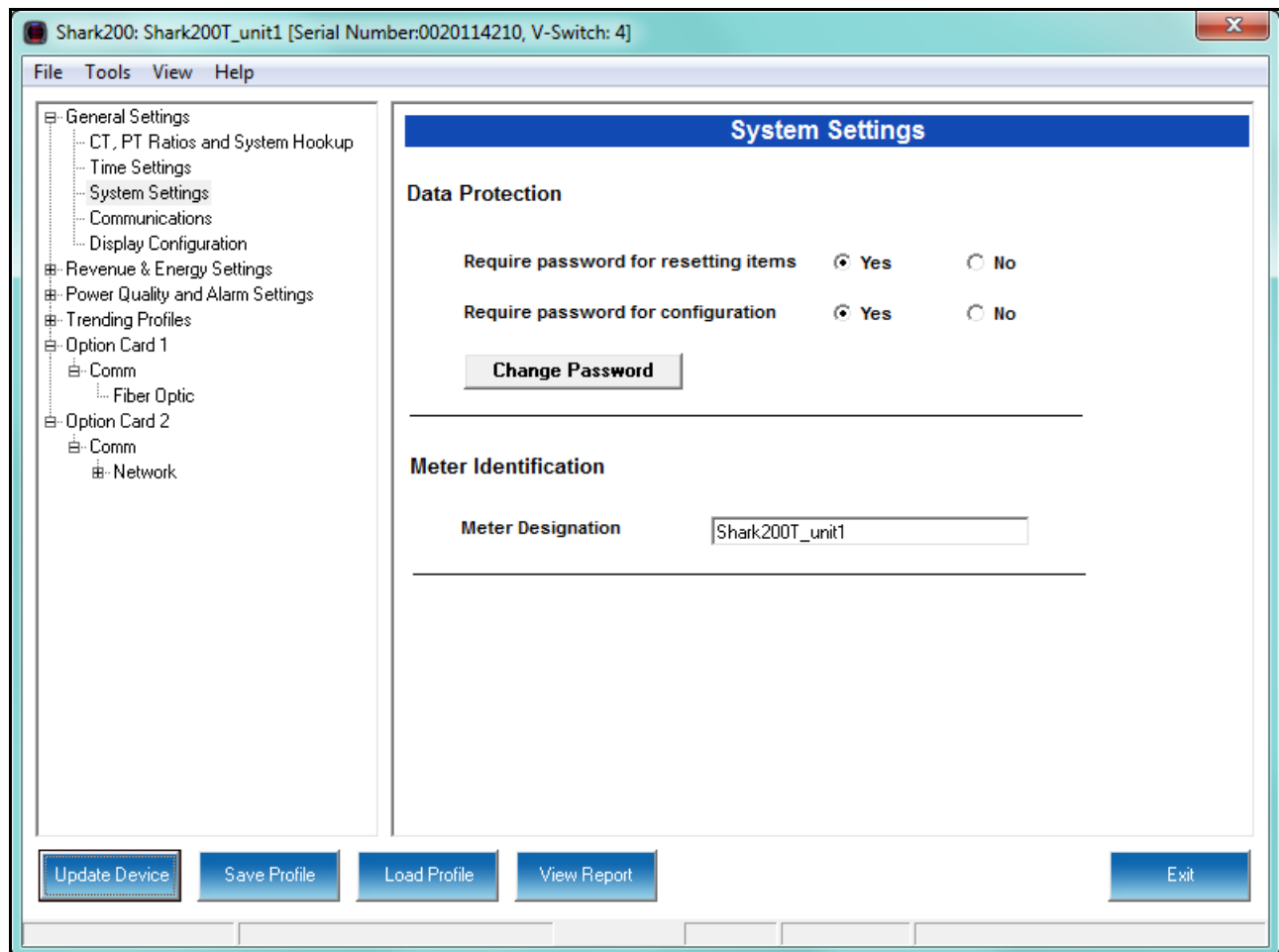
### 8.1.3: Configuring System Settings

Use the system settings to set password protection and a meter ID. You can enable or disable a Password for Resetting (Reset Max/Min Energy Settings, Energy Accumulators, and the Individual Logs) and Configuration (Device Profile) in the Systems Settings screen.

Once password protection is enabled for the meter and the Device Profile is updated, anyone who attempts to make a change that is under password protection is prompted to enter the password. If the correct Password is not entered, the change doesn't take place.

**NOTE:** If you enable a Password for Resetting, you must also enable it for Configuration.

1. From the Tree Menu, click General Settings>System Settings.



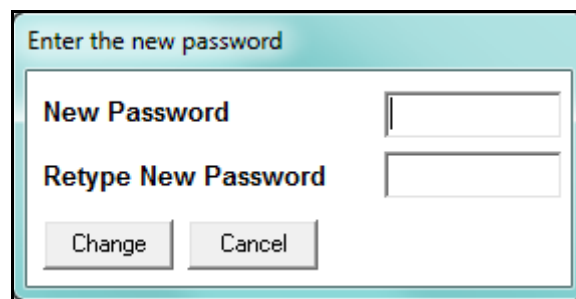
2. From this screen, you can do the following:

- Enable or Disable Password for Resetting and/or Configuration: click the radio button next to Yes or No. Enabling Password protection prevents unauthorized tampering with devices.

**IMPORTANT!** You must set up a password before enabling Password Protection. Click the Change button next to Change Password if you have not already set up a password.

- Change the Password: click the Change button.
- Change the Device Designation: input a new designation into this field.

3. When you click the Change button next to Change Password in the Settings screen, you will see the Enter the New Password screen.



- a. Type in the new password (0 -9999).
- b. Retype the password.
- c. Click Change. The new password is saved and you see the following message window.

**NOTES:** If Password Protection has already been enabled for configuration and you attempt to change the password, you will see the Enter Password screen after you click Change. Enter the old password and click OK to proceed with the password change.

4. To implement any changes, click the Update Device button to send the new profile to the meter.



### 8.1.4: Configuring Communication Settings

Use this screen to enter communication settings for the meter's two on-board ports: the IrDA Port (COM 1) and RS485 Port (COM 2).



**IMPORTANT!** The settings on this screen are the current settings for communication. Any changes you make may affect communication between the Shark® meter and your PC. If your meter is a 200S with the Ethernet option, keep the RS485 settings shown below.

1. From the Tree Menu, click General Settings>Communications.

Shark200: Shark200T\_unit1 [Serial Number:0020114210, V-Switch: 4]

File Tools View Help

General Settings  
 CT, PT Ratios and System Hookup  
 Time Settings  
 System Settings  
 Communications  
 Display Configuration  
 Revenue & Energy Settings  
 Power Quality and Alarm Settings  
 Trending Profiles  
 Option Card 1  
 Comm  
 Fiber Optic  
 Option Card 2  
 Comm  
 Network

### Communications

**COM1 (IrDA)**  
 Response Delay (msec) 0

**COM2 (RS485)**  
 Address 14  
 Protocol Modbus RTU  
 Baud Rate 57600  
 Response Delay (msec) 0  
 Parity None

**DNP Options for Voltage, Current and Power**  
 Return values in ☒ Secondary ☐ Primary

Update Device Save Profile Load Profile View Report Exit

2. The screen fields and acceptable entries are as follows:

- COM 1 (IrDA)
  - Response Delay: 0 - 750 (50msec increments)
- COM 2 (RS-485)

- Address: 1 - 247 (Modbus); 1-65520 (DNP)
- Protocol: Modbus RTU, Modbus ASCII or DNP3
- Baud Rate: 1200, 2400, 4800, 9600, 19200, 38400, 57600 (For the Baud Rates below 9600 your meter must have Runtime Firmware version 26 or higher.)
- Response Delay: 0 - 750 (50 msec increments)  
Response Delay is the delay the meter should use before responding to queries. If your connecting device requires a delay before receiving information, use response delay to program the time to wait before the meter starts responding to queries.
- Parity: Odd, Even, or None (For Parity setting your meter must have Runtime Firmware version 26 or higher.)
- DNP Options for Voltage, Current, and Power:  
These fields allow you to choose Primary or Secondary units for DNP, and to set custom scaling if you choose Primary. The Scaling fields appear after you click the Primary radio button (see partial screen capture, below).

**Response Delay (msec)** 0

**Parity** None

**DNP Options for Voltage, Current and Power**

**Return values in** ☐ Secondary ☒ Primary

	Divisor	Full scale	DNP value at Full scale
Voltage	1	120.00	120
Current	1	5.00	5
Power(K)	1	1800.00	1

**Optimal Scaling**

Save Profile Load Profile View Report Exit

Scaling is used with Primary readings so that you can ensure that your readings will not go beyond the DNP range before they reach Full Scale. The valid range

for DNP Object 30 is -32768 to +32767. If the scaling you enter will cause the values to fall outside the DNP range, the values will be shown in bold or red in the DNP Value at Full Scale fields.

Click the Optimal Scaling button to have the software choose a divisor for voltage, current, and power, that will not result in an over/under-range.

**NOTE:** You must set the DNP polling software to multiply by the divisor amount before showing the final value.

3. To implement any changes, click the Update Device button to send the new profile to the meter.

### 8.1.5: Setting Display Configuration

Some users may want to lock the meter to a particular faceplate display or series of displays. For example, if you would like the meter to act only as a Volt meter, or only as an ammeter, the meter can be configured to display only the relevant screen. Use this setting to lock the display of the Shark® 200/200S meter's faceplate to the specific combination you want. Refer to the meter's Installation and Operation Manual for additional information on the faceplate.

1. From the Tree Menu, click General Settings>Display Configuration.

The screenshot shows the 'Shark200: Pac Height BP1 [Serial Number:0082636025, V-Switch: 33]' window. The left sidebar contains a tree menu with the following items: General Settings, CT, PT Ratios and System Hookup, Time Settings, System Settings, Communications, Display Configuration (selected), Revenue & Energy Settings, Power Quality and Alarm Settings, and Trending Profiles. The main area is titled 'Display Configuration' and contains the following settings:

- Phases Displayed:** A, B and C (dropdown)
- Auto Scroll Display:** Yes (dropdown)
- Enable on Face Plate of Display:**
  - ☒ Volts L-N
  - ☒ Amps
  - ☒ VARh
  - ☒ VA/Hz
  - ☒ Volts L-L
  - ☒ W/VAR/PF (dropdown)
  - ☒ VAh
  - ☒ Wh
- Power Direction:** View as load (dropdown)
- Flip Power Factor Sign:** No (dropdown)
- Current (I) Display Autoscale:** On (dropdown)
- Display Voltage in Secondary:** No (dropdown)
- Use IEEE/IEC power coordinate system:** No (dropdown)
- ☒ **Load bar custom configuration**
  - Current Scale:** 5 (text input)
  - Primary Full Scale:** 5000
  - 100% =** 5 A
- ☐ **Enable fixed scale for voltage display**

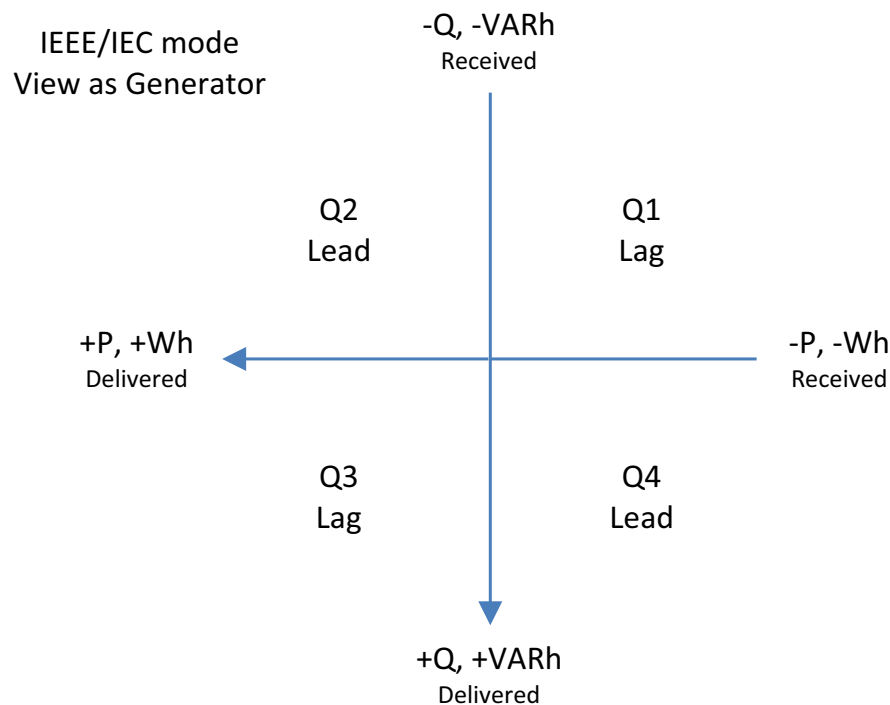
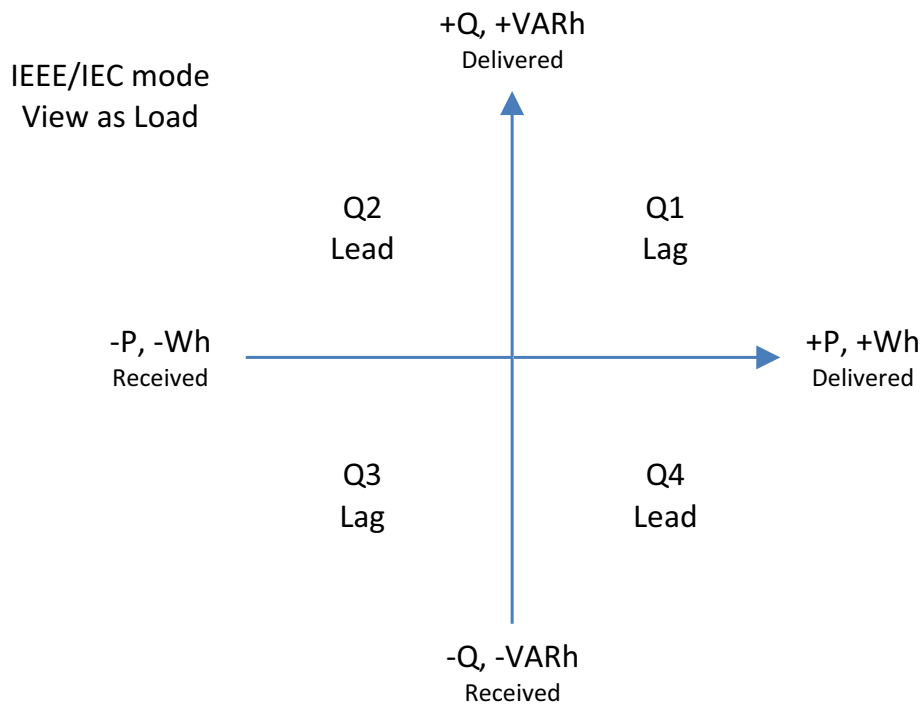
At the bottom of the window are five buttons: Update Device, Save Profile, Load Profile, View Report, and Exit.

2. The screen fields and acceptable entries are as follows:

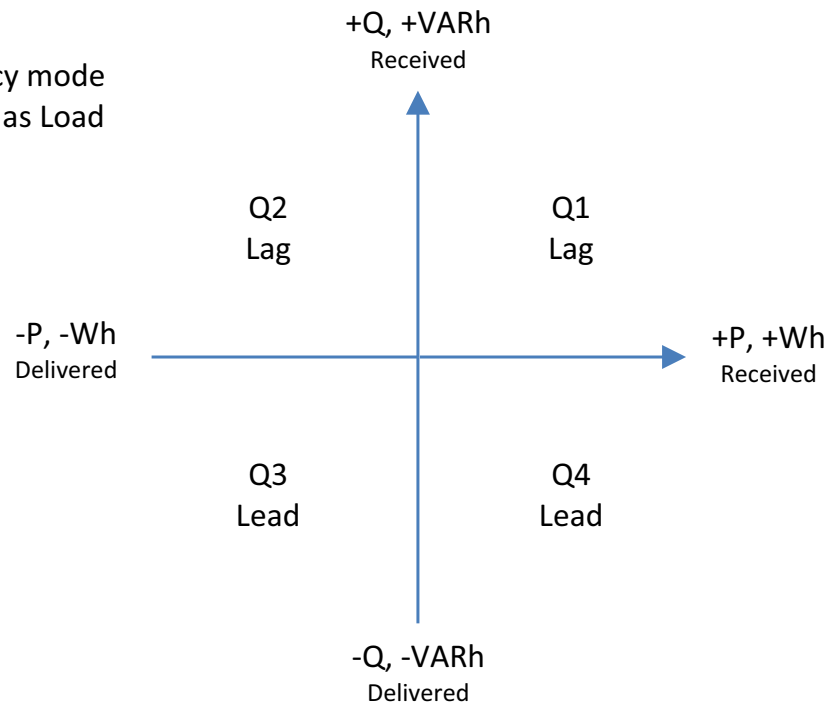
- **Phases Displayed:** A; A and B; A, B, and C. This field determines which phases display on the faceplate. For example, if you select A and B, only those two phases will be displayed on the faceplate.

- Auto Scroll Display: Yes or No. This field enables/disables the scrolling of selected readings on the faceplate. If enabled, the readings scroll every 5 seconds.
- Enable on Face Plate of Display: Check the boxes of the Readings you want displayed on the faceplate of the meter. If you make no selection, Amps are displayed by default.
- Power Direction: View as Load or View as Generator; this controls how energy is accumulated in the Shark® meter. View as Load means the energy readings are accumulated as Whrs Received, View as Generator means the energy readings are accumulated as Whrs Delivered.
- Flip Power Factor Sign: Yes or No.
- Current (I) Display Autoscale: On to apply scaling to the current display or Off (No decimal places).
- Display Voltage in Secondary: Yes or No.

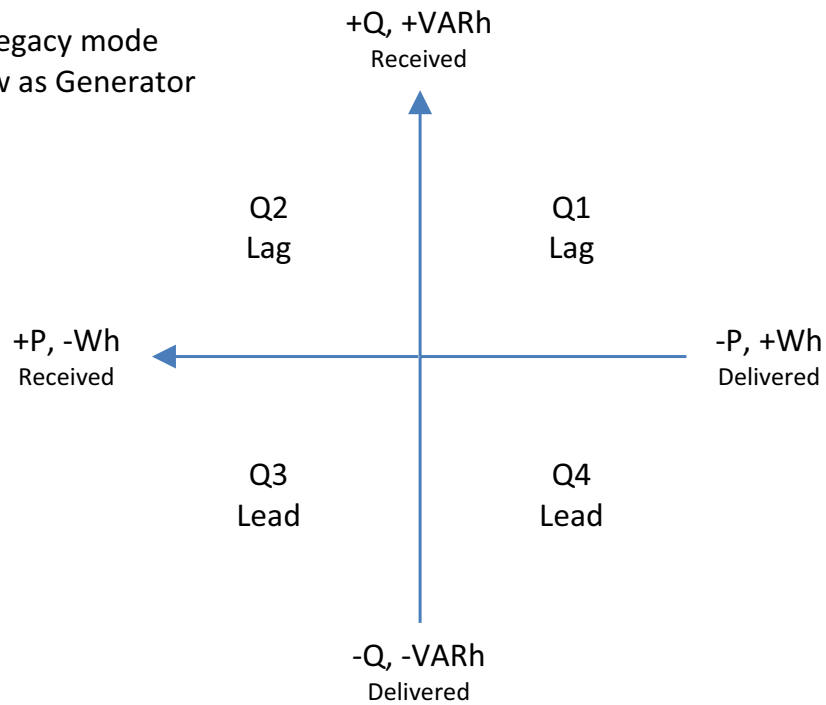
- Use IEEE/IEC Power Coordinate System: Yes or No. Select Yes to use the IEEE/IEC system shown in the charts below. Select No if you want to use the legacy system shown in the charts on the next page.



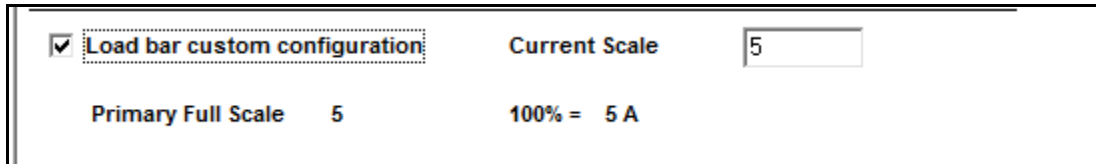
Legacy mode  
View as Load



Legacy mode  
View as Generator



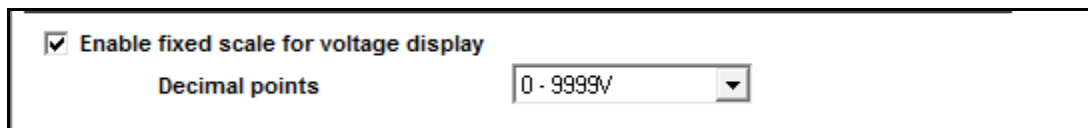
- Load Bar Custom Configuration: This allows the meter to display load with an analog representation. This way the user can get a visual presentation of the loading of the circuit. To enter scaling for the Load Bar:
  - a. Click the Load Bar Custom Configuration checkbox. Fields display on the screen that allow you to enter a Scaling factor for the display. See the figure below



☒ Load bar custom configuration      Current Scale    5

Primary Full Scale    5      100% = 5 A

- b. Enter the scaling factor you want in the Current Scale field. This field is multiplied by the CT Multiplier set in the CT, PT Ratios, and System Hookup screen (see [8.1.1: Configuring CT, PT Ratios and System Hookup, on page 8-2](#)) to arrive at the Primary Full Scale. Make sure you set the CT multiplier correctly.
- Enable Fixed Scale for Voltage Display: To enter a scaling factor for the Voltage display:
    - a. Click the checkbox next to Enable Fixed Scale for Voltage Display. The screen changes - see the figure below.



☒ Enable fixed scale for voltage display

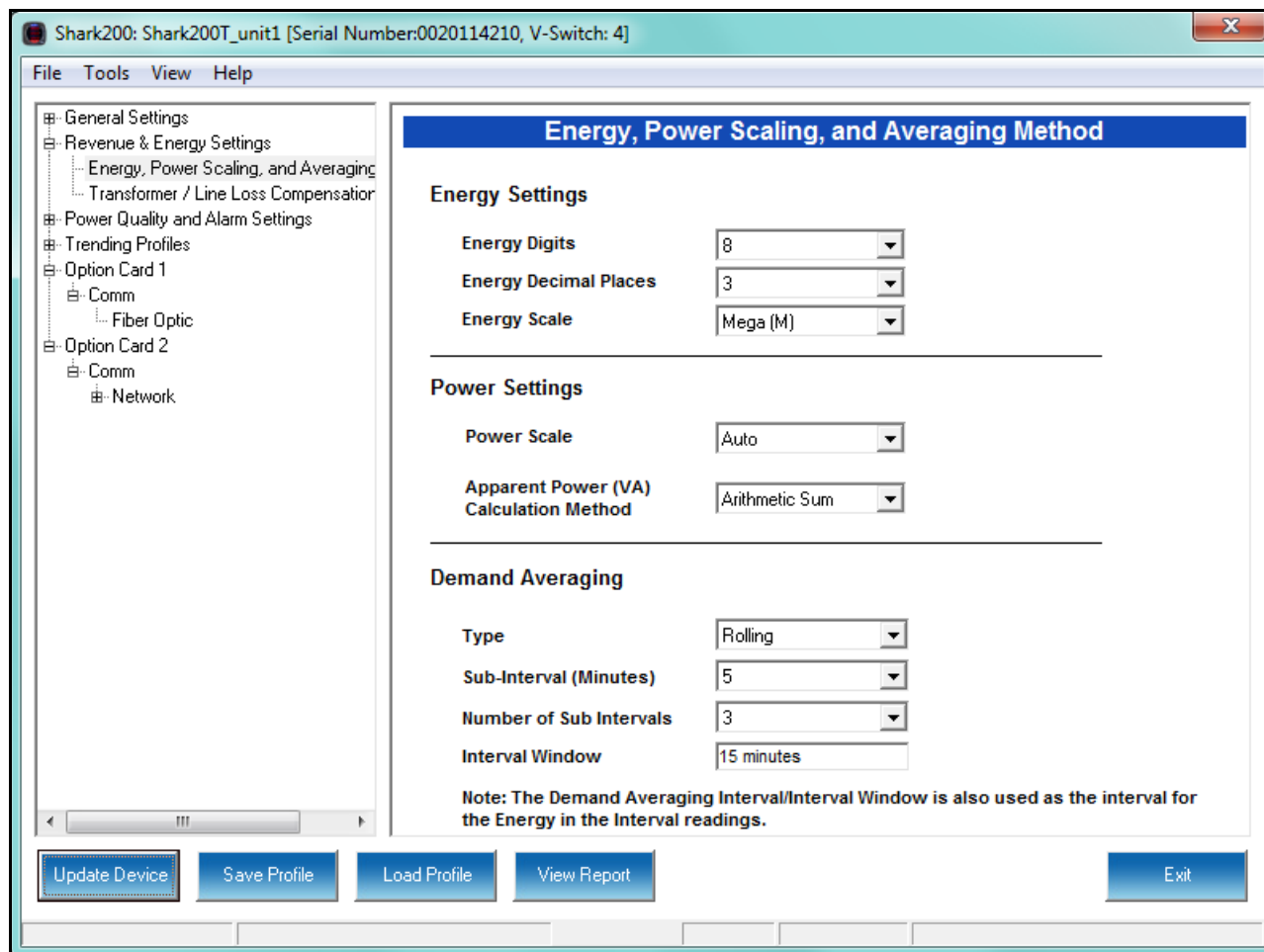
Decimal points    0 - 9999V

- b. Select the scaling you want to use from the pull-down menu. The options are: 0-9999V, 100.0kV-999.9kV, 10.00kV-99.99kV, or 0kV-9.999kV.
3. To implement any changes, click the Update Device button to send the new profile to the meter.



## 8.2: Revenue and Energy Settings

From the Tree Menu on the left side of the Shark 200/200S meter's Device Profile screen, double-click on the Revenue and Energy Settings line or click on the + button next to it. The settings in the Revenue and Energy Settings group are listed.



### 8.2.1: Configuring Energy, Power Scaling, and Averaging Method

From the Tree Menu, click Revenue & Energy Settings> Energy, Power Scaling, and Averaging Method (see the screen above). Use this setting to configure:

- The display and storage of Energy registers in the meter
- The display of Power data in the meter
- The method of VA computation

- The interval over which Average values are computed, as well as the Interval Energy

### **Functional Overview of Energy Settings, VA Computation, and Averaging:**

- **Energy Scaling**

Energy Setting includes:

Digits (the number of digits in the reading)

Decimals (the number of decimal places in the reading)

Energy Scale: the scale of the reading - unit; kilo (number times 1000); Mega (number times 1 million)

Energy settings allow you to balance the resolution (or accuracy) of the energy stored, with the interval over which energy rollover occurs. For example, the maximum resolution for a k scale reading is: 99999.999k.

To calculate the speed at which the energy will rollover, you must know the Power Full Scale, which is computed from the CT and PT Full Scale values (see [8.1.1: Configuring CT, PT Ratios and System Hookup, on page 8-2](#)). The formula for calculating Power Full Scale is:

Wye system:  $\text{CT Full Scale} \times \text{PT Full Scale} \times 3$

Delta system:  $\text{CT Full Scale} \times \text{PT Full Scale} \times 3 \times \sqrt{3}$

For example, for a CT Full Scale of 2000, PT Full Scale of 14400, Wye system:

$2000 \times 14400 \times 3 = 86400000$

In this example, the energy will increment at 86400000 Watts per hour, or 24000 Watts per second.

This value allows you to determine the number of digits, decimal places, and energy scale you want to configure for the Energy settings, when you take into account the rollover time.

To determine the number of hours before rollover, use this formula:

$[\text{Max Resolution}]/[\text{Full Scale}] = \text{\#Hours}$ , where Max Resolution = maximum digits and decimals for the Energy scale in use.

Using the example from above, with an energy scale of Mega, the formula would

be:

99999.999 M/86.4 M = 1157.4074 hours or about 48 days until rollover.

**NOTE:** To increase the number of days until rollover, you can increase the number of digits (to 8), decrease the number of decimal places (to 0), or increase the Energy Scale (to M).

- **Apparent Power (VA) Computation:**

There are two optional methods of VA Computation:

**Arithmetic Sum** - the formula for this calculation is:

$$VA_T = VA_a + VA_b + VA_c$$

**Vector Sum** - the formula for this calculation is:

$$VA_T = \sqrt{W_T^2 + VAR_T^2}$$

Generally, the superior method for calculating VA is to use the Vectoral method; however, both methods are provided.

- **Demand Averaging**

Demand is the average rate of energy use over time. The Shark® 200 meter supports two types of demand averaging: Block demand and Rolling demand.

Block demand records the average demand for time intervals that you define (usually 5, 15, 30, or 60 minutes).

Rolling demand functions like multiple, overlapping Block demands. You define the subintervals at which an average of demand is calculated. An example of Rolling demand would be a 15-minute Demand block using 5-minute subintervals, thus providing a new demand reading every 5 minutes, based on the last 15 minutes.

1. The screen fields and acceptable entries are as follows:

- Energy Settings
  - Energy Digits: 5; 6; 7; 8
  - Energy Decimal Places: 0 - 6

- Energy Scale: unit; kilo (K); Mega (M)

For example: a reading for Digits: 8; Decimals: 3; Scale: K would be formatted: 00123.456k

**NOTES:**

- Your selection in the Energy Settings fields determines the precision of energy stored for display and polling. Refer to the Functional Overview at the beginning of this section for more information.
- If you are changing the energy settings, we recommend you first reset the Energy Accumulators, in order to prevent erroneous counts. See [20.1.7: Reset Device Information, on page 20-7](#), for instructions on resetting the Shark® 200/200S meter's Energy Accumulators.
- Power Settings
  - Power Scale: Auto; unit; kilo (K); Mega (M)
  - Apparent Power (VA) Calculation Method: Arithmetic Sum; Vector Sum (See explanation on the previous page.)
- Demand Averaging
  - Type: Block or Rolling
  - Interval (Block demand) or Sub-Interval (Rolling demand): 5; 15; 30; 60
  - Number of Subintervals: 1; 2; 3; 4
  - Interval Window: This field is display only. It is the product of the values entered in the Sub-Interval and Number of Subintervals fields.

**NOTES:**

- You will only see the Number of Subintervals and Interval Window fields if you select Rolling demand.
- If you have set an Input to trigger EOI demand averaging (using either a Relay Output/Digital Input or Pulse Output/Digital Input Option card) any entry you make in the Demand Averaging field will be ignored. A message

to that effect appears on the screen. See [8.5.2: Configuring a Relay Output/Digital Input Card, on page 8-41](#) and [8.5.3: Configuring a Pulse Output/Digital Input Card, on page 8-46](#), for instructions on setting EOI pulse for demand averaging.

2. To implement any changes, click the Update Device button to send the new profile to the meter.

### **8.2.2: Transformer/Line Loss Compensation**

Transformer losses are power used by the transformer while working. The more load on the transformer, the higher the transformer losses. There are two types of transformer losses:

- No load losses - these are the fixed losses that keep the transformer up and running.
- Load losses - these vary with changes in the load.

When the meter is located on the secondary side of a customer's transformer, a utility will want to add the transformer losses into the energy usage calculation. However, this practice is regulated by local jurisdiction and regulations. The meter has the capability to add in or subtract out these transformer losses, depending on the user's specific needs.

Line losses are similar to transformer losses, except that they are used to compensate for loss incurred on wires, such as transmission lines.

Transformer/Line Loss Compensation allows you to add or subtract transformer and/or line losses to meter registration.

1. From the Tree Menu, click Revenue & Energy Settings>Transformer/Line Loss Compensation.

Shark200: Shark200T\_unit1 [Serial Number:0020114210, V-Switch: 4]

File Tools View Help

General Settings  
Revenue & Energy Settings  
    Energy, Power Scaling, and Averaging  
    Transformer / Line Loss Compensation  
Power Quality and Alarm Settings  
Trending Profiles  
Option Card 1  
    Comm  
    Fiber Optic  
Option Card 2  
    Comm  
    Network

### Transformer / Line Loss Compensation

	Positive Watts	Negative Watts
Due to Iron	1.00	1.00
Due to Copper	1.00	1.00

	Positive Watts	Negative Watts
Due to Iron	1.00	1.00
Due to Copper	1.00	1.00

Both Fe and Cu

Add to Watts and VAR

TLC Calculator

Update Device Save Profile Load Profile View Report Exit

2. This screen displays the current values for the meter's Transformer Loss Compensation. The screen fields and acceptable entries are as follows

- Percent Loss of Watts due to Iron and Copper/Positive Watts and Negative Watts
- Percent Loss of VARS due to Iron and Copper/Positive and Negative Watts
- Drop-down menu #1. Choose from: Disabled, Fe Only, Cu Only, Both Fe and Cu.
- Drop-down menu #2. Choose from: Add to Watts and VAR; Add to Watts and Subtract from VAR; Subtract from Watts and Add to VAR; Add to Watts and VAR; Subtract from Watts and VAR.

3. Click TLC Calculator to find the values to enter into the Percent Loss fields. The TLC Calculator button launches the TLC Calculator that makes the calculations for you

once you enter the required data.

**NOTE:** Appendix A contains a screen captures of the TLC Calculator with example numbers, and an explanation of Loss Compensation considerations.

4. Enter the percent Loss of Watts and VARS for copper and iron in the appropriate fields.
5. To implement any changes, click the Update Device button to send the new profile to the meter.

### 8.3: Power Quality and Alarm Settings

Note that in this area you will find a difference between the Shark® 200 meter and the Shark® 200S meter. Even though they share Device Profiles, the Shark® 200S meter is a submeter, and does not have the option to have Waveform/PQ functions. These features are only for the Shark® 200 meter.

From the Tree Menu on the left side of the Shark® 200/200S meter's Device Profile screen, double-click on the Power Quality and Alarm Settings line or click on the +

button next to it. All of the settings in the Power Quality and Alarm Settings group are listed.

Shark 200: Office RP, V-Switch: 6] Offline

File Tools View Help

- General Settings
- Revenue & Energy Settings
- Power Quality and Alarm Settings
  - Limits**
  - Waveform/PQ
- Trending Profiles
- Option Card 1
- Option Card 2

Limits						
Limit ID	Assigned Channel (Double Click to Edit)	Setting	Setpoint		Return Hysteresis	
			% of Fullscale	Primary	% of Fullscale	Primary
1	Not Assigned	Above				
		Below				
2	Not Assigned	Above				
		Below				
3	Not Assigned	Above				
		Below				
4	Not Assigned	Above				
		Below				
5	Not Assigned	Above				
		Below				
6	Not Assigned	Above				
		Below				
7	Not Assigned	Above				
		Below				
8	Not Assigned	Above				
		Below				

Full Scales (100% equals the following for the given reading type)

Voltage	120.00	Power	600.00	THD	100.00%
Current	5.00	Power Total	1800.00		
Frequency	60.00Hz	Power Factor	1.000		

Save Profile Load Profile View Report Exit



### 8.3.1: Configuring Limits

1. From the Tree Menu, click Power Quality and Alarm Settings>Limits (see the screen on the previous page). The current settings for Limits are shown in the screen. Use this screen to assign Limits for the Shark® 200/200S meter.

#### **Functional Overview for Limits:**

Limits are transition points used to divide acceptable and unacceptable measurements. When a value goes above or below the limit, an out-of-limit condition occurs. You can set and configure up to eight Limits for the Shark® 200 meter.

Once they are configured, you can view the out-of-Limits (or Alarm) conditions in the Limits Log (see [19.4.2: Viewing the Limits Log, on page 19-38](#)) or Limits Polling screen (see [5.4.7: Poll Alarm/Limits Status, on page 5-74](#)). You can also use Limits to trigger relays.

You can assign the eight limits to readings from three groups of parameters:

- Readings (Instantaneous Voltage; Instantaneous Current; Total and Per Phase Power and Power Factor; Frequency; Neutral Current; Symmetrical Components and Voltage Imbalances)
- Demand (Current; Per Phase, Total Power and Power Factor)
- THD (For Voltage and Current)

2. The bottom of the screen shows the Full Scale values for:

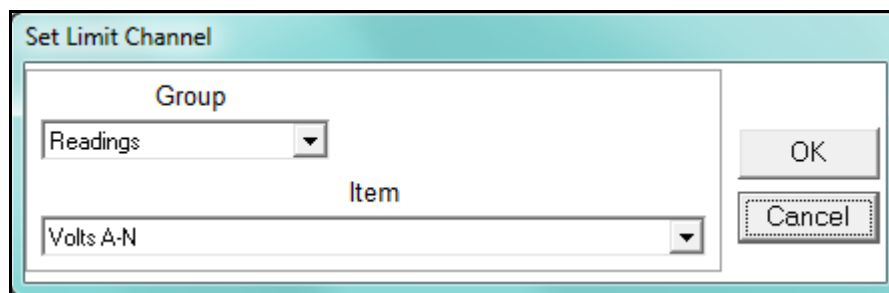
- Voltage
- Current
- Frequency
- Power
- Power Total
- Power Factor

- THD

3. To set or change a Limit:

a. Select a limit by double-clicking on the Assigned Channel field.

b. You will see the screen shown below.



c. Select a Group and an Item for the Limit.

d. Click OK. The Limit you selected will now appear in the Limits screen.

3. To configure a Limit, double-click on the following fields to set their values:

- Above and Below Set Point: Percent of Full Scale (the point at which the reading goes out of limit: see figure on the next page).

For example:

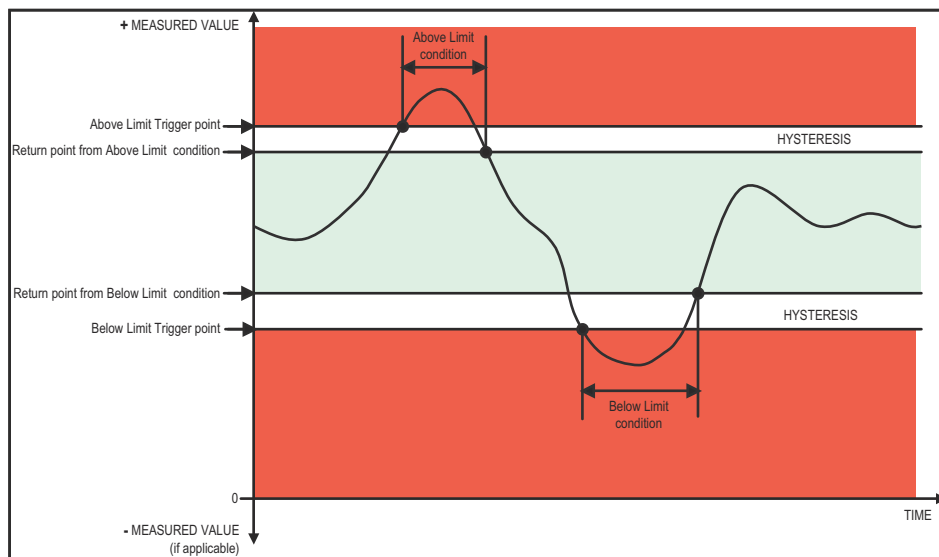
100% of 120V Full Scale = 120 V

90% of 120V Full Scale = 108 V

- Above and Below Return Hysteresis (the point at which the limit's status changes from out of limit to within limit: see figure below).

For example, with a 120 V Full Scale:

- Above Set Point = 110% of Full Scale (Out of Limit above 132 V)
- Below Set Point = 90% of Full Scale (Out of Limit below 108 V)
- Above Return Hysteresis = 105% of Full Scale (Stay Out of Limit until below 126 V)
- Below Return Hysteresis = 95% of Full Scale (Stay Out of Limit until above 114 V)



#### NOTES:

- The Primary fields are display only. They show what the set point and return Hysteresis value are for each limit.
  - If the Above Return Hysteresis is greater than the Above Set Point, the Above Limit is Disabled; if the Below Return Hysteresis is less than the Below Set Point, the Below Limit is Disabled. You may want to use this feature to disable either the Above Limit or Below Limit condition for a reading.
  - If you are entering negative limits, be aware that the negative value affects the way the above and below limits function, since negative numbers are processed as signed values.
4. To implement any changes, click the Update Device button to send the new profile to the meter.

### 8.3.2: Configuring Waveform/PQ (Shark® 200 Meter Only, with V-Switch™ Key 5 and Higher)

The Shark® 200 meter is V-Switch™ key upgradeable. If you have purchased V-Switch™ keys 5 or 6, the waveform recording feature will be available with your meter. The Waveform/PQ capability allows the meter to act as a high-speed waveform recorder to record any anomaly that occurs within a cycle of duration. This provides a user with advanced waveform analysis including pre- and post- waveform recording.

The meter has the capability to record both surges and sags of the measured signals. A voltage surge is any event that increases the RMS voltage for one cycle, calculated every half cycle. A voltage sag is a dip in the RMS of one cycle of voltage, calculated every half cycle. A current fault (or surge) is also calculated in the same manner. When the RMS value of any of these triggers exceeds the threshold settings, the meter will trigger a waveform capture.

This setting determines at what point the meter executes a waveform capture and/or records a power quality event. See Chapter 19 for instructions on viewing Waveform and PQ logs. See [8.4.2: Configuring Historical Log Sectors, on page 8-35](#) for instructions on configuring the log sectors for the Shark® 200 meter.

**NOTE:** PQ and Waveform Thresholds are given as a percentage of the Full Scales ( Full Scale fields). Full Scales are based on the CT and PT Ratios set in the CT, PT Ratios and System Hookup setting. Before programming the Waveform/PQ Thresholds, set the CT and PT ratios. See [8.1.1: Configuring CT, PT Ratios and System Hookup, on page 8-2](#), for instructions.

1. From the Tree Menu, click Power Quality and Alarm Settings>Waveform/PQ. The current settings, if any, are shown in the screen.

**Shark 200: Office RP, V-Switch: 6] Offline**

File Tools View Help

Tree Menu:

- General Settings
- Revenue & Energy Settings
  - Energy, Power Scaling, and Aver.
  - Transformer / Line Loss Compens
- Power Quality and Alarm Settings
  - Limits
  - Waveform/PQ**
- Trending Profiles
- Option Card 1
  - Comm
  - Digital I/O
  - Analog I/O
- Option Card 2
  - Comm
  - Digital I/O
  - Analog I/O

**Waveform/PQ**

Channel	Setting	Setpoints		Enables	
		% Full Scale	Primary	PQ	Waveform
Volts A-N	Surge	0.0	0.00	<input type="checkbox"/>	<input type="checkbox"/>
	Sag	0.0	0.00	<input type="checkbox"/>	<input type="checkbox"/>
Volts B-N	Surge	0.0	0.00	<input type="checkbox"/>	<input type="checkbox"/>
	Sag	0.0	0.00	<input type="checkbox"/>	<input type="checkbox"/>
Volts C-N	Surge	0.0	0.00	<input type="checkbox"/>	<input type="checkbox"/>
	Sag	0.0	0.00	<input type="checkbox"/>	<input type="checkbox"/>
IA	Surge	0.0	0.00	<input type="checkbox"/>	<input type="checkbox"/>
IB	Surge	0.0	0.00	<input type="checkbox"/>	<input type="checkbox"/>
IC	Surge	0.0	0.00	<input type="checkbox"/>	<input type="checkbox"/>

Capture Sample Rate: 32

Pre-trigger Cycles: 2 Note: This includes the triggering cycle

**Full Scales (100% equals the following for the given reading type)**

Voltage: 120.00 Current: 5.00

Buttons: Save Profile Load Profile View Report Exit

2. Set the Surge and Sag Setpoints (in percent of Full Scale), for Voltage, and the Surge Setpoint for Current. When you enter the percentage for a reading, the primary value is displayed in the Primary field. The bottom of the screen displays the Full Scales for Voltage and Current.
3. Click the checkbox under PQ to enable PQ recording when the programmed threshold is exceeded.
4. Click the checkbox under Waveform to enable Waveform recording when the programmed threshold is exceeded.

5. Select the sampling rate from the Capture Sample Rate pull-down menu. The options are:

- For V-Switch™ key 5: 32, 64
- For V-Switch™ key 6: 32, 64, 128, 256, 512.

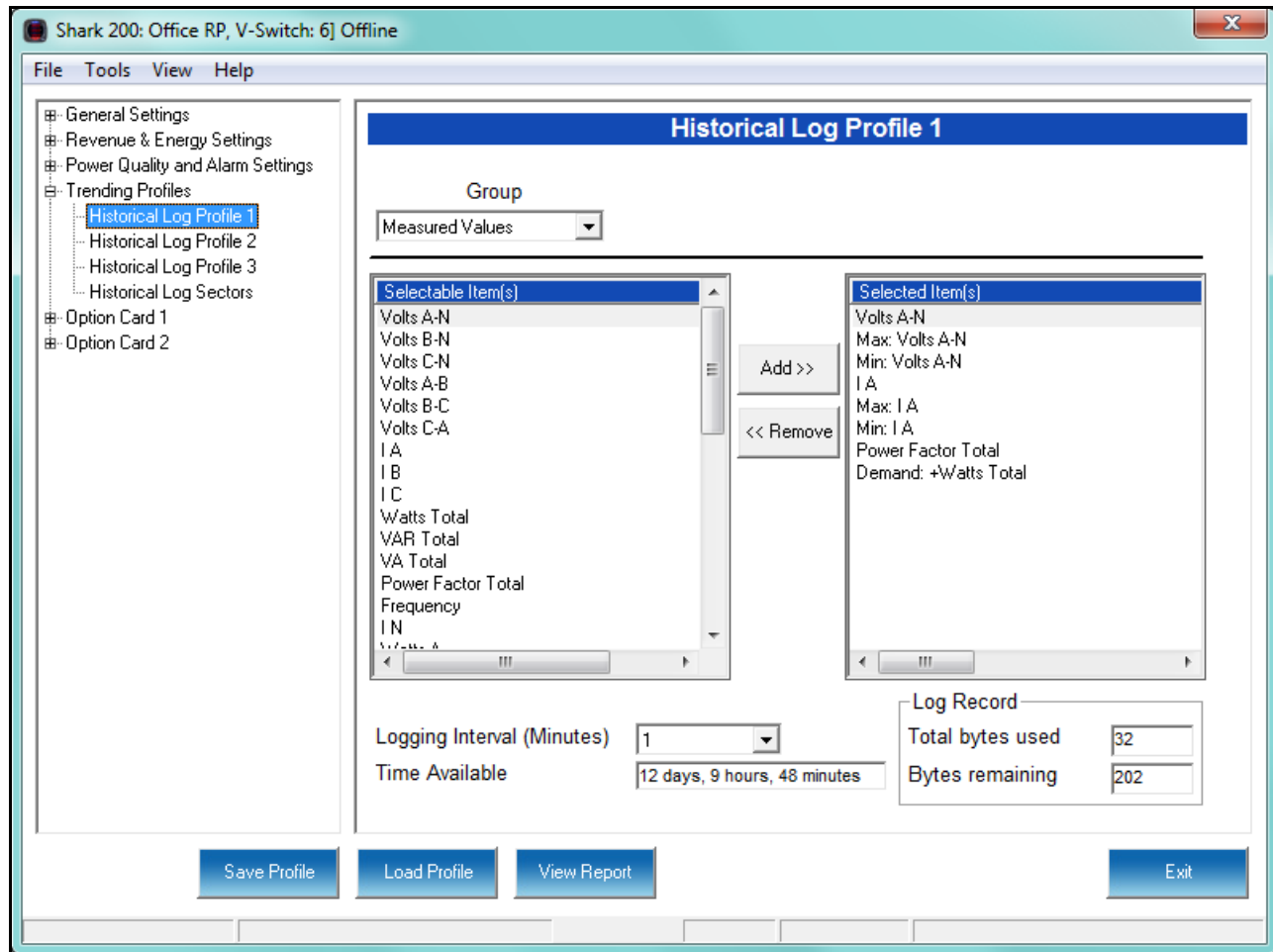
6. From the Pre-trigger pull-down menu, select the number of cycles of waveform data prior to the triggering event, that you want to be included in the waveform capture. The options are 2 to 63.

**NOTE:** Increasing the number of pre-cycles will decrease the number of cycles of data recorded after the event.

7. To implement any changes, click the Update Device button to send the new profile to the meter.

## 8.4: Trending Profiles Settings

From the Tree Menu on the left side of the Shark® 200/200S meter's Device Profile screen, double-click on the Trending Profiles Settings line or click on the + button next to it. All of the settings in the Trending Profiles Settings group are listed.



### 8.4.1: Configuring Historical Logs

Use this setting to select the parameters to be stored in each of the Shark® 200/200S meter's three Historical Logs. For additional information on logs, including using the HHF Converter, see Chapters 16 and 19.

#### Functional Overview of Historical Logs:

The Shark® 200/200S meter allows a user to set up 3 separate historical profile logs that can log up to 64 parameters. Each of these logs can log at different time frames. For example, one log can be set for one minute intervals to record voltage; while another log can be set for 15 minute intervals for energy consumption logging.

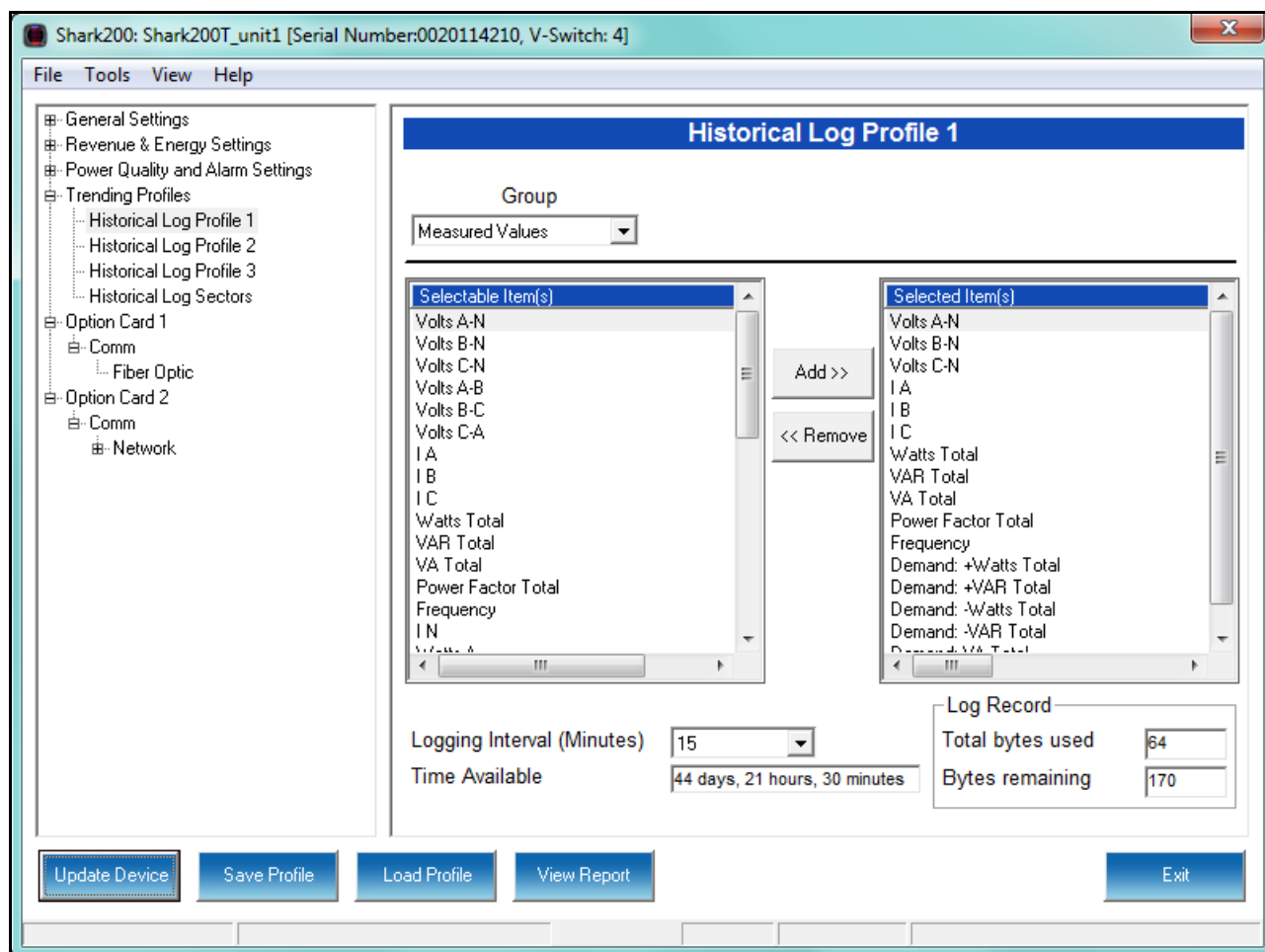
Having three historical logs additionally affords you the flexibility of programming each log with unique parameters. For example, you might program Historical Log 1 to record Power Quality parameters (for example, THD - Shark® 200 meter only), Log 2 to record Demand parameters, and Log 3 to record Energy parameters.

Historical Log parameters can be selected from eleven groups:

- Measured Values (Instantaneous Voltage; Instantaneous Current; Total and Per Phase Power and Power Factor; Frequency; Neutral Current; Symmetrical Components and Voltage Unbalances)
- Demand (Current; Per Phase, Total Power and Power Factor)
- Maximums (Maximum values for all of the readings listed above, including THD voltage and currents)
- Minimums (Minimum values for all of the readings listed above, including THD voltage and currents)
- Energy (Watt-hours, VA-hours, VAR-hours, Energy in the Interval)
- Accumulators (Input and Output Accumulator values)
- Short Term Min (Min value within the Demand Interval)
- Short Term Max (Max value within the Demand Interval)
- Uncompensated (Watt-hours, VA-hours, VAR-hours, Total Power, PF)
- THD (For voltage and current) - Shark® 200 meter only
- Harmonic Magnitudes (For voltage and current up to the 40th order) - Shark® 200 meter only
- Harmonic Phase Angles
- Rollover Counters
- Phase Angles



1. From the Tree Menu, click Trending Profiles>Historical Log Profile (1-3).



This screen allows you to select items to be stored in the historical log you selected. The Group field determines the items that are available for selection.

2. Select a Group. The possible selections are: Measured Values, Demand, Maximums, Minimums, Energy, Energy in the Interval, Accumulators, Short Term Min, Short Term Max, Uncompensated, THD (Shark® 200 meter only), Harmonic Magnitudes (Shark® 200 meter only), Harmonic Phase Angles (Shark® 200 meter only), Rollover Counters, and Phase Angles. (See [8.5.2: Configuring a Relay Output/Digital Input Card, on page 8-41](#) and [8.5.3: Configuring a Pulse Output/Digital Input Card, on page 8-46](#), for information on Accumulators).

**NOTE:** If you select Harmonic Magnitudes, another field opens on the screen allowing you to select one of the following for Harmonic Magnitude: Volts A; Volts B; Volts C; I A; I B; I C.

3. Select items for your log:

- a. Highlight the item(s) you want in the Selectable Items box.
- b. Click Add. The item(s) are added to the Selected Items box.
- c. To remove item(s), highlight them in the Selected Items box and click Remove.

4. Set the Logging Interval (Minutes). The available choices are: 1, 3, 5, 10, 15, 30, 60, EOI (End of Interval) Pulse (Shark® 200 meter only). The Logging Interval determines when the meter takes a snapshot.

**IMPORTANT!** If you are trending Energy in the Interval, the Logging interval must be the same as the Demand interval.

**NOTES:**

- Only **one** of the following can be set for the EOI pulse feature:
  - EITHER **1** Option card input can be set to receive an EOI pulse from another device
  - OR **1** Option card output can be set to trigger an EOI pulse
- The maximum rate for EOI Pulse used to trigger a log is once per minute.
- When you choose EOI Pulse, the meter takes a snapshot when the pulse is either received or generated (depending on whether the EOI pulse is assigned to an input or output), rather than on a time interval.

**NOTE:** There are two display fields at the bottom of the Historical Log Profile screen. They show the Total Bytes Used and the Bytes Remaining for this historical log. These fields are updated as you make selections on the screen. The total number of bytes available per log record is approximately 234.

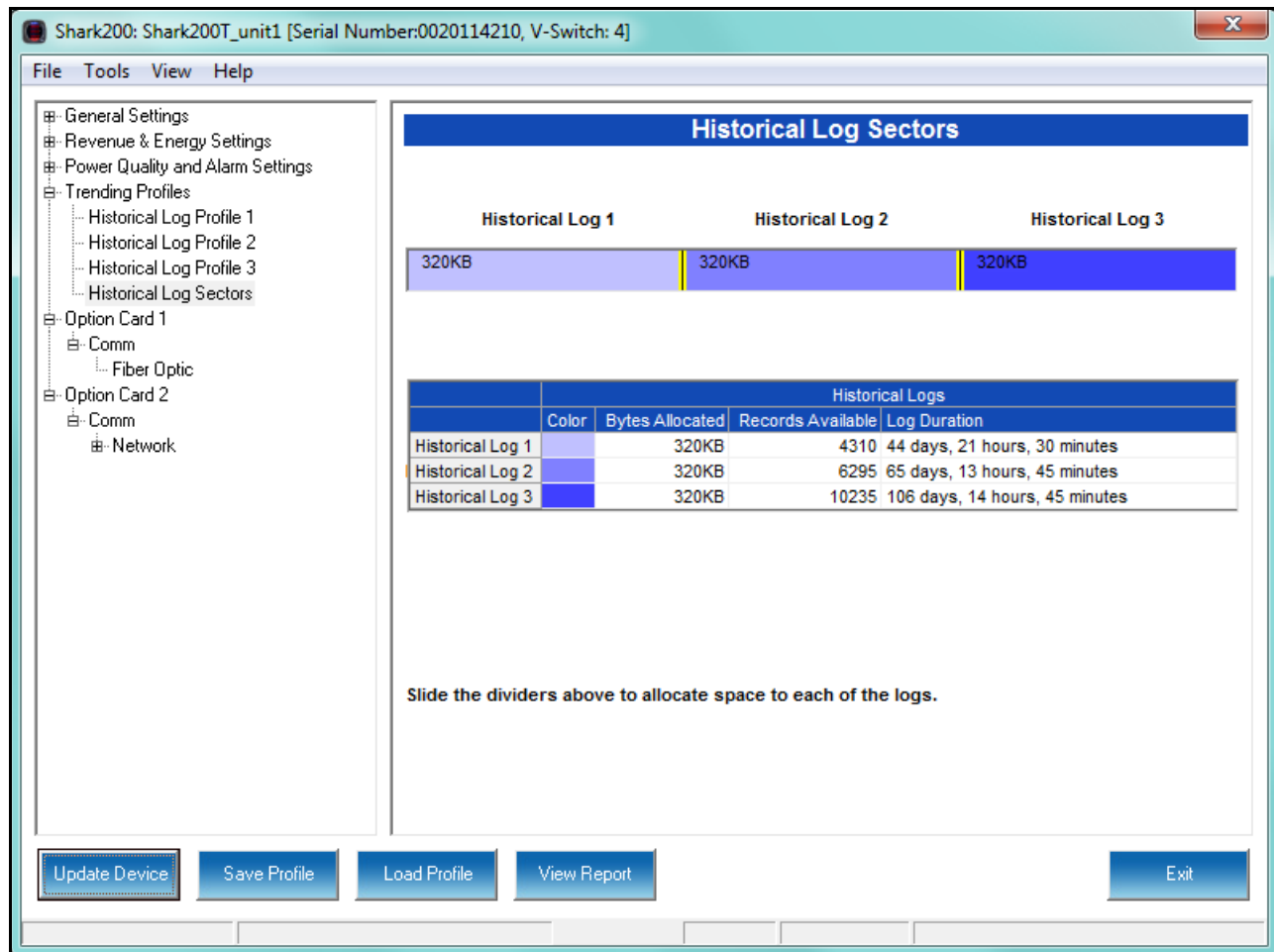
5. To implement any changes, click the Update Device button to send the new profile to the meter.

### 8.4.2: Configuring Historical Log Sectors

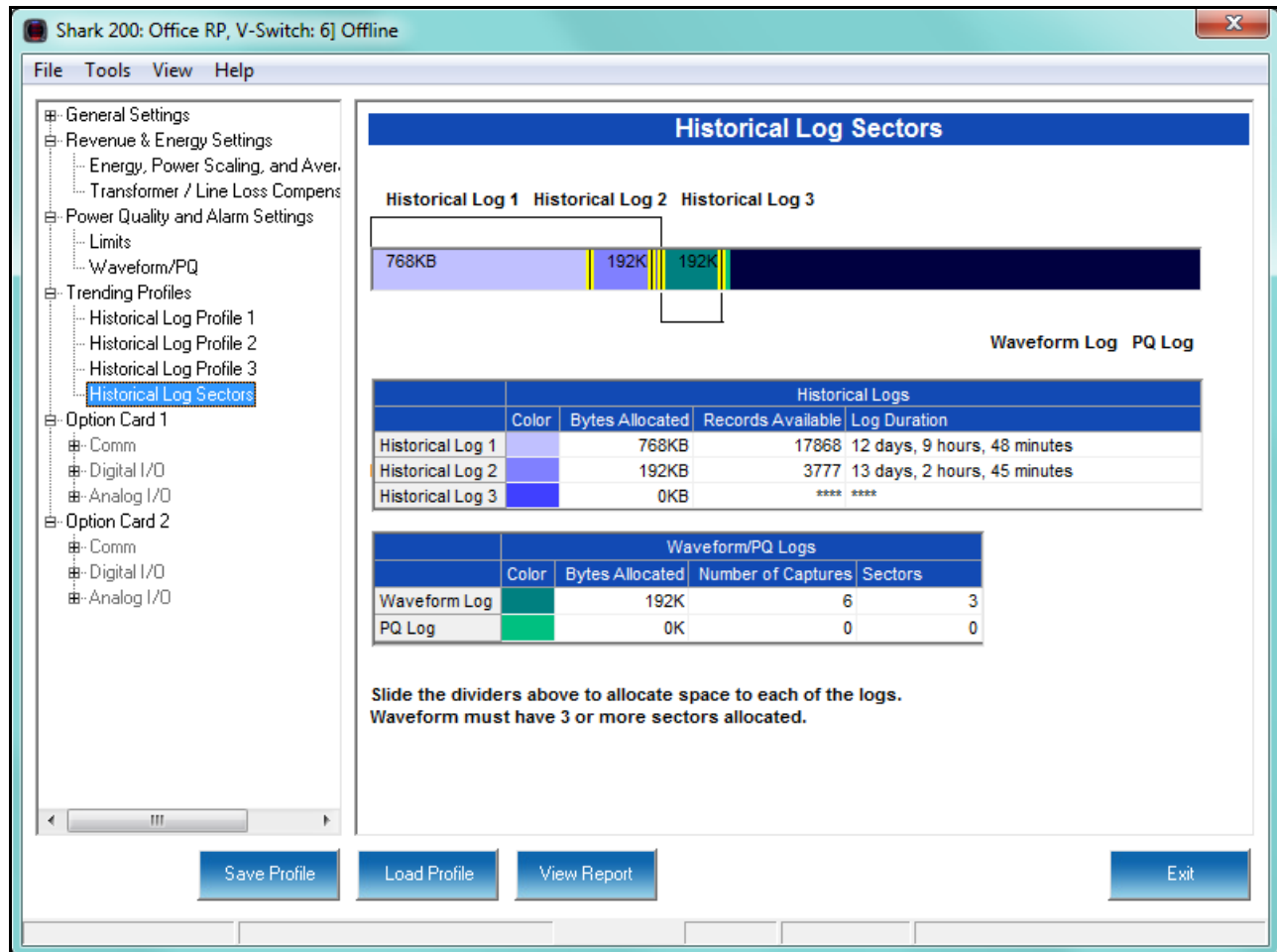
The Shark® 200/200S meter allows a user to configure the amount of memory allocated for each log, so you can optimize the number of records stored for each log.

- For V-Switch™ keys 2 and above, use this setting to increase or decrease the amount of records each of the Shark® 200/200S meter's three Historical logs can store, and the duration each log can run, before becoming filled. This allows a user to set the amount of memory allocated per log for the amount of recording days desired before the memory fills and gets rolled over.
- For V-Switch™ keys 5 and 6 (Shark® 200 meter only), use this setting to set the allocation for the Waveform and Power Quality (PQ) logs, as well as for the Historical logs.

1. From the Tree Menu, click Trending Profiles>Historical Log Sectors.



If your Shark® 200 meter is equipped with V-Switch™ Key 2-4, or the standard Shark® 200S V-Switch™ key, you will see the screen shown on the previous page. If it is a Shark® 200 meter equipped with V-Switch™ Keys 5 or 6, you will see the screen shown below. Both screens are color-coded for ease of use. The color key is shown in the box(es) labeled Historical Logs and Waveform/PQ Logs.



- The first screen shows the current space allocation for the Shark® 200/200S meter's three Historical logs, including:
  - The number of bytes allocated to each log
  - The number of records available for each log
  - The duration of each log.
- The second screen shows the same information, along with the current space allocation for the Waveform/PQ Logs, including:
  - The number of bytes allocated to each log

- The number of captures that can be made before the log rolls over and data is rewritten
- The number of sectors allocated to the log.

2. To change the current allocation for a log:

- a. Click on one of the double yellow lines dividing the individual logs.
- b. You will see a line with arrows on each side. Drag the line in either direction to increase or decrease the log allocation. The display fields for the logs will reflect any changes you make to the allocation.

**NOTES:**

- The Waveform log must have at least 3 sectors allocated to it.
  - When EOI Pulse is set as the Logging Interval for a Historical log (see [8.4.1: Configuring Historical Logs, on page 8-31](#)), the Log Duration field for that log will be blank.
3. To implement any changes, click the Update Device button to send the new profile to the meter.

## 8.5: Configuring Option Cards (Shark 200® Meter Only)

The Shark® 200 meter automatically detects the presence of any Option cards installed in it. You will see the installed card(s) listed in the Tree Menu (see the figure below). Up to two Option cards can be installed in the Shark® 200 meter. Refer to the meter's Installation and Operation Manual for additional information concerning Option cards, including installation procedures. The Shark® 200S form does not accommodate these Option cards.

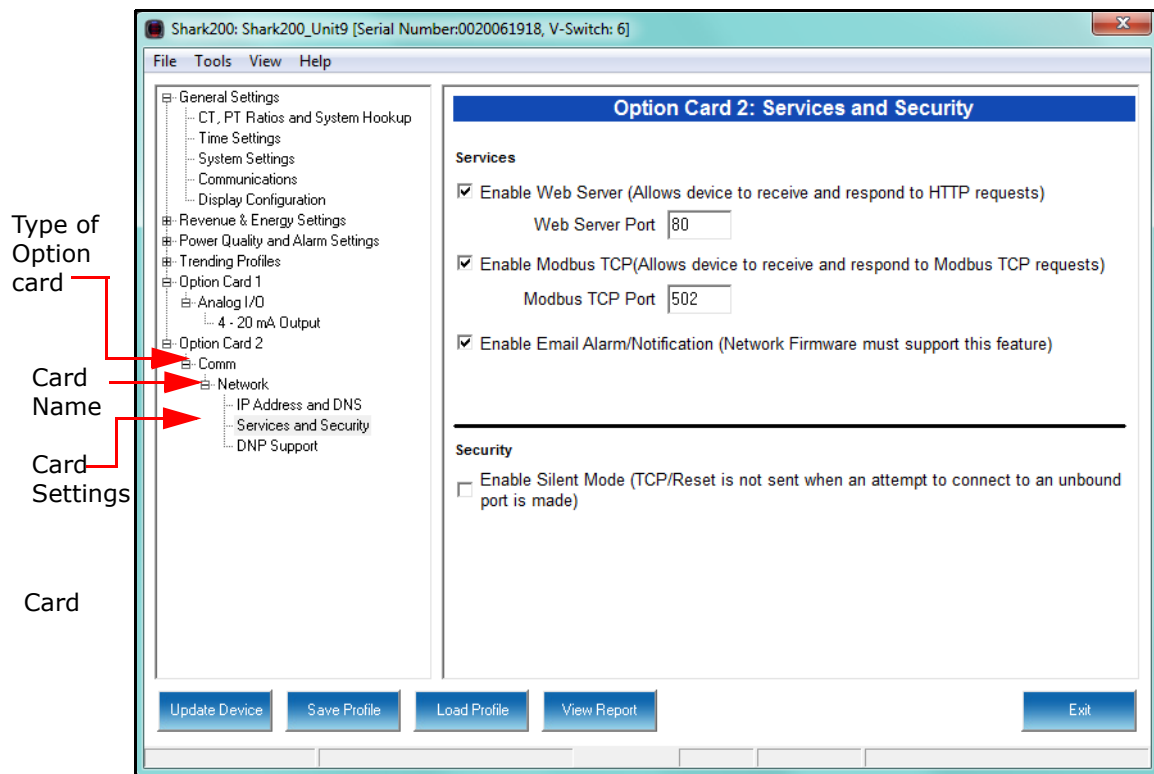
You must configure an Option card before using it. The following sections give instructions for configuring each of the Option cards.

**NOTE:** You can configure settings for an Option card when you are not connected to a meter. Click Option Card 1 or 2 from the Shark® 200 meter's Device Profile screen. The drop-down menu on the displayed screen allows you to select your Option card. The available selections are: Fiber Optic, Network, Digital Relay, Pulse Output, Analog Output (0-1mA), Analog Output (4-20mA), Network IEC61850 (INP300S), None. Click Apply. The Option card you chose is now listed in the menu. Refer to the instructions for configuring the card.

From the Tree Menu on the left side of the Shark 200 meter's Device Profile screen, double-click on the Option Card 1 or Option Card 2 line or click on the + button next to it. The settings for the option card(s) installed in your meter are shown.

### Option Card Screens:

The type of Option card installed in the meter determines the settings you need to configure, and so, the screens you see. Click on the selectable lines under your Option card in the Shark® meter's Device Profile menu. See the example below.



**NOTE:** The Option card settings for your meter will only show the option cards currently installed in your meter.

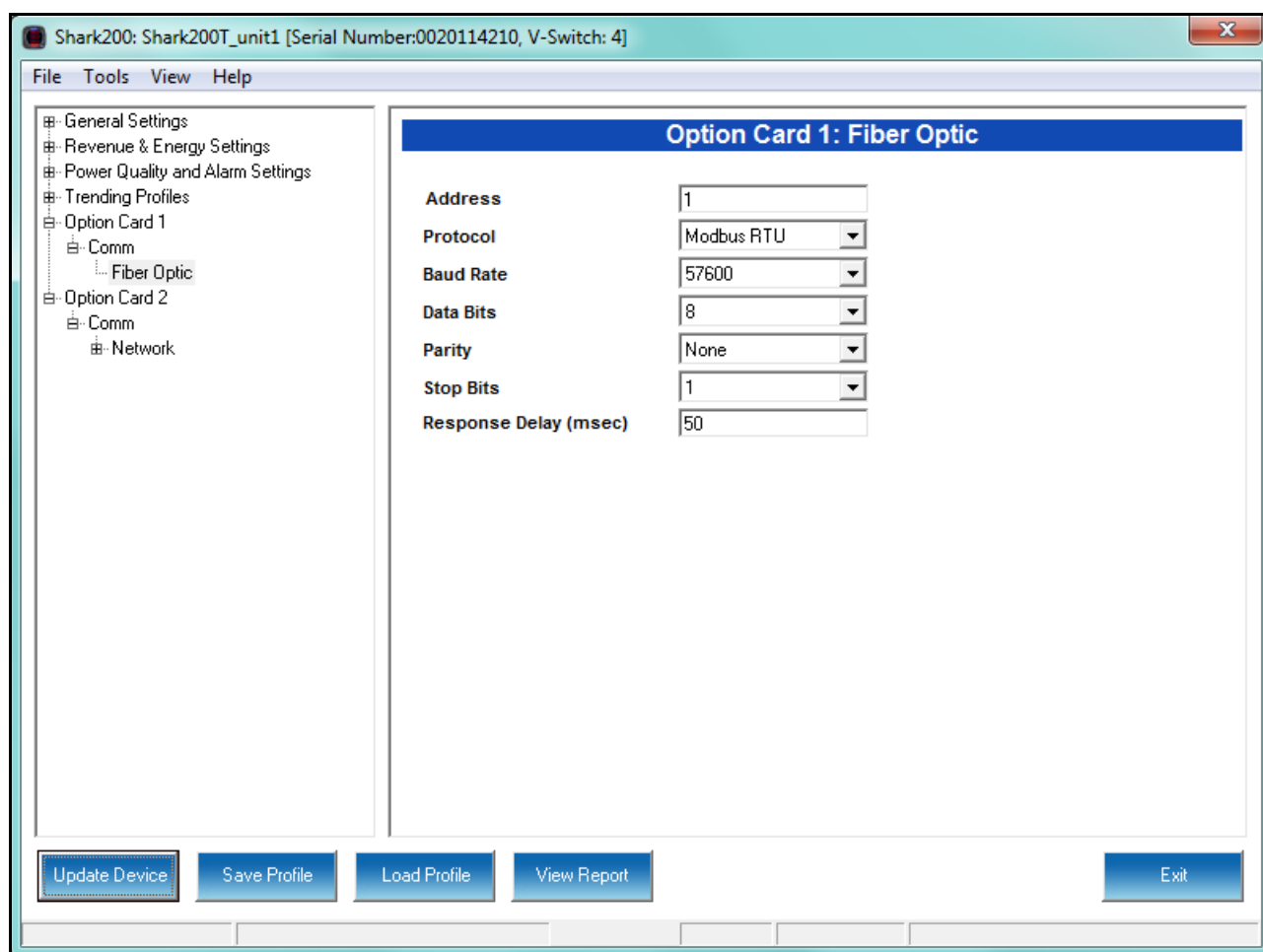
#### 8.5.1: Configuring a Fiber Optic Card

The Fiber Optic Option Card is a Communication card that provides a standard, serial communication port over a fiber optic application. For technical specifications and hardware installation, refer to the meter's Installation and Operation Manual.

#### Example:

An example use of the optional Fiber Optic card is in a daisy chain topology, using the Echo switch on the Fiber Optic Card to allow messages to bypass the unit.

1. From the Option Card menu, click Comm>Fiber Optic.



2. The screen fields and acceptable entries are as follows:

- Address: 1 - 247 (Modbus); 1-65520 (DNP)
- Protocol: Modbus RTU; Modbus ASCII; DNP subset 2; DNP subset 3
- Baud Rate: 9600; 19200; 38400; 57600
- Data Bits: 5; 6; 7; 8
- Parity: None, Odd, Even
- Stop Bits: 1 or 2
- Response Delay (msec): the suggested delay is 50 msec, but you can increase the delay, if necessary.



3. To implement any changes, click the Update Device button to send the new profile to the meter.

### 8.5.2: Configuring a Relay Output/Digital Input Card

The Relay Output/Digital Input card is used for a few purposes. The relay portion is used to send a control output when a limit is exceeded. The input portion can be used to either count KYZ pulse or detect the status of a circuit.

The Relay Output/Digital Input Option Card has:

- Two relay contact outputs for load switching
- Two wet/dry contact sensing digital inputs.

Accumulators in the CommunicatorPQA® software count the transitions of the Inputs and Outputs. For technical specifications and hardware installation, refer to the meter's Installation and Operation Manual.

**NOTE:** When installing a Relay Output/Digital Input card, we recommend you reset the accumulators for the card, in order to prevent erroneous counts. See Chapter 20 for instructions on using the Reset Shark Information screen to reset card accumulators.

**Example:**

An example use of the optional Relay Card is in monitoring the status of circuit breakers or relays in your electrical system. The two status inputs could be used to monitor two circuit breakers, and the two relay outputs could be used to sound an alarm upon the occurrence of a programmed out of limit condition.

1. From the Option Card menu, click Relay Output and Digital Input>Relay Assignments to set the limits/alarm conditions and logging options for the card's Relay Outputs.

**Shark 200: Office RP, V-Switch: 6] Offline**

File Tools View Help

General Settings  
 Revenue & Energy Settings  
 Energy, Power Scaling, and Aver-  
 Transformer / Line Loss Compens  
 Power Quality and Alarm Settings  
 Limits  
 Waveform/PQ  
 Trending Profiles  
 Historical Log Profile 1  
 Historical Log Profile 2  
 Historical Log Profile 3  
 Historical Log Sectors  
 Option Card 1  
 Comm  
 Digital I/O  
 Analog I/O  
 Option Card 2  
 Comm  
 Digital I/O  
 Relay Output and Digital Input  
**Relay Assignments**  
 Digital Input Settings  
 Pulse Output and Digital Input  
 Analog I/O

**Option Card 2: Relay Assignments**

Limit ID	Relay 1	Relay 2
Not Assigned	Not Assigned	Not Assigned
Not Assigned	Not Assigned	Not Assigned
Not Assigned	Not Assigned	Not Assigned
Not Assigned	Not Assigned	Not Assigned
Not Assigned	Not Assigned	Not Assigned
Not Assigned	Not Assigned	Not Assigned
Not Assigned	Not Assigned	Not Assigned
Not Assigned	Not Assigned	Not Assigned

Set Delay(Seconds) 0.0 0.0

Reset Delay(Seconds) 0.0 0.0

Log status change for ☐ Relay 1 ☐ Relay 2

Output Label Relay01\_2 Relay02\_2

Open Label RlyOpen1\_2 RlyOpen2\_2

Closed Label RlyClosed1\_2 RlyClosed2\_2

Accumulation Compression Factor 1 1

Save Profile Load Profile View Report Exit

2. From the Relay Assignments screen, you can:

- Configure up to 8 output conditions for the two Relay Outputs. Note that the Limits used are configured in Power Quality and Alarm Settings>Limits.
- Set a Delay and Reset Delay for the Outputs.

- Choose to log Status Changes for each Relay Output.
- Assign each Output an Output Label, Open Label, and Closed Label, which are used when viewing the Relay Status Log.
- Assign an Accumulation Compression Factor for each output.

**IMPORTANT!** First use the Limits screen to set up the limits you want to assign to an Output. See [8.3.1: Configuring Limits, on page 8-25](#) for instructions.

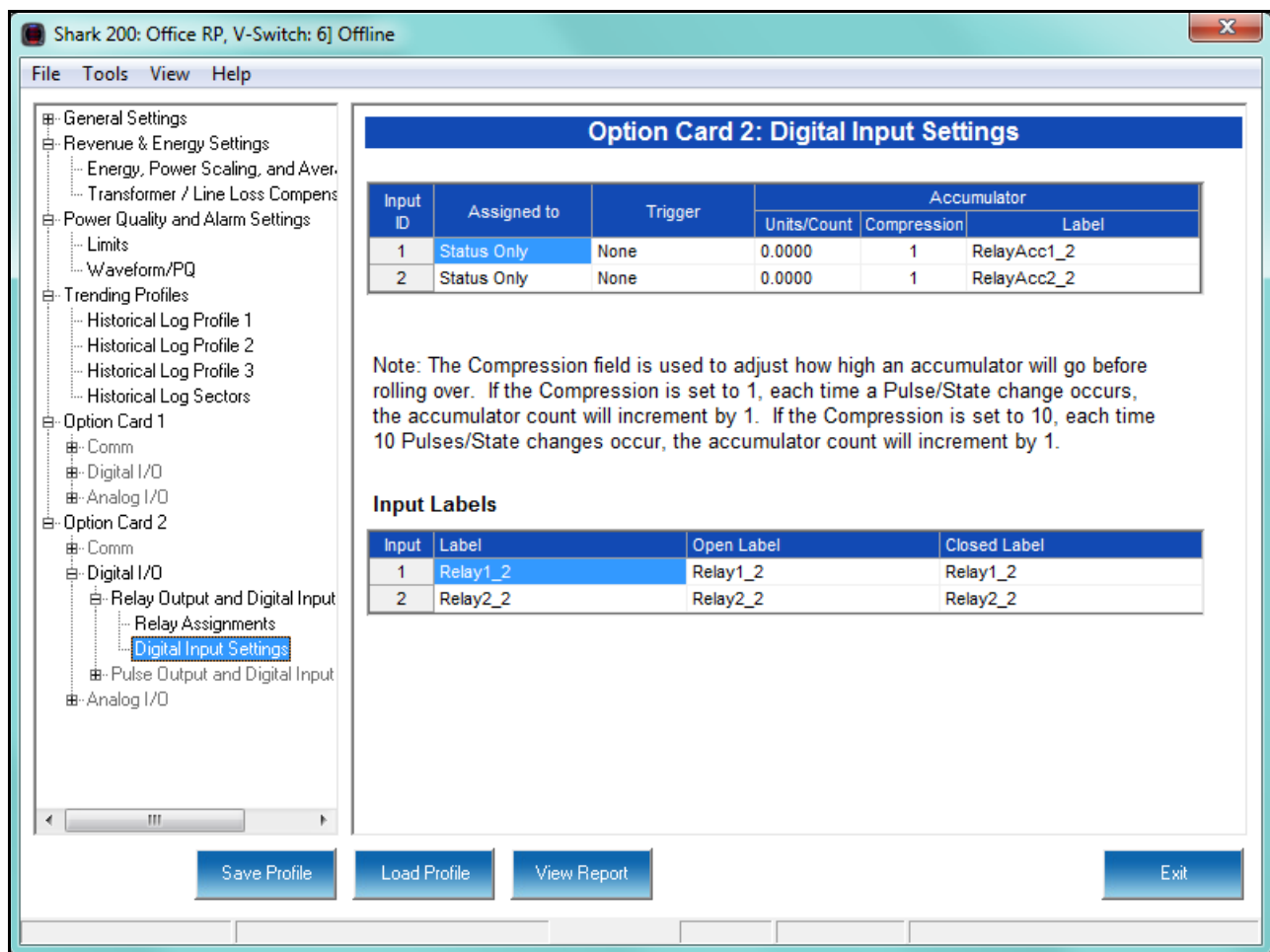
3. The available Limits appear in the Limit ID column. To assign a limit to an Output relay:
  - a. Select the output condition from the pull-down menu next to the Limit ID. The options are: Above Limit (the Output is triggered when the Above Limit condition occurs) and Below Limit (the Output is triggered when the Below Limit condition occurs).
  - b. You can assign the limit to one or both (or neither) of the Relay Outputs.

**NOTE:** A Relay changes its state when any one assigned Limit is tripped, and stays in the Set condition as long as one Limit is in the Alarm state.
4. You can enter Set Delay and/or Reset Delay. These values are the delay before the Output is changed: Set is when the common is shorted to Normal Open (this is the Set Condition), Reset is when the Output is shorted (closed).
5. Check the box next to Log Status Change for if you want to log output status changes for either or both Relay. See Chapter 19 for information on the I/O Change Log.
6. The current Output Labels are displayed in the screen. These labels are used for Logging. To change the Output labels, click in the Labels field you want to change, and enter a new label. The fields that can be changed are:
  - Output Label - Label ID
  - Open Label - Open state ID
  - Closed Label - Closed state ID

7. You can specify an Accumulation Compression Factor. The Compression Factor is used to adjust how high an accumulator will go before rolling over. Because of this, it is useful in delaying rollover. For example, if you select a Compression Factor of 10, each time 10 Pulse/State changes occur, the accumulator count increments by 1. The available Compression Factors are: 1, 10, 100, 1000, 10000, and 100000. The default Compression Factor is 1.

8. To configure the Digital Inputs:

a. From the Option Card menu, click Relay Output and Digital Input>Digital Input Settings. Use this screen to assign labels and functions to the Inputs.



b. Make a selection in the Assigned to field. The available selections are:

- Status Only - select this to use the digital inputs just to indicate if the state is open or closed.

- Accumulator - select this to use the digital input as a pulse counter.
- Digital Input Log - select this to use the digital input to trigger an entry in the I/O change log.
- EOI Pulse - only one Input can be set to receive an EOI pulse.

**NOTES on End of Interval (EOI):**

- EOI is triggered in a device when the programmed condition is met. Only one Option Card input can be set to receive an EOI pulse. EOI is used for the following:
    - As a trigger for demand averaging: the received EOI pulse delineates an interval that results in demand averaging being performed. The minimum interval between received EOI Pulses used to trigger demand averaging should be 5 minutes. An EOI pulse allows the meter to be synchronized with an installed revenue meter, so that both meters are calculating Demand at the same time. When an Input is assigned to EOI, the demand interval is now the time between two received pulses.
    - For historical logging: when the EOI pulse is received, it causes any log that has been configured for EOI Pulse interval to capture a record. Refer to 8.4.1: Configuring Historical Logs, on page 8-31, for additional information on EOI Pulse and logging.
- c. Select Trigger from the pull-down menu. The Trigger you select depends on your Assigned to selection:
- For Status Only, select None.
  - For Accumulator, select from Closing, Opening, High Speed Closing or High Speed Opening.

**NOTE:** Only one accumulator can be assigned to a High Speed Trigger.
  - For Digital Input Log, select Change.
  - For EOI Pulse, select from Closing, Opening, or Change.

- d. Enter Units/Count. The Units/Count is the output ratio from the device that is being input into the Shark® 200 meter. For example, if you have a KYZ module that is outputting a pulse every 1.8 kWh, with the input set to Accumulator, Increment on Contact Opening, you would set the Units/Count to be the value of the KYZ; in this case either 1.8 or a ratio of that number.
- e. Enter Compression. The Compression Factor is used to adjust how high an accumulator will go before rolling over. For example, if you select a Compression Factor of 10, each time 10 Pulse/State changes occur, the accumulator count increments by 1. The available Compression Factors are: 1, 10, 100, 1000, 10000, and 100000. The default Compression Factor is 1.
- f. Enter a Label for the Accumulator.
- g. The current Input Labels are displayed in the screen. To change the Input Labels, click in the Labels field you want to change, and enter a new label. The fields that can be changed are:
  - Input Label - Input ID
  - Open Label - Open state ID
  - Closed Label - Closed state ID

9. To implement any changes to the Relay Output/Digital Input card settings, click the Update Device button to send the new profile to the meter.

### **8.5.3: Configuring a Pulse Output/Digital Input Card**

The Pulse Output/Digital Input card is similar to the Relay Output/Digital Input card except that the card contains 4 pulse output contacts (Form A, closing) instead of relay control outputs. These solid state output contacts can be configured to have the meter pulse out for user-assigned energy values. The Pulse Output/Digital Input Option Card has:

- Four Pulse Outputs via solid state contacts
- Four wet/dry contact sensing digital inputs.

Accumulators in the CommunicatorPQA® software count the pulses of Inputs and Outputs. For technical specifications and hardware installation, refer to the meter's Installation and Operation Manual.

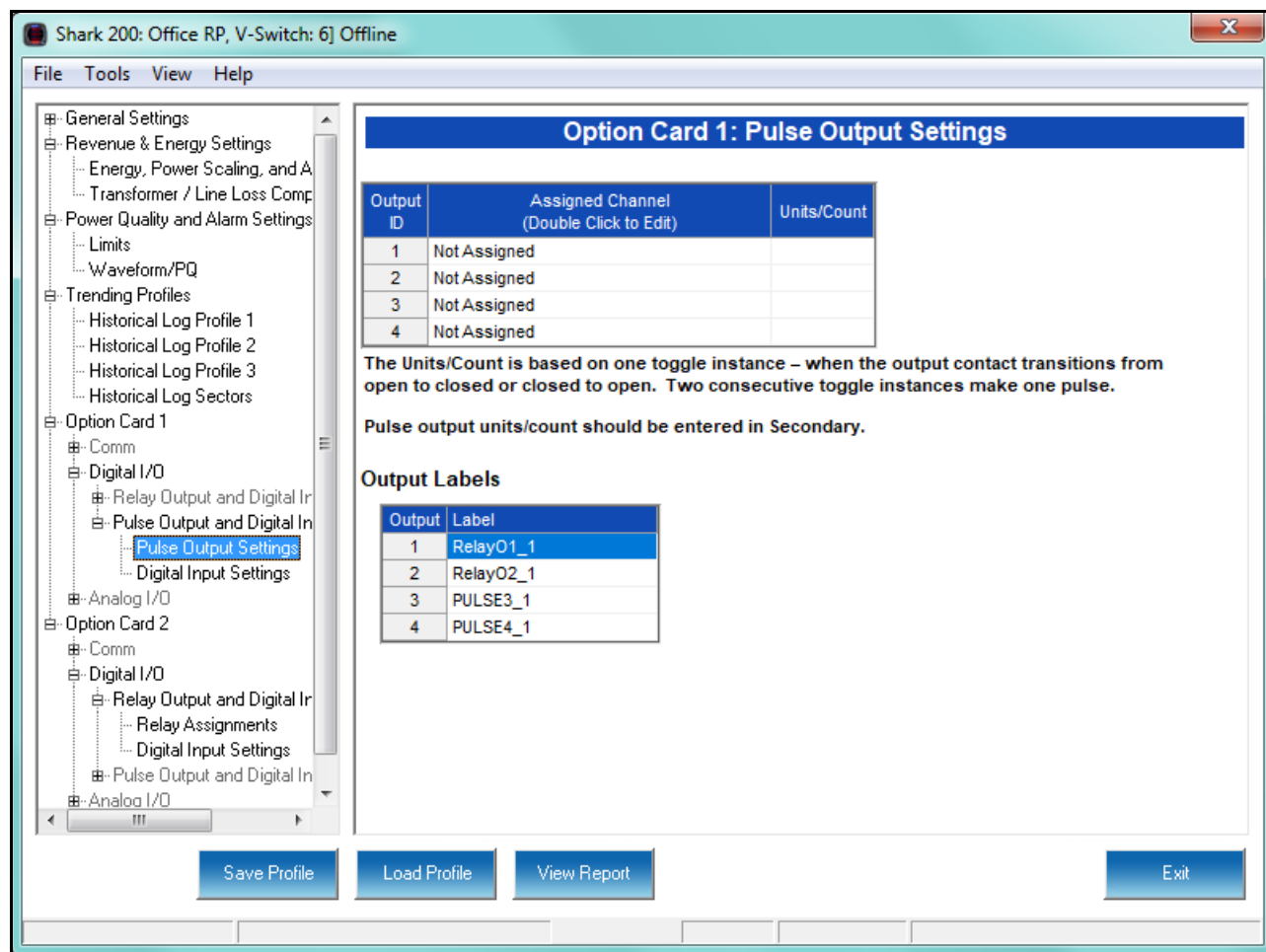
**NOTE:** When installing a Pulse Output/Digital Input card, we recommend you reset the accumulators for the card, in order to prevent erroneous counts. See Chapter 20 for instructions on using the Reset Shark Information screen to reset card accumulators.

**Example:**

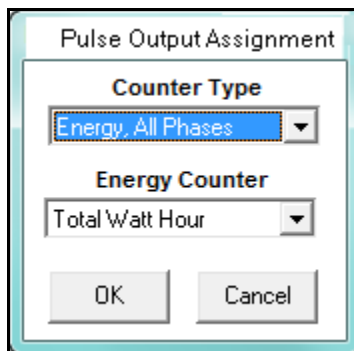
An example use of the Pulse Output/Digital Input Card is in a sub-metering application where a pulse output is needed. The Input Accumulator allows you to count the pulses from another device, for example, a KYZ module or another meter. The Output Accumulators allow you to count the pulses being output by the card.

The Pulse Output and Digital Input Card has two screens for configuration: the Pulse Output Settings screen and the Digital Input Settings screen.

1. From the Option card menu, click Pulse Output and Digital Input>Pulse Output Settings.



2. You can set up to four Output IDs for your Card. Each Output has a Label, an Assigned Channel, and a Unit/Count. Double-click an Assigned Channel field to add or edit an Output ID. You will see the window shown below.



3. Select the Counter Type. The available selections are:



- Energy, All Phases
- End of Interval Event - this counter is triggered by a Demand Averaging Interval
- Energy, Phase A
- Energy, Phase B
- Energy, Phase C
- None.

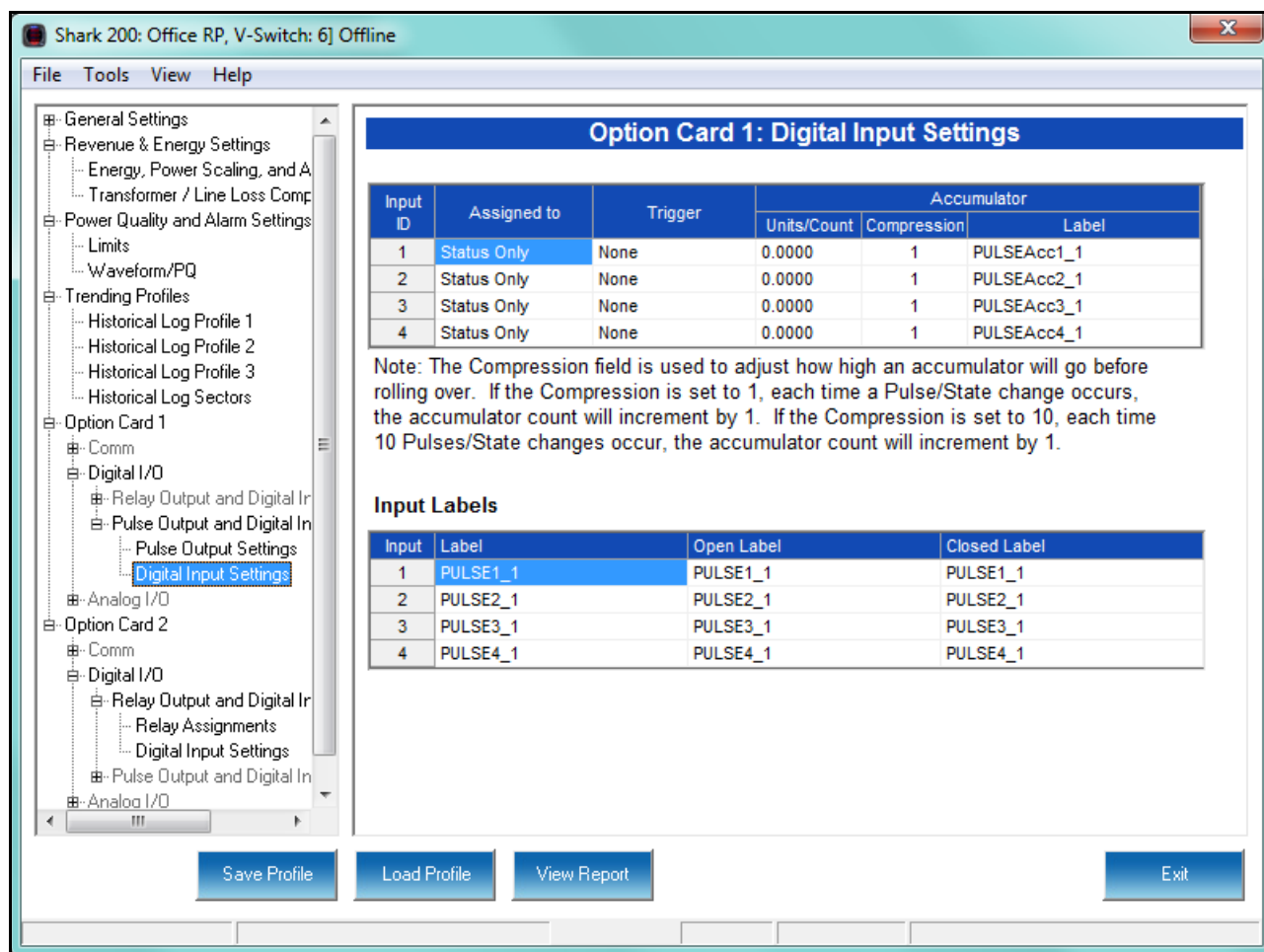
**NOTE:** If you select one of the Energy Counter Types, you will see the Energy Counter field. The available selections are: Total Watt Hour; Positive Watt Hour; Negative Watt Hour; Total VAR Hour; Positive VAR Hour; Negative VAR Hour; VA Hour; Received Watt Hour; Delivered Watt Hour; Inductive VAR Hour; Capacitive VAR Hour.



**IMPORTANT!** The values are based on one toggle instance, when the output changes from open to closed or from closed to open state.

4. Click OK. The Counter Type you selected displays in the Assigned Channel field of the Pulse Output Settings screen.
5. When you select the Assigned Channel, a value is entered for it in the Units/Count field. You can edit this field by double-clicking in it. The Units/Count is determined by the Secondary (the readings in the meter). For example, if you have a three-phase meter with 600 Watts per element, for a total of 1800 Watts, the Units/Count field will be 1.8. That means that every 1.8 Watt-hours, the count will accumulate by 1, and each count will represent 1.8 Watt-hours. If you are using CTs that have a ratio of 1000 to 1, for example, the count will still increment every 1.8 Watt-hours, but the count in that case will represent 1.8 Watt-hours times 1000, or 1800 Watt-hours.
6. The current Output Labels are displayed on the screen. To change the Output labels, click in the Labels field you want to change, and enter a new label.

7. From the Option card menu, click Pulse Output and Digital Input>Digital Input Settings. Use this screen to assign labels and functions to the Inputs



8. Make a selection in the Assigned to field. The available selections are:

- Status Only - select this to use the digital inputs just to indicate if the state is open or closed.
- Accumulator - select this to use the digital input as a pulse counter.
- Digital Input Log - select this to use the digital input to trigger an entry in the I/O change log.

- EOI Pulse - only one Input can be set to receive an EOI pulse.

**NOTES on End of Interval (EOI):**

- EOI is triggered in a device when the programmed condition is met. Only one Option Card input can be set to receive an EOI pulse. EOI is used for the following:
    - As a trigger for demand averaging: the received EOI pulse delineates an interval that results in demand averaging being performed. The minimum interval between received EOI Pulses used to trigger demand averaging should be 5 minutes. An EOI pulse allows the meter to be synchronized with an installed revenue meter, so that both meters are calculating Demand at the same time.
    - For historical logging: when the EOI pulse is received, it causes any log that has been configured for EOI Pulse interval to capture a record. Refer to 8.4.1: Configuring Historical Logs, on page 8-31, for additional information on EOI Pulse and logging.
9. Select Trigger from the pull-down menu. The Trigger you select depends on your Assigned to selection:
- For Status Only, select None.
  - For Accumulator, select from Closing, Opening, High Speed Closing or High Speed Opening.

**NOTES:**

- Only one accumulator can be assigned to a High Speed Trigger.
- High speed opening and closing would be used when monitoring pulses from water meters that can be pulsing very quickly.
- For Digital Input Log, select Change.
- For EOI Pulse, select from Closing, Opening, or Change.

10. Enter Units/Count. The Units/Count is the output ratio from the device that is being input into the Shark® 200 meter. For example, if you have a KYZ module that is outputting a pulse every 1.8 kWh, with the input set to Accumulator, Increment on Contact Opening, you would set the Units/Count to be the value of the KYZ; in this case either 1.8 or a ratio of that number.
11. Enter Compression. The Compression Factor is a divider used to adjust how high an accumulator will go before rolling over. For example, if you select a Compression Factor of 10, each time 10 Pulse/State changes occur, the accumulator count increments by 1. The available Compression Factors are: 1, 10, 100, 1000, 10000, and 100000. The default Compression Factor is 1.
12. Enter a Label for the Accumulator.
13. The current Input Labels are displayed in the screen. To change the Input Labels, click in the Labels field you want to change, and enter a new label. The fields that can be changed are:
  - Input Label - Input ID
  - Open Label - Open state ID
  - Closed Label - Closed state ID
14. To implement any changes to the Pulse Output/Digital Input card settings, click the Update Device button to send the new profile to the meter.

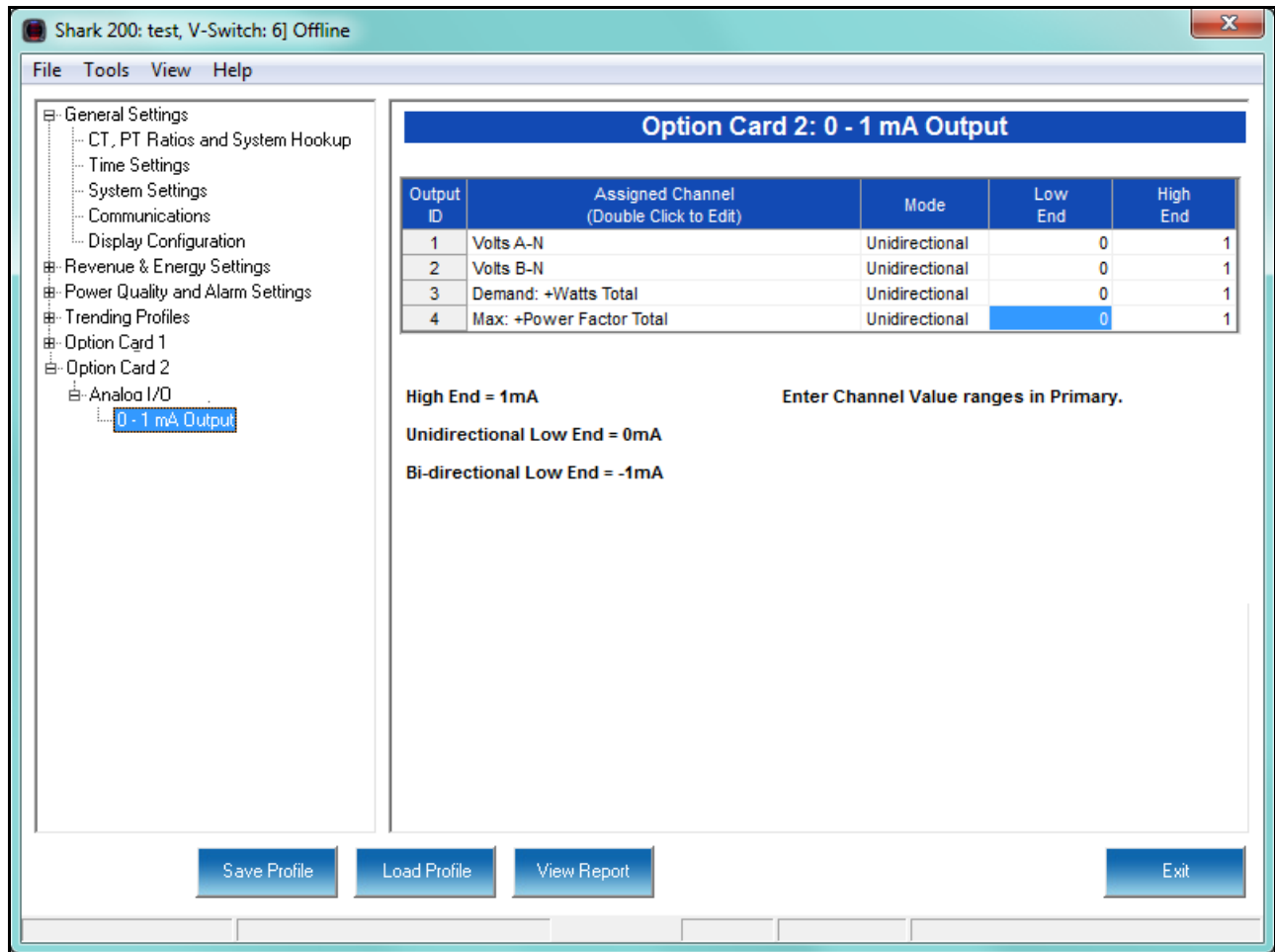
#### **8.5.4: Configuring a 0-1 mA Output Card**

The 0-1mA Output Option Card is an analog output card, which transmits a standard, bidirectional 0-1 milliamp signal proportional to the value selected. This card mimics an analog transducer. With the Shark® design, the user can select any measured parameter to output on an analog transducer signal. For technical specifications and hardware installation, refer to the meter's Installation and Operation Manual.

##### **Example:**

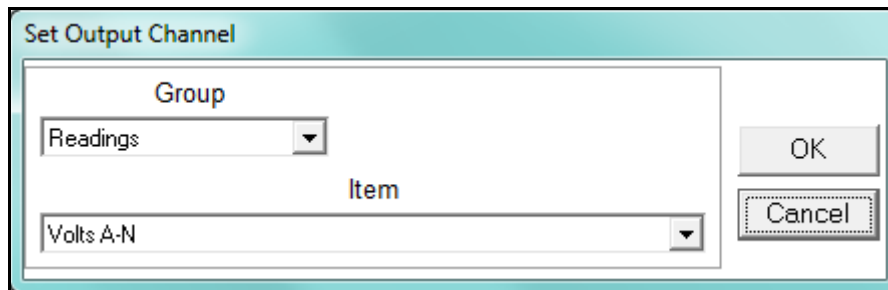
An example use of the optional 0-1mA Output Card is in enabling the Shark® 200 meter to communicate with an RTU.

1. From the Option card menu, click Analog I/O>0-1 mA Output.



You can set up to four Output IDs for your Output Card.

2. Double-click an Assigned Channel field to add or edit an Output ID. You will see the window shown below.



3. Select Group for your Output Channel. The available selections are as follows:

- Readings

- Demand
  - MAXimums
  - Minimums
  - Phase Angles
  - THD
  - Energy
4. Select Item for your Output Channel. The items are the available readings for the group you selected. For example, as shown in the window above, Volts A-N is an item you can select when you have selected Readings as the Group.
  5. Click OK. The Output Channel you selected is displayed in the Assigned Channel field.
  6. Enter Low End and High End for the channel.

**NOTE:** For the Item selected for the Assigned Channel, the Output Card takes the value in the meter and outputs a DC current within its range. The Low End is the lowest value, and the High End is the highest value. For example, for VOLTS A-N and Bidirectional Mode, at Nominal of 120V, the Low End is set to 115V and the High End is set to 125V. The Analog Output Card will output -1 mA when the reading is 115V, 0 mA when the reading is 120V, and 1 mA when the reading is 125V. The analog card can output below -1mA and above +1mA, proportionally to VOLTS A-N. For limiting values refer to the meter's Installation and Operation Manual's applicable section.
  7. You can select either Unidirectional or Bidirectional for Mode. Unidirectional mode is used for unsigned data, e.g., voltage; and bi-directional mode is used with signed data, e.g., Watts.
  8. To implement any changes to the 0-1mA Output card settings, click the Update Device button to send the new profile to the meter.

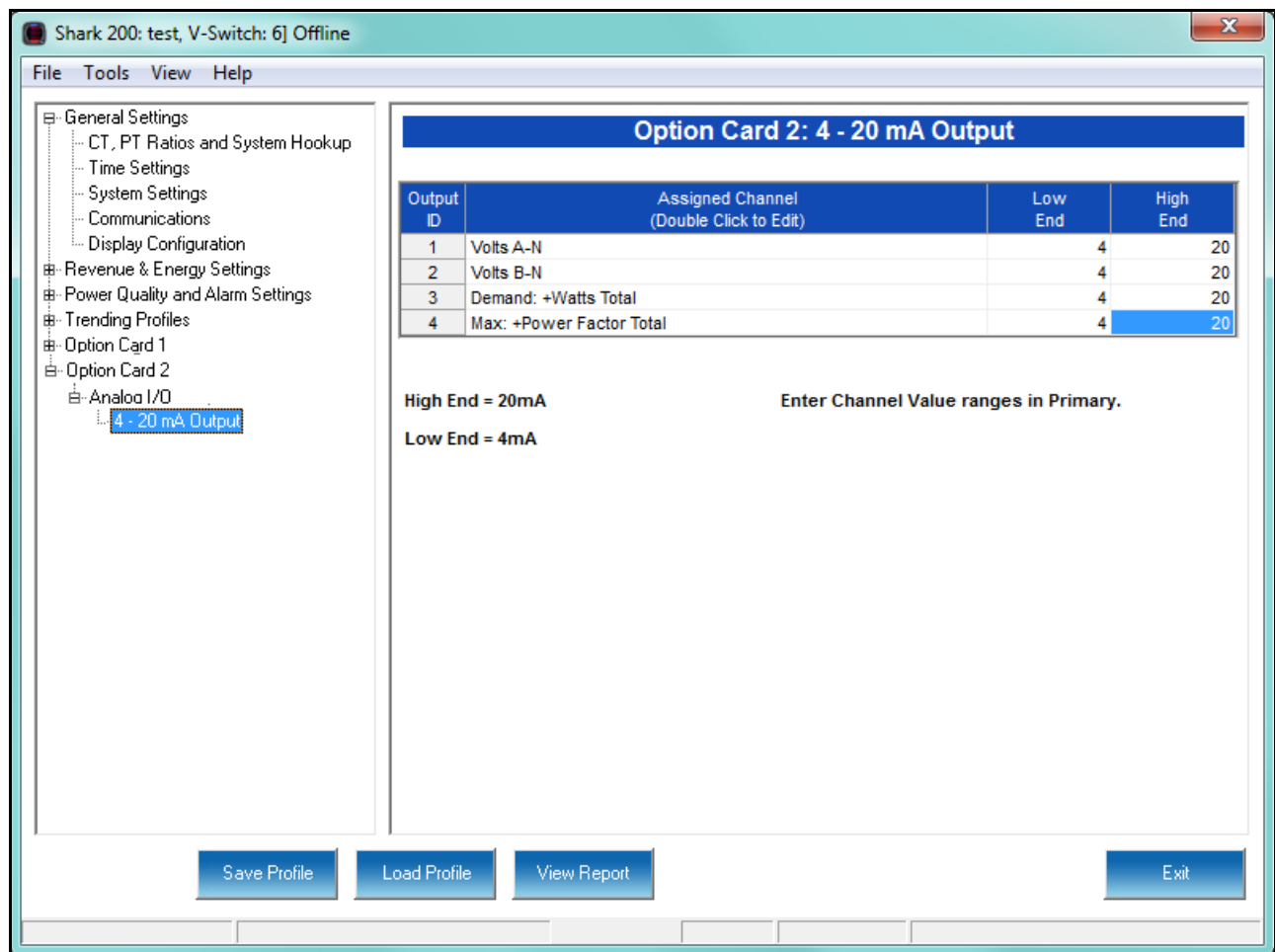
### 8.5.5: Configuring a 4-20 mA Output Card

The 4-20mA Output Option Card is an analog communication card, which transmits a standard, unidirectional 4-20 milliamp signal. For technical specifications and hardware installation, refer to the meter's Installation and Operation Manual.

#### Example:

An example use of the optional 4-20mA Output Card is in enabling the Shark® 200/200S meter to communicate with an RTU.

1. From the Option card menu, click Analog I/O>4-20mA Output.



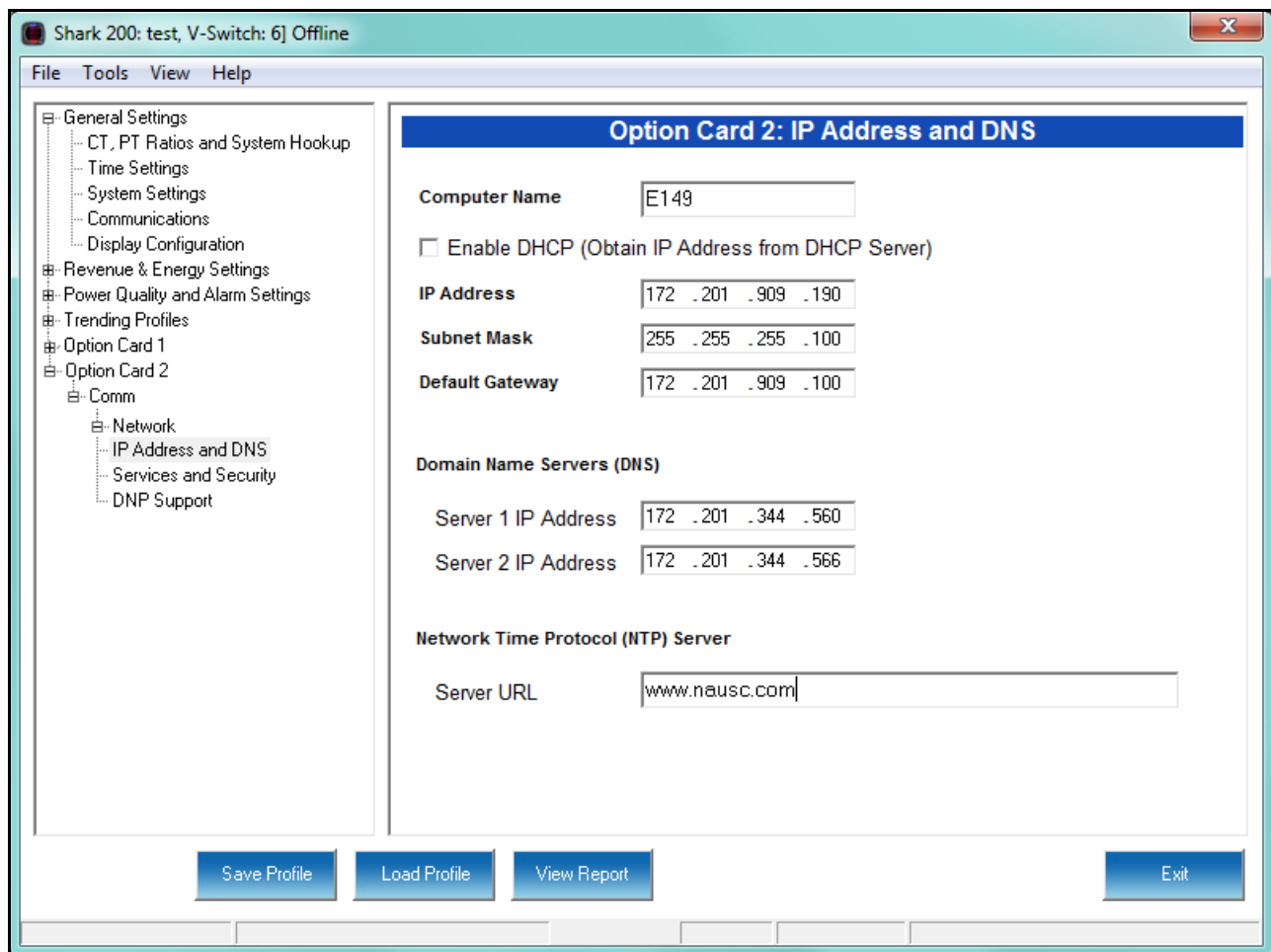
2. Follow the instructions for configuring the 0-1 mA Card. The configuration of a 4-20 mA Card is the same as a 0-1 mA Card, except that this card can only be unidirectional, so there is no Mode setting.

### 8.5.6: Configuring a Network Card

The optional Network Card (INP100S) enables 10/100BaseT Ethernet communications. It also acts as a Web server, allowing the meter's data to be viewed on a standard web browser. For technical specifications, hardware installation, and additional information on the Web server, refer to the meter's Installation and Operation Manual.

**NOTE:** For information on configuring the Shark® 200S meter's WiFi settings, see the *Shark® 200S Meter Installation and Operation Manual*.

1. From the Option Card menu, click Comm>Network>IP Address and DNS. You will see the screen shown below. It allows you to configure the IP Address, DNS, and Network Time Protocol Server for the card.





## 2. Enter the following information:

- Computer Name: Either click the DHCP box to enable a DHCP server to assign the IP address for your network card or enter the following for the network card:
  - IP Address
  - Subnet Mask
  - Default Gateway

**NOTE:** If no mask is entered (blank) or 0.0.0.0 is used, the network card will use an automatic mask based on the network address class, or will not apply a mask, according to the following table:

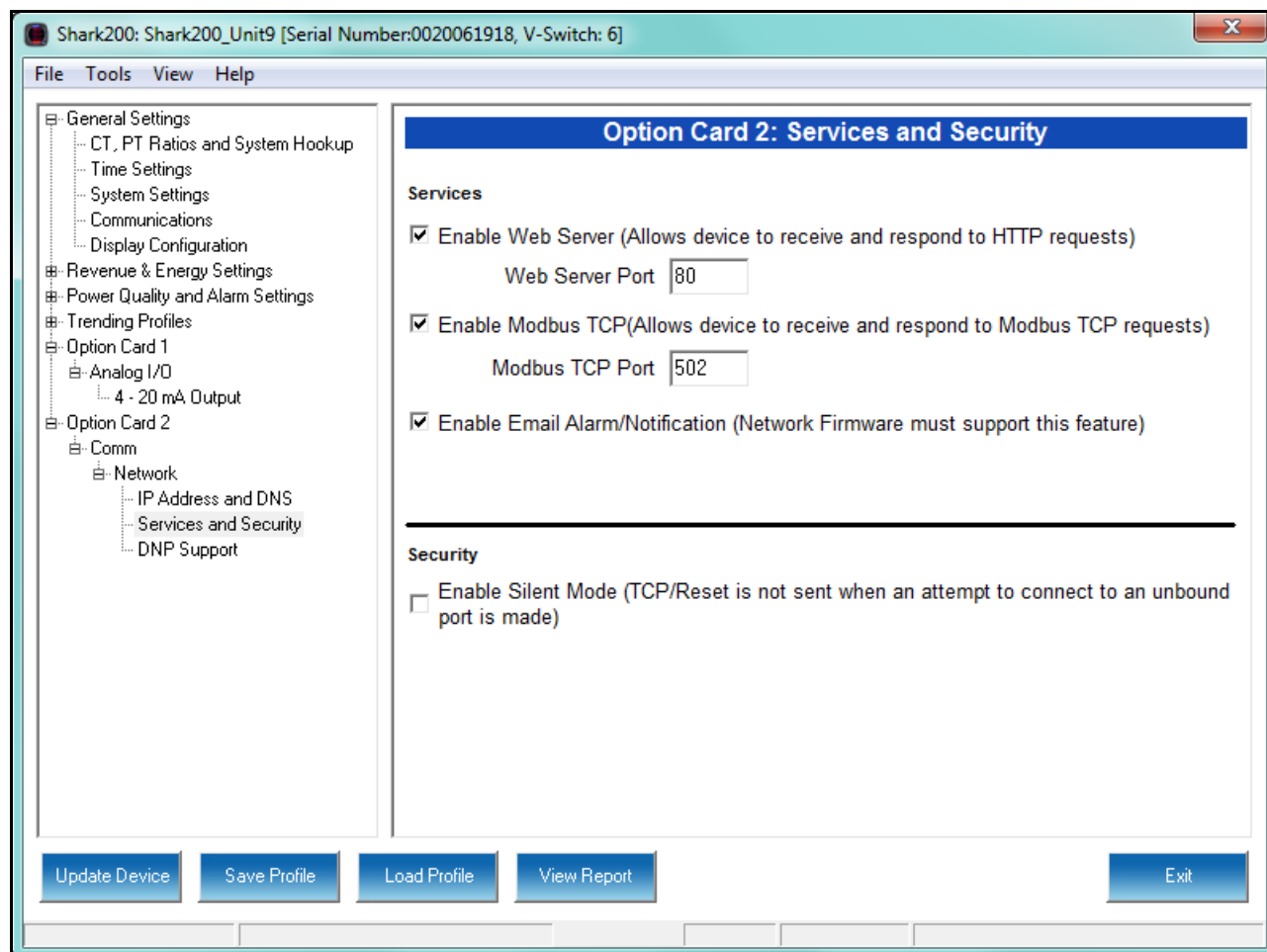
Network Class	Address range	Mask used
Class A	1.0.0.0-127.x.x.x	255.0.0.0
Class B	128.0.0.0-191.x.x.x	255.255.0.0
Class C	192.0.0.0-223.x.x.x	255.255.255.0
Other classes	No masking will be applied	

- Domain Name Server Address(es)
- URL address of a Network Time Protocol server if you are using one.
 

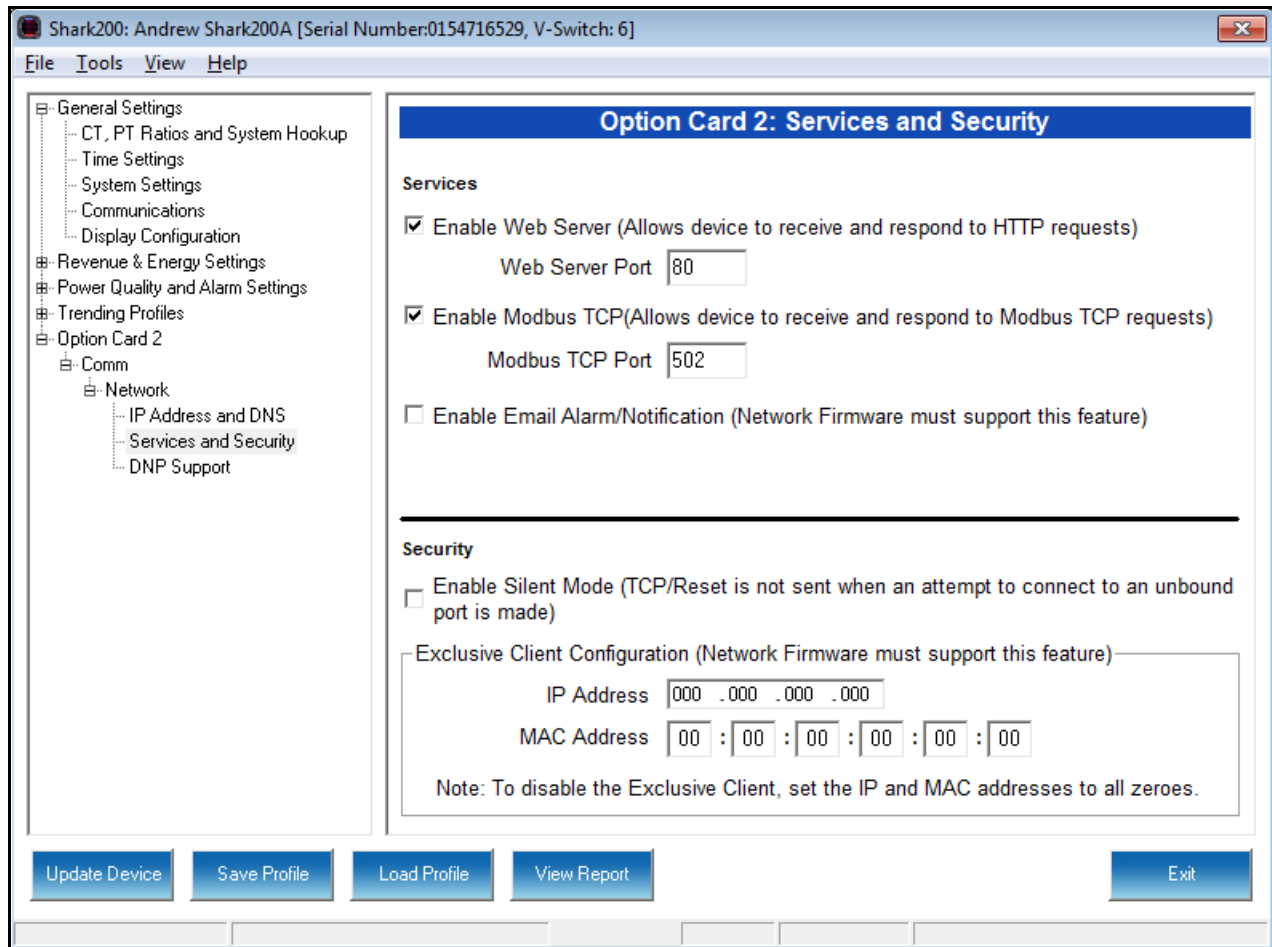
**NOTE:** The Network Time Protocol server is used for clock synchronization. It can be either a device with a real-time clock that is networked with your meter, or an NTP server on the Internet.

**IMPORTANT!** You must also enable Clock Synchronization in the Time Settings screen (see [8.1.2: Configuring Time Settings, on page 8-5](#)).

3. From the Option Card menu, click Comm>Network>Services & Security. You will see the screen shown below if your Network card's Firmware version is 3.42 or lower.



If your Network card's Firmware version is 3.43 or higher, you will see the screen shown below:



4. This screen allows you to disable certain features of the meter's Ethernet connection, for security purposes:

- The HTTP Web Server can be disabled, or its default port can be changed.
- The Modbus TCP server can be shut down, or its default port can be changed.
- The Alarm Email and Notification feature of the Network card can be disabled. Note that the network card's firmware must support alarm and notification email for this feature to be available. The settings for the alarm/notification email feature are made using the card's Web server. See the *Shark 200 Meter Installation and Operation Manual* for instructions.
- If the port entered is less than "10," the standard port is used: 80 for Web Server and 502 for Modbus TCP Server.

- To disable one of the servers, uncheck the box next to it.
- When the Security feature "Silent Mode" is enabled, the meter will totally ignore incoming connections, in such a way that not even TCP/IP Reset packets will be sent. When "Silent Mode" is disabled, the meter follows standard TCP/IP procedures for incoming connections to unused ports. This feature is useful in preventing hacking (attempted security intrusions).
- Network Firmware version 3.43 and higher than CommunicatorPQA® software version 4.0.249 support the Exclusive Client feature. This feature lets you Whitelist an IP and/or MAC address. When that address is used to connect to the meter, all other network communication with the meter, through the same Network card, is suspended. This ensures that anything being done, e.g., updating programmable settings, while the Whitelist address is being used to communicate with the meter, is secure.
  - Enter the IP address or MAC address you want to establish as the Exclusive Client.  
**NOTE:** To disable the exclusive Client feature, set the IP address and MAC address to all zeros.

**NOTES:**

- If you do not know this information, contact your Systems Administrator.
- See Chapter 25 for instructions on updating the Network card's firmware.

5. From the Option Card menu, click Comm>Network>DNP Support if you want to set up DNP over Ethernet for the Network Card. You will see the screen shown below.

Shark 200: The Meter Designation is Not Configured, V-Switch:: 6] Offline

File Tools View Help

General Settings  
 CT, PT Ratios and System Hookup  
 Time Settings  
 System Settings  
 Communications  
 Display Configuration  
 Revenue & Energy Settings  
 Power Quality and Alarm Settings  
 Trending Profiles  
 Option Card 1  
 Comm  
 Digital I/O  
 Analog I/O  
 0 - 1 mA Output  
 4 - 20 mA Output  
 Option Card 2  
 Comm  
 Fiber Optic  
 Network  
 IP Address and DNS  
 Services and Security  
 DNP Support  
 Digital I/O  
 Analog I/O

### Option Card 2: DNP Support

☐ Enable DNP Support

DNP Server Port

DNP Device Address

IP Address Start

IP Address End

TCP/IP Port Start

TCP/IP Port End

Note:

1. Valid range for Server Port, TCP/IP Port Start and End is from 10 to 65534
2. Valid range for IP addresses is from 0.0.0.0 to 255.255.255.255.
3. IP Address Start must be lower or equal to the End.

Save Profile Load Profile View Report Exit

This screen lets you set up a DNP Server gateway for the Network Option card. This gateway enables DNP3 protocol communication over Ethernet, for the meter.

6. Make the following settings:

- a. Enable DNP Support: by default the DNP server support is disabled. Check the box to enable it. Once it is enabled, the other parameters can be entered.
- b. DNP Server Port: this is the TCP/IP port where the meter's Network card unit will be listening for incoming connections via the DNP protocol. Valid numbers are from 1 to 65535. We recommend that you set a value over 1024, because most of the lower numbers are reserved, or are already allocated to other popular services. If you set a port number of less than 10, the network card will set the port to its default, which is 20000.
- c. DNP Device Address: this is the meter's configured address; currently, this setting should be 1.
- d. IP Address Start/End: this setting implements Internet security by letting you specify a range of IP addresses that are authorized to connect to the DNP port. Any requester with an IP address outside of this range will be rejected. Enter the range in the start and end fields. To disable the IP range restriction, write 0.0.0.0 in the start field and 255.255.255.255 in the end field.  
  
An example of a range is 172.20.167.100 in the start field and 172.20.167.150 in the end field. That would authorize connection to the DNP port for any IP address from 172.20.167.100 up to and including 172.20.167.150.
- e. IP Port Start/End: you can also use this setting to implement Internet security by through specifying a range of authorized port addresses. Any requester originating the connection from a port outside of this range will be rejected. Enter the range in the start and end fields (valid port ranges are from 1 to 65535). To disable the port range restriction, use 0 in either the start or the end field.

7. To implement any changes to the Network card settings, click the Update Device button to send the new profile to the meter.

### 8.5.7: Configuring an IEC 61850 Network Card

The optional IEC 61850 Network Card (INP300S) enables both 10/100BaseT Ethernet communication and communication in an IEC 61850 substation automation application. It also acts as a Web server, allowing the meter's data to be viewed on a standard web browser. For technical specifications, hardware installation, and additional information on the Web server, refer to the meter's Installation and Operation Manual.

1. From the Option Card menu, click Comm>Network>IP Address and DNS. You will see the screen shown below. It allows you to configure the IP Address, DNS, and Network Time Protocol Server for the card.

The screenshot shows a software window titled "Shark 200: test, V-Switch: 6] Offline". The window has a menu bar with "File", "Tools", "View", and "Help". On the left is a tree view of settings categories. The main area is titled "Option Card 2: IP Address and DNS" and contains the following configuration fields:

- Computer Name:** E149
- ☐ Enable DHCP (Obtain IP Address from DHCP Server)
- IP Address:** 172 . 201 . 909 . 190
- Subnet Mask:** 255 . 255 . 255 . 100
- Default Gateway:** 172 . 201 . 909 . 100
- Domain Name Servers (DNS):**
  - Server 1 IP Address: 172 . 201 . 344 . 560
  - Server 2 IP Address: 172 . 201 . 344 . 566
- Network Time Protocol (NTP) Server:**
  - Server URL: www.nausc.com

At the bottom of the window are four buttons: "Save Profile", "Load Profile", "View Report", and "Exit".

## 2. Enter the following information:

- Computer Name: Either click the DHCP box to enable a DHCP server to assign the IP address for your network card or enter the following for the network card:
  - IP Address
  - Subnet Mask
  - Default Gateway

**NOTE:** If no mask is entered (blank) or 0.0.0.0 is used, the network card will use an automatic mask based on the network address class, or will not apply a mask, according to the following table:

Network Class	Address range	Mask used
Class A	1.0.0.0-127.x.x.x	255.0.0.0
Class B	128.0.0.0-191.x.x.x	255.255.0.0
Class C	192.0.0.0-223.x.x.x	255.255.255.0
Other classes		No masking will be applied

- Domain Name Server Address(es)
- URL address of a Network Time Protocol server if you are using one.

**NOTE:** The Network Time Protocol server is used for clock synchronization. It can be either a device with a real-time clock that is networked with your meter, or an NTP server on the Internet.

**IMPORTANT!** You must also enable Clock Synchronization in the Time Settings screen (see [8.1.2: Configuring Time Settings, on page 8-5](#)).



3. From the Option Card menu, click Comm>Network>Services & Security. You will see the screen shown below.

Shark 200: The Meter Designation is Not Configured, V-Switch:: 6j Offline

File Tools View Help

**Option Card 2: Services and Security**

**Services**

- ☒ Enable Web Server (Allows device to receive and respond to HTTP requests)  
Web Server Port
- ☒ Enable Modbus TCP (Allows device to receive and respond to Modbus TCP requests)  
Modbus TCP Port
- ☒ Enable IEC-61850 Server (Network Firmware must support this feature)  
☐ Represent all Energy Values as Positive  
This feature is only supported with network card firmware 3.46 or greater

---

**Security**

- ☐ Enable Silent Mode (TCP/Reset is not sent when an attempt to connect to an unbound port is made)

**Exclusive Client Configuration (Network Firmware must support this feature)**

IP Address  .  .  .

MAC Address  :  :  :  :  :

Note: To disable the Exclusive Client, set the IP and MAC addresses to all zeroes.

Save Profile Load Profile View Report Exit

This screen allows you to enable/disable certain features of the meter's Ethernet connection, for security purposes:

- The HTTP Web Server can be disabled, or its default port can be changed.
- The Modbus TCP server can be shut down, or its default port can be changed.
- To enable IEC 61850 protocol communication, make sure that option is checked. If you want all energy values to be represented as positive, check that box as well.
- To disable one of the servers, uncheck the box next to it.
- When the Security feature "Silent Mode" is enabled, the meter will totally ignore incoming connections, in such a way that not even TCP/IP Reset packets will be sent. When "Silent Mode" is disabled, the meter follows standard TCP/IP proce-

dures for incoming connections to unused ports. This feature is useful in preventing hacking (attempted security intrusions).

3. To implement any changes to the Network card settings, click the Update Device button to send the new profile to the meter.

## 9: Shark® 100/100B/100S/50 Meter

This chapter explains how to configure a Shark® 100/100B/100S/50 meter's programmable settings, which are stored in the unit's Device Profile. Chapter 7 contains detailed information on how to use the Device Profile.

### 9.1: Device Profile Settings

All of the Shark® 100/100B/100S/50 meter's Device Profile settings are accessed from the tabs at the top of the Device Profile screen.

**Shark 100 Profile**

Scaling | Energy And Display | Communication | Settings | Limits

**CT, PT Ratios and System Wiring**

CT Numerator (Primary)	<input type="text" value="5"/>	< Update CT	<input type="text" value="1"/>
CT Denominator (Secondary)	<input type="text" value="5"/>	Update Ratio >	<input type="text" value="1"/>
CT Multiplier	<input type="text" value="1"/>		
CT Fullscale	<b>5.000 amps</b>		
PT Numerator (Primary)	<input type="text" value="120"/>	< Update PT	<input type="text" value="1"/>
PT Denominator (Secondary)	<input type="text" value="120"/>	Update Ratio >	<input type="text" value="1"/>
PT Multiplier	<input type="text" value="1"/>		
PT Fullscale	<b>120.0 volts</b>		
System Wiring	<input type="text" value="3 element wye"/>		
Phases Displayed	<input type="text" value="ABC"/>		

Update Cancel Load Save Report Help

### 9.1.1: Configuring Scaling Settings

The first screen you see is the CT, PT Ratios and System Wiring screen, shown on the previous page (to return to this screen from another screen, click the Scaling tab). Use this setting to configure Current Transformer and Potential Transformer ratios and to select the System Hookup.

#### Functional Overview of CT and PT Ratios:

Current and Potential Transformers are used mainly for the following reasons:

- To insulate, and as a result isolate, the meter from high-voltage circuits.
- To change the primary voltage and current to standard values and sizes that the meter can measure.

The CT and PT transformers deliver fractions of the primary voltage and current to the meter. With properly set ratios and multipliers, the readings of the meter can be used to determine the energy, voltage, current, or power of the system.

to determine the energy, voltage, current, or power of the system.

**IMPORTANT!** You have two options for entering the CT and PT settings. You can either enter CT/PT Numerator, Denominator, and Multiplier manually (see instructions below), or you can enter the Ratios for CT/PT Numerator and Denominator and click the Update CT/Update PT buttons to let the software calculate the Numerator, Denominator, and Multiplier for you. You can then empty the Ratio fields and click the Update Ratio buttons to confirm the calculated settings: you will see the same ratios you initially entered.

**NOTE:** Some ratios cannot be represented in the Shark® 100 meter. The software will try to find the closest value, in that case.

1. For manual entry, make these settings:

- CT Ratios
  - CT Numerator (Primary): 1 - 9999
  - CT Denominator (Secondary): 5 or 1 Amp

**NOTE:** This field is display only. The meter is ordered as a 5 Amp or 1 Amp Current Secondary.

- EITHER CT Multiplier (Scaling): 1, 10 or 100  
Multiplies the CT Numerator by this scale. The display can only read 4 digits, or 9999. Above that range the number must be multiplied to have it read K or M values.
- OR Ratio: the ratio to be applied, and click Update CT
- Current Full Scale: Display only
- PT Ratios
  - PT Numerator (Primary): 1 - 9999
  - PT Denominator (Secondary): 1 - 9999
  - PT Multiplier (Scaling): 1, 10, 100, or 1000
  - Voltage Full Scale: Display only
- System Wiring
  - 3 Element Wye; 2.5 Element Wye; 2 CT Delta  
This value must be set properly for the meter to calculate readings correctly.
- Phases Displayed - this field determines which phases display on the faceplate.  
For example, if you select AB, only those two phases will be displayed on the faceplate.
  - ABC; A; AB

Example Settings:

For a CT of 2000/5A, set the following CT Ratios in the entry fields:

CT Numerator (Primary)            2000

CT Denominator (Secondary)    5

CT Multiplier                        1

The Current Full Scale field will read 2000.

For a system that has 14400V primary with a 120V secondary line to neutral (PT Ratio of 120:1), set the following PT Ratios in the entry fields:

PT Numerator (Primary) 1440

PT Denominator (Secondary) 120

PT Multiplier 10

The Voltage Full Scale field will read 14.4k.

2. To implement any changes, click the Update button to send the new profile to the meter.

### 9.1.2: Configuring Energy and Display Settings

Use this setting to configure:

- The display and storage of Energy registers in the meter
- The display of Power data in the meter
- The interval over which Average values are computed, as well as the Interval Energy
- Auto Scrolling and Display Configuration

#### Functional Overview of Energy Settings and Averaging:

- **Energy Scaling**

Energy Setting includes:

Digits (the number of digits in the reading)

Decimals (the number of decimal places in the reading)

Energy Scale: the scale of the reading - unit; kilo (number times 1000); Mega (number times 1 million)

Energy settings allow you to balance the resolution (or accuracy) of the energy stored, with the interval over which energy rollover occurs. For example, the maximum resolution for a k scale reading is: 99999.999k.

To calculate the speed at which the energy will rollover, you must know the Power Full Scale, which is computed from the CT and PT Full Scale values (see Section 5.3.3.1). The formula for calculating Power Full Scale is:

Wye system:  $CT \text{ Full Scale} \times PT \text{ Full Scale} \times 3$

Delta system:  $CT \text{ Full Scale} \times PT \text{ Full Scale} \times 3 \times \sqrt{3}$

For example, for a CT Full Scale of 2000, PT Full Scale of 14400, Wye system:

$2000 \times 14400 \times 3 = 86400000$

In this example, the energy will increment at 86400000 Watts per hour, or 24000 Watts per second.

This value allows you to determine the number of digits, decimal places, and energy scale you want to configure for the Energy settings, when you take into account the rollover time.

To determine the number of hours before rollover, use this formula:

$[Max \text{ Resolution}] / [Full \text{ Scale}] = \#Hours$ , where Max Resolution = maximum digits and decimals for the Energy scale in use.

Using the example from above, with an energy scale of Mega, the formula would be:

$99999.999 \text{ M} / 86.4 \text{ M} = 1157.4074$  hours or about 48 days until rollover.

**NOTE:** To increase the number of days until rollover, you can increase the number of digits (to 8), decrease the number of decimal places (to 0), or increase the Energy Scale (to M).

- **Demand Averaging**

Demand is the average rate of energy use over time. The Shark® meter supports two types of demand averaging: Block demand and Rolling demand.

Block demand records the average demand for time intervals that you define (usually 5, 15 or 30 minutes).

Rolling demand functions like multiple, overlapping Block demands. You define the subintervals at which an average of demand is calculated. An example of Rolling demand would be a 15-minute Demand block using 5-minute subintervals, thus providing a new demand reading every 5 minutes, based on the last 15 minutes.

1. From the Device Profile screen, click the Energy and Display tab.

**Shark 100 Profile**

Scaling | **Energy And Display** | Communication | Settings | Limits

**Power and Energy Format**

Power Scale: auto

Power Direction: view as load

Energy Decimal Places: 0

Energy Scale: kilo (k)

Example: 12345678k **Recalculate**

Energy Digits: 8

**Demand Averaging**

Averaging Method: Block

Interval(Minutes): 15

Sub Interval: 1

**Auto Scroll Display**

☒ On

**Display Configuration**

☒ Volts L-N ☒ VA/Hz

☒ Volts L-L ☒ Wh

☒ Amps ☒ VARh

☒ W/VAR/PF ☒ VAh

Update Cancel Load Save Report Help

2. This screen displays the current settings for Power and Energy Format, Demand Averaging, Auto Scrolling and Display Configuration. The screen fields and acceptable entries are as follows:

- Power and Energy Format
  - Power Scale: Unit, kilo (k), Mega (M), Auto
  - Power Direction: View as Load or View as Generator; this controls how energy is accumulated in the Shark® meter. View as Load means the energy readings are accumulated as Whrs Received, View as Generator means the energy readings are accumulated as Whrs Delivered.
  - Energy Decimal Places: 0 - 6
  - Energy Scale: Unit, kilo (k), Mega (M)
  - Example: Shows an example with the selected settings applied. Click the Recalculate button if you make changes and want to see an example.



- Energy Digits: 5, 6, 7, 8

**NOTES:**

- The Energy Digits, Scale and Decimal Places settings determine how energy values are displayed. Refer to the Functional Overview at the beginning of this section for more information.
- If invalid values are entered, you will see the following warning message: "Warning: Current CT, PT and Energy Settings may cause invalid energy accumulator values." Once you correct the values and click the Recalculate button, this message goes away.  
**NOTE:** Typically, this means that the energy rollover point is too low. Try increasing the number of energy digits, or changing to a higher scale.
- If you are changing the energy digits, decimal places, or energy scale, we recommend you first reset the Energy Accumulators, in order to prevent erroneous counts. See Chapter 20 for instructions on resetting the Shark® meter's Energy Accumulators.
- Demand Averaging (Refer to the Functional Overview at the beginning of this section for more information.)
  - Average Method: Block or Rolling;
  - Interval: 5, 15, 30 or 60 Minutes
  - Subinterval: 1, 2, 3 or 4  
**NOTE:** Block Average cannot have a Subinterval.
- Auto Scroll Display
  - Click the checkbox to turn auto-scrolling On and Off. Auto-scrolling controls the display of selected parameters on the meter's faceplate. Refer to the meter's Meter Installation and Operations Manual for more information.
- Display Configuration
  - Some users may want to lock the meter to a particular faceplate display or series of displays. For example, if you would like the meter to act only

as a Volt meter, or only as an ammeter, the meter can be configured to display only the relevant screen. Use this setting to lock the display of the meter's faceplate to the specific combination you want. Refer to the meter's Installation and Operation Manual for additional information on the faceplate.

- Check the boxes of the Readings you want displayed on the faceplate of the meter. If you make no selection, Amps are displayed by default.

**NOTE:** The Auto Scroll Display and Display Configuration settings can be ignored for the Shark®100T/100BT transducer, since it doesn't have a display.

3. To implement any changes, click the Update button to send the new profile to the meter.

### 9.1.3: Configuring Communications Settings

Use this screen to enter communication settings for the meter's two on-board ports: the IrDA Port (COM 1) and RS485 Port (COM 2). Note that the Shark® 50 meter has an RS485 port, but no IrDA port, and the Shark® 100B meter has an IrDA port, but no RS485 port. The Shark® 100 and 100S meters have both the IrDA port and the RS485 port.

**IMPORTANT!** The settings on this screen are the current settings for communication. Any changes you make may affect communication between the Shark® meter and your PC.

1. From the Device Profile menu, click the Communications tab.

**Shark 100 Profile**

Scaling | Energy And Display | **Communication** | Settings | Limits

**Communication Settings**

**COM1 (IrDA)**

Response Delay (msec) 0

**COM2 (RS485)**

Address 1

Protocol Modbus RTU

Baud Rate 57600

Response Delay (msec) 0

Set COM2 to default

Update Cancel Load Save Report Help

2. The screen fields and acceptable entries are as follows:

- COM 1 (IrDA)
    - Response Delay: 0 - 750 (50msec increments)
  - COM 2 (RS-485)
    - Address: 1 - 247 (Modbus); 1-65520 (DNP)
    - Protocol: Modbus RTU, Modbus ASCII or DNP3 (DNP3 protocol is only available with the Shark® 100 meter's V-Switch key 3 or 4)
    - Baud Rate: 9600, 19200, 38400, 57600
    - Response Delay: 0 - 750 (50 msec increments)
- NOTE:** Response Delay is the delay the meter should use before responding to queries. If your connecting device requires a delay before receiving information, use response delay to program the time to wait before the meter starts responding to queries.



**IMPORTANT!** If your meter is a 100S with the Ethernet option, keep the RS485 factory settings shown in the screen capture.

- The Set Com2 to Default button is used to restore the RS485 settings to their default values if necessary. The default settings are:
  - Baud Rate: 57600
  - Address: 001
  - Protocol: Modbus RTU

3. To implement any changes, click the Update button to send the new profile to the meter.

**NOTE:** For information on configuring the Shark® 100S meter's WiFi settings, see the *Shark® 100S Meter Installation and Operation Manual*; for information on configuring the Shark® 100 meter's optional Ethernet settings, see the *Shark® 100/100T/100B/50 Meters Installation and Operation Manual*.

#### 9.1.4: Configuring Settings

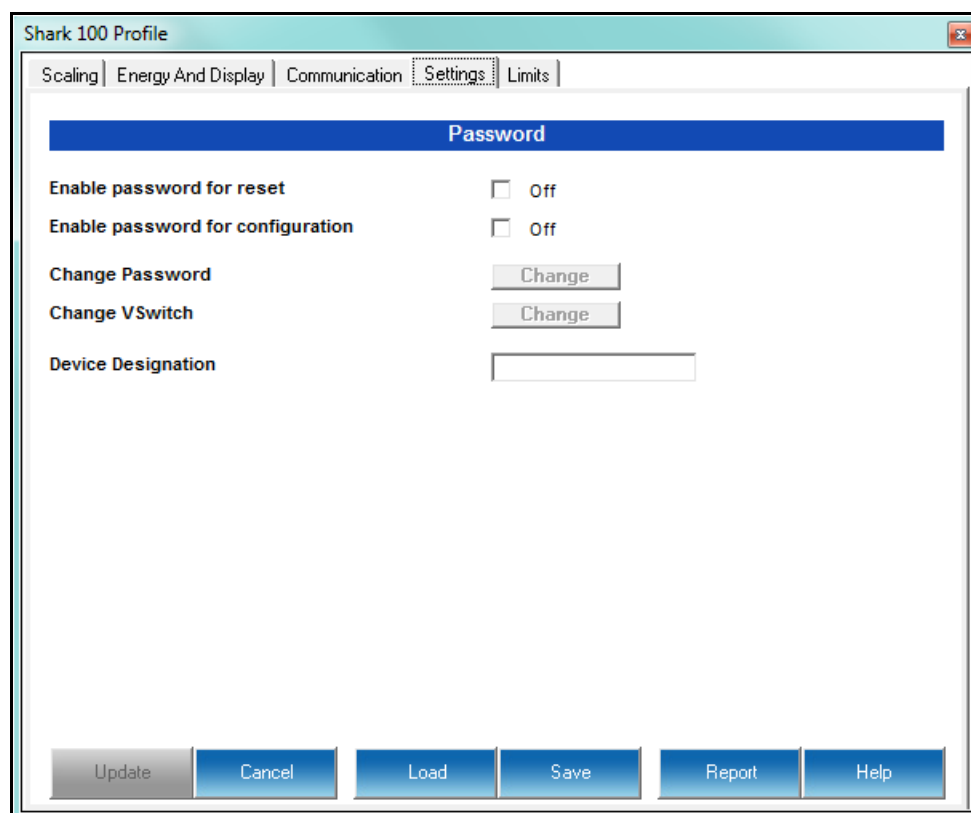
Use the Settings tab to set password protection, set up a meter ID, and change the meter's V-Switch™ key.

You can enable or disable a Password for Resetting (Reset Max/Min Energy Settings, Energy Accumulators, and the Individual Logs) and Configuration (Device Profile) in the Systems Settings screen.

Once password protection is enabled for the meter and the Device Profile is updated, anyone who attempts to make a change that is under password protection is prompted to enter the password. If the correct Password is not entered, the change doesn't take place.

**NOTE:** If you enable a Password for Resetting, you must also enable it for Configuration.

1. From the Device Profile screen, click the Settings tab.



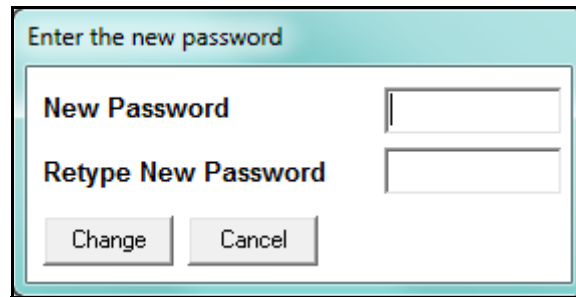
2. From this screen, you can do the following:

- Enable or Disable Password for Reset and/or Configuration: click the checkbox next to the option. The Off changes to On and the box is checked. Enabling Password protection prevents unauthorized tampering with devices.

**IMPORTANT!** You must set up a password before enabling Password Protection. Click the Change button next to Change Password if you have not already set up a password.

- Change the Password: click the Change button.
- Change the V-Switch™ key - see Chapter 20 for instructions.
- Enter/change the Device Designation: input a new designation into this field.

3. When you click the Change button next to Change Password in the Settings screen, you will see the Enter the New Password screen.



- a. Type in the new password (0 -9999).
- b. Retype the password.
- c. Click **Change**. The new password is saved and you see the following message window.

**NOTE:** If Password Protection has already been enabled for configuration and you attempt to change the password, you will see the Enter Password screen after you click Change. Enter the old password and click OK to proceed with the password change.

4. To implement any changes, click the Update button to send the new profile to the meter.

### 9.1.5: Configuring Limit Settings (Shark® 100 or 100S, V4 Only)

Use this screen to assign Limits for the Shark® 100/100S meter with V-Switch™ key 4.

#### Functional Overview for Limits:

Limits are transition points used to divide acceptable and unacceptable measurements. When a value goes above or below the limit, an out-of-limit condition occurs. You can set and configure up to eight Limits for the meter.

Once they are configured, you can view the out-of-Limits (or Alarm) conditions in the Limits Log (see Chapter 19) or Limits Polling screen (see Chapter 5).

1. From the Device Profile screen, click the Limits tab.

Shark 100 Profile

Scaling | Energy And Display | Communication | Settings | Limits

Limit 1 : volts a-n Click to select a Limit

Address: 1000

Label: volts a-n Change

Set Point: 105.0% Return Hysteresis: 105.0%

High: 105.0% Low: 095.0%

Full Scale: 14.40k

Limit	Label	Above	Hysteresis	Below	Hysteresis
1	volts a-n	105.0%	105.0%	095.0%	095.0%
2	volts b-n	105.0%	105.0%	095.0%	095.0%
3	volts c-n	105.0%	105.0%	095.0%	095.0%
4	amps a	025.0%	025.0%	015.0%	015.0%
5	amps b	105.0%	105.0%	095.0%	095.0%
6	amps c	105.0%	105.0%	095.0%	095.0%
7	watts total	105.0%	105.0%	095.0%	095.0%
8	+watts avg	105.0%	105.0%	095.0%	095.0%

Update Cancel Load Save Report Help

2. Select the Limit you want to set from the pull-down menu. You can set up to eight limits.

3. Click the Change button to select a reading value for the limit.

2. Click to select the reading

1. Click to select a reading for the Limit

Limit	Label	Above	Hysteresis	Below	Hysteresis
1	volts c-n	000.0%	000.0%	000.0%	000.0%
2	meter name	000.0%	000.0%	000.0%	000.0%
3	meter name	000.0%	000.0%	000.0%	000.0%
4	meter name	000.0%	000.0%	000.0%	000.0%
5	meter name	000.0%	000.0%	000.0%	000.0%
6	meter name	000.0%	000.0%	000.0%	000.0%
7	meter name	000.0%	000.0%	000.0%	000.0%
8	meter name	000.0%	000.0%	000.0%	000.0%

4. A small window opens at the top of the screen. Click on the pull-down menu to select the reading you want to set the limit for - e.g., voltage a-n. The address field changes to contain the Modbus address of the reading you select, and the Full Scale field changes to contain the full scale value for the reading. (When you first display this screen, all of the limits have "meter name" as their default; the address field displays 1, which is the Modbus address of the meter name field; and the Full Scale field displays 0.)

- The available readings are:
  - Off (no limit is set)
  - Volts phase to phase and phase to reference
  - Amps A, B, C
  - Total Watts, VAR, and VA
  - Power Factor Total



- Frequency
- Whrs Received, Delivered, Net, and Total
- VARhrs Positive, Negative, Net, and Total
- VAhrs Total
- Amps per Phase Average/Minimum Average/
- + and - Watts and VARs Average
- VA Average
- + and - Power Factor Average
- Volts Phase to Phase and Phase to Reference Minimum/Maximum
- Amps per Phase Minimum Average/Maximum Average
- + and - Watts and VARs Minimum Average/Maximum Average
- VA Minimum Average/Maximum Average
- + and - Power Factor Minimum Average/Maximum Average
- Frequency Minimum/Maximum
- Current per Phase A, B, C
- Voltage Angles a-b, b-c, c-a
- Neutral Current

5. To configure the Limit, double-click in the following fields to set their values:

- Above and Below Set Point: of Full Scale (the point at which the reading goes out of limit: see figure on the next page)

For example:

100 of 120V Full Scale = 120V

90 of 120V Full Scale = 108V

- Above and Below Return Hysteresis (the point at which the limit's status changes from out of limit to within limit: see figure below)

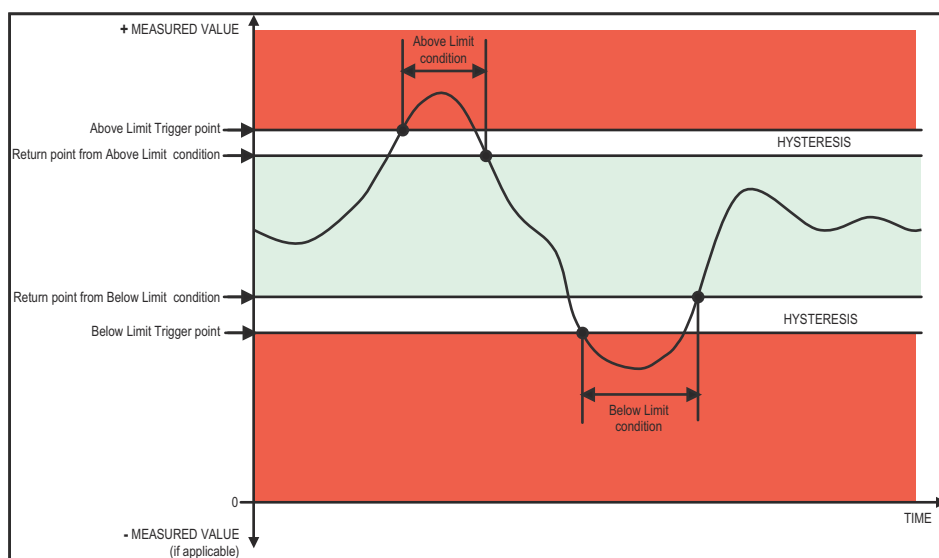
For example:

Above Set Point = 110 Below Set Point = 90

(Out of Limit above 132V) (Out of Limit below 108V)

Above Return Hysteresis = 105 Below Return Hysteresis = 95

(Stay Out of Limit until below 126V) (Stay Out of Limit until above 114V)



#### NOTES:

- If the Above Return Hysteresis is greater than the Above Set Point, the Above Limit is Disabled; if the Below Return Hysteresis is less than the Below Set Point, the Below Limit is Disabled. You may want to use this feature to disable either the Above Limit or Below Limit condition for a reading.
  - If you are entering negative limits, be aware that the negative value affects the way the above and below limits function, since negative numbers are processed as signed values.
6. To implement any changes, click the Update Device button to send the new profile to the meter.

## 10: Shark® MP200™ Metering System

This chapter explains how to configure a Shark® MP200™ metering system's programmable settings, which are stored in the unit's Device Profile. Chapter 7 contains detailed information on the Device Profile.

### 10.1: Device Profile General Settings

1. From the Tree Menu on the left side of the MP200™ metering system's Device Profile screen, double-click on the General Settings line or click on the + button next to it. All of the settings in the General Settings group are listed.

The MP200™ metering system comes in two types:

- The MP200-Y - this version has eight three phase connections and provides an output for eight three phase meters.
- The MP200-S - this version acts as a single phase meter providing an output for all 24 single phase circuits.

**NOTE:** Many of the settings differ between the MP200-Y three phase configuration and the MP200-S single phase configuration. Instructions for both configurations are given when there are differences.

MP200: MP200 5 [V-Switch: 3] Offline

File Tools View Help

- General Settings
  - CT, PT Ratios and System Hookup
  - Time Settings
  - System Settings
  - Communications
- Energy Settings
- Alarm Settings
- Trending Profiles
- Digital I/O

### CT, PT Ratios and System Hookup

PT Numerator (Primary)

PT Denominator (Secondary)

System Wiring

CT Denominator (Secondary)  5 Amps or 1 Amps

CT Numerator (Primary)

Meter 1	Meter 2	Meter 3	Meter 4	Meter 5	Meter 6	Meter 7	Meter 8
<input type="text" value="5"/>	<input type="text" value="5"/>	<input type="text" value="5"/>	<input type="text" value="5"/>	<input type="text" value="5"/>	<input type="text" value="5"/>	<input type="text" value="5"/>	<input type="text" value="5"/>

Save Profile Load Profile View Report Exit

MP200 Unit with Three Phase Configuration - MP200-Y

Since the MP200-Y is a three phase meter, there are only eight sets of CT settings: one for each of the CTs needed for a single three phase circuit.

The screenshot shows the MP200 software interface with the title bar 'MP200: MP200 6 [V-Switch: 3] Offline'. The menu bar includes File, Tools, View, and Help. A tree view on the left shows the following structure:

- General Settings
  - CT, PT Ratios and System Hookup
  - Time Settings
  - System Settings
  - Communications
- Energy Settings
- Alarm Settings
- Trending Profiles
- Digital I/O

The main window is titled 'CT, PT Ratios and System Hookup'. It contains the following fields:

- PT Numerator (Primary): 120
- PT Denominator (Secondary): 120
- System Wiring: Single Phase (dropdown menu)
- CT Denominator (Secondary): 5 (with a note '5 Amps or 1 Amps')
- CT Numerator (Primary): A grid of 24 meters, each with a value of 5.

The grid of CT Numerators (Primary) is as follows:

Meter 1	Meter 4	Meter 7	Meter 10	Meter 13	Meter 16	Meter 19	Meter 22
5	5	5	5	5	5	5	5
Meter 2	Meter 5	Meter 8	Meter 11	Meter 14	Meter 17	Meter 20	Meter 23
5	5	5	5	5	5	5	5
Meter 3	Meter 6	Meter 9	Meter 12	Meter 15	Meter 18	Meter 21	Meter 24
5	5	5	5	5	5	5	5

At the bottom of the window are four buttons: Save Profile, Load Profile, View Report, and Exit.

MP200 Unit with Single Phase Configuration - MP200-S

With the MP200-S there are 24 individual circuits being measured, and since the CTs can be different on all of them, each of the 24 CTs can be configured individually.

### 10.1.1: Configuring CT, PT Ratios and System Hookup

The first screen you see is the CT, PT Ratios and System Hookup screen, shown on the previous two pages (to return to this screen from another screen, click General Settings>CT, PT Ratios and System Hookup). Use this setting to configure Current Transformer and Potential Transformer ratios and to select the System Hookup.

#### Functional Overview of CT and PT Ratios:

Current and Potential Transformers are used mainly for the following reasons:

- To insulate, and as a result isolate, the meter from high-voltage circuits.
- To change the primary voltage and current to standard values and sizes that the meter can measure.

The CT and PT transformers deliver fractions of the primary voltage and current to the meter. With properly set ratios and multipliers, the readings of the meter can be used to determine the energy, voltage, current, or power of the system.

1. Make your settings in the following fields:

- PT Ratios
  - PT Numerator (Primary): 1 - 9999
  - PT Denominator (Secondary): 40 - 600
- System Wiring
  - 3 Element Wye; 2.5 Element Wye; 2 CT Delta
  - This value must be set properly for the meter to calculate readings correctly.
- CT Ratios
  - CT Numerator (Primary): 1 - 9999

**NOTE:** This field is different for the MP200-Y and MP200-S: there are 8 CT Numerator fields for the MP200-Y and 24 CT numerator fields for the MP200-S; in each case, one for each circuit.

- CT Denominator (Secondary): 5 or 1 Amp

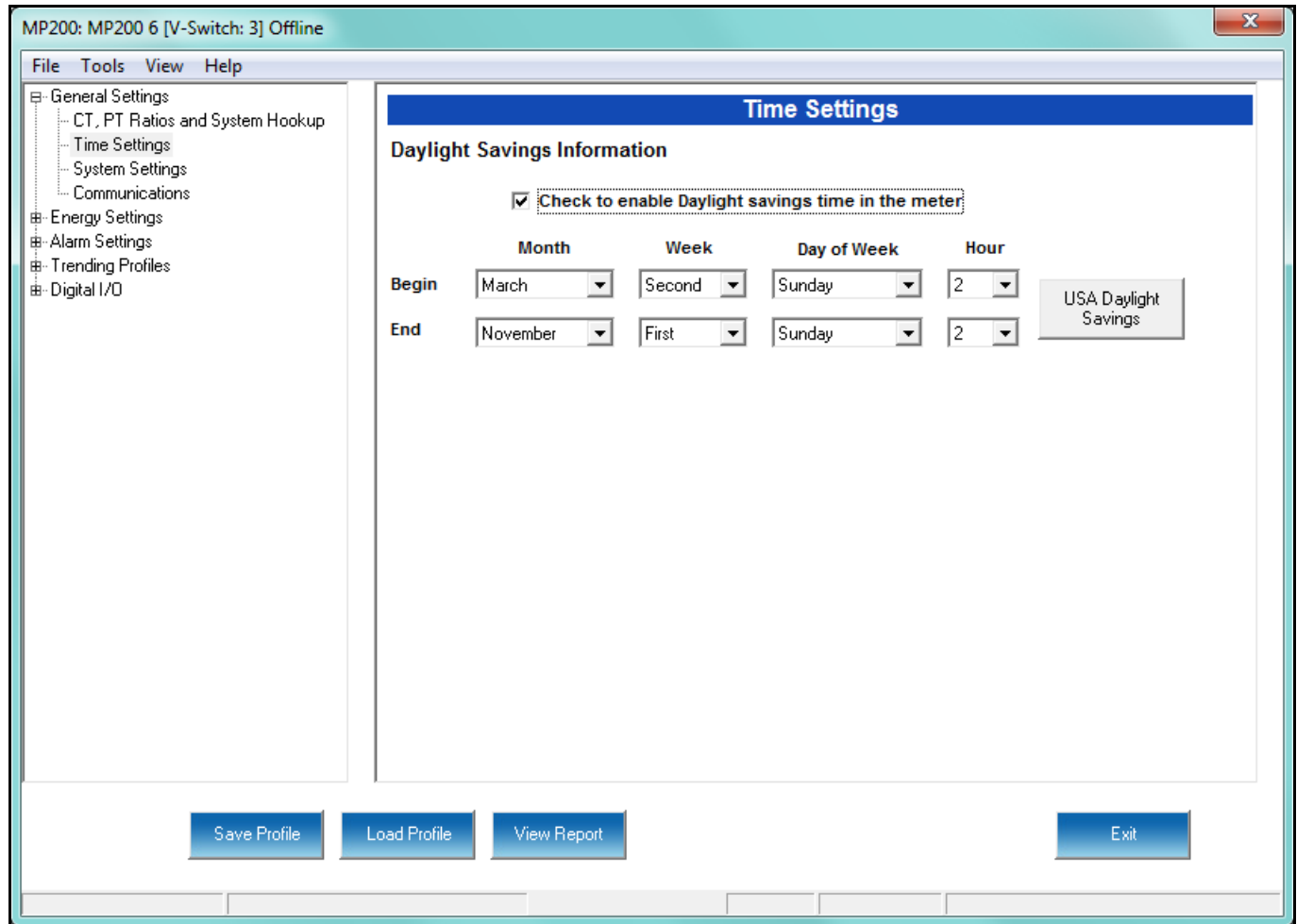
**NOTE:** This field is display only. The meter is ordered as a 5 Amp or 1 Amp Current Secondary.

2. To implement any changes, click the Update Device button to send the new profile to the meter.

### 10.1.2: Configuring Time Settings

Use this setting to enable or disable Daylight Savings Time for the meter and to set the beginning and ending times for Daylight Savings Time. This screen is the same whether you are connected to an MP200-Y or an MP200-S.

1. From the Tree Menu, click General Settings>Time Settings.



2. Check the box to Enable Daylight Savings time, or un-check it to Disable Daylight Savings Time.
3. Use the entry fields to set the start and end times for the Daylight Savings Time feature, if enabled. Select the values you want from the Month, Week, Day of the Week, and Hour fields. You can click USA Daylight Savings to fill the fields with the current DST settings for the United States.

**NOTE:** The Hour field uses a 24-Hour clock.



4. To implement any changes, click the Update Device button to send the new profile to the meter.

### 10.1.3: Configuring System Settings

Use the system settings to set password protection and a meter ID. You can enable or disable a Password for Resetting (Reset Max/Min Energy Settings, Energy Accumulators (three phase configuration only), and the Individual Logs) and Configuration (Device Profile) in the Systems Settings screen. This screen differs between the MP200-Y and MP200-S: the number of meter name fields is different (see the screens on the next two pages).

Once password protection is enabled for the meter and the Device Profile is updated, anyone who attempts to make a change that is under password protection is prompted to enter the password. If the correct Password is not entered, the change doesn't take place.

**NOTE:** If you enable a Password for Resetting, you must also enable it for Configuration.

1. From the Tree Menu, click General Settings>System Settings.

MP200: MP200 5 [V-Switch: 3] Offline

File Tools View Help

- General Settings
  - CT, PT Ratios and System Hookup
  - Time Settings
  - System Settings
  - Communications
- Energy Settings
- Alarm Settings
- Trending Profiles
- Digital I/O

### System Settings

**Data Protection**

Require password for resetting items ☐ Yes ☒ No

Require password for configuration ☐ Yes ☒ No

**Change Password**

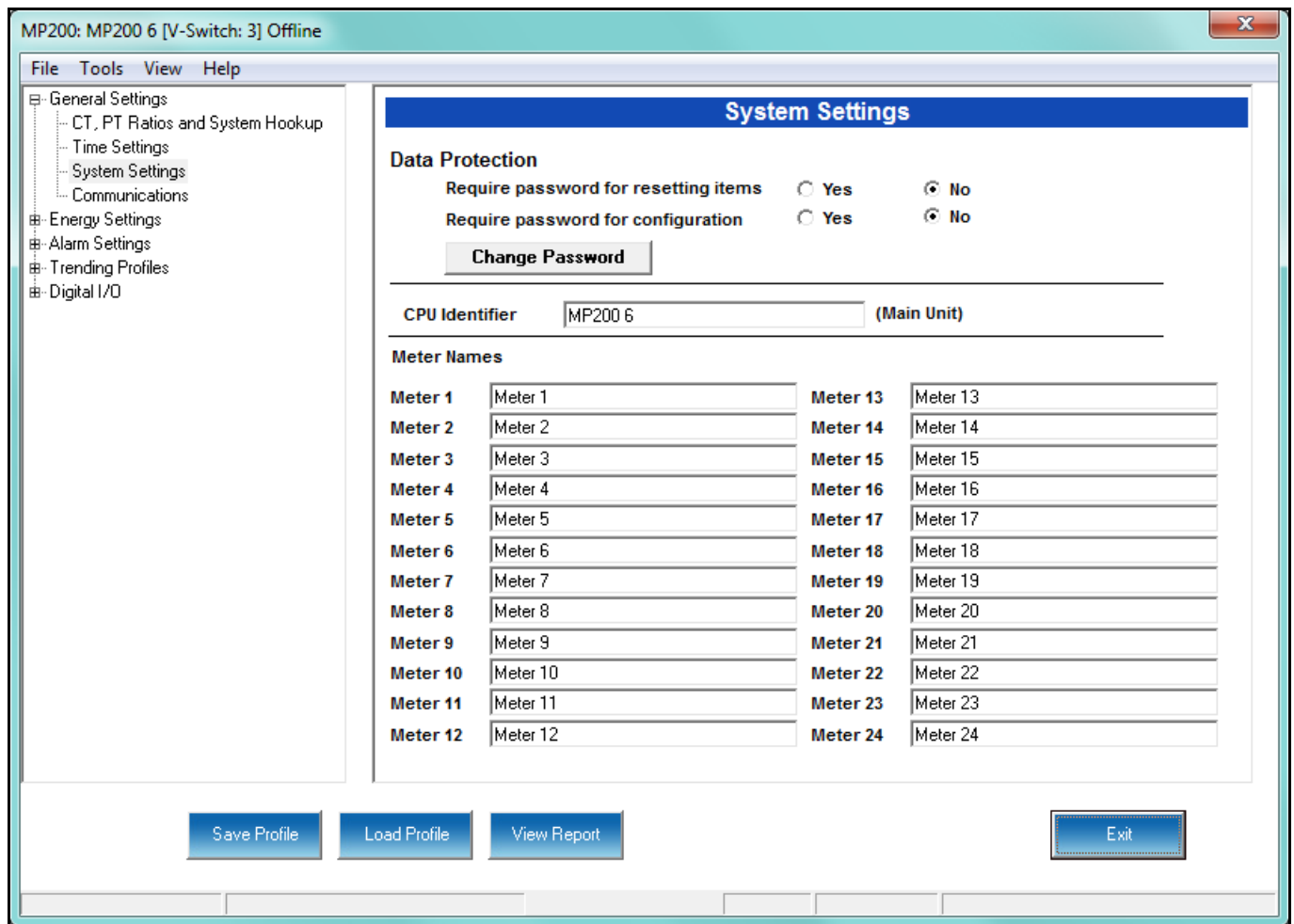
CPU Identifier  (Main Unit)

**Meter Names**

Meter 1	<input type="text" value="Meter 1"/>	Meter 5	<input type="text" value="Meter 5"/>
Meter 2	<input type="text" value="Meter 2"/>	Meter 6	<input type="text" value="Meter 6"/>
Meter 3	<input type="text" value="Meter 3"/>	Meter 7	<input type="text" value="Meter 7"/>
Meter 4	<input type="text" value="Meter 4"/>	Meter 8	<input type="text" value="Meter 8"/>

**Save Profile** **Load Profile** **View Report** **Exit**

MP200-Y System Settings Screen



MP200-S System Settings Screen

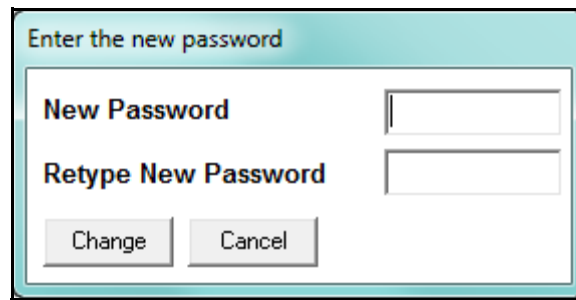
2. From this screen, you can do the following:

- Enable or Disable Password for Resetting and/or Configuration: click the radio button next to Yes or No. Enabling Password protection prevents unauthorized tampering with devices.

**IMPORTANT!** You must set up a password before enabling Password Protection. Click the Change button next to Change Password if you have not already set up a password.

- Change the Password: click the Change button.

- Enter or change the CPU Identifier: input a new designation into this field. This identification is the name given to the main metering module - it is not the name of the metering locations.
  - Enter a name for each of the meters: 8 for the MP200-Y and 24 for the MP200-S. These names are used to identify the meters in logging and polling screens and are also used in the naming of the log files.  
For example, if you have a shopping mall with 8 stores, each having a three phase system that is attached to the MP200-Y, you can name the meters Store 1 - Store 8, to identify each meter with its store. Then when you look at the polling screens or logging screens, you can easily identify each store's data, without needing to check the circuit configuration.
3. When you click the Change button next to Change Password in the Settings screen, you will see the Enter the New Password screen.



- a. Type in the new password (0 -9999).
- b. Retype the password.
- c. Click **Change**. The new password is saved and you see the following message window.

**NOTES:** If Password Protection has already been enabled for configuration and you attempt to change the password, you will see the Enter Password screen after you click Change. Enter the old password and click OK to proceed with the password change.

4. To implement any changes, click the Update Device button to send the new profile to the meter.

### 10.1.4: Configuring Communication Settings

Use this screen to enter communication settings for the MP200™ unit's Communication ports. This screen is the same for the MP200-Y and MP200-S.

**IMPORTANT!** The settings on this screen are the current settings for communication. Any changes you make may affect communication between the MP200™ unit and your PC.

1. From the Tree Menu, click General Settings>Communications.

MP200: MP200 5 [V-Switch: 3] Offline

File Tools View Help

General Settings  
CT, PT Ratios and System Hookup  
Time Settings  
System Settings  
Communications  
Energy Settings  
Alarm Settings  
Trending Profiles  
Digital I/O

### Communications

**COM1(RS485/TCPIP/WiFi)**

Address: 1

Protocol: Modbus RTU

Baud Rate: 57600

Response Delay (msec): 0

Parity: None

Default for Ethernet

**COM2 (USB)**

Address: 1

Protocol: Modbus ASCII

Baud Rate: 57600

Response Delay (msec): 0

**COM3 (RS485/Display Port)**

Address: 1

Protocol: Modbus RTU

Baud Rate: 9600

Response Delay (msec): 0

Default for Display

Save Profile Load Profile View Report Exit

2. Valid Communication Settings are as follows:

- COM 1: RS485/ Ethernet/WIFI (optional)
  - Address: 1-247
  - Baud Rate: 9600, 19200, 38400, 57600 (For WiFi/Ethernet, only 57600)

- Protocol: Modbus RTU/ASCII (For WiFi/Ethernet, only Modbus RTU)
  - Response Delay: 0-750 ms  
**NOTE:** Response Delay is the delay the meter should use before responding to queries. If your connecting device requires a delay before receiving information, use response delay to program the time to wait before the meter starts responding to queries.
  - Parity: Odd, Even or None
  - COM 2: USB port: The USB port settings are fixed, i.e., they cannot be changed.
    - Address: 1
    - Protocol: MODBUS ASCII
    - Baud Rate: 57600
    - Response Delay: 0-750 ms: see the note on response delay, above.
  - COM 3: RS485/Display Port
    - Address: 1-247
    - Protocol: Modbus RTU/ASCII
    - Baud Rate: 9600, 19200, 38400, 57600
    - Response Delay: 0-750 ms: see the note on response delay, above.
3. You can click the (1)Default to Ethernet or (2)Default to Display button to return either the (1)Ethernet settings for COM1 or (2)Display settings for COM3, to their default values.
4. To implement any changes, click the Update Device button to send the new profile to the meter.

**NOTE:** For information on configuring the MP200™ metering system's optional WiFi and Ethernet settings, see the *MP200™ Metering System Installation and Operation Manual*.

## 10.2: Energy Settings

From the Tree Menu on the left side of the MP200™ metering system's Device Profile screen, double-click on the Energy Settings line or click on the + button next to it. The setting in the Energy Settings group is listed.

The screenshot shows the MP200: MP200 6 [V-Switch: 3] Offline window. The left sidebar contains a tree menu with the following items: General Settings, CT, PT Ratios and System Hookup, Time Settings, System Settings, Communications, Energy Settings (selected), Energy, Power Settings, and Averaging Method, Alarm Settings, Trending Profiles, and Digital I/O. The main area is titled "Energy, Power Settings, and Averaging Method".

**Energy Settings**

Energy Digits: 8  
Energy Decimal Places: 2  
Energy Scale: Kilo (k)

**Settings apply to all meters in CPU**  
Example: 999999.99 kWH

**Power Settings**

Apparent Power (VA) Calculation Method: Arithmetic Sum  
Power Direction: View as load  
Flip Power Factor Sign: No  
Watts Direction: ☒ Unidirectional ☐ Bidirectional

**Demand Averaging**

Type: Block  
Interval (Minutes): 15

Buttons at the bottom: Save Profile, Load Profile, View Report, Exit.

### 10.2.1: Configuring Energy, Power Scaling, and Averaging

Use this setting to configure:

- The display and storage of Energy data in the metering module (CPU)
- The display of Power data in the metering module (CPU) and the method of VA computation
- The interval over which Average values are computed

This screen is the same for the MP200-Y and MP200-S units. Note that these settings are consistent for all of the metering points.

#### **Functional Overview of Energy Settings, VA Computation, and Averaging:**

- **Energy Scaling**

Energy Setting includes:

Digits (the number of digits in the reading)

Decimals (the number of decimal places in the reading)

Energy Scale: the scale of the reading - unit; kilo (number times 1000); Mega (number times 1 million)

Energy settings allow you to balance the resolution (or accuracy) of the energy stored, with the interval over which energy rollover occurs. For example, the maximum resolution for a k scale reading is: 99999.999k.

To calculate the speed at which the energy will rollover, you must know the Energy Full Scale, which is computed from the CT and PT Full Scale values (see Section 5.3.3.1). The formula for calculating Energy Full Scale is:

Wye system:  $CT \text{ Full Scale} \times PT \text{ Full Scale} \times 3$

Delta system:  $CT \text{ Full Scale} \times PT \text{ Full Scale} \times 3 \times \sqrt{3}$

For example, for a CT Full Scale of 2000, PT Full Scale of 14400, Wye system:

$2000 \times 14400 \times 3 = 86400000$

In this example, the energy will increment at 86400000 Watts per hour, or 24000 Watts per second.



This value allows you to determine the number of digits, decimal places, and energy scale you want to configure for the Energy settings, when you take into account the rollover time.

To determine the number of hours before rollover, use this formula:

[Max Resolution]/[Full Scale] = #Hours, where Max Resolution = maximum digits and decimals for the Energy scale in use.

Using the example from above, with an energy scale of Mega, the formula would be:

99999.999 M/86.4 M = 1157.4074 hours or about 48 days until rollover.

**NOTE:** To increase the number of days until rollover, you can increase the number of digits (to 8), decrease the number of decimal places (to 0), or increase the Energy Scale (to M).

- **Apparent Power (VA) Computation:**

There are two optional methods of VA Computation:

**Arithmetic Sum** - the formula for this calculation is:

$$VA_T = VA_a + VA_b + VA_c$$

**Vector Sum** - the formula for this calculation is:

$$VA_T = \sqrt{W_T^2 + VAR_T^2}$$

Generally, the superior method for calculating VA is to use the Vectoral method; however, both methods are provided.

- **Demand Averaging**

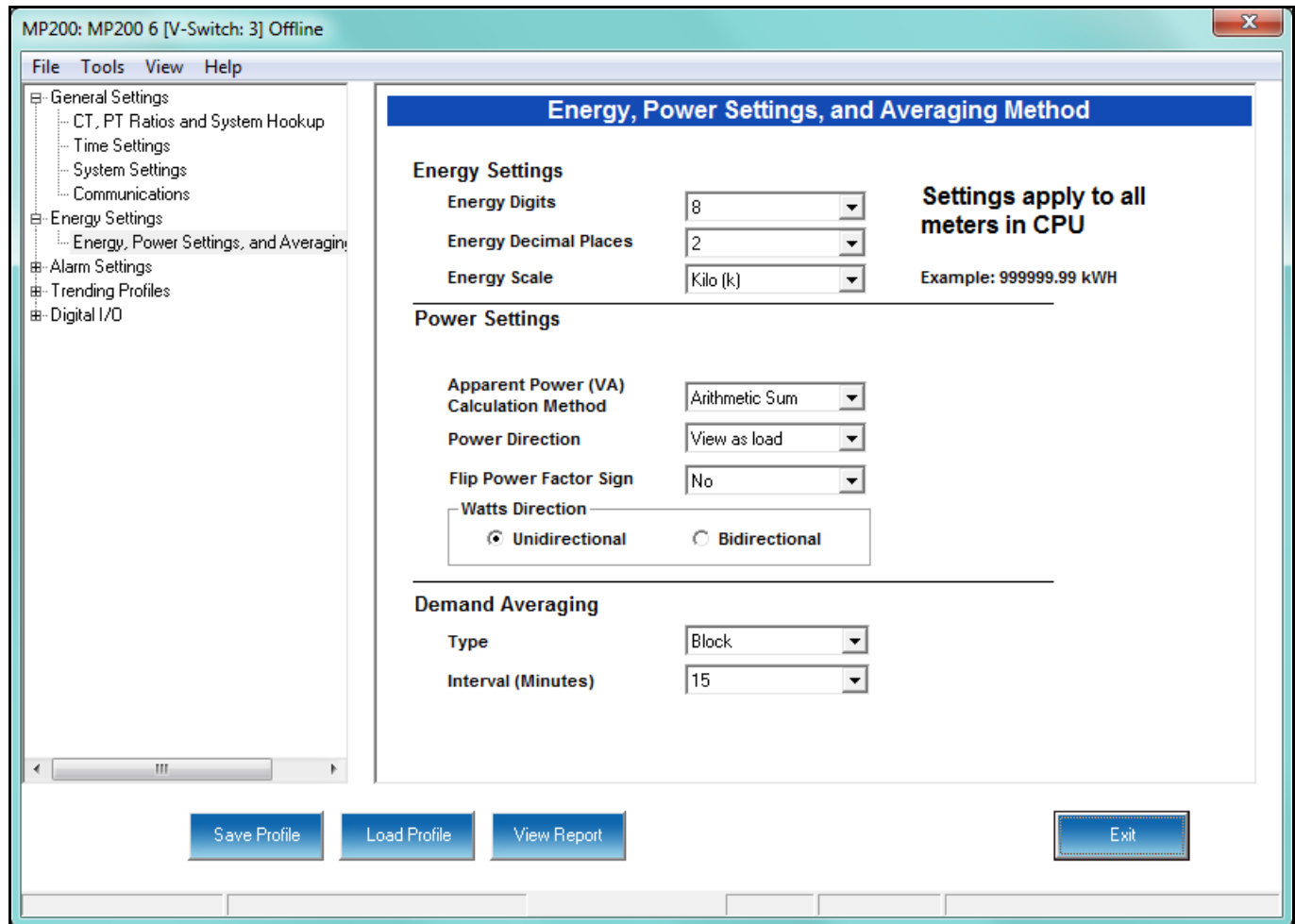
Demand is the average rate of energy use over time. The MP200™ metering system supports two types of demand averaging: Block demand and Rolling demand.

Block demand records the average demand for time intervals that you define (usually 5, 15 or 30 minutes).

Rolling demand functions like multiple, overlapping Block demands. You define the subintervals at which an average of demand is calculated. An example of Rolling

demand would be a 15-minute Demand block using 5-minute subintervals, thus providing a new demand reading every 5 minutes, based on the last 15 minutes.

1. From the Tree Menu, click Energy Settings> Energy, Power Scaling, and Averaging.



2. The screen fields and acceptable entries are as follows:

- Energy Settings
  - Energy Digits: 5; 6; 7; 8
  - Energy Decimal Places: 0 - 6
  - Energy Scale: unit; kilo (K); Mega (M)

For example: a reading for Digits: 8; Decimals: 3; Scale: K would be formatted: 00123.456k

**NOTES:**

- Your selection in the Energy Settings fields determines the precision of energy stored for display and polling. Refer to the Functional Overview at the beginning of this section for more information.
- If you are changing the energy settings, we recommend you first reset the Energy Accumulators, in order to prevent erroneous counts. See Chapter 20 for instructions on resetting the MP200™ metering system's Energy Accumulators.
- Power Settings
  - Apparent Power (VA) Calculation Method: Arithmetic Sum; Vector Sum (See explanation on page 10-15.)
  - Power Direction: View as Load or View as Generator
  - Flip Power Factor Sign: No or Yes.
  - Watts Direction: Unidirectional or Bidirectional.
- Demand Averaging
  - Type: Block or Rolling
  - Interval (Block demand) or Sub-Interval (Rolling demand): 5; 15; 30; 60
  - Number of Subintervals: 1; 2; 3; 4
  - Interval Window: This field is display only. It is the product of the values entered in the Sub-Interval and Number of Subintervals fields.

**NOTES:**

- You will only see the Number of Subintervals and Interval Window fields if you select Rolling demand.

- As the message on the screen states, the energy settings you make apply to all of the meters in the CPU (8 for the MP200-Y and 24 for the MP200-S).

3. To implement any changes, click the Update Device button to send the new profile to the meter.

### 10.3: Alarm Settings

From the Tree Menu on the left side of the MP200™ metering system's Device Profile screen, double-click on the Alarm Settings line or click on the + button next to it. The setting in the Alarm Settings group is listed.

The screenshot shows the MP200: MP200 6 [V-Switch: 3] Offline window. The left sidebar contains a tree menu with the following items: General Settings, CT, PT Ratios and System Hookup, Time Settings, System Settings, Communications, Energy Settings, Energy, Power Settings, and Averaging, Alarm Settings, Limits, Trending Profiles, and Digital I/O. The main area displays the 'Limits' table.

Limit ID	Assigned Limit (Double Click to Edit)	Setting	Setpoint		Return Hysteresis		Full Scale
			% of Fullscale	Primary	% of Fullscale	Primary	
1	Voltage	Above	110.0	132.00	110.0	132.00	120.00
		Below	90.0	108.00	90.0	108.00	
2	Frequency	Above	102.0	61.20	102.0	61.20	60.00
		Below	98.0	58.80	98.0	58.80	
3	Not Assigned	Above					
		Below					
4	Not Assigned	Above					
		Below					
5	Not Assigned	Above					
		Below					
6	Not Assigned	Above					
		Below					
7	Not Assigned	Above					
		Below					
8	Not Assigned	Above					
		Below					

At the bottom of the window, there are four buttons: Save Profile, Load Profile, View Report, and Exit.

### 10.3.1: Configuring Limits

Use this screen to assign Limits for the MP200™ metering system. This screen differs for the MP200-Y and MP200-S units.

#### Functional Overview for Limits:

Limits are transition points used to divide acceptable and unacceptable measurements. When a value goes above or below the limit, an out-of-limit condition occurs. You can set and configure up to eight Limits for the MP200™ metering system.

Once they are configured, you can view the out-of-Limits (or Alarm) conditions in the Limits Log (see Chapter 19) or Limits Polling screen (see Chapter 5). You can also use Limits to trigger relays.

1. From the Tree Menu, click Alarm Settings>Limits. The current settings for Limits are shown in the screen.

MP200: MP200 5 [V-Switch: 3] Offline

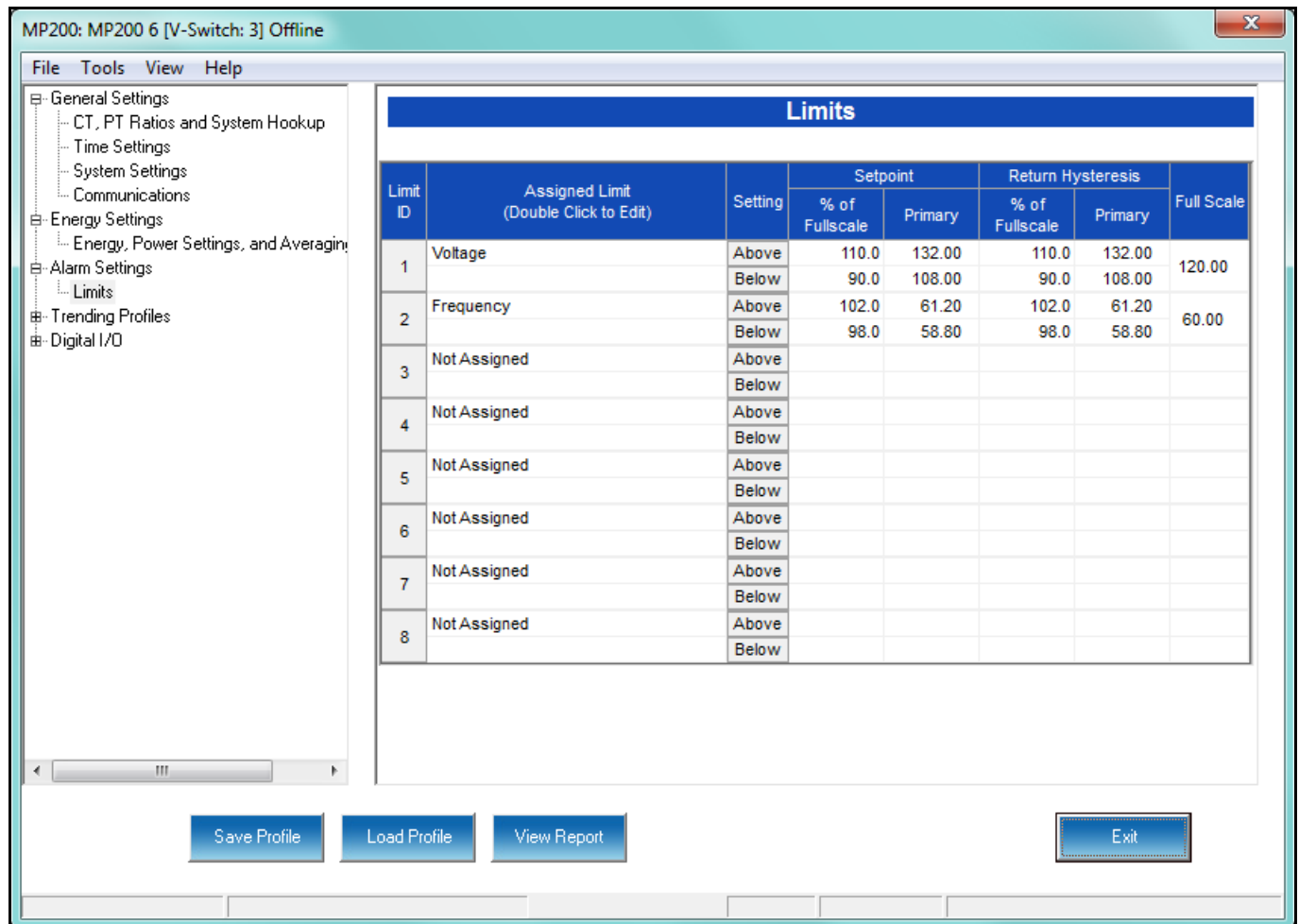
File Tools View Help

- General Settings
  - CT, PT Ratios and System Hookup
  - Time Settings
  - System Settings
  - Communications
- Energy Settings
  - Energy, Power Settings, and Averaging
- Alarm Settings
  - Limits
- Trending Profiles
- Digital I/O

Limit ID	Assigned Limit (Double Click to Edit)	Setting	Setpoint		Return Hysteresis		Full Scale
			% of Fullscale	Primary	% of Fullscale	Primary	
1	Voltage A-N	Above	110.0	132.00	110.0	132.00	120.00
		Below	90.0	108.00	90.0	108.00	
2	Voltage B-N	Above	110.0	132.00	110.0	132.00	120.00
		Below	90.0	108.00	90.0	108.00	
3	Voltage C-N	Above	110.0	132.00	110.0	132.00	120.00
		Below	90.0	108.00	90.0	108.00	
4	Frequency	Above	102.0	61.20	102.0	61.20	60.00
		Below	98.0	58.80	98.0	58.80	
5	Not Assigned	Above					
		Below					
6	Not Assigned	Above					
		Below					
7	Not Assigned	Above					
		Below					
8	Not Assigned	Above					
		Below					

Save Profile Load Profile View Report Exit

MP200-Y Limits Screen

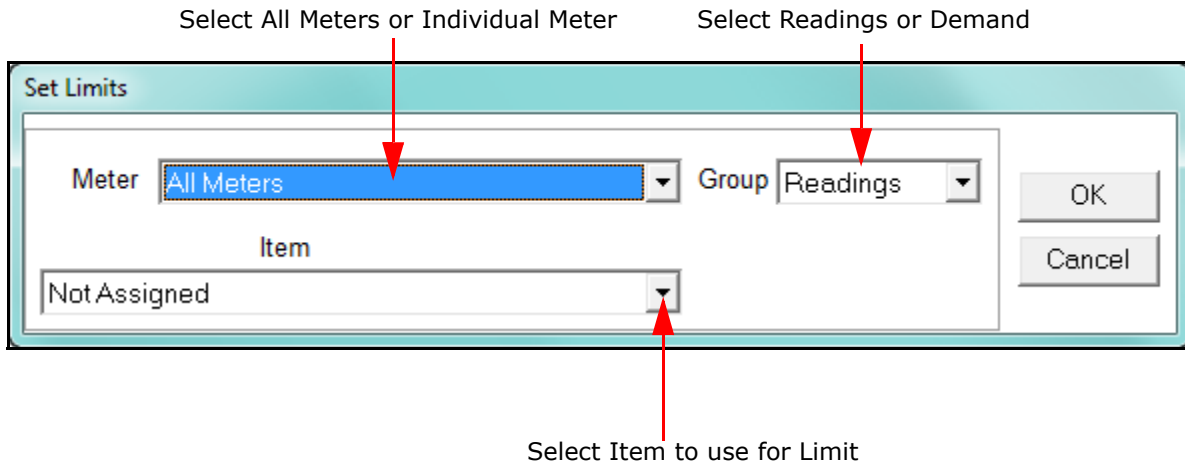


MP200-S Limits Screen

2. To set or change a Limit:

- a. Select a limit by double-clicking on the Assigned Limit field.

b. You will see the screen shown below.



c. This screen lets you configure the limits. The settings you can make depend on your MP200™ unit's configuration:

- For an MP200-Y three phase configuration, you can set up limits from the Readings group's items for all meters or any individual meter (select from the Meter pull-down menu).

The items you can select for Readings limits for All Meters are: Phase to Neutral voltage, Phase to Phase Voltage, and Frequency.

The items you can select for Reading limits for individual meters are: Current phases A, B, and C, Total Watts, Total VAR, Total VA, Total PF, Current Neutral, Watts per Phase, VAR per Phase, VA per Phase, and PF per Phase.

The Demand group (select from the Group pull-down menu) can only have limits set for individual meters (not All Meters).

The items you can select for Demand limits are: Current phases A, B, and C, Current Neutral, Total +Watts, Total +VAR, Total -Watts, Total -VAR, Total VA, Total +PF, Total -PF, +Watts per Phase, -Watts per Phase, +VAR per Phase, -VAR per Phase, VA per Phase, + PF per Phase, and -PF per Phase.

- For an MP200-S single phase configuration, you can set up limits from the Readings group's items for All meters or any individual meter (select from the Meter pull-down menu).

The Items you can select for Readings limits for All Meters are: Voltage and Frequency.

The items you can select for Reading limits for individual meters are: Current, Watts, VAR, VA, and PF.

The Demand group (select from the Group pull-down menu) can only have limits set for individual meters (not All Meters).

The items you can select for Demand limits are: Current, +Watts, +VAR, -Watts, -VAR, VA, +PF, and -PF.

d. Click OK. The Limit you selected will now appear in the Limits screen.

3. To configure a Limit, double-click on the following fields to set their values:

- Above and Below Set Point: of Full Scale (the point at which the reading goes out of limit: see figure on the next page)

For example:

100 of 120V Full Scale = 120V

90 of 120V Full Scale = 108V

- Above and Below Return Hysteresis (the point at which the limit's status changes from out of limit to within limit: see figure on the next page)

For example:

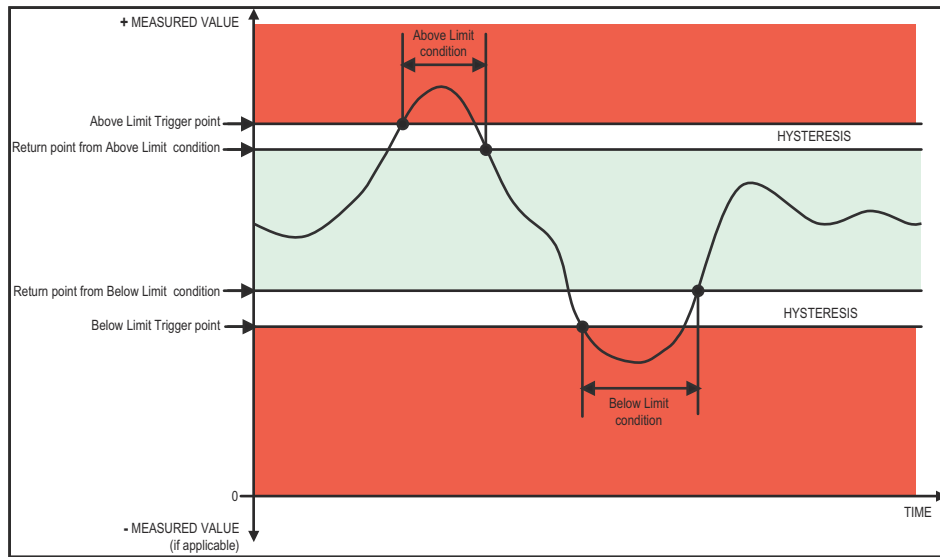
Above Set Point = 110 Below Set Point = 90

(Out of Limit above 132V) (Out of Limit below 108V)

Above Return Hysteresis = 105 Below Return Hysteresis = 95

(Stay Out of Limit until below 126V) (Stay Out of Limit until above 114V)

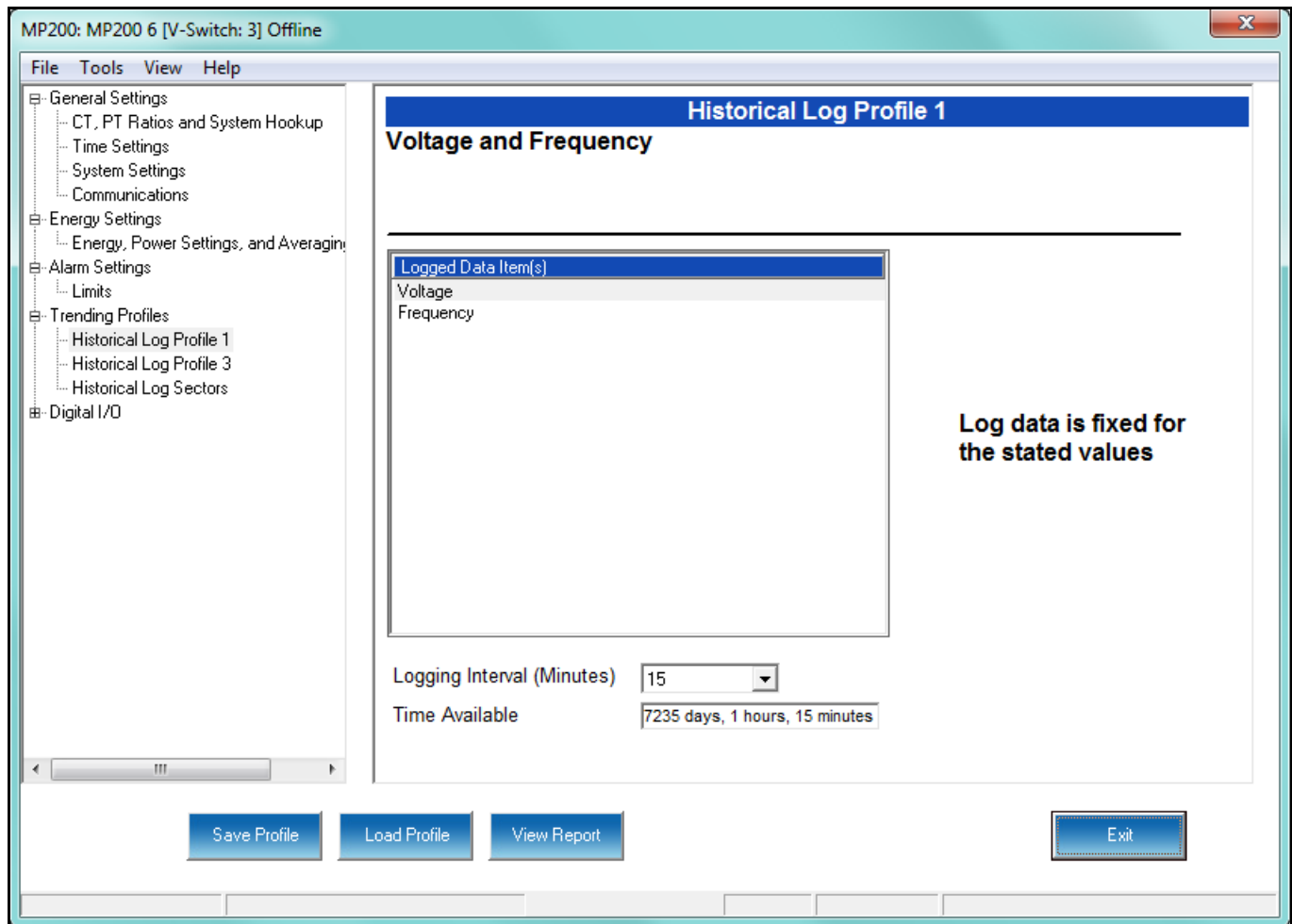


**NOTES:**

- If the Above Return Hysteresis is greater than the Above Set Point, the Above Limit is Disabled; if the Below Return Hysteresis is less than the Below Set Point, the Below Limit is Disabled. You may want to use this feature to disable either the Above Limit or Below Limit condition for a reading.
  - If you are entering negative limits, be aware that the negative value affects the way the above and below limits function, since negative numbers are processed as signed values.
4. To implement any changes, click the Update Device button to send the new profile to the meter.

## 10.4: Trending Profiles Settings

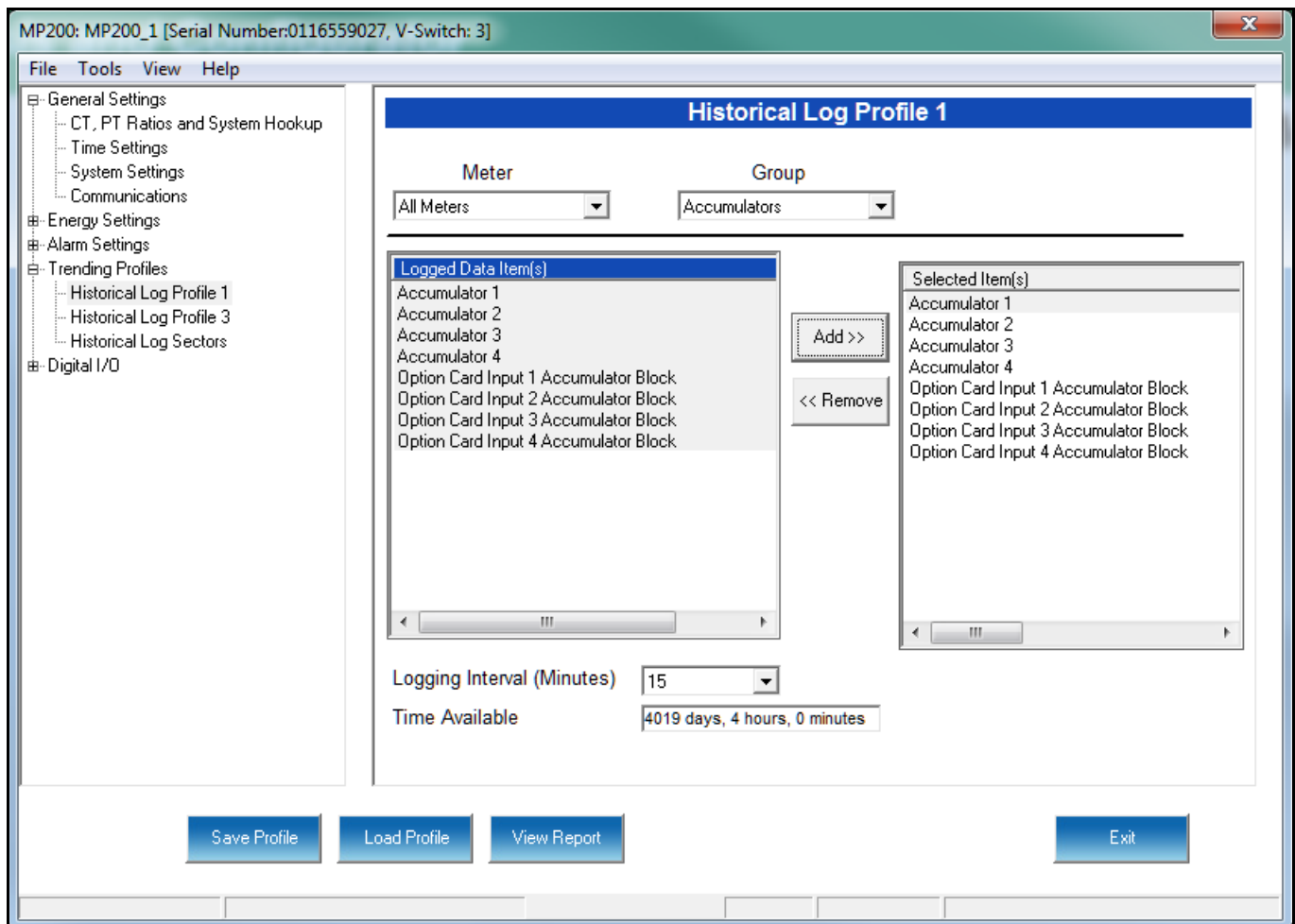
An MP200™ unit with V-Switch key 2 or 3 has memory for logging. From the Tree Menu on the left side of the MP200™ metering system's Device Profile screen, double-click on the Trending Profiles line or click on the + button next to it. All of the settings in the Trending Profiles settings group are listed.



### 10.4.1: Configuring Historical Logs

1. From the Tree Menu, click Trending Profiles>Historical Log Profile 1-3 (depending on your MP200™ unit's circuit configuration), to display a screen that lets you select the data channels you want to log for Historical log 1, and the logging interval for the historical log you selected. Historical logs 1 and 2 are used for the MP200-Y three phase configuration; Historical logs 1 and 3 are used for the MP200-S single phase configuration.

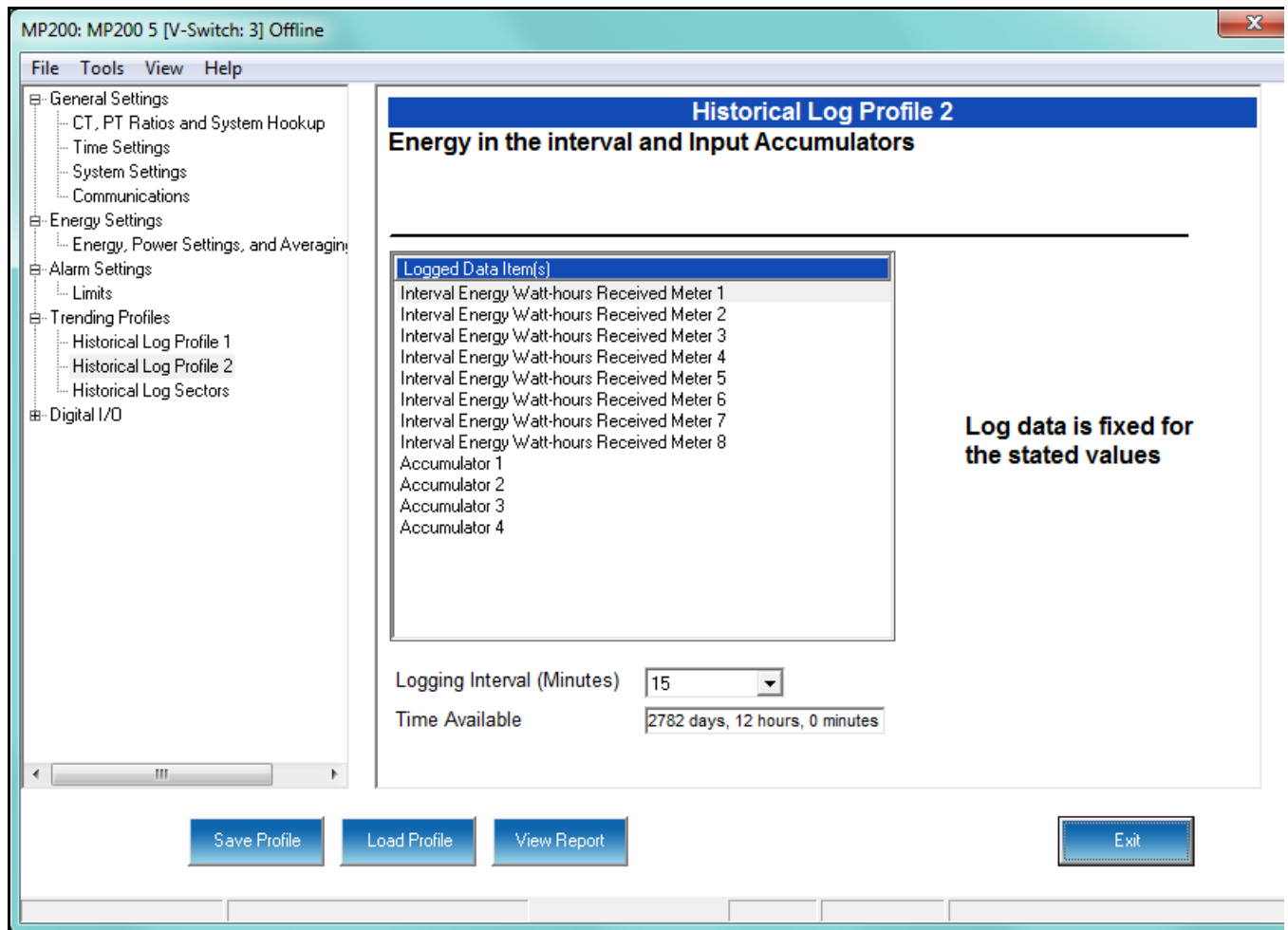
**NOTE:** Historical log 1 is configurable. Historical logs 2 and 3 are pre-configured to log specific readings: Historical log 2 logs Energy in the Interval for the 8 three phase circuits, and Historical log 3 logs Energy in the Interval for each phase of the 24 single phase circuits.



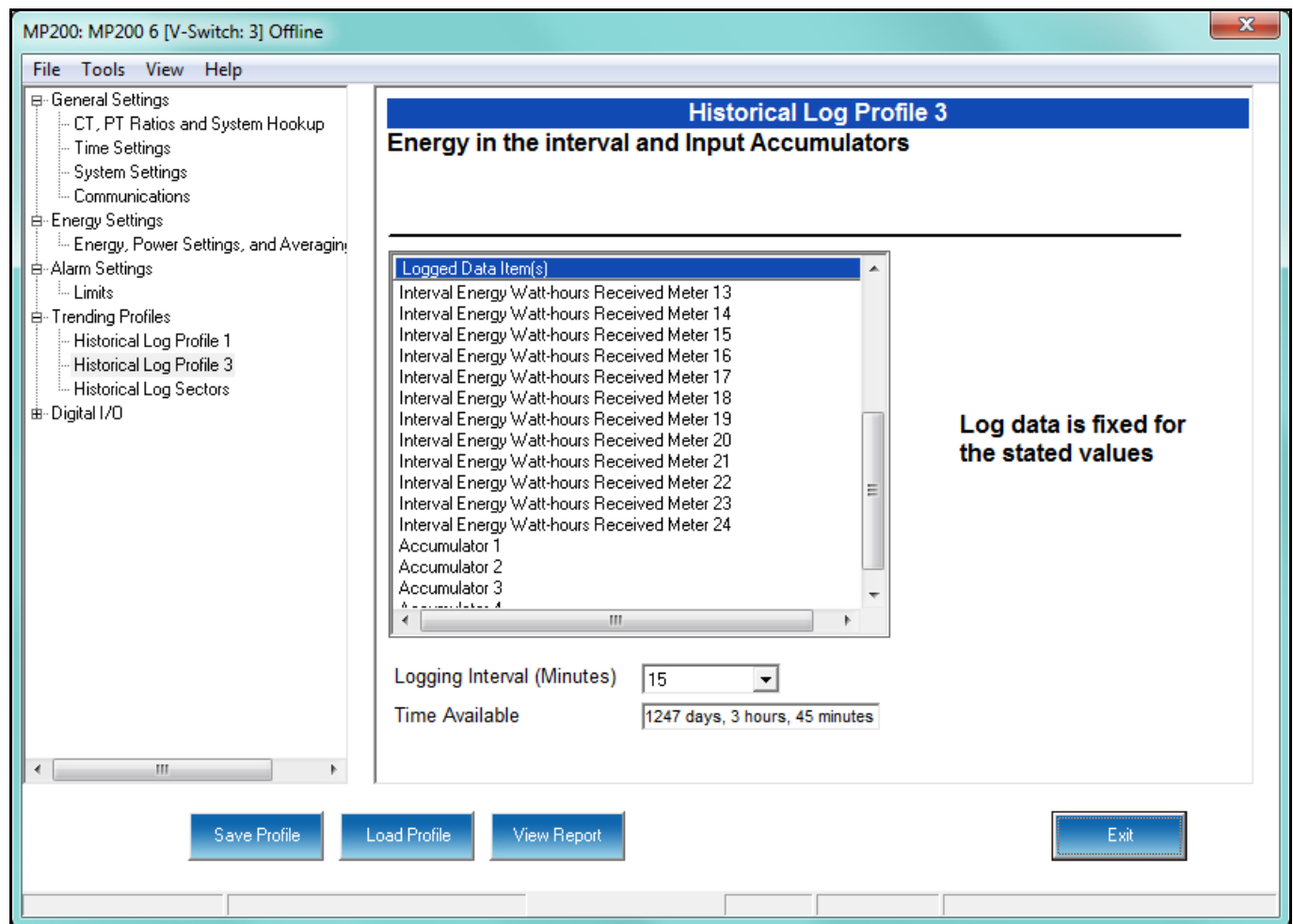
MP200-Y/MP200-S Historical Log 1 Screen

2. To program the data channels for Historical log 1, first select All Meters or an individual meter from the Meters field. For individual meters, you can select from Meter 1 - Meter 8 for the MP200-Y, or from Meter 1 - Meter 24 for the MP200-S.
3. Next select a Group. The possible selections are: Measured Values, Demand, Maximums, Minimums, Energy, Phase Angles, and Accumulators. When you select a Group, all of the data channels for the Group are displayed in the Logged Data Items field, on the left.
4. To select the data channel(s) you want, click on it in the Logged Data Items field and click the Add button to copy it to the Selected Items field. If you need to remove a data channel you selected, click on it in the Selected Items field and click the Remove button. You can select multiple data channels at one time using either the Ctrl button or the Shift button - follow standard usage.
5. Select the logging interval. The available choices are: 1, 3, 5, 10, 15, 30, or 60 minutes, or EOI (End of Interval) Pulse. The Logging Interval determines when the MP200™ unit takes a snapshot of the data values being trended.

Note that the Logging Interval is the only change you can make in the Historical log 2 and Historical log 3 screens, as the other fields are pre-configured. See the example screens on the next two pages.



MP200-Y Historical Log 2 Screen



MP200-S Historical Log 3 Screen

**IMPORTANT!** If you are trending Energy in the Interval (Historical logs 2 and 3), the Logging interval **must** be the same as the Demand interval.

**NOTES:**

- Only one Relay Output/Digital Input card input or output can be set to trigger an EOI pulse.
- The maximum rate for EOI Pulse used to trigger a log is once per minute.

- When you choose EOI Pulse, the MP200™ unit takes a snapshot on the End of Interval Pulse condition, rather than on a time interval. Following are two examples of using EOI Pulse for log recording.

**Examples of EOI Pulse Recording:**

- The Relay Output/Digital Input card installed in your MP200™ unit is set to trigger on a state change. You can use EOI pulse to take a snapshot upon that state change.
- An MP200™ unit is connected on each side of a load. You want to take a snapshot of both sides of the load at the same time. You can do this by connecting the Relay Output/Digital Input card in each of the MP200™ units to a device that will trigger them. Then set the EOI pulse to take a snapshot when the devices are triggered.

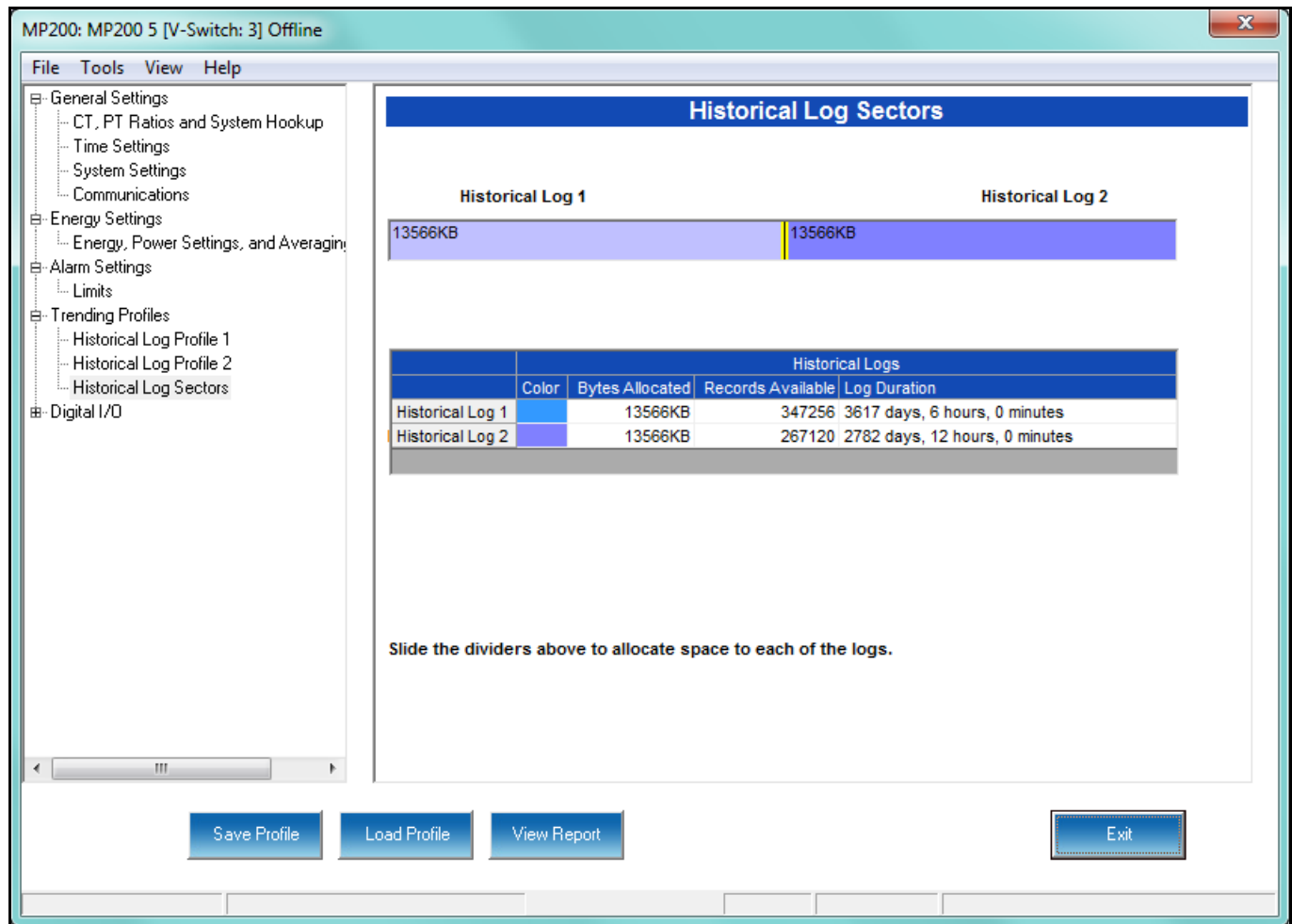
For more information, see 10.5.1: Configuring Relay Assignments, on page 10-33.

6. The Time Available field lets you know how much time is left before the log is full.
7. To implement any changes, click the Update Device button to send the new profile to the meter.

### 10.4.2: Configuring Historical Log Sectors

The MP200™ metering system with V-Switch™ keys 2 and above allows a user to configure the amount of memory allocated for each log, so you can optimize the number of records stored for each log. Use this setting to increase or decrease the amount of records each of the MP200 unit's Historical logs can store, and the duration each log can run, before becoming filled.

1. From the Tree Menu, click Trending Profiles>Historical Log Sectors to display the screen shown below.

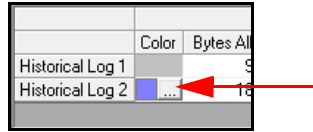


**NOTES:** The screen above is for a three phase circuit configuration; if you are connected to an MP200™ unit with a single phase circuit configuration you will see Historical Logs 1 and 3.

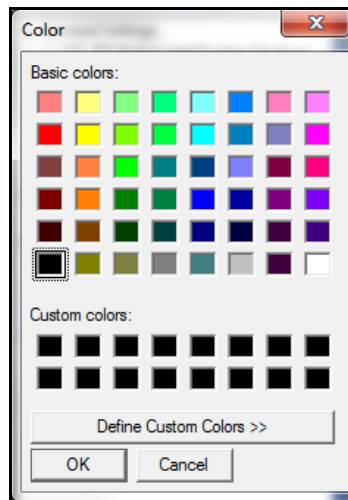


2. The Historical logs are color-coded for ease of use. The color key is shown in the box(es) labeled Historical Log 1 and Historical Log 2 or 3. To change the color assigned to each log:

a. Click in the Color field. A small box with three dots will appear.



b. Click in the box to open a screen that lets you choose an alternate color.



c. Click on the color you want and then click OK to select the new color and close the color selection screen. The new color will now be used for the Historical log.

3. The screen shows the current space allocation for the MP200™ unit's Historical logs, including:

- The number of bytes allocated to each log
- The number of records available for each log
- The duration of each log

4. To change the current allocation for a log:

a. Click on the double yellow line dividing the logs.

b. You will see a line with arrows on each side. Drag the line in either direction to increase or decrease the log allocation. The display fields for the logs will reflect any changes you make to the allocation.

5. To implement any changes, click the Update Device button to send the new profile to the meter.

**NOTE:** When EOI Pulse is set as the Logging Interval for a Historical log (see previous section, 10.4.1), the Log Duration field for that log will be blank.

## 10.5: Digital I/O Settings

From the Tree Menu on the left side of the MP200™ metering system's Device Profile screen, double-click on the Digital I/O line or click on the + button next to it. The settings in the Digital I/O settings group are listed.

The MP200™ unit has an embedded Relay Output/Digital Input card. This card is used for a few purposes. The relay portion is used to send a control output when a limit is exceeded. The input portion can be used to either count KYZ pulse or detect the status of a circuit. Accumulators in the CommunicatorPQA® software count the transitions of the Inputs and Outputs. For technical specifications and hardware installation, refer to the *MP200™ Metering System's Installation and Operation Manual*.

The screenshot shows the 'MP200: MP200 5 [V-Switch: 3] Offline' window. On the left is a tree menu with the following structure:

- General Settings
  - CT, PT Ratios and System Hookup
  - Time Settings
  - System Settings
  - Communications
- Energy Settings
- Alarm Settings
- Trending Profiles
- Digital I/O
  - Relay Output and Digital Input
    - Relay Assignments
    - Digital Input Settings

The main area is titled 'Relay Assignments' and contains the following settings:

Limit ID	Relay 1	Relay 2
Voltage A-II	Not Assigned	Not Assigned
Voltage B-II	Not Assigned	Not Assigned
Voltage C-II	Not Assigned	Not Assigned
Frequency	Not Assigned	Not Assigned
Not Assigned	Not Assigned	Not Assigned
Not Assigned	Not Assigned	Not Assigned
Not Assigned	Not Assigned	Not Assigned
Not Assigned	Not Assigned	Not Assigned

Below the table are the following settings:

- Set Delay(Seconds): 0.0
- Reset Delay(Seconds): 0.0
- Log status change for: ☐ Relay 1 ☐ Relay 2
- Output Label: Relay01 (Relay 1), Relay02 (Relay 2)
- Open Label: RlyOpen1 (Relay 1), RlyOpen2 (Relay 2)
- Closed Label: RlyClosed1 (Relay 1), RlyClosed2 (Relay 2)
- Pulse Scaler Ratio (divide pulses by): 1:1 (Relay 1), 1:1 (Relay 2)

At the bottom of the window are four buttons: 'Save Profile', 'Load Profile', 'View Report', and 'Exit'.

### 10.5.1: Configuring Relay Assignments

An example use of the Relay Card is in monitoring the status of circuit breakers or relays in your electrical system. The two status inputs could be used to monitor two circuit breakers, and the two relay outputs could be used to sound an alarm upon the occurrence of a programmed out of limit condition.

1. From the Tree menu, click Option Card>Digital I/O>Relay Output and Digital Input>Relay Assignments to open the screen shown below. This screen is the same for the MP200-Y and MP200-S units.

MP200: MP200 5 [V-Switch: 3] Offline

File Tools View Help

General Settings  
 CT, PT Ratios and System Hookup  
 Time Settings  
 System Settings  
 Communications  
 Energy Settings  
 Alarm Settings  
 Trending Profiles  
 Digital I/O  
 Relay Output and Digital Input  
 Relay Assignments  
 Digital Input Settings

### Relay Assignments

Limit ID	Relay 1	Relay 2
Voltage A-N	Not Assigned	Not Assigned
Voltage B-N	Not Assigned	Not Assigned
Voltage C-N	Not Assigned	Not Assigned
Frequency	Not Assigned	Not Assigned
Not Assigned	Not Assigned	Not Assigned
Not Assigned	Not Assigned	Not Assigned
Not Assigned	Not Assigned	Not Assigned
Not Assigned	Not Assigned	Not Assigned

Set Delay(Seconds) 0.0 0.0

Reset Delay(Seconds) 0.0 0.0

Log status change for ☐ Relay 1 ☐ Relay 2

Output Label Relay01 Relay02

Open Label RlyOpen1 RlyOpen2

Closed Label RlyClosed1 RlyClosed2

Pulse Scaler Ratio (divide pulses by) 1:1 1:1

Save Profile Load Profile View Report Exit

2. From the Relay Assignments screen, you can:

- Configure up to 8 limits for each of the two Relay Outputs
- Set a Delay and Reset Delay for the Outputs
- Choose to log Status Changes for each Relay Output

- Assign each Output an Output Label, Open Label, and Closed Label, which are used when viewing the Relay Status Log
- Select the Pulse Scaler Ratio

**IMPORTANT!** First use the Limits screen to set up the limits you want to assign to an Output. See Section 10.3.1 for instructions.

3. The available Limits appear in the Limit ID column. To Assign a Limit to an Output Relay:

- a. Select the Alarm trigger from the pull-down menu next to the Limit ID. The options are: Above Limit (the Output is triggered when the Above Limit condition occurs) and Below Limit (the Output is triggered when the Below Limit condition occurs). You can assign the limit to one or both (or neither) of the Relay Outputs.

**NOTE:** A Relay operates when any one assigned Limit is tripped, and stays in the Set condition as long as one Limit is in the Alarm state.

- b. You can enter Set Delay and/or Reset Delay. These values are the delay before the Output is changed: Set is when the common is shorted to Normal Open (this is the Set Condition).

- c. Check the box next to Log Status Change for if you want to log output status changes for either or both Relay. See Chapter 19 for information on the I/O Change Log.

4. The current Output Labels are displayed in the screen. These labels are used for Logging. To change the Output labels, click in the Labels field you want to change, and enter a new label. The fields that can be changed are:

- Output Label - Label ID
- Open Label - Open state ID
- Closed Label - Closed state ID

5. Select the Pulse Scaler Ratio. The available ratios are from 1:1 to 10000000:1 (the default setting is 1:1). The ratio is used to adjust how high an accumulator will go before rolling over. Because of this, it is useful in delaying rollover. For example, if

you select a ratio of 10:1, each time 10 Pulse/State changes occur, the accumulator count increments by 1.

6. To implement any changes, click the Update Device button to send the new profile to the meter.

### 10.5.2: Configuring Digital Input Settings

1. From the Tree menu, click Digital I/O>Relay Output and Digital Input>Digital Input Settings. Use this screen to assign labels and functions to the Relay Output/Digital Input card's Inputs. This screen is the same for the MP200-Y and MP200-S units.

**MP200: MP200 6 [V-Switch: 3] Offline**

File Tools View Help

- General Settings
  - CT, PT Ratios and System Hookup
  - Time Settings
  - System Settings
  - Communications
- Energy Settings
  - Energy, Power Settings, and Averaging
- Alarm Settings
  - Limits
- Trending Profiles
  - Historical Log Profile 1
  - Historical Log Profile 3
  - Historical Log Sectors
- Digital I/O
  - Relay Output and Digital Input
    - Relay Assignments
    - Digital Input Settings

**Digital Input Settings**

Input ID	Assigned to	Trigger	Accumulator		Label
			Pulse Scaler Ratio (divide pulses by)	Scaled Pulses Unit Value (multiply counts by) Format: 0.0001 to 0.9999 1.000 to 999.9)	
1	Accumulator	Closing	1:1	1.000	Accumulator 1
2	Accumulator	Closing	1:1	1.000	Accumulator 2
3	Accumulator	Closing	1:1	1.000	Accumulator 3
4	Accumulator	Closing	1:1	1.000	Accumulator 4

**Input Labels**

Input	Label	Open Label	Closed Label
1	ip1	ip1	ip1
2	ip2	ip2	ip2
3	ip3	ip3	ip3
4	ip4	ip4	ip4

Save Profile Load Profile View Report Exit

2. Make a selection in the Assigned to field. The available selections are:

- Status Only
- Accumulator

- Digital Input Log
- EOI Pulse - only one Input can be set as EOI pulse.

**NOTES on End of Interval (EOI):**

- An EOI pulse allows the meter to be synchronized with an installed revenue meter so that both meters are calculating Demand at the same time.
  - EOI is triggered when the selected condition is met. Only one Option Card input or output can be set to trigger an EOI pulse. EOI is used for the following:
    - As a trigger for demand averaging: when the selected condition is met, the EOI delineates an interval that results in demand averaging being performed. The minimum interval between EOI Pulses used to trigger demand averaging should be 5 minutes.
    - For historical logging: when the selected condition is met, EOI causes any log that has been configured for EOI Pulse interval to capture a record. Refer to Section 10.4.1 for additional information on EOI Pulse and logging.
3. Select Trigger from the pull-down menu. The Trigger options depend on your Assigned to selection:
- For Status Only, select None.
  - For Accumulator, select from Closing or Opening.
  - For Digital Input Log, select Change.
  - For EOI Pulse, select from Closing, Opening, or Change.
4. Use the Scaling Factor fields as follows (you can only set these fields if the input is set as accumulator; otherwise these fields are not used):
- a. The Pulse Scaler Ratio sets the number of pulses needed before the accumulator count increments by 1. The available ratios are from 1:1 to 10000000:1 (the default setting is 1:1). The ratio is used to adjust how high an accumulator will go before rolling over. Because of this, it is useful

in delaying rollover. For example, if you select a ratio of 10:1, each time 10 Pulse/State changes occur, the accumulator count increments by 1.

- b. The Scaled Pulses Unit Value is used to adjust the accumulator count to a value you need. The Scaled Pulses Unit Value is multiplied by the accumulator count, so you enter the value that you want the accumulator count multiplied by.

For example, if you have a KYZ module that is outputting a pulse every 1.8 kWh, with the input set to Accumulator, Increment on Contact Opening, and you have set the Pulse Scaler Ratio to be 10:1, you would set this field to 18.

5. Enter a Label for the Accumulator (only used if the input is set as Accumulator).
6. The current Input Labels are displayed in the screen. To change the Input Labels, click in the Labels field you want to change, and enter a new label. The fields that can be changed are:
  - Input Label - Input ID
  - Open Label - Open state ID
  - Closed Label - Closed state ID
7. To implement any changes, click the Update Device button to send the new profile to the meter.

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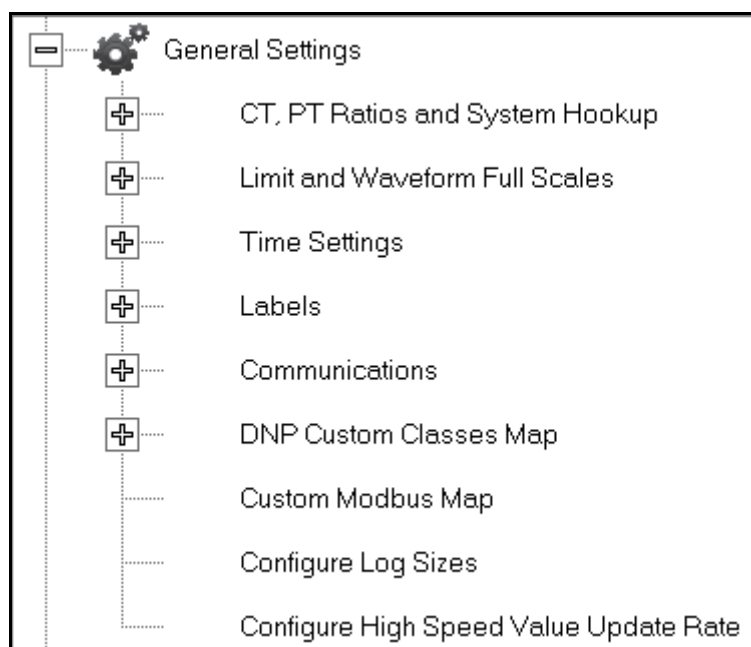


# 11: Nexus® 1500/1500+ Meter

This chapter explains how to configure a Nexus® 1500/1500+ meter's programmable settings, which are stored in the unit's Device Profile. Chapter 7 contains detailed information on how to use the Device Profile. Note that some of the Nexus® 1500+ meter settings are not available for the Nexus® 1500 meter.

## 11.1: Device Profile General Settings

1. From the Device Profile screen, double-click on the General Settings line or click on the + button next to it. All of the settings in the General Settings group are listed.



2. Click on the programmable setting you want to modify. The following sections explain the settings in the order in which they appear in the General Settings menu.

### 11.1.1: CT and PT Ratios and System Hookup

#### Functional Overview of CT and PT Ratios:

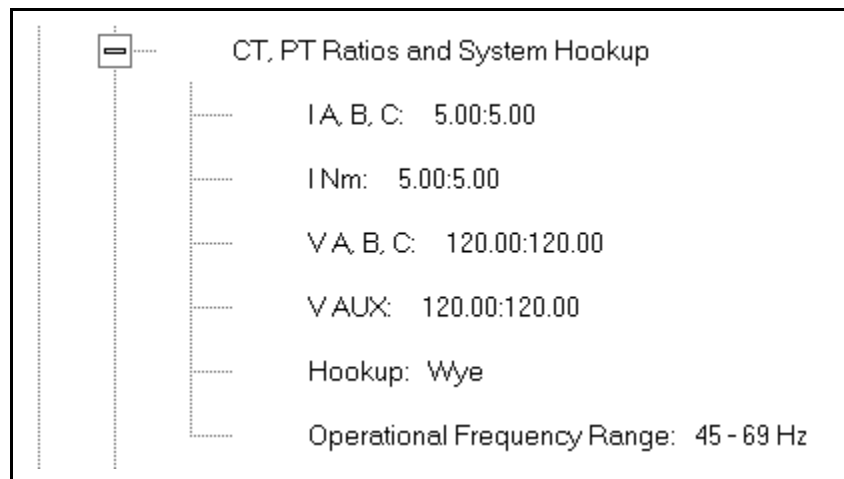
Current and Potential Transformers are used mainly for the following reasons:

- To insulate, and as a result isolate, the meter from high-voltage circuits.
- To change the primary voltage and current to standard values and sizes that the meter can measure.

The CT and PT transformers deliver fractions of the primary voltage and current to the meter. With properly set ratios and multipliers, the readings of the meter can be used to determine the energy, voltage, current, or power of the system.

**NOTE:** For the Nexus® 1500+ meter, be sure to make these settings **before** configuring EN 50160 reporting.

1. From the General Settings menu, click the + button next to CT, PT Ratios and System Hookup. You will see the submenu shown below.



This submenu displays the current Device Profile's settings for CT, PT ratios, connection type, and Operational Frequency range. The values shown here are the default meter settings.

2. Double-click on any of the settings. You will see the CT and PT Ratios screen.

Device Profile: CT and PT Ratios

CT Ratio			PT Ratio (Line to Neutral)		
	Primary Current	Secondary Current		Primary Voltage	Secondary Voltage
I A, B, C	5.00	5.00	V A, B, C	120.00	120.00
IN	5.00	5.00	V AUX	120.00	120.00

Hookup	Total VA/VAh Computation Method
Wye	Arithmetic Sum
	Arithmetic Sum
	Vector Sum

Operational Frequency Range

45Hz to 69Hz

OK Cancel Help

3. Make changes to this screen according to your application requirements.

When you change a PT or CT Ratio, CommunicatorPQA® software updates the corresponding Full Scale value entered in the Limit and Waveform Full Scales setting. When you click OK on this screen, CommunicatorPQA® software opens the Limit & Waveform Full Scales screen so that you can verify the settings (see Section 11.1.2).

- Enter Primary and Secondary Current, Voltage, and VAux.
- Using the pull-down menu, choose the Hookup mode that matches the connection you have to the Nexus® 1500/1500+ meter. Choose from the following:
  - Wye
  - Delta 3 CTs
  - Delta 2 CTs
  - 2.5 Element Wye

- 4 Wire Delta

This value must be set properly for the meter to calculate readings correctly.

See the *Nexus® 1500 (or) 1500+ Meter Installation and Operation Manual* for connection diagrams.

- The Operational Frequency Range for the meter is 45Hz to 69Hz: this field is display only.
- Total VA/VAh Computation Method (not displayed if Hookup is Delta): choose the VA/VAh computation you want used: Arithmetic Sum or Vector Sum, from the pull-down menu.

**Arithmetic Sum** - the formula for this calculation is:

$$VA_T = VA_a + VA_b + VA_c$$

**Vector Sum** - the formula for this calculation is:

$$VA_T = \sqrt{W_T^2 + VAR_T^2}$$

Generally, the superior method for calculation is the Vectoral method; however, both methods are available.

4. Click OK. If changes have been made, a message window opens asking you to verify that the Limit Full Scales are correct.
5. Click OK. The Limit and Waveform Full Scales screen opens (see Section 11.1.2).
6. To implement any changes, click the Update Device button to send the new profile to the meter.

You will see a warning message that logs will be reset, and you will be given the opportunity to retrieve the logs before they are cleared. Resetting the logs prepares the meter for placement in a new installation or change of the meter Transformers.

### 11.1.2: Limit and Waveform Full Scales

All Limit and Waveform settings (see Sections 11.1.1 and 11.3.5, respectively) are based on a percentage of the Full Scale. Full Scales are based on the CT and PT ratios (see Section 11.1.1). The % of Full Scale is defaulted based on the CT and PT ratio. If the user wants, the Full Scales can be adjusted to the actual power system condition, to optimize the triggering conditions.

Set the CT and PT ratios first; CommunicatorPQA® software automatically recalculates the Full Scales every time the CT and PT ratios change and presents them for your verification.

1. From the General Settings menu, click on the + button beside Limit and Waveform Full Scales or double-click on the Limit and Waveform Full Scales line. You will see the submenu shown below.

Limit and Waveform Full Scales	
I A, B, C, Nc :	5.00
I Nm :	5.00
V AN, BN, CN :	120.00
V AB, BC, CA :	208.00
V AUX :	120.00
Power Phase :	600.00
Power Total :	1800.00
Frequency :	60.00
V AE, BE, CE :	120.00
V XE :	120.00
V NE :	120.00

This submenu displays the current Device Profile's settings for the Limit and Waveform Full Scales. The values shown here are the default meter settings.

- Frequency and Voltage values are nominal values. The Power Phase is computed using nominal Voltage and rated maximum current. In most cases the software automatically computes the proper value - you will not need to change it.
- Also note that in almost all cases VAE is the same Full Scale setting as VAN. VAE is voltage to earth ground, while VAN is voltage to the neutral connection.

2. Double-click any of the settings. You will see the Limit and Waveform Full Scales screen.

Device Profile: Limit and Waveform Full Scales	
I A, B, C, Nc	5.00
I Nm	5.00
V AN, BN, CN	120.00
V AB, BC, CA	208.00
V Aux	120.00
Power Phase	600.00
Power Total	1800.00
Frequency	60.00
V AE, BE, CE	120.00
V XE	120.00
V NE	120.00

OK Cancel Help

3. Enter the Full Scale for each parameter.

#### NOTES:

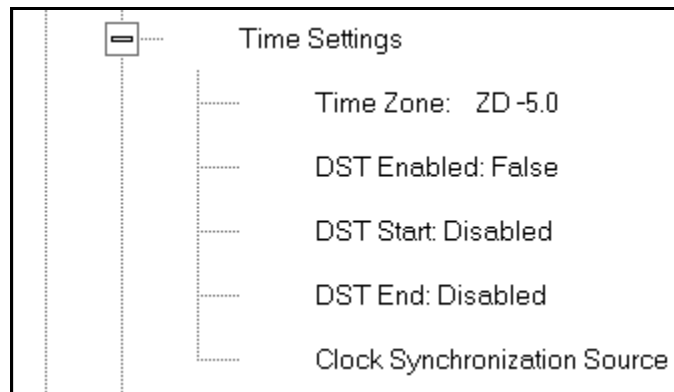
- The Limits and Waveform settings (Sections 11.1.1 and 11.3.5, respectively) are based on a percentage of the Full Scales entered here.
- The software and meter use secondary readings internally, and set Limits on a percentage of Full Scale. The purpose of this is to allow the units to be programmed using standard profiles, so that meters can be managed on a large group basis.
- Communicator PQA™ software automatically recalculates the Full Scale Voltages, currents and power every time the CT and PT ratios change. However, frequency is not changed, even if the operational frequency range is changed.  
**Frequency can only be changed on this screen.**
- Power Phase is the amount of power per each phase; Power Total is the power of all phases combined.

4. When all changes are entered, click OK to return to the main Device Profile screen.  
For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 11.1.3: Time Settings

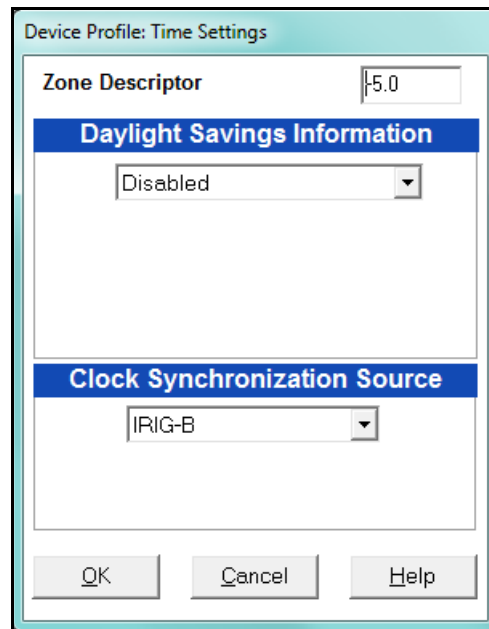
To edit the Device Profile's Time settings:

1. From the General Settings menu, double-click on the Time Settings line. You will see the submenu shown below. DST stands for Daylight Savings Time.



A screenshot of a software submenu titled "Time Settings". On the left is a vertical list of settings: "Time Zone", "DST Enabled", "DST Start", "DST End", and "Clock Synchronization Source". Each item has a horizontal line to its right, indicating it is selectable. The "Time Zone" item is currently selected, and its value, "ZD -5.0", is displayed to the right of the submenu.

2. Double-click on any of the programmable settings; you will see the Time Settings screen.



A screenshot of a dialog box titled "Device Profile: Time Settings". It contains three main sections: "Zone Descriptor" with a text field showing "-5.0"; "Daylight Savings Information" with a dropdown menu set to "Disabled"; and "Clock Synchronization Source" with a dropdown menu set to "IRIG-B". At the bottom are three buttons: "OK", "Cancel", and "Help".

3. Make changes to this screen according to your application requirements.

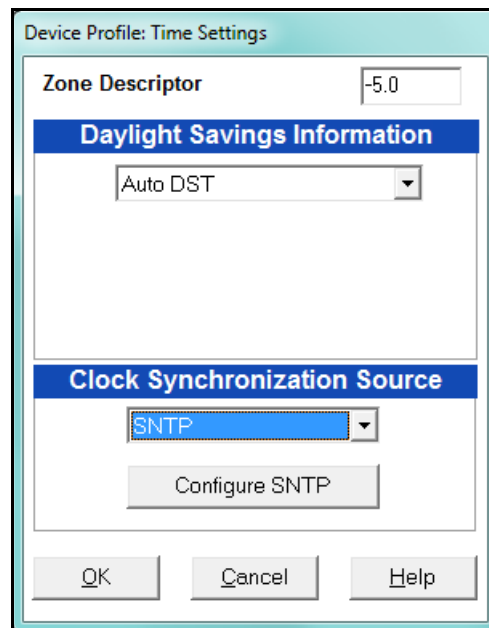
- **Zone Descriptor:** A Zone Descriptor sets the time zone for the meter. 0 = Greenwich Mean Time. Consult the following chart to find the Zone Descriptor for your time zone.

<b>GMT Greenwich Mean Time Table (Dublin, London)</b>	
-1.00 Azores	+1.00 Brussels, Paris, Warsaw
-2.00 Mid-Atlantic	+2.00 Athens, Cairo, Helsinki
-3.00 Buenos Aires, Georgetown	+3.00 Baghdad, Kuwait, Moscow, Tehran
-4.00 Atlantic Time (Canada), Santiago	+4.00 Kabul, Baku
-5.00 Eastern Time (USA and Canada), Lima	+5.00 Karachi
-6.00 Central Time (USA and Canada), Mexico City	+6.00 Dhaka
-7.00 Mountain Time (USA and Canada)	+7.00 Bangkok, Hanoi, Jakarta
-8.00 Pacific Time (USA and Canada), Tijuana	+8.00 Beijing, Hong Kong, Singapore
-9.00 Alaska	+9.00 Osaka, Sapporo, Seoul
-10.00 Hawaii	+10.00 Brisbane, Melbourne, Guam, Hobart
-11.00 Midway Island	+11.00 Magadan, Solomon Islands
-12.00 Eniwetok	+12.00 Auckland, Fiji

- **Daylight Savings Information:**
  - **Disabled:** Disables an automatic adjustment for Daylight Savings Time.
  - **Auto DST:** Sets Daylight Savings Time automatically to the pre-2007 standard for the United States: the time changes automatically occur at 2:00 AM (your local time), on the first Sunday in April and the last Sunday in October.
  - **Auto DST U.S. EPA 2005:** Sets Daylight Savings Time automatically to the 2007 standard for the United States: the time changes automatically occur at 2:00 AM (your local time), on the second Sunday in March and the first Sunday in November.



- User Defined: Allows you to set the Daylight Savings Time start and end times manually. Fields open that let you set the beginning and ending dates for Daylight Savings Time.
- Select the Clock Synchronization Source from the pull-down menu: IRIG-B, SNTP (Simple Network time Protocol), IEEE 1588 PTP, or Line Sync (Line Frequency Synchronization).
  - If you are using IRIG-B as your time synchronization source, select it from the pull-down menu. IRIG-B is one of two clock synchronization sources you can choose if you will be using the meter's synchrophasors feature. See Appendix E and Appendix F in the Nexus® 1500+ meter's User Manual for detailed information on the synchrophasors feature.
  - With SNTP you access a Network Time Protocol (NTP) Server for time synchronization. The NTP server can be either a device with a real-time clock that is networked with your meter, or an NTP server on the Internet. To use SNTP, select it from the pull-down menu.



- a. The screen changes to include a Configure SNTP button: click this button to set up SNTP.
- b. The Advanced Network Options screen opens.

**Advanced Network Option Settings**

DNP LAN/WAN Card 2 | IEC 61850 GOOSE | SNMP | IEEE 1588 PTP | Synchrophasor (PMU)  
 Computer Name / DNS | SNTP | Alarm / Email | GE Protocol (EGD) | **Services** | DNP LAN/WAN Card 1

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**Services**

	Enable	TCP Ports	
		Card 1	Card 2
Web Server	Both Card 1 & 2	80	80
Modbus TCP Server	Both Card 1 & 2	502	502
FTP Server	Card 1 Only	Control Port: 21	21
		Data Port: 20	20

---

	Enable	TCP / UDP Port	
GE EGD	Disabled	18246	
DNP LAN/WAN	Disabled		To configure the DNP ports, please go to the DNP for LAN/WAN tab.
Modbus TCP Client (Master)	Disabled		To configure the TCP port, please see the XML Web Service.
SMTP Client (email)	Disabled	25	Outgoing Mail Port.
Network Time Sync	Disabled		
IEC 61850	Disabled		To configure additional settings, go to Appendix C of the meter's manual.
IEC 61850 GOOSE	SNTP Auto		
SNMP	SNTP Card 1		
	SNTP Card 2		
	IEEE 1588 PTP		
IEEE 1588 PTP Master	Disabled		To configure additional settings, go to the IEEE 1588 PTP tab.
Synchrophasor (PMU)	Disabled		

- c. Click in the Network Time Sync field and select one of these options:
- SNTP Card 1 to use the first network card for SNTP clock synchronization.
  - SNTP Card 2 to use the second network card for SNTP clock synchronization.
  - SNTP Auto to use whichever network card is available for SNTP clock synchronization.

d. Click the SNTP tab.

Advanced Network Option Settings

Computer Name / DNS    **SNTP**    Alarm / Email    IEEE 1588 PTP    GE Protocol (EGD)    Services    DNP LAN/WAN Card 1

**Simple Network Time Protocol (SNTP)**

SNTP Mode: Client Unicast

Configured Clock Sync Source: SNTP   

SNTP Sync Rate: 1 minutes

SNTP Sync Process Time out: 15 seconds

SNTP Server 1:

SNTP Server 2:

e. Enter:

- SNTP Mode: the only choice is Client Unicast, which is already selected.
- In Client Unicast mode, the meter connects to the specified SNTP server using the configured SNTP IP address(es). First, the meter synchronizes with the SNTP server. After that, the meter periodically sends time requests to the SNTP server.
- If Configured Clock Sync Source is not SNTP, close the Advanced Network Option Settings screen to redisplay the Time Settings screen, and choose SNTP for time synchronization. This situation can occur if you previously selected a different time sync method and are now setting up SNTP directly through the Advanced Network Settings screen (Chapter 21 explains the options in the Advanced Network Settings screen).

Note that if SNTP is already displayed in the Configured Clock Sync field, you do not need to do anything.

- The Sync Rate in minutes: this is how often the meter checks the SNTP server for time updates. EIG recommends that the sync rate be set to other than the logging interval, if possible; for example, if the logging interval is every 15 minutes, set the sync rate to every seven minutes. This is done to prevent erroneous time stamps in the log.
- The Sync Process Timeout in seconds: this is how long to wait for the server to respond. Typical timeout should be set for 30 seconds.
- At least one NTP server url address. You can enter a second NTP server url address if you wish.

f. Click OK.

- If you want to use IEEE 1588 PTP (Precision Time Protocol) as the time synchronization method for the meter's PMU synchrophasors feature, see the instructions for setting up the PMU in Appendix F of the Nexus® 1500+ meter's User Manual (download the manual at <https://www.electroind.com/products/nexus-1500-power-quality-meter-with-phasor-measurement-unit/>: click Downloads>Tech Documents>User Manual from the right side of the webpage).
- If you want to use Line Sync, you must also select the Line Frequency from the Frequency pull-down menu: 50Hz or 60Hz. The selection should be based on the nominal frequency in the jurisdiction where the meter is located.

Device Profile: Time Settings

Zone Descriptor: -5.0

**Daylight Savings Information**

Auto DST

**Clock Synchronization Source**

Line Synchronization

Frequency: 60Hz

OK Cancel Help

- Line synchronization uses the frequency zero crossings to provide a time reference for the meter. The basic function of Line Frequency Clock Synchronization is to adjust the real time clock to track the time based on the power line frequency. For this purpose, Phase A voltage only is used.
- This is the most common method to synchronize a meter's clock. EIG recommends that you always select this method unless there is a specific reason not to select it. If the meter is not synchronized to line frequency, SNTP, or IRIG-B, it will default to internal crystal. Meters differ in terms of drift, but typically meters with 20 ppm crystals will drift 30 seconds per month when set to internal crystal. The Nexus® 1500+ meter has a clock accuracy of 3.5 ppm, which gives it a drift of less than 10 seconds per month.
- Line Sync is disabled if an IRIG-B signal is present. If the signal is lost, the unit defaults to its internal crystal for a time synchronizing reference.

- **How Time is Adjusted**

After the clock is synced to the line, the meter periodically checks the cumulative difference between the real time clock in seconds and the line cycle count. If the absolute difference between the two accumulations is more than 1 second or 60 (50) cycles, the clock is adjusted + / - 1 second accordingly.

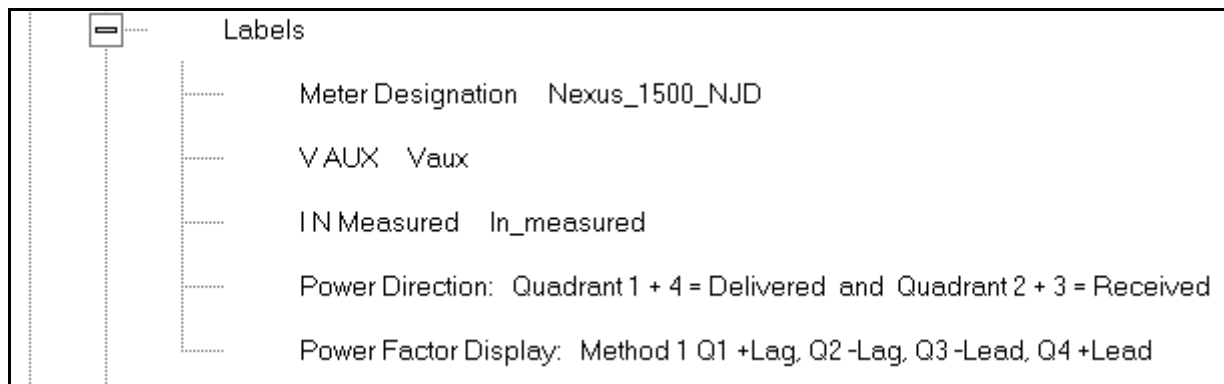
7. To set the meter's on-board clock manually, use Set Device Time from the Tools Menu (see 20.1: Tools Menu, on page 20-1).
8. When all changes are entered, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 11.1.4: Labels

Labels are user-defined names for the Nexus® 1500/1500+ meter, the Auxiliary Voltage terminal, and the I N Measured terminal. You also use the Labels screen to select the power direction, and the power factor display.

It is important to label the meter (under "Meter Designation") with a unique name because that label becomes the file name of any logs retrieved from that meter. See Chapter 19 for more details on logs.

1. From the General Settings menu, double-click on the Labels line. You will see the submenu shown below.



2. Double-click on any of the parameters; you will see the Labels screen.

3. Enter labels in the appropriate fields.

- Meter Designation must be set for log retrieval. You can use any character allowed by the Windows® operating system.
  - In English versions the following characters don't work:  
 $\backslash / : * ? " < > |$
  - For meters used internationally by multilingual users, we recommend you use only alphanumeric characters allowed by your operating system.
- For V Aux (auxiliary voltage input) and IN Measured (measured neutral current) enter the label you want to use for these readings.
- Your selection in Power Direction determines which quadrants of Watt-hours are considered Received and Delivered.
- Your selection in Power Factor Display determines the display of Quadrants in the Power Factor screen.

- The Memo field is used to enter notes about the meter, such as the location, or other relevant details.
  - The Phase Angle representation determines how the voltage phase angles are represented. 90% of users will use the default, which is the first radio button: "Positive angle for events after the reference and negative angle for events prior to the reference"; however, you can choose the opposite display by selecting the second radio button, if you wish.
4. When all changes are entered, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.



### 11.1.5: Communications

1. From the General Settings menu, double-click on the Communications line. You will see the submenu shown below.

Communications					
Optical Port	1	57600,N,1	Modbus RTU		
USB Serial	1	115200,N,1	Modbus RTU		
RS-485 Port 1	3	57600,N,1	Modbus RTU		
RS-485 Port 2	4	57600,N,1	Modbus RTU		

2. Double-click on any of the settings (e.g., "Optical Port 1"); you will see the Communications Settings screen.

Device Profile: Communications Settings

Optical Port	USB Serial Port	RS-485 Port 1	RS-485 Port 2
Address: 1	Address: 1	Address: 3	Address: 4
Baud Rate: 57600	Baud Rate: 115200	Baud Rate: 57600	Baud Rate: 57600
Data Bits: 8	Data Bits: 8	Data Bits: 8	Data Bits: 8
Parity: None	Parity: None	Parity: None	Parity: None
Stop Bits: 1	Stop Bits: 1	Stop Bits: 1	Stop Bits: 1
Tx Delay: 0ms	Tx Delay: 0ms	Tx Delay: 100ms	Tx Delay: 100ms
Protocol: Modbus RTU	Protocol: Modbus RTU	Protocol: Modbus RTU	Protocol: Modbus RTU
Mode: Inverted		Mode: Slave	Mode: Slave

**Main Network Card Settings (Card 1) (MAC Address 00-01-58-00-88-56)**

IP Address	172	200	160	1
Subnet Mask	255	255	255	0
Default Gateway	172	20	161	23

Advanced Settings

**Optional Network Card Settings (Card 2) (MAC Address 00-01-58-00-5F-14)**

IP Address	172	200	160	2
Subnet Mask	255	255	255	0
Default Gateway	172	20	161	23

Advanced Settings

OK Cancel Help

This screen displays the current Device Profile settings for the Nexus® 1500/1500+ meter's Communications ports: address, baud rate, data bits, parity, stop

bits, Tx (Transmit) delay, (communication) protocol, and mode. You can also use the meter's touch screen display to see the current baud rate, address and communication protocol of each of the Nexus® 1500/1500+ meter's ports. See the *Nexus® 1500 (or) 1500+ Meter Installation and Operation Manual* for details.

**NOTES:**

- Only some of the Optical port settings can be changed. Those that can't be changed appear grayed out and are not selectable.
  - RS485 ports 1 and 2 are the meter's optional RS485 ports. The appropriate card must be ordered for the physical ports to be available. This card can be installed at a later time so that the meter can be upgraded.
  - If the meter does not have the optional Network card 2, you will only see settings for the standard Network card 1.
3. Make changes to this screen according to your application requirements by clicking on the box or pull-down menu of any of the following settings:
- Address: assign the address that each port will respond to. Multiple Nexus® meters on an RS485 bus must each have a unique address set for the port that is connected to the bus - if they share the RS485 bus with the same address, the communication will not work.
  - Baud Rate: from the pull-down menu, select 1200, 2400, 4800, 9600, 19200, 38400, 57600, or 115200. The baud rate entered in this field must match the baud rate of the device connected to the Nexus® 1500/1500+ meter at this port. Use 9600 for modem connections.
  - Data Bits: use the pull-down menu to select from: 5, 6, 7 or 8. For Modbus RTU and ASCII, leave the data bits at 8.
  - Parity: use the pull-down menu to select from: None, Even, Odd, Mark or Space. For Modbus RTU and ASCII, leave the parity at None.
  - Stop Bits: use the pull-down menu to select from: 1, 1.5 or 2. For Modbus RTU and ASCII, leave the stop bits at 1.

- TxDelay (Transmit Delay): use the pull-down menu to select from: 0ms, 10ms, 20ms, 30ms, 40ms, 50ms, 60ms, or 70ms. Leave the Tx delay at 50ms for RS485 communication.
- Protocol: use the pull-down menu to select from Modbus RTU and Modbus ASCII. Direct connections made through CommunicatorPQA® software must use either Modbus RTU or Modbus ASCII protocol (we recommend Modbus RTU). Modem connections made through CommunicatorPQA® software must use Modbus ASCII only. See Chapter 3 for details.
- Mode field selections depend on the port:
  - Optical port - select the Receiving mode, either Inverted (for use with the Smart Coupler or A7Z Optical Probes) or Non-inverted.
  - Port 2 - depending on how you will be using this RS485 port select either Slave, Master (I/O Modules), RTU Master, or Ethernet Gateway.
    - Slave: This mode is used when the port will be polled by a Master device.
    - Master (I/O Modules): This mode is used when the port will be polling I/O modules.
    - RTU Master: This mode is used when the port will be used to poll other (slave) devices.
    - Ethernet Gateway: This mode is used when the port will be used by other devices to access an Ethernet network.
- For Network Card Settings, enter:
  - IP Address - the IP address that should be used to connect to this port.
  - Subnet Mask - the subnet mask controls the IP addresses this card will respond to.
  - Default Gateway - A default gateway is the node on the computer network that the network software uses when an IP address does not match any other routes in the routing table. You can enter a default gateway for the port to use in this field, if you wish.

**NOTES:**

- Click the Advanced Settings button to open a screen that lets you set Network card features, including enabling the IEC 61850 Protocol server. See Chapter 21 for details.
  - See your Network Administrator for the correct settings.
4. When all communication settings are entered, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

**IMPORTANT!** In order to prevent communications problems, be careful when making changes in the Communications Settings screen. For example, if you change the baud rate of the port connected to a computer, be sure to make the same change to the computer port's baud rate.

### 11.1.6: DNP3 Custom Class Map

The DNP Custom Class Map lets you set up DNP communication for the meter. From the General Settings menu, double-click on the DNP Custom Classes Map line and the DNP Level 2 line. You will see the screen shown below.

**DNP Custom Mapping**

Object 10 - Binary Output    Object 1 - Binary Input    Object 20 - Binary Counter

**Object 30 - Analog Input**    Global Values    DNP Settings

DNP Points	Map Line	Point	Description	Deadband (%)	Class Assignments
0	34	0	One Second Updated: Voltage A-N	100.00	No Class
1	34	1	One Second Updated: Voltage B-N	100.00	No Class
2	34	2	One Second Updated: Voltage C-N	100.00	No Class
3	36	0	One Second Updated: Current A	100.00	No Class
4	36	1	One Second Updated: Current B	100.00	No Class
5	36	2	One Second Updated: Current C	100.00	No Class
6	45	0	One Second Updated: Watt Total	100.00	No Class
7	43	0	One Second Updated: Var Total	100.00	No Class
8					

Enter Line and Point assignments from the DNP Table or double click the Description Field for a list of Selections.

Enter a dead band % to be used in causing an associated Object 32 value. (See Manual for Description of base values used by the dead band %)

For Object 32 assign a class.

☐ Use Custom 16-Bit Scaling

OK    Cancel    Help    Clear    Clear All

For details on programming the DNP Level 2 settings, see Chapter 22.

### 11.1.7: Custom Modbus Map

The custom Modbus map for the Nexus® 1500/1500+ meter can position up to 256 meter data points in a block of 2048 registers (4096 bytes), to readily provide the functionality you want from your meter. In addition, you can customize selected values for format type, Scaling, byte order, data size, etc. This allows a user to optimize Modbus registers by putting them in a particular order and/or format to make the SCADA poll more quickly and efficiently.

1. From the General Settings menu, double-click on the Custom Modbus Map line. You will see the screen shown below.

Item	Modbus Map Line	Point	Number of Registers	Start Register	Group	Channel	Format	Data Size	Unit	Primary / Secondary	Absolute Value	Byte Order	Display/Modulo/Offset
1	18	0	2	412289	Tenth Second Phase to Neutral Volts	Volts AN	Unsigned Integer	4 Byte		1 Secondary	No	MSR, MSB	N/A
2	18	1	2	412291	Tenth Second Phase to Neutral Volts	Volts BN	Unsigned Integer	4 Byte		1 Secondary	No	MSR, MSB	N/A
3	18	2	2	412293	Tenth Second Phase to Neutral Volts	Volts CN	Unsigned Integer	4 Byte		1 Secondary	No	MSR, MSB	N/A
4	54	0	2	412295	Thermal Avg Measured N Current	I Nm	Unsigned Integer	4 Byte		1 Secondary	No	MSR, MSB	N/A
5	55	0	2	412297	Thermal Avg Calculated N Current	I Nc	Unsigned Integer	4 Byte		1 Secondary	No	MSR, MSB	N/A
6	537	0	2	412299	Scaled +/- Wh, Q 1 - 4 VAh and VARh	Quad(1+4) Watt Hour	Unsigned Integer	4 Byte		1 Secondary	No	MSR, MSB	N/A
7	411	0	2	412301	Analog Input 1 - 8, Module 1	Input # 1	Unsigned Integer	4 Byte		1 Secondary	No	MSR, MSB	N/A
8	584	0	2	412303	Int Scaled +/- Wh, Q 1 - 4 VAh and VARh	Quad(1+4) Watt Hour	Unsigned Integer	4 Byte		1 Secondary	No	MSR, MSB	N/A
9	134	1	2	412305	Harmonics Volts A Mag # 0-7	#1	Unsigned Integer	4 Byte		1 Secondary	No	MSR, MSB	N/A
10	134	2	2	412307	Harmonics Volts A Mag # 0-7	#2	Unsigned Integer	4 Byte		1 Secondary	No	MSR, MSB	N/A
11	233	0	1	412309	Internal Inputs States	Inputs 1-8	Normal		2			MSB, MSb	
12	212	0	2	412310	Phase Angle Volts(AB,BC,CA)	Volts AB	Unsigned Integer	4 Byte		1	No	MSR, MSB	0 to +360
13	212	1	2	412312	Phase Angle Volts(AB,BC,CA)	Volts BC	Unsigned Integer	4 Byte		1	No	MSR, MSB	0 to +360
14	212	2	2	412314	Phase Angle Volts(AB,BC,CA)	Volts CA	Unsigned Integer	4 Byte		1	No	MSR, MSB	0 to +360
15	455	0	2	412316	Instantaneous Flicker V AN,BN,CN	Instantaneous Flicker V AN	Unsigned Integer	4 Byte		1 Secondary	No	MSR, MSB	N/A
16	455	1	2	412318	Instantaneous Flicker V AN,BN,CN	Instantaneous Flicker V BN	Unsigned Integer	4 Byte		1 Secondary	No	MSR, MSB	N/A
17	455	2	2	412320	Instantaneous Flicker V AN,BN,CN	Instantaneous Flicker V CN	Unsigned Integer	4 Byte		1 Secondary	No	MSR, MSB	N/A
18	464	1	2	412322	Long Term Flicker V AN,BN,CN	Long Term Flicker V BN	Unsigned Integer	4 Byte		1 Secondary	No	MSR, MSB	N/A

OK Clear all Clear Cancel Help Registers 35 of 2048

Data entry is straightforward. Each entry field is described below. Note that not all selections appear on the screen at the same time. Use the scroll buttons to view additional data/entry fields on the screen. Certain entries (such as Format, Data Size, etc.) have different allowable selections depending on the data point used. The pull-down menu adjusts to provide the appropriate selections for each data point.

- Data Point Selection: there are two different ways to select a data point:
  - a. Refer to the Nexus® 1500/1500+ meter's Modbus map and find the associated line and point for the value you want. When you enter those values into the screen table, the software displays the associated group and channel.
  - The Nexus® 1500/1500+ meter's Modbus map can be downloaded from the EIG website: <http://www.electroind.com/downloads/nexus-meters/>.

b. Double-click the Group field. From the pull-down menus, select a group and its associated channel value. The software displays the map and line values.

- Number of Registers: this field is display only. The software computes the number in this field based on the data size selected in the Data Size column.
- Start Register: this field is display only. The software assigns and adjusts Start register numbers to take into account previous entries and data sizes. The Start register is the number of the first register used in polling. The Start registers are shown as 4x to describe them as holding registers, for SCADA applications.
- Format: from the pull-down menu, select a format type for a value, such as Signed Integer, Unsigned Integer, and 4 Byte IEEE Float.
- Data Size: from the pull-down menu, select the number of bytes you want to represent the data point: 2 or 4.
- Unit: if the polled value is viewed as an integer, the Unit field tells the software where to place the decimal point.

#### **Examples**

- If you select .01, a polling value 1,800.92883 is interpreted as 180,092.883.
- If you select 100, a polling value 1234 is interpreted as 123400.
- Primary/Secondary: the meter normally computes values in secondary units. Where applicable, you may select primary or secondary. If Primary is selected, the value is multiplied by the appropriate CT and/or PT values.
- Absolute Value: where appropriate, you may have the option of having the data point computed as a signed or absolute value. Select either:
  - No: to have the data point computed as a signed value.
  - Yes: to have the data point computed as an absolute value.

- **Byte Order:** for most of the data points, you can select the polling order of the registers/bytes to match what the SCADA system needs. The choices are: MSR, MSB (most significant register, most significant byte); MSR, LSB (most significant register, least significant byte); LSR, MSB (least significant register, most significant byte); and LSR, LSB (least significant register, least significant byte). EIG meters store data as MSR, MSB, whereas most SCADA systems use LSR, LSB. You can either select an alternate order here, for example, LSR, LSB, or you can leave the data as is and then have your SCADA system change the order after the data is polled.
  - **Display/Modulo/Offset:** depending on the data point, select one or more additional options with appropriate sub-selections.
    - **Display:** for certain data points, interpretation and display options are offered.  
**Example:** For "AN Angle" values, you can represent and display as 0 to 360 degrees or -180 to +180 degrees, etc. Selections appear in a pull-down menu for the associated point. You may want to select -180 to +180 degrees if you want to know if a phase angle is positive or negative in relation to the reference.
    - **Modulo:** Certain values are cumulative and can roll over and start recounting from zero. For those values, where required, you can enter a point at which the rollover will occur.
    - **Offset:** Where allowed, you can enter a value (offset) that will be added to the data point when it is computed.
2. When all changes are entered, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 11.1.8: Configure Log Sizes

The Configure Log Sizes setting allows you to set the size (amount of memory) allocated for each log, so you can optimize the number of records stored for each log.

1. From the General Settings menu, double-click on the Configure Log Sizes line. You will see the screen shown below.

Configure Log Sizes

Log	Assigned		Total Percent of Log Memory	Approximate Time Span	Approximate Records
	Blocks	Memory(MB)			
System Events	1	1	0.13	N/A	31130
Historical 1	1	1	0.13	76 days 7 hr 0 min 0 s	7324
Historical 2	1	1	0.13	259 days	24903
Historical 3	10	10	1.25	926 days	88939
Historical 4	10	10	1.25	2882 days	276706
Historical 5	10	10	1.25	894 days	85870
Historical 6	10	10	1.25	3705 days	355765
Historical 7	10	10	1.25	2255 days	216552
Historical 8	10	10	1.25	2730 days	262143
Event Triggered	1	1	0.13	N/A	31130
Sequence of Events (Limits)	1	1	0.13	N/A	15812
Digital Inputs	1	1	0.13	N/A	6553
Digital Outputs	1	1	0.13	N/A	10376
Flicker	1	1	0.13	N/A	24903
Waveform	40	40	5.00	N/A	38912
Power Quality	20	20	2.50	N/A	34827
Transients	10	10	1.25	N/A	15561

This screen is used to configure the amount of memory that is assigned to each log. To change the amount of memory assigned to a log, click on the 'Blocks' Column of a log to edit.

Remaining Blocks

OK Cancel

This screen lists the logs and the assigned blocks/memory/total percent of log memory/ for each, along with the approximate time span and approximate number of records based on the log's size; the bottom of the screen lists the remaining blocks/memory.

2. Click in the Blocks field of any log that you want to configure and enter the amount of blocks you want that log to use: 1 Block = 1 MegaByte of memory.



The software limitation of the log sizes is shown in the table below. However, the V-Switch key of your meter may restrict these sizes - see the NOTES below.

Log	Min Size	Max Size
System Events	1	1
Historical Log 1	0	8
Historical Log 2	0	8
Historical Log 3-8	0	60
All other logs	0	All remaining unused log memory at current V-Switch key level

- Click OK to save your changes and exit the screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

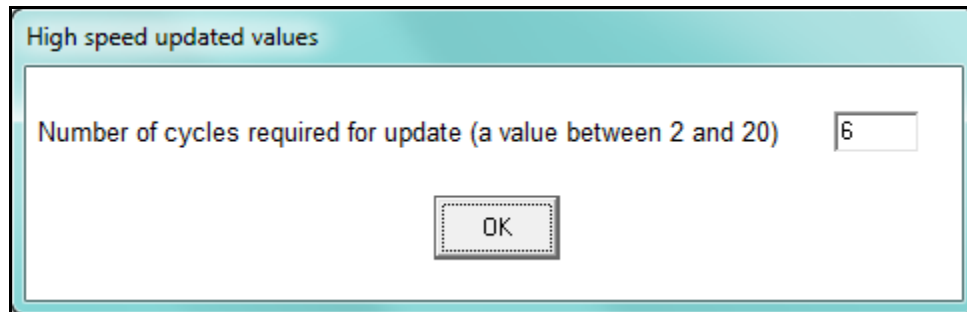
#### NOTES:

- The amount of memory available for logging depends on the meter's model and V-Switch™ key:
  - V1:
    - 128 MB memory for logging for the Nexus® 1500 meter
    - 512 MB memory for logging for the Nexus® 1500+ meter
  - V2: 1 GB memory for logging for both the Nexus® 1500 meter and the Nexus® 1500+ meter
  - V3:
    - 1 GB memory for logging for the Nexus® 1500 meter
    - 4 GB memory for logging for the Nexus® 1500+ meter
- Memory size allocations can change. See the *Nexus® 1500 (or) 1500+ Meter Installation and Operation Manual* for specific memory sizes.

### 11.1.9: Configure High Speed Value Update Rate - Nexus® 1500+ Meter

The Configure High Speed Value Update Rate setting lets you configure the update rate for the meter's High Speed Inputs. You can set between two and 20 cycles. This number determines how often any values assigned to the High Speed Inputs are updated.

1. From the General Settings menu, double-click on the Configure High Speed Value Update Rate line. You will see the screen shown below.

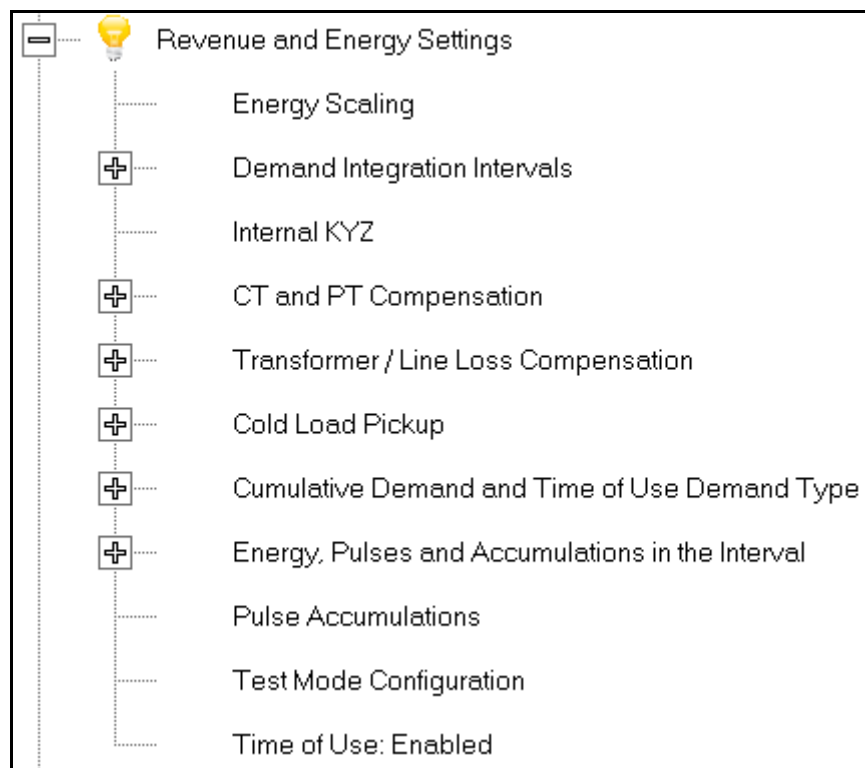


2. Enter the number of cycles you want before an update is performed: enter a number between 2 and 20.
3. Click OK to save your changes and exit the screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

## 11.2: Revenue and Energy Settings

Revenue and Energy Settings are the second group of settings in the Device Profile. They are used to configure the meter settings for parameters that are useful in energy measurement applications.

1. From the Device Profile screen, click on the + button next to Revenue and Energy Settings or double-click on the Revenue and Energy Settings line. All of the settings in the Revenue and Energy Settings group are listed. Not that you will only see the last two settings: Test Mode Configuration and Time of Use: Enabled/Disabled, if you are connected to a Nexus® 1500+ meter.



2. Click on the programmable setting you want to modify. The following sections explain the settings in the order in which they appear in the Revenue and Energy Settings menu.

### 11.2.1: Energy Scaling

Energy scaling is the amount of digits and the decimal point position that will be seen on the meter display. Each energy parameter can be specifically set up for its desired scaling.

1. From the Revenue and Energy Settings menu, click on the + button next to Energy Scaling or double-click on the Energy Scaling line. You will see the Energy Scale Settings screen.

To configure scaling for a reading, enter:

1. Number of Digits, 2. Number of Decimal Places,
3. Unit of Measurement; 4. Example of the resultant scaling is shown here

The screenshot shows the 'Energy Scale Settings' window. It has several tabs: 'I and V Squared T Readings', 'Q Hours', 'Energy', 'Uncompensated Energy', and 'Pulse Accumulations and Aggregations'. The 'Energy' tab is selected. Inside, there are sub-tabs: 'Watt Hour', 'VA Hour', and 'VAR Hour'. The 'Watt Hour' sub-tab is active. Below the sub-tabs is a table with columns: 'Item', 'Digits', 'Decimal Places', 'Units', and 'Example'. Red arrows point to these columns: Arrow 1 points to 'Digits', Arrow 2 points to 'Decimal Places', Arrow 3 points to 'Units', and Arrow 4 points to 'Example'. The table contains rows for 'Quadrant 1 Wh' through 'Quadrant 2+3 Wh'. The 'Quadrant 2+3 Wh' row has a dropdown menu for 'Units' set to 'kWh'. Below the table is a note: 'Net Wh uses Quadrant 1+4 Wh settings.' At the bottom are buttons for 'Global Settings', 'OK', and 'Cancel'.

Item	Digits	Decimal Places	Units	Example
Quadrant 1 Wh	8		1 kWh	9999999.9
Quadrant 2 Wh	8		1 kWh	9999999.9
Quadrant 3 Wh	8		1 kWh	9999999.9
Quadrant 4 Wh	8		1 kWh	9999999.9
Quadrant 1+4 Wh	8		1 kWh	9999999.9
Quadrant 2+3 Wh	8	1	kWh	9999999.9

Net Wh uses Quadrant 1+4 Wh settings.

- This screen has multiple tabs that allow you to access all of the Energy Scaling options. Using the Energy Scale Settings screens you can select the number of digits, decimal point placement and Energy unit for displayed readings.  
**NOTE:** This also affects the resolution of logged energy values and affects the rollover.
- The Example field shows you the scaling choices you made applied to an example reading.

- You click on the tabs to navigate between screens, except for Global settings - you click on the Global Settings button to access that screen.

### Global Settings

Item	Digits	Decimal Places	Units	Example
Quadrant 1+4 Wh	8	1		9999999.9
Quadrant 2+3 Wh	8	1		9999999.9
Quadrant 1+2 VARh	<input type="text"/>	<input type="text"/>		
Quadrant 3+4 VARh				
Quadrant 1+2+3+4 VAh				
Internal Input Accumulators				
Internal Input Aggregators				
I Squared T				
V Squared T				

**NOTE:** Because there are many energy settings, Global Settings conveniently allows you to set these similar energy reading settings all at once.

2. Click the Global Settings button to see the screen shown above. This screen lets you set the scale for all of the Energy Readings.
  - a. Click in the Digits field and select the number of digits for the value from the pull-down menu. You can choose between 2 and 9 digits.
  - b. Click in the Decimal Places field and select the number of decimal places for the value from the pull-down menu. You can choose between 0 and 7 decimal places, depending on the number of digits you selected. For example, if you chose 3 digits, you can only choose up to 2 decimal places.
  - c. Click in the Units field to select the unit of measurement for the value. You can select blank (or leave the field blank), k, or M.

The example field changes as you make selections, to show you how the value would appear with the settings you made.

3. When all changes are entered, click Apply to return to the main Energy Scale Settings screen. You can now use the tabs to modify the scale for specific readings. For example, you might have set the scale for the Internal Input Accumulators as 5

digits, 2 decimal places, and M unit, but you may want one of the accumulators to have a different scale. You would click the Pulse Accumulations and Aggregations tab and change the scale for that accumulator. The following sections show the tab screens where you can make individual scaling changes. You set the Digits, Decimals, and Units fields in the same way as in the Global Settings screen.

## Energy Tab

This is the initial screen view. Click on the Watt Hour, VA Hour, and VAR Hour tabs to configure scaling for those readings.

Click to set Watt Hour readings scaling (this is the initial tab view)

Click to set VA Hour readings scaling

Click to set VAR Hour readings scaling

Energy Scale Settings

I and V Squared T Readings    C Hours    Pulse Accumulations and Aggregations

Energy    Uncompensated Energy    Watt Hour    VA Hour    VAR Hour

Item	Digits	Decimal Places	Units	Example
Quadrant 1 Wh	8	1	kWh	9999999.9
Quadrant 2 Wh	8	1	kWh	9999999.9
Quadrant 3 Wh	8	1	kWh	9999999.9
Quadrant 4 Wh	8	1	kWh	9999999.9
Quadrant 1+4 Wh	8	1	kWh	9999999.9
Quadrant 2+3 Wh	8	1	kWh	9999999.9

Net Wh uses Quadrant 1+4 Wh settings.

Global Settings

OK    Cancel

The meter has the ability to measure and display energy readings for many different purposes. These readings can each be scaled separately.

## Uncompensated Energy Tab

Uncompensated energy is the energy log that does not have the transformer/line loss compensation attached to it.

Click on the Uncompensated Energy tab to configure specific VA, Watt and VAR readings not adjusted by Transformer Loss Compensation.

Item	Digits	Decimal Places	Units	Example
Quadrant 1+4 Wh	8	1	k	9999999.9
Quadrant 2+3 Wh	8	1	k	9999999.9
Quadrant 1+2+3+4 VAh	8	1	k	9999999.9
Quadrant 1+2 VARh	8	1	k	9999999.9
Quadrant 3+4 VARh	8	1	k	9999999.9

This meter has the ability to collect both compensated and uncompensated energy data, simultaneously. This is useful in jurisdictions in which multiple entities need to receive data, if some of the entities require compensated data, and others require uncompensated data.

## Pulse Accumulations and Aggregation Tab

Pulse accumulations allow the meter to be used as a pulse counter and pulse totalizer. This is useful when you want to add additional metered parameters, such as water, condensate (steam), gas, or any other desired energy commodity.

Click on the Pulse and Aggregations tab and then click on the Accumulators and Aggregators tabs to configure scaling for those readings.

Click to set scaling for Accumulator readings (this is the initial tab view)

Click to set scaling for Aggregator readings

Energy Scale Settings

I and V Squared T Readings    Q Hours

Energy    Uncompensated Energy    **Pulse Accumulations and Aggregations**

**Accumulators**    Aggregators

Item	Digits	Decimal Places	Units	Example
Input 1	8		1 k	9999999.9
Input 2	8		1 k	9999999.9
Input 3	8		1 k	9999999.9
Input 4	8		1 k	9999999.9
Input 5	8		1 k	9999999.9
Input 6	8		1 k	9999999.9
Input 7	8		1 k	9999999.9
Input 8	8		1 k	9999999.9

Global Settings

OK    Cancel



## I and V Squared T Readings Tab

Click on the I and V Squared Readings tab to configure scaling for specific  $I^2T$  readings (data will not accumulate until current reaches the programmed level) and  $V^2T$  readings (data stops accumulating when Voltage falls below the programmed level).

**Energy Scale Settings**

Energy    Uncompensated Energy    Pulse Accumulations and Aggregations

**I and V Squared T Readings**    Q Hours

Item	Digits	Decimal Places	Units	Example
I Squared T Phase A	8		1 k	9999999.9
I Squared T Phase B	8		1 k	9999999.9
I Squared T Phase C	8		1 k	9999999.9
V Squared T Phase A	8		1 k	9999999.9
V Squared T Phase B	8		1 k	9999999.9
V Squared T Phase C	8		1 k	9999999.9

I Squared T Average uses I Squared T Phase C's settings.  
V Squared T Average uses V Squared T Phase A's settings.

Global Settings

OK    Cancel

## Q Hours Tab

Click on the Q Hours tab to configure scaling for +QH and -QH readings.

The image shows a software window titled "Energy Scale Settings". It has four tabs: "Energy", "Uncompensated Energy", "Pulse Accumulations and Aggregations", and "Q Hours". The "Q Hours" tab is currently selected. Inside the window, there is a table with the following data:

Item	Digits	Decimal Places	Units	Example
+Qh	8	1	k	9999999.9
-Qh	8	1	k	9999999.9

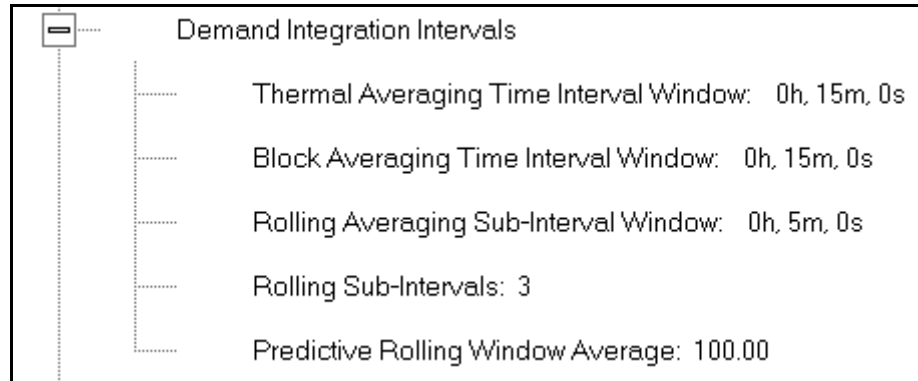
Below the table, there are three buttons: "Global Settings", "OK", and "Cancel".

4. When you are done, click OK to return to the main Device Profile screen. For these changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 11.2.2: Demand Integration Intervals

See the *Nexus® 1500 (or) 1500+ Meter Installation and Operation Manual* for details on Demand intervals.

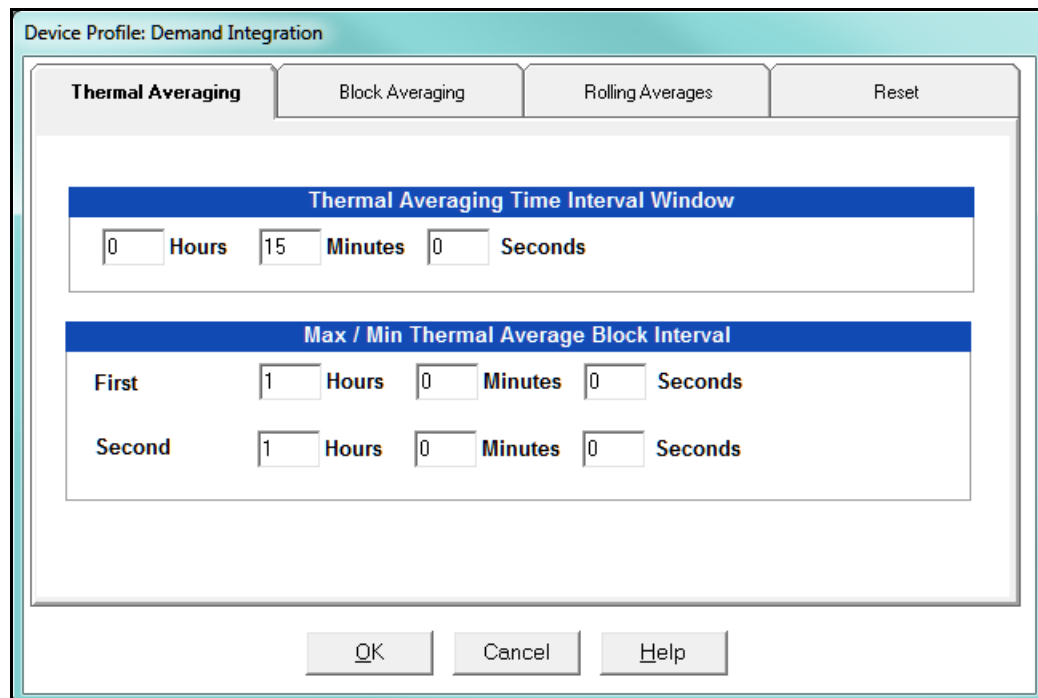
1. From the Revenue and Energy Settings menu, click on the + button next to Demand Integration Intervals or double-click on the Demand Integration Intervals line. You will see the submenu shown below.



The screenshot shows a submenu titled "Demand Integration Intervals". It contains five settings listed vertically:

- Thermal Averaging Time Interval Window: 0h, 15m, 0s
- Block Averaging Time Interval Window: 0h, 15m, 0s
- Rolling Averaging Sub-Interval Window: 0h, 5m, 0s
- Rolling Sub-Intervals: 3
- Predictive Rolling Window Average: 100.00

2. Double-click on any of the settings. You will see the screen shown below.



The screenshot shows a dialog box titled "Device Profile: Demand Integration". It has four tabs: "Thermal Averaging", "Block Averaging", "Rolling Averages", and "Reset". The "Thermal Averaging" tab is selected. Inside the dialog, there are two main sections:

- Thermal Averaging Time Interval Window:** This section contains three input fields for time: "0" Hours, "15" Minutes, and "0" Seconds.
- Max / Min Thermal Average Block Interval:** This section contains two rows of input fields:
  - First:** "1" Hours, "0" Minutes, "0" Seconds
  - Second:** "1" Hours, "0" Minutes, "0" Seconds

At the bottom of the dialog, there are three buttons: "OK", "Cancel", and "Help".

3. Click on the tabs at the top of the screen to navigate from one setting to another. Make changes to the settings according to your application requirements. Following is a brief description of each setting and its function:

- Thermal Averaging (tab shown on previous page): use to set hours and minutes for a precise thermal window of demand data.
  - Traditional analog Watt-hour meters use heat-sensitive elements to measure temperature rises produced by an increase in current flowing through the meter. A pointer moves in proportion to the temperature change, providing a record of demand. The pointer remains at peak level until a subsequent increase in demand moves it again, or until it is manually reset.

The Nexus® 1500/1500+ meter mimics traditional meters to provide Thermal Demand readings. Electronic thermal demand emulation is the logarithmic average of the power used, with a more recent load being weighted more heavily than a less recent load, (approximated exponentially). Each second, as a new power level is computed, a recurrence relation formula is applied. This formula recomputes the thermal demand by averaging a small portion of the new power value with a large portion of the previous thermal demand value. The occurrence of the proportioning of new to previous is programmable, set by the averaging interval. The averaging interval represents a 90 change in thermal demand to a step change in power. So, for example, with a 15 minute set interval, the meter will record 90 of a change in load in 15 minutes, 99 in 30 minutes, and 99.9 in 45 minutes.

Because thermal demand emulation is the logarithmic average, the demand is not set to zero on a demand reset. On a demand reset, present demand becomes the new maximum demand.

- The Max/Min Thermal Average Block Interval fields are used if you want to track the maximum and minimum Demand in more than one interval, e.g., the Max and Min Demand in a 10 minute (First Interval) and a 15 minute interval (Second Interval).

- Block Averaging Time: use to set the length of the block interval used for Demand calculations and other interval-based functions; also used to set End of Interval pulse. Block averaging is also known as fixed window averaging. A window is the user set time range, e.g., 15 minutes. Computation is performed on that 15 minute interval, and after that, a new set of computations will be started. For example, Window 1 will be from 0 to 15 minutes, Window 2 will be from 16 to 30 minutes, and so on.

Device Profile: Demand Integration

Thermal Averaging **Block Averaging** Rolling Averages Reset

**Block Averaging Time Interval Window**

0 Hours 15 Minutes

**Block Window Sync**

High Speed Input Sync Disabled

☐ Generate End of Interval Pulse

Internal Relay # 4 Pulse Width 530 milliseconds

OK Cancel Help

- Use the Hours and Minutes fields to set the length of the Block Interval.
- If you want to generate a pulse at the end of the set interval, click the box next to the Generate End of Interval Pulse field and select the number of the internal relay (1-4) you want to use and the pulse width (600 - 530 milliseconds).

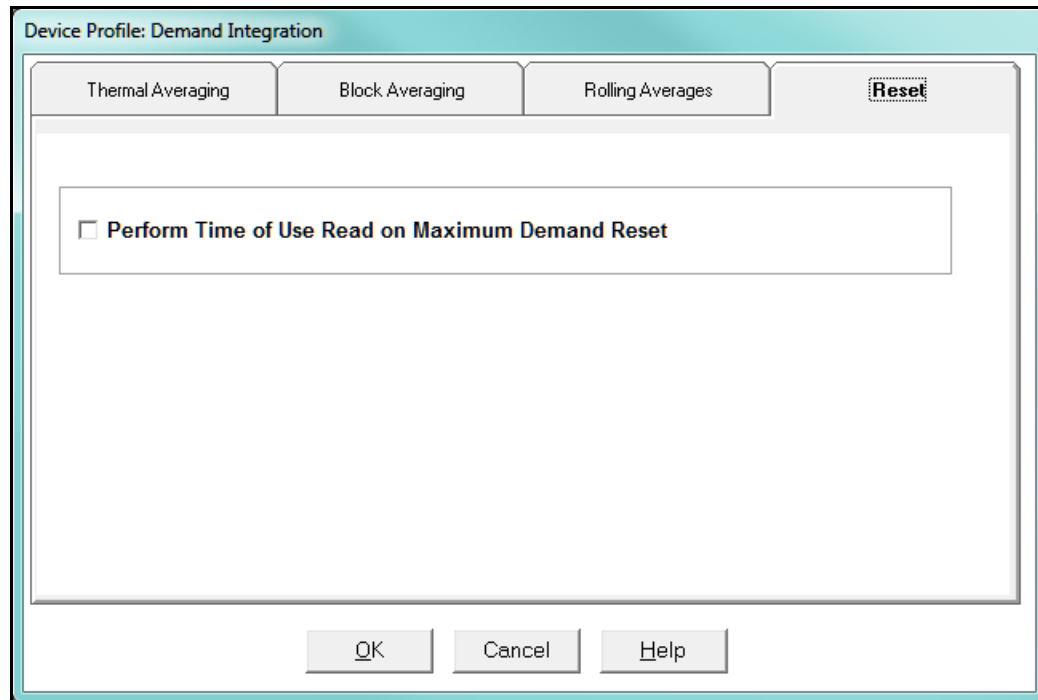
**NOTE:** The Block Window Sync field indicates whether the meter is being synchronized with pulses from a High Speed input. This option is set in the Input Type field of the High Speed Inputs screen (see Section 11.3.8).

- Rolling Averages: also known as a sliding window, functions like multiple, overlapping Block averages. You define the subintervals at which an average of Demand is calculated. A window duration is the user set time, such as 15 minutes, but it moves, so that, for example, Window 1 is 0 to 15, Window 2 is 1 to 16, Window 3 is 2 to 17, and so on.

The screenshot shows a software window titled "Device Profile: Demand Integration". It has four tabs: "Thermal Averaging", "Block Averaging", "Rolling Averages" (which is selected), and "Reset". Inside the "Rolling Averages" tab, there are two main sections. The first section, "Rolling Averaging Sub-Interval Window", contains two input fields: "0" for "Hours" and "5" for "Minutes". The second section, "Rolling Sub-Intervals", contains an input field with the value "3", and to its right, the text "Rolling Average Interval Window: 15.00 Minutes". At the bottom of the window are three buttons: "OK", "Cancel", and "Help".

- Set the Hours and Minutes fields under Rolling Averaging Sub-Interval Window.
- Rolling Sub-Intervals: set the number of rolling windows you want to "string together."
- Predictive Rolling Window Average: you won't see Predictive Rolling Window Average if you are connected to a Nexus® 1500+ meter. For a Nexus® 1500 meter, the meter gives you the programmed (field) prediction of your demands. If you are using Demand as a Limit, such that you will perform certain actions when you hit a certain Demand level, e.g., turning off motors, you may want to give yourself a "buffer." This field accomplishes that by letting you choose to over-predict the Rolling Window Demand - e.g., if you enter 110, the meter will predict Demand at a 10 higher rate than the actual Demand, so that you will trigger a Limit alarm earlier than if you were using 100 Predictive Demand.

- Reset: Allows you to specify a Time of Use read whenever Maximum Demand is reset.



- Check the box to perform the TOU read. By selecting this, the meter will place all of the TOU values in the previous month's registers. Otherwise, the meter will default to self read based on a date set in the meter.
  - Leave the box unchecked if you don't want to perform a TOU read.
4. When all changes are entered, click OK to return to the main Device Profile screen. For these changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 11.2.3: Internal KYZ Outputs

The Internal KYZ Outputs setting lets you assign channels to the KYZ outputs and to the test LEDs. The channel selection sets the type of pulse that will be generated. For example, the Pulse 1 LED can generate Energy Pulses for conventional testing or Reactive (VARh) Pulses for complex testing and approvals. This setting also allows you to determine the frequency and duration of the pulse for each output and LED.

1. From the Revenue and Energy Settings menu, click on the + button next to Internal KYZ Settings or double-click on the Internal KYZ Settings line. You will see the screen shown below.

KYZ Output	Assigned Channel	Watt Hour Per Pulse	Pulse Width(ms)	Mode	Form
1, Pulse 1 LED	Quad (1 + 4) Watthour	1.8000000	150	Enable	Pulse (Form A)
2, Pulse 2 LED	Quad (1 + 2) VARhour	1.8000000	150	Enable	Pulse (Form A)
3	Quad (2 + 3) Watthour	1.8000000	150	Enable	Pulse (Form A)
4	Quad (3 + 4) VARhour	1.8000000	150	Enable	Pulse (Form A)

Note: To configure a Relay to generate End of Interval Pulse, go to the Demand Integration Intervals Block Average Tab.

Note: To configure a Relay to generate Operation Status Output, go to the Operation Status Output Setting.

OK Cancel Help

2. To make selections on this screen:

- a. Select the assigned channel for the pulse/output. This is the demand that will be output as a pulse.
- b. Enter Watt hour per pulse, pulse width, mode and form for each pulse/output.

#### NOTES:

- Form A = Pulse; Form C = Transition
- No more than one Pulse Output can be assigned as an Operation Status Output.



3. When all changes are entered, click OK to return to the main Device Profile screen. For these changes to take effect, you must click the Update Device button to send the new profile to the meter.

### **Considerations on Setting KYZ Outputs**

KYZ Pulses are produced at a rate proportional to the rate of energy accumulation, a feature that makes them useful for accuracy testing. Decreasing the value of the Watt Hour per Pulse field increases the pulse rate, improving the moment-to-moment precision of the output. The increased pulse rate means that the pulses are of shorter duration. Most equipment for detecting and counting pulses has a minimum detection time, so pulses that occur too rapidly might not be detected and counted.

The value in the Pulse Width field is used to force the meter to generate minimum width pulses in situations where proportional width pulses would occur too quickly to be measured. A pulse width setting that does not match appropriately with the input level and Watt hour per pulse setting will result in output that, in the short term, will not verify correctly.

For proper operation of this feature, the pulse width should be set to a value that is longer than the detection time required by the monitoring equipment, and shorter than the pulse period that the inputs and Watt hour per pulse setting would produce. The formula for the second quantity is:

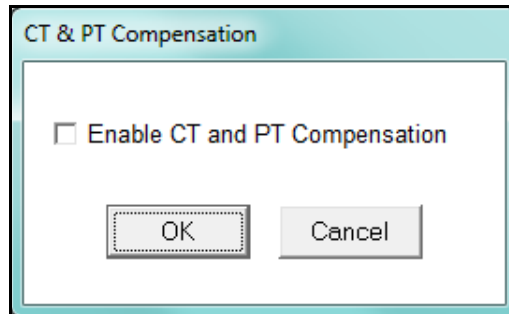
$$\frac{3600 \times \text{Watt-hr per pulse}}{\text{Total Power}}$$

Some example cases are shown in the table below. For proper operation the pulse width should be set to a value that is less than the computed value of seconds per pulse.

Voltage Phase to Neutral/Phase		Current		Total Power Wh/Pulse	Pulses/Hour	Seconds/Pulse
Volts	Volts	Amps	Watts	Wh	Pulses	Seconds
69.28	120.00	1	207.85	1.8000000	115.47	31.18
69.28	120.00	1	207.85	0.2078461	1000.00	3.60
69.28	120.00	5	1039.23	1.8000000	577.35	6.24
69.28	120.00	5	1039.23	1.0392305	1000.00	3.60
120.00	207.85	1	360.00	1.8000000	200.00	18.00
120.00	207.85	1	360.00	0.3600000	1000.00	3.60
120.00	207.85	5	1800.00	1.8000000	1000.00	3.60
277.13	480.00	1	831.38	1.8000000	461.88	7.79
277.13	480.00	1	831.38	0.8313844	1000.00	3.60
277.13	480.00	5	4156.92	1.8000000	2309.40	1.56
277.13	480.00	5	4156.92	4.15629219	1000.00	3.60

### 11.2.4: CT and PT Compensation

1. From the Revenue and Energy Settings menu, click on the + button next to CT and PT Compensation or double-click on the CT and PT Compensation line.



2. Check the Enable box to enable CT and PT Compensation; leave the box unchecked to keep it disabled.
3. Click OK to close the screen and return to the main Device Profile screen. For these changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 11.2.5: Transformer / Line Loss Compensation

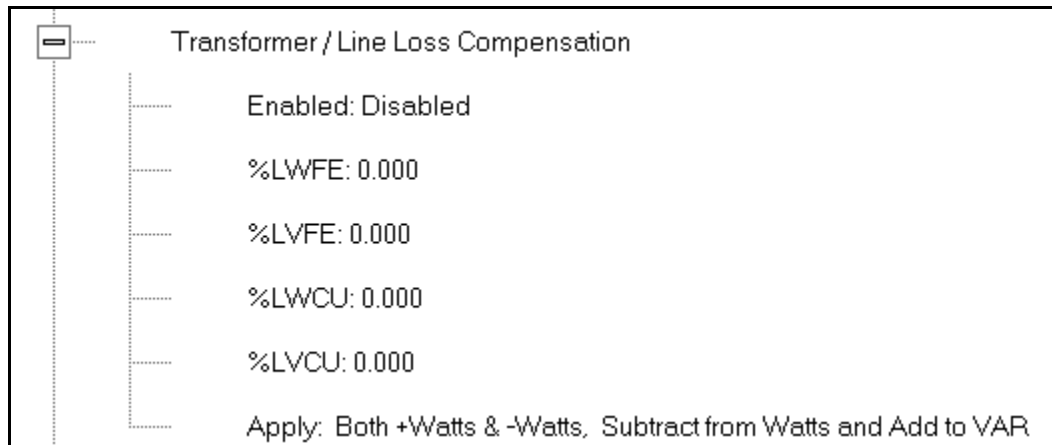
Transformer losses are power used by the transformer while working. The more load on the transformer, the higher the transformer losses. There are two types of transformer losses:

- No load losses - these are the fixed losses that keep the transformer up and running.
- Load losses - these vary with changes in the load.

When the meter is located on the secondary side of a customer's transformer, a utility will want to add the transformer losses into the energy usage calculation. However, this practice is regulated by local jurisdiction and regulations. The meter has the capability to add in or subtract out these transformer losses, depending on the user's specific needs.

Line losses are similar to transformer losses, except that they are used to compensate for loss incurred on wires, such as transmission lines.

1. From the Revenue and Energy Settings menu, click on the + button next to Transformer/Line Loss Compensation or double-click on the Transformer/Line Loss Compensation line. You will see the submenu shown below.



2. The menu displays the current values for the meter's Transformer Loss Compensation.
  - LWFE = percent loss of Watts due to iron
  - LVFE = percent loss of Vars due to iron
  - LWCU = percent loss of Watts due to copper
  - LVCU = percent loss of Vars due to copper

3. Double-click on any of the loss values. You will see the screen shown below.

Device Profile: Transformer and Line Loss Compensation

**Percent Loss of Watts**

Due to Iron 0.000

Due to Copper 0.000

**Percent Loss of VARS**

Due to Iron 0.000

Due to Copper 0.000

Disabled

Subtract from Watts and Add to VAR

**Transformer and Line Loss Applies to**

Both +Watts and -Watts

☐ Disable When Current is Zero

OK TLC Calculator Cancel Help

4. Click on **TLC Calculator** to find the values to enter into the Percent Loss fields. The TLC Calculator button launches the TLC Calculator that performs the calculations for you once the required data is entered.

**NOTE:** Appendix A contains screen caps of the TLC Calculator with example numbers, and an explanation of Loss Compensation considerations.

5. Enter the percent loss of Watts and VARS for copper and iron in the appropriate fields.
6. Enable or Disable Transformer Loss Compensation with the first pull-down menu at the bottom of the screen. The optional selections are:
- Disabled
  - Iron (Fe) Only
  - Copper (Cu) Only
  - Both Iron and Copper (Fe and Cu)

7. With the second pull-down menu, select from the following options:

- Add to Watts and Subtract from VAR
- Subtract from Watts and Add to VAR
- Add to Watts and VAR
- Subtract from Watts and VAR

8. With the third pull-down menu, apply the loss based on the power flow direction by selecting one of the following options:

- Both +Watts and -Watts
- -Watts only
- +Watts only




9. If you want to disable TLC if the current is zero, check the box.

10. When all settings are complete, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

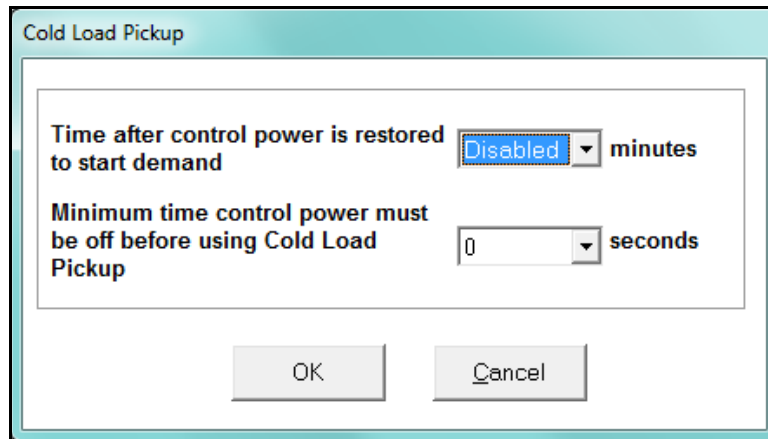
### 11.2.6: Cold Load Pickup

Cold Load Pickup is used to manage Demand in the event of a power outage. You set the amount of time (in seconds) power is off to identify a power outage that is the responsibility of the utility (as opposed to a very short term loss of power that is not their responsibility); then you set the amount of time (in minutes) you want to wait before Demand starts again. This time should correspond to the “grace” period the utility applies to avoid charging for motor startup, etc. after a power outage.

1. From the Revenue and Energy menu, click on the + button next to Cold Load Pickup or double-click on the Cold Load Pickup line. You will see the submenu shown below.

	Cold Load Pickup
	Time after control power is restored to start demand: Disabled
	Minimum time control power must be off before using Cold Load Pickup: 0 Second(s)

2. Double-click on one of the parameters to open the screen shown below.

A screenshot of a software dialog box titled "Cold Load Pickup". The dialog box has a light blue border. Inside, there are two settings. The first setting is "Time after control power is restored to start demand" with a dropdown menu showing "Disabled" and the unit "minutes". The second setting is "Minimum time control power must be off before using Cold Load Pickup" with a dropdown menu showing "0" and the unit "seconds". At the bottom of the dialog box are two buttons: "OK" and "Cancel".

3. Make the following selections in accordance with your application needs:

- Time after control power is restored to start demand - can be 1 to 60 minutes, or Disabled.
- Minimum time control power must be off before using Cold Load Pickup - can be from 0 to 255 seconds.

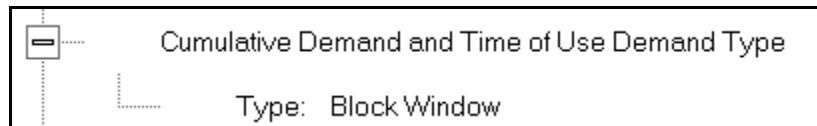
4. When all changes are entered, click OK to return to the main Device Profile screen. For these changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 11.2.7: Cumulative Demand Type and Time of Use Demand Type

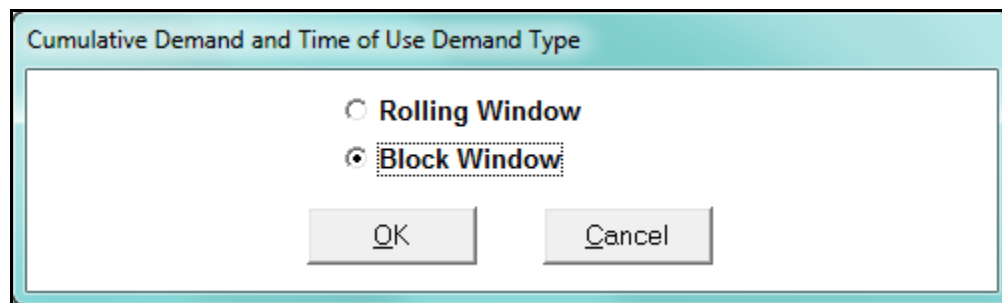
The Nexus® 1500 meter lets you set the Cumulative Demand Type; the Nexus® 1500+ also lets you set the Time of Use Demand Type (both cumulative and TOU must be the same demand type).

- Cumulative demand is a counter of max demand that the meter keeps. It can help you determine if there has been tampering with the meter, i.e., unauthorized resetting of demand. Whenever demand is reset, the current max demand is added to the cumulative demand. By analyzing the data in the counter you can see if the demand is being reset more often than intended. You can choose to use **either** Block Window Demand or Rolling Window Demand for the cumulative demand.

- Time of Use demand type can also be set for the Nexus 1500+ meter. Either Block Window or Rolling Window demand averaging can be chosen. This setting is used to accumulate time of use energy readings. See Chapter 15 for detailed information on time of use for the Nexus® 1500+ meter. Note that the same demand type must be used for both cumulative demand and Time of Use demand.
1. From the Revenue and Energy Settings menu, click on the + button next to Cumulative Demand Type and Time of Use Demand Type or double-click on the Cumulative Demand Type and Time of Use Demand Type line. You will see the submenu shown below. It tells you the type of demand currently selected.



2. Click the Type line to open the screen shown below.



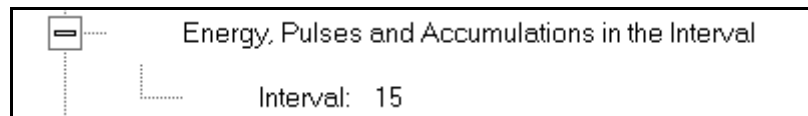
3. Click the radio button in front of Rolling Window (sliding) or Block Window (fixed) to select cumulative Demand and TOU Demand type.
4. Click OK to exit the screen and return to the main Device Profile screen. For a change to take effect, you must click the Update Device button to send the new profile to the meter.



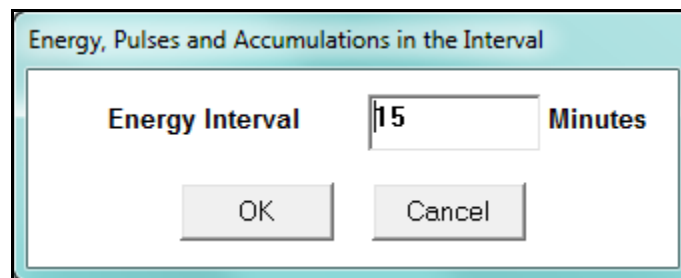
### 11.2.8: Energy, Pulses and Accumulations in the Interval

Energy in the interval is the energy that is accumulated within a load profiling interval. This is often the preferred method for logging because it is a summation of only that particular period of energy. The Interval setting you make creates the sub-accumulation field within the general Energy accumulation. An advantage of this setting is that the sub-accumulation takes up less space and is processed more quickly than the larger accumulation.

1. From the Revenue and Energy Settings menu, click on the + button next to Energy, Pulses and Accumulations in the Interval or double-click on the Energy, Pulses and Accumulations in the Interval line. You will see the submenu shown below.



2. The current Interval setting is displayed. Click on the Interval setting to open the screen shown below.



3. Set the number of minutes for the Energy interval. Note that Energy in the Interval should always match the Demand Interval timing.
3. Click OK to close the window and return to the main Device Profile screen. For any change to take effect, you must click the Update Device button to send the new profile to the meter.

### 11.2.9: Pulse Accumulations

Pulse accumulators are used to count and/or aggregate pulse information from external devices, using the digital high speed inputs. These devices may be gas, water, or electricity meters; energy management systems; SCADA devices; or any pulse-generating device.

This section of the Device Profile displays a series of eight running totals available on the Nexus® 1500/1500+ meter. Each total can be added to (or subtracted from) other totals. This allows you to set the High Speed inputs located directly on the meter to accumulate pulses.

**NOTE:** If you use these inputs for pulse accumulations, do not set them to record waveforms - if you do, you will record endless waveforms.

1. From the Revenue and Energy Settings menu, double-click on the Pulse Accumulations line..

Device Profile: Internal Input Pulse Accumulators Setup

Source	Units/Count	Aggregator	User Assigned Label	Mode	Average Full Scale
1	1	None	Accumulator1	Pulse (Form A)	1000000000000000
2	1	None	Accumulator2	Pulse (Form A)	1000000000000000
3	1	None	Accumulator3	Pulse (Form A)	1000000000000000
4	1	None	Accumulator4	Pulse (Form A)	1000000000000000
5	1	None	Accumulator5	Pulse (Form A)	1000000000000000
6	1	None	Accumulator6	Pulse (Form A)	1000000000000000
7	1	None	Accumulator7	Pulse (Form A)	1000000000000000
8	1	None	Accumulator8	Pulse (Form A)	1000000000000000

Source	Hour Reading	Aggregator
Device	Quadrant(1 + 4) Watt Hour	None

Aggregator	User Assigned Label	Average Full Scale
1	Aggregator 1	1000000000000000
2	Aggregator 2	1000000000000000
3	Aggregator 3	1000000000000000
4	Aggregator 4	1000000000000000

OK Cancel Help

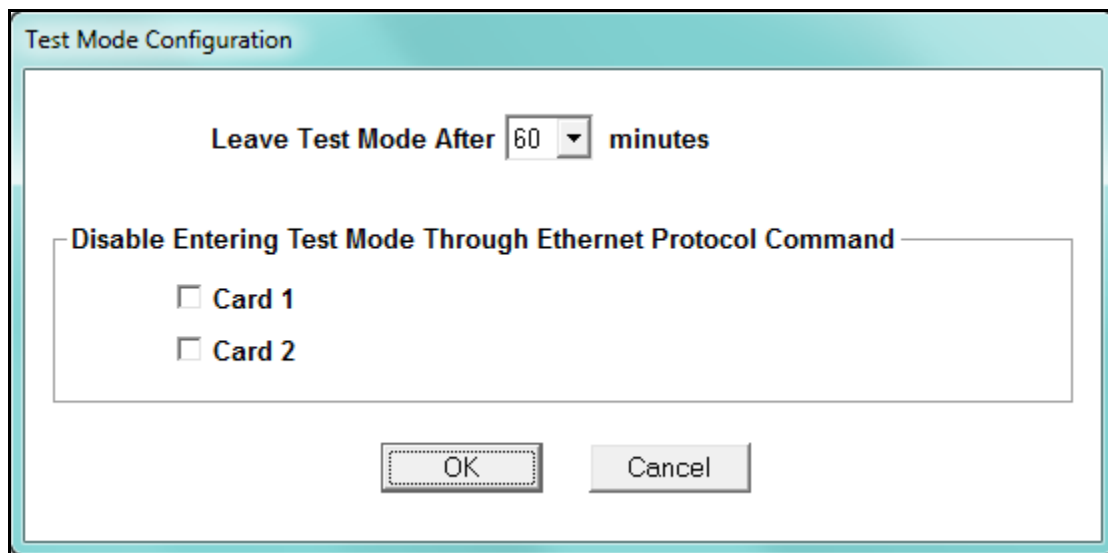
2. High Speed inputs 1-8 are listed in order under Source. Enter the following information or use the pull-down menus to select:

- Units/Count - this is the scale factor that normalizes the pulses so that they can be aggregated. Pulses are stored in primary values.
  - Aggregator - this allows you to place the pulse register into a separate accumulation register that can aggregate (add) or net (subtract) values.
  - User Assigned Label - this window allows you to enter a label designation for the source.
  - Mode - you can set Pulse or Transition. A transition means from open to shorted/closed or from shorted/closed to open; a pulse contains 2 transitions, open to shorted/closed, followed by shorted/closed to open.
  - Average Full Scale - for Nexus® meters, in order to set a limit on a reading it needs a Full Scale value as the 100 reference. You can set a limit on the average number of pulses per interval.
  - Device Hour Reading and Aggregator - source device is the meter you are connected to. The Hour reading is either Quadrant 1 and 4 Watt-hour or Quadrant 2 and 3 Watt-hour. The Aggregators indicate whether the count should be added to, or subtracted from, Aggregators 1-4. You can choose None if you don't want the count to affect any of the Aggregators.
  - Aggregators: The "buckets," or Totalizer fields where pulse counts from the High Speed inputs and from the Watt-Hour counters can be totaled. The user can assign a label to each of the Aggregators. See the Average Full Scale description above for an explanation of this field - it has the same use here, except for the Aggregators.
3. When all data has been entered, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 11.2.10: Test Mode Configuration (Nexus® 1500+ Meter)

The Nexus® 1500+ meter offers a Test Mode that is used to verify the meter's accuracy. This setting lets you configure a time for the Test Mode to time out and for the meter to return to Normal Mode, if there is no testing activity. It also lets you restrict Test Mode access for either or both of the Ethernet ports. See Chapter 20 for additional Test Mode settings, and the *Nexus® 1500+ Meter Installation and Operation Manual* for more information on the meter's Test Mode function.

1. From the Revenue and Energy Settings menu, double-click on Test Mode Configuration. You will see the screen shown below.



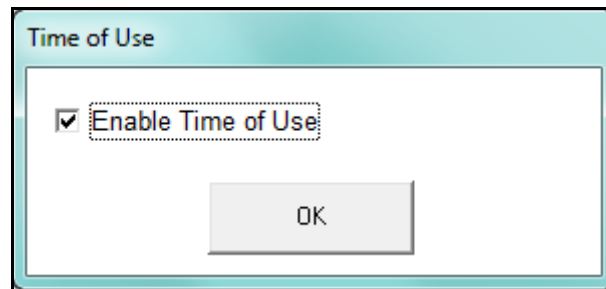
2. Select the timeout period from the pull-down menu. The options are 0-60 minutes. This will be the time the meter waits before returning to Normal Mode from Test Mode, once there is no more testing activity.
3. If you want to restrict Test Mode from being entered through either or both of the Ethernet ports, click the appropriate buttons. Card 1 refers to Network card port #1, and Card 2 refers to the optional Network card port #2.
4. Click OK to save your changes and return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 11.2.11: Time of Use Enable/Disable (Nexus® 1500+ Meter)

The Nexus® 1500+ meter has a setting that lets you enable or disable the meter's Time of Use (TOU) (see Chapter 15 for detailed information on the Nexus® 1500+ meter's TOU). This is useful if you need to reset TOU, since TOU can only be reset if it is not active, i.e., disabled. Once TOU has been reset, use this screen to enable TOU, again.

**NOTE:** You will also use this screen to enable TOU for the first time, once you have set up the TOU Profile, since the meter's default is TOU disabled.

1. From the Revenue and Energy Settings menu, double-click on Time of Use. You will see the screen shown below.

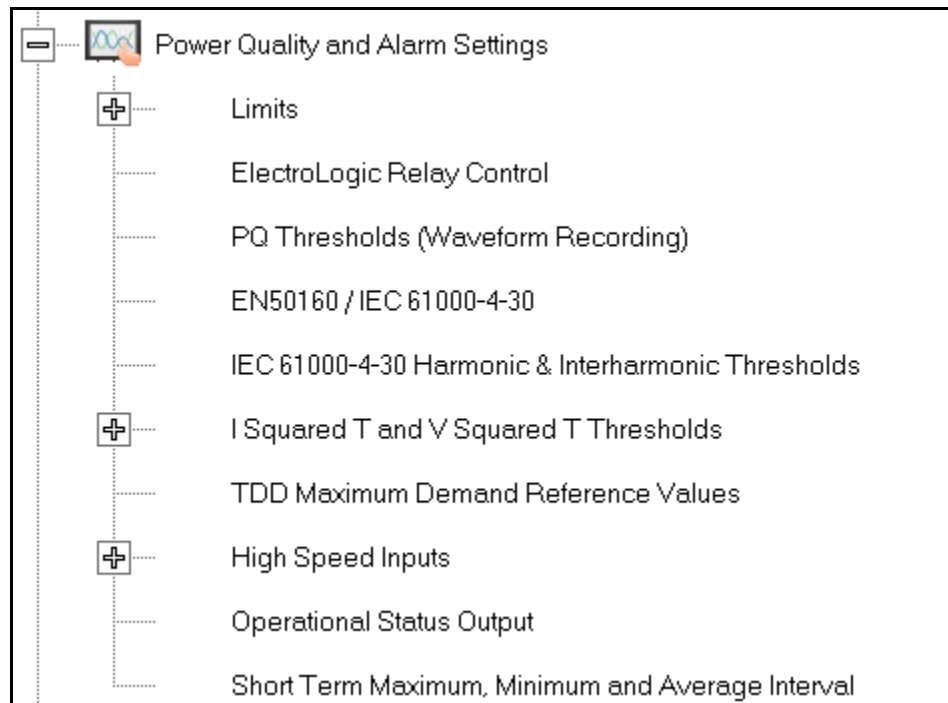


2. When there is a check in the box, TOU is enabled; if the box is blank, TOU is disabled. Clicking in the box toggles it between being checked and being unchecked.
3. Click OK to save your changes and return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 11.3: Power Quality and Alarm Settings

Power Quality and Alarm Settings are the third group of settings in the Device Profile.

1. From the Device Profile screen, click on the + button next to Power Quality and Alarm Settings or double-click on the Power Quality and Alarm Settings line. All of the settings in this group are listed.



2. Click on the programmable setting you want to modify. The following sections explain the settings in the order in which they appear in the Power Quality and Alarm Settings menu.

#### 11.3.1: Limits

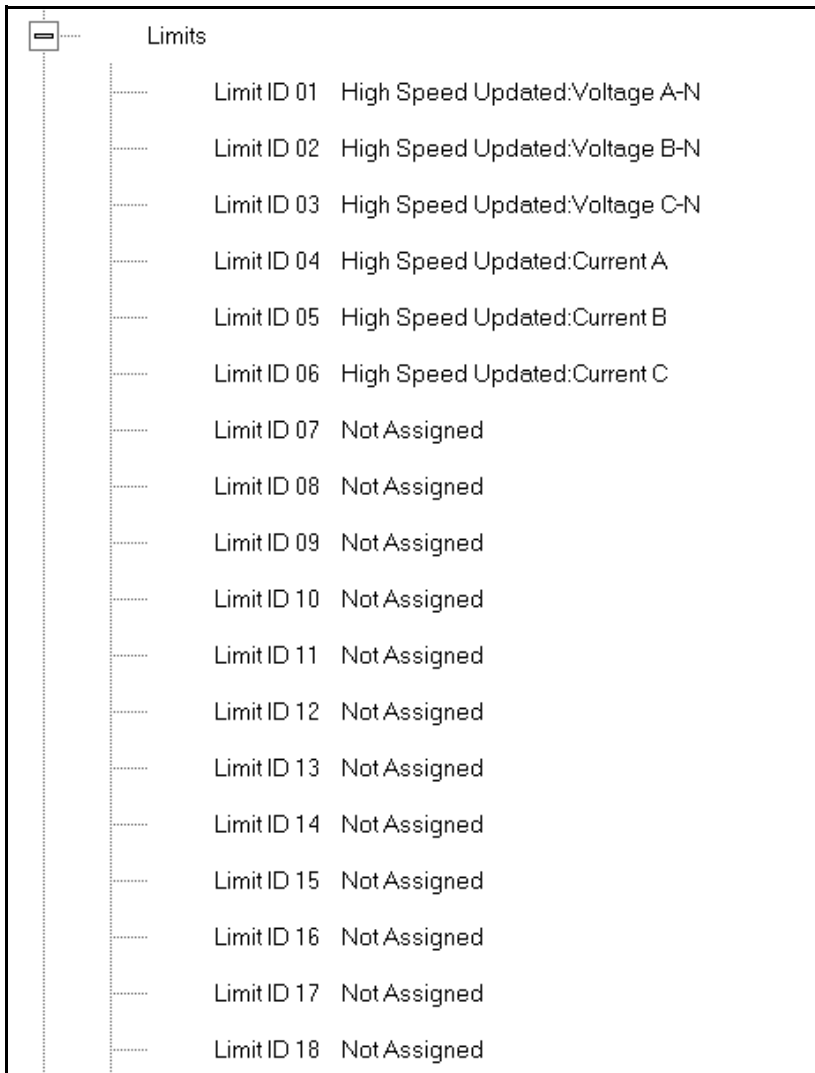
Limits are threshold settings that can be set by a user to trigger a record in a log when an alarm condition is met. Utilizing the limits, the user can then control a relay or send a warning email on that alarm.

Limit settings are based on a percentage of the Full Scale (% of FS), which is set in the Limit and Waveform Full Scales setting (Section 19.4.2). Full Scale is based on CT and PT ratios set in the CT, PT Ratios and System Hookup setting (Section 19.4.1). Limits are based on a percent of Full Scale settings so that the same settings can be used no matter what the CT and PT Ratio needed.

Before programming limits, set the CT and PT ratios. Then, set the Limit and Waveform Full Scales if you want to change to automatic configuration. In most cases the software will configure the Full Scale optimally.

**NOTE:** The software automatically updates the Full Scale; however, you can set it separately from the CT and PT Ratios.

1. From the Power Quality and Alarm Settings menu, click on the + button next to Limits or double-click on the Limits line. You will see the submenu shown below.



Limits	
Limit ID 01	High Speed Updated:Voltage A-N
Limit ID 02	High Speed Updated:Voltage B-N
Limit ID 03	High Speed Updated:Voltage C-N
Limit ID 04	High Speed Updated:Current A
Limit ID 05	High Speed Updated:Current B
Limit ID 06	High Speed Updated:Current C
Limit ID 07	Not Assigned
Limit ID 08	Not Assigned
Limit ID 09	Not Assigned
Limit ID 10	Not Assigned
Limit ID 11	Not Assigned
Limit ID 12	Not Assigned
Limit ID 13	Not Assigned
Limit ID 14	Not Assigned
Limit ID 15	Not Assigned
Limit ID 16	Not Assigned
Limit ID 17	Not Assigned
Limit ID 18	Not Assigned

This submenu displays the current Device Profile Limit settings. Not all limits are shown in the figure above: there are 32 Limit ID fields.

2. Double-click on any of the settings (Limit ID 01, for example). You will see the Limits screen, shown below.

Device Profile: Limits

Limit ID	Assigned Item	Setting	Limit 1		Setting	Limit 2		Combination Limit 3
			% of FS	Primary		% of FS	Primary	
1	High Speed Updated:Voltage A-N	Above	120.00	144.00	Below	80.00	96.00	OR
2	High Speed Updated:Voltage B-N	Above	120.00	144.00	Below	80.00	96.00	OR
3	High Speed Updated:Voltage C-N	Above	120.00	144.00	Below	80.00	96.00	OR
4	High Speed Updated:Current A	Above	150.00	7.50	Below	0.00	0.00	OR
5	High Speed Updated:Current B	Above	150.00	7.50	Below	0.00	0.00	OR
6	High Speed Updated:Current C	Above	150.00	7.50	Below	0.00	0.00	OR
7	Not Assigned	Above	98.00	98.00	Above	0.00	0.00	OR
8	Not Assigned	Below	80.00	80.00	Above	0.00	0.00	OR
9	Not Assigned	Below	80.00	80.00	Above	0.00	0.00	OR
10	Not Assigned	Below	80.00	80.00	Above	0.00	0.00	OR
11	Not Assigned	Below	-0.01	-0.01	Above	0.00	0.00	OR
12	Not Assigned	Below	-0.01	-0.01	Above	0.00	0.00	OR

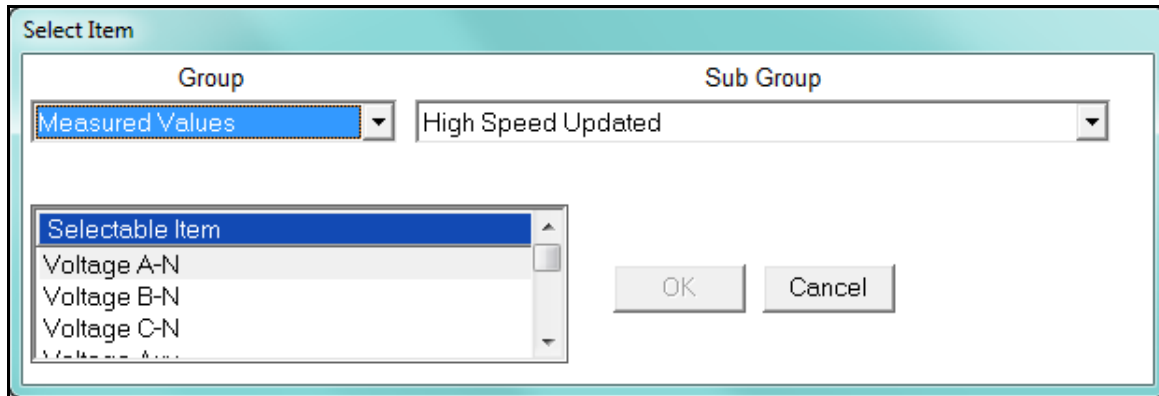
Channels	Primary Values at 100%
I A, B, C, Nc	5.00
I Nm	5.00
V Phase to Neutral	120.00
V Phase to Phase	208.00
Power Phase	600.00
Power Total	1800.00
Frequency	60.00

OK Cancel Help

- This screen can be expanded to show all of the limits. Click on the top or bottom of the screen to display sizing arrows you can click on and drag to expand the screen.
  - Percentage of Full Scale settings ( % of FS): The limits are set in % of Full Scale so that when you create a profile, you can keep your settings. This is true, even though the CT and PT ratios change when the meter (or a new meter) is placed in a different location. Changing the CT and PT ratios does not affect the % of Full Scale limits previously set. This is useful when you are using large numbers of meters because one profile can be used with a common set of limit settings no matter what the CT and PT ratio. Full Scale reference information is available in the lower left box.
3. Make changes to this screen according to your application requirements.
- To set the type of limit and the channel assigned to it:



- a. Double-click in either the Limit ID or Assigned Item column. You will see the screen shown below.



- b. From the pop-up menus, choose the desired settings and click OK. Following is a list of the available Groups, Sub Groups, and Items.

Group: Measured Values

Sub Group: High Speed Updated

Item: Voltage A-N

Voltage B-N

Voltage C-N

Voltage Aux

Current A

Current B

Current C

Current N Measured

Voltage A-B

Voltage B-C

Voltage C-A

VA A

VA B

VA C

VA Total

VAR A

VAR B

VAR C

VAR Total

Watt A

Watt B  
Watt C  
Watt Total  
Frequency  
Power Factor A  
Power Factor B  
Power Factor C  
Power Factor Total  
Volts A-Aux Phase Angle  
Current N Calculated  
Aux Frequency  
Sub Group: One second updated  
Item: Voltage A-N  
Voltage B-N  
Voltage C-N  
Voltage Aux  
Current A  
Current B  
Current C  
Current N Measured  
Current N Calculated  
Voltage A-B  
Voltage B-C  
Voltage C-A  
VA A  
VA B  
VA C  
VA Total  
VAR A  
VAR B  
VAR C  
VAR Total  
Watt A  
Watt B  
Watt C  
Watt Total

Frequency  
Power Factor A  
Power Factor B  
Power Factor C  
Power Factor Total  
Voltage Imbalance  
Current Imbalance  
Uncompensated VA A  
Uncompensated VA B  
Uncompensated VA C  
Uncompensated VA Total  
Uncompensated VAR A  
Uncompensated VAR B  
Uncompensated VAR C  
Uncompensated VAR Total  
Uncompensated Watt A  
Uncompensated Watt B  
Uncompensated Watt C  
Uncompensated Watt Total  
THD Volts A  
THD Volts B  
THD Volts C  
THD Current A  
THD Current B  
THD Current C  
K Factor Current A  
K Factor Current B  
K Factor Current C  
Internal Temperature  
Aux Frequency  
Sub Group: Harmonic Values  
Item: 0 - 127th Harmonic on selectable Harmonic Magnitude  
(Voltage Phases A, B, and C; Current Phases A, B, and C)  
Sub Group: Internal Inputs, States  
Item: Internal Inputs 1-8  
Sub Group: Phase Angles

Item: Phase A-N Voltage  
Phase B-N Voltage  
Phase C-N Voltage  
Phase A Current  
Phase B Current  
Phase C Current  
Phase A-B Voltage  
Phase B-C Voltage  
Phase C-A Voltage  
Volts A-Aux Phase Angle  
Voltage Phase Sequence

Sub Group: Flicker

Item: Flicker: PInst Volts A  
Flicker: PInst Volts B  
Flicker: PInst Volts C  
Flicker: PST Volts A  
Flicker: PST Volts B  
Flicker: PST Volts C  
Flicker: PLT Volts A  
Flicker: PLT Volts B  
Flicker: PLT Volts C

Sub Group: Ten Second Updated

Item: Vaux Frequency

Sub Group: Meter Status

Item: General Health Indication

Sub Group: Fundamental Readings

Item: Watts - A/B/C/Total  
VAR A/B/C/Total  
VA A/B/C/Total  
Power Factor A/B/C/Total

Group: Averages

Sub Group: Thermal Average

Item: Voltage A-N  
Voltage B-N  
Voltage C-N  
Voltage Aux

Current A  
Current B  
Current C  
Current N Measured  
Current N Calculated  
Voltage A-B  
Voltage B-C  
Voltage C-A  
VA A  
VA B  
VA C  
VA Total  
VAR A  
VAR B  
VAR C  
VAR Total  
Watt A  
Watt B  
Watt C  
Watt Total  
Frequency  
Power Factor A  
Power Factor B  
Power Factor C  
Power Factor Total  
Voltage Imbalance  
Aux Frequency  
Sub Group: Block Window Average  
Item: VA  
VAR  
Watt  
Sub Group: Pulse Accumulation/Aggregation Block Window Average  
Item: Internal Inputs #1 - #8  
Aggregators #1 - #4  
Sub Group: Rolling Window Average  
Item: VA

VAR

Watt

Sub Group: Voltage and Current Means

Item: Volts PN

Current P

Volts PP

Group: External I/O Devices

Sub Group: Analog Input Modules

Item: Module 1: Analog Input 1 - Analog Input 8

Module 2: Analog Input 1 - Analog Input 8

Module 3: Analog Input 1 - Analog Input 8

Module 4: Analog Input 1 - Analog Input 8

- To designate the limit as either above or below a percentage of the Full Scale, click once in each Settings column and select the desired setting from the pull-down menu.
- To set the percentage of the Full Scale that will trip the limit, enter the value in the % of FS column. CommunicatorPQA® software automatically calculates the Primary value.
- Combination Limit 3 is the logical combination of Limit 1's state and Limit 2's state.

### **Example 1**

#### Limit I D

Type: 1 Second Readings

Channel: Volts AN

Limit 1 Setting: Limit exceeded if Volts AN is below 120 F.S.

Limit 2 Setting: Limit exceeded if Volts AN is above 80 F.S.

Combination Limit 3 Setting: AND

If Limit 1 AND Limit 2 are tripped (e.g., the reading is 100 F.S.), then Limit 3 is tripped.

### **Example 2**

#### Limit I D

Type: 1 Second Readings

Channel: Volts AN

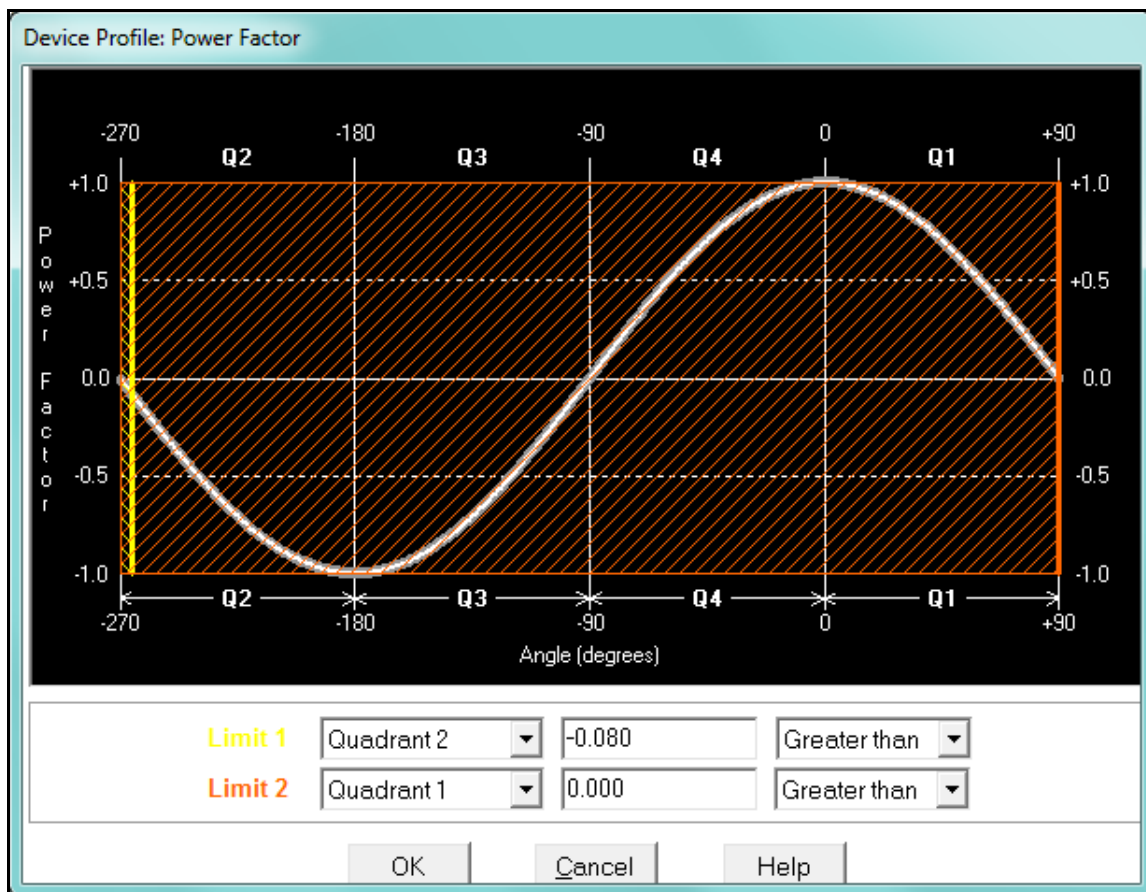
Limit 1 Setting: Limit exceeded if Volts AN is above 120 F.S.

Limit 2 Setting: Limit exceeded if Volts AN is below 80 F.S.

Combination Limit 3 Setting: OR

If either Limit 1 OR Limit 2 is tripped (e.g., the reading is 75), then Limit 3 is tripped.

- Full Scales settings are shown in the lower left of the screen. These values are set in the Limits and Waveform Full Scales section of the Device Profile (Section 11.1.2).
4. Power Factor is broken into four quadrants. Selecting the Full Scale value brings up a screen that lets you set a limit in two of the four quadrants.
- To set the power factor limits, double click on any of the power factor settings in the Limit 1 or Limit 2 columns. You will see the Power Factor screen.



- To set a limit: from the pull-down menus, select a quadrant and Less Than or Greater Than (Full Scales). Enter the power factor number. The graph will

illustrate your selections by shading the out of limit bands. The area of the graph not covered by shading is within normal operational range.

**NOTE:** Whether you see method 1 Quadrants (Q1 +Lag, Q2 -Lag, Q3 -Lead, Q4 +Lead) or method 2 Quadrants (Q1 +Lag, Q2 -Lead, Q3 +Lag, Q4 -Lead) depends on the setting in the Power Factor Display field of the Labels setting (see Section 11.4.4).

**NOTE:** The Nexus® 1500/1500+ device is a four-quadrant meter. Therefore, limits can be set for capacitive and inductive PF when generating or consuming power.

- When all settings are complete, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 11.3.2: Electrologic™ Relay Control

- From the Power Quality and Alarm Settings menu, double-click on the Electro-Logic™ Relay Control line. You will see the screen shown below.

Device Profile: Electro Logic Relay Control

1 ☐ Not Set 2 ☐ Not Set 3 ☐ Not Set 4 ☐ Not Set 5 ☐ Not Set 6 ☐ Not Set 7 ☐ Not Set 8 ☐ Not Set

5a 5b 6

1 Digital Output Module: 1 Relay: 1

Relay 1

Set Delay 0 Seconds  
Reset Delay 0 Seconds

4 ☒ Limits ☐ Digital Inputs

4a Limit ID: 01:High Speed Volts AN Limit 1 Set

4b Input ID: Internal Input 01 Shorted Clear

OK Print Clear Assigned Items Help

ElectroLogic™ Relay Control lets you set up a logic tree to control the meter's



optional relays. Each relay can be programmed individually. The end result of the logic tree is to set, or not set, a relay, with an optional programmed Set Delay and/or Reset Delay. The initial inputs to the logic tree are chosen from among the 32 Limits and 40 Digital Inputs (both internal and external inputs). The gates, in several stages, perform logical combinations (AND, OR, etc) on pairs of inputs (either initial inputs or the outputs of earlier gates), and in combination produce an ultimate "true" or "false" state to drive the relay open or closed.

For example, one of the gates is AND. For data to pass an AND gate, both pieces of data must be "true." For a Limit to be true, the data must be in the Out-of-Limit condition on either Limit 1, Limit 2, or both (you decide which). For a Digital Input to be true, it must be in the condition you specify - either Open or Shorted.

The gates in ElectroLogic™ Relay Control are used as follows:

OR: If either or both of the two conditions are true, the gate is passed

AND: If both of the conditions are true, the gate is passed

Hysteresis: For Limits only, the if the Limit is within the programmed hysteresis value, the gate is passed

XOR: If either of the two conditions are true, but not both, the gate is passed

NOR: If either of the two conditions are true, the gate is not passed

NAND: If both of the two conditions are true, the gate is not passed

NHysteresis: For limits only, if the Limit is within the programmed hysteresis value, the gate is not passed

NXOR: If either of the two conditions are true, but not both, the gate is not passed

**NOTE: See Example of an ElectroLogic™ Relay Logic Tree:, on page 11-67.**

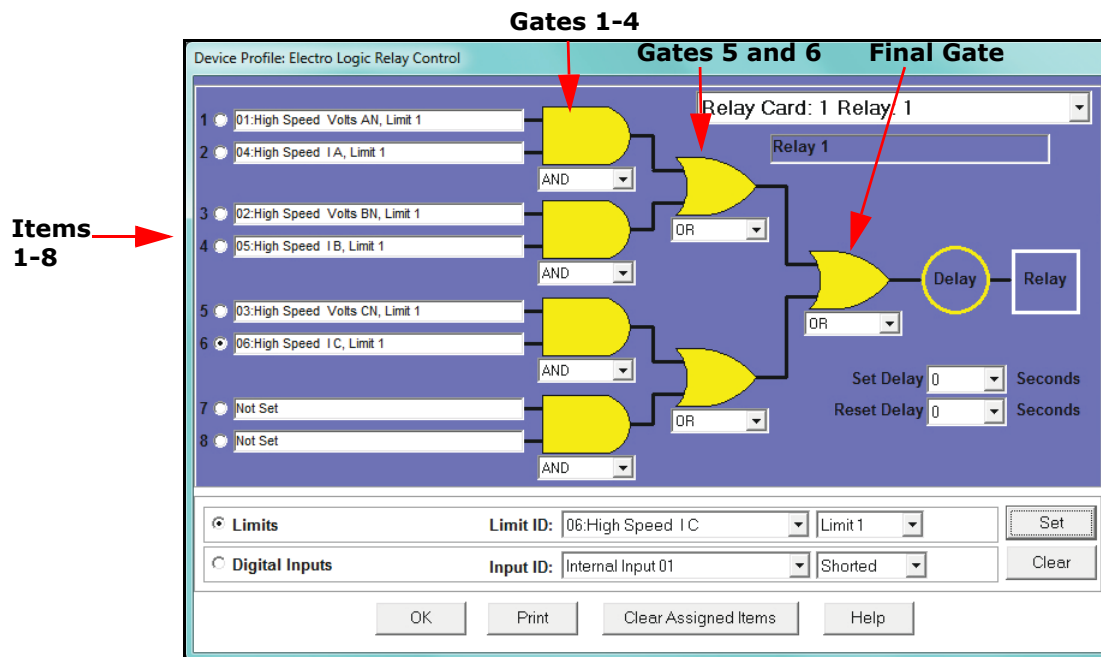
2. To assign an item to the Relay Logic tree:

- a. Select the relay card/module from the pull-down menu - see number 1 in the screen on the previous page.
- b. Select an input for the tree by clicking on a radio button next to numbers 1 through 8 - see number 2 in the screen on the previous page.
- c. Choose Limits or Digital Inputs by clicking on the radio button in front of the word - see number 3 in the screen on the previous page.

- d. From the pull-down menus, select the limit (Limit ID) or input (Input ID) you want to assign to this Relay Logic tree input (step b) - see number 4 in the screen on the previous page.
    - For a limit, use the second pull-down menu to select Limit 1, Limit 2, or Combination - see number 4a in the screen on the previous page.
    - For an input, use the second pull-down menu to select Shorted or Open - see number 4b in the screen on the previous page.
  - e. Press Set to confirm your selection. The software places the selection in the appropriate field in the screen.
3. After you assign all the Relay Logic inputs, select the gates that will be used to combine the logic to trigger the relay. To select a gate type, either:
    - Click on the gate (yellow fields) - see number 5a in the screen on page 11-65.
    - Choose a gate type from the pull-down menu below the gate - see number 5b in the screen on page 11-65.
  4. If you want, select Set Delay and Reset Delay from the pull-down menus. You can choose between 0 and 255 seconds. Use these fields if you want to program a delay before the relay is set, or before it is reset - see number 6 in the screen on page 11-65.
  5. To change items on the Relay Logic tree, follow the previous steps.
    - To clear an item from the Relay tree, click on that item and click the Clear button.
    - To clear all items from the Relay Tree, click the Clear Assigned Items button.
  6. When all settings are complete, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

**NOTE:** In order to use this screen, you must have purchased at least one Relay Option card or one External Relay Output module. For more details on external Output modules, see Chapter 14.

### Example of an ElectroLogic™ Relay Logic Tree:



Inputs 1 through 8 are set to High Speed Volts AN Limit 1, High Speed Amps A Limit 1, High Speed Volts BN Limit 1, High Speed Amps B Limit 1, High Speed Volts CN Limit 1, High Speed Amps C Limit 1, Not Set and Not Set. The four first gates are AND gates, and the remaining three gates are OR gates.

Each first level gate looks at the state of the two limits, and the result is "true" if and only if both the inputs (Voltage Limit and Current Limit) are "true" (Out-of-Limit Condition). The second and third level gates look at the state of the earlier gates, and their results are "true" if either one (or both) of the previous gates are "true". The end result is a relay that is energized if one or more of the three phases (A, B, and/or C) is currently Out-of-Limit on both its voltage and current Limit 1 tests.

### 11.3.3: PQ Thresholds (Waveform Recording)

The PQ Thresholds/Waveform Recording capability allows the meter to act as a high-speed waveform recorder to record any anomaly that occurs within a cycle of duration. This provides a user with advanced waveform analysis including pre- and post-waveform recording.

The meter has the capability to record both surges and sags of the measured signals. A voltage surge is any event that increases the RMS voltage for one cycle, calculated every half cycle. A voltage sag is a dip in the RMS of one cycle of voltage, calculated every half cycle. A current fault (or surge) is also calculated in the same manner. The Nexus® 1500/1500+ meter can also be set to record a waveform when voltage transients are found. When the RMS value of any of these triggers exceeds the threshold settings, the meter will trigger a waveform capture. In addition, you can set a voltage interruption to trigger IEC 61000-4-30 Class A reporting. The Nexus® 1500+ meter can also capture a waveform in response to an IEC 61850 Protocol GOOSE message.

The Power Quality (PQ) and Waveform Thresholds setting determines at what point the Nexus® 1500/1500+ meter executes a waveform capture and/or records a power quality event.

See Chapter 19 for instructions on viewing Waveform and PQ logs.

PQ and Waveform Thresholds are given as a percentage of the Full Scales (% of FS) or a sliding reference voltage if the load voltage is known to be fluctuating (using the  $U_{SR}$  setting, explained in the following instructions). Set the Full Scales in the Limits and Waveform Full Scales setting of the Device Profile (see Section 11.1.2). Full Scales are based on the CT and PT ratios set in the CT, PT Ratios and System Hookup setting of the Device Profile (see Section 11.1.1).

Before programming the PQ and Waveform Thresholds, set the CT and PT ratios and the Limits and Waveform Full Scales.

**Note on Sampling Rate:** A higher sampling rate allows for transients to be monitored. Generally, the meter is set to take 1024 samples per cycle for this purpose. Lower sampling rates have advantages, however, because they allow you to record more cycles of information per event screen. Therefore, low sampling rates are better for long duration events, like motor starts or distribution faults. The meter

enables you to tailor its recording for both these applications. For more information on sampling rate, see the table on page 11-76.

The Nexus® 1500/1500+ meter has a transient feature which combines high speed and low speed sampling. The high sampling records the Mega Hertz speed and the low speed can be recorded at any desired sampling rate. When a high speed transient is found, the meter converts the low speed sample closest to the magnitude of the high speed capture. Additionally, the instrument provides the exact time of the high speed event. This provides the benefit of high speed data acquisition with a captured event that comprises only the data that is needed for analysis.

1. From the Power Quality and Alarm Settings menu, double-click on the PQ Thresholds (Waveform Recording) line. You will see the screen shown below.

**Waveform and Voltage Interruption Settings**

**Voltage RMS Triggers**      **Current RMS Trigger**      **Voltage Transients & Interruptions**

Voltage RMS Triggers (Fixed)											
Voltage		Above Setpoints				Below Setpoints				Waveform Enable	PQ Enable
Channel		Value(%)	Primary	Return Hysteresis Value(%)	Primary	Value(%)	Primary	Return Hysteresis Value(%)	Primary		
1	AN	110.00	132.00	108.00	129.60	90.00	108.00	92.00	110.40	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2	BN	110.00	132.00	108.00	129.60	90.00	108.00	92.00	110.40	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3	CN	110.00	132.00	108.00	129.60	90.00	108.00	92.00	110.40	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
7	Aux	110.00	132.00	108.00	129.60	90.00	108.00	92.00	110.40	<input type="checkbox"/>	<input type="checkbox"/>

Limits are based on: ☒ Fixed RMS      ☐ U<sub>SR</sub>

Group	Full scale
Volt AN, BN, CN	120.00
Volt AB, BC, CA	208.00
Volt Aux	120.00
I A, B, C	5.00
I N	5.00

Enabled High Speed Input Triggers								
Input #	1	2	3	4	5	6	7	8
Enabled	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Sampling Rate: 128      Samples per cycle @ 60Hz

Pre Trigger Cycles: 10

Post Trigger Cycles: 170

Total Waveform Capture Windows per event: 1

OK      Cancel      Help

2. This screen allows you to set the voltage RMS triggers, the current RMS triggers, and the voltage transients triggers for waveform recording. It also allows you to set the voltage interruption settings for IEC61000-4-30 Class A recording. Use the tabs

at the top of the screen to navigate between the voltage, current, and voltage transient and interruption settings.

**NOTES:**

- The Waveform clipping threshold for the Nexus® 1500/1500+ meter is 66.7A RMS and 1140V RMS on the secondary side of all channels.
  - The High Speed Inputs field allows you to see which High Speed input is enabled for Waveform recording. You assign the High Speed input to its trigger in the High Speed Inputs screen (see Section 11.3.9).
  - Voltage and current Full Scale values are shown in the lower left corner of the screen.
3. The Voltage setpoints are used to record voltage type events, such as voltage surges and sags. To set the Voltage RMS triggers for a PQ event and waveform capture (Voltage RMS Triggers tab):
- a. Select either Fixed RMS or  $U_{SR}$  (radio buttons).

**NOTE on  $U_{SR}$  Setting:** The  $U_{SR}$  setting lets you configure waveform capture thresholds based on sliding reference voltage rather than Full Scale (see instructions on the next page). This is useful if you know your line voltage will be varying and you want the voltage reference to be adjusted accordingly.

The formula used is as follows:

$$U_{SR}n = 0.9967 \times U_{SR}(n-1) + 0.0033 \times U_{(10/12)rms}$$

where

$U_{SR}n$  is the present value of the sliding reference voltage;

$U_{SR}(n-1)$  is the previous value of the sliding reference voltage; and

$U_{(10/12)rms}$  is the most recent 10/12-cycle RMS value.

When the measurement is started, the initial value of the sliding reference voltage is set to the programmed input voltage. The sliding reference voltage is computed every 10/12-cycles. If a 10/12-cycle is flagged as being out-of-limits, that voltage is not used - the previous sliding reference voltage is used instead.

b. If you select Fixed RMS:

- i. Enter the desired percentage of Full Scale in the Value() column of the Above setpoints and Below setpoints sections. After you make an entry, the Primary field (display only) adjusts accordingly. When the RMS value crosses the setpoint, a capture is taken.
- ii. Enter the desired percentage for Return Hysteresis for the Above and Below setpoints. After you make an entry, the Primary field (display only) adjusts accordingly. Hysteresis is the value that must be met for the out of limit condition to be considered ended. Hysteresis is useful in preventing excessive out of limit conditions when the readings are hovering around a setpoint, since it dictates that the readings must recover to a certain level before dropping again in order for them to be considered out of limit.
- iii. Click the box(es) to enable Waveform Recording (Waveform Enable box) and/or PQ Recording (PQ Enable box).

c. If you have a load with slowly changing voltage, you probably do not want to use Full Scale as your reference point. In that case, you can use the  $U_{SR}$  function to set up a sliding reference voltage rather than a Full Scale voltage reference. Follow these instructions:

- i. If you don't see the  $U_{SR}$  button on the screen next to the RMS button, then EN 50160/IEC 61000-4-30 logging is enabled, and you will need to disable it. From the Device Profile screen, double-click on the EN 50160/IEC 61000-4-30 line, click the Enable PQ/Waveform, Logs 7 and 8 button, and click OK (see following Section 11.3.6 for detailed instructions).

ii. Go back to the PQ Waveform Recording screen and click the  $U_{SR}$  button.

The top of the screen changes as seen in the example below.

Waveform and Voltage Interruption Settings

**Voltage RMS Triggers** **Current RMS Triggers**

Voltage RMS Triggers (Usr)					
Voltage Channel		Above Setpoints	Below Setpoints	Waveform Enable	PQ Enable
ID		Value(%)	Value(%)		
1	AN	110.00	90.00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2	BN	110.00	90.00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3	CN	110.00	90.00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
7	Aux	110.00	90.00	<input type="checkbox"/>	<input type="checkbox"/>

Limits are based on: ☐ Fixed RMS ☒  $U_{SR}$

Group	Full scale
Volt AN, BN, CN	120.00
Volt AB, BC, CA	208.00
Volt Aux	120.00
I A, B, C	5.00
I N	5.00

Enabled High Speed Input Triggers								
Input #	1	2	3	4	5	6	7	8
Enabled	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Sampling Rate: 128 Samples per cycle @ 60Hz

Pre Trigger Cycles: 10

Post Trigger Cycles: 170

Total Waveform Capture Windows per event: 1

OK Cancel Help

iii. Enter the desired percentage of the sliding reference voltage in the Value() column of the Above setpoints and Below setpoints sections.

iv. Click the box(es) to enable Waveform Recording (Waveform Enable box) and/or PQ Recording (PQ Enable box) when the setpoints are crossed.



3. To set the current RMS triggers for a PQ event and waveform capture (Current RMS Triggers tab - see the example screen below):

Waveform and Voltage Interruption Settings

Voltage RMS Triggers **Current RMS Triggers**

		Current RMS Triggers								Waveform Enable	PQ Enable
		Above Setpoints				Below Setpoints					
Current Channel		Value(%)		Return Hysteresis		Value(%)		Return Hysteresis			
ID		Value(%)	Primary	Value(%)	Primary	Value(%)	Primary	Value(%)	Primary		
1	A	200.00	10.00	108.00	5.40	0.00	0.00	92.00	4.60	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	B	200.00	10.00	108.00	5.40	0.00	0.00	92.00	4.60	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	C	200.00	10.00	108.00	5.40	0.00	0.00	92.00	4.60	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	N	200.00	10.00	108.00	5.40	0.00	0.00	92.00	4.60	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Group	Full scale
Volt AN, BN, CN	120.00
Volt AB, BC, CA	208.00
Volt Aux	120.00
IA, B, C	5.00
IN	5.00

Enabled High Speed Input Triggers								
Input #	1	2	3	4	5	6	7	8
Enabled	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Sampling Rate: 128  Samples per cycle @ 60Hz

Pre Trigger Cycles: 10

Post Trigger Cycles: 170

Total Waveform Capture Windows per event: 1

OK Cancel Help

- Enter the desired percentage of Full Scale in the Value() column of the Above setpoints and Below setpoints sections. After you make an entry, the Primary field (display only) adjusts accordingly.
- Enter the desired percentage for Return Hysteresis for the Above and Below setpoints. After you make an entry, the Primary field (display only) adjusts accordingly. Hysteresis is the value that must be met for the out of limit condition to be considered ended. Hysteresis is useful in preventing excessive out of limit conditions when the readings are hovering around a setpoint, since it dictates that the readings must recover to a certain level before dropping again in order for them to be considered out of limit.

- c. Click the box(es) to enable Waveform Recording (Enable box) and/or PQ Recording (PQ Enable box).

**NOTE:** The current setpoints are used to record faults on the line or in-rush currents from devices such as motors. Typically, to catch these events, set the limit to above 200 of Full Scale. As a general rule you do not want to set either:

1. Any below current thresholds because that will trigger waveforms when the current drops
2. Any above current thresholds within possible current load

Either of these settings will constantly trigger waveforms.

4. To set the Voltage transients trigger for a waveform capture and Voltage interruptions trigger for IEC61000-4-30 recording (Voltage Transients and Interruptions tab - see the example screen below):

Waveform and Voltage Interruption Settings

Voltage RMS Triggers					Current RMS Triggers					Voltage Transients & Interruptions				
Voltage Transients										IEC 61000-4-30 Voltage Interruption				
Voltage		Transient Trigger					Setpoints				Return Hysteresis			
Channel		Above	Setpoints	Enable	Trigger Waveform	Channel		Value(%)	Primary	Value(%)	Primary			
ID		Value(%)	Primary		On Transient	ID		Value(%)	Primary	Value(%)	Primary			
1	AN	212.13	360.00	<input type="checkbox"/>	<input type="checkbox"/>	1	AN	10.00	12.00	10.00	12.00			
2	BN	212.13	360.00	<input type="checkbox"/>	<input type="checkbox"/>	2	BN	10.00	12.00	10.00	12.00			
3	CN	212.13	360.00	<input type="checkbox"/>	<input type="checkbox"/>	3	CN	10.00	12.00	10.00	12.00			

**Voltage Peak Full Scales**

AN, BN, CN

AB, BC, CA

Group	Full scale
Volt AN, BN, CN	120.00
Volt AB, BC, CA	208.00
Volt Aux	120.00
IA, B, C	5.00
IN	5.00

Enabled High Speed Input Triggers								
Input #	1	2	3	4	5	6	7	8
Enabled	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Sampling Rate  Samples per cycle @

Pre Trigger Cycles

Post Trigger Cycles

Total Waveform Capture Windows per event

OK Cancel Help

- a. Enter the desired percentage of the Voltage Peak Full Scales (shown in the center of the screen) in the Value() column of the Voltage Transients Above Setpoints section (there are no Below setpoints for Voltage transients). After you make an entry, the Primary field (display only) adjusts accordingly.
  - b. Click the box(es) to enable transient capture (Enable box) and/or Waveform (Trigger Waveform on Transient box). You might want to record a waveform at the time of transient capture in order to obtain more information about the transient event.
  - c. Enter the desired percentage of Full Scale in the Value ( ) field and in the Return Hysteresis field in the IEC 61000-4-30 Voltage Interruptions section. After you make an entry, the Primary field (display only) adjusts accordingly. This setting relates only to the reporting of voltage interruptions: it sets an internal flag for IEC 61000-4-30 reporting.
5. Select the number of samples per cycle to be recorded from the Sampling Rate field's pull- down menu. Choose from 16, 32, 64, 128, 256, 512 or 1024 samples per cycle. The number of samples per cycle you choose above 128 samples per cycle affects the number of cycles per capture.
- The following table shows the effects of sampling rate on the number of cycles captured. Increasing the sampling rate increases waveform resolution; but for higher sampling rates, reduces the length of the observed window. The approximate length of the observed window is shown in the last column.

**NOTES:**

- The table shows sampling data for 60 Hz systems.
- The table shows values for one waveform capture window. If you have more than one waveform capture window, the maximum time per capture increases.

<b>Nexus 1500/1500+ Sampling Rate Chart (at 60Hz)</b>					
<b>Samples per Cycle</b>	<b>Channels</b>		<b>Samples per Channel</b>	<b>Cycles per Channel per Window*</b>	<b>Time (approx.)</b>
	<b>Analog pts</b>	<b>Digital Inputs</b>			
16	6	8	2880	180	3 sec
32	6	8	5760	180	3 sec
64	6	8	11520	180	3 sec
128	6	8	23040	180	3 sec
256	6	8	30720	120	2 sec
512	6	8	30720	60	1 sec
1024	6	8	40960	40	0.6 sec

\* Each Window contains the number of cycles listed but multiple windows are supported so that the total number of cycles captured is only limited by the memory allocated.

6. You can select Frequency - either 60Hz or 50Hz - from the pull-down menu. This is only to help you decide what options to select - it does not affect the meter.
7. From the Pre-Trigger Cycles and Post-Trigger Cycles fields' pull-down menus, select the number of cycles you want to record before and/or after the triggered recording. The maximum total number of pre and post-trigger cycles is one less than the maximum number of cycles per capture. See the table above for the maximum cycles per capture for each sampling rate.
8. You can select total waveform capture windows per event. You can set between 1 and 65536 windows per event. You may want more than 1 window to get data for a longer time period. Also, selecting multiple windows allows you to make full use of the pre-trigger cycles to have extended recording of events. You always need 1 post-trigger cycle, but can choose multiple pre-trigger cycles. As the sampling rate is reduced, the number of possible pre-trigger windows increases. In this way, you

may choose less resolution, but more information about the conditions before a waveform capture.

**NOTE:** When you select more than one window per event, the Post-Trigger Cycles field cannot be changed. It will be fixed as the maximum number of cycles per capture minus the number of pre-trigger cycles. See the table on the previous page for the maximum cycles per capture for each sampling rate.

**Note on CBEMA (PQ Recording):** CBEMA plotting is a power quality standard known worldwide for recording the amount of damage Voltage transient conditions have done to the equipment being monitored. The meter automatically records this information. For CBEMA purposes, program internal set points for Voltage below 90 and above 110 of Full Scale (+/- 10 from the nominal Voltage). These set points are defined by the ITI (CBEMA) specification. The ITI (CBEMA) Curve is published by Information Technology Industry Council (ITI) and is available online. You can set a recording with tighter Voltage limits to trigger a waveform recording. However, CBEMA plotting is based only on the limits internally set.

9. When all changes are entered, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 11.3.4: EN 50160/IEC 61000-4-30 Class A Reporting

The Nexus® 1500/1500+ meter can record power quality reporting values in two independent logs. When EN 50160/IEC 61000-4-30 reporting is enabled, entries are made into the logs when the associated values occur. All values can be downloaded to the Log Viewer where they are available for graphing or export to another program, such as a spreadsheet. Refer to Chapter 19 for additional information on viewing logs.

**NOTE:** The meter is calculating its Flicker based upon the EN 61000-4-15 standard which is referenced in the EN 61000-4-30 standard. The accuracy requirements for this instrument are within the Class A standards for Flicker measurements. Refer to Chapter 23 for additional information on Flicker standards.

The Nexus® 1500+ meter offers customization of EN 50160/IEC 61000-4-30 reporting so that the user can meet specific jurisdictional or regional requirements. Section 11.3.4.1 details the Nexus® 1500+ meter's settings; see Section 11.3.4.2 for the Nexus® 1500 meter's settings. Note that you should program the CT/PT Ratio and System Hookup settings for the Nexus® 1500+ meter **before** programming the EN 50160 reporting - see 11.1.1: CT and PT Ratios and System Hookup, on page 11-2, for instructions.

**IMPORTANT!** Since the EN 50160/IEC 61000-4-30 reporting has specific requirements for programming, EIG recommends that you refer to the IEC 61000-4-30 2008 standard before making changes to the default settings of the meter.

The meter's Runtime Firmware version 15.2 and above support Edition 3 of IEC 61000-4-30 standard.

### 11.3.4.1: EN 50160/IEC 61000-4-30 Setting for the Nexus® 1500+ Meter

1. From the Power Quality and Alarm Settings menu, double-click on the EN 50160/ IEC 61000-4-30 line. You will see the screen shown below. It has multiple tabs that let you make all the settings for the meter's EN 50160/IEC 61000-4-30 implementation.

**EN 50160 / IEC 61000 Settings**

Supply Voltage Variations | Ten Minute THD | Voltage Durations | Voltage Sub Thresholds | General Settings | Report  
 Frequency | Flicker | Mains Signalling | Rapid Voltage Changes | Supply Voltage Unbalance

**Frequency**

**Frequency Distribution**

Set % above and below nominal Frequency

Range	% Below		% Above
1	-1.00	to	1.00
2	-2.00	to	2.00
3	-6.00	to	4.00
4	-15.00	to	15.00

% Below and % Above ranges must be in increasing order to bin frequency properly

---

**Trigger Pass / Fail Limit Report on Particular Set Range**

Trigger	Set
1	1
2	3

There are two Groups for limit settings. Choose the desired set range for each of them

---

**Pass / Fail Threshold**

Trigger	Threshold
1	99.50 %
2	100.00 %

Enter % pass rate per period to trigger frequency failure reporting

OK Set to defaults Cancel

2. The first tab is the Frequency tab, which lets you set acceptable frequency ranges and pass/fail thresholds:

- Frequency Distribution: enter below and above percentages for four frequency ranges, increasing from 1-4; e.g., range 1: -1 below to 1 above; range 2: -2 below to 2 above, etc.

- Trigger Pass/Fail Limit Report on Particular Set Range: for each of the two available triggers, select the set range (1-4).
  - Pass/Fail Threshold: enter the percentage pass rate per period to that will trigger frequency failure reporting.
3. Click the Flicker tab. The flicker settings let you set passing value and percent thresholds and times for the short-term (PST) and longterm (PLT) flicker tests.

The screenshot shows the 'EN 50160 / IEC 61000 Settings' dialog box with the 'Flicker' tab selected. The dialog has a title bar and a menu bar with options: Supply Voltage Variations, Ten Minute THD, Voltage Durations, Voltage Sub Thresholds, General Settings, Report, Frequency, Flicker (selected), Mains Signalling, Rapid Voltage Changes, and Supply Voltage Unbalance.

**Flicker**

**Set Thresholds**

	Flicker Value	Test Pass (%)
PST	1.0000	95.00
PLT	1.0000	95.00

Threshold set for the full duration of the reporting period

---

**IEC 61000-4-30 Flicker**

	Short Term (min)	Long Term (min)
Test Time	10	120
	PST	PLT

At the bottom of the dialog are three buttons: OK, Set to defaults, and Cancel.

- Set Thresholds: enter flicker value and test pass for both PST and PLT.
- IEC 61000-4-30 Flicker: select time for the short term and long term tests from the pull-down menus.



4. Click the Mains Signaling tab. This screen lets you make settings for the Mains Signaling voltage, which is a burst of signals (often at a non-harmonic frequency) that remotely control industrial equipment, revenue meters, and other devices. In this tab you will set the acceptable thresholds for the Mains signaling voltage.

The screenshot shows the 'EN 50160 / IEC 61000 Settings' dialog box with the 'Mains Signalling' tab selected. The dialog has a title bar and a menu bar with options: Supply Voltage Variations, Ten Minute THD, Voltage Durations, Voltage Sub Thresholds, General Settings, Report, Frequency, Flicker, Mains Signalling (selected), Rapid Voltage Changes, and Supply Voltage Unbalance. The main content area is titled 'Mains Signalling' and contains three sections: 'Set Thresholds', 'Set Interharmonics Frequency', and 'Recording Interval (seconds)'. The 'Set Thresholds' section has a table with two columns: '% of Fundamental Voltage' and 'Test Pass (%)'. The first row shows a value of 5.00 for the percentage and 99.00 for the test pass percentage. A note to the right states 'Threshold set for the full duration of the reporting period'. The 'Set Interharmonics Frequency' section has a table with two columns: 'Frequency (Hz)' and 'Details'. The first row shows a value of 567.5 Hz and a reference to 'See IEC 61000-4-30 Section 5.10.1 for details'. The 'Recording Interval (seconds)' section has a dropdown menu set to 1. At the bottom of the dialog are three buttons: 'OK', 'Set to defaults', and 'Cancel'.

	% of Fundamental Voltage	Test Pass (%)	
1	5.00	99.00	Threshold set for the full duration of the reporting period

	Frequency (Hz)	Details
1	567.5	See IEC 61000-4-30 Section 5.10.1 for details

Recording Interval (seconds): 1

- **Set Thresholds:** set the thresholds for percentage of the fundamental voltage and for test passing. Settings of less than 1% are allowable for Edition 3 of IEC 61000-4-30.
- **Set Interharmonic Frequency:** enter the interharmonic frequency for the test when this interharmonic exceeds the detection threshold reporting is made. See the IEC 61000-4-30 standard's Section 5.10.1 for more details on this setting.
- **Recording Interval (seconds):** if your meter supports IEC 61000-4-30 Edition 3 (Runtime Firmware version 15.2 or higher), you can select an interval (from 1 to 120 seconds) for recording.

5. Click the Rapid Voltage Changes tab. Rapid voltage changes consist of a series of sudden variations or cyclic variations of the nominal value of the voltage between two consecutive levels. Usually rapid voltage changes are caused by load changes or system switching. In this tab, you will set thresholds for the voltage changes, and the acceptable number of changes, for your reporting. Note that the Additional Settings at the bottom of the screen are only visible for meters with Runtime Firmware versions 15.2 or higher - these additional settings are supported in IEC 61000-4-30 Edition 3.

The screenshot shows the 'EN 50160 / IEC 61000 Settings' dialog box with the 'Rapid Voltage Changes' tab selected. The dialog has several tabs: Supply Voltage Variations, Ten Minute THD, Voltage Durations, Voltage Sub Thresholds, General Settings, Report, Frequency, Flicker, Mains Signalling, Rapid Voltage Changes (selected), and Supply Voltage Unbalance.

**Rapid Voltage Changes**

**Set Threshold**

Set	(%)	to	(%)
1	-5.00	to	5.00
2	-10.00	to	10.00

Represents a % change of signal from one reading to the next to trigger a reporting

**Allowed Changes Per Day**

Changes: 10 (dropdown) Defines the amount of fluctuations before reporting

**Voltage Trigger RMS Base Calculation**

RMS updated every: 10/12 (dropdown) cycles 10/12 Cycle Calculation will provide less anomalies and more significant disturbances

**IEC 61000-4-30 Rapid Voltage Changes Additional Settings**

Phase	Threshold	Return Hysteresis
AN/AB	3	1.5
BN/BC	3	1.5
CN/CA	3	1.5

Buttons: OK, Set to defaults, Cancel

- Set Threshold 1 and 2: enter the percentage change in signal from one reading to the next that will trigger reporting.
- Allowed Changes per Day: defines the amount of fluctuations per day before reporting a fail, e.g., if you enter 5, then only the 6th change and later will be reported as failed.

- Voltage Trigger RMS Base Calculation: 10/12 cycle update is the recommended setting.
- IEC 61000-4-30 Rapid Voltage Change Additional Settings: for meters that support Edition 3 (Runtime Firmware versions 15.2 and higher), you can set a Threshold (the % of the voltage Full Scale for each channel) and Return Hysteresis (the % of the voltage Full Scale for each channel) per phase AN/AB, BN/BC, and CN/CA.

**NOTES:**

- The default for the Threshold value is 3% and the default for the Hysteresis Value is 1.5%.
- Make sure that the Threshold setting does not exceed the Dip/Swell threshold settings; and that the Hysteresis does not exceed the Threshold settings.

6. Click the Supply Voltage Unbalance tab. Voltage unbalance occurs when the phase angles between consecutive line voltages are not equal. The degree of the inequality is usually expressed as the ratios of the negative- and zero-sequence components to the positive-sequence component.

**EN 50160 / IEC 61000 Settings**

Supply Voltage Variations | Ten Minute THD | Voltage Durations | Voltage Sub Thresholds | General Settings | Report

Frequency | Flicker | Mains Signalling | Rapid Voltage Changes | **Supply Voltage Unbalance**

**Supply Voltage Unbalance**

**Set Threshold**

Set	(%)
1	2.00
2	3.00

**Source**

Use data that is updated every: 10 minutes

**Test Pass Threshold**

(%)
1: 95.00

**Upper Limit**

Less than or equal to: Set 1

OK Set to defaults Cancel

In this tab, enter:

- Set Threshold 1 and 2: enter the percentage change that will trigger reporting.
- Source: select the update time for the data used - the choices are 10 minutes and 2 hours.
- Test Pass Threshold: enter the percentage of the threshold that will cause the data to be considered passing, i.e., acceptable.
- Upper Limit: select Set 1 or Set 2 as the upper limit for reporting.

7. Click the Supply Voltage Variations tab. In this tab, you set up acceptable variations for the supply voltage.

**EN 50160 / IEC 61000 Settings**

Frequency | Flicker | Mains Signalling | Rapid Voltage Changes | Supply Voltage Unbalance  
**Supply Voltage Variations** | Ten Minute THD | Voltage Durations | Voltage Sub Thresholds | General Settings | Report

**Supply Voltage Variations**

**Set Threshold**

Set	(%)	to	(%)	Of Nominal Voltage
1	-10.00		10.00	
2	-10.00		15.00	

**Test Pass Thresholds**

Set	(%)	Enter % pass rate per period to trigger supply voltage failure reporting
1	99.00	
2	100.00	

OK Set to defaults Cancel

- Set Threshold 1 and 2: enter the percentage range of the nominal voltage that will trigger reporting.
- Test Pass Thresholds: enter the percentage of the threshold for sets 1 and 2 that will cause the data to be considered passing, i.e., acceptable.

8. Click the Ten Minute THD tab. In this tab, you set thresholds for the mean supply voltage THD and the average supply voltage THD. You also set the percentage for test failure for the mean and average THD.

EN 50160 / IEC 61000 Settings

Frequency | Flicker | Mains Signalling | Rapid Voltage Changes | Supply Voltage Unbalance  
 Supply Voltage Variations | **Ten Minute THD** | Voltage Durations | Voltage Sub Thresholds | General Settings | Report

**Ten Minute %THD**

**Mean %THD**

% Above or Greater than %THD Limit

	Threshold		Test Fail Threshold	
1	8.00	%	95.00	%

The % amount in which the Mean %THD should be less than or equal to for the reporting period.

---

**Average %THD**

Harmonic	Threshold		Test Fail Threshold	
2	2.00	%	95.00	%
3	5.00	%	95.00	%
4	1.00	%	95.00	%
5	6.00	%	95.00	%
6	0.50	%	95.00	%
7	5.00	%	95.00	%
8	0.50	%	95.00	%
9	1.50	%	95.00	%
10	0.50	%	95.00	%
11	3.50	%	95.00	%
12	0.50	%	95.00	%
13	3.00	%	95.00	%

Harmonic	Threshold		Test Fail Threshold	
14	0.50	%	95.00	%
15	0.50	%	95.00	%
16	0.50	%	95.00	%
17	2.00	%	95.00	%
18	0.50	%	95.00	%
19	1.50	%	95.00	%
20	0.50	%	95.00	%
21	0.50	%	95.00	%
22	0.50	%	95.00	%
23	1.50	%	95.00	%
24	0.50	%	95.00	%
25	1.50	%	95.00	%

OK Set to defaults Cancel

- **Mean THD:** enter the threshold percentage for acceptable THD (Threshold field) and the percentage of the mean THD that will be considered a fail (Test Fail Threshold field). For example, the default Threshold is 8, and the default Test Fail Threshold is 95. This means that a mean THD reading of over 8 will be considered as a fail, and when more than 95 of the mean THD readings are failed, the mean THD is reported as a fail.
- **Average THD:** for each harmonic magnitude from 1-25, enter the threshold percentage (Threshold field) and the test fail percentage (Test Fail Threshold) based on the average THD readings. For example, if the default average THD Threshold for harmonic magnitude 2 is 2, and the Test Fail Threshold is 95, then the aver-

age THD for magnitude 2 is considered failed if over 2, and if over 95 of the average THD readings are failed, then the average THD for harmonic magnitude 2 will be reported as failed.

- Click the Voltage Durations tab. In this tab, you make settings for the duration of dips and swell in voltages.

**EN 50160 / IEC 61000 Settings**

Frequency | Flicker | Mains Signalling | Rapid Voltage Changes | Supply Voltage Unbalance  
 Supply Voltage Variations | Ten Minute THD | **Voltage Durations** | Voltage Sub Thresholds | General Settings | Report

**Voltage Durations**

**Voltage Dips And Swells**

Duration	Dip (ms)	Swell (ms)
1	0	0
2	0	0
3	0	0
4	0	0
5	0	0
6	0	0

These settings bin Dips and Swells by time according to the setting in milliseconds as set here

Minimum duration of dip to be considered a long interruption

Duration ID: 1 Choose which bin will be considered a long interruption

Allowed Long Interruptions In A Year

Interruptions: 0

OK Set to defaults Cancel

- Voltage Dips and Swells: enter the duration in milliseconds for dips and swells for 6 levels of voltage interruptions.
- Short Interruption Duration: select the level that will be considered a short interruption.
- Long Interruption Duration: select the level that will be considered a long interruption.

- Allowed Long Interruptions in a Year: select the number of long interruptions that are acceptable per year.
10. Click the Voltage Sub Thresholds Tab. In this tab, you set up levels for the magnitude of voltage dips and swells.

**EN 50160 / IEC 61000 Settings**

Frequency | Flicker | Mains Signalling | Rapid Voltage Changes | Supply Voltage Unbalance  
 Supply Voltage Variations | Ten Minute THD | Voltage Durations | **Voltage Sub Thresholds** | General Settings | Report

**Voltage Sub Thresholds**

**Voltage Dips And Swells**

ID	Dip (%)	Swell (%)
1	0.00	0.00
2	0.00	0.00
3	0.00	
4	0.00	
5	0.00	
6	0.00	
7	0.00	
8	0.00	
9	0.00	
10	0.00	

The setting set up bins by % of magnitude dip or swell.

**Interruption Threshold**

Dip ID:  Choose which bin's dip will be considered an interruption

**Voltage Dip Concern**

Dip ID:  This setting allows a user to set a warning dip detection prior to being an interruption

OK Set to defaults Cancel

- Voltage Dips and Swells: enter 10 levels of magnitude for voltage dips and 2 levels of magnitude for voltage swell.
- Interruption Threshold: select the voltage dip level that will be considered an interruption.
- Voltage Dip Concern: select the level that will prompt a warning before a dip interruption occurs.



11. Click the General Settings tab. In this tab, you set general information for the report.

**EN 50160 / IEC 61000 Settings**

Frequency | Flicker | Mains Signalling | Rapid Voltage Changes | Supply Voltage Unbalance  
 Supply Voltage Variations | Ten Minute THD | Voltage Durations | Voltage Sub Thresholds | **General Settings** | Report

**General Settings**

**IEC 61000-4-30 Class A**

**Nominal Voltage (in secondary, Range: 40V to 600V)**

120.00 Volts Select Nominal Voltage

**Frequency**

60 Hz Select Nominal Frequency

**EN 50160**

**Synchronous Connection**

Yes

**First Day Of Week**

Weekly report starts Monday

**Temporary Power Frequency Overvoltages**

Phase Conductor	Threshold
A-E, B-E, and C-E:	170.00 %
N-E	170.00 %

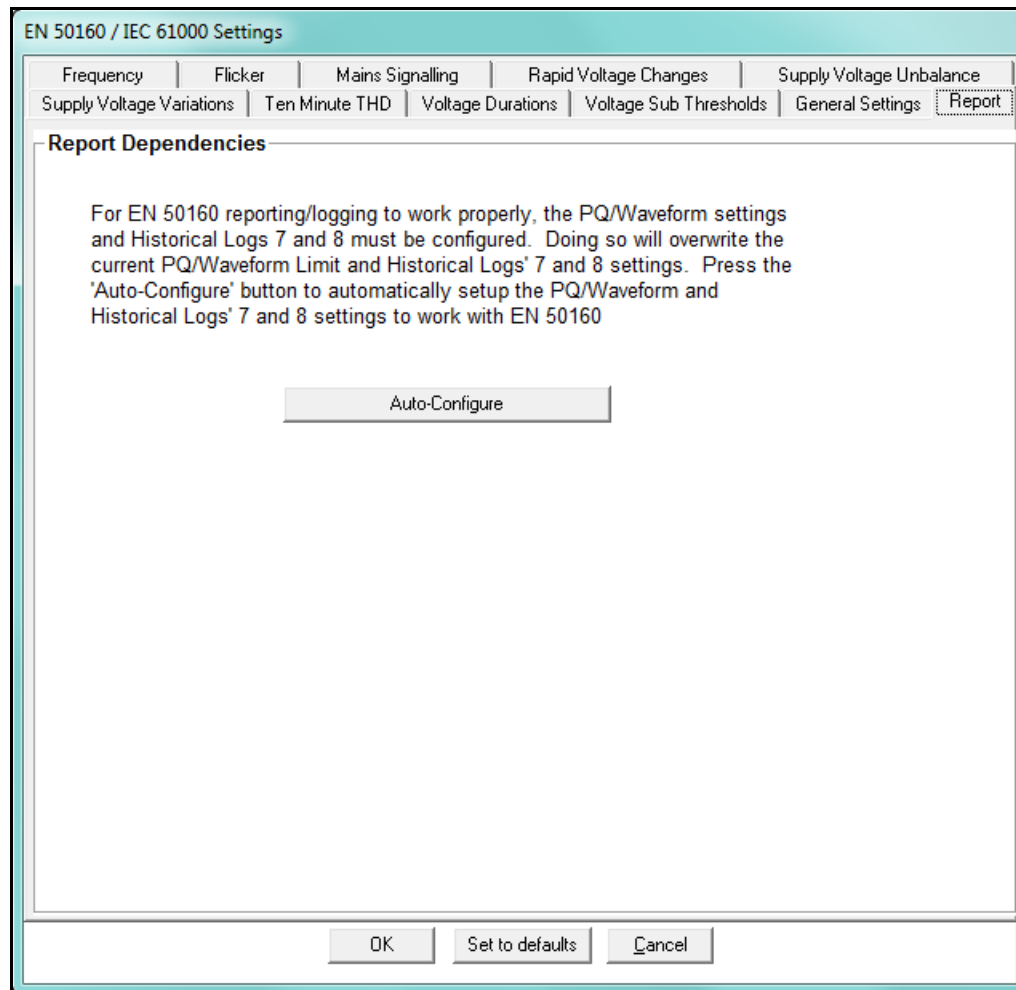
**Duration**

1	0	Seconds
2	0	Seconds

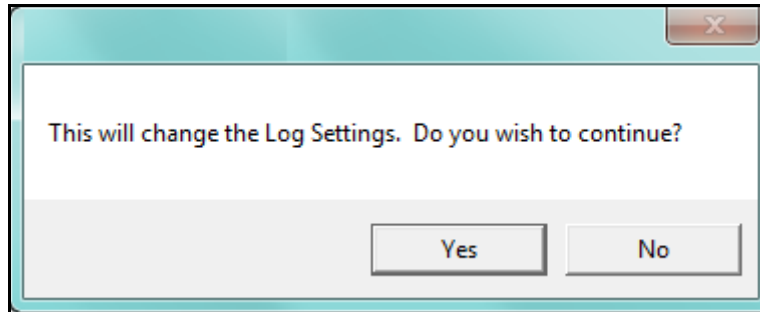
OK Set to defaults Cancel

- IEC 61000-4-30 Class A:
  - Nominal Voltage in Secondary - enter the value for your system.
  - Frequency - select the nominal frequency of your system.
- EN 50160:
  - Synchronous Connection - select Yes or No, depending on whether or not the system is Synchronous. This setting is only used for information purposes, and appears on the power quality report. Consult the IEC 61000-4-30 2008 standard for information on how the synchronous/non-synchronous affects how the frequency test should be conducted.
  - First Day of Week - select the day you want the report to start.

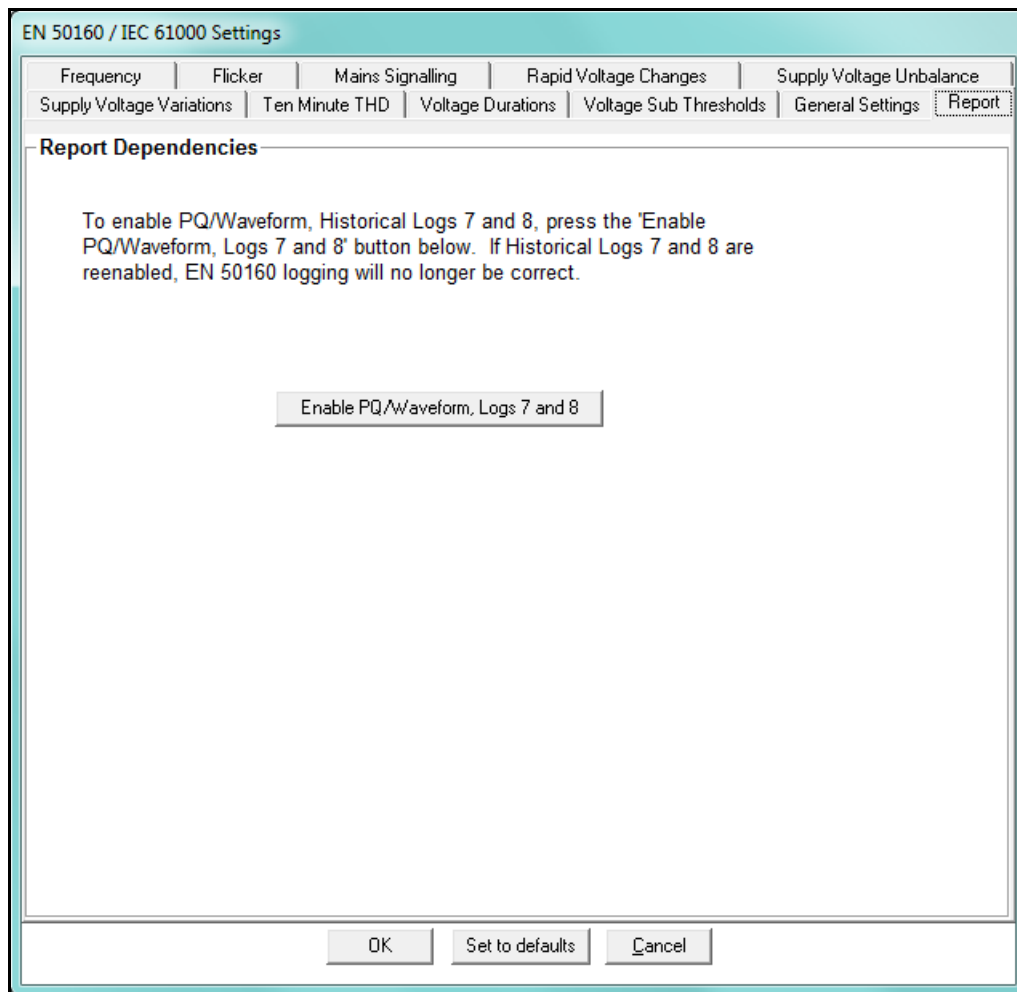
- Temporary Power Frequency Overvoltages:
    - Phase Conductor and Threshold - enter the threshold for the temporary power frequency overvoltage for Phase to Earth, and for Neutral to Earth. This number is a percentage; e.g., 170.00% over normal voltage level. Note that since systems can require different thresholds, the EN 50160:2010 specification should be consulted for information on determining this setting.
    - Duration - enter 2 levels of temporary power frequency overvoltages, in seconds; e.g., level 1: 5 seconds; level 2: 10 seconds.
12. Click the Report tab. In this tab, you can enable PQ/Waveform settings, and EN 50160/IEC 61000-4-30 related information being trended in historical logs 7 and 8.



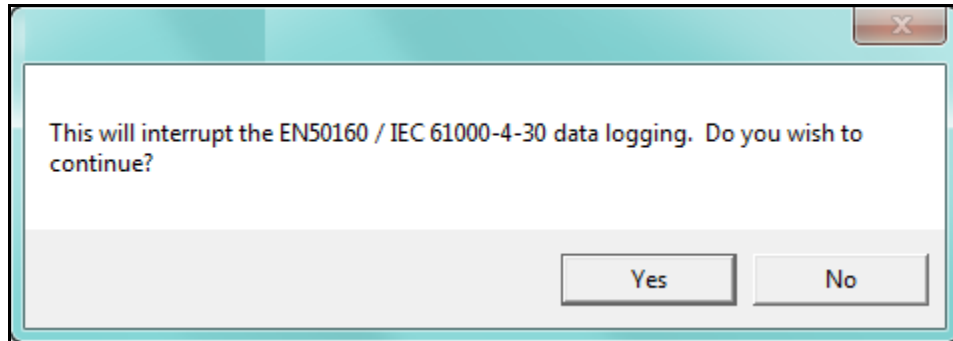
- Click Auto-Configure to set up PQ/Waveform settings, and EN 50160/IEC 61000-4-30 related information being recorded in historical logs 7 and 8. The two logs will have historical trending information related to the EN 50160 report. Note that the EN 50160 report itself is a separate report. See Chapter 23 for information on it. You will see the following confirmation screen.



- Click Yes to enable the PQ/Waveform set up and recording in historical logs 7 and 8. The screen changes as shown below.



14. To disable EN 50160/IEC 61000-4-30 related information being recorded in historical logs 7 and 8 and the PQ/Waveform override setup, click Enable PQ/ Waveform, Logs 7 and 8. You will see this confirmation screen.



15. Click Yes - this will disable the EN 50160/IEC 61000-4-30 related information being recorded in historical logs 7 and 8.

**IMPORTANT!** The EN 50160/IEC 61000-4-30 logs will no longer be correct, and the reports will be invalid.

16. When all changes are entered, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

**NOTE:** You can return all of the EN 50160/ IEC 61000-4-30 settings to their default values by clicking the Set to Defaults button.

#### 11.3.4.2: EN 51060/IEC 61000-4-30 Setting for the Nexus® 1500 Meter

You must set up several parameters to properly configure flicker logging.

1. From the Power Quality and Alarm Settings menu, double-click on the EN 50160/ IEC 61000-4-30 line. Depending on your current setting, you will see one of the following screens.

EN 50160 / IEC 61000 Settings

IEC 61000-4-30	EN 50160
Allowed Rapid Voltage changes per day	1
Synchronous Connection	No
Allowed long interruptions in a year	0
Rapid voltage change data source. RMS updated every	10/12 Cycles
Supply voltage unbalance upper limit: Less than or equal to	2%
Voltage dip concern threshold: Greater than or equal to	10%
First day of week	Sunday
Mains Signalling Threshold	100.00
Mains Signalling Interharmonics Frequency	7.5 Hz
Phase Conductors to Earth Thresholds (in percentage of fullscale)	A-E, B-E, and C-E: 120.00 N-E: 20.00

For EN 50160 reporting/logging to work properly, the PQ/Waveform settings and Historical Logs 7 and 8 must be configured. Doing so will overwrite the current PQ/Waveform Limit and Historical Logs 7 and 8 settings. Press the 'Auto-Configure' button to automatically setup the PQ/Waveform and Historical Logs 7 and 8 settings to work with EN 50160.

Auto-Configure

OK Cancel

EN 50160 / IEC 61000 Settings

IEC 61000-4-30	EN 50160
Allowed Rapid Voltage changes per day	1
Synchronous Connection	No
Allowed long interruptions in a year	0
Rapid voltage change data source. RMS updated every	10/12 Cycles
Supply voltage unbalance upper limit: Less than or equal to	2%
Voltage dip concern threshold: Greater than or equal to	10%
First day of week	Sunday
Mains Signalling Threshold	100.00
Mains Signalling Interharmonics Frequency	7.5 Hz
Phase Conductors to Earth Thresholds (in percentage of fullscale)	A-E, B-E, and C-E: 120.00 N-E: 20.00

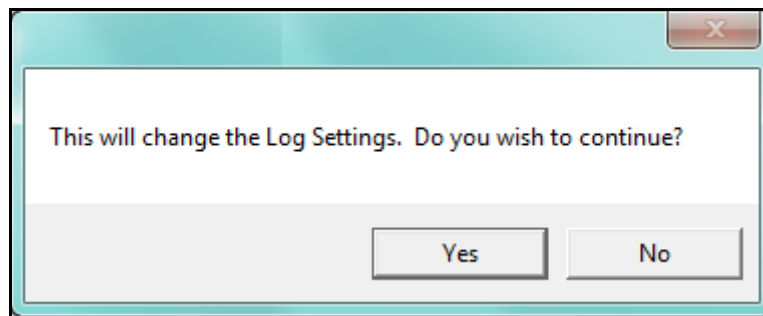
To enable PQ/Waveform, Historical Logs 7 and 8, press the 'Enable PQ/Waveform, Logs 7 and 8' button below. If Historical Logs 7 and 8 are reenabled, EN 50160 logging will no longer be correct.

Enable PQ/Waveform, Logs 7 and 8

OK Cancel

2. The Nexus® 1500 meter can use Historical logs 7 and 8 to record the results of flicker testing: you will see the first screen if EN 50160/IEC 61000-4-30 logging has not been selected for the meter; you will see the second screen if it has already been selected.

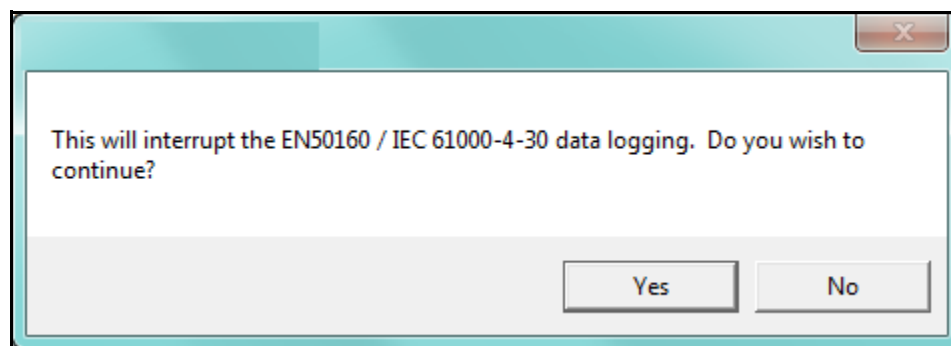
- If you see the first screen, click Auto-Configure. You will see this confirmation screen.



Click Yes - Historical logs 7 and 8 will now be used for EN 50160/IEC 61000-4-30 logging, only. Additionally, PQ and Waveform will be configured for the report.

**NOTE:** It takes a week for the meter to collect all the necessary data for the analysis.

- If EN 50160/IEC 61000-4-30 recording is already active and you want to disable it, click Enable PQ/Waveform Logs 7 and 8. You will see this confirmation screen.



Click Yes - this will disable the EN 50160/IEC 61000-4-30 logging in Historical logs 7 and 8.

**IMPORTANT!** The EN 50160/IEC 61000-4-30 log will no longer be correct, and the Dip/Interruption reports will be invalid.

3. To make settings for EN 50160, configure the following fields (see Chapter 23 for a description of the EN 51060 settings):

- Select the number of allowed rapid Voltage changes per day (1- 50).
- Select the synchronous connection status (Yes or No: yes for a system with a synchronous connection to another system, no if there is no such synchronous connection).
- Select the number of allowed long interruptions (0-100).
- Select how often RMS is updated for rapid Voltage data source (1 cycle or 10/12 cycles).
- Select the upper limit for the supply Voltage unbalance (less than or equal to 2 or 3).
- Select the Voltage dip concern threshold (greater than or equal to 10-85).
- Select the first day of the week (Sunday or Monday).
- Enter the Mains signaling threshold.
- Enter the Mains signaling Interharmonic frequency.
- Enter the Phase Conductors to Earth Thresholds in percentage of Full Scale:
  - Enter the value for A-E, B-E, and C-E.
  - Enter the value for N-E.

4. To change settings for IEC 61000-4-30, first click the IEC 61000-4-30 tab.

EN 50160 / IEC 61000 Settings

IEC 61000-4-30      EN 50160

**Nominal Settings**

Voltage (in secondary, Range: 40V to 600V)      120.00      Volts

Frequency      60      Hz

**Flicker**

Short term test time (PST)      10      Minutes

Long term test time (PLT)      120      Minutes

To enable PQ/Waveform, Historical Logs 7 and 8, press the 'Enable PQ/Waveform, Logs 7 and 8' button below. If Historical Logs 7 and 8 are reenabled, EN 50160 logging will no longer be correct.

Enable PQ/Waveform, Logs 7 and 8

OK      Cancel

5. Configure the following fields:

- Enter the nominal Voltage in secondary (range from 40V to 600V). By supplying the nominal voltage, this field is used to calculate under and over deviations.
- Select the frequency (50 or 60Hz). This field is used to calculate the harmonics and interharmonics associated with the set fundamental frequency.
- Select the short term test time (1-10 minutes, in minute increments). PST is defined over a ten minute interval. Standard IEC 61000-4-15 requires 10 minutes for PST.



- Select the long term test time (10-240 minutes, in ten minute increments). The standard requires 120 minutes, and is calculated from the PLT values.
6. When all changes are entered, click OK to return to the main Device Profile screen.  
For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 11.3.5: IEC 61000-4-30 Harmonic & Interharmonic Thresholds (Nexus® 1500+ Meter)

Use this setting to set the group and subgroup harmonic and interharmonic thresholds that will be applied to the IEC 61000-4-30 reporting for the meter.

1. From the Power Quality and Alarm Settings menu, double-click on the IEC 61000-4-30 Harmonic & Interharmonic line. You will see the screen shown below.

Harmonic		Interharmonic	
Subgroup	Threshold	Subgroup	Threshold
0	0.00	0	0.00
1	0.00	1	0.00
2	0.00	2	0.00
3	0.00	3	0.00
4	0.00	4	0.00
5	0.00	5	0.00
6	0.00	6	0.00
7	0.00	7	0.00
8	0.00	8	0.00
9	0.00	9	0.00
10	0.00	10	0.00
11	0.00	11	0.00
12	0.00	12	0.00
13	0.00	13	0.00
14	0.00	14	0.00

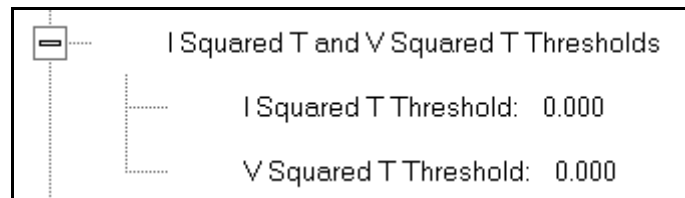
OK Cancel

2. For each of the Harmonic and Interharmonic subgroup levels 0-51, you can enter a threshold percentage value. Use the scroll bars to view all of the levels.
3. When all changes are entered, click OK to return to the Main Device Profile screen.
4. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

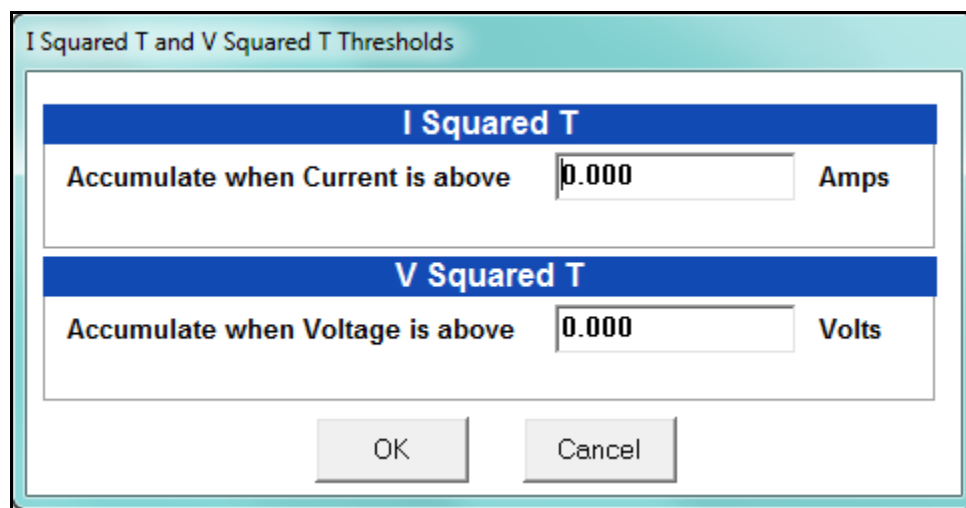
### 11.3.6: I Squared T and V Squared T Thresholds

With the I Squared T and V Squared T Thresholds screen, you can set the point at which the meter accumulates current and Voltage. This feature is used to calculate wear on circuit breaker contacts.

1. From the Power Quality and Alarm Settings menu, click on the + button next to I Squared T and V Squared T Thresholds or double-click on that line. You will see the submenu shown below, which shows the current settings for the meter.



2. Double-click one of the settings to open the I Squared T and V Squared T Thresholds screen, shown below.

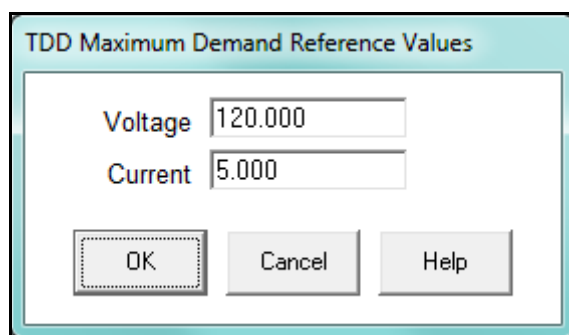


3. Enter the thresholds in the I Squared T and V Squared T fields.
4. Click OK to exit the screen and return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 11.3.7: TDD Maximum Demand Reference Values

This setting of the Device Profile allows you to set the maximum value for voltage and current, which is used for the TDD (Total Demand Distortion) calculation. TDD and THD (Total Harmonic Distortion) are both indices used to measure harmonics. TDD is defined in the IEEE 519 Standard, "Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems" as "the total root-sum-square harmonic current distortion in percent of the maximum load current." It gives a better indication of the impact of distortion on Demand than THD which analyzes the harmonic distortion relative to the fundamental, without consideration of load.

1. From the Power Quality and Alarm Settings menu, double-click on the TDD Maximum Demand Reference Values. You will see the screen below.



2. Enter the maximum values for voltage and current.
  - You can find these values in the Poll Max and Min Readings polling screen (see Section 5.2.2 for details).
  - You can view the TDD values in the Harmonics polling screen (see Section 5.4.2 for details).
3. Click OK to exit the screen and return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 11.3.8: High Speed Inputs

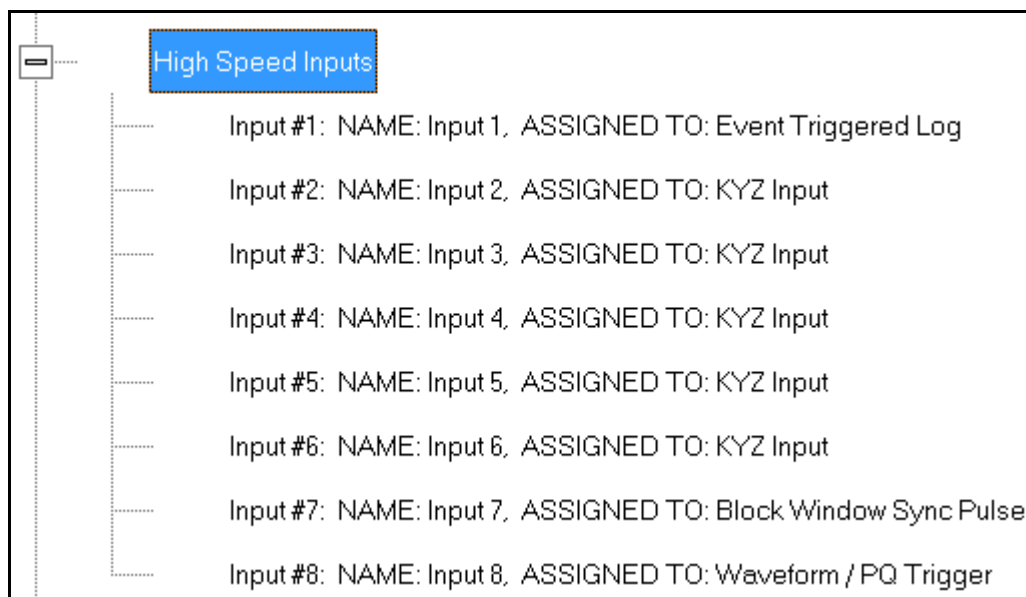
The Nexus® 1500/1500+ meter's built-in High Speed Inputs can be used in two ways:

- Attaching status contacts from relays, breakers or other devices for status or waveform initiation
- Attaching the KYZ pulse outputs from other meters for pulse counting and totalizing

Even though these inputs are capable of being used as high speed digital fault recording inputs, they serve a dual purpose as KYZ counters and totalizers. The function in use is programmable in this setting of the Device Profile, which lets you label the eight High Speed inputs and to specify their status.

- Labeling the inputs allows you to determine the source of status change when data is later analyzed.
- This feature lets you set the High Speed Inputs' status as a KYZ input, a trigger for waveform capture or PQ recording, a trigger for logging, or a means of synchronizing the meter.
- In the Pulse Accumulations setting (Section 11.2.10), you can assign the High Speed Inputs' counts to be accumulated in one of four internal Aggregators of the meter.

1. From the Power Quality and Alarm Settings menu, double-click on the High Speed Inputs line or click on the + button next to it. You will see the submenu shown below.



2. Double-click any of the Input lines. You will see the screen below.

Input ID	Name	Open Label	Shorted Label	Normal Condition	Input Type
1	Input 1	Open	Closed	Open	Event Triggered Log
2	Input 2	Open	Closed	Open	KYZ Input
3	Input 3	Open	Closed	Open	KYZ Input
4	Input 4	Open	Closed	Open	KYZ Input
5	Input 5	Open	Closed	Open	KYZ Input
6	Input 6	Open	Closed	Open	KYZ Input
7	Input 7	Open	Closed	Open	Block Window Sync Pulse
8	Input 8	Open	Closed	Open	Waveform / PQ Trigger

OK Cancel Help

3. Double-click a field to enter the following:

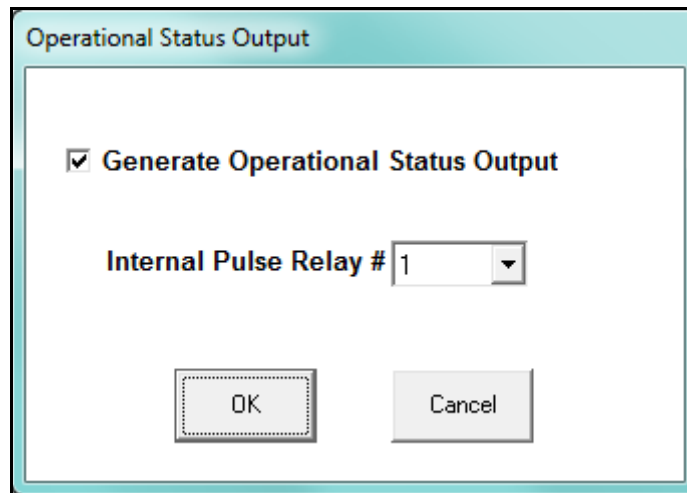
- Name
- Open Label
- Shorted Label

- Normal Condition
4. Click on the Input Type field to select an option from the pull-down menu. The available selections are:
- KYZ Input - select this option to designate the input as a pulse (KYZ) input.
  - Waveform/PQ Trigger - select this option if you want the input to trigger a waveform/PQ recording (see Section 11.3.3).
  - Block Window Sync Pulse - select this option if you want to synchronize the meter with pulses from the input (see Section 11.2.2).
  - Event Triggered Log - select this option if you want the input to trigger logging. Logging occurs when the input's state changes from Open to Closed. Only one High Speed input at a time can be set for Event Triggered logging. You must also set the length of logging and the parameters to be logged (see sections 19.4.1 and 19.4.2).
5. When you have finished making your selections, click OK to exit the screen and return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 11.3.9: Operational Status Output

This setting of the Device Profile lets you assign a relay to indicate that the meter is operational, i.e., when it enters Runtime. When the meter is first started up, the indicator will be off, and once the meter is ready for operation, the indicator will be on. The relay can be monitored either by another connected device, or, if the operational status is assigned to one of the two LED relays, operational status will be indicated on the front of the meter - the LED will light up once the meter is operational.

1. From the Power Quality and Alarm Settings menu, double-click on the Operational Status Output line. You will see the screen shown below.



2. Click the checkbox to enable this feature and select the relay you want to assign from the pull-down menu.

3. When you finish making your selections, click OK to exit the screen and return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

Note that your selection will now be reflected in the Internal KYZ screen; see the example screen below and refer to 11.2.3: Internal KYZ Outputs, on page 11-40.

**Internal KYZ Outputs**

KYZ Output	Assigned Channel	Watt Hour Per Pulse	Pulse Width(ms)	Mode	Form
1, Pulse 1 LED	Operation Status Output			Enable	
2, Pulse 2 LED	Quad (2 + 3) Watthour	1.0000000	100	Enable	Pulse (Form A)
3	Quad (1 + 2) VARhour	1.0000000	100	Enable	Pulse (Form A)
4	Quad (3 + 4) VARhour	1.0000000	100	Enable	Pulse (Form A)

Note: To configure a Relay to generate End of Interval Pulse, go to the Demand Integration Intervals Block Average Tab.  
 Note: To configure a Relay to generate Operation Status Output, go to the Operation Status Output Setting.

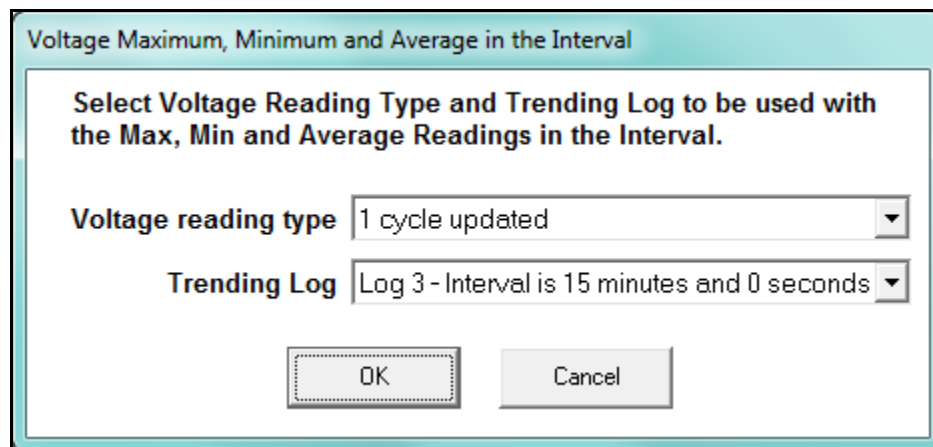
OK Cancel Help



### 11.3.10: Voltage Short Term Maximum, Minimum and Average Interval

This feature allows a user to capture short term high and low readings on voltage that would normally be missed by a 15 minute voltage snapshot log. With this feature the user can see the highest and lowest anomaly on the line to be able to trend voltage quality over a long period of time. This setting of the Device Profile lets you assign a voltage reading type and Historical log (Trending log) for the maximum, minimum, and average readings in the interval.

1. From the Power Quality and Alarm Settings menu, double-click on the Short Term Maximum, Minimum and Average Interval line. You will see the screen shown below.



2. From the pull-down menus, select:
  - Voltage reading type - can be 1 cycle updated, 10/12 cycle updated, 3 second updated or 10 minute updated. The voltage reading type defines which reading to compare for the max/min/average values.
  - Trending log - can be Historical logs 3 - 8. The interval programmed for each log (see Section 11.4.1) is also displayed. The Trending log setting defines which log to synchronize Averaging interval to. You must still manually enter these items into the logs if you wish to use them for that purpose.
3. When you finish making your selections, click OK to exit the screen and return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

## 11.4: Trending Profile Settings

Trending profiles allow you to set up which parameters you wish to trend in the meter's historical memory. Virtually any reading that the meter measures can be stored in the meter's memory to be logged for later download to the host software. This section of the Device Profile enables you to configure parameters for the Nexus® 1500/1500+ meter's eight historical logs and the Event Triggered log.

1. From the Device Profile screen, click on the + button next to Trending Profile Settings or double-click on the Trending Profile Settings line. You will see the menu shown below.



2. Double-click on one of the Trending lines to access the programming screens.

**NOTE on Load Profile Recording:** Load Profile recording is a subset of the Nexus® meter's more general logging and trending capability. The same screens are used for setup, but Load Profile recording only deals with accumulated values; Energy (Wh), reactive Energy (VARh) and apparent power (VAh).

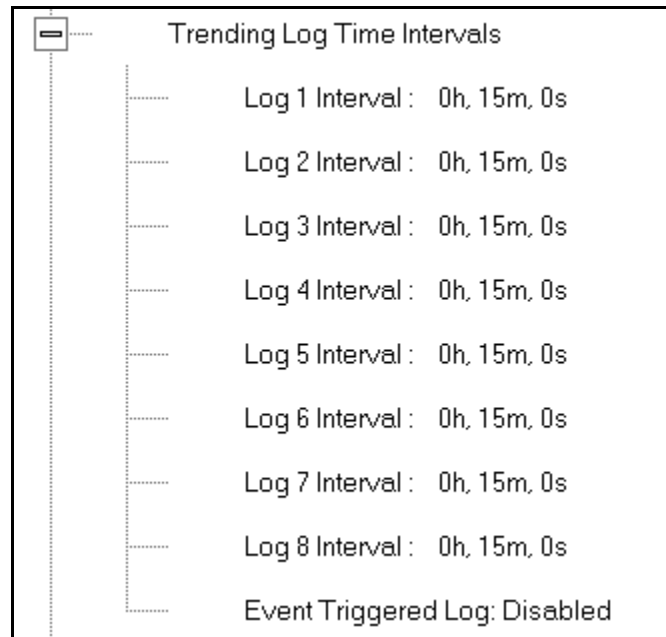
Historically, Load Profile recording referred to recording of quadrant 1 Energy (Wh) because electromechanical meters only measured energy and were designed to prevent reverse rotation outside of quadrant 1.

**NOTE:** When using MV90, you must set up your load profile in Log 1 and Log 2. The MV90 TIM will only read from the first two logs. The additional logs can be used to bring additional data down via the CommunicatorPQA® application.

### 11.4.1: Programming the Trending Log Time Intervals

The Trending Log Time Intervals setting determines the interval at which the Historical logs take a "snapshot" of data, and the length of time logging continues for the Event Triggered log (see Section 11.3.8 for information on setting the Event Triggered log). To set the parameters for the logs, see Section 11.4.2. See Chapter 16 for information on retrieving logs and Chapter 19 for information on viewing logs.

1. From the Trending Profile Settings menu, double-click Trending Log Time Intervals or click the + button next to it. You will see the submenu shown below. The submenu shows both the intervals set for logs 1 through 8, and the length of logging for any Event Triggered log. It will also show if Logs 7 and 8 are enabled for EN 50160/IEC 61000-4-30 logging.



- To change the interval for a Historical log, double-click on one of the log numbers.
- To change logging time for an Event Triggered log, double-click on the Event Triggered log.

**NOTE:** You can also access the Interval setting screens from the Trending Setup screens (see Section 11.4.2).

2. Depending on your selection, follow instructions in step a or b.

a. If you click on Logs 1-8, you will see the screen shown below.

Device Profile: Interval Log Setting

Log 1 Interval	Log 5 Interval
0 Hour 15 Minutes 0 Seconds	0 Hour 15 Minutes 0 Seconds
Log 2 Interval	Log 6 Interval
0 Hour 15 Minutes 0 Seconds	0 Hour 15 Minutes 0 Seconds
Log 3 Interval	Log 7 Interval
0 Hour 15 Minutes 0 Seconds	0 Hour 15 Minutes 0 Seconds
Log 4 Interval	Log 8 Interval
0 Hour 15 Minutes 0 Seconds	0 Hour 15 Minutes 0 Seconds

OK Help Cancel

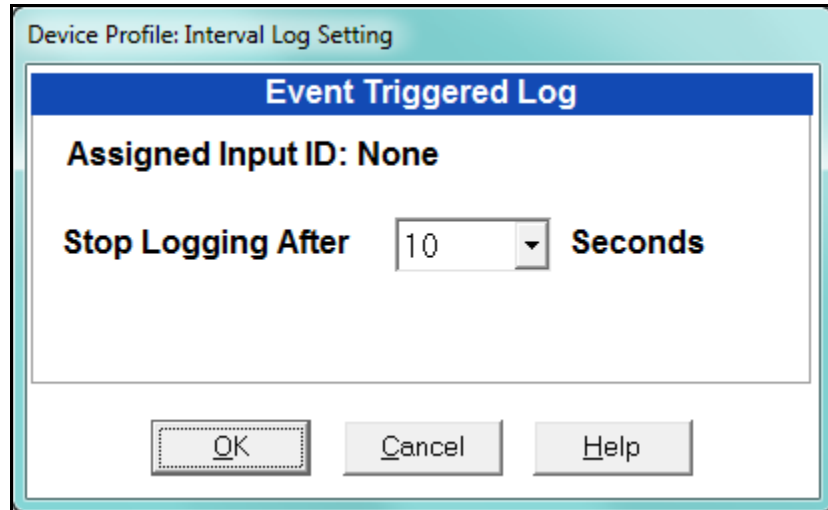
b. This screen lets you set the interval for the Historical (Trending) logs. The interval cannot be greater than one hour. Enter either:

- 1 Hour

or either or both of the following:

- Minutes
- Seconds

- c. If you click on Event Triggered Log, you will see the screen shown below. It displays the High Speed input that is assigned to the Event Triggered log (see Section 11.3.8) and the amount of time (in seconds) that logging continues after the trigger, i.e., when the High Speed input assigned to the log goes from an open state to a closed state.



Select the amount of time for logging from the pull-down menu. You can select from 1 to 60 seconds.

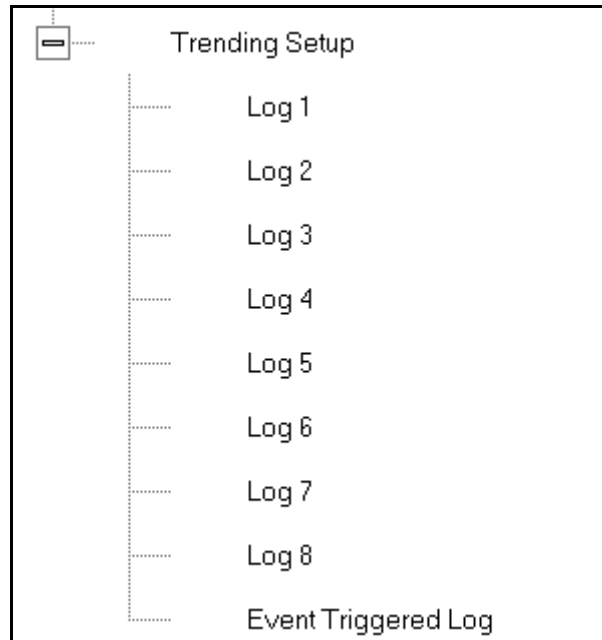
**NOTE:** You enable the Event Triggered log in the High Speed Inputs setting (see Section 11.3.8).

4. Click OK to save your changes. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 11.4.2: Programming the Trending Setup

The Trending Setup controls the channel assignments for Historical logs 1 - 8 and the Event Triggered log. See Chapter 16 for instructions on retrieving logs, including using the HHF Converter.

1. From the Trending Profile Settings menu, click on the + button next to Trending Setup or double-click on the Trending Setup line. You will see the submenu shown below.



2. Double-click on the log whose settings you want to configure. You will see the Trending Log Profile screen for the log you selected. An example screen is shown on the next page.

Trending Log Profile Log 1: 1 MB

Group: **Measured Values** Sub Group: **High Speed Updated**

Selectable Item(s)	Add >>	Selected Item(s)
Voltage A-N		One Second Updated:Voltage A-N
Voltage B-N		One Second Updated:Voltage B-N
Voltage C-N		One Second Updated:Voltage C-N
Voltage Aux		One Second Updated:Voltage Aux
Current A		One Second Updated:Current A
Current B		One Second Updated:Current B
Current C		One Second Updated:Current C
Current N Measured		One Second Updated:Current N Measured
Voltage A-B		One Second Updated:Voltage A-B
Voltage B-C		One Second Updated:Voltage B-C
Voltage C-A		One Second Updated:Voltage C-A
VA A		One Second Updated:VA A
VA B		One Second Updated:VA B
VA C		One Second Updated:VA C
VA Total		One Second Updated:VA Total
Var A		One Second Updated:Var A
Var B		One Second Updated:Var B
Var C		One Second Updated:Var C
Var Total		One Second Updated:Var Total
Watt A		One Second Updated:Watt A
Watt B		One Second Updated:Watt B
Watt C		One Second Updated:Watt C
Watt Total		One Second Updated:Watt Total
Frequency		One Second Updated:Frequency
Power Factor A		
Power Factor B		
Power Factor C		
Power Factor Total		
Volts A - Aux Phase Angle		

Total bytes used: 108      Estimated Log Timespan: 81days 1hour 30min 0sec  
 Bytes remaining: 148      Total Records: 7782

3. Make changes to this screen according to your application requirements. The screen fields are:

- Group - using the pull-down menu, select the type of snapshot. The options are: Measured Values, Averages, Accumulators, Interval Accumulators, External I/O Devices, RTU Master Items, Option Cards, and Input Registers.
- Sub-Group - using the pull-down menu, select a channel for the snapshot. The options you see depend on the Group you selected.

- Sub-Group 2 - with some selections, a second sub-group field will be shown underneath the first one.
- Highlight items in the Selectable Items(s) box and click Add to include the selections in the Log. The items are copied to the Selected Item(s) box. To remove an item from the log, highlight the item in the Selected Item(s) box and click Remove or double-click the item. The item is removed from the Selected Item(s) box.

**NOTES:**

- To select multiple items, hold Ctrl while highlighting the items.
  - To select a range of items, click the first item, hold Shift, and click the last item
  - Move the cursor to the lower left corner of an item, or group of items, to view its size in bytes.
- The Total Bytes Used and Bytes Remaining fields display the amount of memory used for each record of the log. The meter assumes 256 bytes of memory for each record. Total memory is determined by V-Switch™ key and configured log size (see Section 11.1.8).
  - Click Set Interval to open the Interval Log Setting screen (see Section 11.4.1).
4. When all changes have been entered, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.



## 11.5: External I/O Modules

The Nexus® 1500/1500+ meter has the ability to have its I/O expanded using external I/O modules. These modules add both analog and digital inputs and outputs to the meter to greatly expand the capability of the instrument. The meter also has two internal slots to mount expansion digital I/O, including 6 relay outputs and 16 digital inputs - see Section 11.6 for information on the internal I/O options.

This setting of the Device Profile allows you to set up the meter's optional external Input/Output modules (see Chapter 14 for more information on the I/O modules) and RTU Master settings. I/O modules work as Modbus slave devices. The meter polls these modules to get the data from them. I/O modules generally have default RS485 Modbus addresses. So, they don't have to be configured. Once you set up which module you want, put in the default address and start with the basic configuration of readings you desire to gather.

### 11.5.1: Configuring the Input/Output Modules

1. From the Device Profile screen, double-click on the External I/O Modules icon. You will see the screen shown below.

Device Profile: I/O Modules

Module Number	Type	Assigned Address	Nexus Settings	Module Settings	Log / Limit ID
1	20mAON8: Analog Out 4 - 20mA 8 ch	132	Edit	Edit	AO Module 1
2	4PO1: KYZ Output	160	Edit	Edit	KYZ Module 1
3	4RO1: Digital Output	156	Edit	Edit	DO Module 4
4	8AI1: Analog In 0 - 1mA 8 ch	136	Edit	Edit	AI Module 1
5	No Device Assigned				
6	No Device Assigned				
7	No Device Assigned				
8	No Device Assigned				
9	No Device Assigned				
10	No Device Assigned				
11	No Device Assigned				
12	No Device Assigned				
13	No Device Assigned				
14	No Device Assigned				
15	No Device Assigned				
16	No Device Assigned				

OK Cancel Help

2. Click in the Type column and use the pull-down menu to select the specific module you want to add. The Assigned Address, Nexus® settings, and Module settings you can make depend on the module you are configuring. The modules and settings are as follows:

Module	Assigned Address*	Nexus® Setting**	Module Setting
4PO1 - KYZ Output	160*	Click to Edit Relay Accumulations	Click to enter Transmit Delay and configure KYZ outputs' Watt/pulse, rollover and minimum pulse width.
20mAON4 - Analog Transducer Signal Outputs, 4 channels, 4-20 mA	132*	Click to Assign Items to and configure the Analog Outputs	Click to enter Transmit Delay and configure Channel settings
20mAON8- Analog Transducer Signal Outputs, 8 channels, 4-20 mA	132*	Click to Assign Items to and configure the Analog Outputs	Click to enter Transmit Delay and configure Channel settings
1mAON4 - Analog Transducer Signal Outputs, 4 channels, 0-1 mA	128*	Click to Assign Items to and configure the Analog Outputs	Click to enter Transmit Delay and configure Channel settings
1mAON8 - Analog Transducer Signal Outputs, 8 channels, 0-1 mA	128*	Click to Assign Items to and configure the Analog Outputs	Click to enter Transmit Delay and configure Channel settings
4RO1 - Digital Output	156*	Click to configure Relays	Click to enter Transmit Delay
8AI1 - Analog Input Module, 0-1 mA	247*	Click to configure Analog Outputs	Click to enter Transmit Delay and configure Channel settings
8AI2- Analog Input Module, 0-20 mA	247*	Click to configure Analog Outputs	Click to enter Transmit Delay and configure Channel settings
8AI3 - Analog Input Module, 0-5 VDC	247*	Click to configure Analog Outputs	Click to enter Transmit Delay and configure Channel settings
8AI4 - Analog Input Module, 0-10 VDC	247*	Click to configure Analog Outputs	Click to enter Transmit Delay and configure Channel settings

\* The Assigned address on this screen is the address the meter uses to identify the I/O module. The default is the factory set address, which you can change by clicking in the field and choosing a new address from the pull-down menu. This address is not the actual I/O module address. You set that from the I/O Devices menu; see Chapter 14 for instructions.

\*\*When you click in this field you see an Edit button. Click the button to open a screen that lets you edit that module. See the following example screens.

#### 4PO1 Screen - Pulse Output module

Relay	Accumulation
1	Quad (1 + 4) Watthour
2	Quad (2 + 3) Watthour
3	Quad (1 + 2) VARhour
4	Quad (3 + 4) VARhour

OK Cancel

This screen allows you to assign a KYZ output to an accumulator. Click on the pull-down menu to select accumulation configuration for each of the 4 relays. The options are:

- Disabled
- Quad (1+4) Watthr
- Quad (2+3) Watthr
- Quad (1+2) VARhr
- Quad (3+4) VARhr
- Quad (1+2+3+4) VAhr
- Quad 1 Watthr
- Quad 2 Watthr
- Quad 3 Watthr
- Quad4 Watthr
- Quad 1 VARhr
- Quad 2 VARhr
- Quad 3 VARhr
- Quad 4 VARhr

- Quad 1 VAhr
- Quad 2 VAhr
- Quad 3 VAhr
- Quad 4 VAhr
- +Qh Total
- -Qh Total
- Internal Input (#1-8) Totals
- Accumulation (#1-4) Totals
- External Digital Input Modules (1-4) Inputs (#1-8)
- I Squared T (A, B, C)
- V Squared T (A,B,C)

20mAON4 Screen: 4 channel Analog Output module, 4-20 mA

Device Profile: Analog Output

Output	Assigned Item (Click Item to Change)
1	High Speed Updated:Voltage A-B
2	High Speed Updated:Voltage B-C
3	High Speed Updated:Voltage C-A
4	Thermal Average:Current N Calculated

Channel Update

For Pulse Accumulators and Aggregator Block Window Average (8 Byte data) only, please choose 4 of the 8 bytes you want to map to the Analog outputs

Bytes 7, 6, 5, 4

OK Cancel Help

Click in Output channels 1-4 to assign them to a parameter. The other Analog Output Modules - 20mAON8, 1mAON4, and 1mAON8 have similar setting screens, except for the number of channels you can program.

- The analog outputs are used to send a variable current dependent on the programmed reading. This screen lets you select the readings to output.

## 4RO1 Screen- Relay Output module

Device Profile: Digital Output

Relay	Label	Common Shorted to N.C.	Common Shorted to N.O.	Lock to Manual Control
1	Relay 1	Closed1	Open1	<input checked="" type="checkbox"/>
2	Relay2	Closed2	Open2	<input checked="" type="checkbox"/>
3	Relay3	Closed3	Open3	<input checked="" type="checkbox"/>
4	Relay4	Closed4	Open4	<input type="checkbox"/>

OK Cancel Help

Click in the Relay fields 1-4 to enter relay label, common shorted to N.C., common shorted to N.O., and check the box to lock the relay to manual control. When a relay is locked to manual control, it cannot be used in ElectroLogic Relay Control (see Section 11.3.2 for information on ElectroLogic Relay Control).

## 8AI2- Analog Input Module, 4-20 mA

Device Profile: Analog Input

Input	Channel Label	High Value (20mA)	Low Value (4mA)
1	Temperature	100.0000	0.0000
2	Humidity	100.0000	0.0000
3		0.0000	0.0000
4		0.0000	0.0000
5		0.0000	0.0000
6		0.0000	0.0000
7		0.0000	0.0000
8		0.0000	0.0000

OK Cancel Help

Click in Input Channels 1-8 to assign a label and a High and Low Value for each of the analog inputs.

- The two analog input module's settings are the same, except for the Inputs' high and low range.

- The High and Low Value fields let you map the inputs' high and low range to values that are appropriate for the parameters you are measuring. For example, in the screen above, the first input is measuring temperature. The high value for the input is set to 100, and the low value is set to 0. An input reading of 12mA will translate to 50 for the temperature.

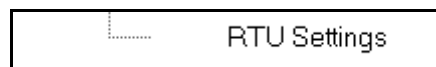
The Analog Input modules can be trended in the historical logs, and the data can be viewed and graphed in Log Viewer (see Chapter 19 for details). The readings shown in the logs and graphs will use the setting range programmed in the screen above, i.e., the results will be reported as 0 through 100.

3. Click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 11.5.2: RTU Settings

The Nexus® 1500/1500+ meter provides a feature that allows it to act as a simple Remote Terminal Unit (RTU). It can poll Modbus registers from downstream devices and bring that data into its memory for logging. This is very useful when trying to integrate data from existing, simpler, legacy Modbus devices. This section of the Device Profile enables you to configure RTU Master settings. This feature is used when you want to have the meter act as an RTU, polling data from other Modbus-based devices, such as lower end meters.

1. From the Device Profile screen, click on the + button next to the External I/O Modules line. You will see the menu option shown below.



2. Double-click on RTU Settings. You will see the screen shown below.

#	Description	Device Address	Starting Register	Number of Registers
1	Grp#1	2	12	5
2	Grp#2	3	20	1

Remaining Registers: 122

Use this screen to configure the settings when Port 2 is set as an RTU Master (see Section 11.1.5).

3. The first view you see is the Group Main tab (shown on the previous page). This screen lets you set up the RTU Master groups, i.e. the devices the Nexus® 1500/1500+ meter is polling. You can enter up to 16 groups. You have the following options:

- Click Add to add a Master group. Fill in the Description, Device Address, Starting Register, and Number of Registers; click Save to save your entries.
- Click on a group and click Edit to change data for the group; click Save to save your changes.
- Click on a group and click Remove to delete the group.
- Click on a group and click Up or Down to change the position of the group.

4. Click the Group Details tab to set up the readings for the devices. See the example screen shown below.

**Modbus RTU Settings**

This feature has not been assigned to a port

Group - Main    **Group - Details**

Selected Group: Grp#1    Remaining Bytes: 8

#	Description	Data Type	Size (Bytes)	Byte Order	Multiplier		Master Starting Register	Slave Starting Register
					Base	Power		
1	Readings	Integer	2	MSB	None	0	14337	12

Up  
Down

Add   Edit   Remove    OK   Cancel

You have the following options:



- Click Add to add a reading to the group. Fill in the Data Type, Size in Bytes, Byte Order, Multiplier Information, and Slave Starting Register (the Master Starting Register is read-only); click Save to save your entries.

**NOTE:** The readings in the group must have consecutive register numbers. If necessary you can break the readings into two or more groups.

- Click on a reading and click Edit to change data for the reading; click Save to save your changes.
- Click on a reading and click Remove to delete the reading from the group.
- Click on the Selected Group pull-down menu to select and display details for another group.

5. Click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

**NOTE:** For more details on I/O Modules, see Chapter 14.

You can then use the polled data in the following ways:

- Access the data using Modbus protocol: Modbus registers, starting at #define MB\_REG\_NEXUS\_MASTER\_DATABASE 0x03800;  
#define MB\_REG\_NEXUS\_MASTER\_DATABASE\_LEN 0x00080.

You can see the Nexus® 1500/1500+ meter's full Modbus map in the Nexus® 1500 (or) 1500+ Meter Modbus User Manual.

- Log the data by selecting Master RTU Items for the group in the Trending Profiles screen: see the example screen, below.

Trending Log Profile Log 2

Group	Sub Group
RTU Master Items	Grp#2

Selectable Item(s)		Selected Item(s)
Rdgs2	Add >>	Grp#2:Rdgs2
	<< Remove	

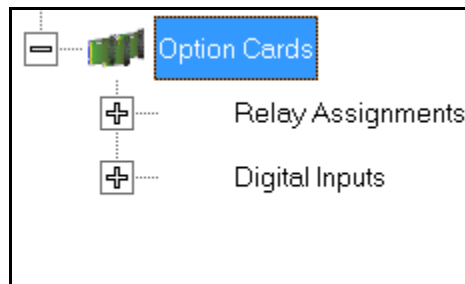
Total bytes used	10	Estimated Log Timespan	648days 12hour 45min 0sec
Bytes remaining	246	Total Records	62259

OK Cancel Set Interval Help

## 11.6: Internally Mounted Option Cards (Nexus® 1500+ Meter)

The Nexus® 1500+ meter has two internal slots to mount expansion digital I/O. The options include 6 relay outputs and 16 digital inputs. In addition to the internal I/O, there are also a large variety of externally mounted I/O modules that can also be added (see Section 11.5). The last Nexus® 1500+ meter's Device Profile settings let you program the Relay Output and Digital Input Option cards. You can install up to two of these internally mounted Option cards in a meter. Refer to the meter's Installation and Operation Manual for additional information on these and other Nexus® 1500+ meter Option cards.

1. From the Device Profile screen, click on the + button next to the Option Cards line. You will see the menu option shown below.

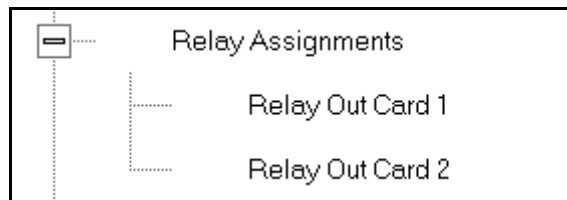


2. To set relay assignments for the Relay Output Option card, continue to Section 11.6.1; to set digital inputs for the Digital Input Option card, go to Section 11.6.2.

### 11.6.1: Relay Assignments (Relay Output Option Card)

This setting allows you to label relays and their states and to set manual control of relays.

1. From the Power Quality and Alarm Settings menu, click on the + button next to Relay Assignments or double-click on the Relay Assignments line. You will see the submenu shown below (the number of Relay Out cards you see depends on your meter's configuration).



2. Click the Relay card you want to configure. You will see the screen shown below.

Relay Output Card: 1

Relay	Label	Common Shorted to N.C.	Common Shorted to N.O.	Lock to Manual Control
1	Relay 1	N.C.	N.O.	<input type="checkbox"/>
2	Relay 2	N.C.	N.O.	<input type="checkbox"/>
3	Relay 3	N.C.	N.O.	<input type="checkbox"/>
4	Relay 4	N.C.	N.O.	<input type="checkbox"/>
5	Relay 5	N.C.	N.O.	<input type="checkbox"/>
6	Relay 6	N.C.	N.O.	<input type="checkbox"/>

OK Cancel Help

3. You can enter a label for the:

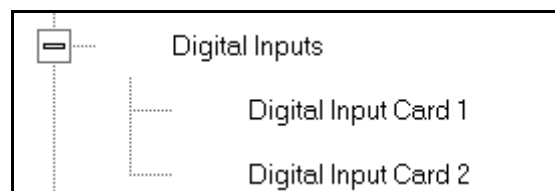
- Relay, which can be used to describe what the relay is used for, attached to, its function, or its purpose
- Common shorted to N.C condition, which can be used to describe the condition or state when the relay's common connection is shorted to the N.C. connection

- Common shorted to N.O. condition, which can be used to describe the condition or state when the relay's common connection is shorted to the N.O. connection
4. If you want to set any of the relays so that they can only be controlled manually, click the Lock to Manual Control checkbox. Then use the Relay Control feature (see Tools menu information in Section 20.1 for instructions) to manually change the state of the relay.
  5. When all settings are complete, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 11.6.2: Digital Inputs (Digital Inputs Option Card)

The Digital Inputs Option card can be used to either count pulses, for example, from a KYZ module or another meter, or to monitor the status of a circuit or equipment, e.g., breakers or transformers. Up to two cards can be entered into a meter. This setting allows you to configure the Digital Inputs Option card(s).

1. From the Power Quality and Alarm Settings menu, click on the + button next to Digital Inputs or double-click on the Digital Inputs line. You will see the submenu shown below (the number of Digital Input cards you see depends on your meter's configuration).



2. Click the Digital Input card you want to configure. You will see the screen shown below.

Device Profile: Digital Input Option Card in Slot 3

Input	Channel Label	Open Label	Closed Label	Normal State	Rollover
1	Input 1	Opened	Closed	Open	99999999
2	Input 2	Opened	Closed	Open	99999999
3	Input 3	Opened	Closed	Open	99999999
4	Input 4	Opened	Closed	Open	99999999
5	Input 5	Opened	Closed	Open	99999999
6	Input 6	Opened	Closed	Open	99999999
7	Input 7	Opened	Closed	Open	99999999
8	Input 8	Opened	Closed	Open	99999999
9	Input 9	Opened	Closed	Open	99999999
10	Input 10	Opened	Closed	Open	99999999
11	Input 11	Opened	Closed	Open	99999999
12	Input 12	Opened	Closed	Open	99999999
13	Input 13	Opened	Closed	Open	99999999
14	Input 14	Opened	Closed	Open	99999999
15	Input 15	Opened	Closed	Open	99999999
16	Input 16	Opened	Closed	Open	99999999

Initialize OK Cancel

3. For each of the 16 inputs, you can enter a label for the:
  - Channel, which can be used to describe its function or its purpose
  - Open condition
  - Closed condition
4. For each of the inputs, select the Normal state from the pull-down menu.
5. The rollover value tells when each of the state counters will roll over. Enter a number between one and 4294967295.  
**NOTE:** You can click Initialize to have the software automatically set up the card's settings to the values shown in the screen above.
6. When all settings are complete, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

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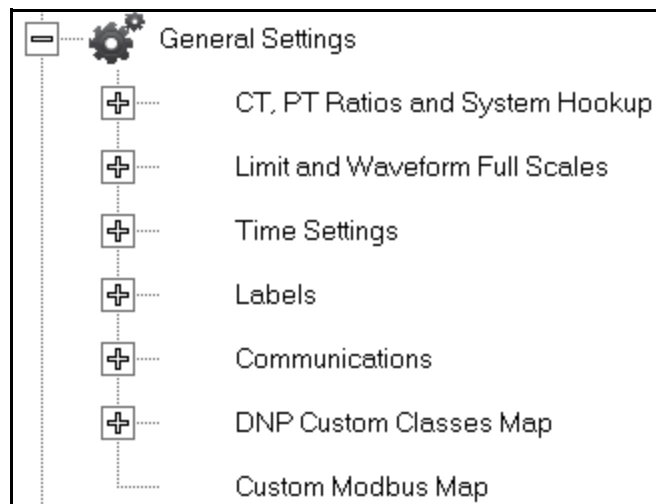
## 12: Nexus® 1262/1272 Meter

This chapter explains how to configure a Nexus® 1262/1272 meter's programmable settings, which are stored in the unit's Device Profile. Chapter 7 contains detailed information on the Device Profile.

The settings screens shown in this chapter are for the Nexus® 1272 meter. The programming screens you see vary slightly, depending on the options ordered with your meter. The Nexus® 1262 meter has most of the same settings, though there are slight differences due to different capabilities. See Section 2.1: Meter Comparisons on page 2-1 for more information.

### 12.1: Device Profile General Settings

1. From the Device Profile screen, double-click on the General Settings line or click on the + button next to it. All of the settings in the General Settings group are listed.



2. Click on the programmable setting you want to modify. The following sections explain the settings in the order in which they appear in the General Settings menu.

If you are connected to a Nexus®1262 meter, the second setting will say: Limit Full Scales.

### 12.1.1: CT and PT Ratios and System Hookup

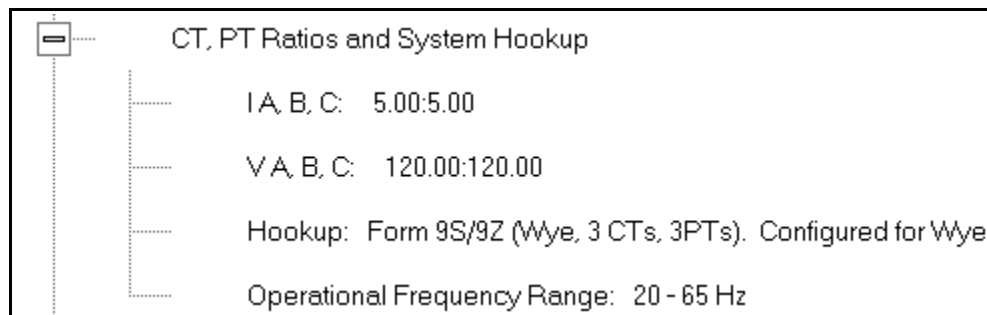
#### Functional Overview of CT and PT Ratios:

Current and Potential Transformers are used mainly for the following reasons:

- To insulate, and as a result isolate, the meter from high-voltage circuits.
- To change the primary voltage and current to standard values and sizes that the meter can measure.

The CT and PT transformers deliver fractions of the primary voltage and current to the meter. With properly set ratios and multipliers, the readings of the meter can be used to determine the energy, voltage, current, or power of the system.

1. From the General Settings menu, click the + button next to CT, PT Ratios and System Hookup. You will see the submenu shown below.



This submenu displays the current Device Profile's settings for CT, PT ratios, connection type, and Operational Frequency range.

2. Double-click on any of the settings. You will see the CT and PT Ratios screen.

Device Profile: CT and PT Ratios

CT Ratio			PT Ratio (Line to Neutral)		
	Primary Current	Secondary Current		Primary Voltage	Secondary Voltage
I A, B, C	2000.00	5.00	V A, B, C	14400.00	120.00

Form 9S/9Z

Wye (No PTs or 3 PTs, 3 CTs)

Operational Frequency Range

20Hz to 65Hz

OK Cancel Help

3. Make changes to this screen according to your application requirements.

When you change a PT or CT Ratio, CommunicatorPQA® software updates the corresponding Full Scale value entered in the Limit and Waveform Full Scales setting. When you click OK on this screen, CommunicatorPQA® software opens the Limit & Waveform Full Scales screen so that you can verify the settings (see Section 12.1.2: Limit and Waveform Full Scales on page 12-4).

- Enter Primary and Secondary Current and Voltage.
- Using the pull-down menu, choose the Hookup mode that matches the connection you have to the Nexus®1262/1272 meter. Choose from the following:
  - Wye (No PTs or 3 PTs, 3 CTs)
  - Delta (No PTs, 2 PTs or 3 PTs, 3 CTs)
  - Delta (No PT or 2 PTs, 2 CTs)

- 2.5 Element Wye (No PTs or 2 PTs, 3 CTs)

This value must be set properly for the meter to calculate readings correctly.

See the *Nexus® 1262/1272 Meter Installation and Operation Manual* for connection diagrams.

- Using the pull-down menu, select Operational Frequency Range:

- 20Hz to 65Hz
- 350Hz to 500Hz
- 20Hz to 500Hz

4. Click OK. If changes have been made, a message window opens asking you to verify that the Limit Full Scales are correct.
5. Click OK. The Limit and Waveform Full Scales screen opens (see Section 12.1.2: Limit and Waveform Full Scales on page 12-4).
6. To implement any changes, click the Update Device button to send the new profile to the meter.

You will see a warning message that logs will be reset, and you will be given the opportunity to retrieve the logs before they are cleared. Resetting the logs prepares the meter for placement in a new installation or change of the meter Transformers.

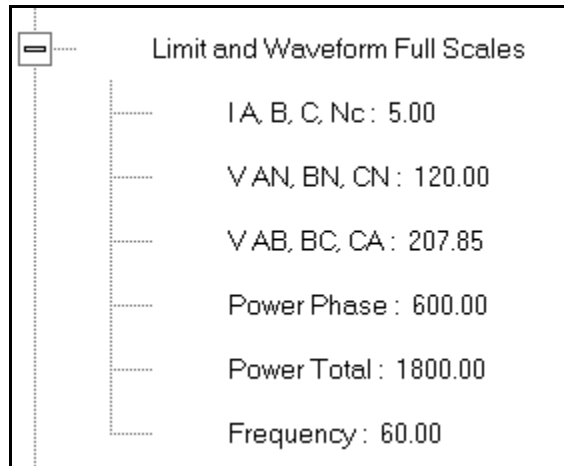
### **12.1.2: Limit and Waveform Full Scales**

All Limit and Waveform settings (see Section 12.3.1: Limits on page 12-67 and Section 12.3.3: PQ Thresholds (Waveform Recording: Nexus® 1272 Meter Only) on page 12-82) are based on a percentage of the Full Scale. Full Scales are based on the CT and PT ratios (see Section 12.1.1: CT and PT Ratios and System Hookup on page 12-2). The % of Full Scale is defaulted based on the CT and PT ratio. If the user wants, the Full Scales can be adjusted to the actual power system condition, to optimize the triggering conditions.

For the Nexus® 1262 meter, this screen is called Limit Full Scales, since the 1262 does not support Waveform recording.

Set the CT and PT ratios first; CommunicatorPQA® software automatically recalculates the Full Scales every time the CT and PT ratios change and presents them for your verification.

1. From the General Settings menu, click on the + button beside Limit and Waveform Full Scales or double-click on the Limit and Waveform Full Scales line. You will see the submenu shown below.



This submenu displays the current Device Profile's settings for the Limit and Waveform Full Scales. The values shown here are the default meter settings.

Frequency and Voltage values are nominal values. The Power Phase is computed using nominal Voltage and rated maximum current. In most cases the software automatically computes the proper value - you will not need to change it.

2. Double-click any of the settings. You will see the Limit and Waveform Full Scales screen.

Device Profile: Limit and Waveform Full Scales

I A, B, C, Nc	5.00
V AN, BN, CN	120.00
V AB, BC, CA	207.85
Power Phase	600.00
Power Total	1800.00
Frequency	60.00

OK Cancel Help

3. Enter the Full Scale for each parameter.

#### NOTES:

- The Limits and Waveform settings (Sections 12.1.1 and 12.3.5, respectively) are based on a percentage of the Full Scales entered here.
- CommunicatorPQA® software automatically recalculates the Full Scale Voltages, currents and power every time the CT and PT ratios change. However, frequency is not changed, even if the operational frequency range is changed.

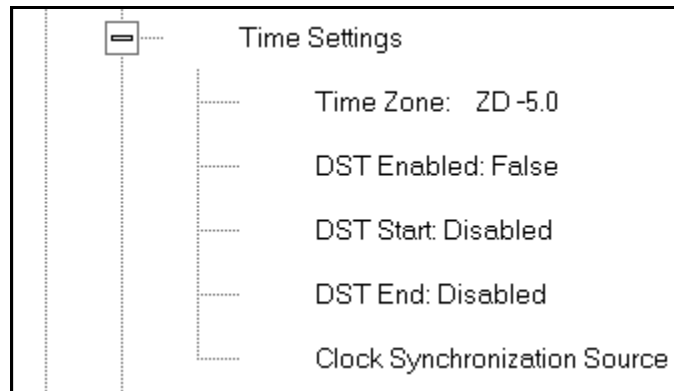
**Frequency can only be changed on this screen.**

- Power Phase is the amount of power per each phase; Power Total is the power of all phases combined.
4. When all changes are entered, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

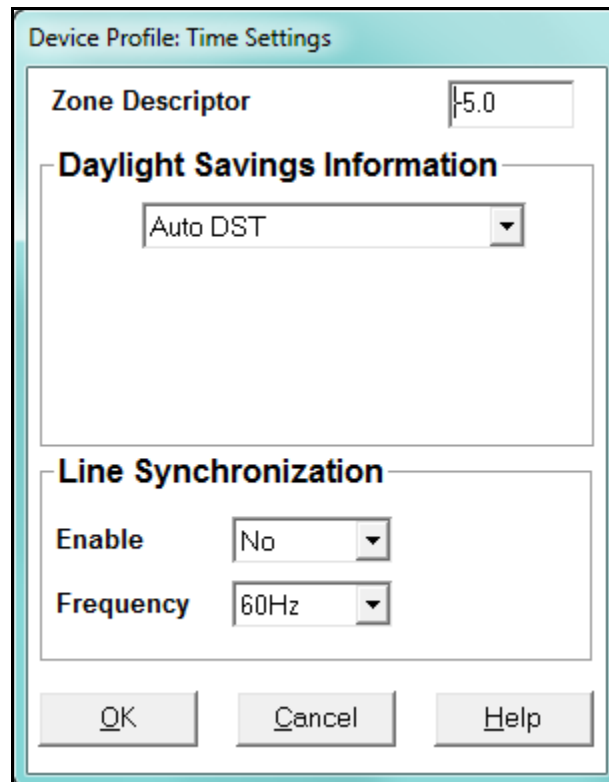
### 12.1.3: Time Settings

To edit a Device Profile's Time settings:

1. From the General Settings menu, double-click on the Time Settings line. You will see the submenu shown below. DST stands for Daylight Savings Time.



2. Double-click on any of the programmable settings; you will see the Time Settings screen.



3. Make changes to this screen according to your application requirements.

- **Zone Descriptor:** A Zone Descriptor sets the time zone for the meter. 0 = Greenwich Mean Time. Consult the chart below to find the Zone Descriptor for your time zone.

<b>GMT Greenwich Mean Time Table (Dublin, London)</b>	
-1.00 Azores	+1.00 Brussels, Paris, Warsaw
-2.00 Mid-Atlantic	+2.00 Athens, Cairo, Helsinki
-3.00 Buenos Aires, Georgetown	+3.00 Baghdad, Kuwait, Moscow, Tehran
-4.00 Atlantic Time (Canada), Santiago	+4.00 Kabul, Baku
-5.00 Eastern Time (USA and Canada), Lima	+5.00 Karachi
-6.00 Central Time (USA and Canada), Mexico City	+6.00 Dhaka
-7.00 Mountain Time (USA and Canada)	+7.00 Bangkok, Hanoi, Jakarta
-8.00 Pacific Time (USA and Canada), Tijuana	+8.00 Beijing, Hong Kong, Singapore
-9.00 Alaska	+9.00 Osaka, Sapporo, Seoul
-10.00 Hawaii	+10.00 Brisbane, Melbourne, Guam, Hobart
-11.00 Midway Island	+11.00 Magadan, Solomon Islands
-12.00 Eniwetok	+12.00 Auckland, Fiji

- **Daylight Savings Information:**
  - **Disabled:** Disables an automatic adjustment for Daylight Savings Time.
  - **Auto DST:** Sets Daylight Savings Time automatically to the pre-2007 standard for the United States: the time changes automatically occur at 2:00 AM (your local time), on the first Sunday in April and the last Sunday in October.
  - **Auto DST U.S. EPA 2005:** Sets Daylight Savings Time automatically to the 2007 standard for the United States: the time changes automatically occur at 2:00 AM (your local time), on the second Sunday in March and the first Sunday in November.



- **User Defined:** Allows you to set the Daylight Savings Time start and end times manually. Fields open that let you set the beginning and ending dates for Daylight Savings Time.
  - **Line Synchronization:** set Enable or Disable and Frequency.
    - Line synchronization uses the frequency zero crossings to provide a time reference for the meter. The basic function of Line Frequency Clock Synchronization is to adjust the real time clock to track the time based on the power line frequency. For this purpose, Phase A voltage only is used.
    - This is the most common method to synchronize a meter's clock. EIG recommends that you always select this method unless there is a specific reason not to select it. If the meter is not synchronized to line frequency or IRIG-B, it will default to internal crystal. Different meters differ in terms of drift, but typically meters with 20 ppm crystals will drift 30 seconds per month when set to internal crystal.
    - Line Sync is disabled if an IRIG-B signal is detected. In that case, the unit synchronizes to the IRIG-B signal and doesn't rely on the internal signal unless the IRIG-B signal is lost.
  - **How Time is Adjusted**

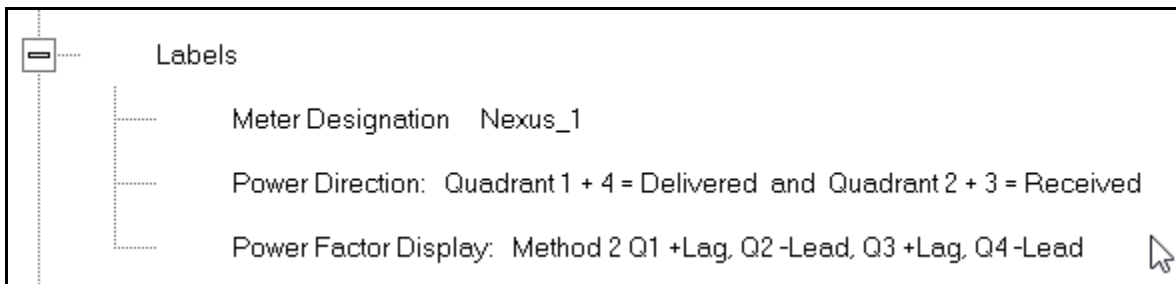
After the clock is synced to the line, the meter periodically checks the cumulative difference between the real time clock in seconds and the line cycle count. If the absolute difference between the two accumulations is more than 1 second or 60 (50) cycles, the clock is adjusted + / - 1 second accordingly.
4. To set the meter's on-board clock, use Set Device Time from the Tools Menu (see Section 20.1: Tools Menu on page 20-1).
  5. When all changes are entered, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 12.1.4: Labels

Labels are user-defined names for the Nexus® 1262/1272 meter and the I N Measured terminal. You also use the Labels screen to select the power direction, and the power factor display.

It is important to label the meter (under "Meter Designation") with a unique name because that label becomes the file name of any logs retrieved from that meter. Duplicate meter designations interfere with retrieved log databases. See Chapter 19 for more details on logs.

1. From the General Settings menu, double-click on the Labels line. You will see the submenu shown below.



2. Double-click on any of the parameters; you will see the Labels screen.

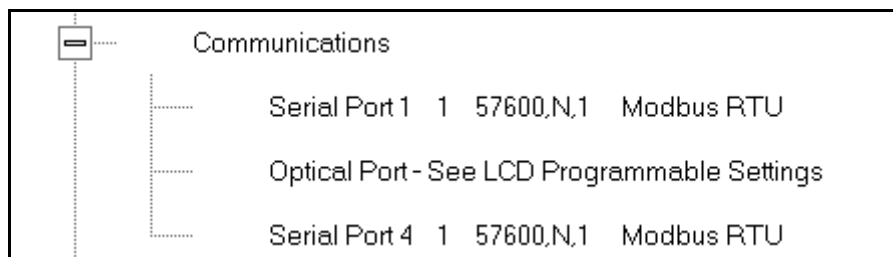
3. Enter labels in the appropriate fields.

- Meter Designation must be set for partial log retrieval. You can use any character allowed by the Windows® operating system.
  - In English versions the following characters don't work:  
 $\backslash / : * ? " < > |$
  - For meters used internationally by multilingual users, we recommend you use only alphanumeric characters allowed by your operating system.
- Your selection in Power Direction determines which quadrants of Watt-hours are considered Received and Delivered.
- Your selection in Power Factor Display determines the display of Quadrants in the Power Factor screen.
- The Memo field is used to enter notes about the meter, such as the location, or other relevant details.

- The Phase Angle representation determines how the voltage phase angles are represented. 90% of users will use the default, which is the first radio button: "Positive angle for events after the reference and negative angle for events prior to the reference"; however, you can choose the opposite display by selecting the second radio button, if you wish.
4. When all changes are entered, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 12.1.5: Communications

1. From the General Settings menu, double-click on the Communications line. You will see the submenu shown below.



2. Double-click on any of the settings (e.g., "Optical Port"): you will see the Communications Settings screen.

Device Profile: Communications Settings

**Port 1**

Address: 65

Baud Rate: 57600

Data Bits: 8

Parity: None

Stop Bits: 1

Tx Delay: 0ms

Protocol: Modbus RTU

**Port 4(Ext Devices)**

Address: 205

Baud Rate: 38400

Data Bits: 8

Parity: None

Stop Bits: 1

Tx Delay: 0ms

Protocol: Modbus ASCII

Mode: Slave

**Network Settings (If Network Option was purchased)**

IP Address: 172 20 167 79

Subnet Mask: 255 255 248 0

Default Gateway: 172 20 161 23

Advanced Settings

Ethernet Gateway (INP10X)

Baud Rate: 57600

Delay: 5 x 15 ms

OK Cancel Help

**NOTE:** You may use the onboard display or one of the Nexus® External Displays to learn the current baud rate, address and communication protocol of each meter port. See the *Nexus® 1262/1272 Meter Installation and Operation Manual* for details.

3. Make changes to this screen according to your application requirements by clicking on the box or pull-down menu of any of the following settings:
- Address: assign an address to each port to communicate with other devices. Multiple Nexus® meters on an RS485 bus must each have a unique address set for the port that is connected to the bus.
  - Baud Rate: from the pull-down menu, select 4800, 9600, 19200, 38400, 57600, or 115200. The baud rate entered in this field must match the baud rate of the

device connected to the Nexus® 1262/1272 meter at this port. Use 9600 for modem connections.

- Data Bits: use the pull-down menu to select from: 5, 6, 7 or 8. For Modbus RTU and ASCII, leave the data bits at 8.
- Parity: use the pull-down menu to select from: None, Even, Odd, Mark or Space. For Modbus RTU and ASCII, leave the parity at None.
- Stop Bits: use the pull-down menu to select from: 1, 1.5 or 2. For Modbus RTU and ASCII, leave the stop bits at 1.
- TxDelay (Transmit Delay): use the pull-down menu to select from: 0 ms to 2550 ms. Leave the Tx delay at 0ms unless you are using equipment that requires a delay in the response time, such as a radio modem.
- Protocol: use the pull-down menu to select from Modbus RTU, Modbus ASCII, or DNP3. Direct connections made through CommunicatorPQA® software must use either Modbus RTU or Modbus ASCII protocol (we recommend Modbus RTU). Modem connections made through CommunicatorPQA® software must use Modbus ASCII only. See Chapter 2 for details.
- Mode (Port 4 only): If you are using Output modules, set this port to Master (I/O modules) mode. Set the port to operate at 57600 baud.
- Internal Network Option: If your meter has the Internal Network Option (INP100/INP200), see your Network Administrator for the correct settings to enter into the Network Settings fields. Settings will vary from network to network.
- If your meter has the INP100/INP200/ INP102/INP202 Option (10/100BaseT and Combo Card), you will see the Advanced Settings button: click it to open a screen that lets you set Network card features; see Chapter 21 for details.
- Internal Modem Settings: If your meter has this option:
  - a. Set the number of Rings to Answer from the pull-down menu.
  - b. Set the Baud Rate to match your system's baud rate.

- c. Click Dial-Out Profile to access the Modem Programming screen: see Chapter 24 for instructions on using the Modem Dial In/Dial Out Function.
4. When all changes are entered, click OK to return to the main Device Profile screen. For these changes to take effect, you must click the Update Device button. This sends the new profile to the meter.

**IMPORTANT!**

- In order to prevent communications problems, be careful when making changes in the Communications Settings screen. For example, if you change the baud rate of the port connected to a computer, be sure to make the same change to the computer port's baud rate. If you change a port's address, be sure to update the address settings of any device that communicates with the port.
- The baud rate of the port used by the Nexus® External Display should always be set to 9600 and the address set to 1.



### 12.1.6: DNP Custom Class Map

The DNP Custom Class Map lets you set up DNP communication for the meter. From the General Settings menu, double-click on the DNP Custom Classes Map line and on the DNP Level 2 line. You will see the screen shown below.

**DNP Custom Mapping**

Object 10 - Binary Output    Object 1 - Binary Input    Object 20 - Binary Counter

**Object 30 - Analog Input**    Global Values    DNP Settings

DNP Points	Map		Description	Deadband (%)	Class Assignments
	Line	Point			Object 32
0	34	0	One Second Updated: Voltage A-N	100.00	No Class
1	34	1	One Second Updated: Voltage B-N	100.00	No Class
2	34	2	One Second Updated: Voltage C-N	100.00	No Class
3	36	0	One Second Updated: Current A	100.00	No Class
4	36	1	One Second Updated: Current B	100.00	No Class
5	36	2	One Second Updated: Current C	100.00	No Class
6	45	0	One Second Updated: Watt Total	100.00	No Class
7	43	0	One Second Updated: Var Total	100.00	No Class
8					

Enter Line and Point assignments from the DNP Table or double click the Description Field for a list of Selections.

Enter a dead band % to be used in causing an associated Object 32 value. (See Manual for Description of base values used by the dead band %)

For Object 32 assign a class.

☐ Use Custom 16-Bit Scaling

OK    Cancel    Help    Clear    Clear All

For details on programming the DNP Level 2 settings, see Chapter 22.

### 12.1.7: Custom Modbus Map

The custom Modbus map for the Nexus® 1262/1272 meter can position up to 256 Registers (or the equivalent of 2K, whichever is lower) to readily provide the functionality you want from your meter. In addition, you can customize selected values for format type, Scaling, byte order, data size, etc. This allows a user to optimize Modbus registers by putting them in a particular order and/or format to make the SCADA poll more quickly and efficiently.

1. From the General Settings menu, double-click on the Custom Modbus Map line. You will see the screen shown below.

Item	Modbus Map Line	Point	Number of Registers	Start Register	Group	Channel	Format	Data Size	Unit	Primary / Secondary	Absolute Value	Byte Order	Display/Modulo/Offset
1	34	0	2	12289	One Second Phase to Neutral Volts	Volts AN	Unsigned Integer	4 Byte	1 Primary	No	No	MSR, MSB	N/A
2	34	1	2	12291	One Second Phase to Neutral Volts	Volts BN	Unsigned Integer	4 Byte	1 Primary	No	No	MSR, MSB	N/A
3	34	2	2	12293	One Second Phase to Neutral Volts	Volts CN	Unsigned Integer	4 Byte	1 Primary	No	No	MSR, MSB	N/A
4	36	0	2	12295	One Second Current(A, B, C)	IA	Unsigned Integer	4 Byte	1 Primary	No	No	MSR, MSB	N/A
5	36	1	2	12297	One Second Current(A, B, C)	IB	Unsigned Integer	4 Byte	1 Primary	No	No	MSR, MSB	N/A
6	36	2	2	12299	One Second Current(A, B, C)	IC	Unsigned Integer	4 Byte	1 Primary	No	No	MSR, MSB	N/A
7	39	0	2	12301	One Second Phase to Phase Volts	Volts AB	Unsigned Integer	4 Byte	1 Primary	No	No	MSR, MSB	N/A
8	39	1	2	12303	One Second Phase to Phase Volts	Volts BC	Unsigned Integer	4 Byte	1 Primary	No	No	MSR, MSB	N/A
9	39	2	2	12305	One Second Phase to Phase Volts	Volts CA	Unsigned Integer	4 Byte	1 Primary	No	No	MSR, MSB	N/A
10	41	0	2	12307	One Second VA Total	VA Total	Unsigned Integer	4 Byte	1 Primary	No	No	MSR, MSB	N/A
11	43	0	2	12309	One Second VAR Total	VAR Total	Unsigned Integer	4 Byte	1 Primary	No	No	MSR, MSB	N/A
12	45	0	2	12311	One Second Watts Total	Watts Total	Unsigned Integer	4 Byte	1 Primary	No	No	MSR, MSB	N/A
13	46	0	2	12313	One Second Frequency	Frequency	Unsigned Integer	4 Byte	1 Primary	No	No	MSR, MSB	N/A
14	48	0	2	12315	One Second Power Factor Total	Total	Unsigned Integer	4 Byte	1	No	No	MSR, MSB	0 to +3.999
15	49	0	2	12317	One Second Imbalance	Voltage	Unsigned Integer	4 Byte	1 Primary	No	No	MSR, MSB	N/A
16	49	1	2	12319	One Second Imbalance	Current	Unsigned Integer	4 Byte	1 Primary	No	No	MSR, MSB	N/A
17	537	0	2	12321	Scaled +/- Wh, Q 1 - 4 VAh and VARh	Quad(1+4) Watt Hour	Unsigned Integer	4 Byte	1 Primary	No	No	MSR, MSB	N/A
18	537	5	2	12323	Scaled +/- Wh, Q 1 - 4 VAh and VARh	Quad(2+3) Watt Hour	Unsigned Integer	4 Byte	1 Primary	No	No	MSR, MSB	N/A

OK Clear all Clear Cancel Help Registers 38 of 256

Data entry is straightforward. Each entry field is described below. Note that not all selections appear on the screen at the same time. Use the scroll buttons to view additional data/entry fields on the screen. Certain entries (such as Format, Data Size, etc.) have different allowable selections depending on the data point used. The pull-down menu adjusts to provide the appropriate selections for each data point.

- Data Point Selection: there are two different ways to select a data point:
  - a. Refer to the Nexus® 1262/1272 meter's Modbus map and find the associated line and point for the value you want. When you enter those values into the screen table, the software displays the associated group and channel.
  - The Nexus® 1262/1272 meter's Modbus map can be downloaded from the EIG website:<http://www.electroind.com/pdf/modbus2.pdf>

b. Double-click the Group field. From the pull-down menus, select a group and its associated channel value. The software displays the map and line values.

- Number of Registers: this field is display only. The software computes the number in this field based on the data size selected in the Data Size column.
- Start Register: this field is display only. The software assigns and adjusts Start register numbers to take into account previous entries and data sizes. The Start register is the number of the first register used in polling. The Start registers are shown as 4x to describe them as holding registers, for SCADA applications.
- Format: from the pull-down menu, select a format type for a value, such as Signed Integer, Unsigned Integer, and 4 Byte IEEE Float.
- Data Size: from the pull-down menu, select the number of bytes you want to represent the data point: 2 or 4.
- Unit: if the polled value is viewed as an integer, the Unit field tells the software where to place the decimal point.

#### **Examples**

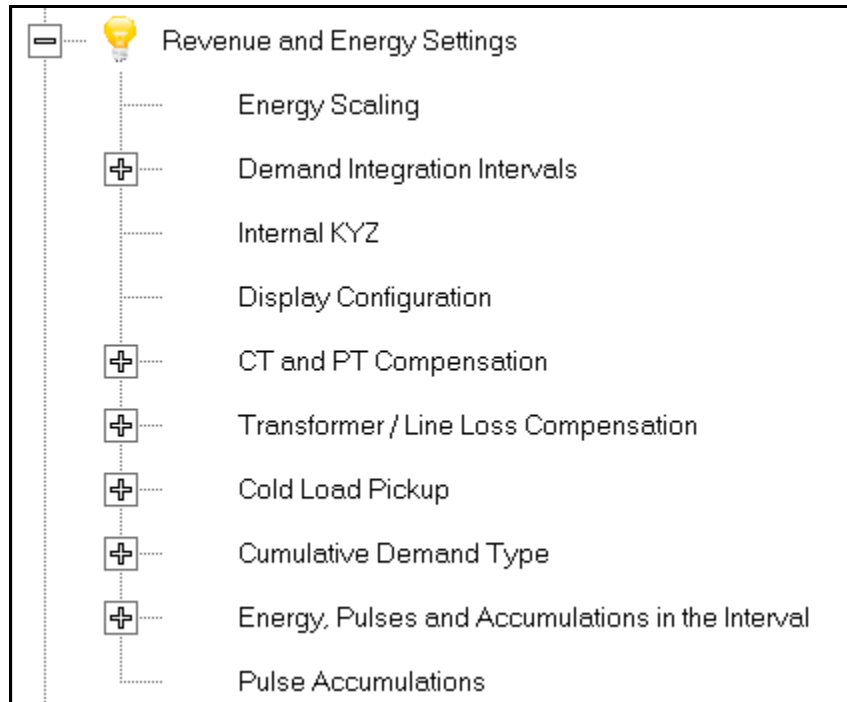
- If you select .01, a polling value 1234 is interpreted as 12.34.
- If you select 100, a polling value 1234 is interpreted as 123400.
- Primary/Secondary: the meter normally computes values in secondary units. Where applicable, you may select primary or secondary. If Primary is selected, the value is multiplied by the appropriate CT and/or PT values.
- Absolute Value: where appropriate, you may have the option of having the data point computed as a signed or absolute value. Select either:
  - No: to have the data point computed as a signed value.
  - Yes: to have the data point computed as an absolute value.

- **Byte Order:** for most of the data points, you can select the polling order of the registers/bytes to match what the SCADA system needs. The choices are: MSR, MSB (most significant register, most significant byte); MSR, LSB (most significant register, least significant byte); LSR, MSB (least significant register, most significant byte); and LSR, LSB (least significant register, least significant byte). EIG meters store data as MSR, MSB, whereas most SCADA systems use LSR, LSB. You can either select an alternate order here, for example, LSR, LSB, or you can leave the data as is and then have your SCADA system change the order after the data is polled.
  - **Display/Modulo/Offset:** depending on the data point, select one or more additional options with appropriate sub-selections.
    - **Display:** This setting supplies a modifier for phase angles and power factor that translates the value into something usable by the SCADA system.  
**Example:** For Volts AN phase angle values, you can represent the value as 0 to 360 degrees or -180 to +180 degrees, etc. Selections appear in a pull-down menu for the associated point. You may want to select -180 to +180 degrees if you want to know if a phase angle is positive or negative in relation to the reference.
    - **Modulo:** Certain values are cumulative and can roll over and start recounting from zero. For those values, where required, you can enter a point at which the rollover will occur.
    - **Offset:** Where allowed, you can enter a value (offset) that will be added to the data point when it is computed.
2. When all changes are entered, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

## 12.2: Revenue and Energy Settings

Revenue and Energy Settings are the second group of settings in the Device Profile.

1. From the Device Profile screen, click on the + button next to Revenue and Energy Settings or double-click on the Revenue and Energy Settings line. All of the settings in the Revenue and Energy Settings group are listed.



2. Click on the programmable setting you want to modify. The following sections explain the settings in the order in which they appear in the Revenue and Energy Settings menu.

### 12.2.1: Energy Scaling

1. From the Revenue and Energy Settings menu, click on the + button next to Energy Scaling or double-click on the Energy Scaling line. You will see the Energy Scale Settings screen.

To configure scaling for a reading, enter:

1. Number of Digits, 2. Number of Decimal Places,
3. Unit of Measurement; 4. Example of the resultant scaling is shown here

The screenshot shows the 'Energy Scale Settings' window. It has several tabs: 'Pulse Accumulations and Aggregations', 'I and V Squared T Readings', 'Q Hours', 'Energy' (selected), 'Uncompensated Energy', and 'Test Mode Energy'. Under the 'Energy' tab, there are sub-tabs: 'Watt Hour' (selected), 'VA Hour', and 'VAR Hour'. A table is displayed with the following data:

Item	Digits	Decimal Places	Units	Example
Quadrant 1 Wh	9	3	MWh	999999.999
Quadrant 2 Wh	9	3	MWh	999999.999
Quadrant 3 Wh	9	3	MWh	999999.999
Quadrant 4 Wh	9	3	MWh	999999.999
Quadrant 1+4 Wh	9	3	MWh	999999.999
Quadrant 2+3 Wh	9	3	MWh	999999.999

Below the table, it says: 'Net Wh uses Quadrant 1+4 Wh settings.' At the bottom of the window are buttons for 'Global Settings', 'OK', and 'Cancel'. Four red arrows point to the 'Digits', 'Decimal Places', 'Units', and 'Example' columns of the table, labeled 1, 2, 3, and 4 respectively.

- This screen has multiple tabs that allow you to access all of the Energy Scaling options. Using the Energy Scale Settings screens you can select the number of digits, decimal point placement and Energy unit for displayed readings.
- The Example field shows you the scaling choices you made applied to an example reading.
- You click on the tabs to navigate between screens, except for Global settings - you click on the Global Settings button to access that screen.

## Global Settings

Item	Digits	Decimal Places	Units	Example
Quadrant 1+4 Wh	8	1		9999999.9
Quadrant 2+3 Wh	8	1		9999999.9
Quadrant 1+2 VARh	<input type="text" value="8"/>	<input type="text" value="1"/>		
Quadrant 3+4 VARh				
Quadrant 1+2+3+4 VAh				
Internal Input Accumulators				
Internal Input Aggregators				
I Squared T				
V Squared T				

Apply Cancel

**NOTE:** Because there are many energy settings, Global Settings conveniently allows you to set these similar energy reading settings all at once.

2. Click the Global Settings button to see the screen shown above. This screen lets you set the scale for all of the Energy Readings.
  - a. Click in the Digits field and select the number of digits for the value from the pull-down menu. You can choose between 2 and 9 digits.
  - b. Click in the Decimal Places field and select the number of decimal places for the value from the pull-down menu. You can choose between 0 and 7 decimal places, depending on the number of digits you selected. For example, if you chose 3 digits, you can only choose up to 2 decimal places.
  - c. Click in the Units field to select the unit of measurement for the value. You can select k or M.

The example field changes as you make selections, to show you how the value would appear with the settings you made.

3. When all changes are entered, click Apply to return to the main Energy Scale Settings screen. You can now use the tabs to modify the scale for specific readings. For example, you might have set the scale for the Internal Input Accumulators as 5 digits, 2 decimal places, and M unit, but you may want one of the accumulators to have a different scale. You would click the Pulse Accumulations and Aggregations

tab and change the scale for that accumulator. The following sections show the tab screens where you can make individual scaling changes. You set the Digits, Decimals, and Units fields in the same way as in the Global Settings screen.

## Energy Tab

This is the initial screen view. Click on the Watt Hour, VA Hour, and VAR Hour tabs to configure scaling for those readings.

Click to set Watt Hour readings scaling (this is the initial tab view)

Click to set VA Hour readings scaling

Click to set VAR Hour readings scaling

Energy Scale Settings

Pulse Accumulations and Aggregations    I and V Squared T Readings    Q Hours

Energy    Uncompensated Energy    Test Mode Energy

Watt Hour    VA Hour    VAR Hour

Item	Digits	Decimal Places	Units	Example
Quadrant 1 Wh	9		3 MWh	999999.999
Quadrant 2 Wh	9		3 MWh	999999.999
Quadrant 3 Wh	9		3 MWh	999999.999
Quadrant 4 Wh	9		3 MWh	999999.999
Quadrant 1+4 Wh	9		3 MWh	999999.999
Quadrant 2+3 Wh	9		3 MWh	999999.999

Net Wh uses Quadrant 1+4 Wh settings.

Global Settings

OK    Cancel



## Uncompensated Energy Tab

Click on the Uncompensated Energy tab to configure specific VA, Watt and VAR readings not adjusted by Transformer Loss Compensation.

Energy Scale Settings

Pulse Accumulations and Aggregations    I and V Squared T Readings    Q Hours

Energy    **Uncompensated Energy**    Test Mode Energy

Item	Digits	Decimal Places	Units	Example
Quadrant 1+4 Wh	9	3	M	999999.999
Quadrant 2+3 Wh	9	3	M	999999.999
Quadrant 1+2+3+4 VAh	7	2	k	99999.99
Quadrant 1+2 VARh	9	3	M	999999.999
Quadrant 3+4 VARh	9	3	M	999999.999

Global Settings

OK    Cancel

## Pulse Accumulations and Aggregation Tab

Click on the Pulse and Aggregations tab and then click on the Accumulators and Aggregators tabs to configure scaling for those readings.

Click to set scaling for Accumulator readings (this is the initial tab view)

Click to set scaling for Aggregator readings

Energy Scale Settings

Energy Uncompensated Energy Test Mode Energy

**Pulse Accumulations and Aggregations** I and V Squared T Readings Q Hours

**Accumulators** Aggregators

Item	Digits	Decimal Places	Units	Example
Input 1	7		2 k	99999.99
Input 2	7		2 k	99999.99
Input 3	7		2 k	99999.99
Input 4	7		2 k	99999.99
Input 5	7		2 k	99999.99
Input 6	7		2 k	99999.99
Input 7	7		2 k	99999.99
Input 8	7		2 k	99999.99

Global Settings

OK Cancel

## I and V Squared T Readings Tab

Click on the I and V Squared Readings tab to configure scaling for specific  $I^2T$  readings (data will not accumulate until current reaches the programmed level) and  $V^2T$  readings (data stops accumulating when Voltage falls below the programmed level).

Energy Scale Settings

Energy      Uncompensated Energy      Test Mode Energy

Pulse Accumulations and Aggregations      **I and V Squared T Readings**      Q Hours

Item	Digits	Decimal Places	Units	Example
I Squared T Phase A	7		2 k	99999.99
I Squared T Phase B	7		2 k	99999.99
I Squared T Phase C	7		2 k	99999.99
V Squared T Phase A	7		2 k	99999.99
V Squared T Phase B	7		2 k	99999.99
V Squared T Phase C	7		2 k	99999.99

I Squared T Average uses I Squared T Phase C's settings.  
V Squared T Average uses V Squared T Phase A's settings.

Global Settings

OK      Cancel

## Q Hours Tab

Click on the Q Hours tab to configure scaling for +QH and -QH readings.

The screenshot shows the 'Energy Scale Settings' dialog box. The 'Q Hours' tab is selected. The dialog has three main sections: 'Energy', 'Uncompensated Energy', and 'Test Mode Energy'. The 'Q Hours' tab is active, showing a table with columns: Item, Digits, Decimal Places, Units, and Example. The table has two rows: '+Qh' and '-Qh'. Both rows have '9' in the Digits column, '3 M' in the Units column, and '999999.999' in the Example column. At the bottom of the dialog are buttons for 'Global Settings', 'OK', and 'Cancel'.

Item	Digits	Decimal Places	Units	Example
+Qh	9		3 M	999999.999
-Qh	9		3 M	999999.999

## Test Mode Tab

Click on the Test Mode Energy tab to configure scaling for Test mode energy readings - Wh, VAh, and VARh - click tabs to configure each.

The screenshot shows the 'Energy Scale Settings' dialog box. The 'Test Mode Energy' tab is selected. The dialog has three main sections: 'Energy', 'Uncompensated Energy', and 'Test Mode Energy'. The 'Test Mode Energy' tab is active, showing a sub-dialog with three tabs: 'Watt Hour', 'VA Hour', and 'VAR Hour'. The 'Watt Hour' tab is selected, showing a table with columns: Item, Digits, Decimal Places, Units, and Example. The table has two rows: 'Quadrant 1+4 Wh' and 'Quadrant 2+3 Wh'. Both rows have '9' in the Digits column, '3 MWh' in the Units column, and '999999.999' in the Example column. At the bottom of the dialog are buttons for 'Global Settings', 'OK', and 'Cancel'.

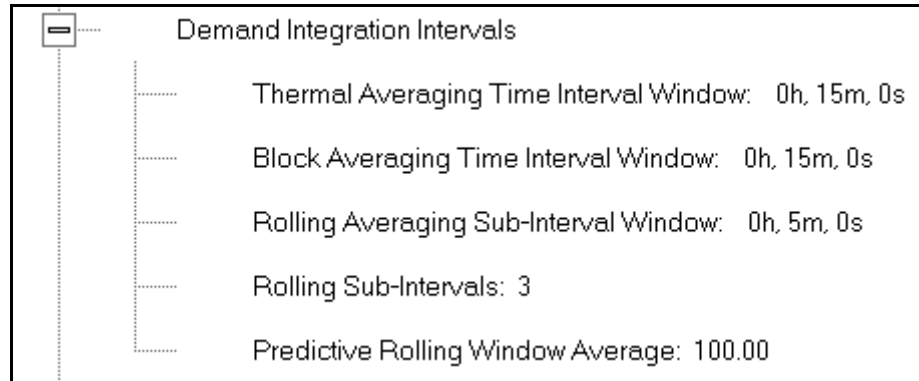
Item	Digits	Decimal Places	Units	Example
Quadrant 1+4 Wh	9		3 MWh	999999.999
Quadrant 2+3 Wh	9		3 MWh	999999.999

- When you are done, click OK to return to the main Device Profile screen. For these changes to take effect, you must click the Update Device button to send the new profile to the meter.

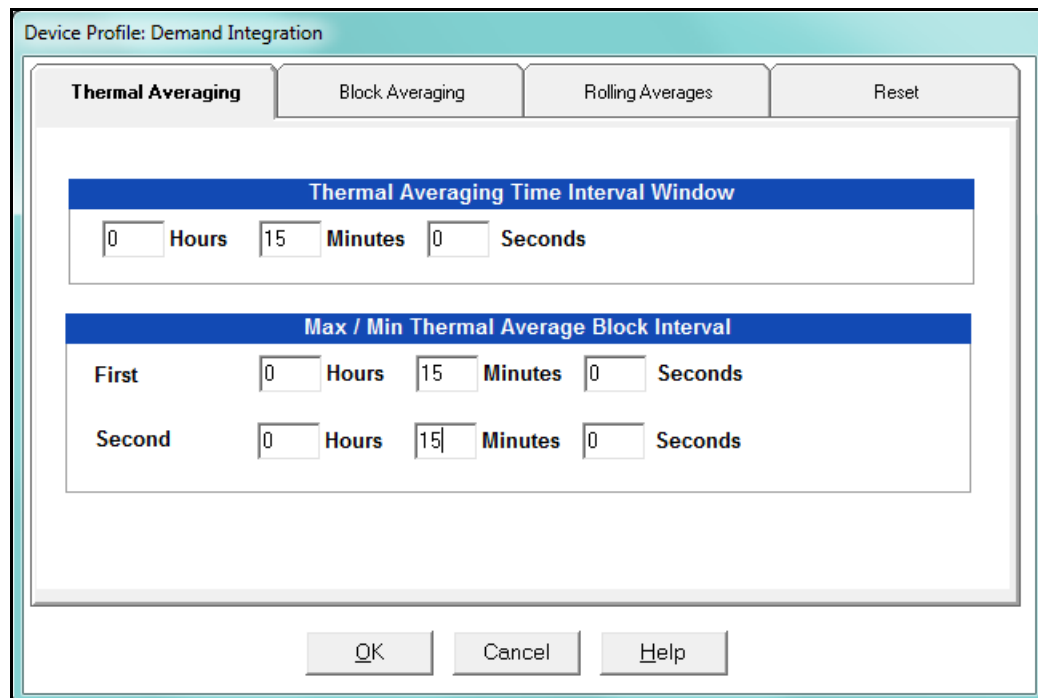
### 12.2.2: Demand Integration Intervals

See the *Nexus® 1262/1272 Meter Installation and Operation Manual* for details on Demand intervals.

1. From the Revenue and Energy Settings menu, click on the + button next to Demand Integration Intervals or double-click on the Demand Integration Intervals line. You will see the submenu shown below.



2. Double-click on any of the settings. You will see the screen shown below.



3. Click on the tabs at the top of the screen to navigate from one setting to another. Make changes to the settings according to your application requirements. Following is a brief description of each setting and its function:

- Thermal Averaging (tab shown on previous page): use to set hours, minutes and seconds for a precise thermal window of demand data.
  - Traditional analog Watt-hour meters use heat-sensitive elements to measure temperature rises produced by an increase in current flowing through the meter. A pointer moves in proportion to the temperature change, providing a record of demand. The pointer remains at peak level until a subsequent increase in demand moves it again, or until it is manually reset.

The Nexus® 1500 meter mimics traditional meters to provide Thermal Demand readings. Electronic thermal demand emulation is the logarithmic average of the power used, with a more recent load being weighted more heavily than a less recent load, (approximated exponentially). Each second, as a new power level is computed, a recurrence relation formula is applied. This formula recomputes the thermal demand by averaging a small portion of the new power value with a large portion of the previous thermal demand value. The occurrence of the proportioning of new to previous is programmable, set by the averaging interval. The averaging interval represents a 90 change in thermal demand to a step change in power. So, for example, with a 15 minute set interval, the meter will record 90 of a change in load in 15 minutes, 99 in 30 minutes, and 99.9 in 45 minutes.

Because thermal demand emulation is the logarithmic average, the demand is not set to zero on a demand reset. On a demand reset, present demand becomes the new maximum demand.

- The Max/Min Thermal Average Block Interval fields are used if you want to track the maximum and minimum Demand in more than one interval, e.g., the Max and Min Demand in a 10 minute (First Interval) and a 15 minute interval (Second Interval).

- Block Averaging Time: use to set the length of the block interval used for Demand calculations and other interval-based functions; also used to set End of Interval pulse. Block averaging is also known as fixed window averaging. A window is the user set time range, e.g., 15 minutes. Computation is performed on that 15 minute interval, and after that, a new set of computations will be started. For example, Window 1 will be from 0 to 15 minutes, Window 2 will be from 16 to 30 minutes, and so on.

- Use the Hours, Minutes, and Seconds fields to set the length of the Block Interval.
- If you want to generate a pulse at the end of the set interval, click the box next to the Generate End of Interval Pulse field and select the number of the internal relay (1-4) you want to use and the pulse width (5 - 635 milliseconds).

**NOTE:** The Block Window Sync field indicates whether the meter is being synchronized with pulses from a High Speed input. This option is set in the Input Type field of the High Speed Inputs screen (see [Section 12.3.6: High Speed Inputs on page 12-88](#)).

- **Rolling Averages:** also known as a sliding window, functions like multiple, overlapping Block averages. You define the subintervals at which an average of Demand is calculated. A window duration is the user set time, such as 15 minutes, but it moves, so that, for example, Window 1 is 0 to 15, Window 2 is 1 to 16, Window 3 is 2 to 17, and so on.

Device Profile: Demand Integration

Thermal Averaging   Block Averaging   **Rolling Averages**   Reset

**Rolling Averaging Sub-Interval Window**

0 Hours   5 Minutes   0 Seconds

**Rolling Sub-Intervals**

3   Rolling Average Interval Window: 15.00 Minutes

**Predictive Rolling Window Average**

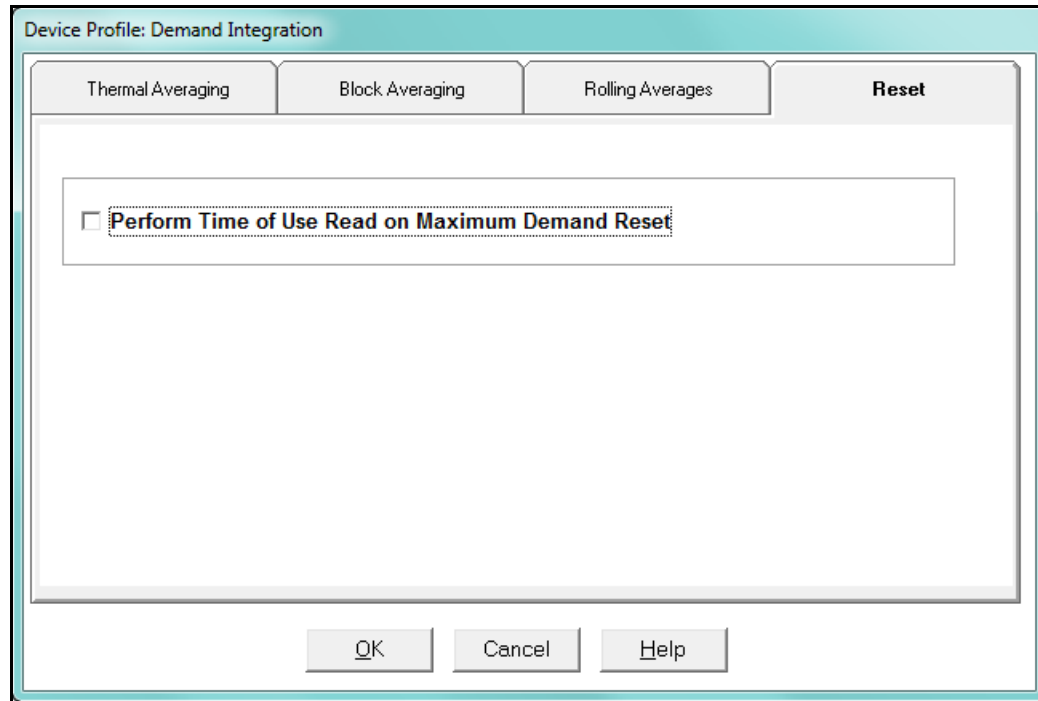
100 %

OK   Cancel   Help

- Set the Hours, Minutes, and Seconds fields under Rolling Averaging Sub-Interval Window.
- Rolling Sub-Intervals: set the number of rolling windows you want to "string together."
- Predictive Rolling Window Average: the meter gives you the programmed ( field) prediction of your demands. If you are using Demand as a Limit, such that you will perform certain actions when you hit a certain Demand level, e.g., turning off motors, you may want to give yourself a "buffer." This field accomplishes that by letting you choose to over-predict the Rolling Window Demand - e.g., if you enter 110, the meter will predict Demand at a 10 higher rate than the actual Demand, so that you will trigger a Limit alarm earlier than if you were using 100 Predictive Demand.



- **Reset:** Allows you to specify a Time of Use read whenever Maximum Demand is reset.



- Check the box to perform the TOU read. By selecting this, the meter will place all of the TOU values in the previous month's registers. Otherwise, the meter will default to self read based on a date set in the meter.
  - Leave the box unchecked if you don't want to perform a TOU read.
4. When all changes are entered, click OK to return to the main Device Profile screen. For these changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 12.2.3: Internal KYZ Outputs

The Internal KYZ Outputs setting lets you assign channels to the KYZ outputs and to the test LEDs. The channel selection sets the type of pulse that will be generated. For example, the Pulse 1 LED can generate Energy Pulses for conventional testing or Reactive (VARh) Pulses for complex testing and approvals. This setting also allows you to determine the frequency and duration of the pulse for each output and LED.

1. From the Revenue and Energy Settings menu, click on the + button next to Internal KYZ Settings or double-click on the Internal KYZ Settings line. You will see the screen shown below.

Internal KYZ Outputs

KYZ Output	Assigned Channel	Watt Hour Per Pulse	Pulse Width(ms)	Mode	Form
1	Quad (1 + 4) Watthour	0.0119040	200	Enable	Transition (Form C)
2	Quad (2 + 3) Watthour	0.1000000	200	Enable	Transition (Form C)
3	Quad (1 + 2) VARhour	0.1000000	200	Enable	Transition (Form C)
4	Quad (3 + 4) VARhour	0.1000000	200	Enable	Transition (Form C)
Test LED	Quad (1 + 4) Watthour	1.8000000	200	Enable	Pulse (Form A)

Note: To configure a Relay to generate End of Interval Pulse, go to the Demand Integration Intervals Block Average Tab.

Note: To configure a Relay to generate Operation Status Output, go to the Operation Status Output Setting.

OK Cancel Help

2. To make selections on this screen:

- a. Select the assigned channel for the pulse/output. This is the demand that will be output as a pulse.
- b. Enter Watt hour per pulse, pulse width, mode and form for each pulse/output.

#### NOTES:

- Form A = Pulse; Form C = Transition
- No more than one Pulse Output can be assigned as an Operation Status Output.

3. When all changes are entered, click OK to return to the main Device Profile screen. For these changes to take effect, you must click the Update Device button to send the new profile to the meter.

### **Considerations on Setting KYZ Outputs**

KYZ Pulses are produced at a rate proportional to the rate of energy accumulation, a feature that makes them useful for accuracy testing. Decreasing the value of the Watt Hour per Pulse field increases the pulse rate, improving the moment-to-moment precision of the output. The increased pulse rate means that the pulses are of shorter duration. Most equipment for detecting and counting pulses has a minimum detection time, so pulses that occur too rapidly might not be detected and counted.

The value in the Pulse Width field is used to force the meter to generate minimum width pulses in situations where proportional width pulses would occur too quickly to be measured. A pulse width setting that does not match appropriately with the input level and Watt hour per pulse setting will result in output that, in the short term, will not verify correctly.

For proper operation of this feature, the pulse width should be set to a value that is longer than the detection time required by the monitoring equipment, and shorter than the pulse period that the inputs and Watt hour per pulse setting would produce. The formula for the second quantity is:

$$\frac{3600 \times \text{Watt-hr per pulse}}{\text{Total Power}}$$

Some example cases are shown in the table below. For proper operation the pulse width should be set to a value that is less than the computed value of seconds per pulse.

Voltage Phase to Neutral/Phase		Current		Total Power Wh/Pulse	Pulses/Hour	Seconds/Pulse
Volts	Volts	Amps	Watts	Wh	Pulses	Seconds
69.28	120.00	1	207.85	1.8000000	115.47	31.18
69.28	120.00	1	207.85	0.2078461	1000.00	3.60
69.28	120.00	5	1039.23	1.8000000	577.35	6.24
69.28	120.00	5	1039.23	1.0392305	1000.00	3.60
120.00	207.85	1	360.00	1.8000000	200.00	18.00
120.00	207.85	1	360.00	0.3600000	1000.00	3.60
120.00	207.85	5	1800.00	1.8000000	1000.00	3.60
277.13	480.00	1	831.38	1.8000000	461.88	7.79
277.13	480.00	1	831.38	0.8313844	1000.00	3.60
277.13	480.00	5	4156.92	1.8000000	2309.40	1.56
277.13	480.00	5	4156.92	4.15629219	1000.00	3.60

### 12.2.4: Display Configuration

The Nexus® 1262/1272 meter with appropriate firmware (User Programmable LCD Display Run Time Firmware version 100, LCD Display Boot version 30, Base meter's COM run Time 624; or higher) gives you the Display Configurator. This feature lets you customize the meter's LCD screens to display any measured readings. The Display Configurator features the same three View Modes as the base programmable display but has memory for up to 75 screens, distributed however you want among the three View Modes.

The settings shown in this section are for a Nexus® 1262/1272 meter with the Display Configurator. If you have an earlier version of firmware that does not support the Display Configurator (Runtime Firmware version less than 100 and LCD Display Boot version less than 30), you will see a different Screen Assignments tab: see Section 12.2.4.1 for instructions on using that tab. The other Display Configuration settings are the same, irrespective of hardware version. The Firmware versions are shown on the bottom portion of the Device Display Programmable Settings screen - see the screen on the next page.

1. From the Revenue and Energy Settings menu, click on the + button next to Display Configuration or double-click on the Display Configuration line. You will see the screen shown below.

**Device Display Programmable Settings**

**Display Modes** | **Power and Energy Display** | **Miscellaneous**

**Meter Display Mode Names** | **Screen Assignments**

Enter Mode Label and Description for each mode

	Label	Line 1 Description	Line 2 Description
View Mode 1	Nrm	Normal	
View Mode 2	CD	Circuit	Diag
View Mode 3	TOU	Time_of	Use

**Firmware versions**

Boot Version - 30  
Run Version - 101

Firmware version is shown here

Update Display | Retrieve from Display | OK | Cancel | Save | Load | Help

2. Click the tabs at the top of the screens to access the different settings.
  - Meter Display Mode Names Tab (screen shown above; this screen is used by all firmware versions, and is the initial tab view):
    - a. Enter a Label for each of the three View Modes.
    - b. Enter a Description for each View Mode using the Line 1 and 2 Description windows.

- Power and Energy Display Tab: (this screen is used by all firmware versions)

- For Primary Power (right side of screen), set Digits and Decimal Point. These settings apply to VA-hours, Watt-hours (+/-), VAR-hours (+/-) and VAR-hours (quadrants) in the meter. Previews appear at the bottom of the screen.

**NOTE:** Care should be taken to match the Primary Power values on the display with those in the historical logs, since these values are stored in the meter.

- The Primary Energy fields are used to modify the display, only. They are not stored in the meter. Select a value for the Multiply by Constant field, located in the Energy Display box, from the pull-down menu. This value is used to modify the display.  
For example: if the multiple you select is 100 and the value is 7835, 78.35 will be displayed.

- c. If you want the Multiply by Constant to be applied to Demand as well as energy, click the checkbox next to the Apply to the Demand Registers as Well field.

- Miscellaneous Tab: (this screen is used by all firmware versions)

The screenshot shows the 'Device Display Programmable Settings' window with the 'Miscellaneous' tab selected. The window is divided into three main sections: 'Screen', 'Optical Port', and 'User Inactivity Time Outs'. The 'Screen' section contains settings for Back Light Level (4 - Brightest), Back Light Time (02 min, 00 sec), Contrast (2), Scroll Stop (Enabled), Phasor Diagram Rotation (Clockwise), Demand Shown (Cumulative), Time of Use Demand (Block/Rolling), Date Format (Month/Day/Year), Dwell Time While Scrolling (7 seconds), and Show Voltage Phasors in Delta (3). The 'Optical Port' section contains Baud Rate (9600) and Optical Receive Mode (Inverted). The 'User Inactivity Time Outs' section contains three settings: Leave Test Mode After (5 minutes), Leave View Mode 2 After (5 minutes), and Leave View Mode 3 After (5 minutes). At the bottom of the window are buttons for Update Display, Retrieve from Display, OK, Cancel, Save, Load, and Help.

Use this screen to Set Screen Settings, Optical Port and User Inactivity Time Outs. The Screen Settings replace Adjustments Mode in the default profile.

- a. Screen Settings: set Back Light Level (brightness), Back Light Time (when Back Light shuts off), Contrast level, Scroll Stop (Enabled or Disabled), Phasor Diagram Rotation (Clockwise or Counter Clockwise), Demand Shown (Cumulative - running total or Continuous - running total + current max/min), Time of Use Demand (Block/Rolling or Cumulative) Date Format (Month-Day-Year or Day-Month-Year), Dwell Time While Scrolling (the amount of time each screen is displayed when Scroll mode is selected), and how many Voltage Phasors to show in Delta (2 or 3).



b. Optical Port: Set Baud Rate and Optical Receive (Non-Inverted or Inverted)  
Inverted Operation is used with the Smart Coupler or A7Z optical readers.

c. User Inactivity Time Outs: (number of minutes since last user action when Mode reverts to View Mode 1). Settings are from 5 - 60 minutes.

- Leave Test Mode After \_ Minutes: Reverts with or without energy accumulation.
- Leave View Mode 2 or 3 After \_ Minutes: Reverts automatically.
- Screen Assignments Tab (for Runtime Firmware Version 100 or higher and LCD Display Boot version 30 or higher: see Section 12.2.4.1 for earlier firmware)

1. Click the Screen Assignments tab. You will see the screen shown below.

Display screens that are available for assignment to View Modes \*

View Mode

Right-click on a screen to assign it to a View Mode or to copy it

Buttons that let you: Create custom Display screens, Edit Display screens, or Remove Display screens from the available screens list

Buttons that let you: change the order of Display screens in a View Mode, or Remove Display screens from a View Mode

Device Display Programmable Settings

Display Modes Power and Energy Display Miscellaneous

Meter Display Mode Names Screen Assignments

Available Screens

ID	Description
1	kWh Delivered
2	kWh Received
3	Block Watt Delivered
4	Block Watt Received
5	+kVARh
6	-kVARh
7	Watt Last Reset
8	Display Check
9	Optical Port Settings
10	Phase to Neutral Voltage
11	Phase to Phase Voltage
12	Phasors
13	THD Voltage A
14	THD Voltage B
15	THD Voltage C
16	THD Current A

Create Edit Remove

Note: Right click on an item to copy

View Mode 1

ID	Description
1	kWh Delivered
2	kWh Received
3	Block Watt Delivered
4	Block Watt Received
5	+kVARh
6	-kVARh
7	Watt Last Reset
8	Display Check
9	Optical Port Settings

View Mode 2

ID	Description
10	Phase to Neutral Voltage
11	Phase to Phase Voltage
12	Phasors
13	THD Voltage A
14	THD Voltage B
15	THD Voltage C
16	THD Current A
17	THD Current B
18	THD Current C

View Mode 3

ID	Description
20	TOU: Current Month: Register 1: kWh Delivered
21	TOU: Current Month: Register 1: kWh Received
22	TOU: Current Month: Register 2: kWh Delivered
23	TOU: Current Month: Register 2: kWh Received
24	TOU: Current Month: Register Totals: kWh Delivered
25	TOU: Current Month: Register Totals: kWh Received

Move Up Move Down Remove

Note: To move an item up or down or remove first click on the item, then click on the button to perform the action.

Update Display Retrieve from Display OK Cancel Save Load Help

\*Note that there will be no screens listed until you retrieve them from the connected meter.

2. Use the buttons on the bottom of the screen to:

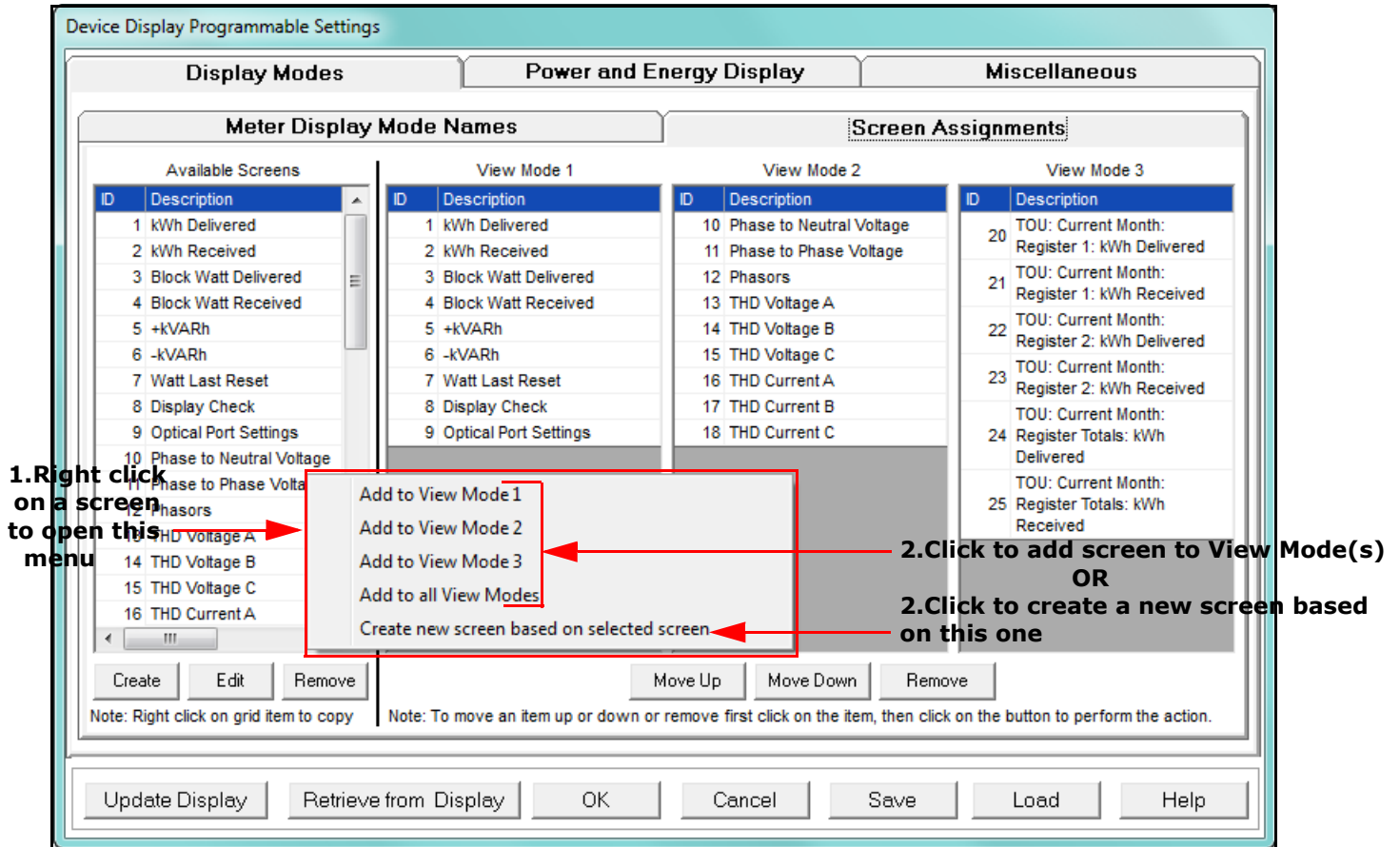
- Retrieve display settings from the connected meter by clicking Retrieve from Display. The display screens set up in the meter are shown.
- Update the connected 1262/1272 meter's display settings by clicking Update Display. The meter will reboot, and you will get a message on the PC screen: Device LCD Display Programmable Settings Updated.
- Save any changes you have made to display settings by clicking Save.
- Load a previously saved LCD Display file by clicking Load and select the file you want to load into this screen (it is a .nds2 file).
- Return to the previous screen without saving any changes by clicking Cancel.
- View online instructions for using this screen by clicking Help.

3. The leftmost column lists all of the Available display screens. Before you've used the Display Configurator, you will only see the pre-programmed display screens in the list. Once you have created customized screens, you will see those in the list as well.

The other three columns list the display screens that are assigned to each of the three View Modes. Use the scroll bars to display all of the items in the columns.

4. To assign one of the screens to a View Mode or to create a new screen based on it:

a. Click on the screen in the list and right-click. You will see the pop-up menu shown below.



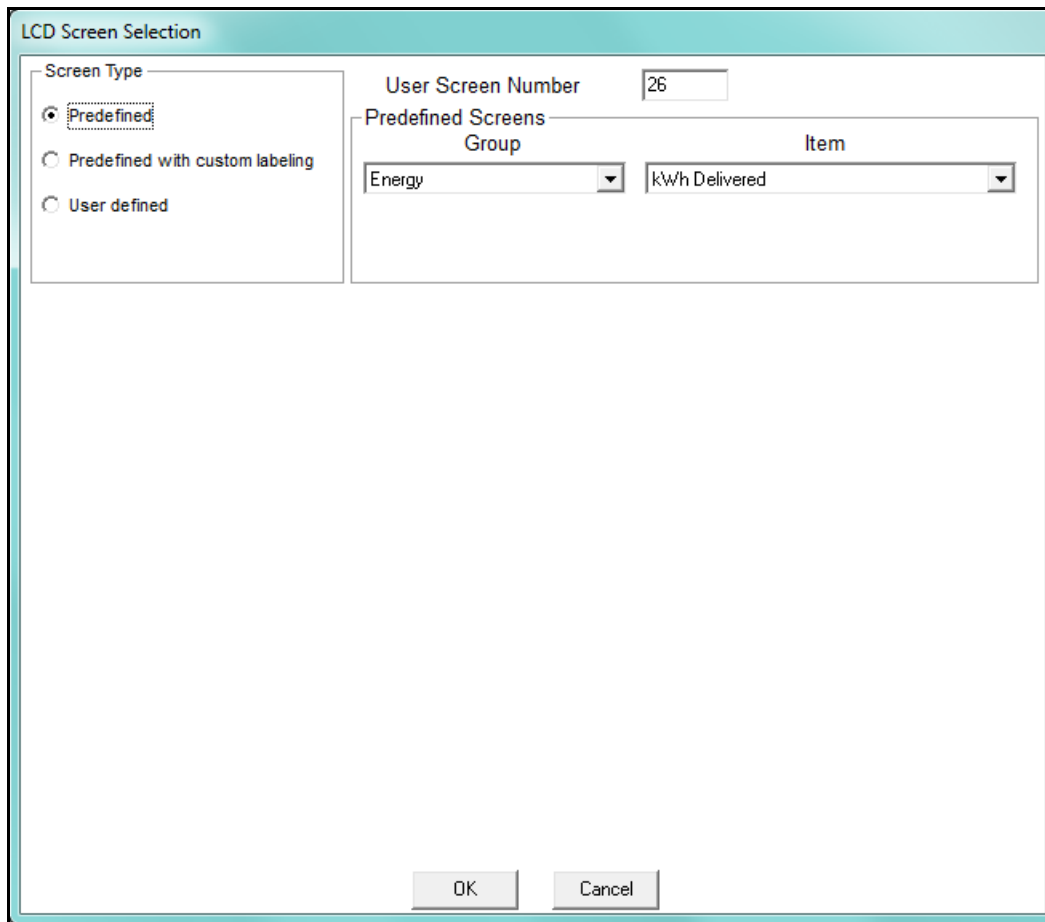
- To add the screen to one of the modes, or to all modes, click on that item in the menu.

- To create a new screen based on the screen, click on the last item in the menu.

5. To change the position of screens in one of the View modes, or to remove the screen from the mode:

a. Click on the screen in the View Mode column and then either:

- Click on a screen and then click Move Up or Move Down to change the position of the screen within that View Mode. The position of the screens determines the scrolling order in the LCD Display.
  - Click on a screen and then click Remove to remove the screen from that View Mode.
6. To remove a screen from the list of available screens, click on the screen in the Available Screens column list and then click Remove. The screen will no longer be displayed in the list of available screens, and cannot be assigned to any View Mode. It will also be removed from any View Modes it has already been assigned to.
  7. To edit a screen, click on the screen in the Available Screens column list and then click Edit.
  8. To create a new screen based on an existing screen, right-click on the screen in the Available Screens column list and select Create New Screen Based on Selected Screen from the pop-up menu.
  9. To create a new custom Display screen, click Create in the Available Screens column.



The image shows a software dialog box titled "LCD Screen Selection". It contains three radio buttons under the "Screen Type" section: "Predefined" (selected), "Predefined with custom labeling", and "User defined". To the right, there is a "User Screen Number" text field containing the value "26". Below this, a section titled "Predefined Screens" contains two dropdown menus: "Group" (set to "Energy") and "Item" (set to "kWh Delivered"). At the bottom of the dialog are "OK" and "Cancel" buttons.

10. The screen above is displayed if you are creating a new screen or editing an existing screen.

- When you are creating a new screen, the User Screen Number field displays the next screen number in sequence (e.g., if there are already 25 screens, the number will be 26).
- When you are editing an existing screen, or creating a new screen based on an existing screen, the screen number and data will be shown for the screen you selected.

a. There are three types of screens:

- Predefined - the default screens for the meter; you can edit some of these screens - go to step 10-I for instructions

- Predefined with Custom Labeling - a new screen based on a predefined screen; you can change some fields to make the screen unique - go to step 10-I for instructions
  - User Defined - a new custom designed screen - the instructions follow
- b. To create a custom screen: click the User Defined button in the Screen Type box. The screen changes to allow you to set up the new Display screen.

You can change this number

The fields in Screen Layout are based on the number of items you select

Select number of items OR 1 Demand, 1 Time-stamp

These fields are for Modbus information

These fields are for Multiplier setup

These fields are for Scaling setup

Item entry fields - click here to enter the Modbus Register containing the Item

Note: Click on Button of the row to edit the Modbus Address of the item for that row.

OK Cancel

**NOTE:** The instructions for editing a custom screen are the same as for creating a new custom screen, except that since the screen is already be in the Available Screens list, you click on it and then click Edit. You will see the screen shown above.

- c. The number you see in the User Screen Number field can be changed. The Screen number field accepts any number up to three digits in length. Use numbers between 1 and 999 if you want the number to display on the LCD Display screen; use numbers between 1000 and 1999 if you don't want the

number to display.

**NOTE:** The Harmonics, Phasors, and Line Segment screens never display their number on the LCD Display screen.

d. Use the Layout Arrangement field to choose what fields you want the LCD screen to display. Choose either:

- The number of items you want the LCD screen to display: click one of the Item buttons.
- Display Demand and Timestamp fields: click the 1 Demand, 1 Timestamp button.

e. After you make your selection, the left side of the screen will change to display entry fields for the Item(s) (see the screen on the previous page) or Demand and Time Stamp information: see the example screen below.

The screenshot shows the 'LCD Screen Selection' dialog box. It has several sections: 'Screen Type' with radio buttons for 'Predefined', 'Predefined with custom labeling', and 'User defined' (selected); 'User Screen Number' set to 26; 'Layout Arrangement' with radio buttons for '1 Item', '2 Items', '3 Items', '4 Items', '5 Items', and '1 Demand, 1 Timestamp' (selected); 'Screen Layout' with three input fields (the first is empty, the second is '0', the third is 'MM/DD/YY HH:MM:SS'); and 'Screen's Modbus Registers' Data Interpretation' with various settings. Annotations with red arrows point to specific fields: 'Display Screen Label Fields' points to the first empty field in the layout; 'Demand Field' points to the '0' field; 'Timestamp' points to the 'MM/DD/YY HH:MM:SS' field; 'Status Field - does not display on the LCD screen' points to the 'Status' field; 'The information for these fields comes from the meter's Modbus Map' points to the 'Registers per item' field; 'This is where you can specify a multiplier for your data' points to the 'Multiply by' field; and 'These fields let you specify Scaling and data display' points to the 'Numerical Sign', 'Show Sign', 'Scale', 'Total Digits', and 'Digits to the right of the decimal place' fields.

**Annotations:**

- Display Screen Label Fields
- Demand Field
- Timestamp
- Status Field - does not display on the LCD screen
- The information for these fields comes from the meter's Modbus Map
- This is where you can specify a multiplier for your data
- These fields let you specify Scaling and data display

f. The top field in the Screen Layout section is for the Display screen label (Title). Depending on the number of items you've selected, you will have between 0 to 2 lines for a screen label:

- If you have selected 1-3 items or 1 Demand, 1 Timestamp, you will have two entry lines.
  - If you have selected 4 items you will have one entry line.
  - If you have selected 5 items, you will not have any entry fields for a Display screen label (there won't be room on the screen for a label).
- g. The Item entry fields allow you to specify the data you want to display on the LCD screen. You can also enter a prefix (optional) for each line item and a suffix (optional) for all of the items on the display screen.

**Example:** a screen containing phase to phase voltages might have a single title (Volts P-P), 3 lines of data with prefixes (Vab, Vbc, Vca), and the same suffix (MV) on all 3 lines.

- h. The 1 Demand, 1 Timestamp entry fields allow you to specify the demand, the timestamp, and an optional status register. The status register is not displayed on the LCD screen.

- i. To enter an item:

i. Click on the Item label box.

ii. Fields open underneath the item, which allow you to enter the starting value of the Modbus Register containing the data for the item. Use the Decimal value of the register. See the screen on the next page. Refer to the *Nexus® 1252/1262/1272 Meter Modbus Manual* for the 1272 meter's Modbus Register Map. The manual can be downloaded from the Downloads page of EIG's website: [www.electroind.com/dl\\_page\\_nexus-meters.html](http://www.electroind.com/dl_page_nexus-meters.html).




**IMPORTANT!** All of the data items you select must be the same Modbus type, for example F3. The Modbus type is listed in the Modbus map. See the following example.



**Example:**

To select 1 Cycle Phase A-N voltage, find the starting register for the field in the Modbus manual. See the figure below:

1 Cycle Block							
00090-00093	9	0	50	1 cycle Block Time Stamp	12/31/9999 23:59:59.99	10 msec	F3 R
00094-00095	10	0		1 cycle Phase A-N Voltage	+65536 V <sup>2</sup> / 0 V <sup>2</sup>	1/65536 V <sup>2</sup> sec	F5 R

 Decimal Starting Register is 01521    
  Item you are selecting    
  F Type

iii. Click Update to save the item's starting register address.

iv. Enter any additional items in the same way.

- j. When you have finished entering items, use the entry fields in the right portion of the screen to enter details for the items' Modbus type, and to enter scaling, multiplier, and data display settings.

The Modbus type information is found in Chapter 3 of the *Nexus® 1252/1262/1272 Meter Modbus Manual*. See the example below.

**Example:**

The item in the example above was Modbus type F5. Any additional items must be the same Modbus type. Type F5 is described in Chapter 3, page 3-3 of the 1272 meter's Modbus manual, as shown on the next page. Use the Modbus type information as shown.

Screen's Modbus Registers' Data Interpretation

Registers per item: 2

Register Contents are: Binary

The data is: Unsigned

Divide Register Contents by: 1

Multiply by:

☐ User Multiplier

☐ PT Ratio

☐ CT Ratio

Data Format: Number

Numerical Sign: Auto

Show Sign: No

Scale: Auto

Total Digits: 9

Digits to the right of the decimal place: 3

Cancel

**3.5: Type F5 Secondary 1 Cycle RMS Voltage or Current**

- Length: 2 Registers (4 bytes)
- Range:  $+1,048,576 \text{ V}^2 / 0 \text{ V}^2$  or  $+65536 \text{ I}^2 / 0 \text{ I}^2$  (1262 or 1272)
- Unit:  $1/4906 \text{ V}^2$  secondary or  $1/65536 \text{ A}^2$  secondary (1262 or 1272)
- These registers together are a four-byte unsigned integer. Conversion into secondary voltage or current involves multiplying by the appropriate scale and taking the square root of that value.
- Depending on the unit and hardware, the range and unit of voltage readings differs. For a Nexus 1262/72 meter, the range goes to  $+1,048,576 \text{ V}^2$  with a unit of  $1/4906 \text{ V}^2$ .

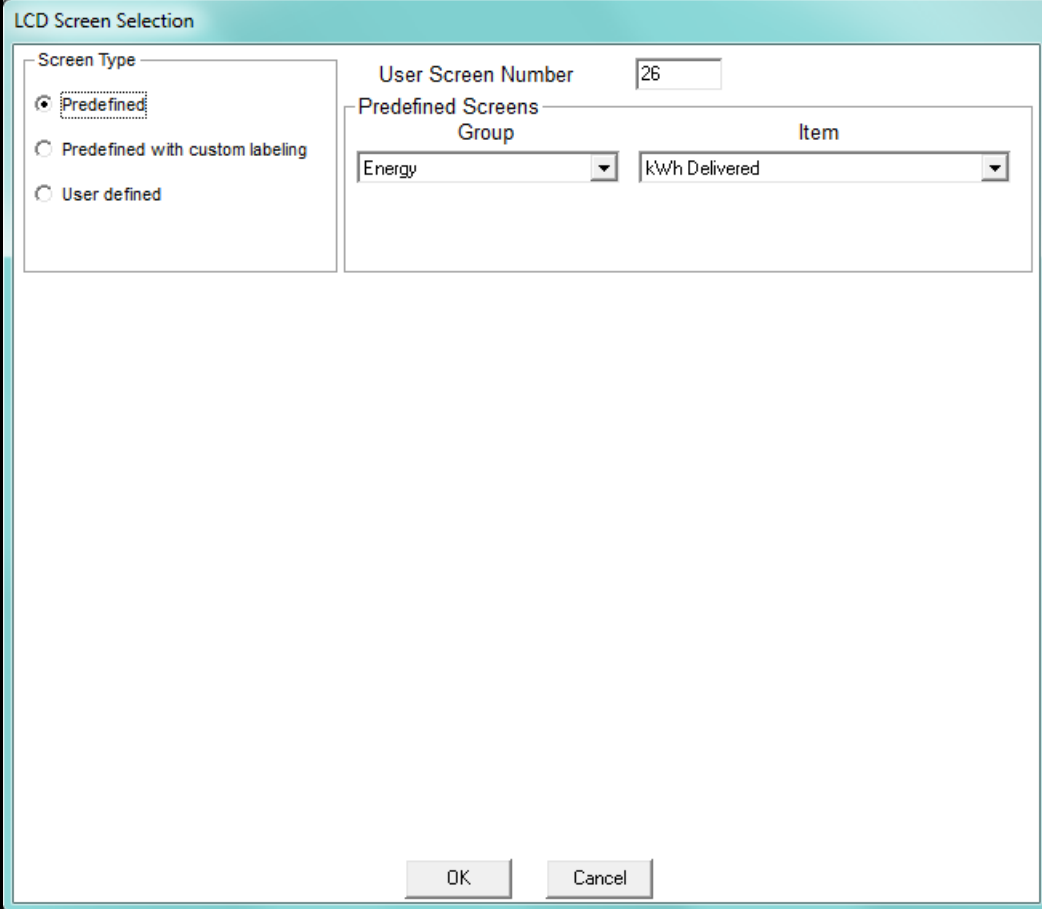
In the example here, you would find the number of registers per item, the fact that the data is unsigned, and scaling information from the Modbus type information.

The fields underneath the Multiply by fields, let you set up how the data will be displayed, for example, specifying if the data is a number or some other value; whether you want the sign to display for signed data; whether you want the data scaled, the number of digits and decimal places in the field. Click the drop-down menus to see alternate choices for the fields. The entries you make affect **all of the items** on the screen. The table on the next page shows the fields and the valid entries for them.

<b>Entry fields</b>	<b>Possible entries</b>
Registers per item	1 - 8
Register contents	Binary, BCD, Text, Scaled Energy
Data	Signed, Unsigned
Divide contents by	1, 100, 65536
Multiply by	User multiplier (enter in blank field), PT Ratio, CT Ratio
Data format	Number, Text, Power factor, Time, Date, Time & Date, Status indicator
Numerical sign	Auto, Forced negative, Forced positive
Show sign	No, Yes
Scale	Auto, None, kilo (k), Mega (M), Giga (G)
Total digits	1-10
Digits to the right of the decimal place	0-8

- k. Once you have finished your entries, click OK to return to the Screen Assignments tab. The new screen will be listed in the leftmost column. Click on it and then right-click to assign it to one or all of the View Modes.

- I. To edit a predefined screen or create a new screen from a predefined screen: either click Edit after selecting a predefined screen in the Available Screens list, or right-click on a predefined screen and select Create a new screen based on selected screen from the pop-up menu.



The dialog box is titled "LCD Screen Selection". It contains the following elements:

- Screen Type**: A group box containing three radio buttons:
  - ☒ Predefined
  - ☐ Predefined with custom labeling
  - ☐ User defined
- User Screen Number**: A text box containing the value "26".
- Predefined Screens**: A table with two columns: "Group" and "Item".
 

Group	Item
Energy	kWh Delivered
- Buttons**: "OK" and "Cancel" buttons at the bottom right.

You have the following options for editing predefined screens:

- You can edit the screen number.
- You can create a new screen based on the predefined screen, but you will only be able to change the screen number and/or screen label (title).

**NOTE:** Some of the predefined screens cannot be customized as described above. The following table below lists those predefined screens and tells what can be changed on them.

Predefined LCD Screen Number (Default Value)	Description	Editing Options
18	Phasors	None
20	VAR, PF, & Frequency	Title
21 - 26	Harmonics	Title
60	Segment check	None
64	Optical Port Settings	Title
65	Comm Ports	Title
66	Nexus Status	Title
67	Firmware Versions	Title
68	Nexus Info	Title
76 - 77	Rolling/Block Demand	Title
80 - 89	TOU Energy	Title
90 - 93	TOU Demand	Title
94 - 95	TOU +/- VARh	Title

i. Click the button for one of these screen types:

- Predefined - you can only change the screen number.
- Predefined with custom labeling - you can change the title as well as the number of the screen. Refer to the table above for editing limitations.

#### NOTES:

- The Screen number field is a three digit numeric field. Use numbers between 1 and 999 to display the number on the LCD Display screen; use numbers between 1000 and 1999 to not display the number on the LCD display screen.
- The Harmonics, Phasors, and Line Segment screens never display their number on the LCD Display screen.
- Depending on the predefined screen, you will have between 0 - 3 lines for screen label (title) entry. Screen labels can be up to 16 characters per line.

ii. Below is the LCD Screen Selection screen with the Predefined with custom labeling option selected. You can enter a new screen title in the Screen Layout fields.

**LCD Screen Selection**

Screen Type

☐ Predefined

☒ **Predefined with custom labeling**

☐ User defined

User Screen Number: 26

Predefined Screens

Group	Item
Energy	kWh Delivered

Screen Layout

Note: Click on Button of the row to edit the Modbus Address of the item for that row.

OK Cancel

iii. After you have made your entries, click OK. You will return to the previous screen (Screen Assignments tab).

11. When you have finished programming the LCD Display, click:

- Save to save the LCD Programmable Settings to a .nds2 file.
- Upload to upload the LCD Programmable Settings to the connected 1262/1272 meter.
- Cancel to exit the screen WITHOUT SAVING ANY CHANGES.

12. Click Update Display to save any changes and return to the main CommunicatorPQA™ application screen.

**NOTE:** See the *Nexus® 1262/1272 Meter Installation and Operation Manual* for further details.

### 12.2.4.1: Using the Screen Assignments Tab (Earlier Firmware Version Only)

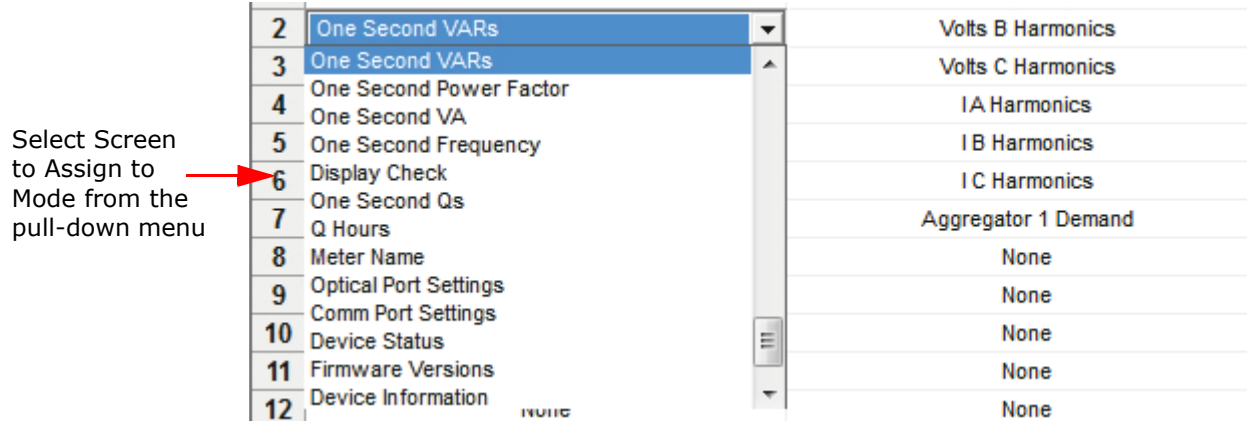
**NOTE:** The screen shown here is only seen if your meter's Display Run Time firmware version is earlier than 100: see Section 12.2.4: Display Configuration on page 12-37, for instructions on using the Screen Assignments tab for later Firmware versions.

Device Display Programmable Settings

Display Modes		Power and Energy Display	Miscellaneous
Meter Display Mode Names		Screen Assignments	
	111 Mode Screens	222 Mode Screens	333 Mode Screens
1	One Second Watts	Volts A Harmonics	Meter Name
2	One Second VARs	Volts B Harmonics	Optical Port Settings
3	One Second VA	Volts C Harmonics	Device Status
4	One Second Frequency	IA Harmonics	Firmware Versions
5	Phase to Neutral Voltage	IB Harmonics	Device Information
6	Phase Current	IC Harmonics	None
7	Block W Demand Delivered	Aggregator 1 Demand	None
8	Block W Demand Received	None	None
9	kW Demand Last Reset	None	None
10	kWh Delivered	None	None
11	kWh Received	None	None
12	None	None	None
13	None	None	None
14	None	None	None
15	None	None	None
16	None	None	None

Update Display   Retrieve from Display   OK   Cancel   Save   Load   Help

1. Your Label for each View Mode appears at the top of each column.
2. Enter up to 16 screens for each View Mode clicking in one of the 48 entry fields on the screen and selecting the screen you want to assign, from the pull-down menu. Use the scroll bars to display all of the screen selections.

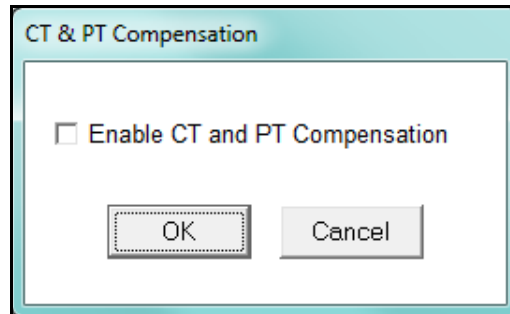


3. When you have finished your settings, click:
  - Save to save the LCD Programmable Settings to a .nds2 file.
  - Upload to upload the LCD Programmable Settings to the connected 1262/1272 meter.
  - Cancel to exit the screen WITHOUT SAVING ANY CHANGES.
4. Click Update Display to save any changes and return to the main CommunicatorPQA™ screen.



### 12.2.5: CT and PT Compensation

1. From the Revenue and Energy Settings menu, click on the + button next to CT and PT Compensation or double-click on the CT and PT Compensation line.



2. Check the Enable box to enable CT and PT Compensation; leave the box unchecked to keep it disabled.
3. Click OK to close the screen and return to the main Device Profile screen. For these changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 12.2.6: Transformer / Line Loss Compensation

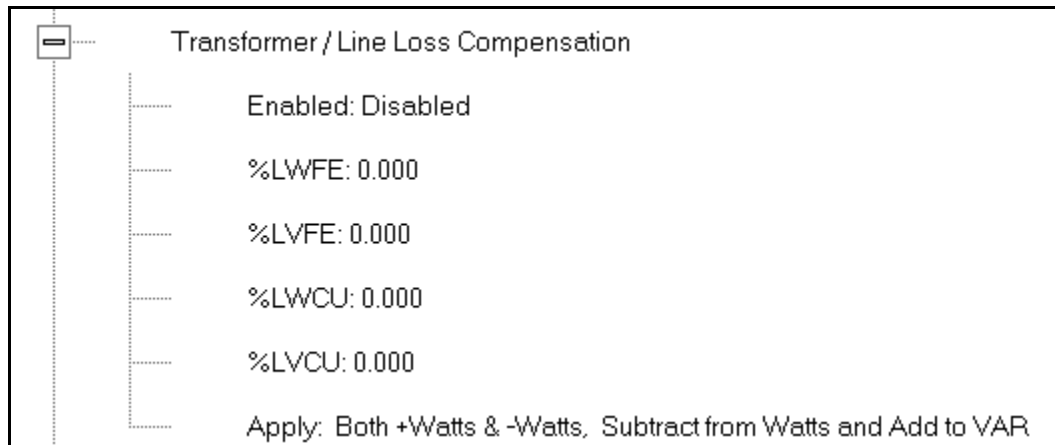
Transformer losses are power used by the transformer while working. The more load on the transformer, the higher the transformer losses. There are two types of transformer losses:

- No load losses - these are the fixed losses that keep the transformer up and running.
- Load losses - these vary with changes in the load.

When the meter is located on the secondary side of a customer's transformer, a utility will want to add the transformer losses into the energy usage calculation. However, this practice is regulated by local jurisdiction and regulations. The meter has the capability to add in or subtract out these transformer losses, depending on the user's specific needs.

Line losses are similar to transformer losses, except that they are used to compensate for loss incurred on wires, such as transmission lines.

1. From the Revenue and Energy Settings menu, click on the + button next to Transformer/Line Loss Compensation or double-click on the Transformer/Line Loss Compensation line. You will see the submenu shown below.



2. The menu displays the current values for the meter's Transformer Loss Compensation.
  - LWFE = percent loss of Watts due to iron
  - LVFE = percent loss of Vars due to iron
  - LWCU = percent loss of Watts due to copper
  - LVCU = percent loss of Vars due to copper

3. Double-click on any of the loss values. You will see the screen shown below.

Device Profile: Transformer and Line Loss Compensation

**Percent Loss of Watts**

Due to Iron

Due to Copper

**Percent Loss of VARS**

Due to Iron

Due to Copper

**Transformer and Line Loss Applies to**

4. Click on **TLC Calculator** to find the values to enter into the Percent Loss fields. The TLC Calculator button launches the TLC Calculator that performs the calculations for you once the required data is entered.

**NOTE:** Appendix A contains screen captures of the TLC Calculator with example numbers, and an explanation of Loss Compensation considerations.

5. Enter the percent loss of Watts and VARS for copper and iron in the appropriate fields.

6. Click in the first pull-down menu. The optional selections are:

- Disabled - disable TLC.
- Iron (Fe) Only
- Copper (Cu) Only
- Both Iron and Copper (Fe and Cu)




7. With the second pull-down menu, select from the following options:

- Add to Watts and Subtract from VAR
  - Subtract from Watts and Add to VAR
  - Add to Watts and VAR
  - Subtract from Watts and VAR
8. With the third pull-down menu, apply the loss based on the power flow direction by selecting one of the following options:
- Both +Watts and -Watts
  - -Watts only
  - +Watts only
3. When all settings are complete, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

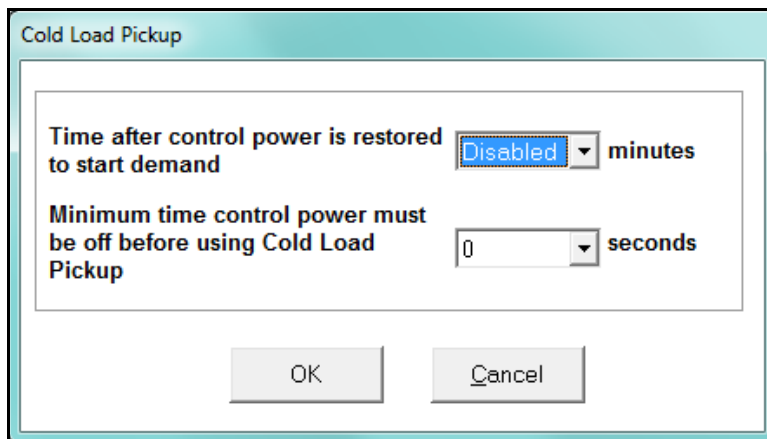
### 12.2.7: Cold Load Pickup

Cold Load Pickup is used to manage Demand in the event of a power outage. You set the amount of time (in seconds) power is off to identify a power outage that is the responsibility of the utility (as opposed to a very short term loss of power that is not their responsibility); then you set the amount of time (in minutes) you want to wait before Demand starts again. This time should correspond to the “grace” period the utility applies to avoid charging for motor startup, etc. after a power outage.

1. From the Revenue and Energy menu, click on the + button next to Cold Load Pickup or double-click on the Cold Load Pickup line. You will see the submenu shown below.

	Cold Load Pickup
	Time after control power is restored to start demand: Disabled
	Minimum time control power must be off before using Cold Load Pickup: 0 Second(s)

2. Double-click on one of the parameters to open the screen shown below.



The image shows a dialog box titled "Cold Load Pickup". It contains two settings: "Time after control power is restored to start demand" with a dropdown menu set to "Disabled" and the unit "minutes", and "Minimum time control power must be off before using Cold Load Pickup" with a dropdown menu set to "0" and the unit "seconds". At the bottom are "OK" and "Cancel" buttons.

3. Make the following selections in accordance with your application needs:

- Time after control power is restored to start demand - can be 1 to 60 minutes, or Disabled.
- Minimum time control power must be off before using Cold Load Pickup - can be from 0 to 255 seconds.

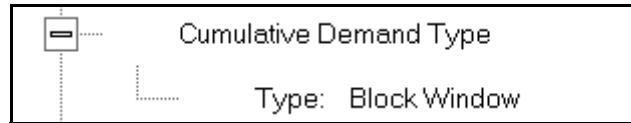
4. When all changes are entered, click OK to return to the main Device Profile screen. For these changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 12.2.8: Cumulative Demand Type

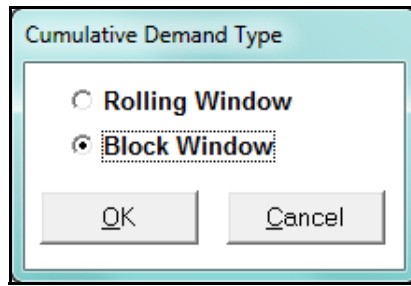
Cumulative Demand is a counter of Max Demand that the meter keeps. It can help you determine if there has been tampering with the meter, i.e., unauthorized resetting of Demand. Whenever Demand is reset, the current Max Demand is added to the Cumulative Demand. By analyzing the data in the counter you can see if the Demand is being reset more often than intended. You can choose to use **either** Block Window Demand or Rolling Window Demand for the Cumulative Demand.

1. From the Revenue and Energy Settings menu, click on the + button next to Cumulative Demand Type or double-click on the Cumulative Demand Type line.

You will see the submenu shown below. It tells you the type of Demand currently selected.



2. Click the Type line to open the screen shown below.

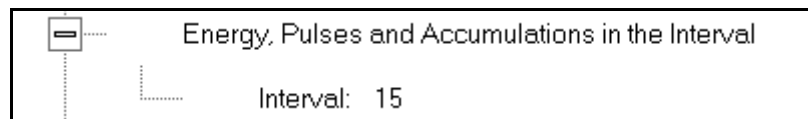


3. Click the radio button in front of Rolling Window (sliding) or Block Window (fixed) to select cumulative Demand type.
4. Click OK to exit the screen and return to the main Device Profile screen. For a change to take effect, you must click the Update Device button to send the new profile to the meter.

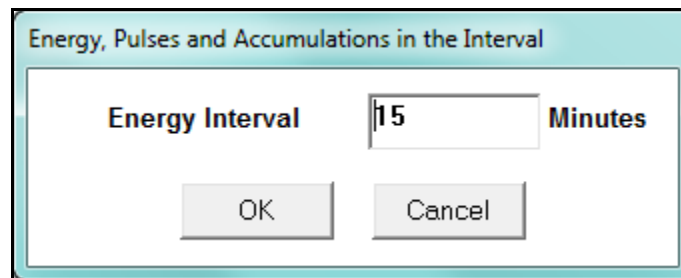
### 12.2.9: Energy, Pulses and Accumulations in the Interval

Energy in the interval is the energy that is accumulated within a load profiling interval. This is often the preferred method for logging because it is a summation of only that particular period of energy. The Interval setting you make creates the sub-accumulation field within the general Energy accumulation. An advantage of this setting is that the sub-accumulation takes up less space and is processed more quickly than the larger accumulation.

1. From the Revenue and Energy Settings menu, click on the + button next to Energy, Pulses and Accumulations in the Interval or double-click on the Energy, Pulses and Accumulations in the Interval line. You will see the submenu shown below.



2. The current Interval setting is displayed. Click on the Interval setting to open the screen shown below.



3. Set the number of minutes for the Energy interval.
3. Click OK to close the window and return to the main Device Profile screen. For any change to take effect, you must click the Update Device button to send the new profile to the meter.

### 12.2.10: Pulse Accumulations

Pulse accumulators are used to count and/or aggregate pulse information from external devices, using the High Speed inputs. These devices may be gas, water, or electricity meters; energy management systems; SCADA devices; or any pulse-generating device.

This section of the Device Profile displays a series of eight running totals available on the Nexus® 1262/1272 meter. Each total can be added to (or subtracted from) other totals. This allows you to set the High Speed inputs located directly on the meter to accumulate pulses.

**NOTE:** If you use these inputs for pulse accumulations, do not set them to record waveforms - if you do, you will record endless waveforms.

1. From the Revenue and Energy Settings menu, click on the + button next to Pulse Accumulations or double-click on the Pulse Accumulations line. You will see the screen shown below.

Device Profile: Internal Input Pulse Accumulators Setup

Source	Units/Count	Aggregator	User Assigned Label	Mode	Average Full Scale
1	1	None	Accumulator1	Pulse (Form A)	1000000000000000
2	1	None	Accumulator2	Pulse (Form A)	1000000000000000
3	1	None	Accumulator3	Pulse (Form A)	1000000000000000
4	1	None	Accumulator4	Pulse (Form A)	1000000000000000
5	1	None	Accumulator5	Pulse (Form A)	1000000000000000
6	1	None	Accumulator6	Pulse (Form A)	1000000000000000
7	1	None	Accumulator7	Pulse (Form A)	1000000000000000
8	1	None	Accumulator8	Pulse (Form A)	1000000000000000

Source	Hour Reading	Aggregator
Device	Quadrant(1 + 4) Watt Hour	None

Aggregator	User Assigned Label	Average Full Scale
1	Aggregator 1	1000000000000000
2	Aggregator 2	1000000000000000
3	Aggregator 3	1000000000000000
4	Aggregator 4	1000000000000000

OK Cancel Help

2. High Speed inputs 1-8 are listed in order under Source. Enter the following information or use the pull-down menus to select:

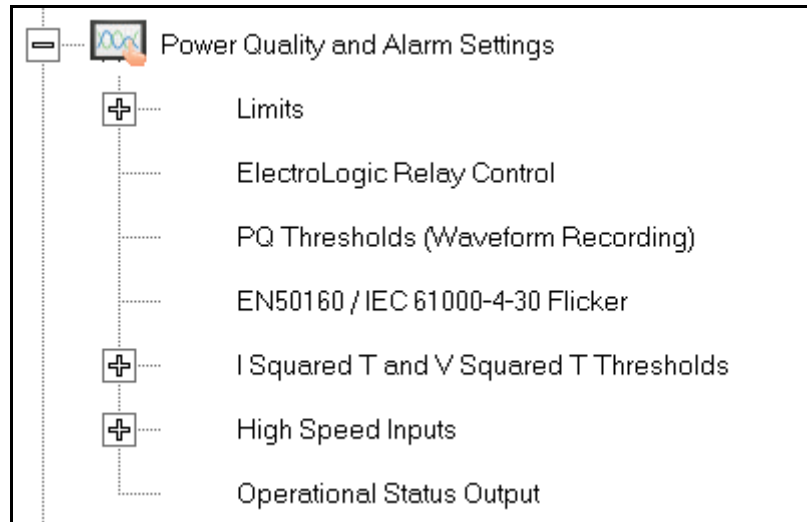


- Units/Count - this is the scale factor that normalizes the pulses so that they can be aggregated. Pulses are stored in primary values.
  - Aggregator - this allows you to place the pulse register into a separate accumulation register that can aggregate (add) or net (subtract) values.
  - User Assigned Label - this window allows you to enter a label designation for the source.
  - Mode - you can set Pulse or Transition. A transition means from open to shorted/closed or from shorted/closed to open; a pulse contains 2 transitions, open to shorted/closed, followed by shorted/closed to open.
  - Average Full Scale - for Nexus® meters, in order to set a limit on a reading it needs a Full Scale value as the 100 reference. You can set a limit on the average number of pulses per interval.
  - Device Hour Reading and Aggregator - source device is the meter you are connected to. The Hour reading is either Quadrant 1 and 4 Watt-hour or Quadrant 2 and 3 Watt-hour. The Aggregators indicate whether the count should be added to, or subtracted from, Aggregators 1-4. You can choose None if you don't want the count to affect any of the Aggregators.
  - Aggregators: The "buckets," or Totalizer fields where pulse counts from the High Speed inputs and from the Watt-Hour counters can be totaled. The user can assign a label to each of the Aggregators. See the Average Full Scale description above for an explanation of this field - it has the same use here, except for the Aggregators.
3. When all data has been entered, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 12.3: Power Quality and Alarm Settings

Power Quality and Alarm Settings are the third group of settings in the Device Profile.

1. From the Device Profile screen, click on the + button next to Power Quality and Alarm Settings or double-click on the Power Quality and Alarm Settings line. All of the settings in this group are listed.



2. Click on the programmable setting you want to modify. The following sections explain the settings in the order in which they appear in the Power Quality and Alarm Settings menu.

### 12.3.1: Limits

Limits are threshold settings that can be set by a user to trigger a record in a log when an alarm condition is met. Utilizing the limits, the user can then control a relay or send a warning email on that alarm.

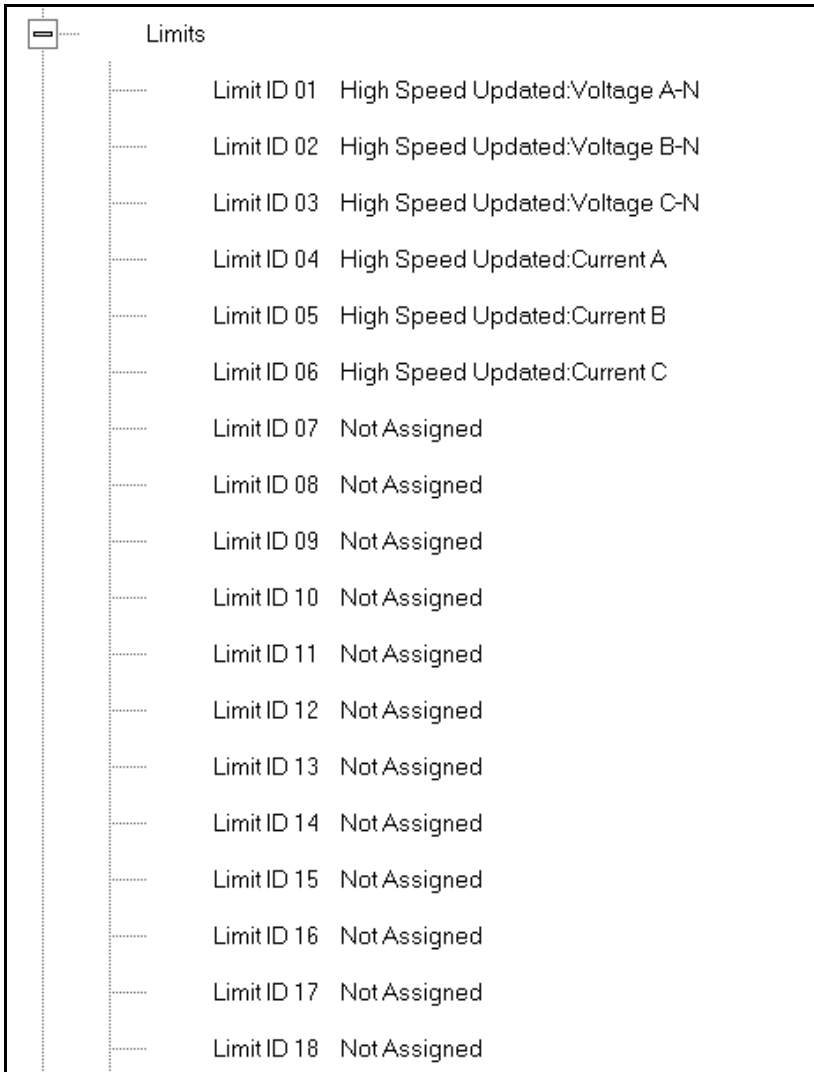
Limit settings are based on a percentage of the Full Scale (% of FS), which is set in the Limit and Waveform Full Scales setting (Section 12.1.2) (Limit Full Scales setting for the Nexus® 1262 meter). Full Scale is based on CT and PT ratios set in the CT, PT Ratios and System Hookup setting (Section 12.1.1).

Limits are based on a percent of Full Scale settings so that the same settings can be used no matter what the CT and PT Ratio needed.

Before programming limits, set the CT and PT ratios. Then, set the Limit and Waveform Full Scales if you want to change to automatic configuration. In most cases the software will configure the Full Scale optimally.

**NOTE:** The software automatically updates the Full Scale; however, you can set it separately from the CT and PT Ratios.

1. From the Power Quality and Alarm Settings menu, click on the + button next to Limits or double-click on the Limits line. You will see the submenu shown below.



Limits	
Limit ID 01	High Speed Updated:Voltage A-N
Limit ID 02	High Speed Updated:Voltage B-N
Limit ID 03	High Speed Updated:Voltage C-N
Limit ID 04	High Speed Updated:Current A
Limit ID 05	High Speed Updated:Current B
Limit ID 06	High Speed Updated:Current C
Limit ID 07	Not Assigned
Limit ID 08	Not Assigned
Limit ID 09	Not Assigned
Limit ID 10	Not Assigned
Limit ID 11	Not Assigned
Limit ID 12	Not Assigned
Limit ID 13	Not Assigned
Limit ID 14	Not Assigned
Limit ID 15	Not Assigned
Limit ID 16	Not Assigned
Limit ID 17	Not Assigned
Limit ID 18	Not Assigned

This submenu displays the current Device Profile Limit settings. Not all limits are shown in the figure above: there are 32 Limit ID fields.

2. Double-click on any of the settings (Limit ID 01, for example). You will see the Limits screen, shown below.

Device Profile: Limits

Limit ID	Assigned Item	Setting	Limit 1		Setting	Limit 2		Combination Limit 3
			% of FS	Primary		% of FS	Primary	
1	High Speed Updated:Voltage A-N	Above	120.00	144.00	Below	80.00	96.00	OR
2	High Speed Updated:Voltage B-N	Above	120.00	144.00	Below	80.00	96.00	OR
3	High Speed Updated:Voltage C-N	Above	120.00	144.00	Below	80.00	96.00	OR
4	High Speed Updated:Current A	Above	150.00	7.50	Below	0.00	0.00	OR
5	High Speed Updated:Current B	Above	150.00	7.50	Below	0.00	0.00	OR
6	High Speed Updated:Current C	Above	150.00	7.50	Below	0.00	0.00	OR
7	Not Assigned	Above	98.00	98.00	Above	0.00	0.00	OR
8	Not Assigned	Below	80.00	80.00	Above	0.00	0.00	OR
9	Not Assigned	Below	80.00	80.00	Above	0.00	0.00	OR
10	Not Assigned	Below	80.00	80.00	Above	0.00	0.00	OR
11	Not Assigned	Below	-0.01	-0.01	Above	0.00	0.00	OR
12	Not Assigned	Below	-0.01	-0.01	Above	0.00	0.00	OR

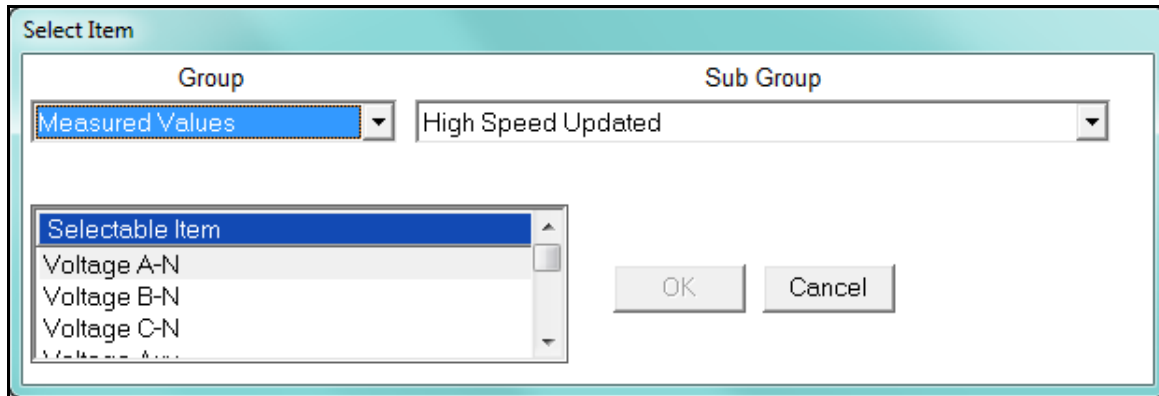
  

Channels	Primary Values at 100%
I A, B, C, Nc	5.00
I Nm	5.00
V Phase to Neutral	120.00
V Phase to Phase	208.00
Power Phase	600.00
Power Total	1800.00
Frequency	60.00

OK Cancel Help

- This screen can be expanded to show all of the limits. Click on the top or bottom of the screen to display sizing arrows you can click on and drag to expand the screen.
  - Percentage of Full Scale settings (% of FS): The limits are set in % of Full Scale so that when you create a profile, you can keep your settings. This is true, even though the CT and PT ratios change when the meter (or a new meter) is placed in a different location. Changing the CT and PT ratios does not affect the % of Full Scale limits previously set. This is useful when you are using large numbers of meters because one profile can be used with a common set of limit settings no matter what the CT and PT ratio. Full Scale reference information is available in the lower left box.
3. Make changes to this screen according to your application requirements.
- To set the type of limit and the channel assigned to it:

- a. Double-click in either the Limit ID or Assigned Item column. You will see the screen shown below.



- b. From the pop-up menus, choose the desired settings and click OK. Following is a list of the available Groups, Sub Groups, and Items.

Group: Measured Values

Sub Group: High Speed Updated

Item: Voltage A-N

Voltage B-N

Voltage C-N

Voltage Aux

Current A

Current B

Current C

Current N Measured

Voltage A-B

Voltage B-C

Voltage C-A

VA A

VA B

VA C

VA Total

VAR A

VAR B

VAR C

VAR Total

Watt A

Watt B  
Watt C  
Watt Total  
Frequency  
Power Factor A  
Power Factor B  
Power Factor C  
Power Factor Total  
Volts A-Aux Phase Angle  
Current N Calculated  
Sub Group: One second updated  
Item: Voltage A-N  
Voltage B-N  
Voltage C-N  
Voltage Aux  
Current A  
Current B  
Current C  
Current N Measured  
Current N Calculated  
Voltage A-B  
Voltage B-C  
Voltage C-A  
VA A  
VA B  
VA C  
VA Total  
VAR A  
VAR B  
VAR C  
VAR Total  
Watt A  
Watt B  
Watt C  
Watt Total  
Frequency

Power Factor A  
Power Factor B  
Power Factor C  
Power Factor Total  
Voltage Imbalance  
Current Imbalance  
Uncompensated VA A  
Uncompensated VA B  
Uncompensated VA C  
Uncompensated VA Total  
Uncompensated VAR A  
Uncompensated VAR B  
Uncompensated VAR C  
Uncompensated VAR Total  
Uncompensated Watt A  
Uncompensated Watt B  
Uncompensated Watt C  
Uncompensated Watt Total  
THD Volts A  
THD Volts B  
THD Volts C  
THD Current A  
THD Current B  
THD Current C  
K Factor Current A  
K Factor Current B  
K Factor Current C  
Internal Temperature  
Maximum TDD Phase A-N/Phase A-B Voltage  
Maximum TDD Phase B-N/Phase B-C Voltage  
Maximum TDD Phase C-N/Phase C-A Voltage  
Maximum TDD Phase A Current Timestamp  
Maximum TDD Phase B Current Timestamp  
Maximum TDD Phase C Current Timestamp  
Minimum TDD Phase A-N/Phase A-B Voltage  
Minimum TDD Phase B-N/Phase B-C Voltage



Minimum TDD Phase C-N/Phase C-A Voltage

Minimum TDD Phase A Current Timestamp

Minimum TDD Phase B Current Timestamp

Minimum TDD Phase C Current Timestamp

Sub Group: Harmonic Values

Item: 0 - 127th Harmonic on selectable Harmonic Magnitude

(Voltage Phases A, B, and C; Current Phases A, B, and C)

Sub Group: Internal Inputs, States

Item: Internal Inputs 1-8

Sub Group: Phase Angles

Item: Phase A-N Voltage

Phase B-N Voltage

Phase C-N Voltage

Phase A Current

Phase B Current

Phase C Current

Phase A-B Voltage

Phase B-C Voltage

Phase C-A Voltage

Volts A-Aux Phase Angle

Voltage Phase Sequence

Sub Group: Flicker

Item: Flicker: PInst Volts A

Flicker: PInst Volts B

Flicker: PInst Volts C

Flicker: PST Volts A

Flicker: PST Volts B

Flicker: PST Volts C

Flicker: PLT Volts A

Flicker: PLT Volts B

Flicker: PLT Volts C

Group: Averages

Sub Group: Thermal Average

Item: Voltage A-N

Voltage B-N

Voltage C-N

Voltage Aux  
Current A  
Current B  
Current C  
Current N Measured  
Current N Calculated  
Voltage A-B  
Voltage B-C  
Voltage C-A  
VA A  
VA B  
VA C  
VA Total  
VAR A  
VAR B  
VAR C  
VAR Total  
Watt A  
Watt B  
Watt C  
Watt Total  
Frequency  
Power Factor A  
Power Factor B  
Power Factor C  
Power Factor Total  
Voltage Imbalance  
Current Imbalance  
Sub Group: Block Window Average  
Item: VA  
VAR  
Watt  
Sub Group: Pulse Accumulation/Aggregation Block Window Average  
Item: Internal Inputs #1 - #8  
Aggregators #1 - #4  
Sub Group: Rolling Window Average

Item: Predictive VA

Predictive VAR

Predictive Watt

VA

VAR

Watt

Sub Group: Voltage and Current Means

Item: Volts PN

Current P

Volts PP

Group: External I/O Devices

Sub Group: Analog Input Modules

Item: Module 1: Analog Input 1 - Analog Input 8

Module 2: Analog Input 1 - Analog Input 8

Module 3: Analog Input 1 - Analog Input 8

Module 4: Analog Input 1 - Analog Input 8

- To designate the limit as either above or below a percentage of the Full Scale, click once in each Settings column and select the desired setting from the pull-down menu.
- To set the percentage of the Full Scale that will trip the limit, enter the value in the % of FS column. CommunicatorPQA™ software automatically calculates the Primary value.
- Combination Limit 3 is the logical combination of Limit 1's state and Limit 2's state.

### **Example 1**

#### Limit I D

Type: 1 Second Readings

Channel: Volts AN

Limit 1 Setting: Limit exceeded if Volts AN is below 120 F.S.

Limit 2 Setting: Limit exceeded if Volts AN is above 80 F.S.

Combination Limit 3 Setting: AND

If Limit 1 AND Limit 2 are tripped (e.g., the reading is 100F.S.), then Limit 3 is tripped.

**Example 2**Limit I D

Type: 1 Second Readings

Channel: Volts AN

Limit 1 Setting: Limit exceeded if Volts AN is above 120 F.S.

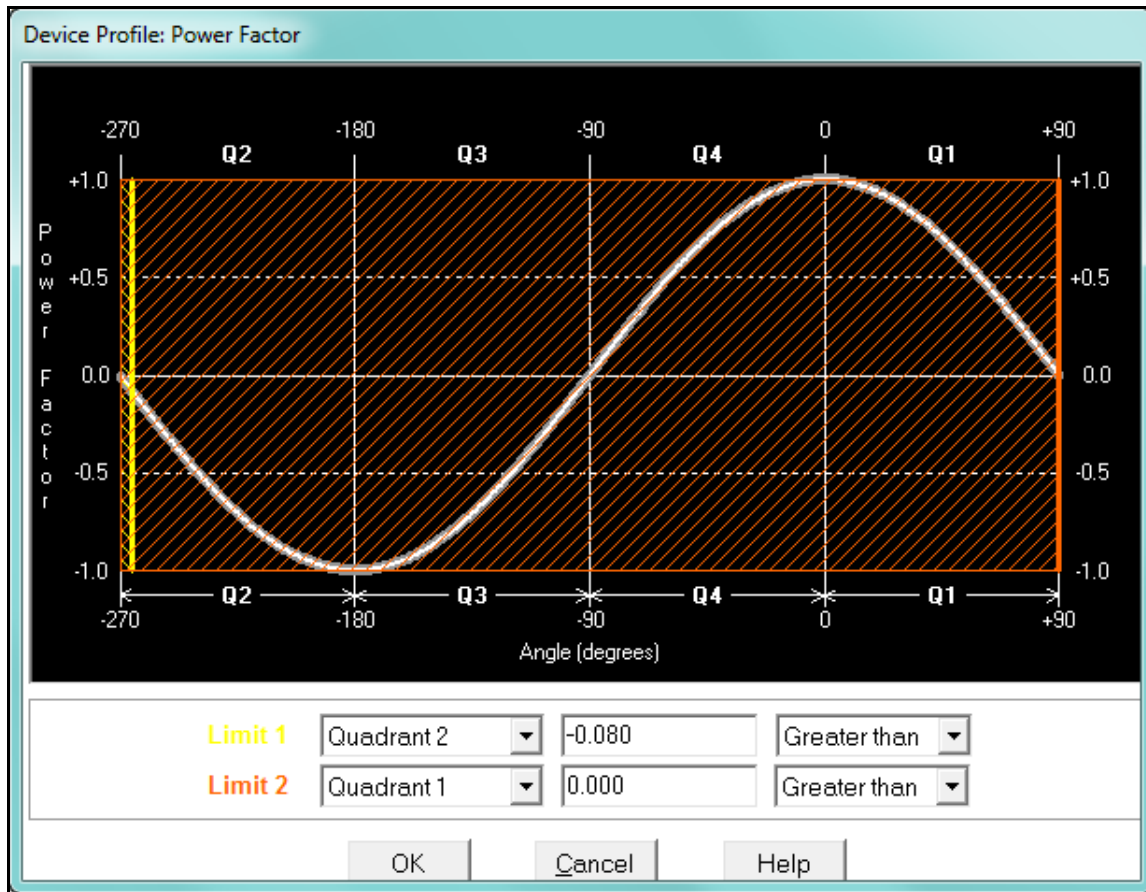
Limit 2 Setting: Limit exceeded if Volts AN is below 80 F.S.

Combination Limit 3 Setting: OR

If either Limit 1 OR Limit 2 is tripped (e.g., the reading is 75), then Limit 3 is tripped.

- Full Scales settings are shown in the lower left of the screen. These values are set in the Limits and Waveform Full Scales section of the Device Profile (Section 12.1.2).
3. Power Factor is broken into four quadrants. Selecting the Full Scale value brings up a screen that lets you set a limit in two of the four quadrants.

- To set the power factor limits, double click on any of the power factor settings in the Limit 1 or Limit 2 columns. You will see the Power Factor screen.



- To set a limit: from the pull-down menus, select a quadrant and Less Than or Greater Than (Full Scales). Enter the power factor number. The graph will illustrate your selections by shading the out of limit bands. The area of the graph not covered by shading is within normal operational range.
- NOTE:** Whether you see method 1 Quadrants (Q1 +Lag, Q2 -Lag, Q3 -Lead, Q4 +Lead) or method 2 Quadrants (Q1 +Lag, Q2 -Lead, Q3 +Lag, Q4 -Lead) depends on the setting in the Power Factor Display field of the Labels setting (see [Section 12.1.4: Labels on page 12-10](#)).

**NOTE:** The Nexus® 1262/1272 device is a four-quadrant meter. Therefore, limits can be set for capacitive and inductive PF when generating or consuming power.

- When all settings are complete, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.



The gates used in ElectroLogic™ Relay Control are used as follows:

OR: If either or both of the two conditions are true, the gate is passed

AND: If both of the conditions are true, the gate is passed

Hysteresis: For Limits only, the if the Limit is within the programmed hysteresis value, the gate is passed

XOR: If either of the two conditions are true, but not both, the gate is passed

NOR: If either of the two conditions are true, the gate is not passed

NAND: If both of the two conditions are true, the gate is not passed

NHysteresis: For limits only, if the Limit is within the programmed hysteresis value, the gate is not passed

NXOR: If either of the two conditions are true, but not both, the gate is not passed

**NOTE: See Example settings on page 12-80.**

2. To assign an item to the Relay Logic tree:

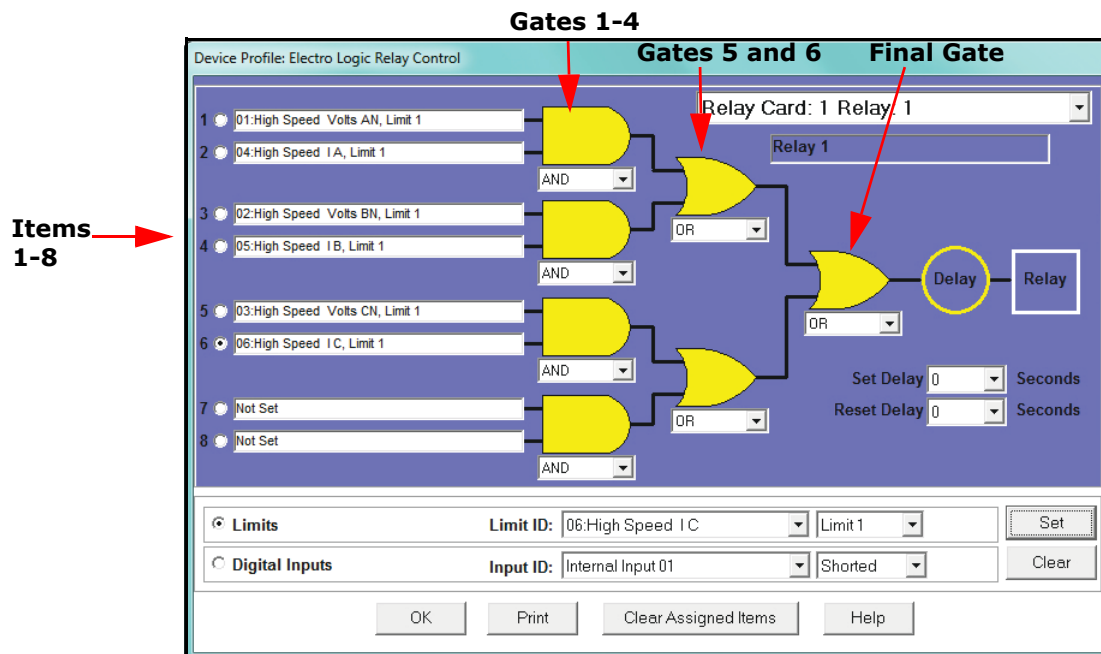
- a. Select the relay card/module from the pull-down menu - see number 1 in the screen on the previous page.
  - b. Select an input for the tree by clicking on a radio button next to numbers 1 through 8 - see number 2 in the screen on the previous page.
  - c. Choose Limits or Digital Inputs by clicking on the radio button in front of the word - see number 3 in the screen on the previous page.
  - d. From the pull-down menus, select the limit (Limit ID) or input (Input ID) you want to assign to this Relay Logic tree input (step b) - see number 4 in the screen on the previous page.
    - For a limit, use the second pull-down menu to select Limit 1, Limit 2, or Combination - see number 4a in the screen on the previous page.
    - For an input, use the second pull-down menu to select Shorted or Open - see number 4b in the screen on the previous page.
  - e. Press Set to confirm your selection. The software places the selection in the appropriate field in the screen.
3. After you assign all the Relay Logic inputs, select the gates that will be used to combine the logic to trigger the relay. To select a gate type, either:

- Click on the gate (yellow fields) - see number 5a in the screen on page 12-77.
  - Choose a gate type from the pull-down menu below the gate - see number 5b in the screen on page 12-77.
4. If you want, select Set Delay and Reset Delay from the pull-down menus. You can choose between 0 and 255 seconds. Use these fields if you want to program a delay before the relay is set, or before it is reset - see number 6 in the screen on page 12-77.
5. To change items on the Relay Logic tree, follow the previous steps.
- To clear an item from the Relay tree, click on that item and click the Clear button.
  - To clear all items from the Relay Tree, click the Clear Assigned Items button.
6. When all settings are complete, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

**NOTE:** In order to use this screen, you must have purchased at least one External Relay Output module. For more details on external Output modules, see Chapter 14.



### Example of an ElectroLogic™ Relay Logic Tree:



Inputs 1 through 8 are set to High Speed Volts AN Limit 1, High Speed Amps A Limit 1, High Speed Volts BN Limit 1, High Speed Amps B Limit 1, High Speed Volts CN Limit 1, High Speed Amps C Limit 1, Not Set and Not Set. The four first gates are AND gates, and the remaining three gates are OR gates.

Each first level gate looks at the state of the two limits, and the result is "true" if and only if both the inputs (Voltage Limit and Current Limit) are "true" (Out-of-Limit Condition). The second and third level gates look at the state of the earlier gates, and their results are "true" if either one (or both) of the previous gates are "true". The end result is a relay that is energized if one or more of the three phases (A, B, and/or C) is currently Out-of-Limit on both its voltage and current Limit 1 tests.

### 12.3.3: PQ Thresholds (Waveform Recording: Nexus® 1272 Meter Only)

The PQ Thresholds/Waveform Recording capability allows the meter to act as a high-speed waveform recorder to record any anomaly that occurs within a cycle of duration. This provides a user with advanced waveform analysis including pre- and post-waveform recording.

The meter has the capability to record both surges and sags of the measured signals. A voltage surge is any event that increases the RMS voltage for one cycle, calculated every half cycle. A voltage sag is a dip in the RMS of one cycle of voltage, calculated every half cycle. A current fault (or surge) is also calculated in the same manner. When the RMS value of any of these triggers exceeds the threshold settings, the meter will trigger a waveform capture.

The Power Quality (PQ) and Waveform Thresholds setting determines at what point the Nexus® 1272 meter executes a waveform capture and/or records a power quality event.

See Chapter 19 for instructions on viewing Waveform and PQ logs.

PQ and Waveform Thresholds are given as a percentage of the Full Scales (% of FS). Set the Full Scales in the Limits and Waveform Full Scales setting of the Device Profile (see Section 12.1.2: Limit and Waveform Full Scales on page 12-4). Full Scales are based on the CT and PT ratios set in the CT, PT Ratios and System Hookup setting of the Device Profile (see Section 12.1.1: CT and PT Ratios and System Hookup on page 12-2).

Before programming the PQ and Waveform Thresholds, set the CT and PT ratios and the Limits and Waveform Full Scales.

**Note on Sampling Rate:** A higher sampling rate allows for transients to be monitored. Generally, the meter is set to take 1024 samples per cycle for this purpose. Lower sampling rates have advantages, however, because they allow you to record more cycles of information per event screen. Therefore, low sampling rates are better for long duration events, like motor starts or distribution faults. The meter enables you to tailor its recording for both these applications. For more information on sampling rate, see the table on page 12-84.

1. From the Power Quality and Alarm Settings menu, double-click on the PQ Thresholds (Waveform Recording) line. You will see the screen shown below

Device Profile: Waveform - CBEMA Profile Hookup: Wye

Channel	Waveform Above Setpoint		Waveform Below Setpoint		PQ Enable
	Value(%)	Enable	Value(%)	Enable	
Volts AN	120.00	<input checked="" type="checkbox"/>	80.00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Volts BN	120.00	<input checked="" type="checkbox"/>	80.00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Volts CN	120.00	<input checked="" type="checkbox"/>	80.00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
I A	120.00	<input checked="" type="checkbox"/>	0.00	<input type="checkbox"/>	<input checked="" type="checkbox"/>
I B	120.00	<input checked="" type="checkbox"/>	0.00	<input type="checkbox"/>	<input checked="" type="checkbox"/>
I C	120.00	<input checked="" type="checkbox"/>	0.00	<input type="checkbox"/>	<input checked="" type="checkbox"/>
I Nm	10.00	<input type="checkbox"/>	0.00	<input type="checkbox"/>	<input type="checkbox"/>

Input	Assigned to
1	KYZ Input
2	KYZ Input
3	KYZ Input
4	KYZ Input
5	KYZ Input
6	KYZ Input
7	KYZ Input
8	KYZ Input

Sampling Rate: 32 Samples / Cycle @ 60Hz

32 Cycles Captured Per Window

Total Capture Windows Per Event: 1

A limit value of 100 % equals the following primary value

I A,B,C: 5.00 V P - N: 120.00 V P - P: 207.85

OK Cancel Help

2. To set the threshold for a PQ event and waveform capture, enter the desired percentage of Full Scale in the Value() column of the Above Setpoint and Below Setpoint sections. Full Scales are shown in the lower right corner of the screen.

**NOTE ON CBEMA:** The CBEMA plotting is a power quality standard known worldwide for recording the amount of damage voltage transient conditions have done to the equipment being monitored. The meter automatically records this information. For CBEMA purposes, program internal setpoints for voltage below 90 and above 110 of full scale (+/- 10 from the nominal voltage). These setpoints are defined by the ITI (CBEMA) specification. The ITI (CBEMA) Curve is published by Information Technology Industry Council (ITI). You can set a recording with tighter voltage limits to trigger a waveform recording. However, CBEMA plotting will be based only on the limits internally set.

**NOTE ON SETTING THE METER TO RECORD CURRENT FAULTS:** The voltage setpoints are used to record voltage type events, such as voltage surges, sags and transients. The current settings are used to record faults on the line or in-rush

currents from devices such as motors. Typically, to catch these events, set the limit to above 200 of full scale.

- Current Waveform Clipping Thresholds: Nexus® 1272 Meter; Class 20A -  $\pm 90A$  Peak before clipping; Class 2A -  $\pm 18A$  Peak before clipping
- Voltage Waveform Clipping Thresholds: Nexus® 1272 Meter SE, S, DE Hardware -  $\pm 800V$  Peak before clipping; LV Hardware -  $\pm 200V$  Peak before clipping
- High Speed Inputs: The High Speed Inputs field allows you to see which High Speed Inputs are enabled for Waveform recording.

**IMPORTANT!** You assign the High Speed Input to its trigger in the High Speed Inputs screen (see Section 12.3.6: High Speed Inputs on page 12-88).

- Samples per Cycle: To choose the Samples per Cycle to be recorded at 60 Hz, click on the Sampling Rate pull-down menu. Choose from 16, 32, 64, 128, 256 and 512 samples per cycle. The number of samples per cycle you choose will inversely affect the number of cycles per capture.
  - If you select 256, a Capture Only pop-up screen will ask you to select Volts A, B, C or I A, B, C.
  - If you select 512, a Capture Only pop-up screen will ask you to select one of the individual channels.

The following table illustrates the effects of sampling rate on the number of cycles captured. Increasing the Sampling Rate increases Waveform definition, but reduces the length of the observed window. The approximate length of the observed window is shown in the last column.

Effects of Sampling Rate					
Samples Per Cycle	Channels		Samples Per Channel	Cycles Per Capture	Time (Approx)
	Analog	HSI			
16	7	8	1024	64	1 Second
32	7	8	1024	32	½ Second
64	7	8	1024	16	¼ Second
128	7	8	1024	8	1/8 Second
256	3	8	2048	8	1/8 Second
512	1	8	4096	8	1/8 Second

For example, for observed events of approximately ½ second, a sampling rate of 32 samples per Cycle, or less, should be used.

**NOTE ON WAVEFORM EVENT CAPTURES:** A screen of data is one capture. If you set Total Captures to 3 and you are recording at 16 samples per cycle, you will record:

16 Samples3 x 64 = 192 cycles of recorded waveforms

128 Samples3 x 8 = 24 cycles of recorded waveforms

With the 2 Megabyte module, you have a total of 64 captures; with the 4 Megabyte module, you have a total of 96 captures. You can partition the memory in any fashion required by your application. There is no limitation on the amount of cycles that can be recorded per event.

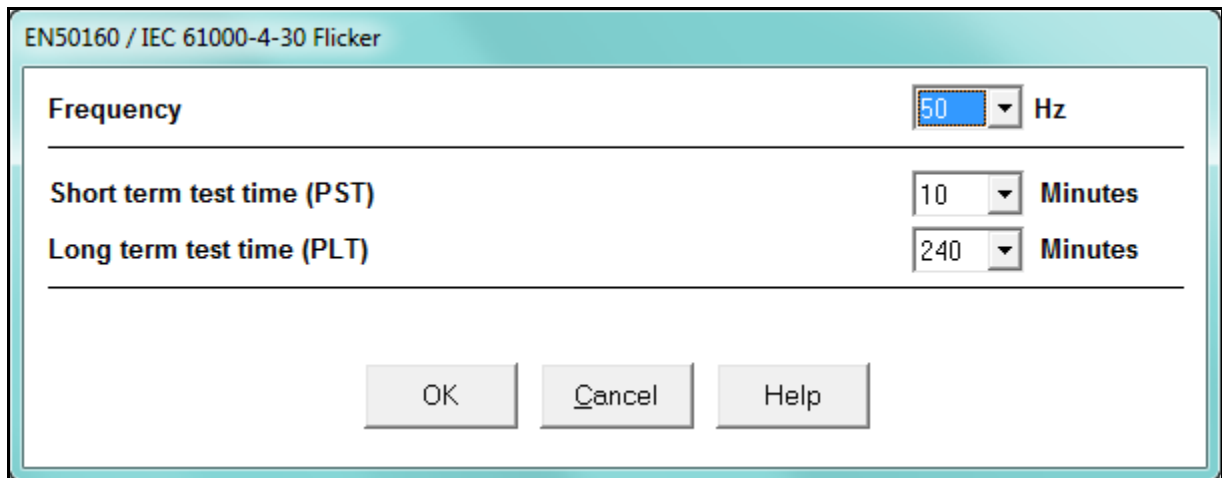
- To choose the total amount of captures, click on the Total Captures pull-down menu. Select from 0 to 96 captures. The higher the number, the more information you will be "stringing together."

4. When all changes are entered, click OK to return to the main Device Profile screen. For changes to take effect, you must click the Update Device button. This sends the new profile to the meter.

### 12.3.4: EN 50160/IEC 61000-4-30 Flicker

With the EN 50160/IEC 61000-4-30 Flicker screen, you can set the test times for the Flicker function.

1. From the Device Profile screen double-click on the EN50160/IEC61000-4-30 Flicker line. You will see the screen shown below.



EN50160 / IEC 61000-4-30 Flicker

Frequency 50 Hz

Short term test time (PST) 10 Minutes

Long term test time (PLT) 240 Minutes

OK Cancel Help

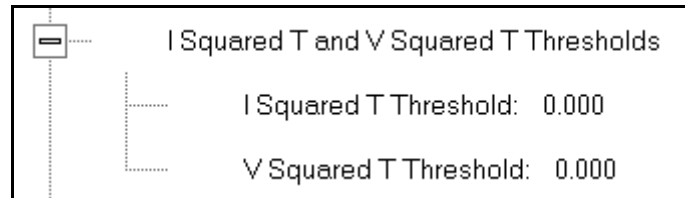
2. From the pull-down menus, select:
  - Frequency (50 or 60Hz) - this field is used to calculate the harmonics and interharmonics associated with the set fundamental frequency.
  - Short Term Test Time (1-10 minutes, in minute increments) - PST is defined over a ten minute interval. Standard IEC 61000-4-15 requires 10 minutes for PST.
  - Long Term Test Time (10-240 minutes, in ten minute increments) - the standard requires 120 minutes, and is calculated from the PLT values.
3. When all changes have been entered, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

**NOTE:** Flicker is discussed in detail in Chapter 23.

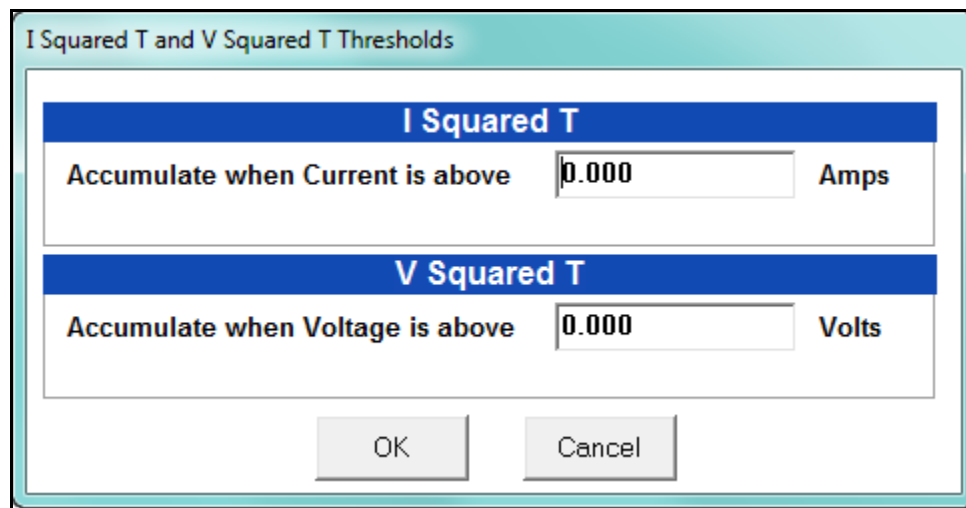
### 12.3.5: I Squared T and V Squared T Thresholds

With the I Squared T and V Squared T Thresholds screen, you can set the point at which the meter accumulates current and Voltage. This feature is used to calculate wear on circuit breaker contacts.

1. From the Power Quality and Alarm Settings menu, click on the + button next to I Squared T and V Squared T Thresholds or double-click on that line. You will see the submenu shown below, which shows the current settings for the meter.



2. Double-click one of the settings to open the I Squared T and V Squared T Thresholds screen, shown below.



3. Enter the thresholds in the I Squared T and V Squared T fields.
4. Click OK to exit the screen and return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 12.3.6: High Speed Inputs

The Nexus® 1262/1272 meter's built-in High Speed Inputs can be used in two ways:

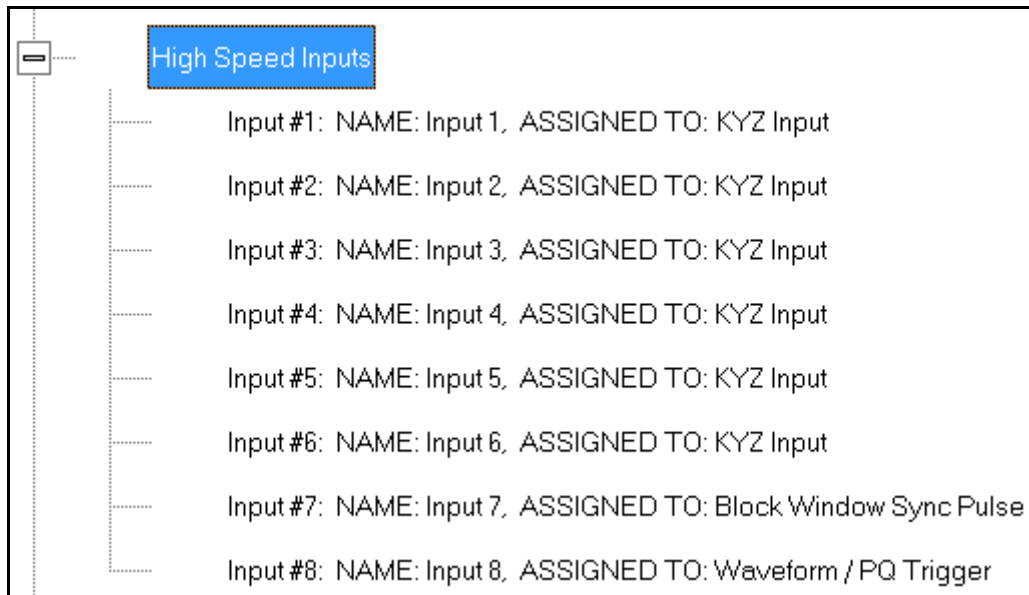
- Attaching status contacts from relays, breakers or other devices for status or waveform initiation
- Attaching the KYZ pulse outputs from other meters for pulse counting and totalizing

Even though these inputs are capable of being used as high speed digital fault recording inputs, they serve a dual purpose as KYZ counters and totalizers. The function in use is programmable in this setting of the Device Profile, which lets you label the eight High Speed inputs and to specify their status.

- Labeling the inputs allows you to determine the source of status change when data is later analyzed.
- This feature lets you set the High Speed Inputs' status as a KYZ input, a trigger for waveform capture or PQ recording, or as a means of synchronizing the meter.
- In the Pulse Accumulations setting (Section 12.2.10), you can assign the High Speed Inputs' counts to be accumulated in one of four internal Aggregators of the meter.



1. From the Power Quality and Alarm Settings menu, double-click on the High Speed Inputs line or click on the + button next to it. You will see the submenu shown below.



2. Double-click any of the Input lines. You will see the screen below.

Device Profile: High Speed Digital Input Assignments

Input ID	Name	Open Label	Shorted Label	Normal Condition	Input Type
1	Input 1	Open	Closed	Open	KYZ Input
2	Input 2	Open	Closed	Open	KYZ Input
3	Input 3	Open	Closed	Open	KYZ Input
4	Input 4	Open	Closed	Open	KYZ Input
5	Input 5	Open	Closed	Open	KYZ Input
6	Input 6	Open	Closed	Open	KYZ Input
7	Input 7	Open	Closed	Open	Block Window Sync Pulse
8	Input 8	Open	Closed	Open	Waveform / PQ Trigger

OK Cancel Help

3. Double-click a field to enter the following:

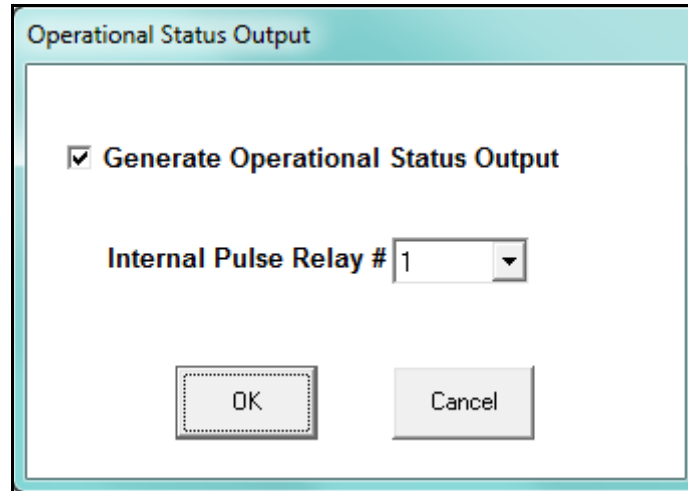
- Name
- Open Label
- Shorted Label

- Normal Condition
4. Click on the Input Type field to select an option from the pull-down menu. The available selections are:
- KYZ Input - select this option to designate the input as a pulse (KYZ) input.
  - Waveform/PQ Trigger - select this option if you want the input to trigger a waveform/PQ recording (see Section 12.3.3: PQ Thresholds (Waveform Recording: Nexus® 1272 Meter Only) on page 12-82).
  - Block Window Sync Pulse - select this option if you want to synchronize the meter with pulses from the input (see Section 12.2.2: Demand Integration Intervals on page 12-29).
5. When you have finished making your selections, click OK to exit the screen and return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 12.3.7: Operational Status Output

This setting of the Device Profile lets you assign a relay to the operational status of the meter. The relay can then be monitored by another connected device.

1. From the Power Quality and Alarm Settings menu, double-click on the Operational Status Output line. You will see the screen shown below.



2. Select the relay you want to assign from the pull-down menu and click the check-box.
3. When you finish making your selections, click OK to exit the screen and return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

## 12.4: Trending Profile Settings

This section of the Device Profile enables you to configure parameters for the Nexus® 1262/1272 meter's two historical logs.

1. From the Device Profile screen, click on the + button next to Trending Profile Settings or double-click on the Trending Profile Settings line. You will see the menu shown below.



2. Double-click on one of the Trending lines to access the programming screens.

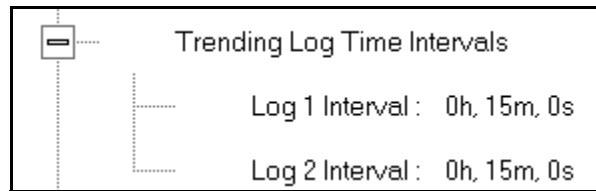
**NOTE on Load Profile Recording:** Load Profile recording is a subset of the Nexus® meter's more general logging and trending capability. The same screens are used for setup, but Load Profile recording only deals with accumulated values; Energy (Wh), reactive Energy (VARh) and apparent power (VAh).

Historically, Load Profile recording referred to recording of quadrant 1 Energy (Wh) because electromechanical meters only measured energy and were designed to prevent reverse rotation outside of quadrant 1.

### 12.4.1: Programming the Trending Log Time Intervals

The Trending Log Time Intervals setting determines the interval at which the Historical logs take a "snapshot" of data. To set the parameters for the logs, see [Section 12.4.2: Programming the Trending Setup on page 12-94](#). See Chapter 16 for information on retrieving logs and Chapter 19 for information on viewing logs.

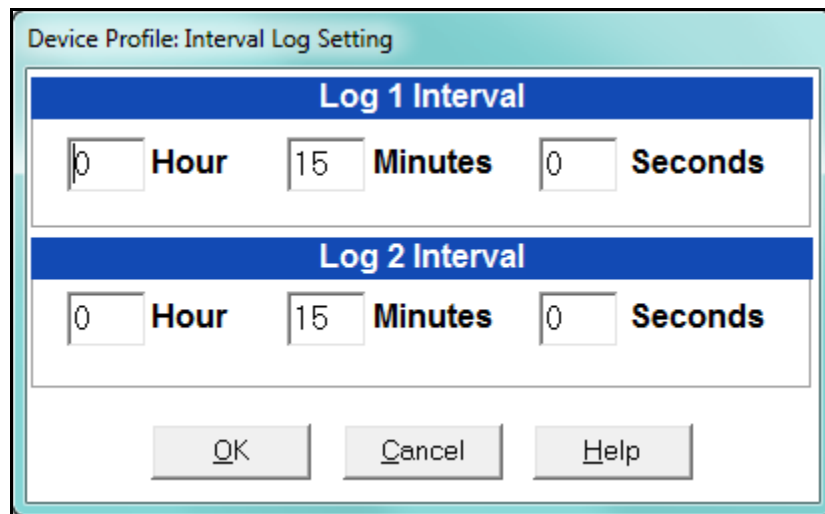
1. From the Trending Profile Settings menu, double-click Trending Log Time Intervals or click the + button next to it. You will see the submenu shown below. The submenu shows the interval set for both Historical logs.



2. To change the interval for a Historical log, double-click on one of the logs.

**NOTE:** You can also access the Interval setting screens from the Trending Setup screens (see [Section 12.4.2: Programming the Trending Setup on page 12-94](#)).

2. You will see the screen shown below. Enter the interval you want.

A screenshot of a dialog box titled "Device Profile: Interval Log Setting". It has two sections: "Log 1 Interval" and "Log 2 Interval". Each section has three input fields for "Hour", "Minutes", and "Seconds", all set to 0, 15, and 0 respectively. At the bottom are three buttons: "OK", "Cancel", and "Help".

3. Click OK to save your changes. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 12.4.2: Programming the Trending Setup

The Trending Setup controls the channel assignments for the Historical logs. See Chapter 16 for instructions on retrieving logs.

1. From the Trending Profile Settings menu, click on the + button next to Trending Setup or double-click on the Trending Setup line. You will see the submenu shown below.



1. Double-click on the log whose settings you want to configure. You will see the Trending Log Profile screen for the log you selected. An example screen is shown below.

**Trending Log Profile Log 1**

**Group** Measured Values **Sub Group** High Speed Updated

Selectable Item(s)		Selected Item(s)
Voltage A-N	Add >>	One Second Updated:Voltage A-N
Voltage B-N	<< Remove	One Second Updated:Voltage B-N
Voltage C-N	< HHF >	One Second Updated:Voltage C-N
Voltage Aux	Check HHF	One Second Updated:Current A
Current A	EN50160	One Second Updated:Current B
Current B	GenName List	One Second Updated:Current C
Current C		One Second Updated:VA Total
Current N Measured		One Second Updated:Var Total
Voltage A-B		One Second Updated:Watt Total
Voltage B-C		One Second Updated:Frequency
Voltage C-A		One Second Updated:THD Volts A
VA A		One Second Updated:THD Volts B
VAB		One Second Updated:THD Volts C
VAC		One Second Updated:THD Current A
VA Total		One Second Updated:THD Current B
Var A		One Second Updated:THD Current C
Var B		One Second Updated:K Factor Current A
Var C		One Second Updated:K Factor Current B
Var Total		One Second Updated:K Factor Current C
Watt A		One Second Updated:Internal Temperature
Watt B		Block Window Average:VA
Watt C		Block Window Average:VAR
Watt Total		Block Window Average:Watt
Frequency		Rolling Window Average:Predictive VA
Power Factor A		Rolling Window Average:Predictive VAR
Power Factor B		Rolling Window Average:Predictive Watt
Power Factor C		Rolling Window Average:VA
Power Factor Total		Rolling Window Average:VAR
Volts A - Aux Phase Angle		Rolling Window Average:Watt
		Scaled Pulse Accumulations and Aggregations:Internal Input #1
		Scaled Pulse Accumulations and Aggregations:Aggregator #1

**Total bytes used** 112 **Estimated Log Timespan** 21days 8hour 0min 0sec

**Bytes remaining** 144 **Total Records** 2048

OK Cancel Set Interval Help

2. Make changes to this screen according to your application requirements.
  - a. Group: Using the pull-down menu, select the type of snapshot. The options are: Measured Values, Averages, Accumulators, Interval Accumulators, External Output Devices, TOU Cumulative Dmd.

- b. Sub-Group: Using the pull-down menu, select a channel for the snapshot. The options are: Fifty Millisecond Updated; One Second Updated; Harmonic Values; Internal Inputs, States; Phase Angles; Flicker.
- c. Sub-Group 2: With some selections, a second sub-group field will be shown underneath the first one. Select a value for this field from the pull-down menu.
- d. Highlight items in the Selectable Items(s) box and click Add to include the selections in the Log. The items will be copied to the Selected Item(s) box. To remove an item from the log, highlight the item in the Selected Item(s) box and click Remove or double-click the item. The item will be removed from the Selected Item(s) box.

**NOTES:**

- To select multiple items, hold Control while highlighting the items.
  - To select a range of items, click the first item, hold Shift, and click the last item.
  - Move the cursor to the lower left corner of an item, or group of items, to view its size in bytes.
- e. Click HHF if you want to convert files to HHF format for use with MV-90. See Chapter 16 for details.
  - f. Click Check HHF if you want to check if current settings are compatible with the HHF Converter.

**NOTE:** You will not see the HHF options unless you have enabled the HHF converter using the Options menu. See Chapter 20 for instructions.

- g. The Total bytes used and Bytes remaining fields display the amount of memory used for each record of the log. The meter assumes 256 bytes of memory for each record. Total memory is determined at time of purchase.
- h. The Estimated Log Timespan field displays the length of the time between the first and last records in the log when it is full.



- i. The Total Records field displays the total number of records that will be in the log when it is full.
  - j. Click Set Interval to open the Interval Log Setting screen (see Section 12.4.1: Programming the Trending Log Time Intervals on page 12-92).
4. When all changes have been entered, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

## 12.5: External I/O Modules

This setting of the Device Profile allows you to set up the meter's optional external Input/Output modules (see Chapter 14 for more information on the I/O modules). I/O modules work as Modbus slave devices. The meter polls these modules to get the data from them. I/O modules generally have default RS485 Modbus addresses. So, they don't have to be configured. Once you set up which module you want, put in the default address and start with the basic configuration of readings you desire to gather.

### 12.5.1: Configuring the Input/Output Modules

1. From the Device Profile screen, double-click on the External I/O Modules icon. You will see the screen shown below.

Device Profile: I/O Modules

Module Number	Type	Assigned Address	Nexus Settings	Module Settings	Log / Limit ID
1	20mAON8: Analog Out 4 - 20mA 8 ch	132	Edit	Edit	AO Module 1
2	4PO1: KYZ Output	160	Edit	Edit	KYZ Module 1
3	4RO1: Digital Output	156	Edit	Edit	DO Module 4
4	8AI1: Analog In 0 - 1mA 8 ch	136	Edit	Edit	AI Module 1
5	No Device Assigned				
6	No Device Assigned				
7	No Device Assigned				
8	No Device Assigned				
9	No Device Assigned				
10	No Device Assigned				
11	No Device Assigned				
12	No Device Assigned				
13	No Device Assigned				
14	No Device Assigned				
15	No Device Assigned				
16	No Device Assigned				

OK Cancel Help

2. Click in the Type column and use the pull-down menu to select the specific module you want to add. The Assigned Address, Nexus settings®, and Module settings you can make depend on the module you are configuring. The modules and settings are as follows:

Module	Assigned Address*	Nexus® Setting**	Module Setting
4PO1 - KYZ Output	160*	Click to Edit Relay Accumulations	Click to enter Transmit Delay and configure KYZ outputs' Watt/pulse, rollover and minimum pulse width.
20mAON4	132*	Click to Assign Items to and configure the Analog Outputs	Click to enter Transmit Delay and configure Channel settings
20mAON8	132*	Click to Assign Items to and configure the Analog Outputs	Click to enter Transmit Delay and configure Channel settings
1mAON4	128*	Click to Assign Items to and configure the Analog Outputs	Click to enter Transmit Delay and configure Channel settings
1mAON8	128*	Click to Assign Items to and configure the Analog Outputs	Click to enter Transmit Delay and configure Channel settings
4RO1 - Digital Output	156*	Click to configure Relays	Click to enter Transmit Delay
8AI1 - Analog Input Module	247*	Click to configure Analog Outputs	Click to enter Transmit Delay and configure Channel settings
8AI2- Analog Input Module	247*	Click to configure Analog Outputs	Click to enter Transmit Delay and configure Channel settings
8AI3 - Analog Input Module	247*	Click to configure Analog Outputs	Click to enter Transmit Delay and configure Channel settings
8AI4 - Analog Input Module	247*	Click to configure Analog Outputs	Click to enter Transmit Delay and configure Channel settings
8DI1 - Digital Status Input Module	164*	Click to configure Digital Inputs	Click to enter Transmit Delay and configure Channel settings

\* The Assigned address on this screen is the address the meter uses to identify the I/O module. The default is the factory set address, which you can change by clicking in the field and choosing a new address from the pull-down menu. This address is not the actual I/O module address. You set that from the I/O Devices menu; see Chapter 14 for instructions.

\*\*When you click in this field you see an Edit button. Click the button to open a screen that lets you edit that module. See the following example screens.

## 4PO1 Screen

Relay	Accumulation
1	Quad (1 + 4) Watthour
2	Quad (2 + 3) Watthour
3	Quad (1 + 2) VARhour
4	Quad (3 + 4) VARhour

OK Cancel

This screen allows you to assign a KYZ output to an accumulator. Click on the pull-down menu to select accumulation configuration for each of the 4 relays. The options are:

- Disabled
- Quad (1+4) Watthr
- Quad (2+3) Watthr
- Quad (1+2) VARhr
- Quad (3+4) VARhr
- Quad (1+2+3+4) VAhr
- Quad 1 Watthr
- Quad 2 Watthr
- Quad 3 Watthr
- Quad4 Watthr
- Quad 1 VARhr
- Quad 2 VARhr
- Quad 3 VARhr
- Quad 4 VARhr
- Quad 1 VAhr
- Quad 2 VAhr

- Quad 3 VAhr
- Quad 4 VAhr
- +Qh Total
- -Qh Total
- Internal Input (#1-8) Totals
- Accumulation (#1-4) Totals
- External Digital Input Modules (1-4) Inputs (#1-8)
- I Squared T (A, B, C)
- V Squared T (A,B,C)

## 20mAON4 Screen

Device Profile: Analog Output

Output	Assigned Item (Click Item to Change)
1	High Speed Updated:Voltage A-B
2	High Speed Updated:Voltage B-C
3	High Speed Updated:Voltage C-A
4	Thermal Average:Current N Calculated

Channel Update 1

---

For Pulse Accumulators and Aggregator Block Window Average (8 Byte data) only,  
please choose 4 of the 8 bytes you want to map to the Analog outputs

Bytes 7, 6, 5, 4

OK Cancel Help

Click in Output channels 1-4 to assign them to a parameter. The other Analog Output Modules - 20mAON8, 1mAON4, and 1mAON8 have similar setting screens, except for the number of channels you can program.

- The analog outputs are used to send a variable current dependent on the programmed reading. This screen lets you select the readings to output.

## 4RO1 Screen

Device Profile: Digital Output

Relay	Label	Common Shorted to N.C.	Common Shorted to N.O.	Lock to Manual Control
1	Relay 1	Closed1	Open1	<input checked="" type="checkbox"/>
2	Relay2	Closed2	Open2	<input checked="" type="checkbox"/>
3	Relay3	Closed3	Open3	<input checked="" type="checkbox"/>
4	Relay4	Closed4	Open4	<input type="checkbox"/>

OK Cancel Help

Click in the Relay fields 1-4 to enter relay label, common shorted to N.C., common shorted to N.O., and check the box to lock the relay to manual control. When a relay is locked to manual control, it cannot be used in ElectroLogic Relay Control (see Section 12.3.2 for information on ElectroLogic Relay Control).

## Analog Input Screen

Device Profile: Analog Input

Input	Channel Label	High Value (20mA)	Low Value (4mA)
1	Temperature	100.0000	0.0000
2	Humidity	100.0000	0.0000
3		0.0000	0.0000
4		0.0000	0.0000
5		0.0000	0.0000
6		0.0000	0.0000
7		0.0000	0.0000
8		0.0000	0.0000

OK Cancel Help

Click in Input Channels 1-8 to assign a label and a High and Low Value.

- The two analog input module's settings are the same, except for the Inputs' high and low range.

- The High and Low Value fields let you map the inputs' high and low range to values that are appropriate for the parameters you are measuring. For example, in the screen above, the first input is measuring temperature. The high value for the input is set to 100, and the low value is set to 0. An input reading of 12mA will translate to 50 for the temperature.

The Analog Input modules can be trended in the historical logs, and the data can be viewed and graphed in Log Viewer (see Chapter 19 for details). The readings shown in the logs and graphs will use the setting range programmed in the screen above, i.e., the results will be reported as 0 through 100.

Digital Input Screen

Device Profile: Digital Input

Input	Channel Label	Open Label	Closed Label	Normal State
1	Ext Dig In 1	Open 1	Closed 1	Open ▾
2	Ext Dig In 2	Open 2	Closed 2	Open ▾
3	Ext Dig In 3	Open 3	Closed 3	Open ▾
4	Ext Dig In 4	Open 4	Closed 4	Open ▾
5	Ext Dig In 5	Open 5	Closed 5	Open ▾
6	Ext Dig In 6	Open 6	Closed 6	Open ▾
7	Ext Dig In 7	Open 7	Closed 7	Open ▾
8	Ext Dig In 8	Open 8	Closed 8	Open ▾

OK Cancel Help

Click in Channel Label's 1-8 to assign a Channel label, Open and Closed label, and Normal State (Open or Shorted) for each of the digital inputs.

#### NOTES:

- The Assigned Address, Nexus® settings, and Module settings you can make depend on the module you are configuring. The modules and settings are explained fully in the *Nexus® 1262/1272 Installation and Operation Manual*.
- Port 4 is the only available port for the modules.

- Log/Limit ID is a display only field. It shows the ID CommunicatorPQA™ software generates to identify this module in the Log Viewer and Limits functions.
3. Click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

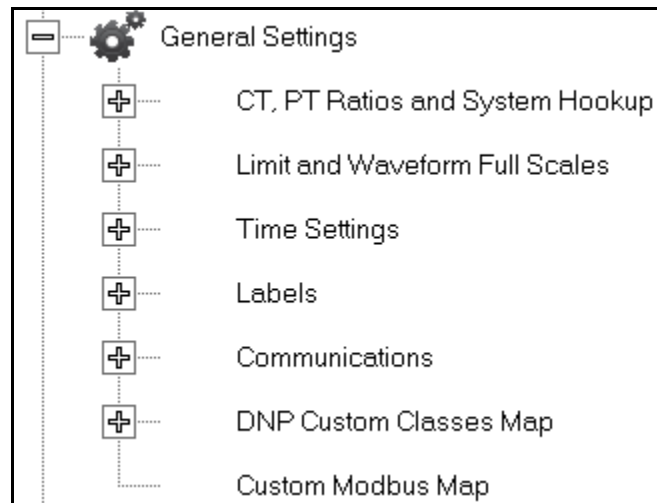


## 13: Nexus® 1252 Meter

This chapter explains how to configure a Nexus® 1252 meter's programmable settings, which are stored in the unit's Device Profile. Chapter 7 contains detailed information on the Device Profile.

### 13.1: Device Profile General Settings

1. From the Device Profile screen, double-click on the General Settings line or click on the + button next to it. All of the settings in the General Settings group are listed.



2. Click on the programmable setting you want to modify. The following sections explain the settings in the order in which they appear in the General Settings menu.

### 13.1.1: CT and PT Ratios and System Hookup

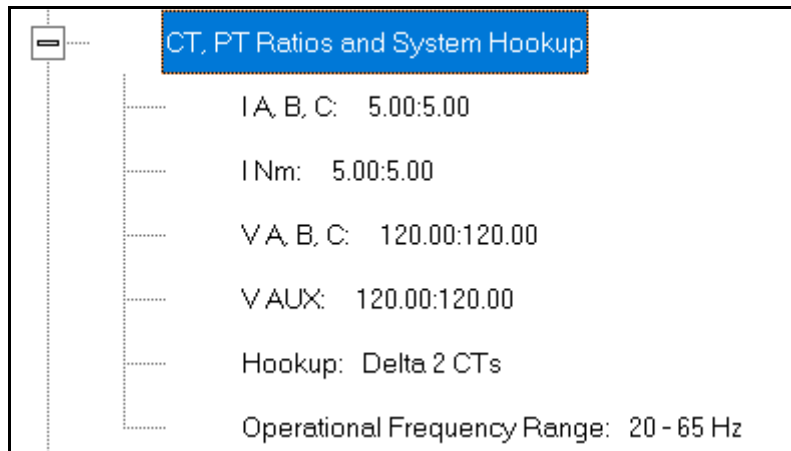
#### Functional Overview of CT and PT Ratios:

Current and Potential Transformers are used mainly for the following reasons:

- To insulate, and as a result isolate, the meter from high-voltage circuits.
- To change the primary voltage and current to standard values and sizes that the meter can measure.

The CT and PT transformers deliver fractions of the primary voltage and current to the meter. With properly set ratios and multipliers, the readings of the meter can be used to determine the energy, voltage, current, or power of the system.

1. From the General Settings menu, click the + button next to CT, PT Ratios and System Hookup. You will see the submenu shown below.



This submenu displays the current Device Profile's settings for CT, PT ratios, connection type, and Operational Frequency range.

2. Double-click on any of the settings. You will see the CT and PT Ratios screen.

Device Profile: CT and PT Ratios

CT Ratio			PT Ratio (Line to Line)		
	Primary Current	Secondary Current		Primary Voltage	Secondary Voltage
I A, B, C	5.00	5.00	V A, B, C	120.00	120.00
IN	5.00	5.00	V AUX	120.00	120.00

**Hookup**

Delta 2 CTs

**Operational Frequency Range**

20Hz to 65Hz

OK Cancel Help

3. Make changes to this screen according to your application requirements.

When you change a PT or CT Ratio, CommunicatorPQA® software updates the corresponding Full Scale value entered in the Limit and Waveform Full Scales setting. When you click OK on this screen, CommunicatorPQA® software opens the Limit & Waveform Full Scales screen so that you can verify the settings (see Section 13.1.2).

- Enter Primary and Secondary Current and Voltage.
- Using the pull-down menu, choose the Hookup mode that matches the connection you have to the Nexus®1252 meter. Choose from the following:
  - Wye
  - Delta 3 CTs
  - Delta 2 CTs

- 2.5 Element Wye
  - 4 Wire Delta
- This value must be set properly for the meter to calculate readings correctly.
- See the *Nexus® 1252 Meter Installation and Operation Manual* for connection diagrams.
- Using the pull-down menu, select Operational Frequency Range:
    - 20Hz to 65Hz
    - 350Hz to 500Hz
    - 20Hz to 500Hz
4. Click OK. If changes have been made, a message window opens asking you to verify that the Limit Full Scales are correct.
5. Click OK. The Limit and Waveform Full Scales screen opens (see Section 13.1.2).
6. To implement any changes, click the Update Device button to send the new profile to the meter.

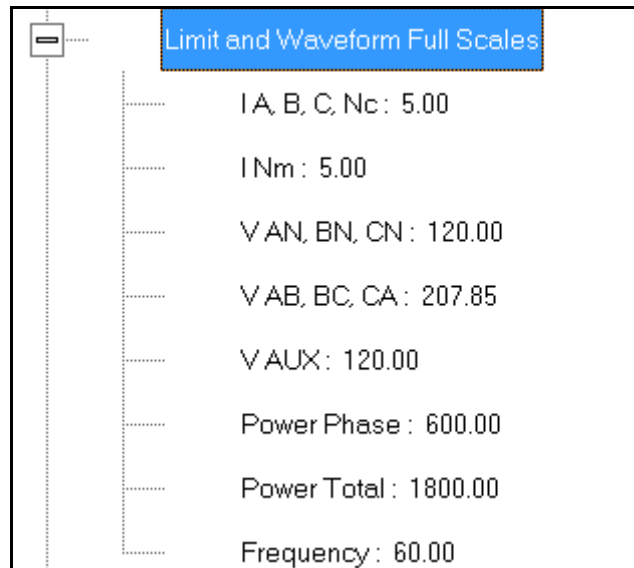
You will see a warning message that logs will be reset, and you will be given the opportunity to retrieve the logs before they are cleared. Resetting the logs prepares the meter for placement in a new installation or change of the meter Transformers.

### **13.1.2: Limit and Waveform Full Scales**

All Limit and Waveform settings (see Sections 13.1.1 and 13.3.5, respectively) are based on a percentage of the Full Scale. Full Scales are based on the CT and PT ratios (see Section 13.1.1). The % of Full Scale is defaulted based on the CT and PT ratio. If the user wants, the Full Scales can be adjusted to the actual power system condition, to optimize the triggering conditions.

Set the CT and PT ratios first; CommunicatorPQA® software automatically recalculates the Full Scales every time the CT and PT ratios change and presents them for your verification.

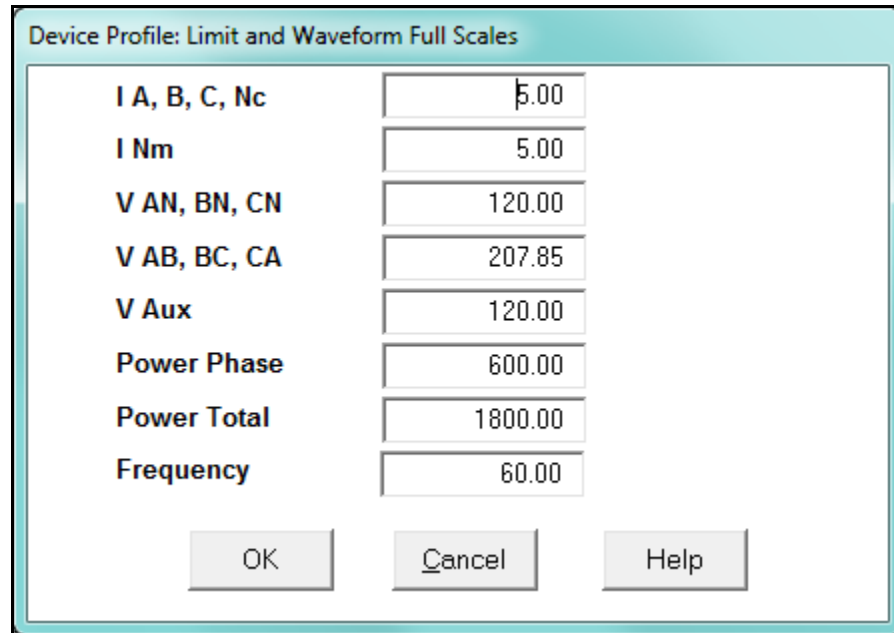
1. From the General Settings menu, click on the + button beside Limit and Waveform Full Scales or double-click on the Limit and Waveform Full Scales line. You will see the submenu shown below.



This submenu displays the current Device Profile's settings for the Limit and Waveform Full Scales. The values shown here are the default meter settings.

Frequency and Voltage values are nominal values. The Power Phase is computed using nominal Voltage and rated maximum current. In most cases the software automatically computes the proper value - you will not need to change it.

2. Double-click any of the settings. You will see the Limit and Waveform Full Scales screen.



Device Profile: Limit and Waveform Full Scales	
I A, B, C, Nc	5.00
I Nm	5.00
V AN, BN, CN	120.00
V AB, BC, CA	207.85
V Aux	120.00
Power Phase	600.00
Power Total	1800.00
Frequency	60.00

OK Cancel Help

3. Enter the Full Scale for each parameter.

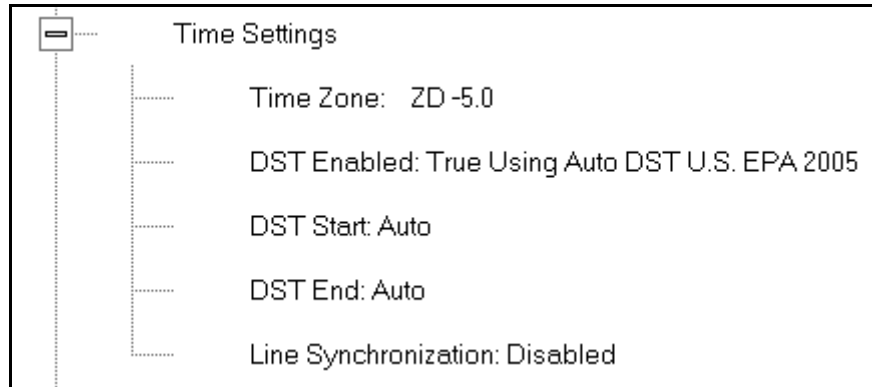
#### NOTES:

- The Limits and Waveform settings (Sections 13.1.1 and 13.3.5, respectively) are based on a percentage of the Full Scales entered here.
  - CommunicatorPQA® software automatically recalculates the Full Scale Voltages, currents and power every time the CT and PT ratios change. However, frequency is not changed, even if the operational frequency range is changed. **Frequency can only be changed on this screen.**
  - Power Phase is the amount of power per each phase; Power Total is the power of all phases combined.
4. When all changes are entered, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 13.1.3: Time Settings

To edit a Device Profile's Time settings:

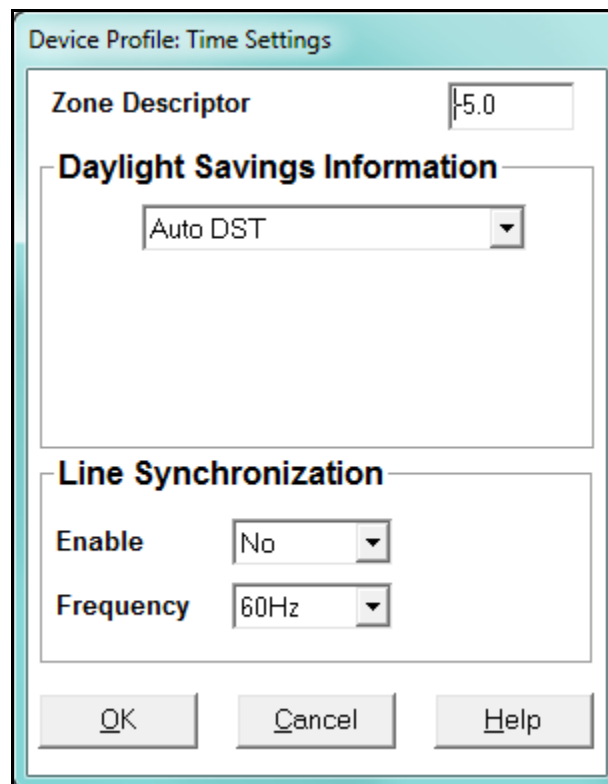
1. From the General Settings menu, double-click on the Time Settings line. You will see the submenu shown below. DST stands for Daylight Savings Time.



A screenshot of a software submenu titled "Time Settings". On the left is a vertical list of settings with a small icon at the top. To the right of this list are the following settings:

- Time Zone: ZD -5.0
- DST Enabled: True Using Auto DST U.S. EPA 2005
- DST Start: Auto
- DST End: Auto
- Line Synchronization: Disabled

2. Double-click on any of the programmable settings; you will see the Time Settings screen.



A screenshot of a dialog box titled "Device Profile: Time Settings". It contains three main sections:

- Zone Descriptor**: A text field containing "-5.0".
- Daylight Savings Information**: A dropdown menu currently showing "Auto DST".
- Line Synchronization**: Two dropdown menus. The "Enable" dropdown is set to "No", and the "Frequency" dropdown is set to "60Hz".

At the bottom of the dialog are three buttons: "OK", "Cancel", and "Help".

3. Make changes to this screen according to your application requirements.

- **Zone Descriptor:** A Zone Descriptor sets the time zone for the meter. 0 = Greenwich Mean Time. Consult the chart below to find the Zone Descriptor for your time zone.

<b>GMT Greenwich Mean Time Table (Dublin, London)</b>	
-1.00 Azores	+1.00 Brussels, Paris, Warsaw
-2.00 Mid-Atlantic	+2.00 Athens, Cairo, Helsinki
-3.00 Buenos Aires, Georgetown	+3.00 Baghdad, Kuwait, Moscow, Tehran
-4.00 Atlantic Time (Canada), Santiago	+4.00 Kabul, Baku
-5.00 Eastern Time (USA and Canada), Lima	+5.00 Karachi
-6.00 Central Time (USA and Canada), Mexico City	+6.00 Dhaka
-7.00 Mountain Time (USA and Canada)	+7.00 Bangkok, Hanoi, Jakarta
-8.00 Pacific Time (USA and Canada), Tijuana	+8.00 Beijing, Hong Kong, Singapore
-9.00 Alaska	+9.00 Osaka, Sapporo, Seoul
-10.00 Hawaii	+10.00 Brisbane, Melbourne, Guam, Hobart
-11.00 Midway Island	+11.00 Magadan, Solomon Islands
-12.00 Eniwetok	+12.00 Auckland, Fiji

- **Daylight Savings Information:**
  - **Disabled:** Disables an automatic adjustment for Daylight Savings Time.
  - **Auto DST:** Sets Daylight Savings Time automatically to the pre-2007 standard for the United States: the time changes automatically occur at 2:00 AM (your local time), on the first Sunday in April and the last Sunday in October.
  - **Auto DST U.S. EPA 2005:** Sets Daylight Savings Time automatically to the 2007 standard for the United States: the time changes automatically occur at 2:00 AM (your local time), on the second Sunday in March and the first Sunday in November.



- **User Defined:** Allows you to set the Daylight Savings Time start and end times manually. Fields open that let you set the beginning and ending dates for Daylight Savings Time.
  - **Line Synchronization:** set Enable or Disable and Frequency.
    - Line synchronization uses the frequency zero crossings to provide a time reference for the meter. The basic function of Line Frequency Clock Synchronization is to adjust the real time clock to track the time based on the power line frequency. For this purpose, Phase A voltage only is used.
    - This is the most common method to synchronize a meter's clock. EIG recommends that you always select this method unless there is a specific reason not to select it. If the meter is not synchronized to line frequency or IRIG-B, it will default to internal crystal. Different meters differ in terms of drift, but typically meters with 20 ppm crystals will drift 30 seconds per month when set to internal crystal.
    - Line Sync is disabled if an IRIG-B signal is present. If the signal is lost, the unit defaults to its internal crystal for a time synchronizing reference.
  - **How Time is Adjusted**

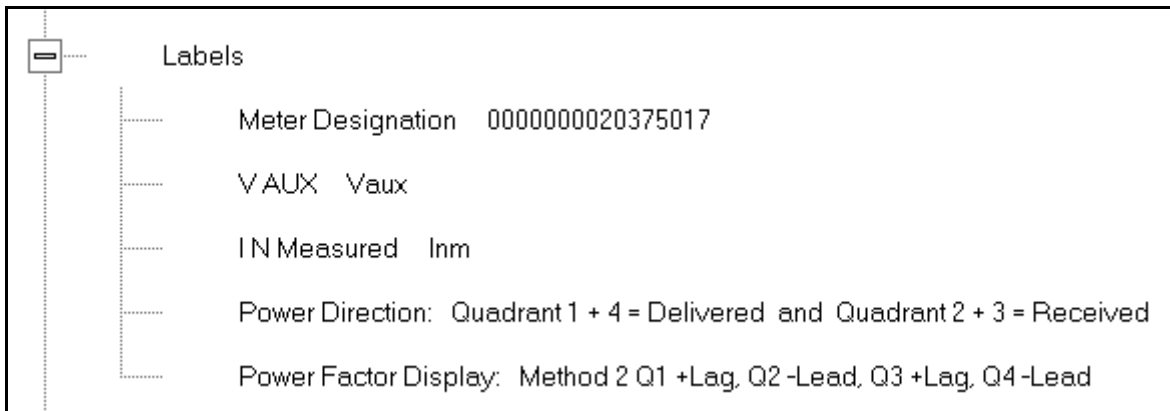
After the clock is synced to the line, the meter periodically checks the cumulative difference between the real time clock in seconds and the line cycle count. If the absolute difference between the two accumulations is more than 1 second or 60 (50) cycles, the clock is adjusted + / - 1 second accordingly.
4. To set the meter's on-board clock, use Set Device Time from the Tools Menu (see Section 20.1).
  5. When all changes are entered, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 13.1.4: Labels

Labels are user-defined names for the Nexus® 1252 meter and the I N Measured terminal. You also use the Labels screen to select the power direction, and the power factor display.

It is important to label the meter (under "Meter Designation") with a unique name because that label becomes the file name of any logs retrieved from that meter. Duplicate meter designations interfere with retrieved log databases. See Chapters 16 and 19 for more details on logs.

1. From the General Settings menu, double-click on the Labels line. You will see the submenu shown below.



The screenshot shows a submenu titled "Labels" with a list of settings. Each setting has a dotted line to its left, indicating it is a selectable option. The settings are:

- Meter Designation 0000000020375017
- V AUX Vaux
- I N Measured Inm
- Power Direction: Quadrant 1 + 4 = Delivered and Quadrant 2 + 3 = Received
- Power Factor Display: Method 2 Q1 +Lag, Q2 -Lead, Q3 +Lag, Q4 -Lead

2. Double-click on any of the parameters; you will see the Labels screen.

Device Profile: Labels

**Meter Designation** 0000000020375017

**V Aux** Vaux

**I N Measured** Inm

**Power Direction** Quadrant 1 + 4 = Delivered and Quadrant 2 + 3 = Received

**Power Factor Display** Method 2 Q1 +Lag, Q2 -Lead, Q3 +Lag, Q4 -Lead

**Memo Field** Test

**Phase Angle Representation**

☒ Positive angle for events after the reference and negative angle for events prior to the reference (original behavior)

☐ Negative angle for events after the reference and positive angle for events prior to the reference

OK Cancel Help

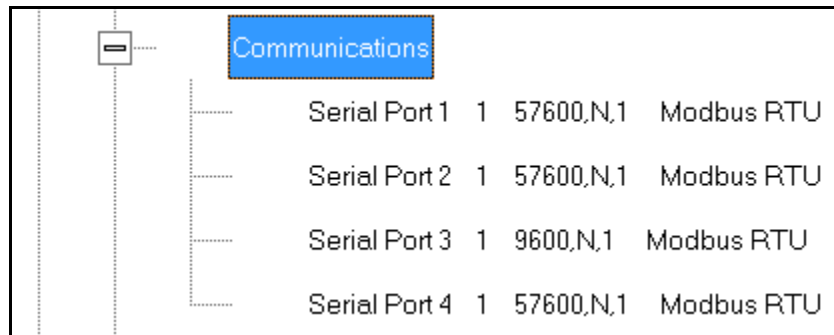
3. Enter labels in the appropriate fields.

- Meter Designation must be set for partial log retrieval. You can use any character allowed by the Windows® operating system.
  - In English versions the following characters don't work:  
 $\backslash / : * ? " < > |$
  - For meters used internationally by multilingual users, we recommend you use only alphanumeric characters allowed by your operating system.
- For V Aux (auxiliary voltage input) and IN Measured (measured neutral current) enter the label you want to use for these readings.
- Your selection in Power Direction determines which quadrants of Watt-hours are considered Received and Delivered.
- Your selection in Power Factor Display determines the display of Quadrants in the Power Factor screen.

- The Memo field is used to enter notes about the meter, such as the location, or other relevant details.
  - The Phase Angle representation determines how the voltage phase angles are represented. 90% of users will use the default, which is the first radio button: "Positive angle for events after the reference and negative angle for events prior to the reference"; however, you can choose the opposite display by selecting the second radio button, if you wish.
4. When all changes are entered, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 13.1.5: Communications

1. From the General Settings menu, double-click on the Communications line. You will see the submenu shown below.



2. Double-click on any of the settings (e.g., "Serial Port 1"): you will see the Communications Settings screen.

Device Profile: Communications Settings

Port 1	Port 2	Port 3	Port 4(Ext Devices)
Address: 1	Address: 95	Address: 42	Address: 1
Baud Rate: 9600	Baud Rate: 115200	Baud Rate: 115200	Baud Rate: 57600
Data Bits: 8	Data Bits: 8	Data Bits: 8	Data Bits: 8
Parity: None	Parity: None	Parity: None	Parity: None
Stop Bits: 1	Stop Bits: 1	Stop Bits: 1	Stop Bits: 1
Tx Delay: 0ms	Tx Delay: 0ms	Tx Delay: 0ms	Tx Delay: 0ms
Protocol: Modbus RTU	Protocol: Modbus RTU <small>If the Modem or Network option is installed, Port 2 settings here will not be used. See below</small>	Protocol: Modbus RTU Mode: Slave	Protocol: Modbus RTU Mode: Master (I/O Modules)

**Network Settings (MAC Address 00-01-58-00-18-7C)**

IP Address: 172 20 169 96  
 Subnet Mask: 255 255 248 0  
 Default Gateway: 172 20 161 25

**Advanced Settings**

Ethernet Gateway (INP10X)  
 Baud Rate: 115200  
 Delay: 10 x 15 ms

**Internal Modem Settings (If Internal Modem Option was purchased)**

Answer Phone on: 3 Rings  
 Modem Gateway Baud Rate: 38400  
 Dial Out Profile

OK Cancel Help

This screen displays the current Device Profile settings for the Nexus®1252 meter's 4 Communications ports: address, baud rate, data bits, parity, stop bits, Tx (Transmit) delay, (communication) protocol, and mode. You may use one of the Nexus® External Displays to learn the current baud rate, address and communication protocol of each meter port. *See the Nexus® 1252 Meter Installation and Operation Manual* for details.

**NOTES:**

- When a Nexus® 1252 meter has the Internal Network option (INP100/INP102/INP200/202) Port 2 is unavailable and any settings in the Port 2 fields are ignored.
  - Port 2 settings are ignored when the Internal Modem option (INP2) is installed and the address is set to 1.
  - Port 3 is factory set to the Nexus® External Display's baud rate of 9600. The External Display only communicates at Address 1. You must use Port 3 or Port 4 to connect any external devices, such as a Nexus® External I/O module.
  - Port 3 and Port 4 are Master (I/O modules)/Slave selectable. If you use Port 3 as an I/O Module port, you can use one of the other ports for the display (change the baud rate to 9600 and set address to 1). For all External I/O Devices, set the Communication Protocol to Modbus RTU.
3. Make changes to this screen according to your application requirements by clicking on the box or pull-down menu of any of the following settings:
- Address: assign an address to each port to communicate with other devices. Multiple Nexus® meters on an RS485 bus must each have a unique address set for the port that is connected to the bus.
  - Baud Rate: from the pull-down menu, select 4800, 9600, 19200, 38400, 57600, or 115200. The baud rate entered in this field must match the baud rate of the device connected to the Nexus® 1252 meter at this port. Use 9600 for modem connections.
  - Data Bits: use the pull-down menu to select from: 5, 6, 7 or 8. For Modbus RTU and ASCII, leave the data bits at 8.

- Parity: use the pull-down menu to select from: None, Even, Odd, Mark or Space. For Modbus RTU and ASCII, leave the parity at None.
- Stop Bits: use the pull-down menu to select from: 1, 1.5 or 2. For Modbus RTU and ASCII, leave the stop bits at 1.
- TxDelay (Transmit Delay): use the pull-down menu to select from (0-12750) ms. Leave the Tx delay at 0ms unless you are using equipment that requires a delay in the response time, such as a radio modem.
- Protocol: use the pull-down menu to select from Modbus RTU, Modbus ASCII, and DNP3. See Chapter 3 for connection details.
- Mode (Port 4 only): If you are using Output modules, set this port to Master (I/O modules) mode. Set the port to operate at 57600 baud.
- Internal Network Option: If your meter has the Internal Network Option (INP100/INP200), see your Network Administrator for the correct settings to enter into the Network Settings fields. Settings will vary from network to network.
- If your meter has the INP100/INP200/ INP102/INP202 Option (10/100BaseT and Combo Card), you will see the Advanced Settings button: click it to open a screen that lets you set Network card features; see Chapter 21 for details.
- Internal Modem Settings: If your meter has this option:
  - a. Set the number of Rings to Answer from the pull-down menu.
  - b. Set the Baud Rate to 57600, or to match your system's baud rate.
  - c. Click Dial-Out Profile to access the Modem Programming screen: see Chapter 24 for instructions on using the Modem Dial In/Dial Out Function.

4. When all changes are entered, click OK to return to the main Device Profile screen. For these changes to take effect, you must click the Update Device button. This sends the new profile to the meter.

**IMPORTANT!**

- In order to prevent communications problems, be careful when making changes in the Communications Settings screen. For example, if you change the baud rate of the port connected to a computer, be sure to make the same change to the computer port's baud rate. If you change a port's address, be sure to update the address settings of any device that communicates with the port.
- The baud rate of the port used by the Nexus® External Display should always be set to 9600 and the address set to 1.



### 13.1.6: DNP Custom Class Map

The DNP Custom Class Map lets you set up DNP communication for the meter. From the General Settings menu, double-click on the DNP Custom Classes Map line and on the DNP Level 2 line. You will see the screen shown below.

**DNP Custom Mapping**

Object 10 - Binary Output      Object 1 - Binary Input      Object 20 - Binary Counter

**Object 30 - Analog Input**      Global Values      DNP Settings

DNP Points	Map		Description	Deadband (%)	Class Assignments
	Line	Point			Object 32
0	34	0	One Second Updated: Voltage A-N	100.00	No Class
1	34	1	One Second Updated: Voltage B-N	100.00	No Class
2	34	2	One Second Updated: Voltage C-N	100.00	No Class
3	36	0	One Second Updated: Current A	100.00	No Class
4	36	1	One Second Updated: Current B	100.00	No Class
5	36	2	One Second Updated: Current C	100.00	No Class
6	45	0	One Second Updated: Watt Total	100.00	No Class
7	43	0	One Second Updated: Var Total	100.00	No Class
8					

Enter Line and Point assignments from the DNP Table or double click the Description Field for a list of Selections.

Enter a dead band % to be used in causing an associated Object 32 value. (See Manual for Description of base values used by the dead band %)

For Object 32 assign a class.

☐ Use Custom 16-Bit Scaling

OK      Cancel      Help      Clear      Clear All

For details on programming the DNP Level 2 settings, see Chapter 22.

### 13.1.7: Custom Modbus Map

The custom Modbus map for the Nexus® 1252 meter can position up to 256 unique items (or the equivalent of 2048 registers, whichever you reach first) to readily provide the functionality you want from your meter. In addition, you can customize selected values for format type, Scaling, byte order, data size, etc. This allows a user to optimize Modbus registers by putting them in a particular order and/or format to make the SCADA poll more quickly and efficiently.

1. From the General Settings menu, double-click on the Custom Modbus Map line. You will see the screen shown below.

Item	Modbus Map Line	Point	Number of Registers	Start Register	Group	Channel	Format	Data Size	Unit	Primary / Secondary	Absolute Value	Byte Order	Display/Modulo/Offset
1	18	0	2	412289	Tenth Second Phase to Neutral Volts	Volts AN	Unsigned Integer	4 Byte	1 Secondary	No		MSR, MSB	N/A
2	18	1	2	412291	Tenth Second Phase to Neutral Volts	Volts BN	Unsigned Integer	4 Byte	1 Secondary	No		MSR, MSB	N/A
3	18	2	2	412293	Tenth Second Phase to Neutral Volts	Volts CN	Unsigned Integer	4 Byte	1 Secondary	No		MSR, MSB	N/A
4	54	0	2	412295	Thermal Avg Measured N Current	I Nm	Unsigned Integer	4 Byte	1 Secondary	No		MSR, MSB	N/A
5	55	0	2	412297	Thermal Avg Calculated N Current	I Nc	Unsigned Integer	4 Byte	1 Secondary	No		MSR, MSB	N/A
6	537	0	2	412299	Scaled +/- Wh, Q 1 - 4 VAh and VARh	Quad(1+4) Watt Hour	Unsigned Integer	4 Byte	1 Secondary	No		MSR, MSB	N/A
7	411	0	2	412301	Analog Input 1 - 8, Module 1	Input # 1	Unsigned Integer	4 Byte	1 Secondary	No		MSR, MSB	N/A
8	584	0	2	412303	Int Scaled +/- Wh, Q 1 - 4 VAh and VARh	Quad(1+4) Watt Hour	Unsigned Integer	4 Byte	1 Secondary	No		MSR, MSB	N/A
9	134	1	2	412305	Harmonics Volts A Mag # 0-7	#1	Unsigned Integer	4 Byte	1 Secondary	No		MSR, MSB	N/A
10	134	2	2	412307	Harmonics Volts A Mag # 0-7	#2	Unsigned Integer	4 Byte	1 Secondary	No		MSR, MSB	N/A
11	233	0	1	412309	Internal Inputs States	Inputs 1-8	Normal		2			MSB, MSb	
12	212	0	2	412310	Phase Angle Volts(AB,BC,CA)	Volts AB	Unsigned Integer	4 Byte	1	No		MSR, MSB	0 to +360
13	212	1	2	412312	Phase Angle Volts(AB,BC,CA)	Volts BC	Unsigned Integer	4 Byte	1	No		MSR, MSB	0 to +360
14	212	2	2	412314	Phase Angle Volts(AB,BC,CA)	Volts CA	Unsigned Integer	4 Byte	1	No		MSR, MSB	0 to +360
15	455	0	2	412316	Instantaneous Flicker V AN,BN,CN	Instantaneous Flicker V AN	Unsigned Integer	4 Byte	1 Secondary	No		MSR, MSB	N/A
16	455	1	2	412318	Instantaneous Flicker V AN,BN,CN	Instantaneous Flicker V BN	Unsigned Integer	4 Byte	1 Secondary	No		MSR, MSB	N/A
17	455	2	2	412320	Instantaneous Flicker V AN,BN,CN	Instantaneous Flicker V CN	Unsigned Integer	4 Byte	1 Secondary	No		MSR, MSB	N/A
18	464	1	2	412322	Long Term Flicker V AN,BN,CN	Long Term Flicker V BN	Unsigned Integer	4 Byte	1 Secondary	No		MSR, MSB	N/A

OK Clear all Clear Cancel Help Registers 35 of 2048

Data entry is straightforward. Each entry field is described below. Note that not all selections appear on the screen at the same time. Use the scroll buttons to view additional data/entry fields on the screen. Certain entries (such as Format, Data Size, etc.) have different allowable selections depending on the data point used. The pull-down menu adjusts to provide the appropriate selections for each data point.

- Data Point Selection: there are two different ways to select a data point:
  - a. Refer to the Nexus® 1252 meter's Modbus map and find the associated line and point for the value you want. When you enter those values into the screen table, the software displays the associated group and channel.
  - The Nexus® 1252 meter's Modbus map can be downloaded from the EIG website: <http://www.electroind.com/pdf/modbus2.pdf>

b. Double-click the Group field. From the pull-down menus, select a group and its associated channel value. The software displays the map and line values.

- Number of Registers: this field is display only. The software computes the number in this field based on the data size selected in the Data Size column.
- Start Register: this field is display only. The software assigns and adjusts Start register numbers to take into account previous entries and data sizes. The Start register is the number of the first register used in polling. The Start registers are shown as 4x to describe them as holding registers, for SCADA applications.
- Format: from the pull-down menu, select a format type for a value, such as Signed Integer, Unsigned Integer, and 4 Byte IEEE Float.
- Data Size: from the pull-down menu, select the number of bytes you want to represent the data point: 2 or 4.
- Unit: if the polled value is viewed as an integer, the Unit field tells the software where to place the decimal point.

#### **Examples**

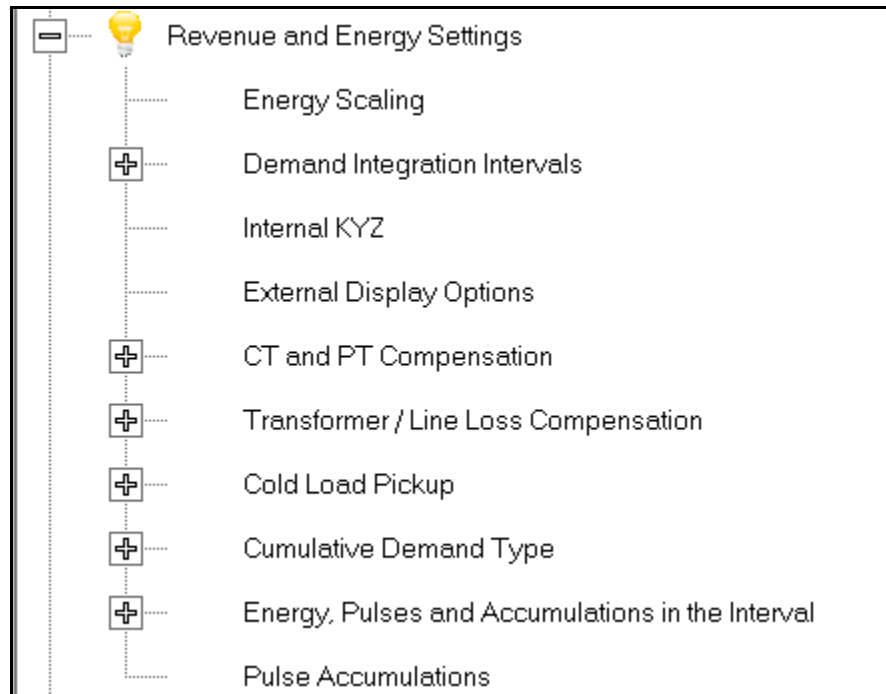
- If you select .01, a polling value 1234 is interpreted as 12.34.
- If you select 100, a polling value 1234 is interpreted as 123400.
- Primary/Secondary: the meter normally computes values in secondary units. Where applicable, you may select primary or secondary. If Primary is selected, the value is multiplied by the appropriate CT and/or PT values.
- Absolute Value: where appropriate, you may have the option of having the data point computed as a signed or absolute value. Select either:
  - No: to have the data point computed as a signed value.
  - Yes: to have the data point computed as an absolute value.

- **Byte Order:** for most of the data points, you can select the polling order of the registers/bytes to match what the SCADA system needs. The choices are: MSR, MSB (most significant register, most significant byte); MSR, LSB (most significant register, least significant byte); LSR, MSB (least significant register, most significant byte); and LSR, LSB (least significant register, least significant byte). EIG meters store data as MSR, MSB, whereas most SCADA systems use LSR, LSB. You can either select an alternate order here, for example, LSR, LSB, or you can leave the data as is and then have your SCADA system change the order after the data is polled.
  - **Display/Modulo/Offset:** depending on the data point, select one or more additional options with appropriate sub-selections.
    - **Display:** for certain data points, interpretation and display options are offered.  
**Example:** For Volts AN phase angle values, you can represent and display as 0 to 360 degrees or -180 to +180 degrees, etc. Selections appear in a pull-down menu for the associated point. You may want to select -180 to +180 degrees if you want to know if a phase angle is positive or negative in relation to the reference.
    - **Modulo:** Certain values are cumulative and can roll over and start recounting from zero. For those values, where required, you can enter a point at which the rollover will occur.
    - **Offset:** Where allowed, you can enter a value (offset) that will be added to the data point when it is computed.
2. When all changes are entered, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

## 13.2: Revenue and Energy Settings

Revenue and Energy Settings are the second group of settings in the Device Profile.

1. From the Device Profile screen, click on the + button next to Revenue and Energy Settings or double-click on the Revenue and Energy Settings line. All of the settings in the Revenue and Energy Settings group are listed.



2. Click on the programmable setting you want to modify. The following sections explain the settings in the order in which they appear in the Revenue and Energy Settings menu.

### 13.2.1: Energy Scaling

1. From the Revenue and Energy Settings menu, click on the + button next to Energy Scaling or double-click on the Energy Scaling line. You will see the Energy Scale Settings screen.

To configure scaling for a reading, enter:  
 1. Number of Digits, 2. Number of Decimal Places,  
 3. Unit of Measurement; 4. Example of the resultant scaling is shown here

The screenshot shows the 'Energy Scale Settings' window. It has several tabs: 'I and V Squared T Readings', 'Q Hours', 'Energy', 'Uncompensated Energy', and 'Pulse Accumulations and Aggregations'. The 'Energy' tab is selected. Inside the 'Energy' tab, there are sub-tabs: 'Watt Hour', 'VA Hour', and 'VAR Hour'. The 'Watt Hour' sub-tab is selected. Below the sub-tabs is a table with columns: 'Item', 'Digits', 'Decimal Places', 'Units', and 'Example'. Red arrows point to the 'Digits', 'Decimal Places', 'Units', and 'Example' columns. The 'Digits' column has a value of 8. The 'Decimal Places' column has a value of 1. The 'Units' column has a value of kWh. The 'Example' column shows the value 9999999.9. Below the table, there is a note: 'Net Wh uses Quadrant 1+4 Wh settings.' At the bottom of the window are buttons for 'Global Settings', 'OK', and 'Cancel'.

Item	Digits	Decimal Places	Units	Example
Quadrant 1 Wh	8	1	kWh	9999999.9
Quadrant 2 Wh	8	1	kWh	9999999.9
Quadrant 3 Wh	8	1	kWh	9999999.9
Quadrant 4 Wh	8	1	kWh	9999999.9
Quadrant 1+4 Wh	8	1	kWh	9999999.9
Quadrant 2+3 Wh	8	1	kWh	9999999.9

Net Wh uses Quadrant 1+4 Wh settings.

- This screen has multiple tabs that allow you to access all of the Energy Scaling options. Using the Energy Scale Settings screens you can select the number of digits, decimal point placement and Energy unit for displayed readings.
- The Example field shows you the scaling choices you made applied to an example reading.
- You click on the tabs to navigate between screens, except for Global settings - you click on the Global Settings button to access that screen.

## Global Settings

Item	Digits	Decimal Places	Units	Example
Quadrant 1+4 Wh	8	1		9999999.9
Quadrant 2+3 Wh	8	1		9999999.9
Quadrant 1+2 VARh	<input type="text" value="8"/>	<input type="text" value="1"/>		
Quadrant 3+4 VARh				
Quadrant 1+2+3+4 VAh				
Internal Input Accumulators				
Internal Input Aggregators				
I Squared T				
V Squared T				

Apply Cancel

**NOTE:** Because there are many energy settings, Global Settings conveniently allows you to set these similar energy reading settings all at once.

2. Click the Global Settings button to see the screen shown above. This screen lets you set the scale for all of the Energy Readings.
  - a. Click in the Digits field and select the number of digits for the value from the pull-down menu. You can choose between 2 and 9 digits.
  - b. Click in the Decimal Places field and select the number of decimal places for the value from the pull-down menu. You can choose between 0 and 7 decimal places, depending on the number of digits you selected. For example, if you chose 3 digits, you can only choose up to 2 decimal places.
  - c. Click in the Units field to select the unit of measurement for the value. You can select k or M or leave the field blank.

The example field changes as you make selections, to show you how the value would appear with the settings you made.

3. When all changes are entered, click Apply to return to the main Energy Scale Settings screen. You can now use the tabs to modify the scale for specific readings. For example, you might have set the scale for the Internal Input Accumulators as 5 digits, 2 decimal places, and M unit, but you may want one of the accumulators to have a different scale. You would click the Pulse Accumulations and Aggregations

tab and change the scale for that accumulator. The following sections show the tab screens where you can make individual scaling changes. You set the Digits, Decimals, and Units fields in the same way as in the Global Settings screen.

## Energy Tab

This is the initial screen view. Click on the Watt Hour, VA Hour, and VAR Hour tabs to configure scaling for those readings.

Click to set Watt Hour readings scaling (this is the initial tab view)

Click to set VA Hour readings scaling

Click to set VAR Hour readings scaling

**Energy Scale Settings**

I and V Squared T Readings    Energy Hours    Pulse Accumulations and Aggregations

**Energy**    Uncompensated Energy    Pulse Accumulations and Aggregations

**Watt Hour**    VA Hour    VAR Hour

Item	Digits	Decimal Places	Units	Example
Quadrant 1 Wh	8	1	kWh	9999999.9
Quadrant 2 Wh	8	1	kWh	9999999.9
Quadrant 3 Wh	8	1	kWh	9999999.9
Quadrant 4 Wh	8	1	kWh	9999999.9
Quadrant 1+4 Wh	8	1	kWh	9999999.9
Quadrant 2+3 Wh	8	1	kWh	9999999.9

Net Wh uses Quadrant 1+4 Wh settings.

Global Settings

OK    Cancel



## Uncompensated Energy Tab

Click on the Uncompensated Energy tab to configure specific VA, Watt and VAR readings not adjusted by Transformer Loss Compensation.

The screenshot shows the 'Energy Scale Settings' dialog box with the 'Uncompensated Energy' tab selected. The dialog has three tabs: 'I and V Squared T Readings', 'Q Hours', and 'Uncompensated Energy'. Below the tabs is a table with five columns: 'Item', 'Digits', 'Decimal Places', 'Units', and 'Example'. The table lists five energy-related items. The 'Units' column for the last item, 'Quadrant 3+4 VARh', has a dropdown menu set to 'k'. At the bottom of the dialog are buttons for 'Global Settings', 'OK', and 'Cancel'.

Item	Digits	Decimal Places	Units	Example
Quadrant 1+4 Wh	8		1 k	9999999.9
Quadrant 2+3 Wh	8		1 k	9999999.9
Quadrant 1+2+3+4 VAh	8		1 k	9999999.9
Quadrant 1+2 VARh	8		1 k	9999999.9
Quadrant 3+4 VARh	8	1	k	9999999.9

## Pulse Accumulations and Aggregation Tab

Click on the Pulse and Aggregations tab and then click on the Accumulators and Aggregators tabs to configure scaling for those readings.

Click to set scaling for Accumulator readings (this is the initial tab view)

Click to set scaling for Aggregator readings

**Energy Scale Settings**

I and V Squared T Readings    Q Hours

Energy    Uncompensated Energy    **Pulse Accumulations and Aggregations**

**Accumulators**    Aggregators

Item	Digits	Decimal Places	Units	Example
Input 1	8		1 k	9999999.9
Input 2	8		1 k	9999999.9
Input 3	8		1 k	9999999.9
Input 4	8		1 k	9999999.9
Input 5	8		1 k	9999999.9
Input 6	8		1 k	9999999.9
Input 7	8		1 k	9999999.9
Input 8	8		1 k	9999999.9

Global Settings

OK    Cancel

## I and V Squared T Readings Tab

Click on the I and V Squared Readings tab to configure scaling for specific  $I^2T$  readings (data will not accumulate until current reaches the programmed level) and  $V^2T$  readings (data stops accumulating when Voltage falls below the programmed level).

**Energy Scale Settings**

Energy    Uncompensated Energy    Pulse Accumulations and Aggregations

**I and V Squared T Readings**    Q Hours

Item	Digits	Decimal Places	Units	Example
I Squared T Phase A	8		1 k	9999999.9
I Squared T Phase B	8		1 k	9999999.9
I Squared T Phase C	8		1 k	9999999.9
V Squared T Phase A	8		1 k	9999999.9
V Squared T Phase B	8		1 k	9999999.9
V Squared T Phase C	8		1 k	9999999.9

I Squared T Average uses I Squared T Phase C's settings.  
V Squared T Average uses V Squared T Phase A's settings.

Global Settings

OK    Cancel

## Q Hours Tab

Click on the Q Hours tab to configure scaling for +QH and -QH readings.

The image shows a screenshot of the 'Energy Scale Settings' dialog box. The 'Q Hours' tab is selected. The dialog contains a table with columns: Item, Digits, Decimal Places, Units, and Example. The table has two rows: '+Qh' and '-Qh'. Both rows have '8' in the Digits column, '1' in the Decimal Places column, and 'k' in the Units column. The Example for '+Qh' is '9999999.9' and for '-Qh' is '9999999.9'. Below the table are buttons for 'Global Settings', 'OK', and 'Cancel'.

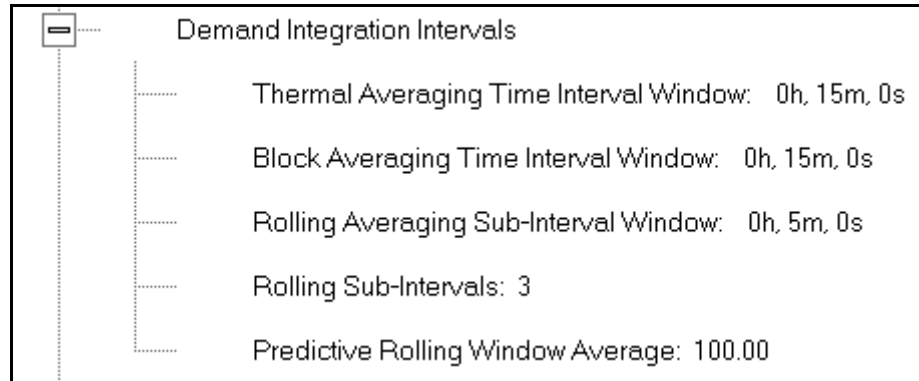
Item	Digits	Decimal Places	Units	Example
+Qh	8	1	k	9999999.9
-Qh	8	1	k	9999999.9

4. When you are done, click OK to return to the main Device Profile screen. For these changes to take effect, you must click the Update Device button to send the new profile to the meter.

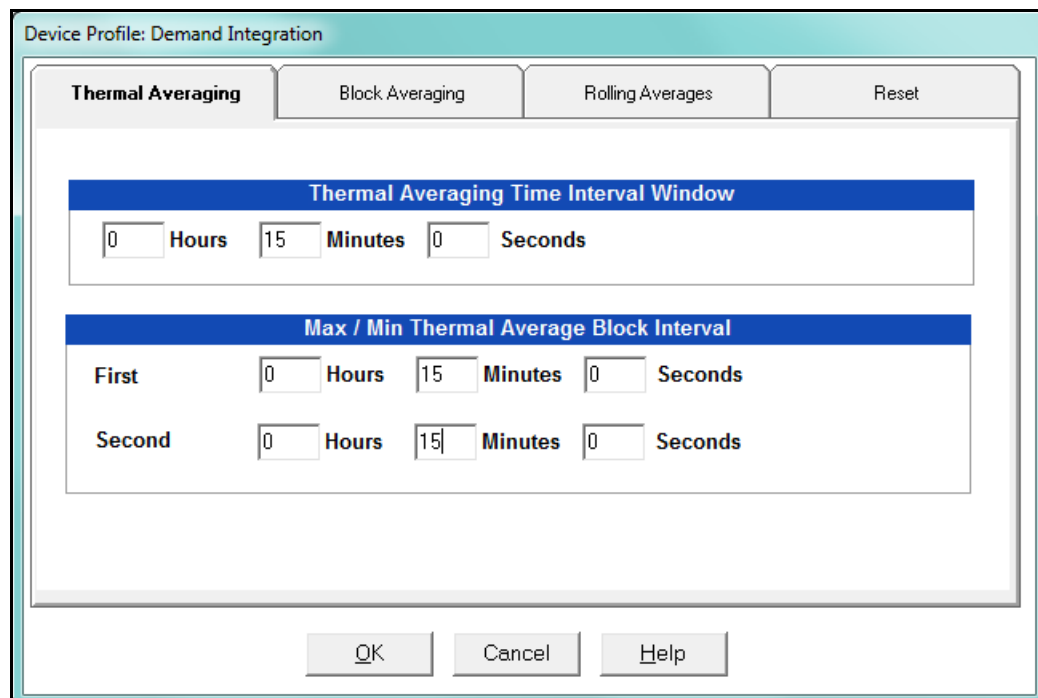
### 13.2.2: Demand Integration Intervals

See the *Nexus® 1252 Meter Installation and Operation Manual* for details on Demand intervals.

1. From the Revenue and Energy Settings menu, click on the + button next to Demand Integration Intervals or double-click on the Demand Integration Intervals line. You will see the submenu shown below.



2. Double-click on any of the settings. You will see the screen shown below.



3. Click on the tabs at the top of the screen to navigate from one setting to another. Make changes to the settings according to your application requirements. Following is a brief description of each setting and its function:

- Thermal Averaging (tab shown on previous page): use to set hours, minutes and seconds for a precise thermal window of demand data.

Thermal Averaging (tab shown on previous page): use to set hours, minutes and seconds for a precise thermal window of demand data.

- Traditional analog Watt-hour meters use heat-sensitive elements to measure temperature rises produced by an increase in current flowing through the meter. A pointer moves in proportion to the temperature change, providing a record of demand. The pointer remains at peak level until a subsequent increase in demand moves it again, or until it is manually reset.

The Nexus® 1500 meter mimics traditional meters to provide Thermal Demand readings. Electronic thermal demand emulation is the logarithmic average of the power used, with a more recent load being weighted more heavily than a less recent load, (approximated exponentially). Each second, as a new power level is computed, a recurrence relation formula is applied. This formula recomputes the thermal demand by averaging a small portion of the new power value with a large portion of the previous thermal demand value. The occurrence of the proportioning of new to previous is programmable, set by the averaging interval. The averaging interval represents a 90 change in thermal demand to a step change in power. So, for example, with a 15 minute set interval, the meter will record 90 of a change in load in 15 minutes, 99 in 30 minutes, and 99.9 in 45 minutes.

Because thermal demand emulation is the logarithmic average, the demand is not set to zero on a demand reset. On a demand reset, present demand becomes the new maximum demand.

- The Max/Min Thermal Average Block Interval fields are used if you want to track the maximum and minimum Demand in more than one interval, e.g., the Max and Min Demand in a 10 minute (First Interval) and a 15 minute interval (Second Interval).
- Block Averaging Time: use to set the length of the block interval used for Demand calculations and other interval-based functions; also used to set End of Interval pulse. Block averaging is also known as fixed window averaging. A

window is the user set time range, e.g., 15 minutes. Computation is performed on that 15 minute interval, and after that, a new set of computations will be started. For example, Window 1 will be from 0 to 15 minutes, Window 2 will be from 16 to 30 minutes, and so on.

Device Profile: Demand Integration

Thermal Averaging **Block Averaging** Rolling Averages Reset

**Block Averaging Time Interval Window**

0 Hours 15 Minutes 0 Seconds

**Block Window Sync**

High Speed Input Sync Disabled

OK Cancel Help

- a. Use the Hours, Minutes, and Seconds fields to set the length of the Block Interval.

**NOTE:** The Block Window Sync field indicates whether the meter is being synchronized with pulses from a High Speed input. This option is set in the Input Type field of the High Speed Inputs screen (see [13.3.7: High Speed Inputs on page 13-67](#)).

- Rolling Averages: also known as a sliding window, functions like multiple, overlapping Block averages. You define the subintervals at which an average of Demand is calculated. A window duration is the user set time, such as 15 min-

utes, but it moves, so that, for example, Window 1 is 0 to 15, Window 2 is 1 to 16, Window 3 is 2 to 17, and so on.

Device Profile: Demand Integration

Thermal Averaging   Block Averaging   **Rolling Averages**   Reset

**Rolling Averaging Sub-Interval Window**

0 Hours   5 Minutes   0 Seconds

**Rolling Sub-Intervals**

3   Rolling Average Interval Window: 15.00 Minutes

**Predictive Rolling Window Average**

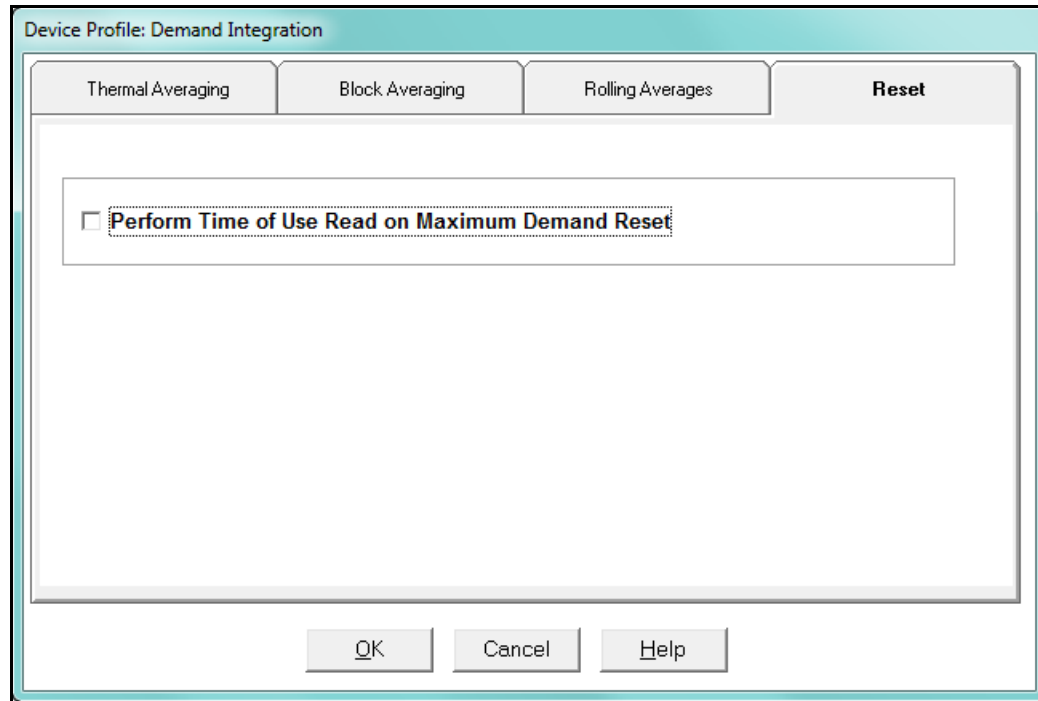
100 %

OK   Cancel   Help

- a. Set the Hours, Minutes, and Seconds fields under Rolling Averaging Sub-Interval Window.
- b. Rolling Sub-Intervals: set the number of rolling windows you want to "string together."
- c. Predictive Rolling Window Average: the meter gives you the programmed (field) prediction of your demands. If you are using Demand as a Limit, such that you will perform certain actions when you hit a certain Demand level, e.g., turning off motors, you may want to give yourself a "buffer." This field accomplishes that by letting you choose to over-predict the Rolling Window Demand - e.g., if you enter 110, the meter will predict Demand at a 10 higher rate than the actual Demand, so that you will trigger a Limit alarm earlier than if you were using 100 Predictive Demand.



- **Reset:** Allows you to specify a Time of Use read whenever Maximum Demand is reset.



- Check the box to perform the TOU read. By selecting this, the meter will place all of the TOU values in the previous month's registers. Otherwise, the meter will default to self read based on a date set in the meter.
  - Leave the box unchecked if you don't want to perform a TOU read.
4. When all changes are entered, click OK to return to the main Device Profile screen. For these changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 13.2.3: Internal KYZ Outputs

The Nexus® 1252 meter has no internal KYZ outputs. The Internal KYZ Outputs setting allows you to assign a channel and determine other settings for the Heartbeat LED which the meter does have.

1. From the Revenue and Energy Settings menu, click on the + button next to Internal KYZ Settings or double-click on the Internal KYZ Settings line. You will see the screen shown below.

KYZ Output	Assigned Channel	Watt Hour Per Pulse	Pulse Width(ms)	Mode	Form
HB LED	Quad (1 + 4) Watthour	1.0000	200	Enable	Pulse (Form A)

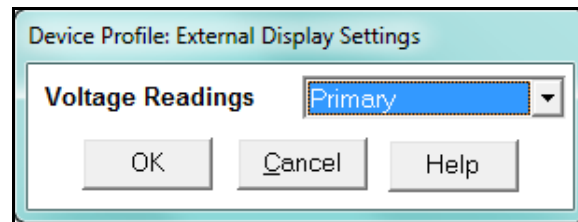
OK Cancel Help

2. Using the pull-down menu next to HB LED (Heartbeat LED):
    - a. Assign a channel to the LED.
    - b. Enter Watt Hour per Pulse, Pulse Width, Mode and Form for the HB LED.
- NOTE ON FORM:** Form A = Pulse; Form C = Transition.
3. When all changes are entered, click OK to return to the main Device Profile screen. For these changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 13.2.4: External Display Options

Many utility companies want to read secondary Volts and primary power readings. This setting configures a P40N/P40N+ external display to read either primary or secondary Volts. All other readings will be in the primary, regardless of this setting.

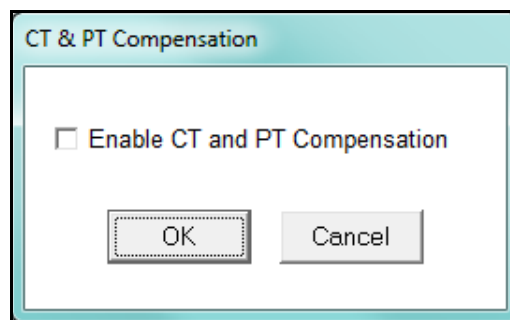
1. From the Revenue and Energy Settings menu, double-click on the External Display Options line. You will see the screen below.



2. Use the pull-down menu to select either primary or secondary units for Voltage.
3. Click OK to return to the main Device Profile screen. For these changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 13.2.5: CT and PT Compensation

1. From the Revenue and Energy Settings menu, click on the + button next to CT and PT Compensation or double-click on the CT and PT Compensation line.



2. Check the Enable box to enable CT and PT Compensation; leave the box unchecked to keep it disabled.
3. Click OK to close the screen and return to the main Device Profile screen. For these changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 13.2.6: Transformer / Line Loss Compensation

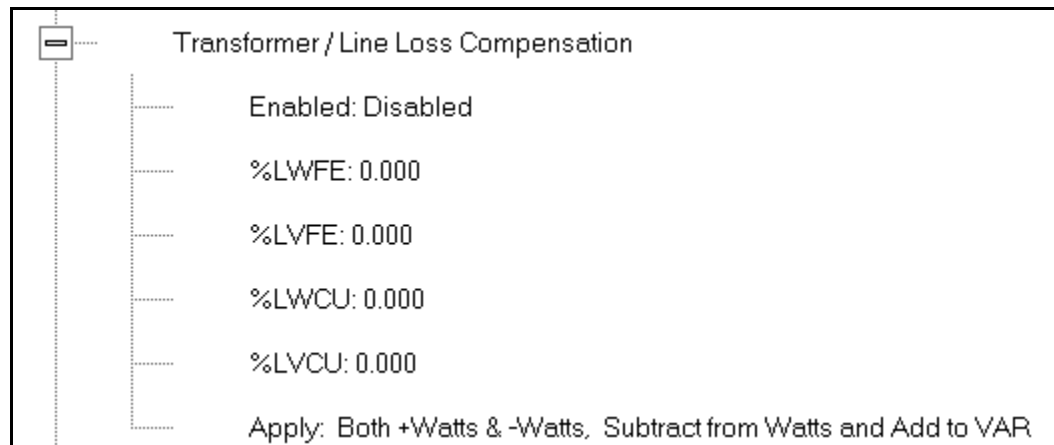
Transformer losses are power used by the transformer while working. The more load on the transformer, the higher the transformer losses. There are two types of transformer losses:

- No load losses - these are the fixed losses that keep the transformer up and running.
- Load losses - these vary with changes in the load.

When the meter is located on the secondary side of a customer's transformer, a utility will want to add the transformer losses into the energy usage calculation. However, this practice is regulated by local jurisdiction and regulations. The meter has the capability to add in or subtract out these transformer losses, depending on the user's specific needs.

Line losses are similar to transformer losses, except that they are used to compensate for loss incurred on wires, such as transmission lines.

1. From the Revenue and Energy Settings menu, click on the + button next to Transformer/Line Loss Compensation or double-click on the Transformer/Line Loss Compensation line. You will see the submenu shown below.



2. The menu displays the current values for the meter's Transformer Loss Compensation.

- LWFE = percent loss of Watts due to iron
- LVFE = percent loss of Vars due to iron

- LWCU = percent loss of Watts due to copper
  - LVCU = percent loss of Vars due to copper
3. Double-click on any of the loss values. You will see the screen shown below.

Device Profile: Transformer and Line Loss Compensation

**Percent Loss of Watts**

Due to Iron

Due to Copper

**Percent Loss of VARS**

Due to Iron

Due to Copper

Disabled

Add to Watts and Subtract from VAR

**Transformer and Line Loss Applies to**

Both +Watts and -Watts

OK TLC Calculator Cancel Help

4. Click on **TLC Calculator** to find the values to enter into the Percent Loss fields. The TLC Calculator button launches the TLC Calculator that performs the calculations for you once the required data is entered.

**NOTE:** Appendix A contains screen captures of the TLC Calculator with example numbers, and an explanation of Loss Compensation considerations.




5. Enter the percent loss of Watts and VARS for copper and iron in the appropriate fields.
6. Enable or Disable Transformer Loss Compensation with the first pull-down menu at the bottom of the screen. The optional selections are:
- Disabled
  - Iron (Fe) Only
  - Copper (Cu) Only

- Both Iron and Copper (Fe and Cu)
7. With the second pull-down menu, select from the following options:
- Add to Watts and Subtract from VAR
  - Subtract from Watts and Add to VAR
  - Add to Watts and VAR
  - Subtract from Watts and VAR
8. With the third pull-down menu, apply the loss based on the power flow direction by selecting one of the following options:
- Both +Watts and -Watts
  - -Watts only
  - +Watts only
3. When all settings are complete, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

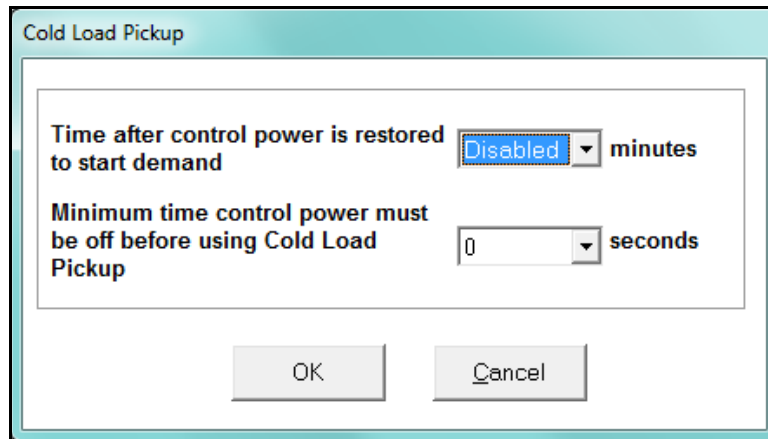
### 13.2.7: Cold Load Pickup

Cold Load Pickup is used to manage Demand in the event of a power outage. You set the amount of time (in seconds) power is off to identify a power outage that is the responsibility of the utility (as opposed to a very short term loss of power that is not their responsibility); then you set the amount of time (in minutes) you want to wait before Demand starts again. This time should correspond to the “grace” period the utility applies to avoid charging for motor startup, etc. after a power outage.

1. From the Revenue and Energy menu, click on the + button next to Cold Load Pickup or double-click on the Cold Load Pickup line. You will see the submenu shown below.

	Cold Load Pickup
	Time after control power is restored to start demand: Disabled
	Minimum time control power must be off before using Cold Load Pickup: 0 Second(s)

2. Double-click on one of the parameters to open the screen shown below.



The image shows a dialog box titled "Cold Load Pickup". It contains two settings: "Time after control power is restored to start demand" with a dropdown menu set to "Disabled" and the unit "minutes", and "Minimum time control power must be off before using Cold Load Pickup" with a dropdown menu set to "0" and the unit "seconds". At the bottom are "OK" and "Cancel" buttons.

3. Make the following selections in accordance with your application needs:

- Time after control power is restored to start demand - can be 1 to 60 minutes, or Disabled.
- Minimum time control power must be off before using Cold Load Pickup - can be from 0 to 255 seconds.

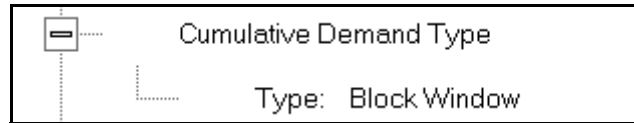
4. When all changes are entered, click OK to return to the main Device Profile screen. For these changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 13.2.8: Cumulative Demand Type

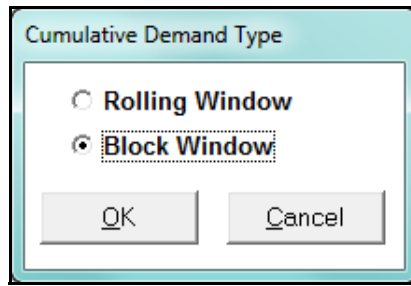
Cumulative Demand is a counter of Max Demand that the meter keeps. It can help you determine if there has been tampering with the meter, i.e., unauthorized resetting of Demand. Whenever Demand is reset, the current Max Demand is added to the Cumulative Demand. By analyzing the data in the counter you can see if the Demand is being reset more often than intended. You can choose to use **either** Block Window Demand or Rolling Window Demand for the Cumulative Demand.

1. From the Revenue and Energy Settings menu, click on the + button next to Cumulative Demand Type or double-click on the Cumulative Demand Type line.

You will see the submenu shown below. It tells you the type of Demand currently selected.



2. Click the Type line to open the screen shown below.



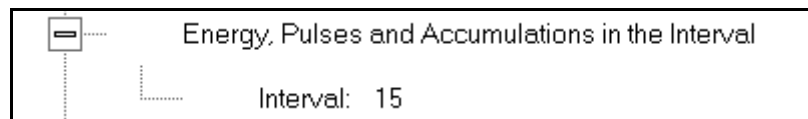
3. Click the radio button in front of Rolling Window (sliding) or Block Window (fixed) to select cumulative Demand type.
4. Click OK to exit the screen and return to the main Device Profile screen. For a change to take effect, you must click the Update Device button to send the new profile to the meter.



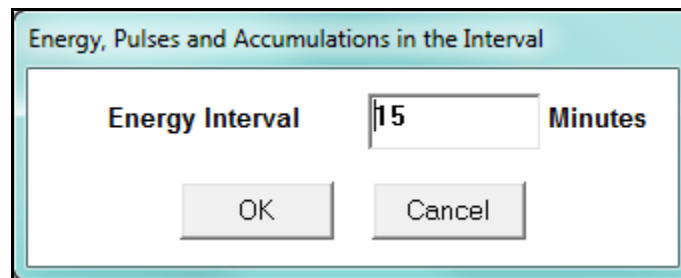
### 13.2.9: Energy, Pulses and Accumulations in the Interval

Energy in the interval is the energy that is accumulated within a load profiling interval. This is often the preferred method for logging because it is a summation of only that particular period of energy. The Interval setting you make creates the sub-accumulation field within the general Energy accumulation. An advantage of this setting is that the sub-accumulation takes up less space and is processed more quickly than the larger accumulation.

1. From the Revenue and Energy Settings menu, click on the + button next to Energy, Pulses and Accumulations in the Interval or double-click on the Energy, Pulses and Accumulations in the Interval line. You will see the submenu shown below.



2. The current Interval setting is displayed. Click on the Interval setting to open the screen shown below.



3. Set the number of minutes for the Energy interval.
3. Click OK to close the window and return to the main Device Profile screen. For any change to take effect, you must click the Update Device button to send the new profile to the meter.

### 13.2.10: Pulse Accumulations

Pulse accumulators are used to count and/or aggregate pulse information from external devices, using the High Speed inputs. These devices may be gas, water, or electricity meters; energy management systems; SCADA devices; or any pulse-generating device.

This section of the Device Profile displays a series of eight running totals available on the Nexus® 1252 meter. Each total can be added to (or subtracted from) other totals. This allows you to set the High Speed inputs located directly on the meter to accumulate pulses.

**NOTE:** If you use these inputs for pulse accumulations, do not set them to record waveforms - if you do, you will record endless waveforms.

1. From the Revenue and Energy Settings menu, click on the + button next to Pulse Accumulations or double-click on the Pulse Accumulations line. You will see the screen shown below.

Device Profile: Internal Input Pulse Accumulators Setup

Source	Units/Count	Aggregator	User Assigned Label	Mode	Average Full Scale
1	1	None	Accumulator1	Pulse (Form A)	1000000000000000
2	1	None	Accumulator2	Pulse (Form A)	1000000000000000
3	1	None	Accumulator3	Pulse (Form A)	1000000000000000
4	1	None	Accumulator4	Pulse (Form A)	1000000000000000
5	1	None	Accumulator5	Pulse (Form A)	1000000000000000
6	1	None	Accumulator6	Pulse (Form A)	1000000000000000
7	1	None	Accumulator7	Pulse (Form A)	1000000000000000
8	1	None	Accumulator8	Pulse (Form A)	1000000000000000

Source	Hour Reading	Aggregator
Device	Quadrant(1 + 4) Watt Hour	None

Aggregator	User Assigned Label	Average Full Scale
1	Aggregator 1	1000000000000000
2	Aggregator 2	1000000000000000
3	Aggregator 3	1000000000000000
4	Aggregator 4	1000000000000000

OK Cancel Help

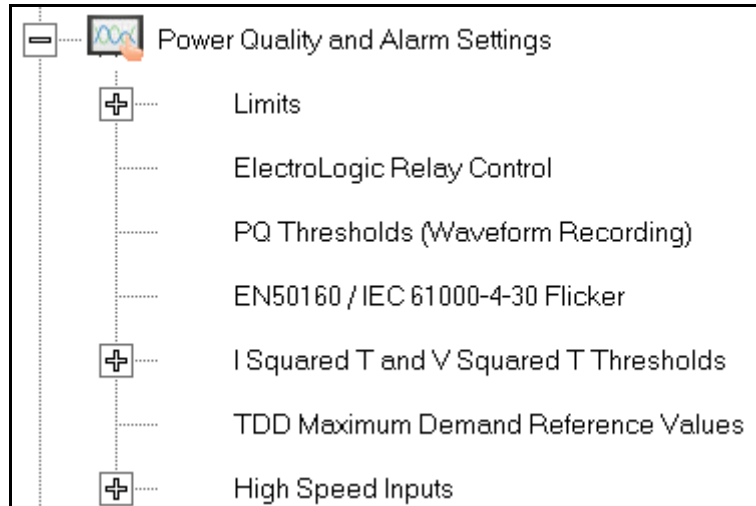
2. High Speed inputs 1-8 are listed in order under Source. Enter the following information or use the pull-down menus to select:

- Units/Count - this is the scale factor that normalizes the pulses so that they can be aggregated. Pulses are stored in primary values.
  - Aggregator - this allows you to place the pulse register into a separate accumulation register that can aggregate (add) or net (subtract) values.
  - User Assigned Label - this window allows you to enter a label designation for the source.
  - Mode - you can set Pulse or Transition. A transition means from open to shorted/closed or from shorted/closed to open; a pulse contains 2 transitions, open to shorted/closed, followed by shorted/closed to open.
  - Average Full Scale - for Nexus® meters, in order to set a limit on a reading it needs a Full Scale value as the 100 reference. You can set a limit on the average number of pulses per interval.
  - Device Hour Reading and Aggregator - source device is the meter you are connected to. The Hour reading is either Quadrant 1 and 4 Watt-hour or Quadrant 2 and 3 Watt-hour. The Aggregators indicate whether the count should be added to, or subtracted from, Aggregators 1-4. You can choose None if you don't want the count to affect any of the Aggregators.
  - Aggregators: The "buckets," or Totalizer fields where pulse counts from the High Speed inputs and from the Watt-Hour counters can be totaled. The user can assign a label to each of the Aggregators. See the Average Full Scale description above for an explanation of this field - it has the same use here, except for the Aggregators.
3. When all data has been entered, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 13.3: Power Quality and Alarm Settings

Power Quality and Alarm Settings are the third group of settings in the Device Profile.

1. From the Device Profile screen, click on the + button next to Power Quality and Alarm Settings or double-click on the Power Quality and Alarm Settings line. All of the settings in this group are listed.



2. Click on the programmable setting you want to modify. The following sections explain the settings in the order in which they appear in the Power Quality and Alarm Settings menu.

### 13.3.1: Limits

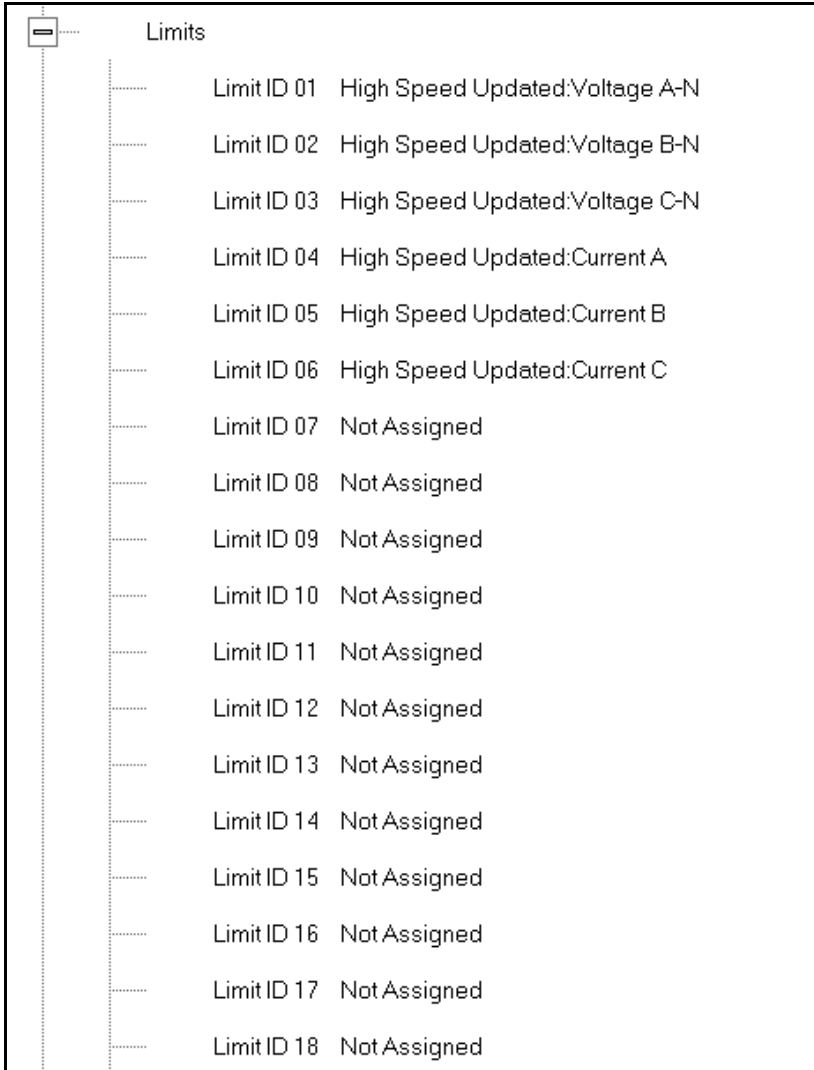
Limits are threshold settings that can be set by a user to trigger a record in a log when an alarm condition is met. Utilizing the limits, the user can then control a relay or send a warning email on that alarm.

Limit settings are based on a percentage of the Full Scale (% of FS), which is set in the Limit and Waveform Full Scales setting (Section 13.1.2). Full Scale is based on CT and PT ratios set in the CT, PT Ratios and System Hookup setting (Section 13.1.1). Limits are based on a percent of Full Scale settings so that the same settings can be used no matter what the CT and PT Ratio needed.

Before programming limits, set the CT and PT ratios. Then, set the Limit and Waveform Full Scales if you want to change to automatic configuration. In most cases the software will configure the Full Scale optimally.

**NOTE:** The software automatically updates the Full Scale; however, you can set it separately from the CT and PT Ratios.

1. From the Power Quality and Alarm Settings menu, click on the + button next to Limits or double-click on the Limits line. You will see the submenu shown below.



Limits	
Limit ID 01	High Speed Updated:Voltage A-N
Limit ID 02	High Speed Updated:Voltage B-N
Limit ID 03	High Speed Updated:Voltage C-N
Limit ID 04	High Speed Updated:Current A
Limit ID 05	High Speed Updated:Current B
Limit ID 06	High Speed Updated:Current C
Limit ID 07	Not Assigned
Limit ID 08	Not Assigned
Limit ID 09	Not Assigned
Limit ID 10	Not Assigned
Limit ID 11	Not Assigned
Limit ID 12	Not Assigned
Limit ID 13	Not Assigned
Limit ID 14	Not Assigned
Limit ID 15	Not Assigned
Limit ID 16	Not Assigned
Limit ID 17	Not Assigned
Limit ID 18	Not Assigned

This submenu displays the current Device Profile Limit settings. Not all limits are shown in the figure above: there are 32 Limit ID fields.

- Double-click on any of the settings (Limit ID 01, for example). You will see the Limits screen, shown below.

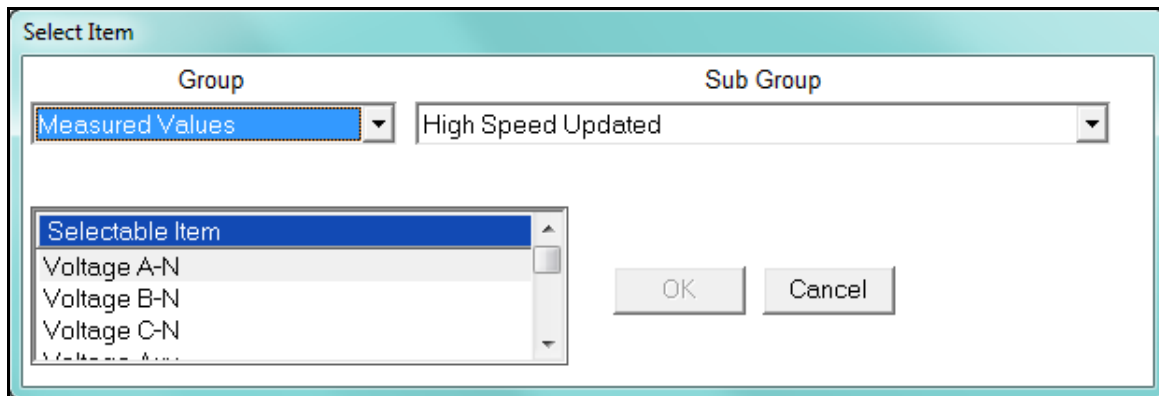
Device Profile: Limits								
Limit ID	Assigned Item	Setting	Limit 1		Setting	Limit 2		Combination Limit 3
			% of FS	Primary		% of FS	Primary	
1	High Speed Updated:Voltage A-N	Above	120.00	83.14	Below	80.00	55.42	OR
2	High Speed Updated:Voltage B-N	Above	120.00	83.14	Below	80.00	55.42	OR
3	High Speed Updated:Voltage C-N	Above	120.00	83.14	Below	80.00	55.42	OR
4	High Speed Updated:Current A	Above	200.00	10.00	Below	98.00	4.90	OR
5	High Speed Updated:Current B	Above	200.00	10.00	Below	98.00	4.90	OR
6	High Speed Updated:Current C	Above	200.00	10.00	Below	98.00	4.90	OR
7	Not Assigned	Above	110.00	110.00	Below	90.00	90.00	OR
8	Not Assigned	Above	25.00	25.00	Below	21.00	21.00	OR
9	Not Assigned	Above	95.00	95.00	Below	92.00	92.00	OR
10	Not Assigned	Above	24.65	24.65	Below	25.35	25.35	AND

Channels	Primary Values at 100%
I A, B, C, Nc	5.00
I Nm	5.00
V Phase to Neutral	69.28
V Aux	120.00
V Phase to Phase	120.00
Power Phase	346.41
Power Total	1039.23
Frequency	60.00

- This screen can be expanded to show all of the limits. Click on the top or bottom of the screen to display sizing arrows you can click on and drag to expand the screen.
  - Percentage of Full Scale settings (% of FS): The limits are set in % of Full Scale so that when you create a profile, you can keep your settings. This is true, even though the CT and PT ratios change when the meter (or a new meter) is placed in a different location. Changing the CT and PT ratios does not affect the % of Full Scale limits previously set. This is useful when you are using large numbers of meters because one profile can be used with a common set of limit settings no matter what the CT and PT ratio. Full Scale reference information is available in the lower left box.
- Make changes to this screen according to your application requirements.
    - To set the type of limit and the channel assigned to it:

- a. Double-click in either the Limit ID or Assigned Item column. You will see the screen shown below.



- b. From the pop-up menus, choose the desired settings and click OK. Following is a list of the available Groups, Sub Groups, and Items.

Group: Measured Values

Sub Group: High Speed Updated

Item: Voltage A-N

Voltage B-N

Voltage C-N

Voltage Aux

Current A

Current B

Current C

Current N Measured

Voltage A-B

Voltage B-C

Voltage C-A

VA A

VA B

VA C

VA Total

VAR A

VAR B

VAR C

VAR Total

Watt A



Watt B  
Watt C  
Watt Total  
Frequency  
Power Factor A  
Power Factor B  
Power Factor C  
Power Factor Total  
Volts A-Aux Phase Angle  
Current N Calculated  
Sub Group: One second updated  
Item: Voltage A-N  
Voltage B-N  
Voltage C-N  
Voltage Aux  
Current A  
Current B  
Current C  
Current N Measured  
Current N Calculated  
Voltage A-B  
Voltage B-C  
Voltage C-A  
VA A  
VA B  
VA C  
VA Total  
VAR A  
VAR B  
VAR C  
VAR Total  
Watt A  
Watt B  
Watt C  
Watt Total  
Frequency

Power Factor A  
Power Factor B  
Power Factor C  
Power Factor Total  
Voltage Imbalance  
Current Imbalance  
Uncompensated VA A  
Uncompensated VA B  
Uncompensated VA C  
Uncompensated VA Total  
Uncompensated VAR A  
Uncompensated VAR B  
Uncompensated VAR C  
Uncompensated VAR Total  
Uncompensated Watt A  
Uncompensated Watt B  
Uncompensated Watt C  
Uncompensated Watt Total  
THD Volts A  
THD Volts B  
THD Volts C  
THD Current A  
THD Current B  
THD Current C  
K Factor Current A  
K Factor Current B  
K Factor Current C  
Internal Temperature  
TDD Volts A  
TDD Volts B  
TDD Volts C  
TDD Current A  
TDD Current B  
TDD Current C  
Maximum TDD Phase A-N/Phase A-B Voltage  
Maximum TDD Phase B-N/Phase B-C Voltage

Maximum TDD Phase C-N/Phase C-A Voltage

Maximum TDD Phase A Current Timestamp

Maximum TDD Phase B Current Timestamp

Maximum TDD Phase C Current Timestamp

Minimum TDD Phase A-N/Phase A-B Voltage

Minimum TDD Phase B-N/Phase B-C Voltage

Minimum TDD Phase C-N/Phase C-A Voltage

Minimum TDD Phase A Current Timestamp

Minimum TDD Phase B Current Timestamp

Minimum TDD Phase C Current Timestamp

Sub Group: Harmonic Values

Item: 0 - 127th Harmonic on selectable Harmonic Magnitude

(Voltage Phases A, B, and C; Current Phases A, B, and C)

Sub Group: Internal Inputs, States

Item: Internal Inputs 1-8

Sub Group: Phase Angles

Item: Phase A-N Voltage

Phase B-N Voltage

Phase C-N Voltage

Phase A Current

Phase B Current

Phase C Current

Phase A-B Voltage

Phase B-C Voltage

Phase C-A Voltage

Volts A-Aux Phase Angle

Voltage Phase Sequence

Sub Group: Flicker

Item: Flicker: PInst Volts A

Flicker: PInst Volts B

Flicker: PInst Volts C

Flicker: PST Volts A

Flicker: PST Volts B

Flicker: PST Volts C

Flicker: PLT Volts A

Flicker: PLT Volts B

Flicker: PLT Volts C  
Group: Averages  
Sub Group: Thermal Average  
Item: Voltage A-N  
Voltage B-N  
Voltage C-N  
Voltage Aux  
Current A  
Current B  
Current C  
Current N Measured  
Current N Calculated  
Voltage A-B  
Voltage B-C  
Voltage C-A  
VA A  
VA B  
VA C  
VA Total  
VAR A  
VAR B  
VAR C  
VAR Total  
Watt A  
Watt B  
Watt C  
Watt Total  
Frequency  
Power Factor A  
Power Factor B  
Power Factor C  
Power Factor Total  
Voltage Imbalance  
Current Imbalance  
Sub Group: Block Window Average  
Item: VA

VAR

Watt

Sub Group: Pulse Accumulation/Aggregation Block Window Average

Item: Internal Inputs #1 - #8

Aggregators #1 - #4

Sub Group: Rolling Window Average

Item: Predictive VA

Predictive VAR

Predictive Watt

VA

VAR

Watt

Sub Group: Voltage and Current Means

Item: Volts PN

Current P

Volts PP

Group: External I/O Devices

Sub Group: Analog Input Modules

Item: Module 1: Analog Input 1 - Analog Input 8

Module 2: Analog Input 1 - Analog Input 8

Module 3: Analog Input 1 - Analog Input 8

Module 4: Analog Input 1 - Analog Input 8

- To designate the limit as either above or below a percentage of the Full Scale, click once in each Settings column and select the desired setting from the pull-down menu.
- To set the percentage of the Full Scale that will trip the limit, enter the value in the % of FS column. CommunicatorPQA™ software automatically calculates the Primary value.
- Combination Limit 3 is the logical combination of Limit 1's state and Limit 2's state.

### **Example 1**

Limit I D

Type: 1 Second Readings

Channel: Volts AN

Limit 1 Setting: Limit exceeded if Volts AN is below 120 F.S.

Limit 2 Setting: Limit exceeded if Volts AN is above 80 F.S.

Combination Limit 3 Setting: AND

If Limit 1 AND Limit 2 are tripped (e.g., the reading is 100F.S.), then Limit 3 is tripped.

### **Example 2**

#### Limit I D

Type: 1 Second Readings

Channel: Volts AN

Limit 1 Setting: Limit exceeded if Volts AN is above 120 F.S.

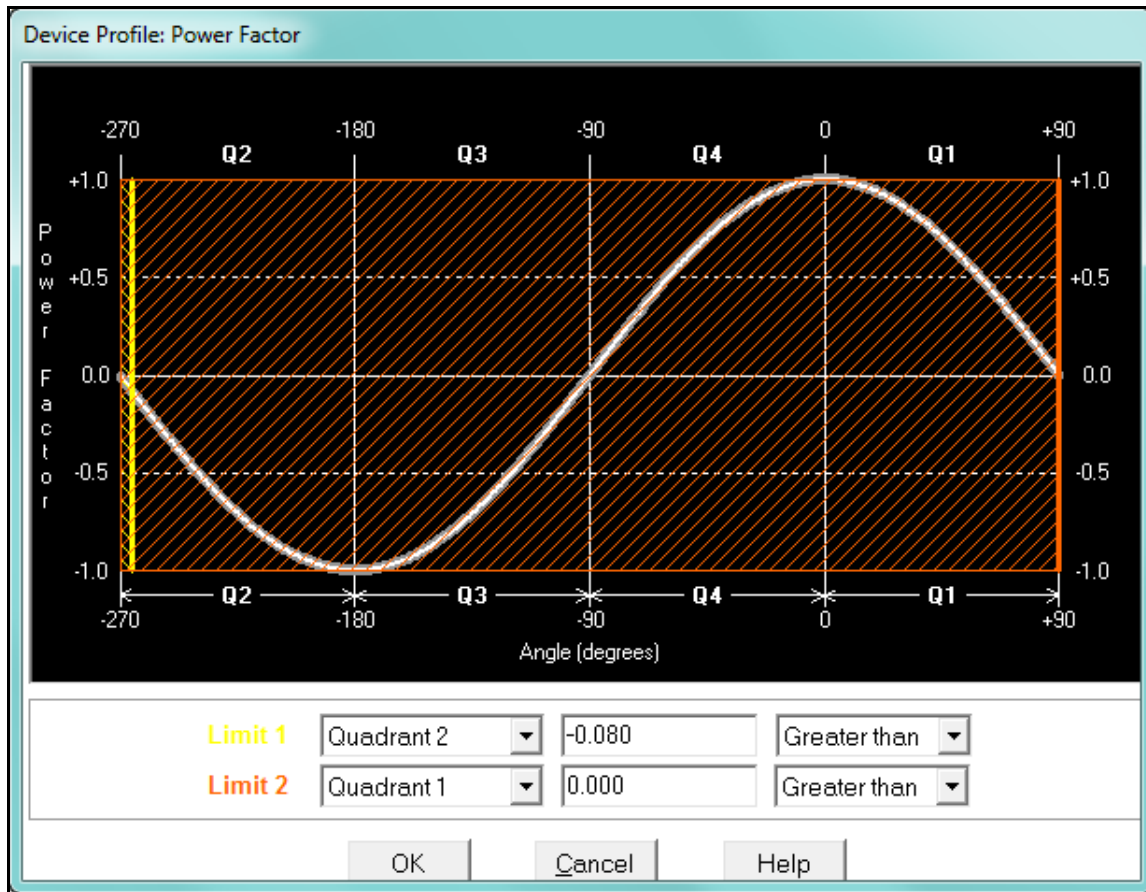
Limit 2 Setting: Limit exceeded if Volts AN is below 80 F.S.

Combination Limit 3 Setting: OR

If either Limit 1 OR Limit 2 is tripped (e.g., the reading is 75), then Limit 3 is tripped.

- Full Scales settings are shown in the lower left of the screen. These values are set in the Limits and Waveform Full Scales section of the Device Profile (Section 13.1.2).
4. Power Factor is broken into four quadrants. Selecting the Full Scale value brings up a screen that lets you set a limit in two of the four quadrants.

- To set the power factor limits, double click on any of the power factor settings in the Limit 1 or Limit 2 columns. You will see the Power Factor screen.



- To set a limit: from the pull-down menus, select a quadrant and Less Than or Greater Than (Full Scales). Enter the power factor number. The graph will illustrate your selections by shading the out of limit bands. The area of the graph not covered by shading is within normal operational range.
- NOTE:** Whether you see method 1 Quadrants (Q1 +Lag, Q2 -Lag, Q3 -Lead, Q4 +Lead) or method 2 Quadrants (Q1 +Lag, Q2 -Lead, Q3 +Lag, Q4 -Lead) depends on the setting in the Power Factor Display field of the Labels setting (see [13.1.4: Labels on page 13-10](#)).

**NOTE:** The Nexus® 1252 device is a four-quadrant meter. Therefore, limits can be set for capacitive and inductive PF when generating or consuming power.

- When all settings are complete, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.





The gates used in ElectroLogic™ Relay Control are used as follows:

OR: If either or both of the two conditions are true, the gate is passed

AND: If both of the conditions are true, the gate is passed

Hysteresis: For Limits only, the if the Limit is within the programmed hysteresis value, the gate is passed

XOR: If either of the two conditions are true, but not both, the gate is passed

NOR: If either of the two conditions are true, the gate is not passed

NAND: If both of the two conditions are true, the gate is not passed

NHysteresis: For limits only, if the Limit is within the programmed hysteresis value, the gate is not passed

NXOR: If either of the two conditions are true, but not both, the gate is not passed

**NOTE: See Example settings on page 13-58.**

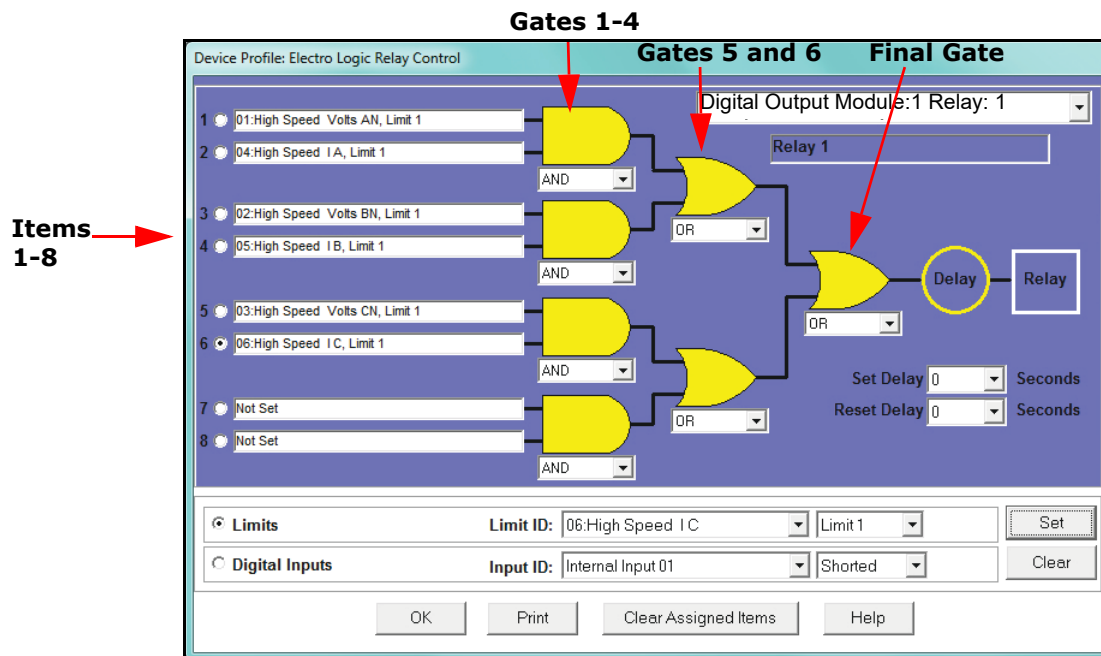
2. To assign an item to the Relay Logic tree:

- a. Select the relay card/module from the pull-down menu - see number 1 in the screen on the previous page.
  - b. Select an input for the tree by clicking on a radio button next to numbers 1 through 8 - see number 2 in the screen on the previous page.
  - c. Choose Limits or Digital Inputs by clicking on the radio button in front of the word - see number 4 in the screen on the previous page.
  - d. From the pull-down menus, select the limit (Limit ID) or input (Input ID) you want to assign to this Relay Logic tree input (step b) - see number 4 in the screen on the previous page.
    - For a limit, use the second pull-down menu to select Limit 1, Limit 2, or Combination - see number 4a in the screen on the previous page.
    - For an input, use the second pull-down menu to select Shorted or Open - see number 4b in the screen on the previous page.
  - e. Press Set to confirm your selection. The software places the selection in the appropriate field in the screen.
3. After you assign all the Relay Logic inputs, select the gates that will be used to combine the logic to trigger the relay. To select a gate type, either:

- Click on the gate (yellow fields) - see number 5a in the screen on page 13-55.
  - Choose a gate type from the pull-down menu below the gate - see number 5b in the screen on page 13-55.
4. If you want, select Set Delay and Reset Delay from the pull-down menus. You can choose between 0 and 255 seconds. Use these fields if you want to program a delay before the relay is set, or before it is reset - see number 6 in the screen on page 13-55.
5. To change items on the Relay Logic tree, follow the previous steps.
- To clear an item from the Relay tree, click on that item and click the Clear button.
  - To clear all items from the Relay Tree, click the Clear Assigned Items button.
6. When all settings are complete, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

**NOTE:** In order to use this screen, you must have purchased at least one External Relay Output module. For more details on external Output modules, see Chapter 14.

### Example of an ElectroLogic™ Relay Logic Tree:



Inputs 1 through 8 are set to High Speed Volts AN Limit 1, High Speed Amps A Limit 1, High Speed Volts BN Limit 1, High Speed Amps B Limit 1, High Speed Volts CN Limit 1, High Speed Amps C Limit 1, Not Set and Not Set. The four first gates are AND gates, and the remaining three gates are OR gates.

Each first level gate looks at the state of the two limits, and the result is "true" if and only if both the inputs (Voltage Limit and Current Limit) are "true" (Out-of-Limit Condition). The second and third level gates look at the state of the earlier gates, and their results are "true" if either one (or both) of the previous gates are "true". The end result is a relay that is energized if one or more of the three phases (A, B, and/or C) is currently Out-of-Limit on both its voltage and current Limit 1 tests.

### 13.3.3: PQ Thresholds (Waveform Recording)

The PQ Thresholds/Waveform Recording capability allows the meter to act as a high-speed waveform recorder to record any anomaly that occurs within a cycle of duration. This provides a user with advanced waveform analysis including pre- and post-waveform recording.

The meter has the capability to record both surges and sags of the measured signals. A voltage surge is any event that increases the RMS voltage for one cycle, calculated every half cycle. A voltage sag is a dip in the RMS of one cycle of voltage, calculated every half cycle. A current fault (or surge) is also calculated in the same manner. When the RMS value of any of these triggers exceeds the threshold settings, the meter will trigger a waveform capture.

The Power Quality (PQ) and Waveform Thresholds setting determines at what point the Nexus® 1252 meter executes a waveform capture and/or records a power quality event.

See Chapter 19 for instructions on viewing Waveform and PQ logs.

PQ and Waveform Thresholds are given as a percentage of the Full Scales (% of FS). Set the Full Scales in the Limits and Waveform Full Scales setting of the Device Profile (see Section 13.1.2). Full Scales are based on the CT and PT ratios set in the CT, PT Ratios and System Hookup setting of the Device Profile (see Section 13.1.1).

Before programming the PQ and Waveform Thresholds, set the CT and PT ratios and the Limits and Waveform Full Scales.

**Note on Sampling Rate:** A higher sampling rate allows for transients to be monitored. Generally, the meter is set to take 1024 samples per cycle for this purpose. Lower sampling rates have advantages, however, because they allow you to record more cycles of information per event screen. Therefore, low sampling rates are better for long duration events, like motor starts or distribution faults. The meter enables you to tailor its recording for both these applications. For more information on sampling rate, see the table on page 13-62.

1. From the Power Quality and Alarm Settings menu, double-click on the PQ Thresholds (Waveform Recording) line. You will see the screen shown below

Device Profile: Waveform - CBEMA Profile Hookup: Wye

Channel	Waveform Above Setpoint		Waveform Below Setpoint		PQ Enable
	Value(%)	Enable	Value(%)	Enable	
Volts AN	120.00	<input checked="" type="checkbox"/>	80.00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Volts BN	120.00	<input checked="" type="checkbox"/>	80.00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Volts CN	120.00	<input checked="" type="checkbox"/>	80.00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
I A	120.00	<input checked="" type="checkbox"/>	0.00	<input type="checkbox"/>	<input checked="" type="checkbox"/>
I B	120.00	<input checked="" type="checkbox"/>	0.00	<input type="checkbox"/>	<input checked="" type="checkbox"/>
I C	120.00	<input checked="" type="checkbox"/>	0.00	<input type="checkbox"/>	<input checked="" type="checkbox"/>
I Nm	10.00	<input type="checkbox"/>	0.00	<input type="checkbox"/>	<input type="checkbox"/>

Input	Assigned to
1	KYZ Input
2	KYZ Input
3	KYZ Input
4	KYZ Input
5	KYZ Input
6	KYZ Input
7	KYZ Input
8	KYZ Input

Sampling Rate: 32 Samples / Cycle @ 60Hz

32 Cycles Captured Per Window

Total Capture Windows Per Event: 1

A limit value of 100 % equals the following primary value

I A,B,C: 5.00 V P - N: 120.00 V P - P: 207.85

OK Cancel Help

2. To set the threshold for a PQ event and waveform capture, enter the desired percentage of Full Scale in the Value() column of the Above Setpoint and Below Setpoint sections. Full Scales are shown in the lower right corner of the screen.

**NOTE ON CBEMA:** The CBEMA plotting is a power quality standard known worldwide for recording the amount of damage voltage transient conditions have done to the equipment being monitored. The meter automatically records this information. For CBEMA purposes, program internal setpoints for voltage below 90 and above 110 of full scale (+/- 10 from the nominal voltage). These setpoints are defined by the ITI (CBEMA) specification. The ITI (CBEMA) Curve is published by Information Technology Industry Council (ITI). You can set a recording with tighter voltage limits to trigger a waveform recording. However, CBEMA plotting will be based only on the limits internally set.

**NOTE ON SETTING THE METER TO RECORD CURRENT FAULTS:** The voltage setpoints are used to record voltage type events, such as voltage surges, sags and transients. The current settings are used to record faults on the line or in-rush currents from devices such as motors. Typically, to catch these events, set the limit to above 200 of full scale.

- Waveform Clipping Threshold: Nexus® 1252 Meter 5 Amp Standard Hardware -  $\pm 60A$  Peak before clipping; Nexus® 1252 Meter 1 Amp Hardware -  $\pm 12A$  Peak before clipping.
- Voltage Waveform Clipping Thresholds: Nexus® 1252 Meter Standard Hardware -  $\pm 200V$  Peak before clipping; Nexus® 1252 Meter -G Hardware -  $\pm 400V$  Peak before clipping.
- High Speed Inputs: The High Speed Inputs field allows you to see which High Speed Inputs are enabled for Waveform recording.

**IMPORTANT!** You assign the High Speed Input to its trigger in the High Speed Inputs screen (see Section 13.3.7).

- Samples per Cycle: To choose the Samples per Cycle to be recorded at 60 Hz, click on the Sampling Rate pull-down menu. Choose from 16, 32, 64, 128, 256 and 512 samples per cycle. The number of samples per cycle you choose will inversely affect the number of cycles per capture.
  - If you select 256, a Capture Only pop-up screen will ask you to select Volts A, B, C or I A, B, C.
  - If you select 512, a Capture Only pop-up screen will ask you to select one of the individual channels.

The following table illustrates the effects of sampling rate on the number of cycles captured. Increasing the Sampling Rate increases Waveform definition, but reduces the length of the observed window. The approximate length of the observed window is shown in the last column.

Effects of Sampling Rate					
Samples Per Cycle	Channels		Samples Per Channel	Cycles Per Capture	Time (Approx)
	Analog	HSI			
16	7	8	1024	64	1 Second
32	7	8	1024	32	½ Second
64	7	8	1024	16	¼ Second
128	7	8	1024	8	1/8 Second
256	3	8	2048	8	1/8 Second
512	1	8	4096	8	1/8 Second

For example, for observed events of approximately ½ second, a sampling rate of 32 samples per Cycle, or less, should be used.

**NOTE ON WAVEFORM EVENT CAPTURES:** A screen of data is one capture. If you set Total Captures to 3 and you are recording at 16 samples per cycle, you will record:

16 Samples3 x 64 = 192 cycles of recorded waveforms

128 Samples3 x 8 = 24 cycles of recorded waveforms

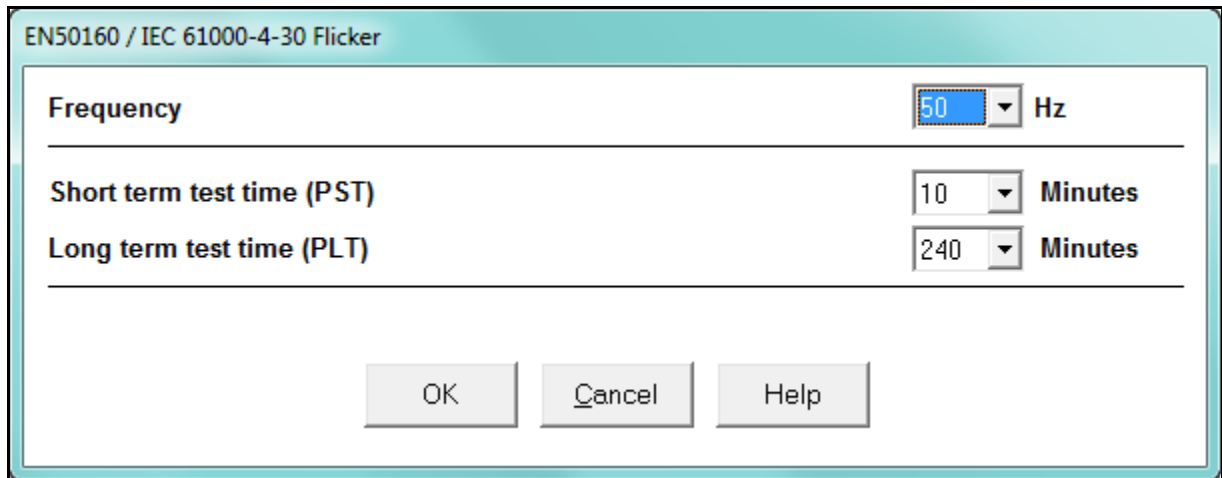
With the 2 Megabyte module, you have a total of 64 captures; with the 4 Megabyte module, you have a total of 96 captures. You can partition the memory in any fashion required by your application. There is no limitation on the amount of cycles that can be recorded per event.

- To choose the total amount of captures, click on the Total Captures pull-down menu. Select from 0 to 96 captures. The higher the number, the more information you will be "stringing together."
- When all changes are entered, click OK to return to the main Device Profile screen. For changes to take effect, you must click the Update Device button. This sends the new profile to the meter.

### 13.3.4: EN 50160/IEC 61000-4-30 Flicker

With the EN 50160/IEC 61000-4-30 Flicker screen, you can set the test times for the Flicker function.

1. From the Device Profile screen double-click on the EN50160/IEC61000-4-30 Flicker line. You will see the screen shown below.



EN50160 / IEC 61000-4-30 Flicker

Frequency 50 Hz

Short term test time (PST) 10 Minutes

Long term test time (PLT) 240 Minutes

OK Cancel Help

2. From the pull-down menus, select:

- Frequency (50 or 60Hz) - this field is used to calculate the harmonics and interharmonics associated with the set fundamental frequency.
- Short Term Test Time (1-10 minutes, in minute increments) - PST is defined over a ten minute interval. Standard IEC 61000-4-15 requires 10 minutes for PST.
- Long Term Test Time (10-240 minutes, in ten minute increments) - the standard requires 120 minutes, and is calculated from the PLT values.

3. When all changes have been entered, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

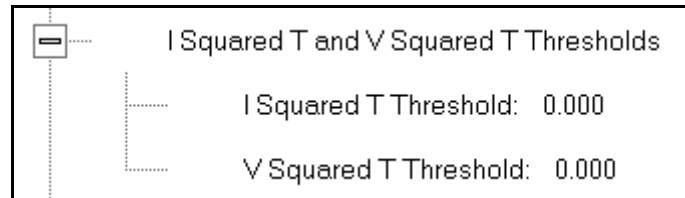
**NOTE:** Flicker is discussed in detail in Chapter 23.



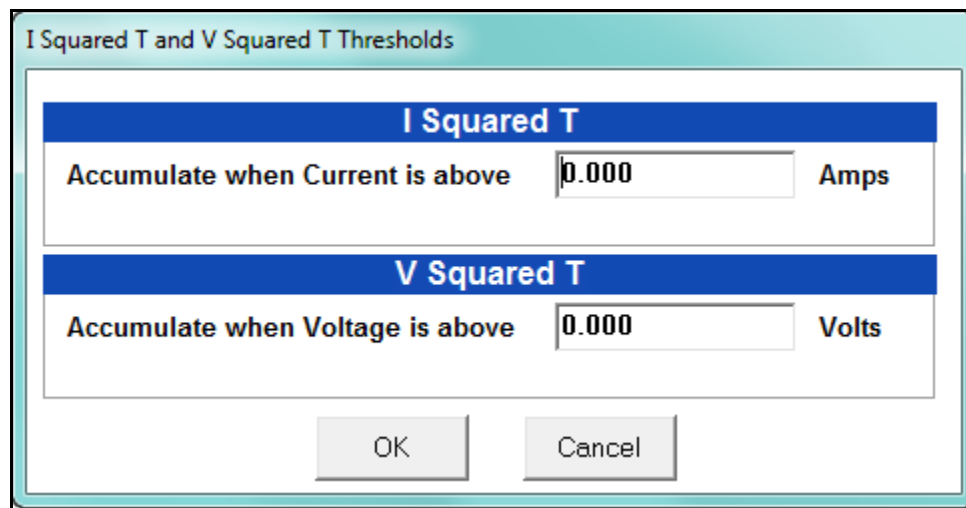
### 13.3.5: I Squared T and V Squared T Thresholds

With the I Squared T and V Squared T Thresholds screen, you can set the point at which the meter accumulates current and Voltage. This feature is used to calculate wear on circuit breaker contacts.

1. From the Power Quality and Alarm Settings menu, click on the + button next to I Squared T and V Squared T Thresholds or double-click on that line. You will see the submenu shown below, which shows the current settings for the meter.



2. Double-click one of the settings to open the I Squared T and V Squared T Thresholds screen, shown below.

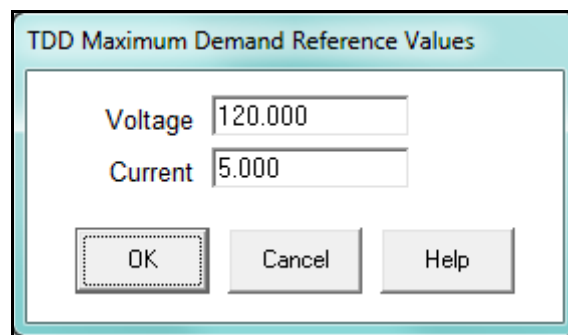


3. Enter the thresholds in the I Squared T and V Squared T fields.
4. Click OK to exit the screen and return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 13.3.6: TDD Maximum Demand Reference Values

This setting of the Device Profile allows you to set the maximum value for voltage and current, which is used when the meter calculates TDD (Total Demand Distortion). TDD and THD (Total Harmonic Distortion) are both indices used to measure harmonics. TDD is defined in the IEEE 519 Standard, "Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems" as "the total root-sum-square harmonic current distortion in percent of the maximum load current." It gives a better indication of the impact of distortion on Demand than THD which analyzes the harmonic distortion relative to the fundamental, without consideration of load.

1. From the Power Quality and Alarm Settings menu, double-click on the TDD Maximum Demand Reference Values. You will see the screen below.



2. Enter the maximum values for voltage and current.
  - You can find these values in the Poll Max and Min Readings polling screen (see Section 5.2.2 for details).
  - You can view the TDD values in the Harmonics polling screen (see Section 5.4.2 for details).
3. Click OK to exit the screen and return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 13.3.7: High Speed Inputs

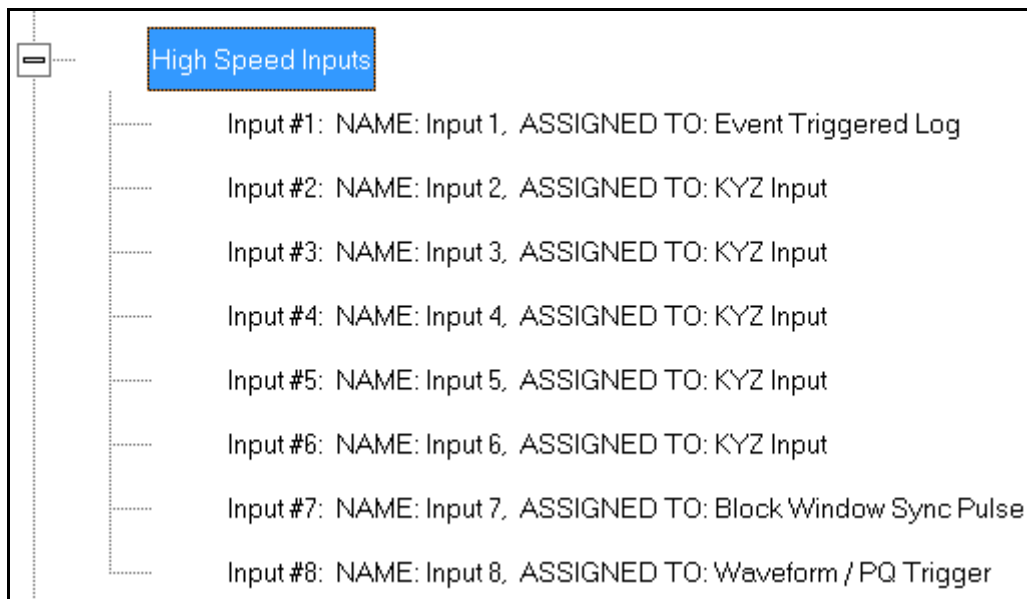
The Nexus® 1252 meter's built-in High Speed Inputs can be used in two ways:

- Attaching status contacts from relays, breakers or other devices for status or waveform initiation
- Attaching the KYZ pulse outputs from other meters for pulse counting and totalizing

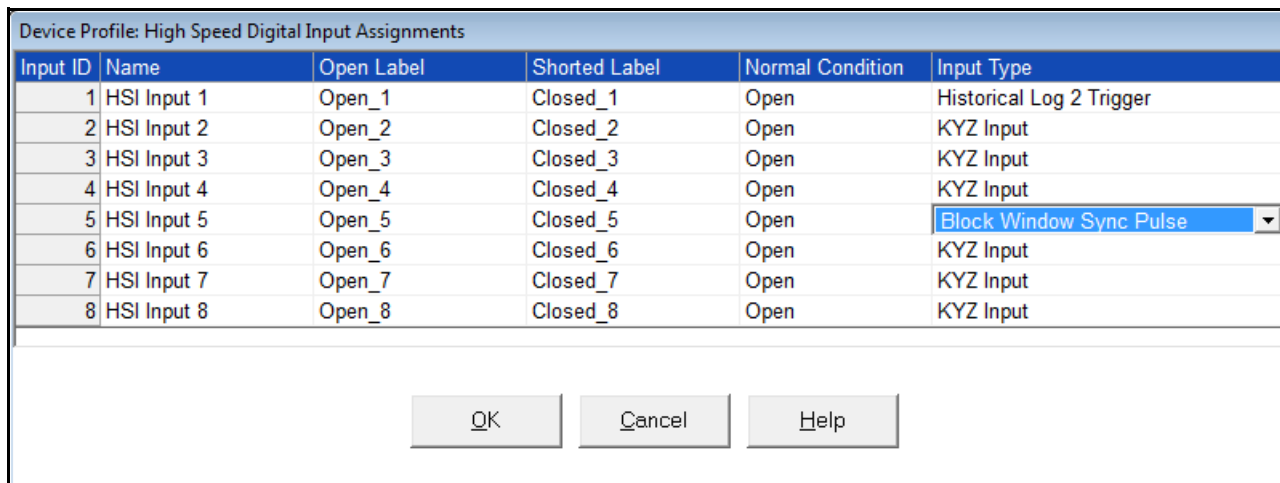
Even though these inputs are capable of being used as high speed digital fault recording inputs, they serve a dual purpose as KYZ counters and totalizers. The function in use is programmable in this setting of the Device Profile, which lets you label the eight High Speed inputs and to specify their status.

- Labeling the inputs allows you to determine the source of status change when data is later analyzed.
- This feature lets you set the High Speed Inputs' status as a KYZ input, a trigger for waveform capture or PQ recording, a trigger for logging, or a means of synchronizing the meter.
- In the Pulse Accumulations setting (Section 13.2.10), you can assign the High Speed Inputs' counts to be accumulated in one of four internal Aggregators of the meter.

1. From the Power Quality and Alarm Settings menu, double-click on the High Speed Inputs line or click on the + button next to it. You will see the submenu shown below.



2. Double-click any of the Input lines. You will see the screen below.



3. Double-click a field to enter the following:

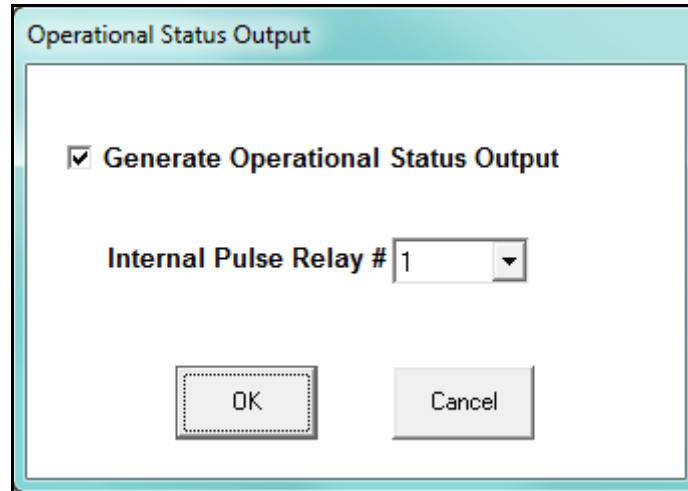
- Name
- Open Label

- Shorted Label
  - Normal Condition
4. Click on the Input Type field to select an option from the pull-down menu. The available selections are:
- KYZ Input - select this option to designate the input as a pulse (KYZ) input.
  - Waveform/PQ Trigger - select this option if you want the input to trigger a waveform/PQ recording (see Section 13.3.3).
  - Block Window Sync Pulse - select this option if you want to synchronize the meter with pulses from the input (see Section 13.2.2).
  - Historical Log 2 Trigger - select this option to use this input to trigger logging in Historical log 2 upon a change in its state (see 13.4.1: Programming the Trending Log Time Intervals on page 13-71).
5. When you have finished making your selections, click OK to exit the screen and return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 13.3.8: Operational Status Output

This setting of the Device Profile lets you assign a relay to the operational status of the meter. The relay can then be monitored by another connected device.

1. From the Power Quality and Alarm Settings menu, double-click on the Operational Status Output line. You will see the screen shown below.



2. Select the relay you want to assign from the pull-down menu and click the check-box.
3. When you finish making your selections, click OK to exit the screen and return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

## 13.4: Trending Profile Settings

This section of the Device Profile enables you to configure parameters for the Nexus® 1252 meter's two historical logs.

1. From the Device Profile screen, click on the + button next to Trending Profile Settings or double-click on the Trending Profile Settings line. You will see the menu shown below.



2. Double-click on one of the Trending lines to access the programming screens.

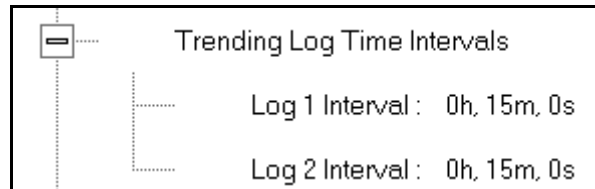
**NOTE on Load Profile Recording:** Load Profile recording is a subset of the Nexus® meter's more general logging and trending capability. The same screens are used for setup, but Load Profile recording only deals with accumulated values; Energy (Wh), reactive Energy (VARh) and apparent power (VAh).

Historically, Load Profile recording referred to recording of quadrant 1 Energy (Wh) because electromechanical meters only measured energy and were designed to prevent reverse rotation outside of quadrant 1.

### 13.4.1: Programming the Trending Log Time Intervals

The Trending Log Time Intervals setting determines the interval at which the Historical logs take a "snapshot" of data, and the length of time logging continues when Historical log 2 recording is triggered by changes in the state of an input (see 13.3.7: High Speed Inputs on page 13-67). To set the parameters for the logs, see Section 13.4.2. See Chapter 16 for information on retrieving logs and Chapter 19 for information on viewing logs.

1. From the Trending Profile Settings menu, double-click Trending Log Time Intervals or click the + button next to it. You will see the submenu shown below. The submenu shows the interval set for both Historical logs.



2. To change the interval for a Historical log, double-click on one of the logs.

#### NOTES:

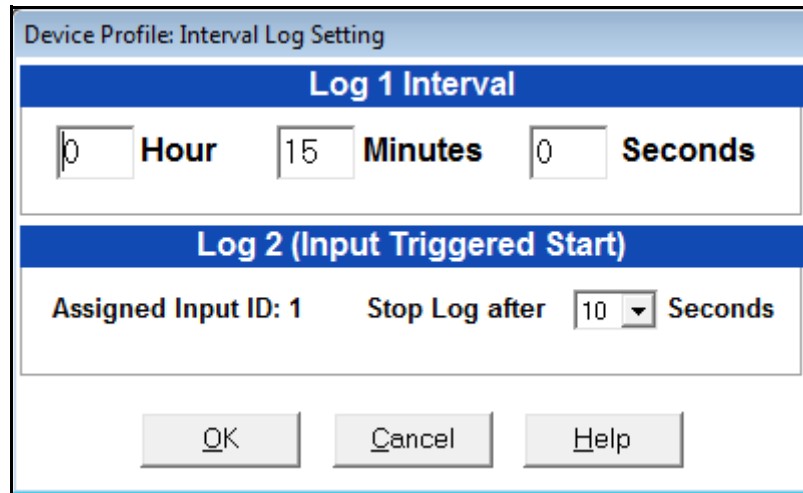
- You can also access the Interval setting screens from the Trending Setup screens (see Section 13.4.2).
- If Historical log 2 has been configured to log the changes in state of an input, the menu shown above will indicate that.

3. You will see the screen shown below. Enter the interval you want.

Note that if Historical log 2 recording is being triggered by the change of state of an input, the Input number will be displayed and the selection for Log 2 will consist of



the number of seconds after which logging should stop. See the example screen, below. Select the number of seconds from the pull-down menu.



4. Click OK to save your changes. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 13.4.2: Programming the Trending Setup

The Trending Setup controls the channel assignments for the Historical logs. See Chapter 16 for instructions on retrieving logs.

1. From the Trending Profile Settings menu, click on the + button next to Trending Setup or double-click on the Trending Setup line. You will see the submenu shown below.



2. Double-click on the log whose settings you want to configure. You will see the Trending Log Profile screen for the log you selected. An example screen is shown below.

Trending Log Profile Log 1

Group: **Measured Values** Sub Group: **High Speed Updated**

Selectable Item(s)	Add >>	Selected Item(s)
Voltage A-N		One Second Updated:Current A
Voltage B-N		One Second Updated:Current B
Voltage C-N		One Second Updated:Current C
Voltage Aux		One Second Updated:Watt Total
Current A		One Second Updated:Var Total
Current B		One Second Updated:VA Total
Current C		One Second Updated:Frequency
Current N Measured		One Second Updated:Voltage A-N
Voltage A-B		One Second Updated:Voltage B-N
Voltage B-C		One Second Updated:Voltage C-N
Voltage C-A		Thermal Average:Watt Total
VA A		Thermal Average:Var Total
VA B		Thermal Average:VA Total
VA C		Block Window Average:VA
VA Total		Block Window Average:VAR
Var A		Block Window Average:Watt
Var B		Rolling Window Average:Predictive VA
Var C		Rolling Window Average:Predictive VAR
Var Total		Rolling Window Average:Predictive Watt
Watt A		Scaled Pulse Accumulations and Aggregations:Internal Input #1
Watt B		Scaled Pulse Accumulations and Aggregations:Aggregator #1
Watt C		Block Window Average:Internal Input #1
Watt Total		Block Window Average:Aggregator #1
Frequency		Pulse Accumulators Max Block Window Average:Internal Input #1
Power Factor A		Pulse Aggregators Max Block Window Average:Aggregator #1
Power Factor B		One Second Updated:THD Volts A
Power Factor C		One Second Updated:THD Volts B
Power Factor Total		One Second Updated:THD Volts C
Volts A - Aux Phase Angle		One Second Updated:THD Current A
		One Second Updated:THD Current B
		One Second Updated:THD Current C
		One Second Updated:K Factor Current A
		One Second Updated:K Factor Current B

Total bytes used: 144      Estimated Log Timespan: 69days 8hour 0min 0sec  
 Bytes remaining: 112      Total Records: 6656

3. Make changes to this screen according to your application requirements.
  - a. Group: Using the pull-down menu, select the type of snapshot. The options are: Measured Values, Averages, Accumulators, Interval Accumulators, External Output Devices, TOU Cumulative Dmd.

- b. Sub-Group: Using the pull-down menu, select a channel for the snapshot. The sub-group options vary depending on the selected group.
- c. Sub-Group 2: With some selections, a second sub-group field will be shown underneath the first one. Select a value for this field from the pull-down menu.
- d. Highlight items in the Selectable Items(s) box and click Add to include the selections in the Log. The items will be copied to the Selected Item(s) box. To remove an item from the log, highlight the item in the Selected Item(s) box and click Remove or double-click the item. The item will be removed from the Selected Item(s) box.

**NOTES:**

- To select multiple items, hold Control while highlighting the items.
  - To select a range of items, click the first item, hold Shift, and click the last item.
  - Move the cursor to the lower left corner of an item, or group of items, to view its size in bytes.
- e. Click HHF if you want to convert files to HHF format for use with MV-90. See Chapter 16 for details.
  - f. Click Check HHF if you want to check if current settings are compatible with the HHF Converter.

**NOTE:** You will not see the HHF options unless you have enabled the HHF converter using the Options menu. See Chapter 20 for instructions.

- g. The Total bytes used and Bytes remaining fields display the amount of memory used for each record of the log. The meter assumes 256 bytes of memory for each record. Total memory is determined at time of purchase.
- h. The Estimated Log Timespan field displays the length of the time between the first and last records in the log when it is full.

- i. The Total Records field displays the total number of records that will be in the log when it is full.
  - j. Click Set Interval to open the Interval Log Setting screen (see Section 13.4.1).
4. When all changes have been entered, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

### **13.5: External I/O Modules**

This setting of the Device Profile allows you to set up the meter's optional external Input/Output modules (see Chapter 14 for more information on the I/O modules). I/O modules work as Modbus slave devices. The meter polls these modules to get the data from them. I/O modules generally have default RS485 Modbus addresses. So, they don't have to be configured. Once you set up which module you want, put in the default address and start with the basic configuration of readings you desire to gather.

### 13.5.1: Configuring the Input/Output Modules

1. From the Device Profile screen, double-click on the External I/O Modules icon. You will see the screen shown below.

Device Profile: I/O Modules

Module Number	Type	Assigned Address	Nexus Settings	Module Settings	Log / Limit ID
1	20mAON8: Analog Out 4 - 20mA 8 ch	132	Edit	Edit	AO Module 1
2	4PO1: KYZ Output	160	Edit	Edit	KYZ Module 1
3	4RO1: Digital Output	156	Edit	Edit	DO Module 4
4	8AI1: Analog In 0 - 1mA 8 ch	136	Edit	Edit	AI Module 1
5	No Device Assigned				
6	No Device Assigned				
7	No Device Assigned				
8	No Device Assigned				
9	No Device Assigned				
10	No Device Assigned				
11	No Device Assigned				
12	No Device Assigned				
13	No Device Assigned				
14	No Device Assigned				
15	No Device Assigned				
16	No Device Assigned				

OK Cancel Help

2. Click in the Type column and use the pull-down menu to select the specific module you want to add. The Assigned Address, Nexus settings®, and Module settings you can make depend on the module you are configuring. The modules and settings are as follows:

Module	Assigned Address*	Nexus® Setting**	Module Setting
4PO1 - KYZ Output	160*	Click to Edit Relay Accumulations	Click to enter Transmit Delay and configure KYZ outputs' Watt/pulse, rollover and minimum pulse width.
20mAON4	132*	Click to Assign Items to and configure the Analog Outputs	Click to enter Transmit Delay and configure Channel settings
20mAON8	132*	Click to Assign Items to and configure the Analog Outputs	Click to enter Transmit Delay and configure Channel settings
1mAON4	128*	Click to Assign Items to and configure the Analog Outputs	Click to enter Transmit Delay and configure Channel settings
1mAON8	128*	Click to Assign Items to and configure the Analog Outputs	Click to enter Transmit Delay and configure Channel settings
4RO1 - Digital Output	156*	Click to configure Relays	Click to enter Transmit Delay
8AI1 - Analog Input Module	247*	Click to configure Analog Outputs	Click to enter Transmit Delay and configure Channel settings
8AI2- Analog Input Module	247*	Click to configure Analog Outputs	Click to enter Transmit Delay and configure Channel settings
8AI3 - Analog Input Module	247*	Click to configure Analog Outputs	Click to enter Transmit Delay and configure Channel settings
8AI4 - Analog Input Module	247*	Click to configure Analog Outputs	Click to enter Transmit Delay and configure Channel settings
8DI1 - Digital Status Input Module	164*	Click to configure Digital Inputs	Click to enter Transmit Delay and configure Channel settings

\* The Assigned address on this screen is the address the meter uses to identify the I/O module. The default is the factory set address, which you can change by clicking in the field and choosing a new address from the pull-down menu. This address is not the actual I/O module address. You set that from the I/O Devices menu; see Chapter 14 for instructions.

\*\*When you click in this field you see an Edit button. Click the button to open a screen that lets you edit that module. See the following example screens.

## 4PO1 Screen

Relay	Accumulation
1	Quad (1 + 4) Watthour
2	Quad (2 + 3) Watthour
3	Quad (1 + 2) VARhour
4	Quad (3 + 4) VARhour

OK Cancel

This screen allows you to assign a KYZ output to an accumulator. Click on the pull-down menu to select accumulation configuration for each of the 4 relays. The options are:

- Disabled
- Quad (1+4) Watthr
- Quad (2+3) Watthr
- Quad (1+2) VARhr
- Quad (3+4) VARhr
- Quad (1+2+3+4) VAhr
- Quad 1 Watthr
- Quad 2 Watthr
- Quad 3 Watthr
- Quad4 Watthr
- Quad 1 VARhr
- Quad 2 VARhr
- Quad 3 VARhr
- Quad 4 VARhr
- Quad 1 VAhr
- Quad 2 VAhr

- Quad 3 VAhr
- Quad 4 VAhr
- +Qh Total
- -Qh Total
- Internal Input (#1-8) Totals
- Accumulation (#1-4) Totals
- External Digital Input Modules (1-4) Inputs (#1-8)
- I Squared T (A, B, C)
- V Squared T (A,B,C)

## 20mAON4 Screen

The screenshot shows a window titled "Device Profile: Analog Output". Inside, there is a table with two columns: "Output" and "Assigned Item (Click Item to Change)". The table has four rows, numbered 1 to 4. Row 1 is assigned "High Speed Updated:Voltage A-B", Row 2 is "High Speed Updated:Voltage B-C", Row 3 is "High Speed Updated:Voltage C-A", and Row 4 is "Thermal Average:Current N Calculated". Below the table, there is a "Channel Update" label and a dropdown menu showing "1". A horizontal line separates this from a note: "For Pulse Accumulators and Aggregator Block Window Average (8 Byte data) only, please choose 4 of the 8 bytes you want to map to the Analog outputs". Below the note is another dropdown menu showing "Bytes 7, 6, 5, 4". At the bottom are three buttons: "OK", "Cancel", and "Help".

Output	Assigned Item (Click Item to Change)
1	High Speed Updated:Voltage A-B
2	High Speed Updated:Voltage B-C
3	High Speed Updated:Voltage C-A
4	Thermal Average:Current N Calculated

Channel Update 1

---

For Pulse Accumulators and Aggregator Block Window Average (8 Byte data) only,  
please choose 4 of the 8 bytes you want to map to the Analog outputs

Bytes 7, 6, 5, 4

OK Cancel Help

Click in Output channels 1-4 to assign them to a parameter. The other Analog Output Modules - 20mAON8, 1mAON4, and 1mAON8 have similar setting screens, except for the number of channels you can program.

- The analog outputs are used to send a variable current dependent on the programmed reading. This screen lets you select the readings to output.



## 4RO1 Screen

Device Profile: Digital Output

Relay	Label	Common Shorted to N.C.	Common Shorted to N.O.	Lock to Manual Control
1	Relay 1	Closed1	Open1	<input checked="" type="checkbox"/>
2	Relay2	Closed2	Open2	<input checked="" type="checkbox"/>
3	Relay3	Closed3	Open3	<input checked="" type="checkbox"/>
4	Relay4	Closed4	Open4	<input type="checkbox"/>

OK Cancel Help

Click in the Relay fields 1-4 to enter relay label, common shorted to N.C., common shorted to N.O., and check the box to lock the relay to manual control. When a relay is locked to manual control, it cannot be used in ElectroLogic Relay Control (see Section 13.3.2 for information on ElectroLogic Relay Control).

## Analog Input Screen

Device Profile: Analog Input

Input	Channel Label	High Value (20mA)	Low Value (4mA)
1	Temperature	100.0000	0.0000
2	Humidity	100.0000	0.0000
3		0.0000	0.0000
4		0.0000	0.0000
5		0.0000	0.0000
6		0.0000	0.0000
7		0.0000	0.0000
8		0.0000	0.0000

OK Cancel Help

Click in Input Channels 1-8 to assign a label and a High and Low Value.

- The two analog input module's settings are the same, except for the Inputs' high and low range.
- The High and Low Value fields let you map the inputs' high and low range to values that are appropriate for the parameters you are measuring. For example,

in the screen above, the first input is measuring temperature. The high value for the input is set to 100, and the low value is set to 0. An input reading of 12mA will translate to 50 for the temperature.

The Analog Input modules can be trended in the historical logs, and the data can be viewed and graphed in Log Viewer (see Chapter 19 for details). The readings shown in the logs and graphs will use the setting range programmed in the screen above, i.e., the results will be reported as 0 through 100.

#### Digital Input Screen

Device Profile: Digital Input

Input	Channel Label	Open Label	Closed Label	Normal State
1	Ext Dig In 1	Open 1	Closed 1	Open ▾
2	Ext Dig In 2	Open 2	Closed 2	Open ▾
3	Ext Dig In 3	Open 3	Closed 3	Open ▾
4	Ext Dig In 4	Open 4	Closed 4	Open ▾
5	Ext Dig In 5	Open 5	Closed 5	Open ▾
6	Ext Dig In 6	Open 6	Closed 6	Open ▾
7	Ext Dig In 7	Open 7	Closed 7	Open ▾
8	Ext Dig In 8	Open 8	Closed 8	Open ▾

OK Cancel Help

Click in Channel Label's 1-8 to assign a Channel label, Open and Closed label, and Normal State (Open or Shorted) for each of the digital inputs.

#### NOTES:

- The Assigned Address, Nexus® settings, and Module settings you can make depend on the module you are configuring. The modules and settings are explained fully in the *Nexus® 1252 Installation and Operation Manual*.
- Port 4 is the only available port for the modules.
- Log/Limit ID is a display only field. It shows the ID CommunicatorPQA™ software generates to identify this module in the Log Viewer and Limits functions.

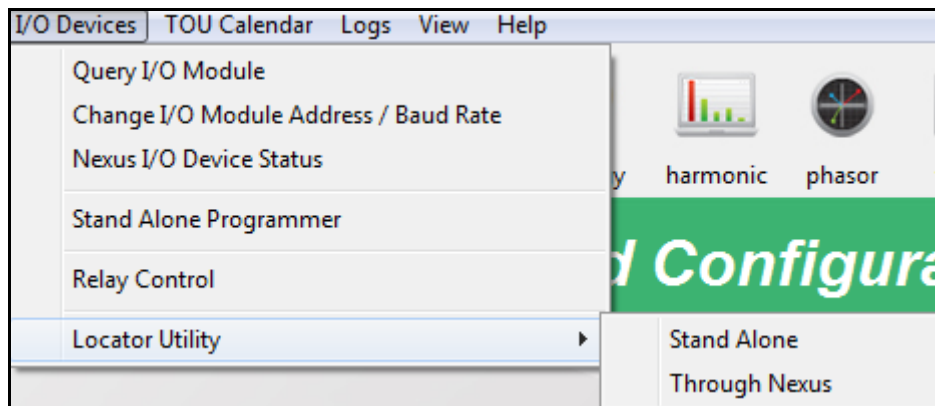
3. Click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

# 14: External I/O Modules

## 14.1: Overview

The Nexus® 1500+, 1262/1272, 1450, and 1252 meters have optional external I/O modules. Refer to your meter's Installation and Operation manual for the options offered and physical installation instructions, any necessary power supplies, and related hardware considerations.

The external I/O devices are programmed through the meter's Device Profile (refer to the Communications and External I/O Devices settings instructions for your meter in chapters 11-13). There are additional software options available through the I/O Devices menu, which is accessed from the Main screen's Menu Bar.



This chapter explains these software options.

### 14.1.1: Information About the External I/O Modules

- Depending on the Nexus® meter you are configuring, the external I/O devices use the following RS485 Com ports:
  - Nexus® 1500+ meter's optional Port 2
  - Nexus® 1262/1272 meter's Port 4
  - Nexus® 1450/1252 meter's Port 3 or 4

**IMPORTANT!** You must use the correct port. Be sure ports are set to operate at the same baud rate as the I/O modules. The ports must also be configured as Output Modules. See chapters 11 (Nexus® 1500+ meter), 12 (Nexus® 1262/

1272 meter), 13 (Nexus® 1252 meter), and 27 (Nexus® 1450 meter) for port configuration instructions.

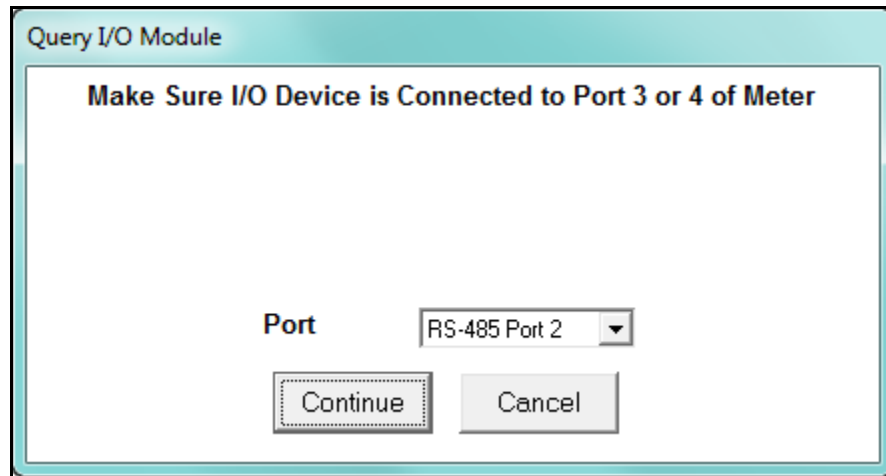
- The External I/O Modules setting of the Nexus® meter's Device Profile (Chapters 11 - 13), tells the meter which I/O Modules are connected to it at which addresses. This profile must reflect what is physically attached to the meter.
- Revise the Nexus® meter's Device Profile each time an I/O module is added, removed or configured.
- Each type of I/O module is shipped with a factory-set address (see sections 11.5, 12.5, and 13.5 for details and the table of factory-set addresses for each of the I/O modules). If you plan to use more than one I/O module of the same type (such as three KYZ modules), you must change the address of each module individually before connecting the group to the Nexus® meter. See Section 14.3 for instructions on changing a module's address and baud rate.

## 14.2: Query I/O Module

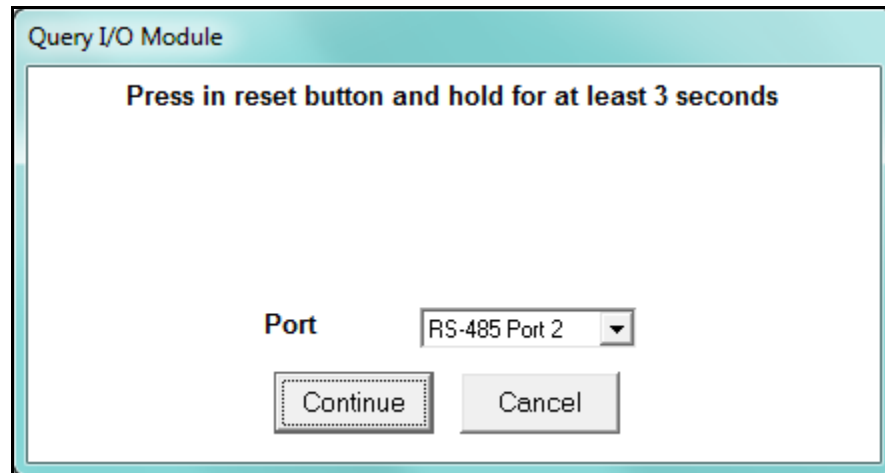
Though the I/O modules are shipped with default addresses (shown in the tables in sections 11.5, 12.5, and 13.5), in the case that you have changed the address and don't know it, you can use the Query I/O Module option to locate a module with an unknown address and baud rate.

**NOTES:** This utility requires you to press the I/O module's Reset button. If you are off-site, or cannot access the Reset button, use the Locator Utility option described in Section 14.7, instead.

1. From the Menu Bar, select I/O Devices>Query I/O Module. See the example screen, shown below.



2. Select the port the module is connected to from the pull-down menu and click Continue. You will see the screen shown below.



3. Use an instrument with a fine point to depress the I/O module's Reset button. Hold it in for at least three seconds. This resets the I/O module to address 247 at 57600 baud for thirty seconds, allowing the CommunicatorPQA® application to retrieve the stored address and baud rate.
4. Click Continue. The software begins looking for the device at the temporary address of 247. When the I/O's programmable information is located, the following

screen opens (the specific screen you see will be for the type of External I/O Module you are connected to).

**Analog Output 4 to 20 mA External Module Programmer**

Module Type: Analog Output Module 8 Channel

Version: 0014, Build 106

Address: 32

Baud Rate: 57600

Transmit Delay: 0.00 s

Channel #	Scale High Value(20mA)	Scale Low Value(4mA)
1	1800.0000	-1800.0000
2	0.1500	0.0300
3	20.0000	4.0000
4	20.0000	4.0000
5	0.0000	1011.0000
6	3.0000	8196.0000
7	2.0000	1.0000
8	1800.0000	0.0000

Buttons: Send, Retrieve, Exit, Print, Save, Load, Help

5. Write down the address and baud rate.

6. Click Exit to close the screen.

### 14.3: Assign Addresses and Baud Rates to an I/O Module

As mentioned previously, the external I/O modules are shipped with a factory-set default address and baud rate. If you have more than one of a particular type of I/O module, you'll have to change the address of the additional module(s), since each I/O module must have a unique address. This feature lets you change the address of an I/O module. You can also change the baud rate of the module with this feature, if you wish.

#### NOTES:

- The utility described here requires the I/O module to be connected to the meter's I/O port - Port 2 of the Nexus® 1500 meter, Port 4 of the Nexus® 1262/1272 meter, or ports 3 or 4 of the Nexus® 1252 meter. To configure an I/O module by

connecting it directly to your computer rather than to the meter, use the Stand Alone Programmer utility: see Section 14.5 for instructions.

- You must know the current address and baud rate of the I/O you want to change. See 14.2: Query I/O Module, on page 14-2 and 14.7: Locator Utility, on page 14-15, if the address and/or baud rate has been changed or is no longer known. When you have determined the current address and baud rate, proceed with the steps listed below.

1. Make sure the Nexus® meter's port is configured to communicate with the external I/O module. See the Communications setting instruction in your meter's programming chapter.

2. Connect the external I/O module to the meter's port.

**NOTE:** You may connect a group of I/O modules to the Nexus® meter to make address/baud rate changes only if each I/O already has a unique address. If the I/O modules have the same address - such as three new KYZ modules—you must connect and change their addresses individually.

3. Select I/O Devices>Change I/O Module Address/Baud Rate. You will see the screen shown below.

Change Address / Baud Rate [Through Device]

	Current Settings	New Settings
Port	Port 4	Port 4
Module Address	1	3
Module Baud Rate	57600	57600

Make Change Cancel

4. From the pull-down menus:

- a. Select the port the I/O module is connected to.
- b. Enter the module's current address and baud rate.

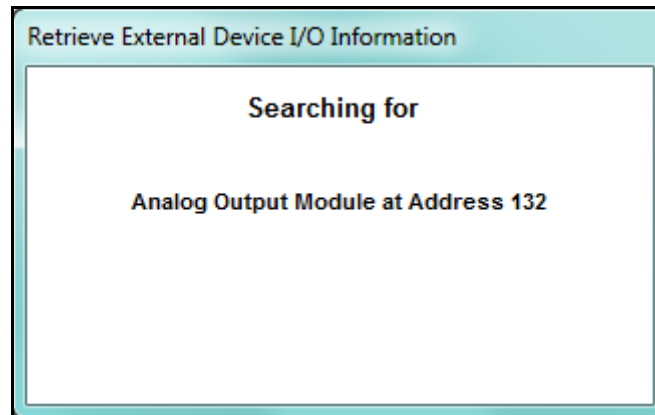
- c. Enter the new address (1 - 247)and/or baud rate(4800, 9600, 19,200, 57600). Make sure that the address is not already assigned to an external I/O module you will be using.
  - d. Click Make Change. A confirmation screen appears after the module has been updated. If there are multiple I/O modules in this group, repeat the procedure for all of the I/O modules.
5. Write down the module's new address and baud rate.
6. Enter the information in the meter's External I/O settings screen. Refer to the programming chapter for your meter.



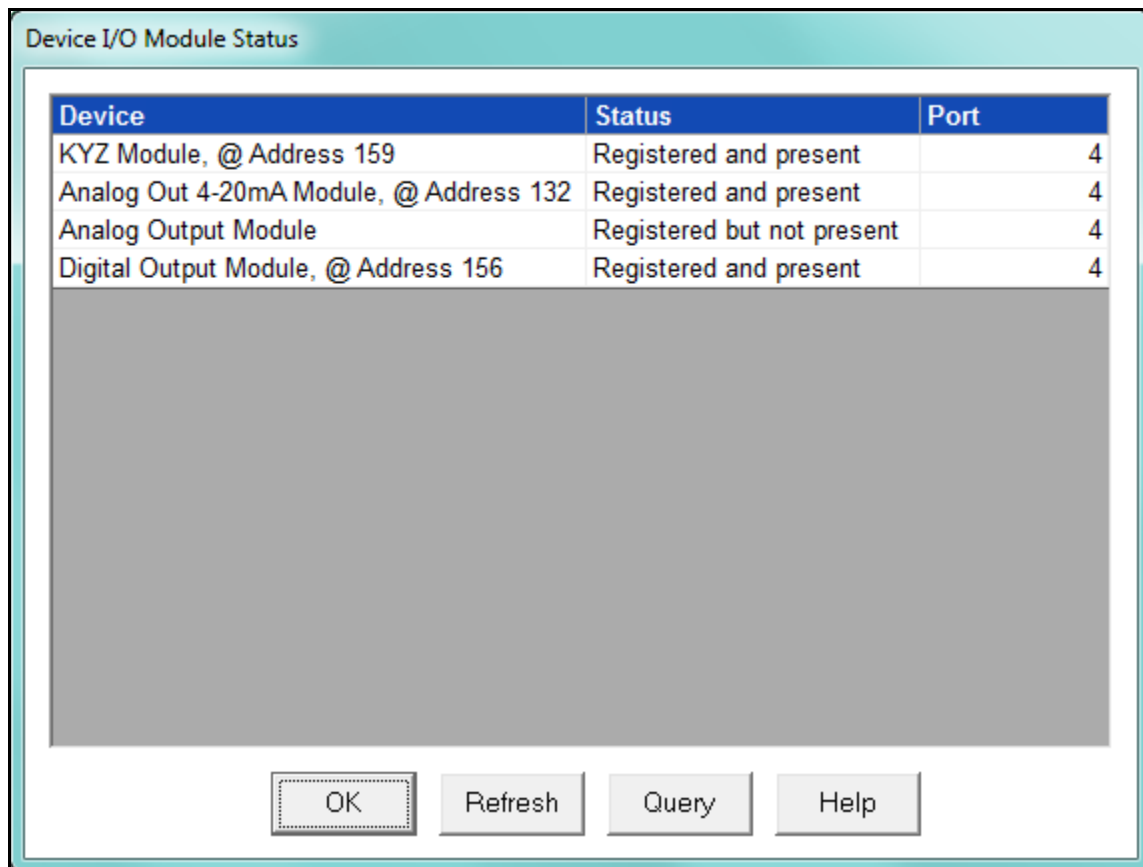
### 14.4: Nexus® I/O Device Status

This utility lets you view a list of all the modules that have been entered ("registered") in the Nexus® meter's Device Profile.

1. From the Menu Bar, select I/O Devices>Nexus I/O Device Status. CommunicatorPQA® software searches for all entered I/O modules. You will see a status screen while the I/O modules are being located. See the example screen below.



2. When the external I/O modules are all located you will see the following screen.



3. To view the current programmable settings of a particular module, select it and click Query. You will see the status screens shown below.

Device	Status	Port
KYZ Module, @ Address 159	Registered and present	4
Analog Out 4-20mA Module, @ Address 132	Registered and present	4
Analog Output Module	Registered but not present	4
Digital Output Module		4

I/O Modules

**Retrieving Programmable Settings**

Please Wait

I/O Modules

**Reading Block 9 of 12**

Read in 4 registers from the buffer

4. When the information is all found, you will see a screen like the one shown below.

**KYZ External Module Settings**

Module Type: KYZ Module

Version: 0017, Build 114

Address: 159

Baud Rate: 57600

Transmit Delay: 0.00 s

KYZ Output	Watt/Pulse	Roll Over	Min Pulse Width (ms)
1	1000	9999999999999999	300
2	1000	9999999999999999	300
3	1	9999999999999999	250
4	1	9999999999999999	250

Exit Print Help

5. Click Print to select a printer and then print a copy of this screen.

6. Click Exit to return to the I/O Module Status screen.

7. Click Refresh to initiate a new search and listing of connected I/O modules; click OK to close the screen.

## 14.5: Stand Alone Programmer

The Stand Alone programmer lets you configure all parameters of an I/O module or group of I/O modules by connecting the I/O modules directly to the computer.

**NOTE:** If you plan to connect the I/O module(s) to a Nexus® meter in the future, you must still enter it in the External I/O Devices setting of the Nexus® meter's Device Profile.

To use the Stand Alone Programmer, you will need the following:

- RS232 Cable or USB Cable
- EIG's Unicom 2500 (or similar RS232/RS485 converter) or an USB to RS485 converter

- An RS485 cable with power wires separated from communication wires; see diagram below.
  - A 15–20V DC at 50–200mA power source for the I/O module, such as EIG model PSIO; you may also use any port on a Nexus® 1252 meter as a power source (12VA max combined).
1. Wire the Unicom or other converter, I/O module(s) and computer as shown:
  2. Either connect a USB to RS485 cable into your computer, or use an RS232 cable to connect the Unicom 2500 and your computer:
    - Set the Unicom to operate at 57600 baud rate.
    - Set the Unicom to DCE and HD.
  3. Click the Connect icon in the Main screen's Icon Bar, or select Connect>Quick Connect from the Menu Bar. You will see the screen shown below.

**Connect**

☒ **Serial Port**      ☐ **Network**

---

**Device Address**      1

**Baud Rate**      57600

☐ **Available Ports**    ☒ **All Ports**

**Port**      COM1

**Protocol**      Modbus RTU

**Flow Control**      None

**Echo Mode**      No Echo

**Parity**      None

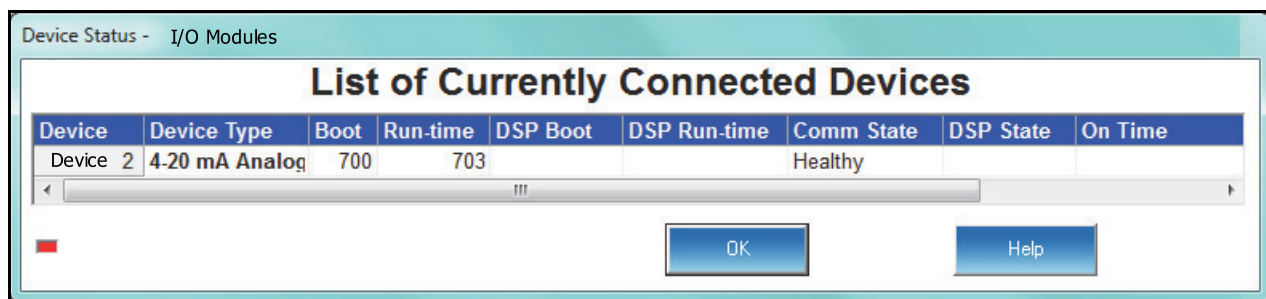
☐ **Disable DTR**

**Connect**    **Cancel**    **Help**

- a. In the Device Address field, enter the current address of one of the I/O modules in the group. If you do not know the address, use the Stand Alone Locator utility (see 14.7: Locator Utility, on page 14-15).

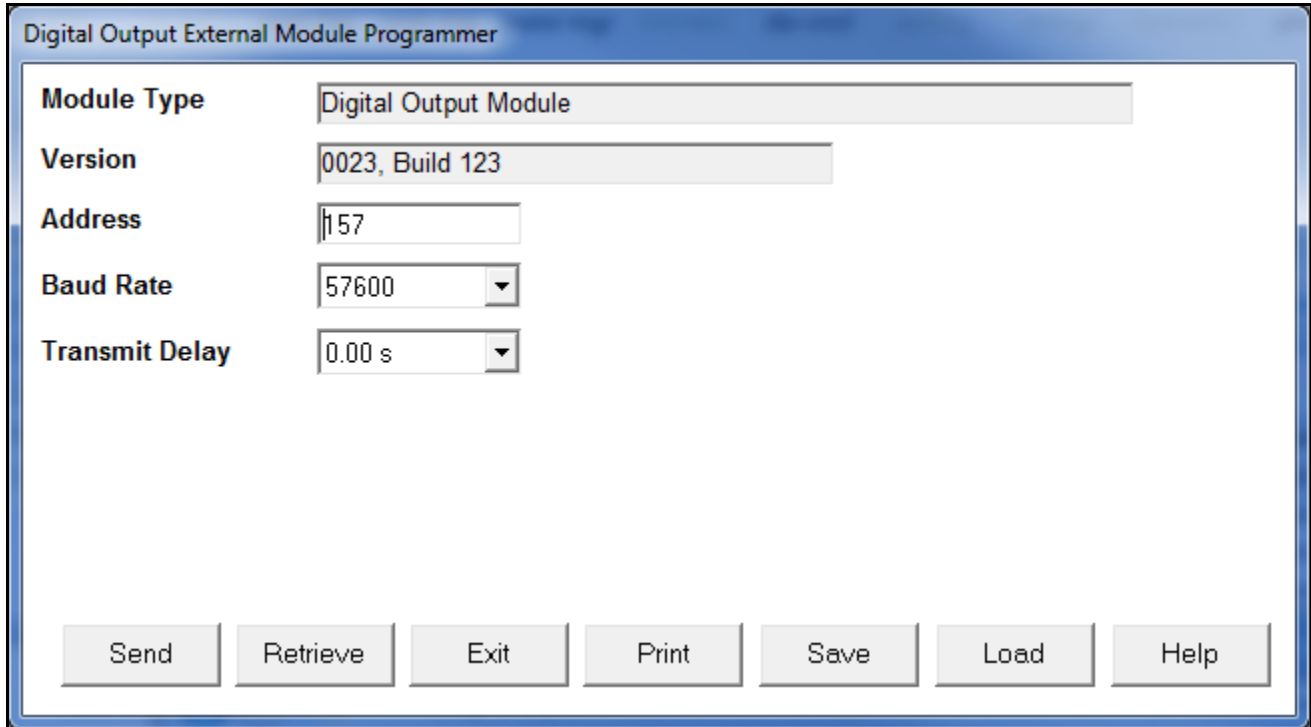
- b. In the Baud Rate field, enter a baud rate that matches the baud rate of the I/O modules - 57600 is recommended. If you do not know the baud rate, use the Stand Alone Locator utility (see 14.7: Locator Utility, on page 14-15).
  - c. In the Serial Port field, enter the computer's communication port into which the RS232 cable is inserted.
  - d. Leave the Protocol field set to Modbus RTU.
4. Click Connect. The software searches for a module at the specified baud rate and address.
  5. When it has located the external I/O(s) modules, you will see the following screen.

**NOTE:** The software will find a group of external I/O modules if they have been added together on the Connection Manager screen (see Chapter 3).



6. Click OK to close the Status screen.
7. From the Menu Bar, select I/O Devices>Stand Alone Programmer. The CommunicatorPQA® software retrieves the current settings from the I/O module and displays them in the Module Programmer screen. The contents of this screen will vary, depending on the type of module in use. The example below shows the Digital Output Module Programmer screen. See the instructions for programming the

external I/O modules in the External I/O Devices settings section of your meters programming chapter (chapters 11-13).



The screenshot shows a software window titled "Digital Output External Module Programmer". It contains several input fields and a row of buttons at the bottom. The fields are: "Module Type" with a dropdown menu showing "Digital Output Module"; "Version" with a text box containing "0023, Build 123"; "Address" with a text box containing "157"; "Baud Rate" with a dropdown menu showing "57600"; and "Transmit Delay" with a dropdown menu showing "0.00 s". The buttons at the bottom are "Send", "Retrieve", "Exit", "Print", "Save", "Load", and "Help".

8. When you have finished configuring the address, baud rate and other programmable settings, click Send to send the new settings to the I/O module.
9. If you have connected a group of I/O modules to the computer, click Retrieve.
10. At the prompt, enter the address of the next module you wish to program. Click OK; the software will retrieve the programmable settings of that device.
11. When you have finished programming all of the external I/O modules, click Exit.

**IMPORTANT!** Be sure to enter any external I/O modules in the External I/O Devices setting of your meter's Device Profile when you connect them to the meter. See the instructions for programming the external I/O modules in the External I/O Devices settings section of your meters programming chapter (chapters 11-13).

14.6: Relay Control

- 1. Be sure each module has a unique address, is entered in the Nexus® meter’s Device Profile, and is connected to the meter’s I/O port at the same baud rate.
- 2. From the Menu Bar, select I/O Devices>Relay Control. You will see the screen shown below if you are connected to a Nexus® 1252/1262/1272/1450 meter, and the screen on the next page you are connected to a Nexus® 1500 meter.

External Relay Control

Relay	Name	State	Change
1	Peak Shaving	Common Shorted to N.C.	<input type="checkbox"/>
2		Common Shorted to N.C.	<input type="checkbox"/>
3		Common Shorted to N.C.	<input type="checkbox"/>
4		Common Shorted to N.C.	<input type="checkbox"/>
5	Not Installed		
6	Not Installed		
7	Not Installed		
8	Not Installed		
9	Not Installed		
10	Not Installed		
11	Not Installed		
12	Not Installed		
13	Not Installed		
14	Not Installed		
15	Not Installed		
16	Not Installed		

Select New State

Unlock

Apply

OK

Help

Relay Control

Relay	Name	State	Change
7	Relay 7	Common Shorted to N.O.	<input type="checkbox"/>
8	Relay 8	Common Shorted to N.O.	<input type="checkbox"/>
9	Relay 9	Common Shorted to N.O.	<input type="checkbox"/>
10	Relay 10	Common Shorted to N.O.	<input type="checkbox"/>
11	Relay 11	Common Shorted to N.O.	<input type="checkbox"/>
12	Relay 12	Common Shorted to N.O.	<input type="checkbox"/>
13	Relay	Common Shorted to N.C. *Locked*	<input type="checkbox"/>
14	Relay	Common Shorted to N.C. *Locked*	<input type="checkbox"/>
15	Relay	Common Shorted to N.C. *Locked*	<input type="checkbox"/>
16	Relay	Common Shorted to N.C. *Locked*	<input type="checkbox"/>

Select New State    Unlock   

3. The relays for each installed I/O module are shown in the screen. To change the state of one or more relays, click the box next to the relay(s) you want to change.

**NOTE:** The first 12 slots in the Nexus 1500/1500+ meter screen are for the two optional Relay Output Cards, and slots 13-16 are for the external Relay Output module. See Chapter 20 for information on Relay Control for the optional Relay Output cards.

4. Use the pull down menu next to Select New State to assign a "Lock Common to N.C.", "Lock Common to N.O." or an "Unlock" state to the relay(s).
5. Click the Apply button to send the new setting to one or more relays of one or more modules.
6. Click OK to close the screen when you have finished configuring all Relay Outputs.



## 14.7: Locator Utility

Use the Locator Utility to find an external I/O module's address and baud rate if you do not have access to the module's Reset button; if you can press the Reset button, use the Query I/O function. The Locator Utility has two options:

- Stand Alone - this option allows you to search for an external I/O module's address and baud rate by connecting the I/O module directly to the computer.
- Through Nexus - this option searches each address in succession only at the baud rate at which the computer and the Nexus® meter are connected.

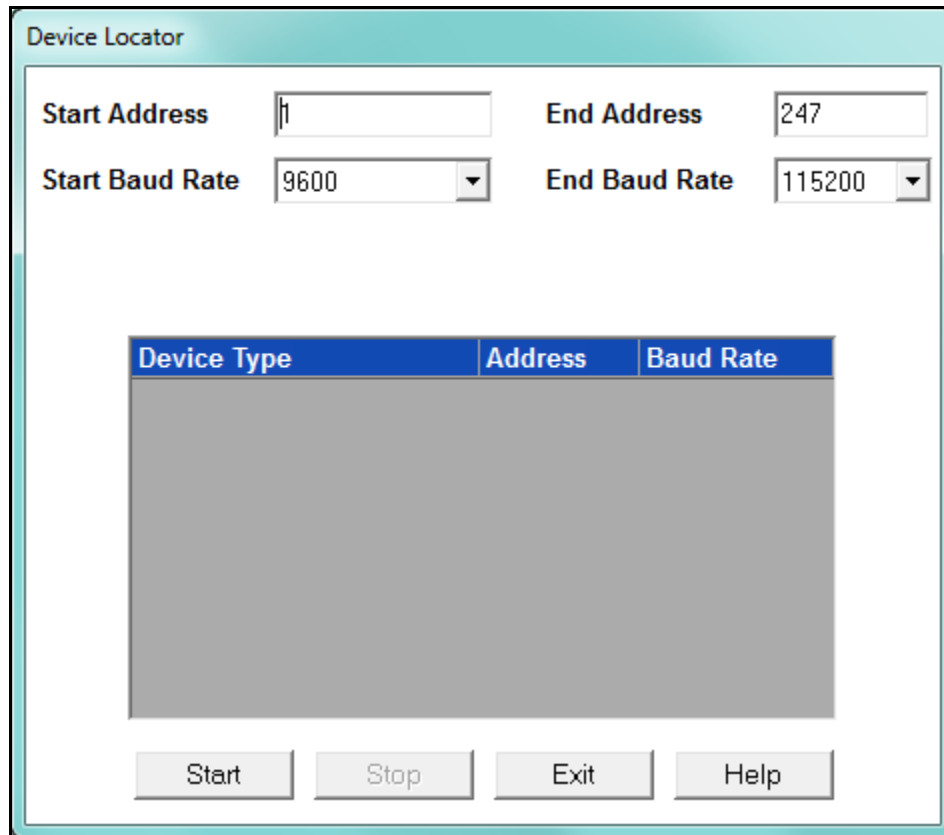
### 14.7.1: Locator through Stand Alone Mode

The Stand Alone Locator utility searches for any I/O device connected directly to your computer (it is not for use with remote connections). The search criteria is a programmable range of baud rates and addresses. When a device is found, Locator displays its name, baud rate and address.

To make a Stand Alone connection you will need the same connections as described in 14.5: Stand Alone Programmer, on page 14-9. Follow the information given for connecting the meter and external I/O module and the software connection steps through step 4.

1. CommunicatorPQA® software will be unable to locate the device - after a few seconds a No Device Found At This Location dialogue box will appear: click OK.

2. From the Menu Bar, select I/O Devices>Locator Utility>Stand Alone. You will see the screen shown below.



3. Set the address and baud rate ranges for the search. CommunicatorPQA® software will begin at the start address and baud rate, searching every address up to and including the End Address; then it will begin the same address search at the next baud rate in the range.

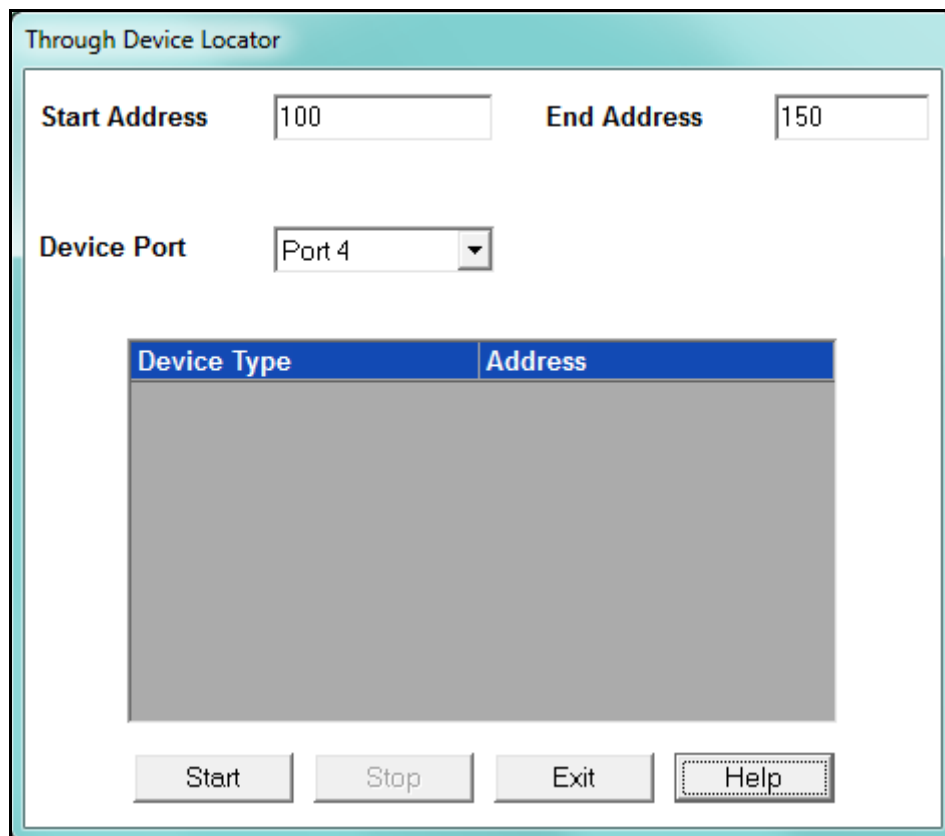
**NOTE:** If you include all baud rates, the Device Locator will take about 12 hours to complete the search. If you know the baud rate of the device (external I/O module usually have a baud rate of 57600), just look for addresses in that baud rate - the search will take minutes instead of hours.

4. Click Start. The Device Locator begins searching for devices within the specified baud rate and address range.
5. The Device Locator will continue to search for devices until it reaches the end of the specified criteria or until you click Stop. Write down the address and baud rate.
6. Click Exit to close the Device Locator screen.

### 14.7.2: Locator through Nexus® Mode

This option locates an external I/O module by searching each address in succession only at the baud rate at which the computer and the Nexus® meter are connected.

1. Connect the module to the Nexus® meter's I/O modules port.
2. Establish a connection between the computer and the Nexus® meter. The baud rate at which the computer and the Nexus® meter are connected is the baud rate Locator will use to search for the I/O module's address.
3. From the Menu bar, select I/O Devices>Locator Utility>Through Nexus. You will see the following screen.



4. Select the port the external I/O Module is attached to
5. Set the address range for the search in the Start and End Address fields. Set the address range as small as possible to limit the time of the search.
6. Click Start. CommunicatorPQA® software will begin at the Start Address, searching every address up to and including the End Address.

7. The Through Device Locator screen opens, listing any devices found, as shown in the example screen below.

The screenshot shows a window titled "Through Device Locator". It contains input fields for "Start Address" (125) and "End Address" (150). Below these is a "Device Port" dropdown menu set to "Port 4". A status message reads "Searching for a device at Address 133". A table displays the search results:

Device Type	Address
4-20 mA Analog Out	132

At the bottom of the window are four buttons: "Start", "Stop", "Exit", and "Help".

8. The software will continue to search for devices until it reaches the end of the address range for the port or until you click Stop.
9. Click Exit to close the Through Device Locator screen.

# 15: Time of Use

## 15.1: Overview

In Time of Use (TOU) metering, the meter is set up to automatically segment usage data based on the time it is used. The most common reason for this is to track On Peak and Off Peak energy consumption, so that customers can be charged more for On Peak times when energy is more expensive for the utility to produce. The TOU feature is important in rate jurisdictions that use the TOU method of billing.

When a user sets up TOU in a meter, the user is setting up the accumulation bins, for example, On Peak, and setting the rules for when energy usage is added to the bins, for example, from 9-5 on weekdays. For maximum flexibility, a TOU system lets the user set up multiple seasons, billing periods (these are usually months), types of days (weekday, weekend, holidays), and the time periods that are assigned to each bin. In advanced TOU systems, the user can also define which energy or other accumulators should be segmented.

The figure on the next page provides a graphical representation of TOU.

# Time of Use

Energy use is binned according to the time it is used, so that it can be billed for appropriately.

To set up the bins (that is, the rates), you can use:

## Seasons 1-4

### Months 1-12

#### Type of Days (Weekend/Weekday/Holiday)

#### Time of Day Bins (Rates)

For Example: Off-Peak=Lowest Energy Usage Cost  
On-Peak=Highest Energy Usage Cost  
Shoulder Peak=Middle Energy Usage Cost

TOU example: Season One, Month 1

Weekdays  
**Off Peak 12 am-7:59am**  
**On Peak 8 am - 5:59pm**  
**Shoulder Peak 6 pm - 7:59 pm**  
**Off Peak 8 pm-11:59pm**

Weekends  
**Off Peak 12 am-11:59pm**

Holidays  
**Off Peak 12 am-11:59pm**

Monday: the day's usage is binned as shown below:

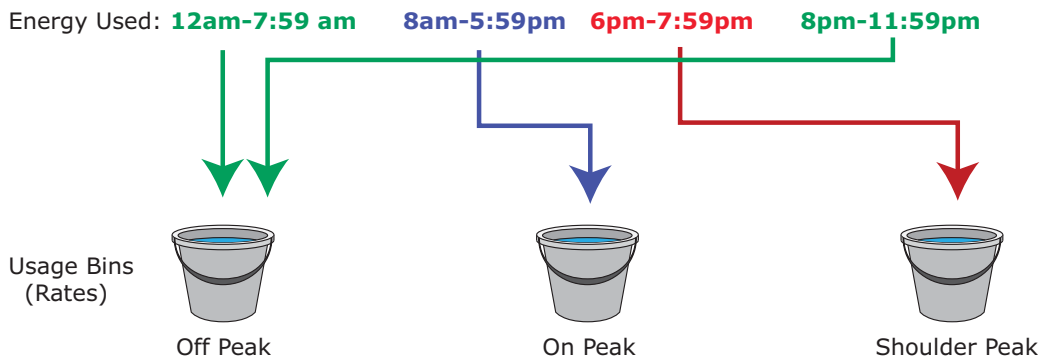


Figure 15.1: Time of Use

### 15.1.1: TOU in EIG Meters

TOU functions are found in many EIG meters. See the User Manual for your meter, for more information on your meter's TOU function. See [5.3.8: Poll Time of Use Registers, on page 5-42](#) for information on the TOU Polling screen.

The Nexus® 1252/1262/1272/1500 meters use a fixed 20 year calendar. With this implementation, each day must be configured. See [15.2: TOU for the Nexus® 12xx meters and the Nexus® 1500 Meter, on page 15-6](#).

The Nexus® 1450/1500+ and the Shark® 250/270 meters use EIG's advanced perpetual calendar to automatically calculate days based on event algorithms, so the user does not have to program each year. Following is a high-level summary of the TOU implementation - the specifics of the settings are explained in [15.3: Nexus® 1450/1500+/Shark® 250/270 Meter's TOU Settings, on page 15-45](#).

- Feature Enable/Disable: TOU is enabled or disabled in the meter's Device profile
- Demand Type and Interval: set in the meter's Device profile
  - Block Window type
  - Rolling Window type
- TOU Read modes
  - Self Read - TOU is automatically read based on the user's programming
  - Manual Read - TOU is read manually by the user
- Months
  - Up to 12 billing month periods
  - Configurable time of day for self read
- Seasons
  - Up to 4 season periods
  - A season can be configured as any length

- Configurable time of day for self read
- Weekly and Daily
  - Seasons can be set up for weekly self read or daily self read
  - Configurable starting day of the week for weekly self read
  - Configurable time of day for self read
- Calendar
  - Perpetual calendar
  - Flexible methods to specify dates for month, season and holiday
    - Recurring - month/day
    - Floating - nth day-of-week in month
    - Specific - month/day/year
    - Repeating - every n days beginning with month/day/year
    - Special - Easter and Good Friday
    - Configurable Date Occurs On
      - This day only
      - The following day only
      - The day and the following day
      - Only when this day falls on a weekday
      - This day only, unless this day falls on Saturday, then apply to the Friday before this day
      - This day only, unless this day falls on Sunday, then apply to the Monday after this day



- Holidays
  - Up to 31 calendar entries for holiday dates
- Rates
  - Up to 5 rates - one fixed totalizer rate and up to 4 individual user configurable rates, such as On Peak, Off Peak, Shoulder Peak, etc.
- Day Types
  - Holiday type
  - Up to 3 additional user configurable types, such as Weekday, Saturday, and Sunday
- Schedules
  - Up to 16 daily schedules
  - Rate changes may occur on any demand interval boundary
  - Up to 50 rate changes are available for all schedules combined
- Monitored Data Sets
  - Up to 16 data sets are available
  - Choose from 38 -61 accumulator demand values (number is dependent on meter model)
  - Choose from 12 -32 coincident demand values (number is dependent on meter model)
  - Each set includes
    - Accumulator
    - Peak demand with time stamp
    - Cumulative demand with continuous option
    - Coincident demand

## 15.2: TOU for the Nexus® 12xx meters and the Nexus® 1500 Meter

For the Nexus® 12xx meters and the Nexus® 1500 (not 1500+) meter, you have two options:

- Program an individual year calendar - allows a user to program a meter for just a particular year. The meters can store 20 individual years.
- Program a “perpetual” calendar - allows a user to program the meter for 20 years based on changing events that the meter automatically calculates.

In either of these cases, there are basic steps for programming the TOU calendar:

1. From the Tool Bar, select either:
  - TOU Calendar>Calendar Settings to set up an individual year’s calendar
  - TOU>Perpetual Calendar to create a perpetual calendar
2. Create the TOU calendar profile.
3. Send the TOU calendar profile to the connected meter. You can also send multiple TOU calendars to the meter at one time (TOU Calendar>Multi Calendar Update).
4. View, print or export the TOU calendar.
5. Reset the TOU accumulations at any time by selecting Reset Meter Information from the Tools Menu (see 20.1.7: Reset Device Information, on page 20-7). Resetting clears all accumulations of the current month or season and causes the accumulations to use the present date as the start date and accumulate to the next new end date, which is taken from the new calendar.

### NOTES:

- To use Daylight Savings Time, you must enable it in the meter’s Device Profile Time Settings screen (see the Time settings section of your meter’s programming chapter).
- If GPS Time (IRIG-B) is connected, you must set the appropriate time zone. Date and time settings (except year) are overridden by GPS Time.

**NOTE:** An IRIG-B signal-generating device connected to the GPS satellite system

will synchronize meters located at different geographic locations. See the Installation and Operation Manual for your meter, for installation instructions.

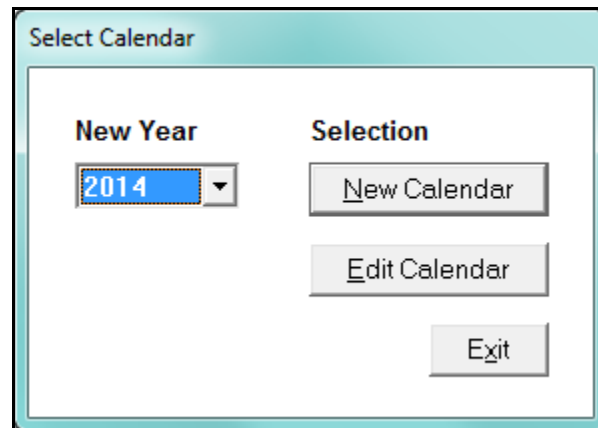
**NOTE on Time Sync:** If you are not using an external time sync method like NTP or IRIG-B, it is recommended that you enable line frequency sync for highest time accuracy.

### 15.2.1: Creating a TOU Calendar Profile - Yearly Profile

The TOU calendar profile sets the parameters for TOU data accumulation. You may store up to 20 individual calendars in the meter.

- To create a new individual calendar, follow the steps listed below. To edit an existing individual calendar, see 15.2.2: Edit a TOU Calendar Profile, on page 15-22.
- To create or edit a perpetual calendar (all 20 years at one time), see 15.2.4: Using the TOU Perpetual Calendar Configurator, on page 15-25.
- To load multiple calendars to a meter, see 15.2.3: Multi Calendar Update, on page 15-24.

1. From the TOU Calendar menu, select Calendar Settings. You will see the screen shown below.



2. From the pull-down menu, choose the year for which you would like to create a TOU usage structure.

3. Click New Calendar. You will see the screen shown below.

Edit Calendar [New]	
CURRENT YEAR	2014
LABELS	TOU Registers
DEMAND	Averaging
MONTHLY SELF READ	Monthly Bill Date
ADJUSTABLE SELF READ	Period Selection
REGISTER ACCUMULATION	Method
DAILY SETUP	TOU Schedules Calendar Assignments
STORE	Update Device Save to File
Cancel Help	

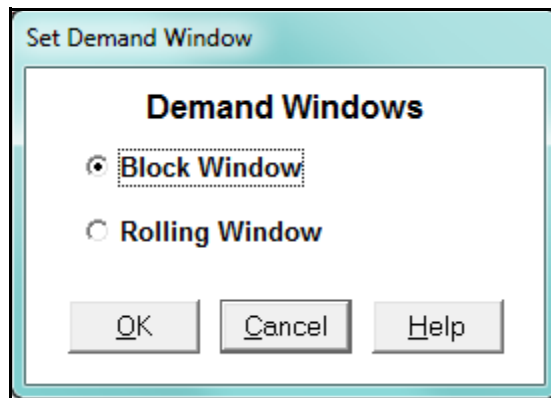
4. Click TOU Registers. You will see the screen shown below.

Assign Register Labels	
Register Label	
#1	On-Peak
#2	Off-Peak
#3	
#4	
#5	
#6	
#7	
#8	
OK Cancel Help	

5. A register is a type of rate structure, for example "Peak", "Off-Peak" or "Shoulder Peak." You will assign one register to each fifteen-minute interval of the day when you set up the TOU schedule (instructions on page 15-11). In this setting you will assign a name to any new registers. The default registers are Peak and Off-Peak.

- Enter a name for each different register (up to eight).
- Click OK to return to the main Edit Calendar screen.

6. Click Averaging. You will see the screen shown below.



7. Demand is the average rate of energy used over time. Select the type of Demand Averaging to be applied to the TOU accumulations: Block Demand or Rolling Window Demand. The Demand type you select should be the Demand needed for your specific jurisdiction. Most users rely on a Block Demand, however, a Rolling Demand is also available. The Demand Integration interval is usually 15 minutes, but it is programmable, and is configured in the meter's Device Profile.
8. Click OK to return to the main Edit Calendar screen.
9. Click on Monthly Bill Date. You will see the screen shown below.

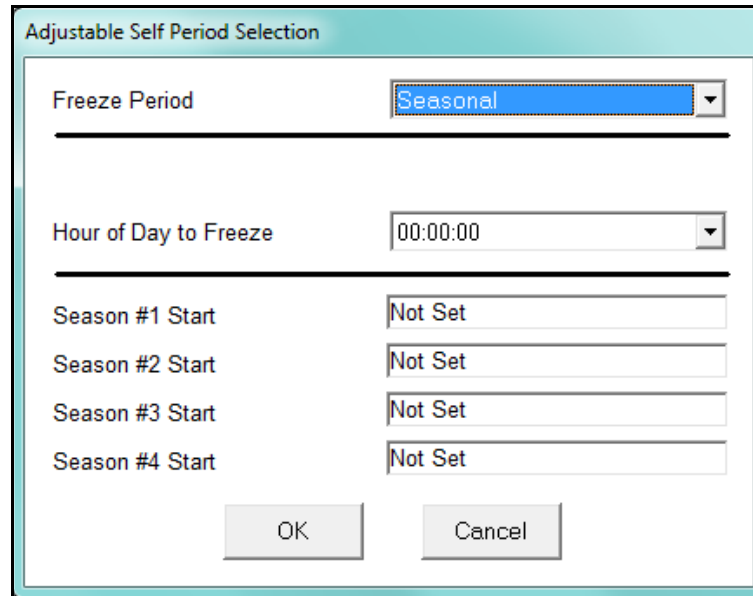
Current Year		2014	
January	Wed, 1	July	Tue, 1
February	Mon, 3	August	Fri, 1
March	Mon, 3	September	Tue, 2
April	Tue, 1	October	Wed, 1
May	Thu, 1	November	Mon, 3
June	Mon, 2	December	Mon, 1

Buttons: OK, Cancel, Help

The billing date delineates the self read. When the billing date is reached, the meter shifts the current month views to the previous month views. Since billing dates can differ, the user can program the day for each read.

10. To program a specific Bill Date for each month, use the pull-down menus. If you do not select a specific billing date for a given month, accumulations will continue until the next monthly billing date is reached or December 31, if there is no next year spanning calendar.
11. When you have entered all Monthly Bill Dates, click OK to return to the main Edit Calendar screen.

12.To set the Freeze values for Time of Use Polling, click Period Selection. You will see the screen shown below.



The image shows a dialog box titled "Adjustable Self Period Selection". It contains the following fields and controls:

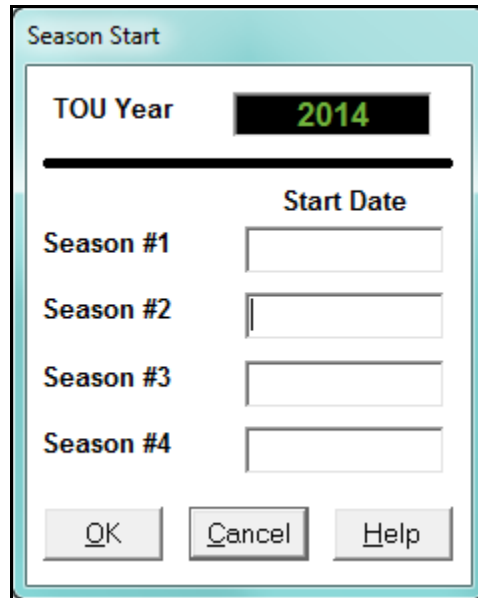
- Freeze Period:** A pull-down menu currently showing "Seasonal".
- Hour of Day to Freeze:** A pull-down menu currently showing "00:00:00".
- Season #1 Start:** A text field containing "Not Set".
- Season #2 Start:** A text field containing "Not Set".
- Season #3 Start:** A text field containing "Not Set".
- Season #4 Start:** A text field containing "Not Set".
- Buttons:** "OK" and "Cancel" buttons at the bottom.

13.The four Freeze Period options are Seasonal, Weekly, Daily, and Hourly. Click on the Freeze Period pull-down menu to select the option you want. The Freeze period specifies when TOU data will be copied to a Freeze register for later reading.

- a. Seasonal Freeze Period lets you set up to four seasons (time periods), for which values are frozen (accumulations of data are stopped) for Time of Use Polling. Select Hour of Day to Freeze from the pull-down menu next to this option. The Hour of Day specifies the time on the season start date that the season changes and the values are frozen.

Click one of the Season Start windows to specify the start date for the season. You will see the screen shown below. Enter a start date for each season field or double-click to retrieve a calendar from which you can choose a Month and Day.

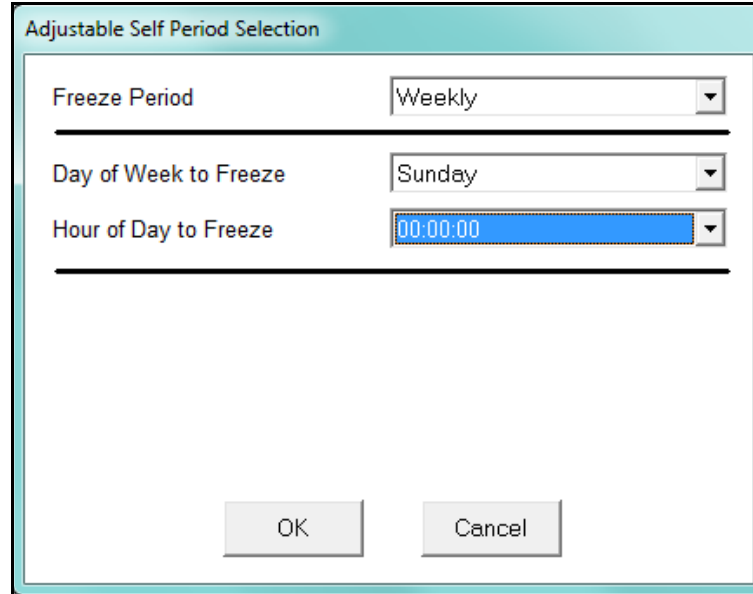
Click OK to return to the Adjustable Self Period Selection screen.

A screenshot of a 'Season Start' dialog box. At the top, it says 'Season Start'. Below that is a 'TOU Year' field with a black background and green text showing '2014'. A horizontal line separates this from the 'Start Date' section. Under 'Start Date', there are four rows labeled 'Season #1', 'Season #2', 'Season #3', and 'Season #4', each followed by an empty text input field. At the bottom of the dialog are three buttons: 'OK', 'Cancel', and 'Help'.

**NOTE:** The date format you use here should be the same as the date format set for your computer. To change or view your computer's date settings: open the Control Panel and select Clock, Language, and Region>Change the date, time, or number format.



- b. Weekly Freeze Period lets you set the day and hour each week at which values are frozen for Time of Use Polling. Select the Day of Week to Freeze and Hour to Freeze from the pull-down menus next to these options, in the Adjustable Self Period Selection screen.

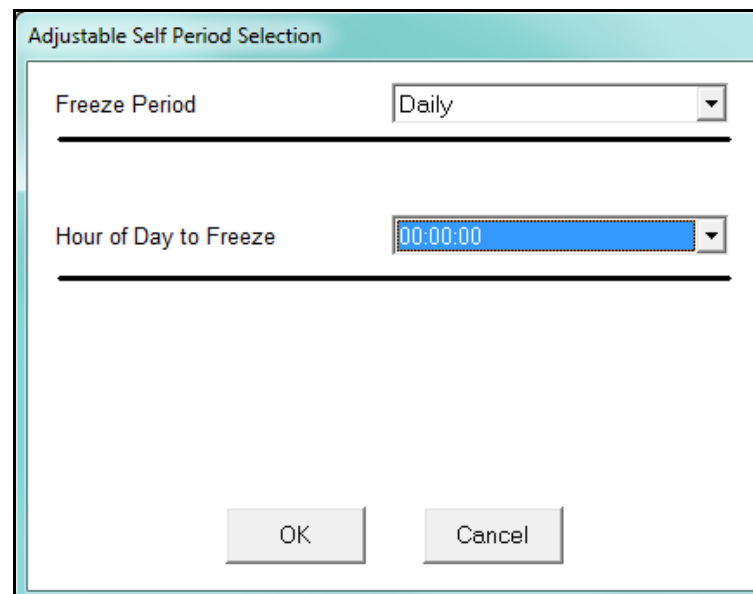


The dialog box titled "Adjustable Self Period Selection" has a light blue header. It contains three labeled fields, each with a pull-down menu. The first field, "Freeze Period", has "Weekly" selected. The second field, "Day of Week to Freeze", has "Sunday" selected. The third field, "Hour of Day to Freeze", has "00:00:00" selected. At the bottom are "OK" and "Cancel" buttons.

Freeze Period	Weekly
Day of Week to Freeze	Sunday
Hour of Day to Freeze	00:00:00

OK Cancel

- c. Daily Freeze Period lets you set the hour each day at which values are frozen for Time of Use Polling. Select Hour of Day to Freeze from the pull-down menu next to this option, in the Adjustable Self Period Selection screen.

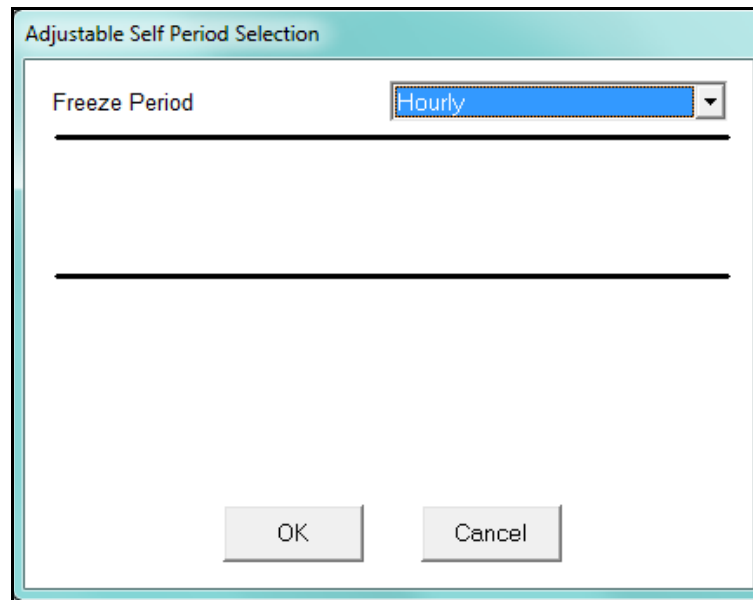


The dialog box titled "Adjustable Self Period Selection" has a light blue header. It contains two labeled fields, each with a pull-down menu. The first field, "Freeze Period", has "Daily" selected. The second field, "Hour of Day to Freeze", has "00:00:00" selected. At the bottom are "OK" and "Cancel" buttons.

Freeze Period	Daily
Hour of Day to Freeze	00:00:00

OK Cancel

- d. Hourly Freeze Period freezes the values for Time of Use Polling each hour.

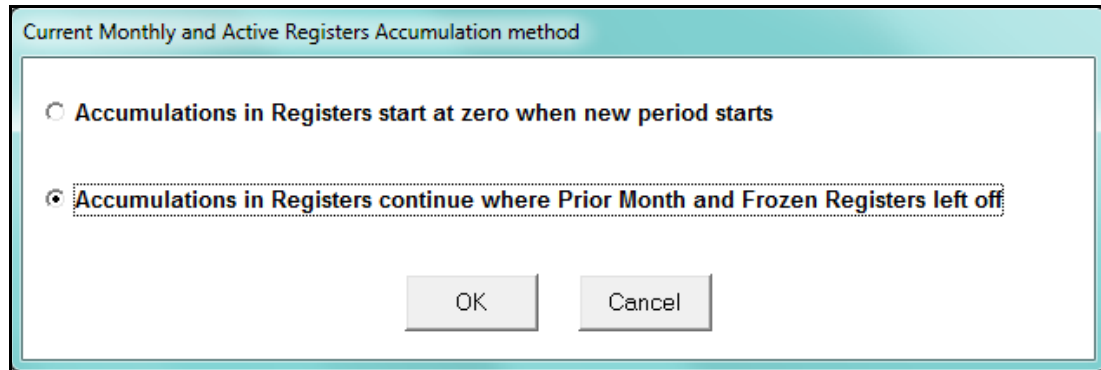


The image shows a dialog box titled "Adjustable Self Period Selection". It has a light blue header bar. Below the header, there is a label "Freeze Period" followed by a dropdown menu. The dropdown menu is currently set to "Hourly". Below the dropdown menu, there are two horizontal lines. At the bottom of the dialog box, there are two buttons: "OK" and "Cancel".

13. Click OK in the Adjustable Self Period Selection screen to save your selections and return to the main Edit Calendar screen; click Cancel to exit the screen without saving any changes.

14. Click Method in the Register Accumulation section of the Edit Calendar window.

You will see the screen shown below.



15. Click the radio button for the type of Accumulations you require and click OK:

- Click Accumulations in Registers start at zero when new period starts if you want accumulations to begin anew once the last period's values are frozen.
- Click Accumulations in Registers continue where Prior Month and Frozen Registers left off to add the new accumulations to the prior frozen ones.
  - In almost all cases, this will be a user's selection, so that the TOU registers continue to accumulate.

16. Click TOU Schedules. You will see the screen shown below.

The screenshot shows a software window titled "Edit TOU Schedules". It contains a table with 16 rows representing 15-minute intervals of a 24-hour day. The first column lists the time ranges. The next five columns are labeled "Schedule\_1" through "Schedule\_5". The data in the table is as follows:

	Schedule_1	Schedule_2	Schedule_3	Schedule_4	Schedule_5
09:00:00 - 09:14:59	On-Peak	Off-Peak	Off-Peak		
09:15:00 - 09:29:59	On-Peak	Off-Peak	Off-Peak		
09:30:00 - 09:44:59	On-Peak	Off-Peak	Off-Peak		
09:45:00 - 09:59:59	On-Peak	Off-Peak	Off-Peak		
10:00:00 - 10:14:59	On-Peak	Off-Peak	Off-Peak		
10:15:00 - 10:29:59	On-Peak	Off-Peak	Off-Peak		
10:30:00 - 10:44:59	On-Peak	Off-Peak	Off-Peak		
10:45:00 - 10:59:59	On-Peak	Off-Peak	Off-Peak		
11:00:00 - 11:14:59	On-Peak	Off-Peak	Off-Peak		
11:15:00 - 11:29:59	On-Peak	Off-Peak	Off-Peak		
11:30:00 - 11:44:59	On-Peak	Off-Peak	Off-Peak		
11:45:00 - 11:59:59	On-Peak	Off-Peak	Off-Peak		
12:00:00 - 12:14:59	On-Peak	Off-Peak	Off-Peak		
12:15:00 - 12:29:59	On-Peak	Off-Peak	Off-Peak		
12:30:00 - 12:44:59	On-Peak	Off-Peak	Off-Peak		
12:45:00 - 12:59:59	On-Peak	Off-Peak	Off-Peak		
13:00:00 - 13:14:59	On-Peak	Off-Peak	Off-Peak		
13:15:00 - 13:29:59	On-Peak	Off-Peak	Off-Peak		
13:30:00 - 13:44:59	On-Peak	Off-Peak	Off-Peak		
13:45:00 - 13:59:59	On-Peak	Off-Peak	Off-Peak		

At the bottom of the window are four buttons: "OK", "Cancel", "Edit", and "Help".

- The first column lists each fifteen-minute block of a 24-hour day.
- The individual Registers named in Step 5 will be applied to each fifteen-minute block.
- A schedule is the type of accumulation structure you will apply to individual days. You may program up to 16 different schedules (use the scroll bars to view all of the data in the screen).
- This screen sets up the bucketing so that TOU registers will be accumulated in different buckets at certain times of the day. See the example graphic on the next page.

## Time of Use Example: Weekday

Off-Peak	On-Peak	Shoulder Peak	Off-Peak
00:00 am - 8:59 am	9:00 am - 4:59 pm	5:00 pm - 6:59 pm	7:00 pm - 11:59 pm

Off-Peak=Lowest Energy Usage Cost  
 On-Peak=Highest Energy Usage Cost  
 Shoulder Peak=Middle Energy Usage Cost

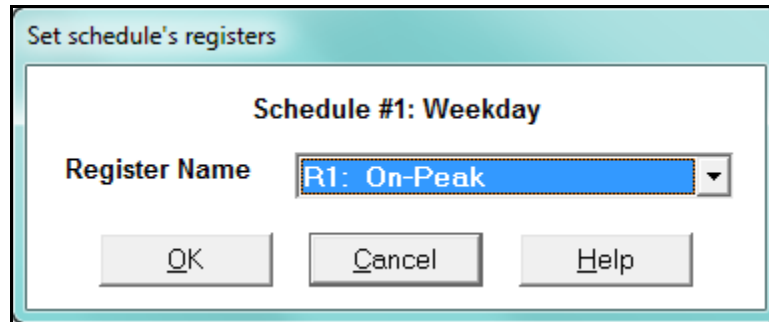
Figure 15.2: TOU Example

The Nexus® meter will switch accumulating to different registers based on the time of day to capture energy usage at these different rate structures.

17. Double-click on one of the Schedule Headings—for example: "Schedule\_1". You will see the following screen.

18. Enter a Name for the schedule, such as "Weekday," "Weekend" or "Holiday." Click OK. Note that all the names used here are just examples. They can be custom named to whatever you require.

19. Double-click on one of the fifteen-minute blocks in the schedule. You will see the following screen.



20. From the pull-down menu, select the Register Name you would like to apply to this fifteen-minute block. Click OK.
21. Repeat the above procedure until all fifteen-minute blocks in the schedule(s) are assigned registers.
22. When all schedules are formatted, click OK to return to the main Edit Calendar screen.

23. Click Calendar Assignments. You will see the screen shown below.

Time-of-Use Profile

**January 2014**

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

Prev << Month

Next Month >>

---

S1 Weekday      S2 Weekend      S3 Holiday      S4 No schedule name  
 S5 No schedule name      S6 No schedule name      S7 No schedule name      S8 No schedule name  
 S9 No schedule name      S10 No schedule name      S11 No schedule name      S12 No schedule name  
 S13 No schedule name      S14 No schedule name      S15 No schedule name      S16 No schedule name

With the use of color, the screen delineates how the day is described as a rate structure. The user must enter each holiday individually.

24. The schedules created in steps 16–21 are shown beneath the calendar. Each schedule is color-coded. Assign a schedule to each day by clicking on the day. You will see the screen shown below.

Assign a schedule to a date

Current Date **Wed, 1/1/2014**

Available Schedules **S03: Holiday**

25. From the pull-down menu, select the Schedule you would like to apply to this day.
26. Click OK to return to the calendar.
27. To apply a Schedule to a Range of Dates or to selected days of the week, click Multi Date. You will see the screen shown below.

**NOTE:** With the Multi Date button, you can quickly program a whole year (For Example, 2014) by selecting, for instance, all the weekdays (Mon - Fri) and in the Date Range type 01/01/14 to 12/31/14. Do the same for the weekend days. Fill in holidays and vacations for each month.

Assign a schedule to a date

Date Range  to

Available Schedules S01: Weekday

Day of Week

☐ Sunday ☐ Monday ☐ Tuesday

☐ Wednesday ☐ Thursday ☐ Friday

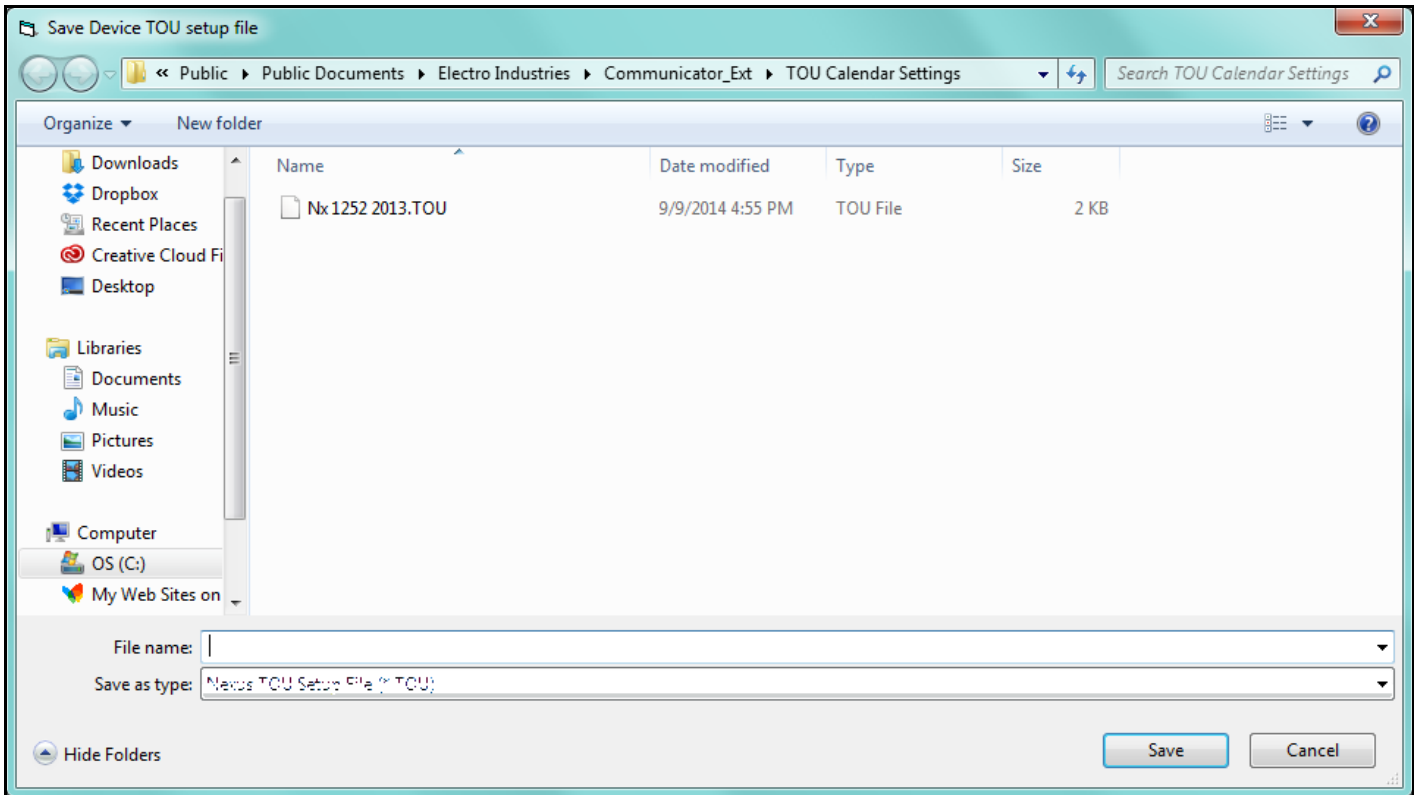
☐ Saturday

- a. Enter a Date Range.
  - b. Select the Schedule from the pull-down menu.
  - c. If you want, choose a Day of the Week.
  - d. Click OK.
28. Use the color-coded key below the calendar to review which Schedules have been applied to the month. Click Next Month and repeat the process for the year.
29. When the calendar settings are complete, click OK to return to the main Edit Calendar screen.



30. You may now:

- Click Save to File to send the calendar to the computer for future use. See 15.2.2: Edit a TOU Calendar Profile, on page 15-22 for instructions on editing a previously saved calendar. You will see a screen similar to the one shown below, which allows you to name and save the TOU file.

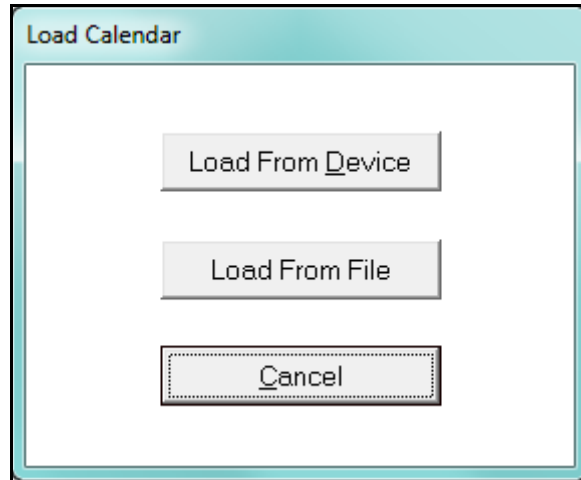


- Click Update Device to send the calendar to the meter. You will see a screen that prompts you to the year the calendar will be applied to. Select the radio button of the year you want to use and click Send. A message window will tell you that the calendar was received. Click OK. The meter will use the calendar for the designated year, based on the date settings of your computer.

**NOTE:** Do not enter more than one calendar for the same year (i.e., do not store two calendars for 2014). If you do, the meter uses the first calendar entered.

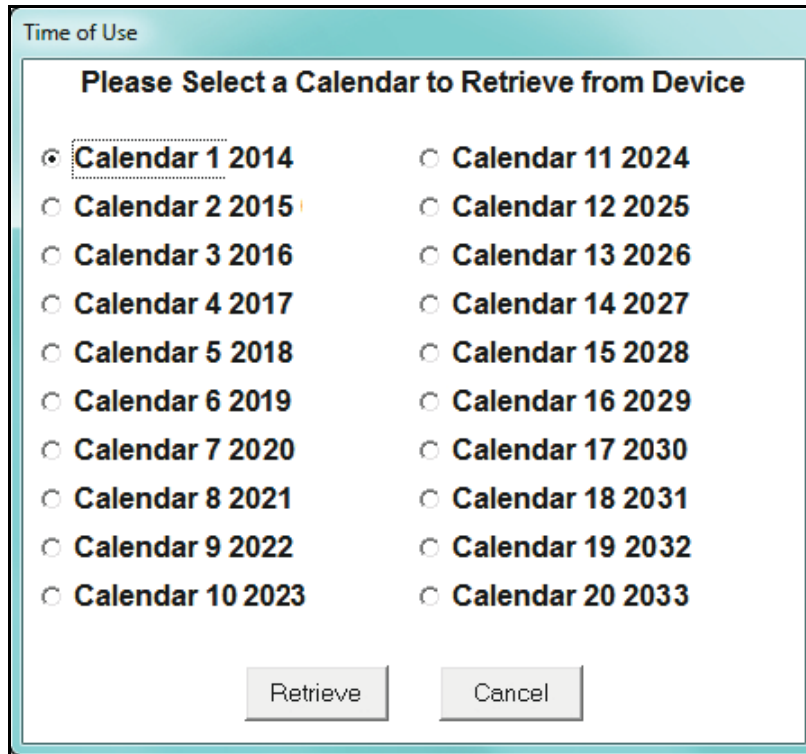
### 15.2.2: Edit a TOU Calendar Profile

1. From the Time of Use menu, select Calendar Settings. You will see the same screen as shown in 15.2.1: Creating a TOU Calendar Profile - Yearly Profile, on page 15-7. Click Edit Calendar. You will see the screen shown below.



- To edit a calendar saved on the computer's hard drive, click Load From File. A screen opens that lets you to locate the calendar. After the calendar has loaded, see 15.2.1: Creating a TOU Calendar Profile - Yearly Profile, on page 15-7, for details on programming the calendar.

- To edit one of the calendars stored in the meter, click Load from Device. You will see the following screen.



The screenshot shows a window titled "Time of Use" with a subtitle "Please Select a Calendar to Retrieve from Device". It contains a list of 20 radio button options, each labeled "Calendar [number] [year]". The first option, "Calendar 1 2014", is selected. The options are arranged in two columns. At the bottom of the window are two buttons: "Retrieve" and "Cancel".

Calendar	Year
Calendar 1	2014
Calendar 2	2015
Calendar 3	2016
Calendar 4	2017
Calendar 5	2018
Calendar 6	2019
Calendar 7	2020
Calendar 8	2021
Calendar 9	2022
Calendar 10	2023
Calendar 11	2024
Calendar 12	2025
Calendar 13	2026
Calendar 14	2027
Calendar 15	2028
Calendar 16	2029
Calendar 17	2030
Calendar 18	2031
Calendar 19	2032
Calendar 20	2033

2. Select the calendar year you would like to edit and click Retrieve. After the calendar has been retrieved, see 15.2.1: Creating a TOU Calendar Profile - Yearly Profile, on page 15-7, for details on programming the calendar.

### 15.2.3: Multi Calendar Update

Use this feature to send multiple individual year TOU calendars to the meter at one time.

1. From the TOU Calendar menu, select Multi Calendar Update. You will see the screen shown below.

2. You can select up to 20 calendars, using the tabs at the top of the screen.
  - To upload a calendar, click Select to select it from the Calendar Settings directory.
  - If your calendar(s) are saved in a different directory, click Select Directory and locate the files.
  - If a calendar is not loading correctly, you can increase the Inter Calendar Delay time to give the meter more time to process the data. If you are not having a problem, leave this field as it is.

3. Click Update to send the calendars to the meter; select Abort to cancel the update; select Close to close the window.

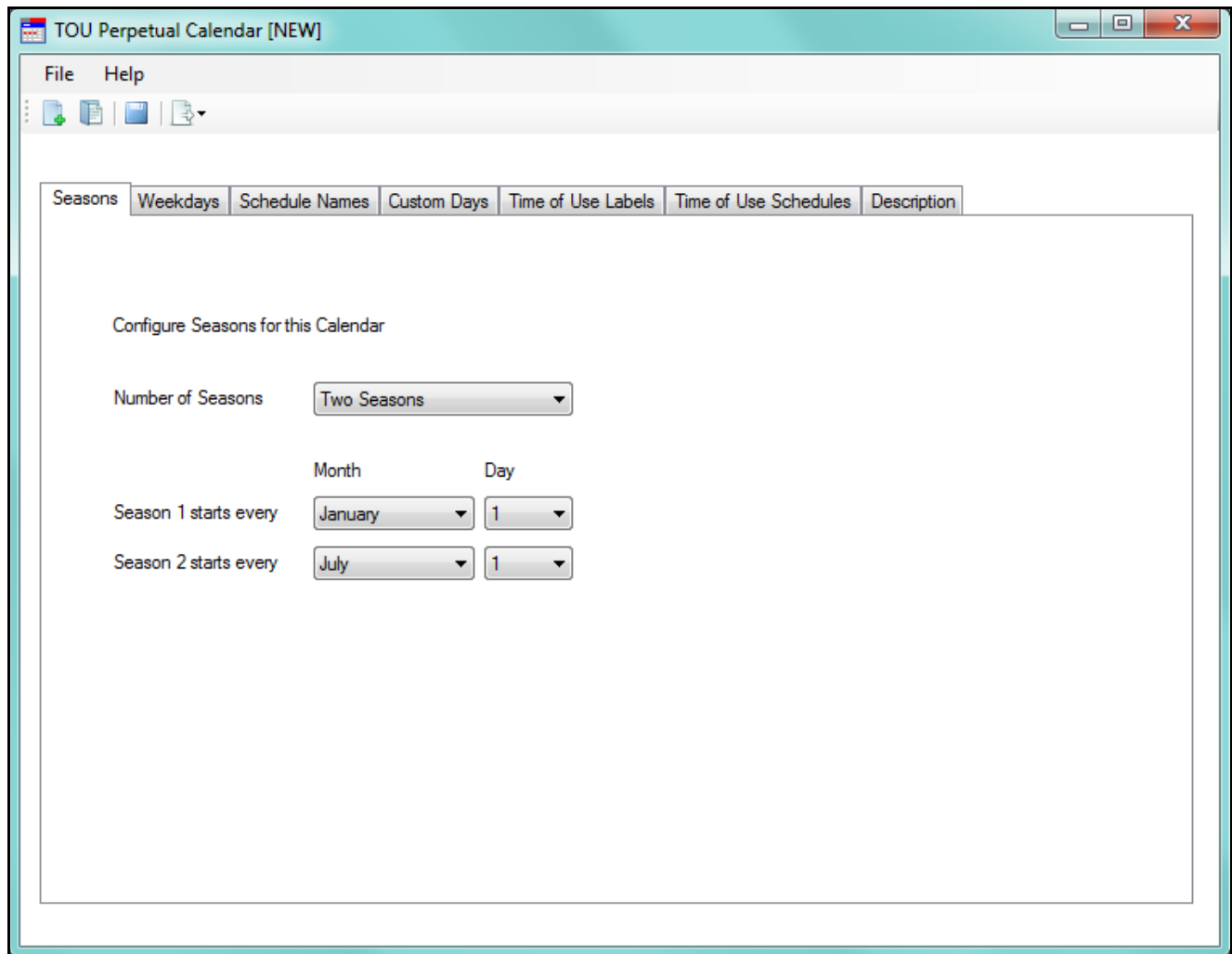
#### **15.2.4: Using the TOU Perpetual Calendar Configurator**

The TOU Perpetual Calendar configurator will automatically configure the meter for all 20 years. The structure of this feature is different, and rule-based. In an effort to simplify the TOU programming process, EIG developed this utility that configures the Nexus® 20 year calendars using a perpetual TOU calendar setup concept. This new form uses an event-based algorithm to configure all 20 years based on one setting from the user. It is much easier and faster and less prone to mistakes. However, if you wish to edit a specific year, you must use the individual edit calendar function discussed previously.

Note that the Nexus® 1450/1500+ meter uses a perpetual TOU calendar built into the meter's firmware (i.e., the software that runs the meter). The other Nexus® meters rely on this software-based perpetual calendar.

There are benefits to having the meters calculate the perpetual calendars internally. One of the main benefits is that the algorithms can be retrieved by the meter, at a later time, for analysis. With the PC software-based TOU, the meter will only provide the individual days of the year it has stored.

1. From the TOU Calendar menu, select Perpetual Calendar. You will see the screen shown below.



2. The TOU Perpetual Calendar screen has tabs that let you access all of its settings:

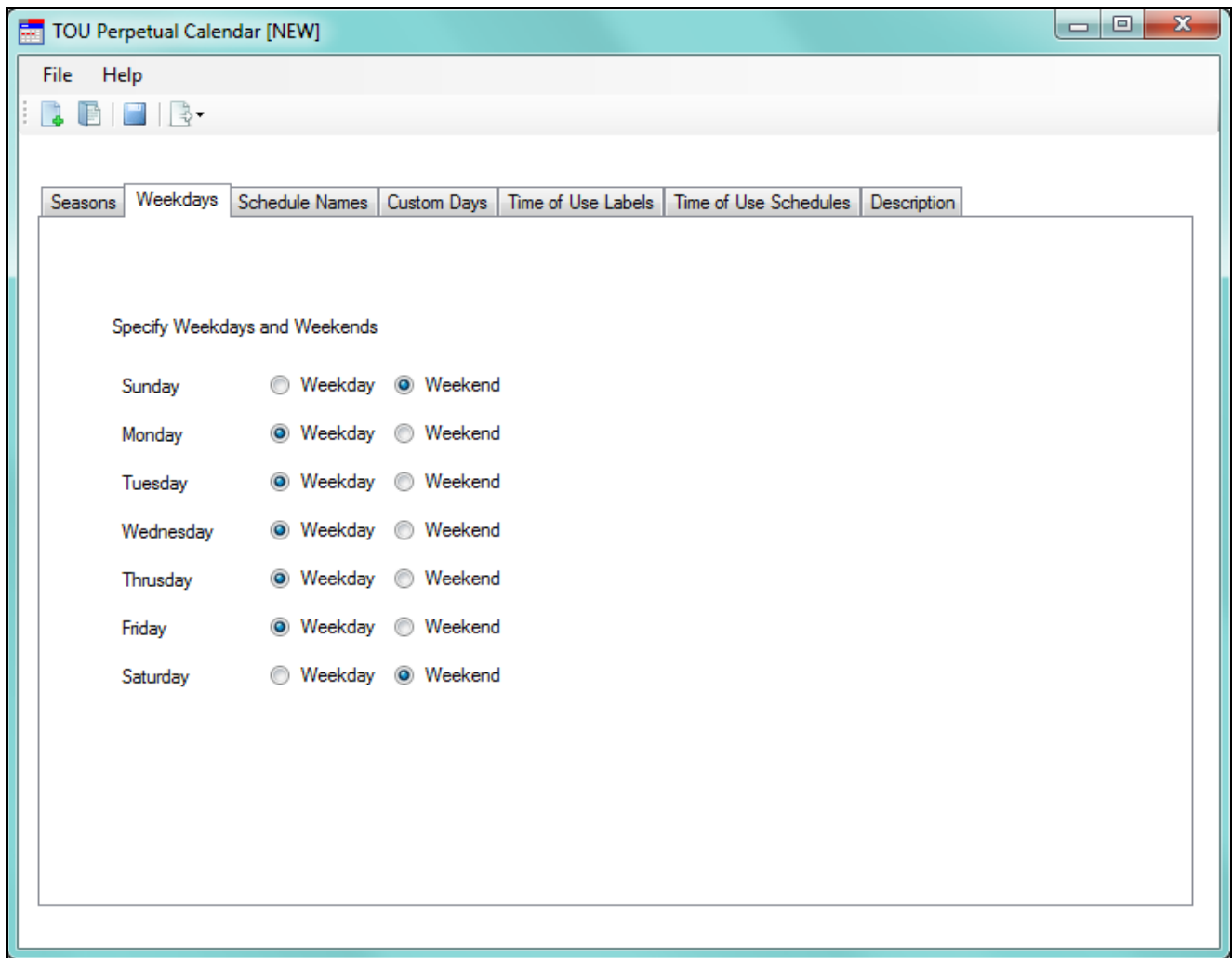
- Seasons - use this tab to set up to 4 seasons for the calendar.
- Weekdays - use this tab to set days as weekends or weekdays.
- Schedule Names - use this tab to label the TOU schedules you set up.
- Custom Days - use this tab to set up holidays, for example, Christmas.
- Time of Use Labels - use this tab to set up names for TOU that will be used in addition to the two Default labels: On Peak and Off Peak.

- Time of Use Schedules - use this tab to set the hourly time range for the TOU schedules.
  - Description - use this tab to enter any descriptive information about the Perpetual Calendar.
3. The first tab is the Seasons tab (see previous page and screen below). The default setting is two seasons. Click in the pull-down menu to select between one and four seasons. Depending on what you select, you will see one to four fields that let you select the start date for the seasons. Select the month and day for the season start date from the pull-down menus.

The screenshot shows a software window titled "TOU Perpetual Calendar [NEW]". It has a menu bar with "File" and "Help", and a toolbar with icons for file operations. Below the toolbar is a tabbed interface with the following tabs: "Seasons", "Weekdays", "Schedule Names", "Custom Days", "Time of Use Labels", "Time of Use Schedules", and "Description". The "Seasons" tab is currently selected. Inside this tab, the text "Configure Seasons for this Calendar" is displayed. Below this text, there is a "Number of Seasons" label followed by a pull-down menu showing "Four Seasons". Underneath, there are four rows of configuration for each season. Each row has a label (e.g., "Season 1 starts every"), a "Month" pull-down menu, and a "Day" pull-down menu. The values shown are: Season 1 (January, 1), Season 2 (April, 1), Season 3 (July, 1), and Season 4 (October, 1).

	Month	Day
Season 1 starts every	January	1
Season 2 starts every	April	1
Season 3 starts every	July	1
Season 4 starts every	October	1

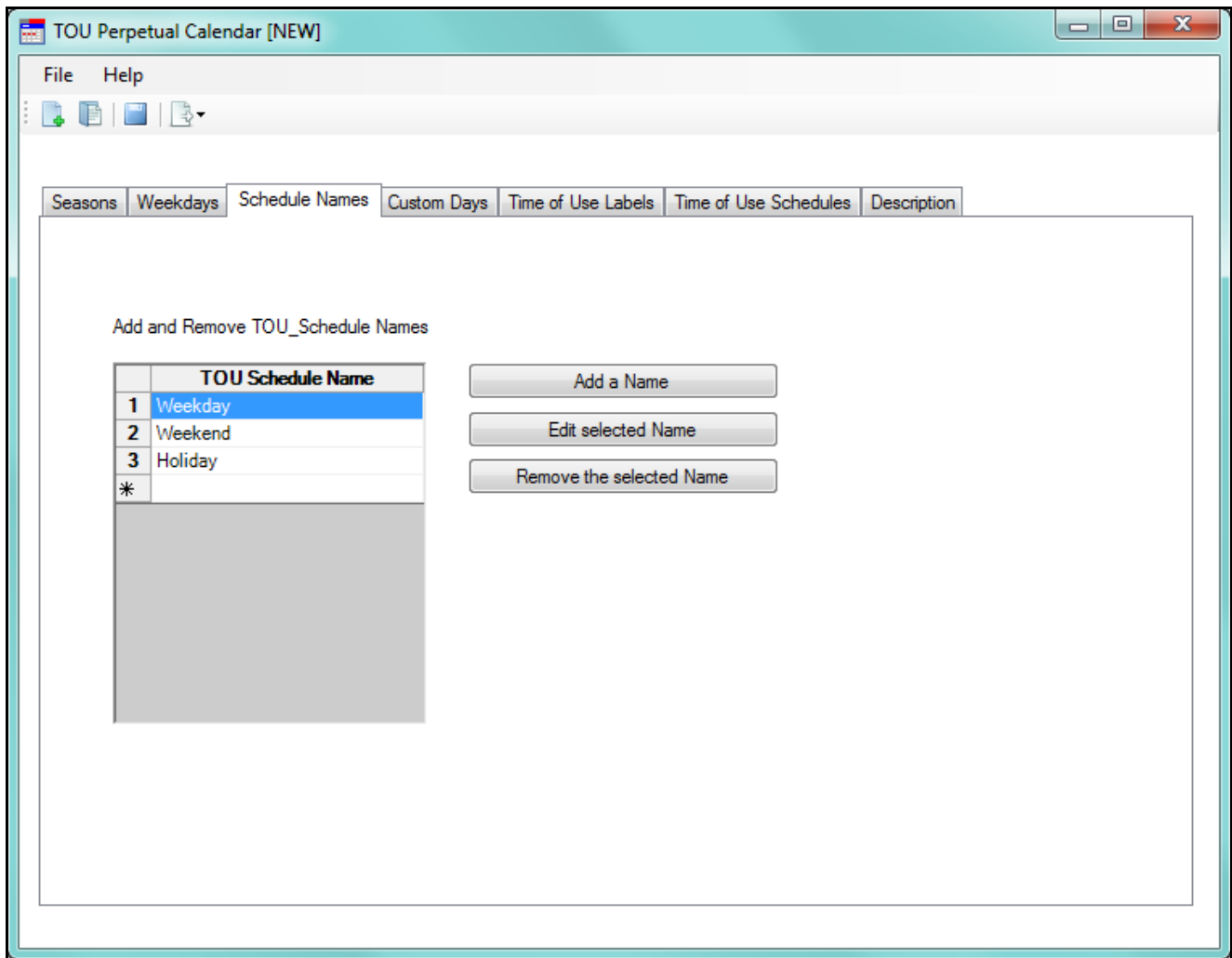
4. Click the Weekdays tab - you will see the screen shown below.



You can change a day of the week to a weekend or weekday by clicking on one of the radio buttons next to it. The default values are Monday - Friday as weekdays, and Saturday and Sunday as weekends.



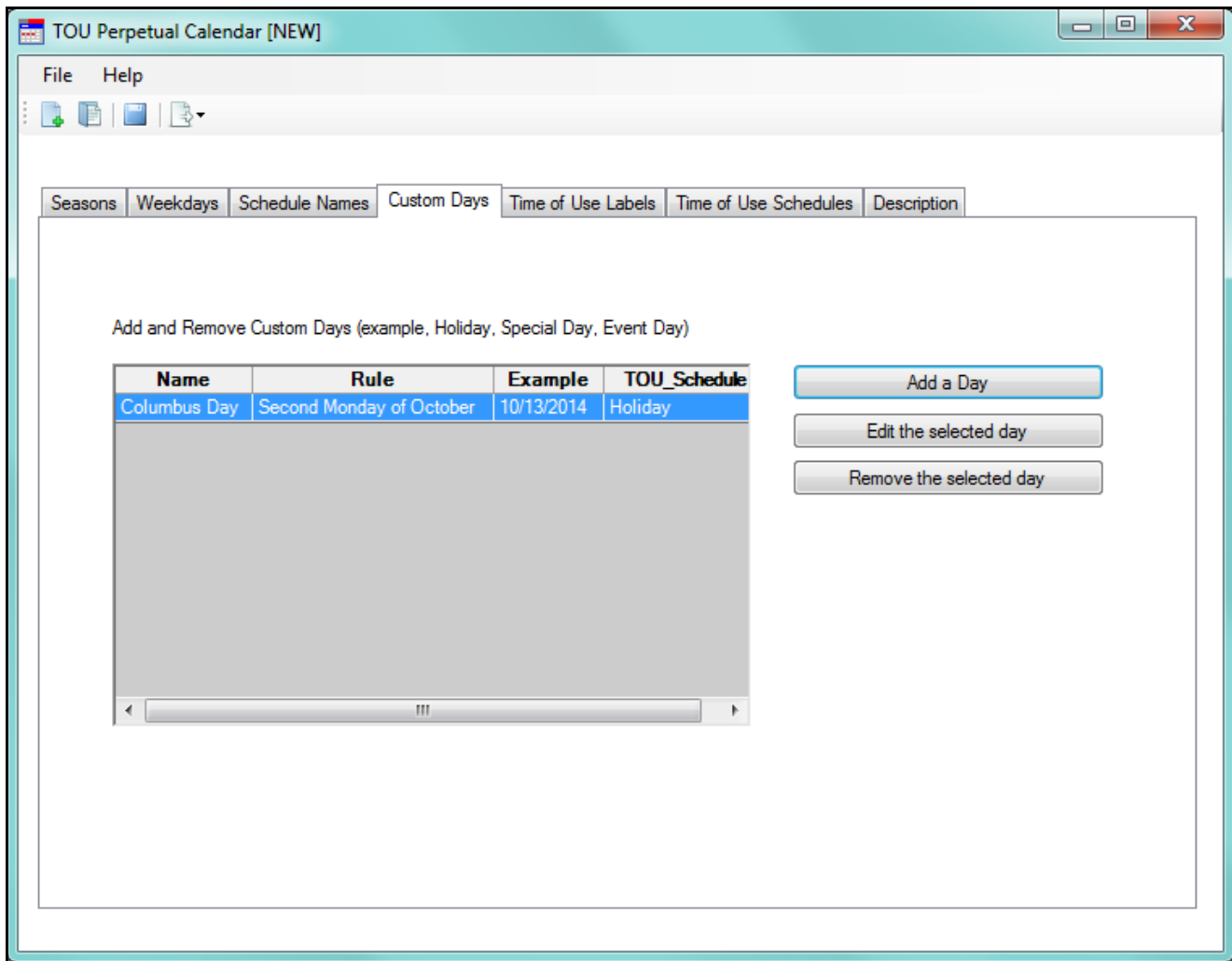
5. Click the Schedule Names tab - you will see the screen shown below.



The default Schedule names are Weekday, Weekend, and Holiday.

- To add a new schedule name, click the Add a Name button. You will see an empty line where you can add the new name. After you enter a name, press Enter or click anywhere in the screen. A number will appear next to the new Schedule name.
- To edit an existing name, click on the name and click the Edit Selected Name button. You can then change the name. After you change the name, press Enter or click anywhere in the screen.
- To remove a name you added, click on the name and click the Remove Selected Name button. Note that you won't be able to remove the default Schedule names (Weekday, Weekend, and Holiday).

6. Click the Custom Days tab - you will see the screen shown below.



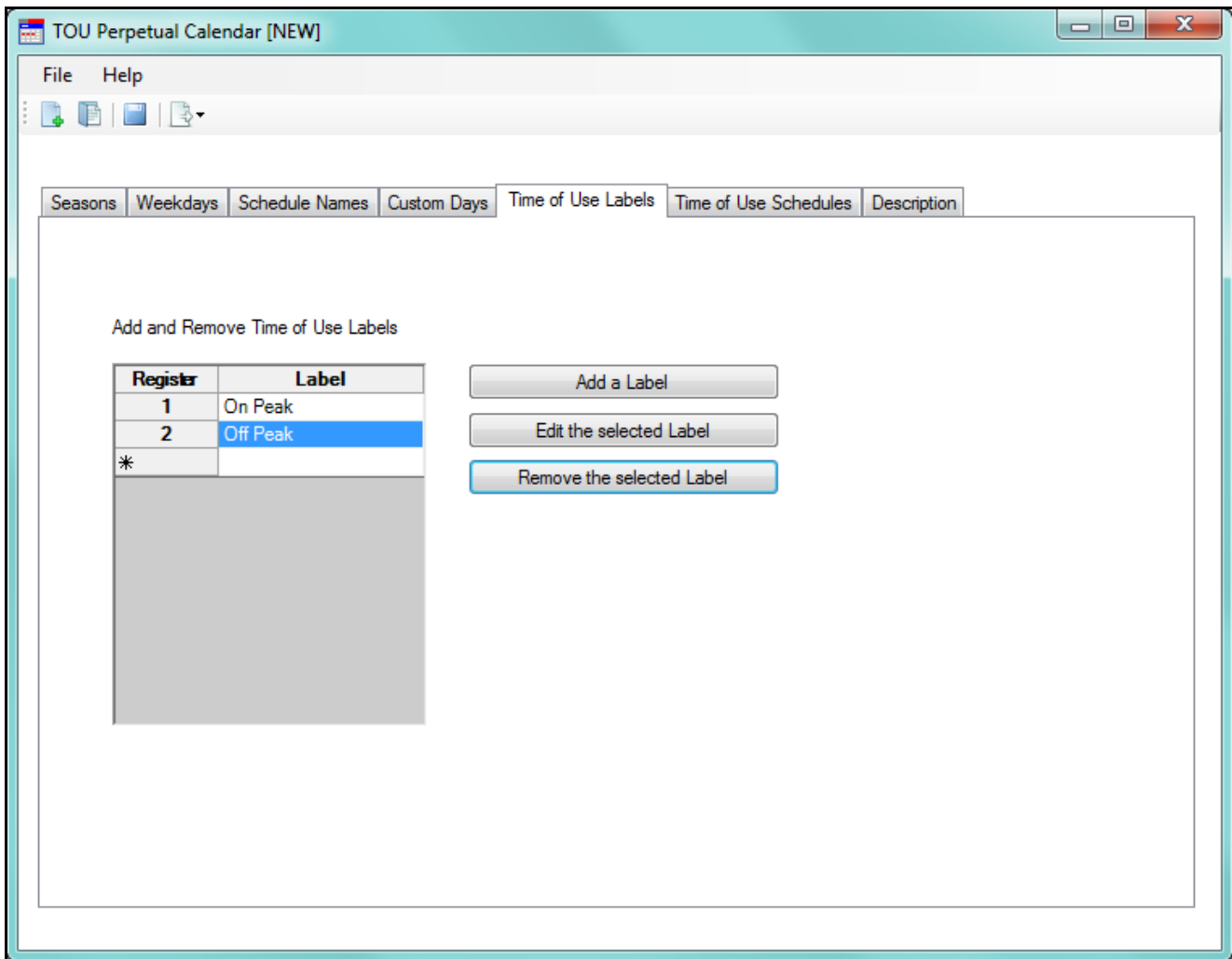
Use this screen to set up holidays. A holiday is a day that would normally be a regular "on peak" day but because of a special event, it is fully off peak. The best example is Christmas, since December 25th is almost always an off peak day. People are not working that day and there are no peak charges. In this section, the user enters all these dates, as defined by the Utility rate structure.

- To add a Custom day, click the Add a New Day button. You will see the screen shown below.

- Enter a name for the holiday, e.g., Columbus Day.
- Select the Calendar Modifier from the pull-down menu. You can select:
  - Fixed Date - the holiday always falls on the same date each year, e.g., New Year's Day, which is always January 1st
  - Occurs on the Next Day - the holiday always occurs on the day after, e.g., a holiday that begins at sundown of the previous day.
  - Spans to the Next Day - it is a two-day holiday, e.g., Thanksgiving and the day after.
  - Weekday Only - Nearest Weekday - if the date falls on a weekend, the holiday moves to the nearest weekday; e.g., if the holiday falls on Saturday, the holiday moves to Friday, but if the holiday falls on Sunday, it moves to Monday.
  - Weekday Only - Nearest Weekday After - if the date falls on a weekend, the holiday moves to the nearest weekday after the set date; e.g., if the holiday falls on either a Saturday or Sunday, it moves to Monday.

- Weekday Only - Nearest Weekday Prior - if the date falls on a weekend, the holiday moves to the nearest weekday before the set date; e.g., if the holiday falls on either a Saturday or Sunday, it moves to Friday.
- c. Configure the custom day's date. You can select Week, Day, of Month (for example, the First Monday of September for U.S. Labor Day); a specific day (for example December 25th for Christmas), or Special Day (Easter).
- d. Click OK to save the custom day's settings. Once the holiday rules are set up, the software will apply them to all 20 years.
- To edit a Custom day, click on the date in the list and click the Edit the Selected Day button. You will see the screen shown above. Change the settings as you want and click OK.
- To remove a Custom day, click on the date in the list and click the Remove the Selected Day button.

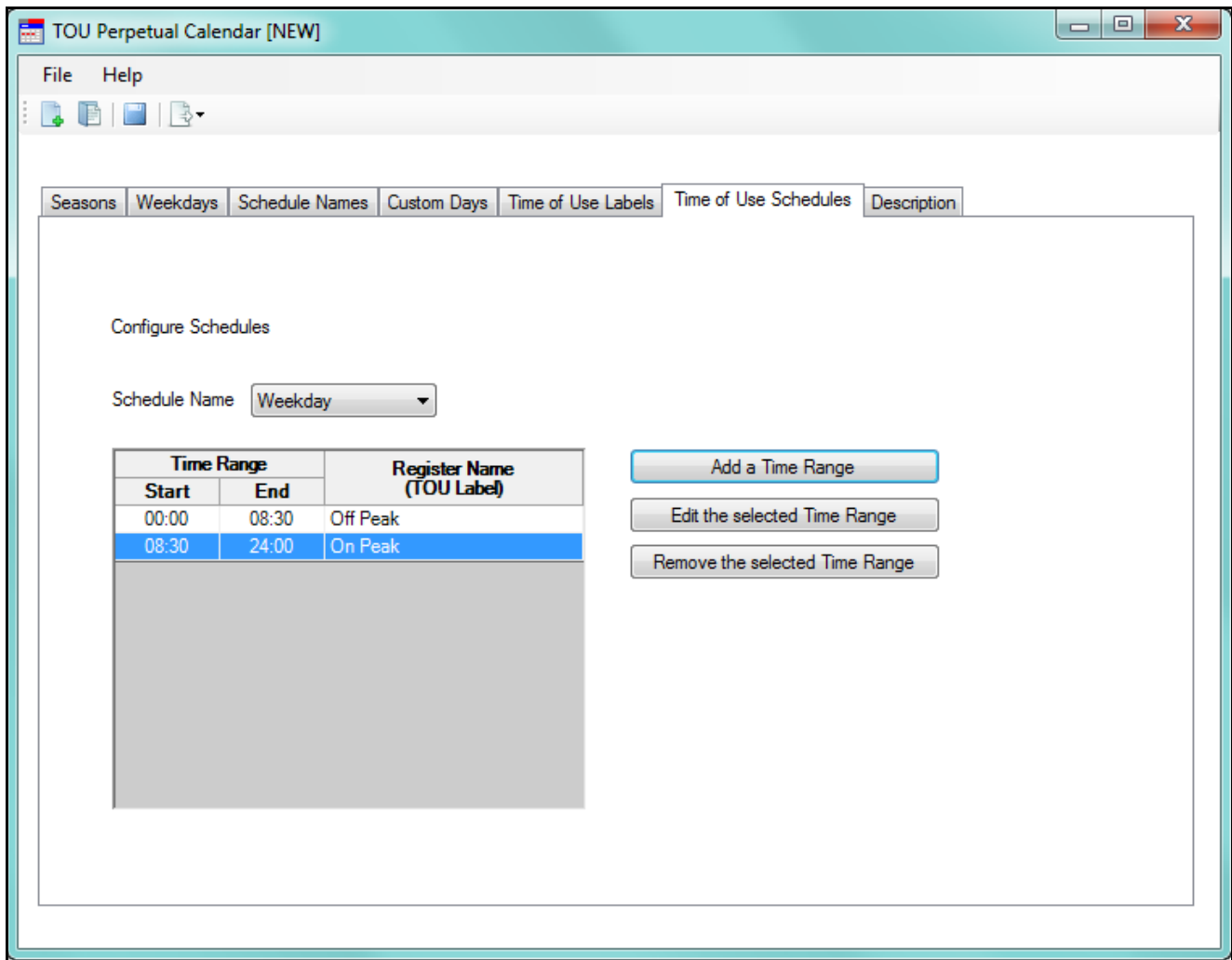
7. Click the Time of Use Labels tab - you will see the screen shown below.



The default TOU labels are On Peak and Off Peak.

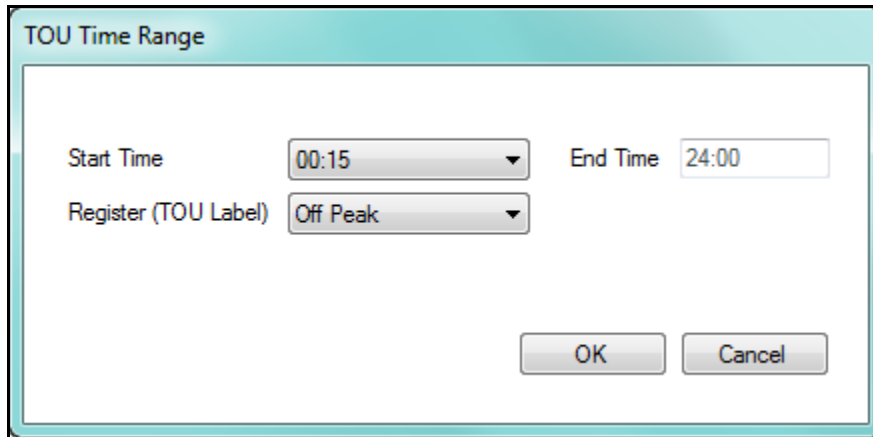
- To add a new Time of Use label, click the Add a Label button. You will see an empty line where you can add the new label. After you enter a label, press Enter or click anywhere in the screen. A number will appear next to the new Time of Use label.
- To edit an existing Time of Use label, click on the label and click the Edit the Selected Label button. You can then change the label. After you change the label, press Enter or click anywhere in the screen.
- To remove a Time of Use label you added, click on the label and click the Remove the Selected Label button. Note that you won't be able to remove the default TOU labels.

8. Click the Time of Use Schedules tab - you will see the screen shown below.



- Use this screen to set the time range for the existing Schedules. The Schedules consist of the default Schedules - Weekday, Weekend, and Holiday, and any Schedules you created using the Schedule Names tab. There is one default time range with a Start Time of 00:00 and an End time of 24:00 for the Off Peak TOU label. This feature uses a 24 hour clock, so that 12PM - 12AM is 13:00-24:00.
- This feature works like a timer. Use it to set up when the meter will switch to the next bucket of energy accumulation. The meter will run these rules in the order they appear.

- To add a time range to a schedule, select the Schedule from the pull-down menu and click the Add a Time Range button. You will see the screen shown below.



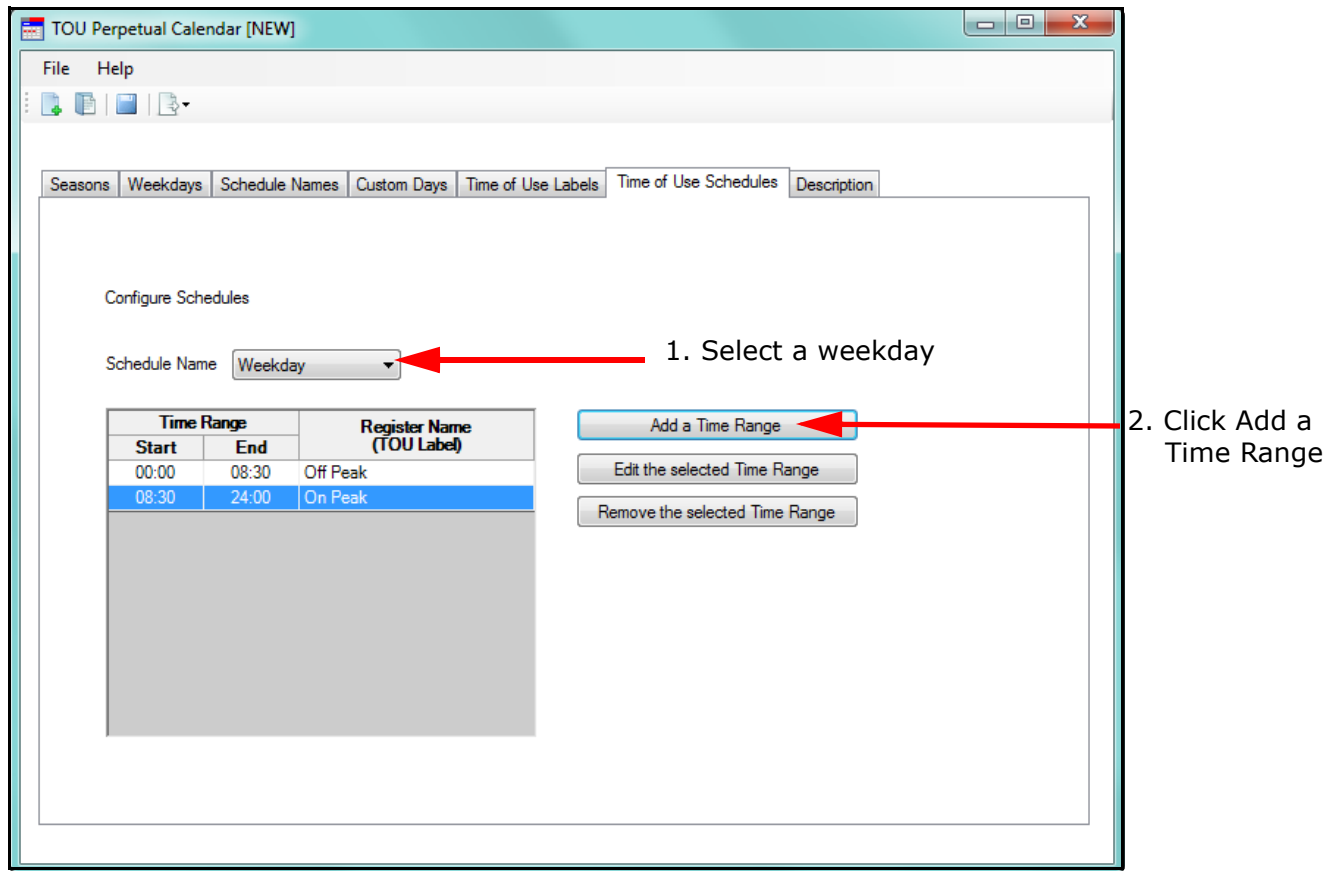
Select the start time and the TOU label from the pull-down menus and click OK. The End time will be updated automatically (see the following example).

- To edit a Schedule's time range, select the Schedule from the pull-down list, click on the Register name (TOU label) in the list and click the Edit a Selected Time Range button. You will see the TOU Time Range screen shown on the previous page. Change the settings as you want and click OK.
- To remove a Schedule's time range, select the Schedule from the pull-down list, click on the Register name (TOU label) in the list and click the Remove a Selected Time Range button.

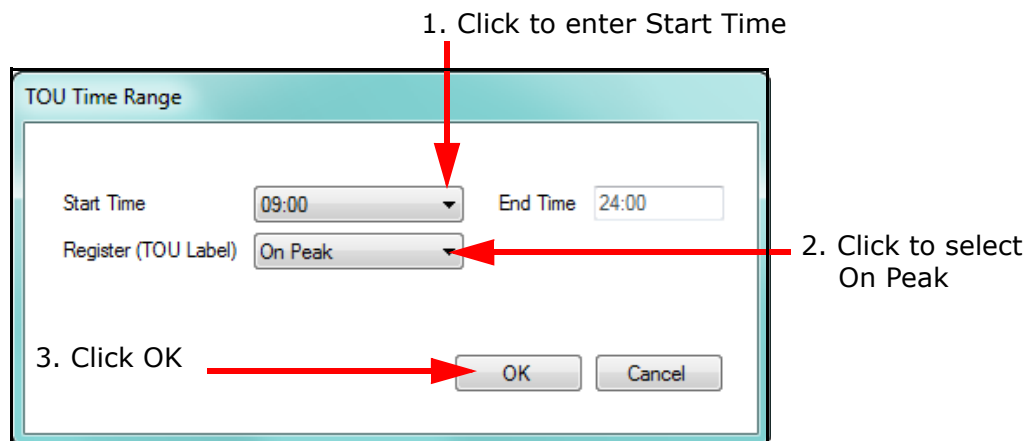
- **Example of Time Range Setting**

Let's say you are setting up the Weekday Schedule's Off Peak and On Peak Time Range. The first Off Peak range is already set in the default setting. But it is set for the whole day - 00:00 Start Time and 24:00 End Time. So the first step is to set the beginning time for the On Peak range. Once you do that, the End Time for the first Off Peak period will be adjusted accordingly.

- a. From the TOU Schedules tab screen, select Weekday from the Schedule Name pull-down menu and click the Add a Time Range button.



- b. Select the start time for the On Peak period for a Weekday schedule. The example below uses 9:00 AM. Make sure that the Register (TOU Label) is On Peak. Click OK.





- c. The Time of Use Schedules screen redisplay, now listing the On Peak time range as well as the default Off Peak time range. Note that the Off Peak time range's end time is now the same as the start time of the On Peak time range, and that the On Peak time range's End time is 24:00 (end of the day).

TOU Perpetual Calendar [NEW]

File Help

Seasons Weekdays Schedule Names Custom Days Time of Use Labels Time of Use Schedules Description

Configure Schedules

Schedule Name Weekday

Time Range		Register Name (TOU Label)
Start	End	
00:00	09:00	Off Peak
09:00	24:00	On Peak

Add a Time Range

Edit the selected Time Range

Remove the selected Time Range

- d. To set up the second Off Peak period, click the Add a Time Range button. Enter the start time for the second Weekday's Off Peak period. The example below uses 6 PM (18:00). Make sure that the Register (TOU Label) is Off Peak. Click OK.

TOU Time Range

Start Time 18:00 End Time 24:00

Register (TOU Label) Off Peak

OK Cancel

- e. The Time of Use Schedules screen redisplay, now listing the new Off Peak time range as well as the other two time ranges. Note that the On Peak time range's end time is now the same as the start time of the second Off Peak time range, and that the second Off Peak time range's End time is 24:00 (end of the day). So now you have a Weekday schedule of Off Peak from 12 AM to 9 AM, On peak from 9 AM to 6 PM, and Off Peak from 6 PM to midnight.

TOU Perpetual Calendar [NEW]

File Help

Seasons Weekdays Schedule Names Custom Days Time of Use Labels Time of Use Schedules Description

Configure Schedules

Schedule Name Weekday

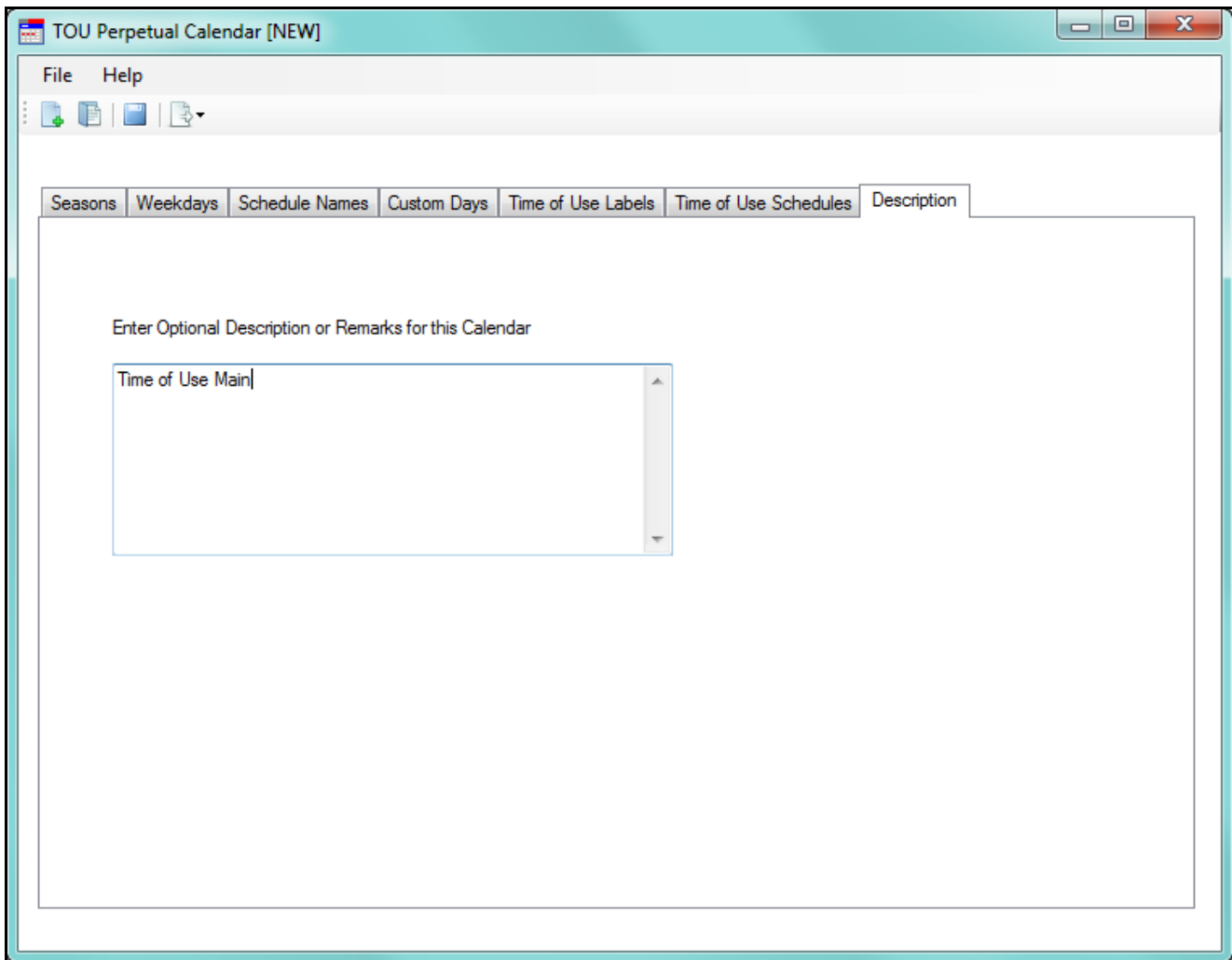
Time Range		Register Name (TOU Label)
Start	End	
00:00	09:00	Off Peak
09:00	18:00	On Peak
18:00	24:00	Off Peak

Add a Time Range

Edit the selected Time Range

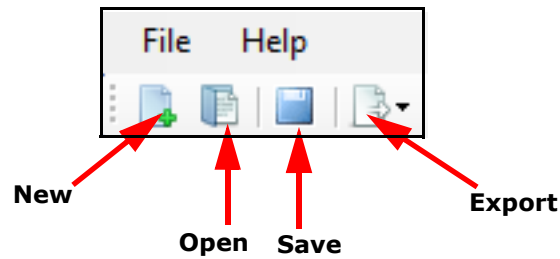
Remove the selected Time Range

9. Click the Description tab. You will see the screen shown below.



You can use this tab to enter a description or notes for this perpetual calendar.

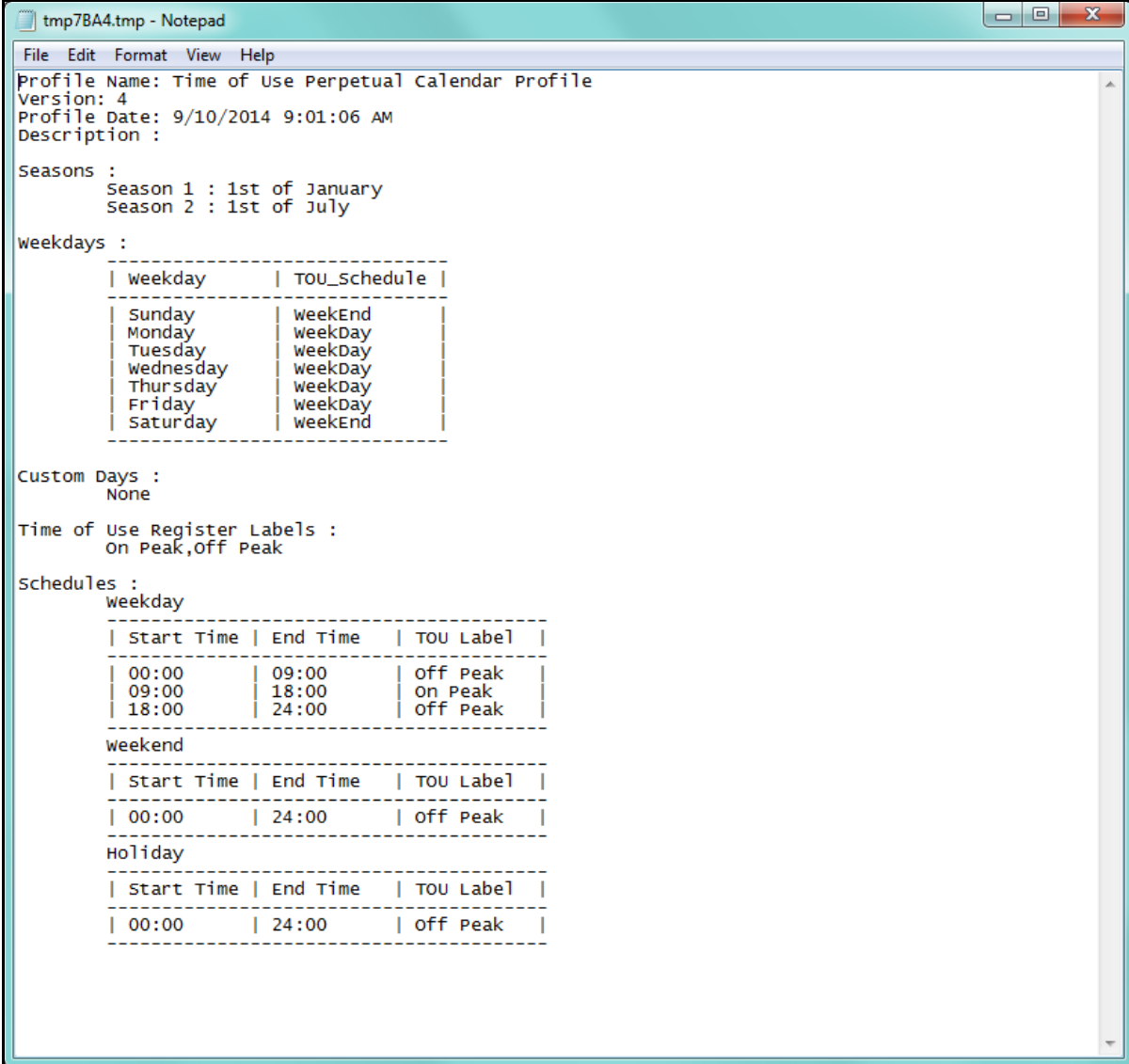
10. To save the Perpetual Calendar, click the Save icon at the top of the screen or click File>Save Profile or File>Save Profile As.



11. You also have the following options:

- To create a new Perpetual Calendar, click the New icon or click File>New Profile.
- To open a previously saved Perpetual Calendar, click the Open icon or click File>Open Profile.
- To export the Perpetual Calendar (and create up to 20 years of calendars based on it), click the Export icon or click: File>Export>Nexus TOU Calendar File. See the instructions in 15.2.3: Multi Calendar Update, on page 15-24.

- To view a report, click File>View a Report. You will be prompted to save the perpetual calendar. Then the Calendar report will open in a text window. See the example report below.



```

tmp7BA4.tmp - Notepad
File Edit Format View Help
Profile Name: Time of Use Perpetual Calendar Profile
Version: 4
Profile Date: 9/10/2014 9:01:06 AM
Description :

Seasons :
Season 1 : 1st of January
Season 2 : 1st of July

weekdays :


| weekday   | TOU_Schedule |
|-----------|--------------|
| Sunday    | weekEnd      |
| Monday    | weekDay      |
| Tuesday   | weekDay      |
| Wednesday | weekDay      |
| Thursday  | weekDay      |
| Friday    | weekDay      |
| Saturday  | weekEnd      |



Custom Days :
None

Time of Use Register Labels :
On Peak,Off Peak

Schedules :
weekday


| Start Time | End Time | TOU Label |
|------------|----------|-----------|
| 00:00      | 09:00    | Off Peak  |
| 09:00      | 18:00    | On Peak   |
| 18:00      | 24:00    | Off Peak  |


weekend


| Start Time | End Time | TOU Label |
|------------|----------|-----------|
| 00:00      | 24:00    | Off Peak  |


Holiday


| Start Time | End Time | TOU Label |
|------------|----------|-----------|
| 00:00      | 24:00    | Off Peak  |

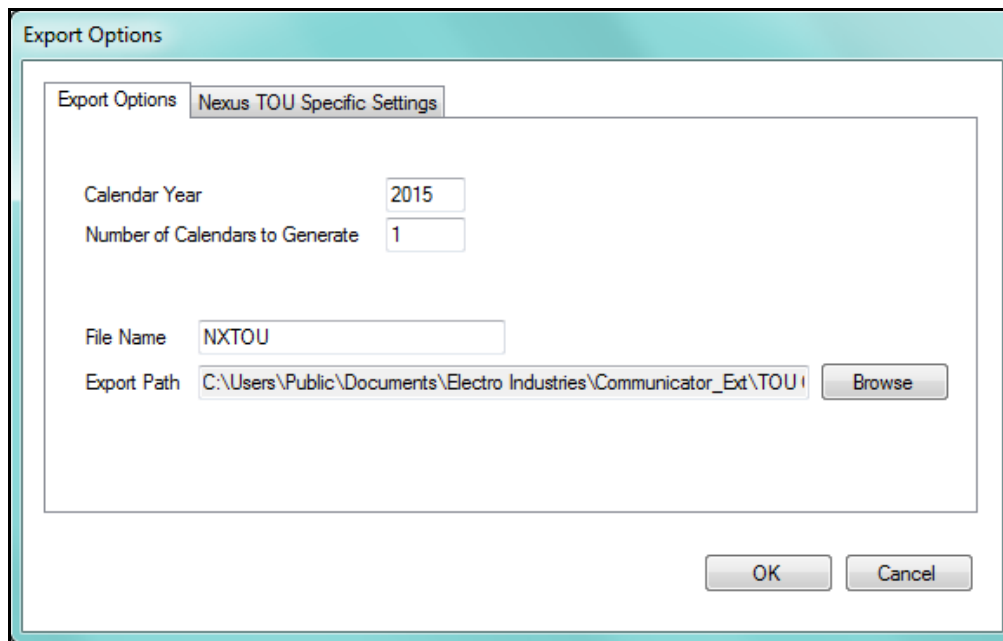

```

- To exit the Perpetual Calendar setup, click File>Exit or click the X in the screen's Menu Bar. You will be asked to confirm that you want to close the software - click Yes to exit the Perpetual Calendar setup screen.

### 15.2.5: Exporting a Perpetual Calendar to a Nexus® TOU Calendar File

Use this function to create a Nexus® TOU Calendar file from a perpetual calendar configuration. You can use this feature to create calendars for multiple years from one perpetual calendar. You can then import the TOU files into the CommunicatorPQA® application when you configure TOU Calendars. See 15.2.3: Multi Calendar Update, on page 15-24, and 15.2.4: Using the TOU Perpetual Calendar Configurator, on page 15-25.

1. Save the perpetual calendar you want to export.
2. From the Perpetual Calendar screen, click the Export icon or click File> Export> Nexus TOU Calendar File. (You will be prompted to save the perpetual calendar.)
3. You will see the Export Options screen, shown below.

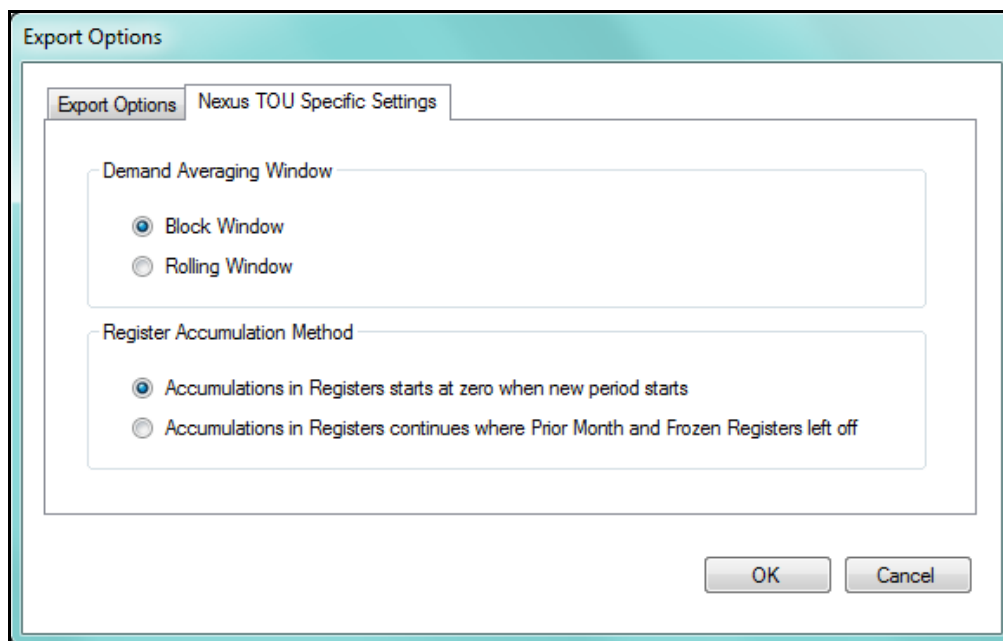
The image shows a screenshot of the 'Export Options' dialog box. It has a title bar 'Export Options' and two tabs: 'Export Options' and 'Nexus TOU Specific Settings'. The 'Nexus TOU Specific Settings' tab is active. It contains the following fields: 'Calendar Year' with a value of '2015', 'Number of Calendars to Generate' with a value of '1', 'File Name' with a value of 'NXTOU', and 'Export Path' with a value of 'C:\Users\Public\Documents\Electro Industries\Communicator\_Ext\TOU'. There is a 'Browse' button next to the 'Export Path' field. At the bottom right, there are 'OK' and 'Cancel' buttons.

4. Enter the following information:
- The year for which the new, exported calendar will be used. If you are creating a calendar for more than one year, this should be the first year for which the calendar will be used.
  - The number of years that calendars should be created from the exported calendar. You can select up to 30 years. For example, if this field is set to 3 and the

Calendar Year is set to 2014, 3 exported TOU Calendar files will be created: one for each of the years 2014, 2015 and 2016.

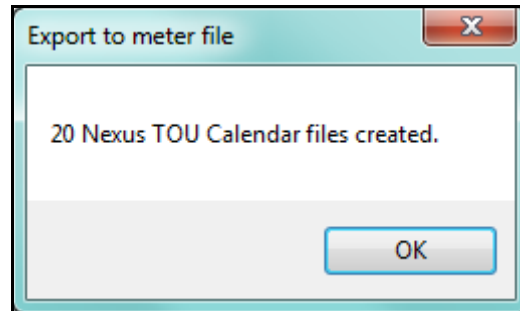
- The File Name and Export Path. These fields are used to specify the base file-name of the exported file and the location where the exported file(s) will be saved.
  - The calendar year is added to the end of the file name you enter. For example, if the filename is NXTOU, the exported file for year 2014 will be named "NXTOU2014.TOU."
  - You can click the Browse button to select another location to save the calendar file, other than the default location listed on the screen.

5. Use the Nexus TOU Specific Settings tab to configure the Demand Averaging Window and/or the Register Accumulation Method for the exported file(s).



- Select the Demand Average Window method: Block Window or Rolling Window.
  - Select the Register Accumulation method: "Accumulations in Registers starts at 0 when new period starts" or "Accumulations in Registers continues where Prior Month and Frozen Registers left off."
6. Click OK to save your Export settings.

7. Click OK on the Export screen. The software creates calendars for the number of years you selected, based on the Perpetual calendar, and exports them to the meter. You will see a message window when the files have been exported - see the example below.





### **15.3: Nexus® 1450/1500+/Shark® 250/270 Meter's TOU Settings**

As explained earlier in this chapter, TOU bins energy use into time periods, so that utilities can bill customers correctly for Peak and Off Peak usage. The Nexus® 1450/1500+ and Shark® 250/270 meters use a perpetual TOU schedule called the TOU Profile, configured and stored in the meter's firmware, that you only need to set up once.

To program the TOU Profile, you:

- Set up the number of seasons per year - up to four seasons are allowed. You can also set up the seasons for weekly or daily TOU accumulations.
- Set up the billing periods, e.g., January 1st, February 1st, etc - up to 12 billing periods are allowed.
- Set up the days designated as holidays.
- Set up day types, e.g., weekday - up to four day types are allowed, including the default day type "holidays."
- Set up rates, which are accumulators for usage from different times, e.g., peak usage which is accumulated from times designated as peak - up to four rates plus a default total accumulations rate are allowed.
- Set up schedules that specify when rate changes occur during a day; e.g., Schedule 1 consists of Off-Peak at 12 AM, On-Peak at 7 AM, and Off-Peak again at 6 PM; the result of this is that the usage from 12 AM to 6:59 AM is applied to the Off-Peak Rate, the usage from 7 AM to 5:59 PM is applied to the On-Peak Rate, and the usage from 6 PM to 11:59 PM is applied to the Off-Peak Rate.
- Assign schedules to day type (weekday, weekend, holiday, etc.) for each of the configured seasons (or weekly/daily accumulations); e.g., assign Schedule 1 to Weekdays for Season 1.
- Set up the values that will be accumulated.

Usage data is automatically accumulated in the appropriate counters at the TOU demand interval set in the meter's Device Profile (see 11.2.7: Cumulative Demand Type and Time of Use Demand Type, on page 11-47 for the Nexus® 1500+ meter, 27.2.2: Demand Integration Intervals, on page 27-26 for the Nexus® 1450 meter, 28.2.1: Configuring Energy, Power Scaling, and Averaging, on page 28-36 for the Shark® 250 meter, or 26.2.1: Configuring Energy, Power Scaling, and Averaging Method, on page 26-41 for the Shark® 270 meter, for instructions); for example, every 15 minutes.

An exception to this interval accumulation occurs for the Shark® 250/270 meter, when an external digital input has been configured as end of interval (EOI). In that case, TOU will perform automatic data usage accumulation and calendar actions (rate change, day type change, season/billing month self reads) based on the EOI input trigger. This can result in shorter or longer interval periods, depending on the EOI input timing, so the rate/day type/calendar actions may differ from what is expected.

**NOTE:** When the meter is set up for automatic (self read) TOU, there are restrictions on resets for the Nexus® 1450 and 1500+ meters. See the screen capture below and additional information in [20.1.7: Reset Device Information, on page 20-7](#).

Reset Device Parameters

Log Data      Accumulators, Max / Min and Demands      **TOU Registers**

☐ Reset Time of Use Current Month Registers

☒ **Time of Use Master Reset**

☐ Reset Time of Use Current Season

☐ Reset Time of Use Demands

☐ Initialize Time of Use Cumulative Demands

☐ Time of Use Manual Read Season Block Data

☐ Time of Use Manual Read Month Block Data

OK      Cancel      Help

Time of Use in Self Read Mode.  
Disabled items cannot be reset

**NOTES:**

- If you need to reset TOU, use the TOU Enable/Disable setting in the Device Profile. See [11.2.11: Time of Use Enable/Disable \(Nexus® 1500+ Meter\), on page 11-53](#) for instructions, [26.2.7: Time of Use Setting, on page 26-66](#) (Shark® 270 meter),

[27.2.8: Time of Use, on page 27-40](#) (Nexus® 1450 meter), or [28.2.6: Time of Use Setting, on page 28-53](#) (Shark® 250 meter),

- When resetting the non-TOU energy in the meter, the TOU energy must be also initialized, in order to keep the TOU module synchronized correctly.
- If you are manually reading TOU, you do not have these reset restrictions.
- Detailed instructions for programming a TOU profile begin in 15.3.1: Creating a New TOU Profile, on page 15-47. For an example of programming a TOU profile, see 15.3.6: Example of Programming a TOU Profile, on page 15-78.

### **15.3.1: Creating a New TOU Profile**

When setting up TOU for the Nexus® 1450/1500+ or Shark® 250/270 meter, these are the recommended steps:

1. Program the meter's Device profile settings needed for TOU: enabling TOU (see 11.2.11: Time of Use Enable/Disable (Nexus® 1500+ Meter), on page 11-53, 28.2.6: Time of Use Setting, on page 28-53 (Shark® 250 meter), or 26.2.7: Time of Use Setting, on page 26-66 (Shark® 270 meter)), demand averaging type: block window or sliding window (see 11.2.7: Cumulative Demand Type and Time of Use Demand Type, on page 11-47 for the Nexus® 1500+ meter, 27.2.2: Demand Integration Intervals, on page 27-26 for the Nexus® 1450 meter, 28.2.1: Configuring Energy, Power Scaling, and Averaging, on page 28-36 for the Shark® 250 meter, or 26.2.1: Configuring Energy, Power Scaling, and Averaging Method, on page 26-41 for the Shark® 270 meter), demand interval (see 11.2.2: Demand Integration Intervals, on page 11-35 for the Nexus® 1500+ meter, 27.2.2: Demand Integration Intervals, on page 27-26 for the Nexus® 1450 meter, 28.2.1: Configuring Energy, Power Scaling, and Averaging, on page 28-36 for the Shark® 250 meter, or 26.2.1: Configuring Energy, Power Scaling, and Averaging Method, on page 26-41 for the Shark® 270 meter), scaled energy formats (see 11.2.1: Energy Scaling, on page 11-28 for the Nexus® 1500+ meter, 27.2.1: Energy Scaling, on page 27-25 for the Nexus® 1450 meter, 28.2.1: Configuring Energy, Power Scaling, and Averaging, on page 28-36 for the Shark® 250 meter, or 26.2.1: Configuring Energy, Power Scaling, and Averaging Method, on page 26-41 for the Shark® 270 meter), and which scaled energy accumulators will be available in the meter (see 11.2.9: Pulse Accumulations, on page 11-50 for the Nexus® 1500+ meter or 27.2.6: Pulse Accumulations, on page 27-37 for the Nexus® 1450 meter).

2. Program the TOU profile: instructions begin on the next page.
3. Program additional meter profile settings: apply available TOU data-set items from the TOU profile to the DNP map (see 11.1.6: DNP3 Custom Class Map, on page 11-20 for the Nexus® 1500+ meter) and to interval logs ( 11.4: Trending Profile Settings, on page 11-106 for the Nexus® 1500+ meter, 27.4: Trending Profile Settings, on page 27-73 for the Nexus® 1450 meter, 28.4.2: Trending Profiles - Configuring Historical Logs, on page 28-68 for the Shark® 250 meter, or 26.4.2: Configuring Historical Logs, on page 26-82 for the Shark® 270 meter), to get the TOU from either DNP or meter logs.

Instructions follow:

1. From the Main screen's File menu, click TOU Calendar>TOU Rate Configurator

**1. Click the Self Read Mode button for automatic TOU, or the Manual Read Mode button if the meter will be manually read**

The screenshot shows the 'TOU Rate Configurator' window. It has a menu bar with 'File', 'Rate Profile', and 'Help'. Below the menu bar are buttons for 'Reload Settings From Device' and 'Update Device'. The 'Read Mode' section has two radio buttons: 'Self Read Mode' (selected) and 'Manual Read Mode'. A green banner in the background says 'TOU Rate Configurator'. Below this is a tabbed interface with tabs for 'Seasons', 'Billing Periods', 'Holidays', 'Day Type Assignment', 'Rate Names', 'Schedules', 'Annual Profile', 'Monitored Data Sets', and 'Accumulation Method'. The 'Seasons' tab is active. It contains a 'Customized Season' checkbox, a 'Number of Seasons' dropdown menu set to 'Four Seasons', and a 'Season Names' section with four text input fields labeled 'Season One' through 'Season Four'. To the right is a 'Season Transition Dates' section with four date pickers labeled 'Season One' through 'Season Four'. At the bottom, there is a 'Self Read Time of Day' section with a 'Season Self Read' time picker set to '12:00 AM'. Red callout boxes with arrows point to specific elements: Box 1 points to the 'Self Read Mode' radio button. Box 2 points to the 'Number of Seasons' dropdown. Box 3 points to the 'Season Names' input fields. Box 4 points to the 'Season Transition Dates' date pickers. Box 5 points to the 'Season Self Read' time picker. Box 6 points to the 'Customized Season' checkbox.

**2. Click to choose number of seasons**

**3. Enter season names**

**4. Select the date the season will start**

**5. Click to select a time other than 12 AM for the seasons' self read**

**6. Click to set up daily or weekly accumulations (optional)**

Device Type: Nexus 1500+ Demand Type: Block Window Demand Interval: 900 seconds

2. You will use the screen shown above to set up the information for the TOU Profile. The normal order of tasks is shown in the example screen. The tabs let you navigate between the different settings.

Note that there are two options at the top of the screen in the Icon bar: Reload Settings From Device - will load the settings from the currently connected meter; and Update Device - will send the currently open TOU Profile settings to the meter.

3. Click the Self Read Mode button if the meter will be performing TOU reads automatically, based on the TOU Profile settings.

- If the meter will be read manually, click the Manual Read Mode. In the case of manual TOU reading of the meter, you will not set up Seasons or Billing Periods.

#### **15.3.1.1: Seasons (or Weekly/Daily)**

The first tab is used to set up the number of seasons you want for your TOU Profile. The Seasons setting lets you assign different rates to days, based on when in the year the day falls - for example, setting a higher On Peak rate in the summer than in the spring, since there the higher energy usage caused by air conditioning is more expensive for the utility to produce. You can set up to four seasons.

1. Select the number of seasons - 1 to 4 - from the pull-down menu.
  2. Enter names for each of the seasons.
  3. Enter the date that the season will begin.
  4. The default for the seasons' self read is 12 AM (midnight) - if you want to use a different time of day, select it.
- This tab also lets you set up weekly or daily TOU accumulations. To do so, click the Customized Season checkbox. The screen changes as shown on the next page.

TOU Rate Configurator

File Rate Profile Help

Reload Settings From Device Update Device

**Read Mode**

☒ Self Read Mode

☐ Manual Read Mode

**TOURate Configurator**

Seasons Billing Periods Holidays Day Type Assignment Rate Names Schedules Annual Profile Monitored Data Sets Accumulation Method

☒ Customized Season

Season Label Current Season

Season Entry

☒ Weekly on Sunday

☐ Daily

Self Read Time of Day

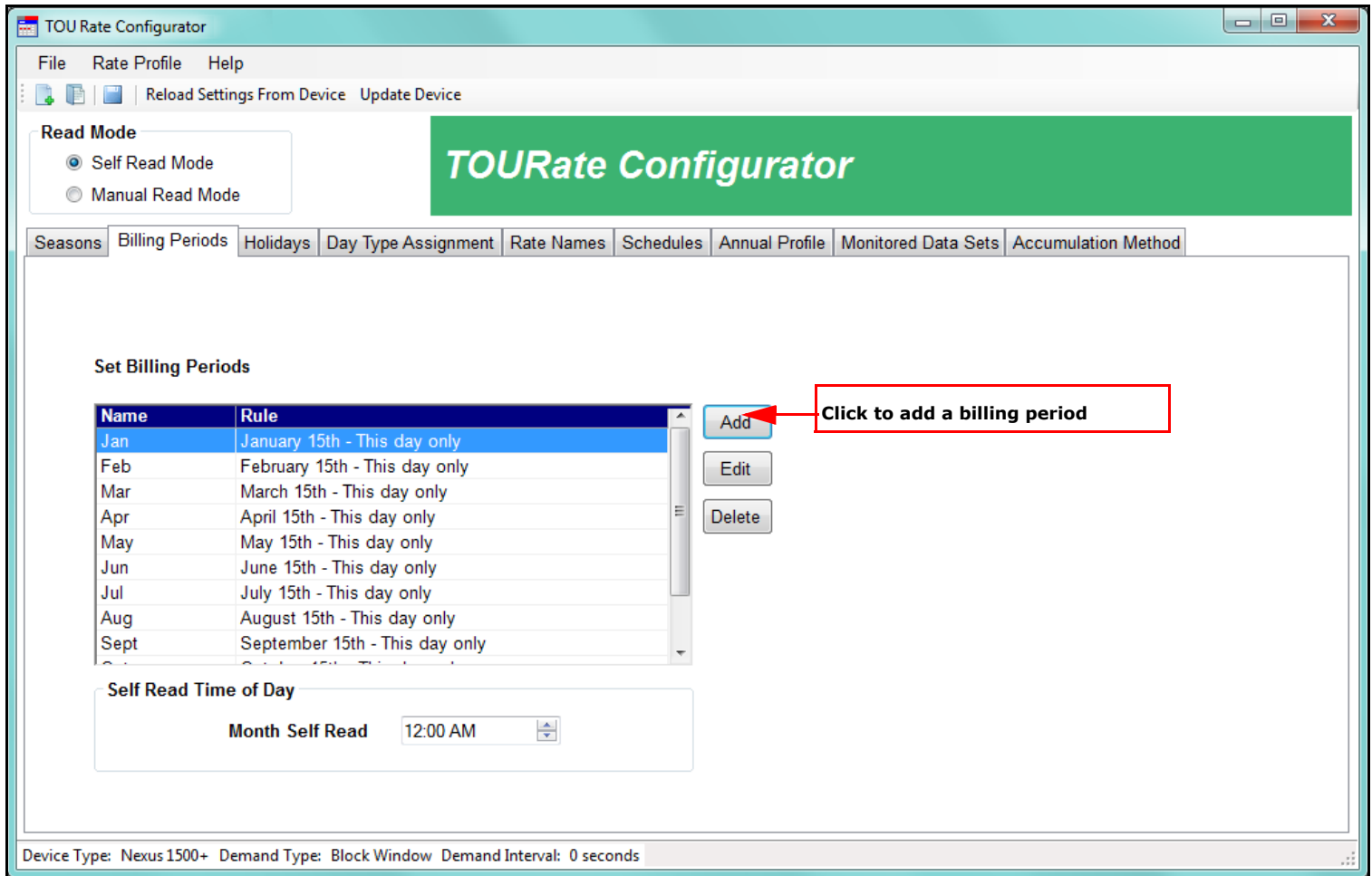
Season Self Read 12:00 AM

Device Type: Nexus 1500+ Demand Type: Rolling Window Demand Interval: 0

- a. Enter a label for the season.
- b. Click one of the following to set when the TOU accumulations will be read:
  - Weekly - select the day of the week that the TOU accumulations will be read.
  - Daily - select if you want the TOU accumulations to be read daily.
- c. The Self Read Time of Day setting is the same as described in step 4 of the previous page.

### 15.3.1.2: Billing Periods

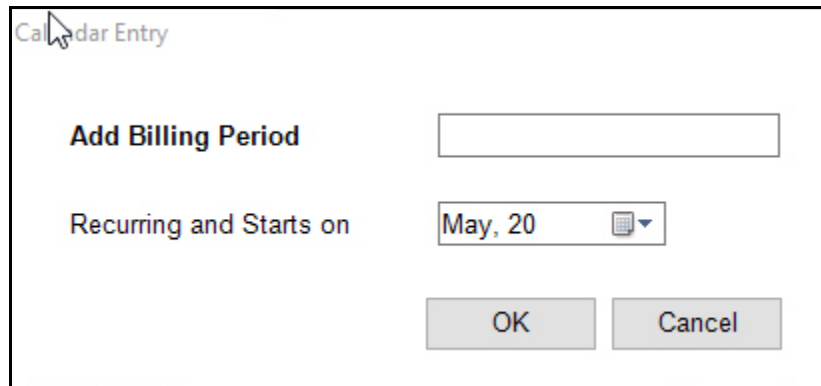
1. Click the Billing Periods tab.



2. Billing periods are the time periods in which the usage is stored, e.g., January 1, February 1, March 1, etc. You can set up to 12 billing periods. At the end of a billing period, the meter moves the accumulations into the Prior month and season bucket and resets Demand to 0.

- Billing periods can coincide with a month, be less than a month, or be multiple months, depending on what your application requires.

- a. Click the Add button to add a new billing period. You will see the screen shown below.

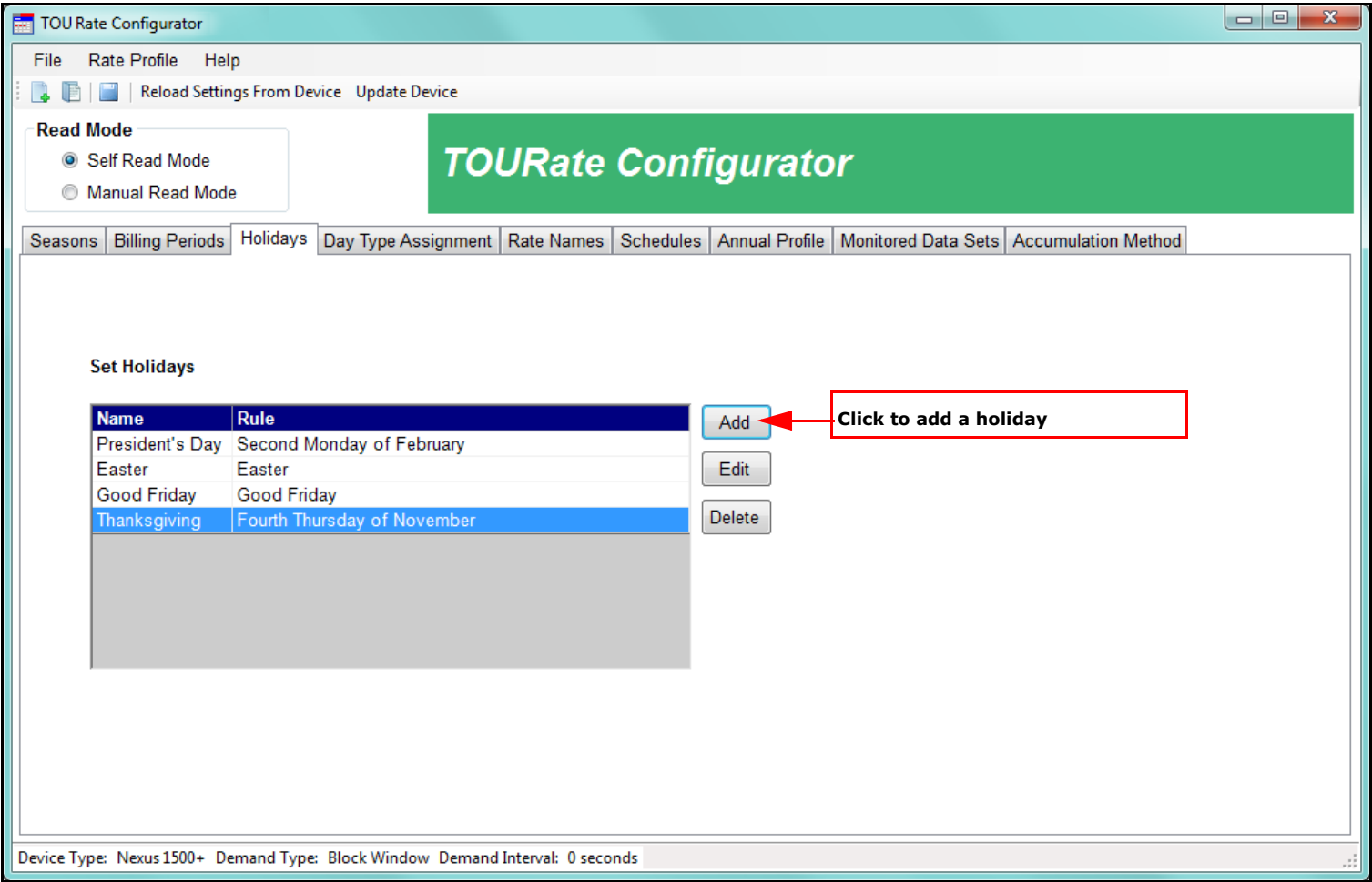
A screenshot of a 'Calendar Entry' dialog box. The title bar at the top left says 'Calendar Entry'. Inside the box, there are two main sections. The first section is labeled 'Add Billing Period' and has a text input field to its right. The second section is labeled 'Recurring and Starts on' and has a date selection field to its right. The date field shows 'May, 20' and has a small calendar icon with a dropdown arrow. At the bottom of the dialog box, there are two buttons: 'OK' and 'Cancel'.

- b. Enter a name for the billing period, e.g., Summer.
- c. To set the start date for the billing period, click in the Recurring and Starts on field and select the date from the pull-down menu.
- d. Click OK to save your selection and return to the Billing Period tab.
- e. The default for the months' self read is 12 AM (midnight) - if you want to use a different time of day, select it.
- Note that in the Shark® 250/270 meter's Billing Periods screen, the self-read setting is located to the right of the Set Billing Periods box.



15.3.1.3: Holidays

1. Click the Holidays tab.



2. Holidays are days in which Off Peak billing is usually applied to the entire day. Use this screen to set up the days that are considered holidays in your TOU Profile.

a. Click the Add button to add a new holiday. You will see the screen shown below.

**Calendar Entry**

**Add Holiday**

☐ Recurring

☐ The  of  of

☒ Specific Day

☐ Special Days

**Occurs**

OK Cancel

b. Enter a name for the holiday, e.g., President's Day.

c. This screen gives you many options for setting up the holiday. To set up the holiday's date, select from the following:

- Recurring - select the month and day for the holiday, e.g., December 25, if the holiday is always on the same date every year
- The (Order), (Day of the Week) of (Month), e.g., Fourth Thursday in November, if the holiday always takes place on a specific day of the week in a specific month. You can also enter the order and day of the week and select Every Month, e.g., the first Monday of every month.
- Specific Day - select the day, month, and year, e.g., Wednesday, March 4, 2015, to set the holiday for only that day, if the holiday only takes place on one specific day and is non-recurring
- Special Days - to choose either Good Friday or Easter for the holiday

- Occurs - this field gives you added flexibility for setting the date of the holiday. You can leave the default setting of "this day only"; but you can select one of the following options:
  - "The following day only" to designate the holiday as the day after the date you set up
  - "This day and the following day" to set the holiday to begin on this day and extend to the next day; for example to set a holiday for U.S. Thanksgiving and the day after
  - "Only when this day falls on a weekday" to only designate the day as a holiday if the set day is a weekday
  - "This day only, unless this day falls on Saturday, then apply to the Friday before this day" to designate the Friday before a Saturday as the holiday when the set day is a Saturday
  - "This day only, unless this day falls on Sunday, then apply to the Monday after this day" to designate the Monday after a Sunday as the holiday when the set day is a Sunday

d. Click OK to save your selection and return to the Holiday tab.

### 15.3.1.4: Day Type Assignments

1. Click the Day Type Assignments tab.

The screenshot shows the 'TOU Rate Configurator' application window. The 'Day Type Assignment' tab is selected. On the left, under 'Set Day Type Names', there is a table with three rows:

Day Type	Name
1	Weekday
2	Weekend
3	Day Type 3

Below the table is an 'Edit selected Name' button. On the right, under 'Configure Day Type Assignments', there are seven dropdown menus for each day of the week:

- Sunday type: Weekend
- Monday type: Weekday
- Tuesday type: Weekday
- Wednesday type: Weekday
- Thursday type: Weekday
- Friday type: Weekday
- Saturday type: Weekend

The status bar at the bottom indicates: Device Type: Nexus 1500+ Demand Type: Block Window Demand Interval: 0 seconds

2. Use the screen above to set up to three day types and to assign one of the three day types to each day of the week, i.e, Sunday - Saturday. You do this in order to apply Off Peak and On Peak rates to a day.

- For example: you set up a Weekend day type that will be Off Peak for the entire day, and a Weekday day type that will be On Peak 9-5 and Off Peak the rest of the day. Then you apply the Weekend day type to Saturday and Sunday, and the Weekday day type to Monday - Friday.

a. Enter a name for the day types.

- To change a day type name, click in the name field and click the Edit Selected Name button. You can then change the name.

- b. For each of the days listed (Sunday type through Saturday type), select the day type for it from the pull-down menu. In the example screen on the previous page, the Weekend day type is assigned to Saturday and Sunday, and the Week-day day type is assigned to Monday - Friday. Make the proper settings for your jurisdiction.

### 15.3.1.5: Rate Names

1. Click the Rate Names tab.

The screenshot shows the 'TOU Rate Configurator' application window. The 'Rate Names' tab is selected in the top navigation bar. The interface includes a 'Read Mode' section with 'Self Read Mode' selected. A large green banner displays 'TOURate Configurator'. Below the tabs, the 'Set Rate Names' section contains a table with four rows: '1 On Peak', '2 Off Peak', '3 Shoulder Peak', and '4 Rate 4'. A 'Total' row is at the bottom. To the right of the table, text reads 'Such as On Peak and Off Peak'. An 'Edit selected Name' button is located below the table. The status bar at the bottom indicates 'Device Type: Nexus 1500+ Demand Type: Block Window Demand Interval: 0 seconds'.

Rate	Name
1	On Peak
2	Off Peak
3	Shoulder Peak
4	Rate 4
Total	Total Rate

Such as On Peak and Off Peak

Edit selected Name

Device Type: Nexus 1500+ Demand Type: Block Window Demand Interval: 0 seconds

2. This screen is used to set up rates. A rate is the type of charge that is applied to a TOU time period - for example, On Peak, Off Peak, Shoulder Peak. The Total rate keeps a cumulative total of usage. Use the screen above to set up to four rates and the Total rate.
3. Enter a name for each rate, e.g., On Peak.
  - To change a rate name, click in the name field and click the Edit Selected Name button. You can then change the name.

### 15.3.1.6: Schedules

1. Click the Schedules tab.

The screenshot shows the 'TOU Rate Configurator' application window. The 'Schedules' tab is selected in the top navigation bar. The interface includes a 'Read Mode' section with 'Self Read Mode' selected. A large green banner displays 'TOURate Configurator'. Below the navigation bar, the 'Daily Schedules and Rate Changes' section contains a table with three columns: 'Schedule', 'Rate', and 'Start Time'. The table lists three schedules, with 'Schedule 3' highlighted. To the right of the table are buttons for 'Add Schedule', 'Delete the Schedule', 'Add Rate Change', 'Edit the Rate Change', and 'Delete the Rate Change'. A note at the bottom states: 'Note: If a Schedule is deleted from the middle of the list, each schedule that is below the deleted one will have its id number subtracted by one.' The status bar at the bottom shows 'Device Type: Nexus 1500+', 'Demand Type: Rolling Window', and 'Demand Interval: 0'.

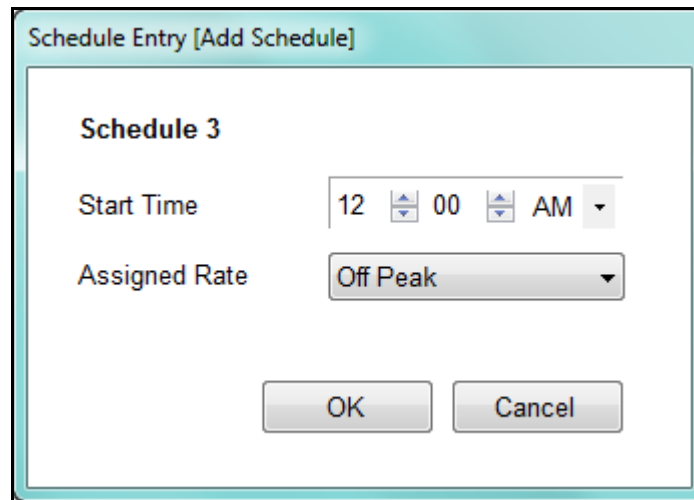
Schedule	Rate	Start Time
Schedule 1	Off Peak	12:00 AM
	On Peak	9:00 AM
Schedule 2	Off Peak	5:00 PM
	Off Peak	12:00 AM
Schedule 3	Off Peak	12:00 AM
	On Peak	9:00 AM
	Shoulder Peak	5:00 PM
	Off Peak	7:00 PM

Note: If a Schedule is deleted from the middle of the list, each schedule that is below the deleted one will have its id number subtracted by one.

Device Type: Nexus 1500+ Demand Type: Rolling Window Demand Interval: 0

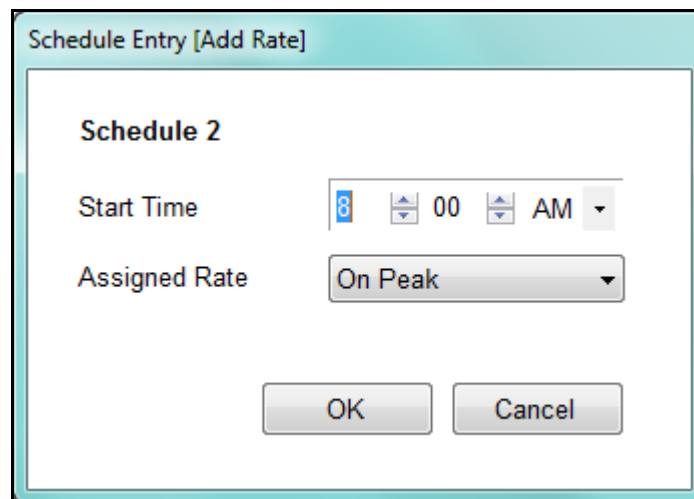
2. This screen lets you set up TOU schedules. The schedules define what time of the day the rates are applied, for example Off Peak from 9-5 and On Peak the rest of the day. The schedules you set up are then applied to the day types (Weekend, Weekday, Holiday, etc.) for each of the seasons (or weekly/daily TOU accumulations). You can set up to 16 schedules.

- a. Click the Add Schedule button to add a new schedule.



The screenshot shows a dialog box titled "Schedule Entry [Add Schedule]". Inside, it is labeled "Schedule 3". There are two input fields: "Start Time" and "Assigned Rate". The "Start Time" field is a time picker set to 12:00 AM. The "Assigned Rate" field is a dropdown menu currently showing "Off Peak". At the bottom of the dialog are two buttons: "OK" and "Cancel".

- b. The schedules are automatically numbered consecutively. Select the start time for the first rate and select the rate from the pull-down menus. For example, select 12:00 AM and Off Peak to set up the Off Peak rate for the beginning of the day for this schedule.
- c. Click OK. You return to the Schedules tab.
- d. Click Add Rate Change to add another Rate to the schedule. This lets you set up a different rate for part of the day



The screenshot shows a dialog box titled "Schedule Entry [Add Rate]". Inside, it is labeled "Schedule 2". There are two input fields: "Start Time" and "Assigned Rate". The "Start Time" field is a time picker set to 8:00 AM. The "Assigned Rate" field is a dropdown menu currently showing "On Peak". At the bottom of the dialog are two buttons: "OK" and "Cancel".

e. Select the start time and rate from the pull-down menus; then click OK. For example, to set up a schedule that can be applied to a Weekday, select 9:00 AM and On Peak. Repeat this step until all of the rate changes for the schedule are entered.

- For example: to make a schedule that you will apply to a weekday, in which 9 AM-5 PM is Peak usage and all other hours are Off Peak usage, you would create the schedule and 1. apply the Off Peak Rate to begin at 12 AM, 2. apply the On Peak Rate to begin at 9 AM, and 3. apply the Off Peak Rate to begin at 5 PM. This will ensure that the usage will be accumulated correctly.

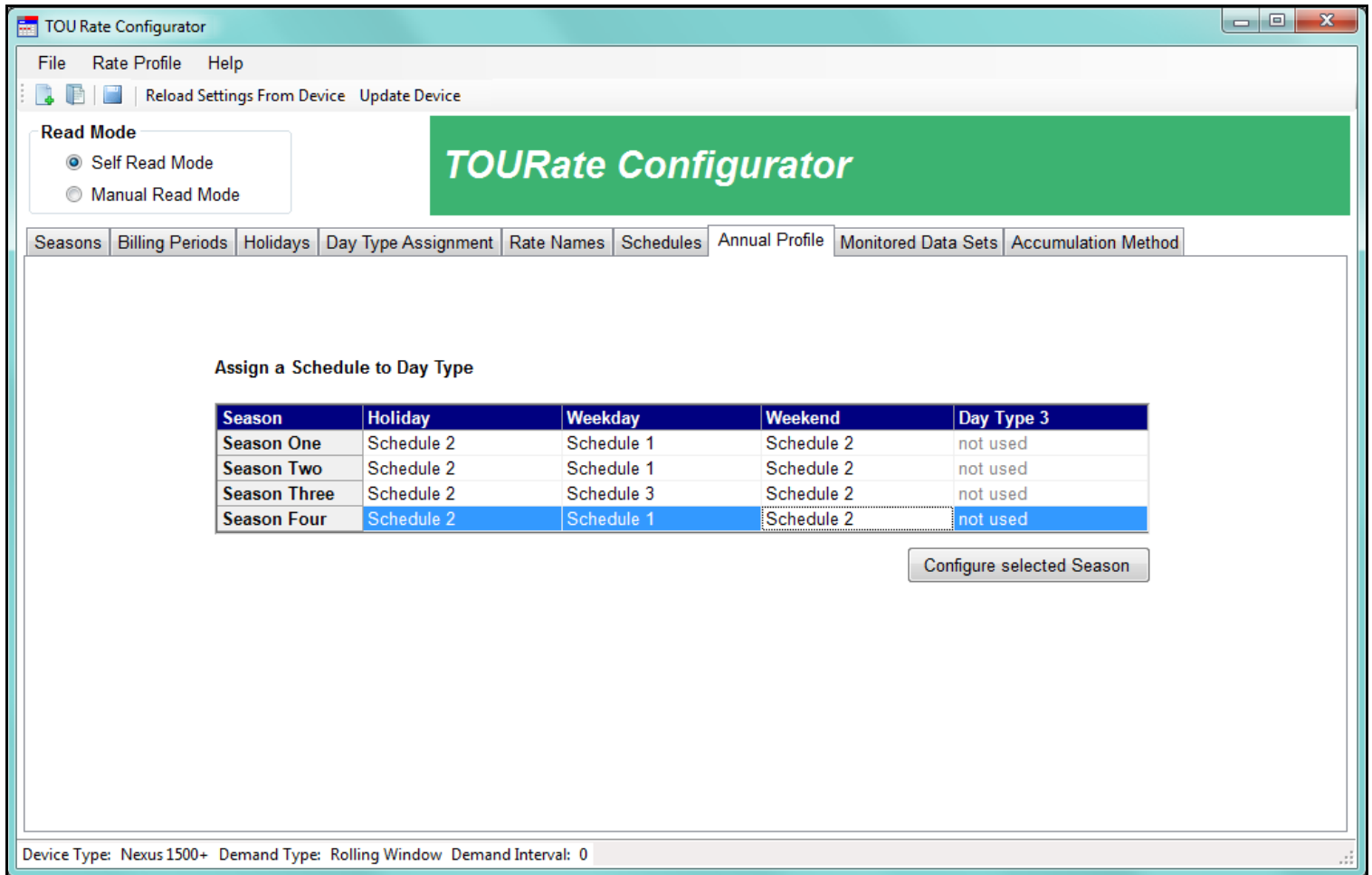
**NOTES:**

- You can delete a schedule by highlighting it in the schedule list and clicking Delete the Schedule. Note that if you delete a schedule, the schedules after it are renumbered by subtracting 1, i.e., if you have schedules 1-4 and you delete schedule 2, the schedule that was schedule 3 will be renumbered schedule 2; and the schedule that was schedule 4 will be renumbered schedule 3. Be sure to readjust the Annual Profile tab, accordingly - see 15.3.1.7: Annual Profile, on page 15-61.
- You can edit a Rate change by highlighting the Rate in the list and selecting Edit the Rate Change.
- You can delete a Rate change by highlighting the Rate in the list and selecting Delete the Rate Change.



### 15.3.1.7: Annual Profile

1. Click the Annual Profile tab.



2. The Annual Profile is the assignment of the schedules you set up in the previous step to the day types you set up earlier. You can assign different schedules for each of the day types and for each of the seasons (or weekly/daily TOU accumulations).

- For example: (as shown in the above example screen)
  - You have set up Weekend and Weekday day types, in addition to the default Holiday day type.
  - Then you set up Schedule 1 which has On Peak hours 9-5 and Off-Peak the rest of the day; Schedule 2 which is Off Peak all day, and Schedule 3 which is On-Peak 9-5, Shoulder Peak 5-7, and Off-Peak the rest of the day.

- Here in the Annual Profile setting, you could set Seasons 1, 2, and 4 with Schedule 1 for Weekday, and Schedule 2 for Weekend and Holiday; and Season 3 with Schedule 3 for Weekday, and Schedule 2 for Weekend and Holiday. (Day Type 3 is not used in this example Annual Profile.)
- This way the whole year is set up for the proper TOU accumulations and billing.

a. Click on a season and click Configure Selected Season.

The screenshot shows a software window titled "Annual Profile". Inside, there is a section titled "Configure Season Three Day Type's Schedule". Below this title are four pull-down menus arranged horizontally. The first three are labeled "Holiday", "Weekday", and "Weekend", and each has "Schedule 1" selected. The fourth is labeled "Day Type 3" and has "Schedule 3" selected. At the bottom right of the window are two buttons: "OK" and "Cancel".

- b. For each of the day types, select the schedule to apply to it from the pull-down menu.
- c. Click OK. You will return to the Annual Profile tab.
- d. Repeat for each of the seasons.

### 15.3.1.8: Monitored Data Sets

1. Click the Monitored Data Sets button.

The screenshot shows the 'TOU Rate Configurator' application window. The 'Monitored Data Sets' tab is selected. The interface includes a 'Read Mode' section with 'Self Read Mode' selected. A table titled 'Configure Monitored Data Sets (1 - 16)' displays three data sets. Below the table are buttons for 'Add Data Set', 'Edit selected Data Set', and 'Remove the selected Data Set'. A status bar at the bottom shows 'Device Type: Nexus 1500+', 'Demand Type: Sliding Window', and 'Demand Interval: 900 seconds'.

#	Register Identifiers	Data Set Options	Labels
1	Accumulator Register: 6918d Peak Demand Register: 7933d Coincident Demand Register: 8073d	Accumulator Register Monitoring: Enabled Peak Demand Monitoring: Enabled Cumulative Demand: Enabled Continuous Cumulative Demand Use: Yes Coincident Demand Association: Enabled Accumulator Register Sign: Positive Demand Register Type: Positive Power Coincident Demand Entity: VAR	Dataset Label: Quadrant 1+4 Accumulator: +Wh Q1+4 Peak Demand: WQ14 Coincident Demand: Coin VARQ14 Cumulative Demand: Cumulative Deman
2	Accumulator Register: 6920d Peak Demand Register: 7945d Coincident Demand Register: 0	Accumulator Register Monitoring: Enabled Peak Demand Monitoring: Enabled Cumulative Demand: Disabled Continuous Cumulative Demand Use: No Coincident Demand Association: Disabled Accumulator Register Sign: Positive Demand Register Type: Positive Power Coincident Demand Entity: PF	Dataset Label: Q1 VAh Accumulator: VAh Q1 Peak Demand: VAQ14 Coincident Demand: Cumulative Demand:
		Accumulator Register Monitoring: Enabled Peak Demand Monitoring: Disabled	

This screen allows you to pick the Energy values for creating TOU function

Device Type: Nexus 1500+ Demand Type: Sliding Window Demand Interval: 900 seconds

2. The Monitored Data Sets setting lets you decide what accumulators, in addition to the Energy and Demand readings, that you want to save when TOU is performed. In many cases you will leave the default setup as it has been configured to be most useful for accumulating TOU data. However, the Nexus® 1450/1500+/Shark® 250/270 meter's TOU implementation gives you the flexibility to perform TOU on many different readings. There are 38 channels of data that can be accumulated for TOU, as follows:

- Total VAh (Quadrants 1+2+3+4)
- Positive VARh (Quadrants 1+2)/Negative VARh (Quadrants 3+4)
- Positive Wh (Quadrants 1+4)/Negative Wh (Quadrants 2+3)

- Quadrant 1 VAh/Quadrant 1 VARh
- Quadrant 2 VAh/Quadrant 2 VARh
- Quadrant 3 VAh/Quadrant 3 VARh
- Quadrant 4 VAh/Quadrant 4 VARh
- I2t Phase A/I2t Phase B/I2t Phase C
- V2t Phase A/V2t Phase B/V2t Phase C
- Quadrant 1 Wh/Quadrant 2 Wh/Quadrant 3 Wh/Quadrant 4 Wh
- Uncompensated Total VAh/Uncompensated +VARh/Uncompensated -VARh /  
Uncompensated +Wh/Uncompensated -Wh
- +Q/-Q
- Pulse Accumulation Inputs 1-8
- In addition, the following coincident demand values can be selected:
  - VAR Q12/VAR Q34
  - VAR Q1/Q2/Q3/Q4
  - VA Q1/Q2/Q3/Q4
  - PF
  - +PF/-PF
  - Uncompensated PF

- a. Click Add Data Set to add new monitored data.

**Monitored Data Set**

**Monitored Data Set 1**

TOU Data Set Label: Q4 Wh

Select Accumulator: Q4 Wh

Coincident Demand Association: VAR Q4

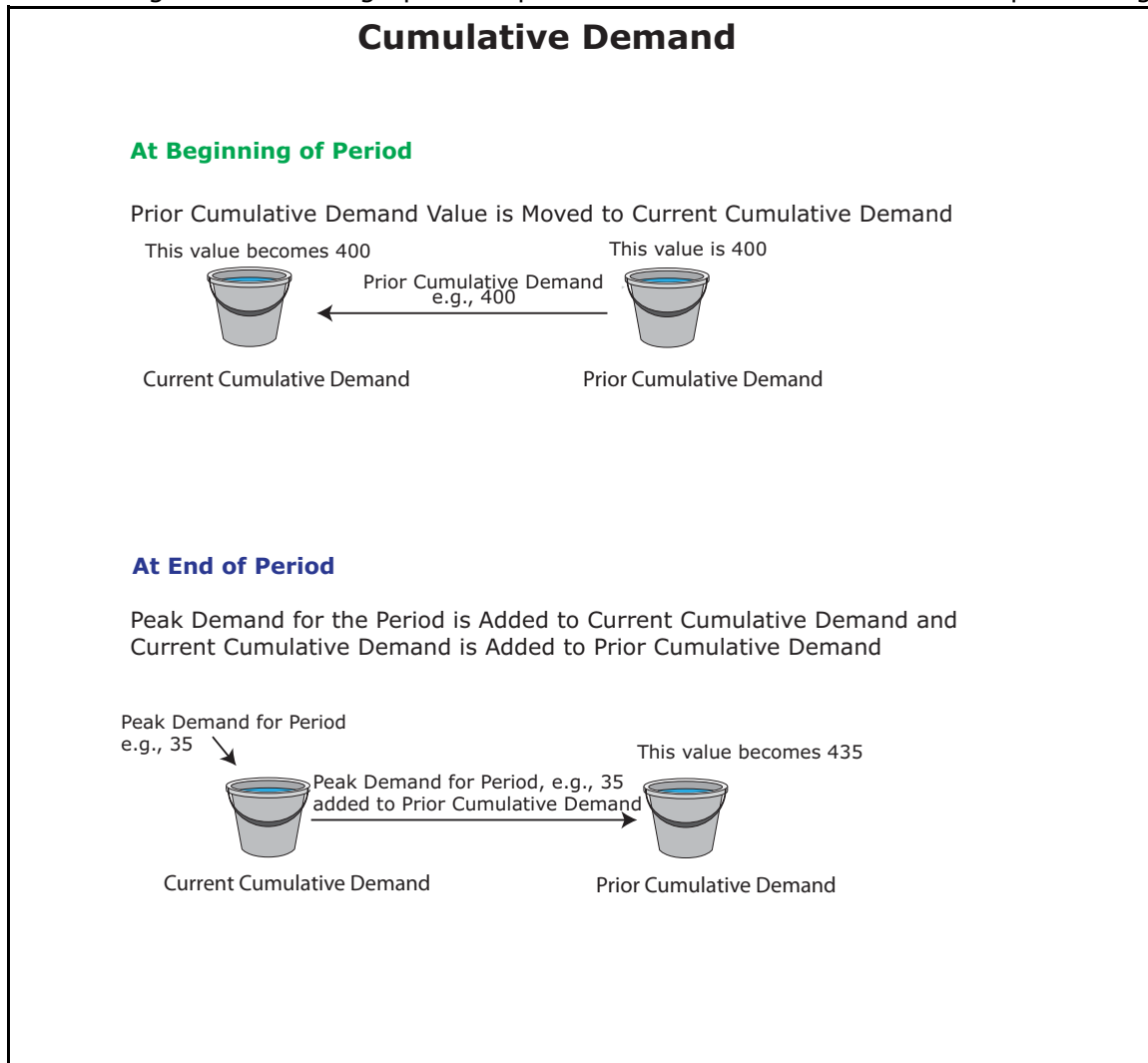
Cumulative Demand: Enabled

Select Continuous Cumulative Demand: ☒

OK Cancel

- b. Select the reading you want to accumulate from the pull-down menu next to "Select Accumulator." The accumulator you select will also be listed in the TOU Data Set Label field. Note that the peak demand is based on the selected accumulator.
- c. Coincident Demand Association lets you accumulate another reading at the time of peak demand accumulation. For example, you may want to track Power Factor (PF) or VARs at the time of peak demand, to identify the number of capacitors needed, peak inefficiencies, etc. To enable this, select the required coincident demand reading from the pull-down menu.

- d. Cumulative demand is the sum of peak demand. There are two cumulative demand blocks: current and prior. At the start of a period, the TOU cumulative demand is carried forward to the current period data block from the prior period data block. At the end of a period, TOU cumulative demand is the sum of the cumulative demand value and the peak demand from the current period. Then the meter moves the current data into the prior data block, and carries forward the updated cumulative demand into the next period's current data block. Select Enabled from the pull-down menu to activate cumulative demand. Refer to Figure 15.3 for a graphical representation of Cumulative Demand processing.



15.3: Cumulative Demand Processing

- e. Continuous cumulative demand means that the current cumulative peak demand is updated continuously throughout the period. At the start of a period, the TOU cumulative demand is carried forward to the current period from the prior period. During the period, TOU current cumulative demand is the sum of the cumulative demand value and the current peak demand from the current period. At the end of the period, the meter moves the current cumulative demand data into the prior cumulative demand data block, and carries forward the updated cumulative demand into the next period. Click the checkbox to enable cumulative demand accumulation. Note that selecting continuous cumulative demand doesn't affect the prior cumulative demand field, which will still be added to at the end of the period. Refer to Figure 15.4 for a graphical representation of Continuous Cumulative Demand processing.

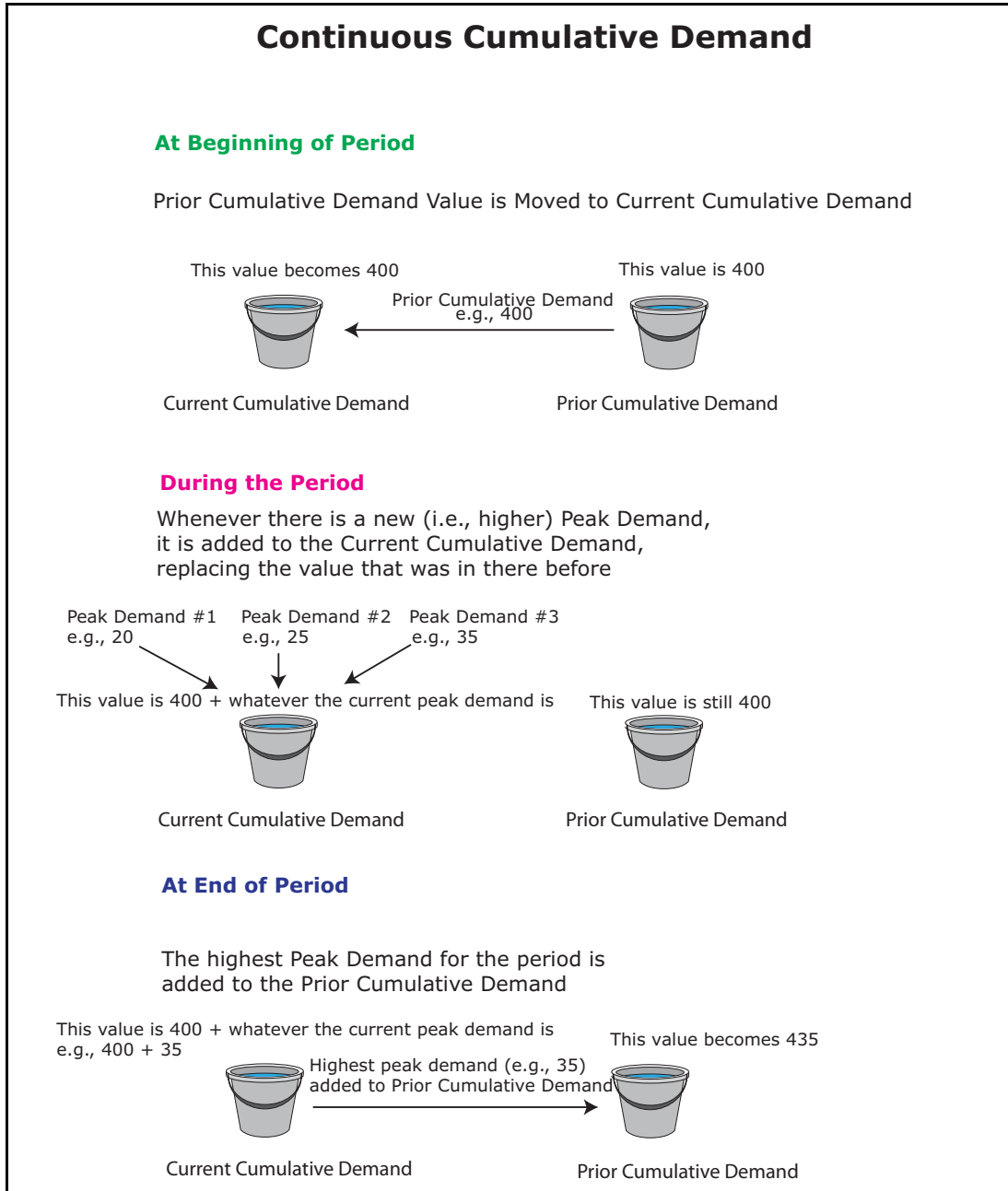


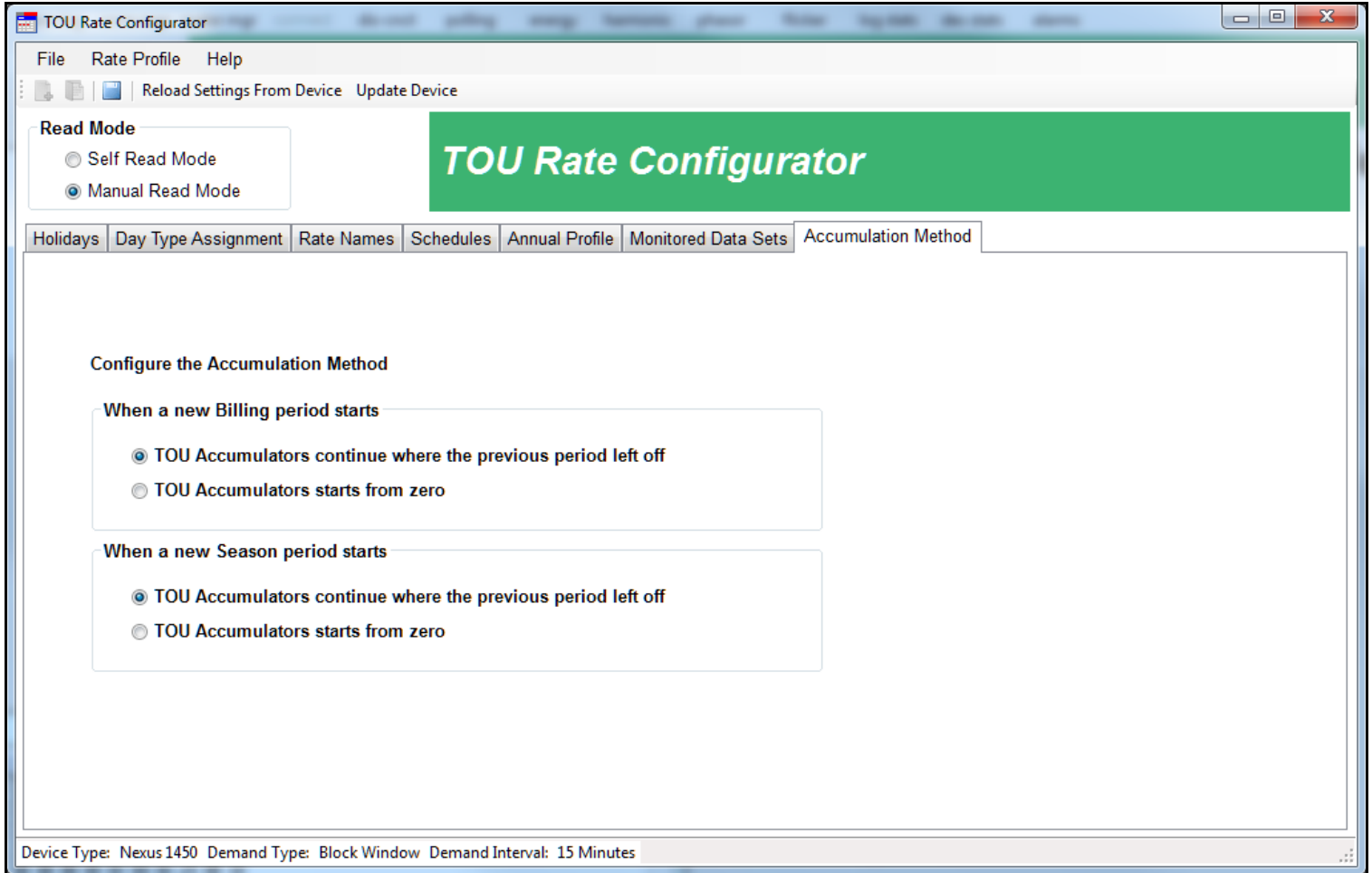
Figure 15.4: Continuous Cumulative Demand Processing



f. Click OK to save your monitored data set.

### 15.3.1.9: Accumulation Method

1. Click the Accumulation Method tab.



2. This setting lets you specify what happens to the TOU accumulators when a new billing period and a new season begin:

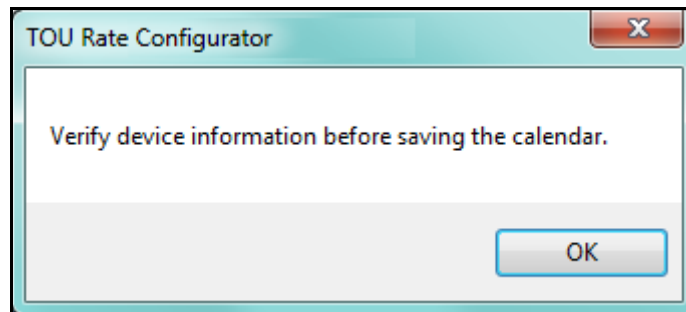
- You can select to either continue TOU accumulations where the previous billing period/season left off or start the TOU accumulators from zero.
- Click the settings you want to use.

3. When you have made all the TOU settings:

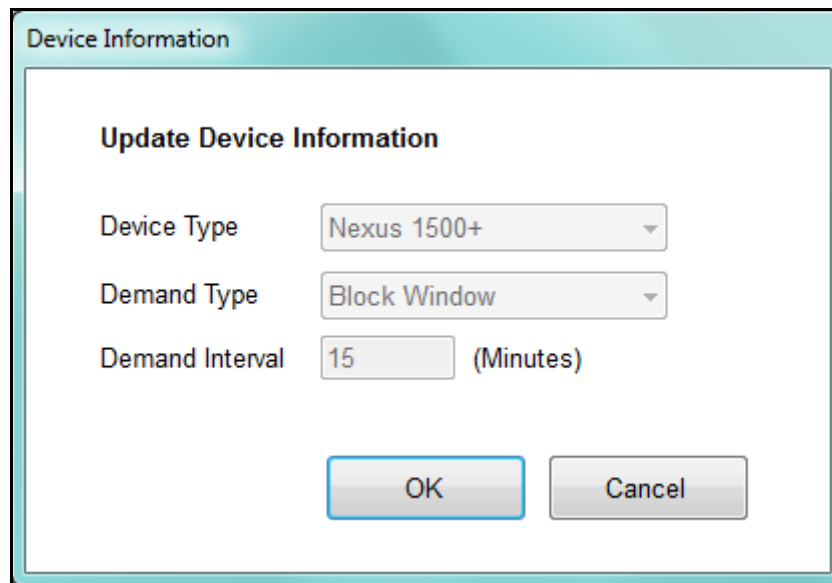
- Click File>Save Rate Profile As to save the TOU Profile as a .cal file. You will be prompted to save the file.

- Click View As Report to see a report of the TOU Profile settings.

**NOTE:** If you aren't currently connected to a meter, you will see the following screens.



4. Click OK.



5. This information is for reference only and is saved by the software as part of the TOU profile. Click OK to proceed with the save or report options.

### 15.3.2: Editing an Existing TOU Profile

To edit an existing TOU Profile, you first need to import it either from the connected meter or from a saved calendar file.

For the Nexus® 1450/1500+ meter:

- To edit the current device's TOU Profile, click TOU Calendar>Nexus 1500+ TOU Calendar Settings>Edit Current Device Rate Profile. The application will load the meter's TOU Rate Profile and open it in the Rate Configurator. You can then follow the instructions given in 15.3.1: Creating a New TOU Profile, on page 15-47 to edit the profile and then save it. See 15.3.3: Importing a TOU Profile to the Meter, on page 15-72 for instructions on importing it back into the meter.
- To edit a TOU Profile for other than the connected device, click TOU Calendar>Open Rate Profile. A screen opens letting you select the profile file, which is a Time of Use Configurator file - with the file extension .cal. The file will open in the Rate Configurator and you can follow the instructions in 15.3.1: Creating a New TOU Profile, on page 15-47 to edit and save it.

For the Shark® 250/270 meter, click TOU Calendar>TOU Rate Configurator. The connected meter's TOU Profile is loaded, if there is one.

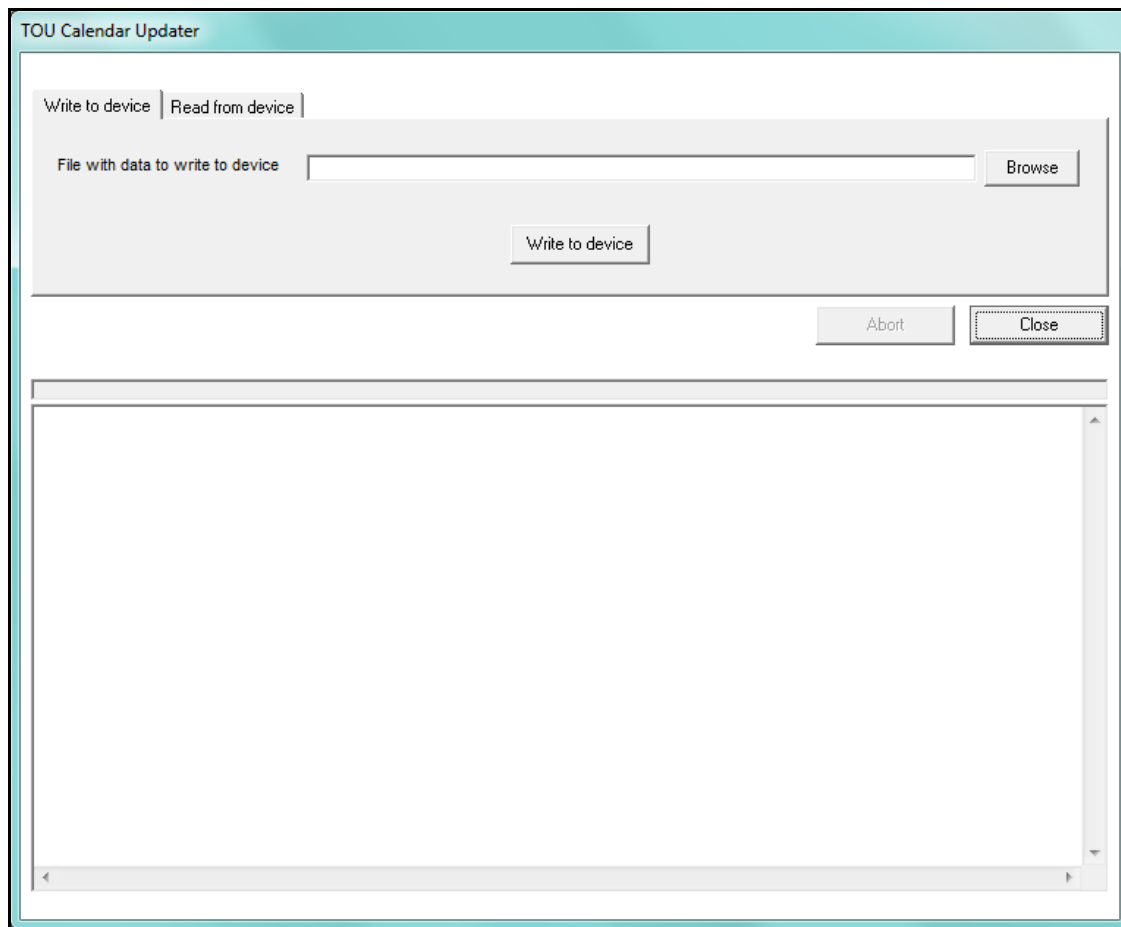
To edit another TOU Profile, click File>Open Rate Profile. A screen opens that shows all TOU Profile files. Select the one you want and click Open. The TOU Profile you selected will open in the TOU Rate Configurator screen.

### 15.3.3: Importing a TOU Profile to the Meter

When you have saved a TOU Profile as a Time of Use Configurator file, you can copy it to any other Nexus® 1450/1500+/Shark® 250/270 meter, for example, if you are replacing an existing meter or setting up another meter with the same TOU settings. This way you do not need to enter the settings again. The procedure is slightly different for the two meters.

#### 15.3.3.1: Importing a Nexus® 1450/1500+ Meter TOU Profile

1. To import a new or edited Time of Use Configurator file to the meter, click TOU Calendar>Nexus 1500+ TOU Calendar Settings>TOU Calendar Utility.



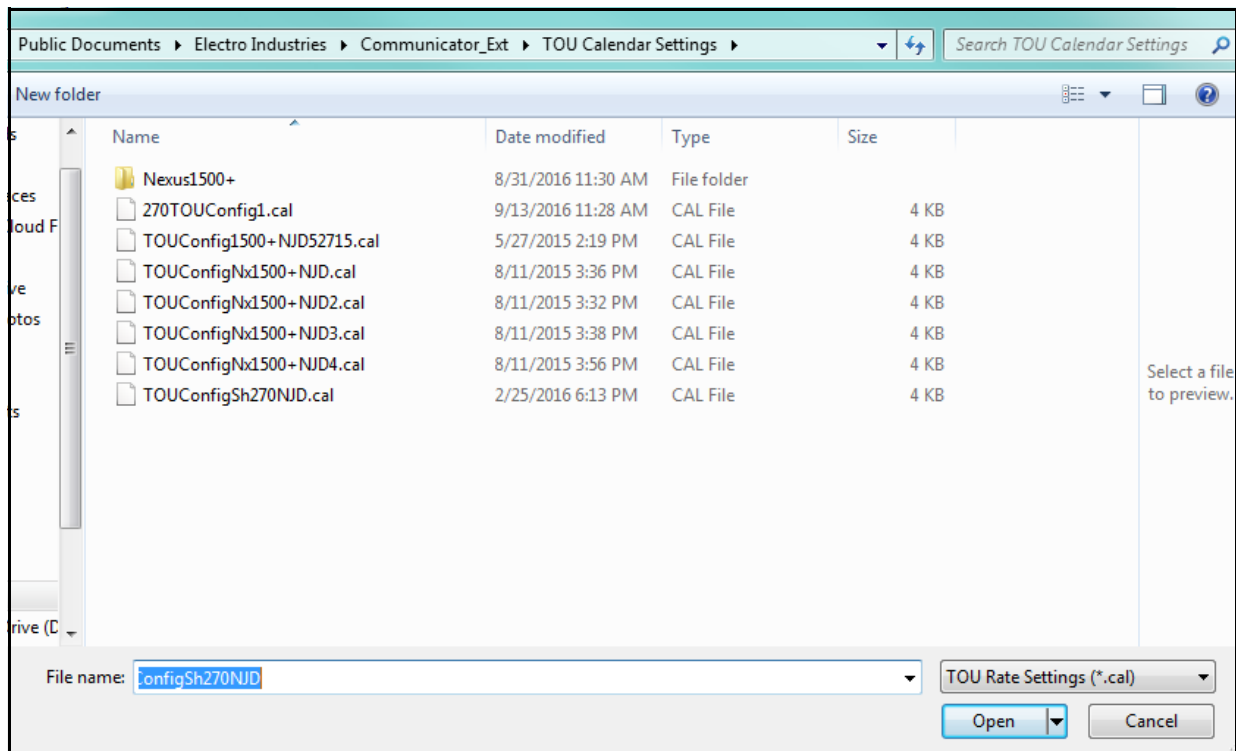
2. Using this screen, you can either read a TOU file from the meter or write a file to the meter using this screen. To write a file to the meter:
  - a. Click the Browse button to locate the file you want. It will be a file with the .cal extension.

- b. Click the Write to Device button. You will see messages in the screen as the meter is being updated. Note that the TOU module will automatically perform a self read and then restart, after each TOU profile update.
3. Click Close when the update is complete.
4. Enable TOU in the meter's Device Profile - see 11.2.11: Time of Use Enable/Disable (Nexus® 1500+ Meter), on page 11-53 for instructions.

### 15.3.3.2: Importing a Shark® 250/270 Meter TOU Profile

For the Shark® 250/270 meter you select the TOU Profile you want and then upload it to the meter:

1. Click TOU Calendar>Upload TOU Rate Settings.

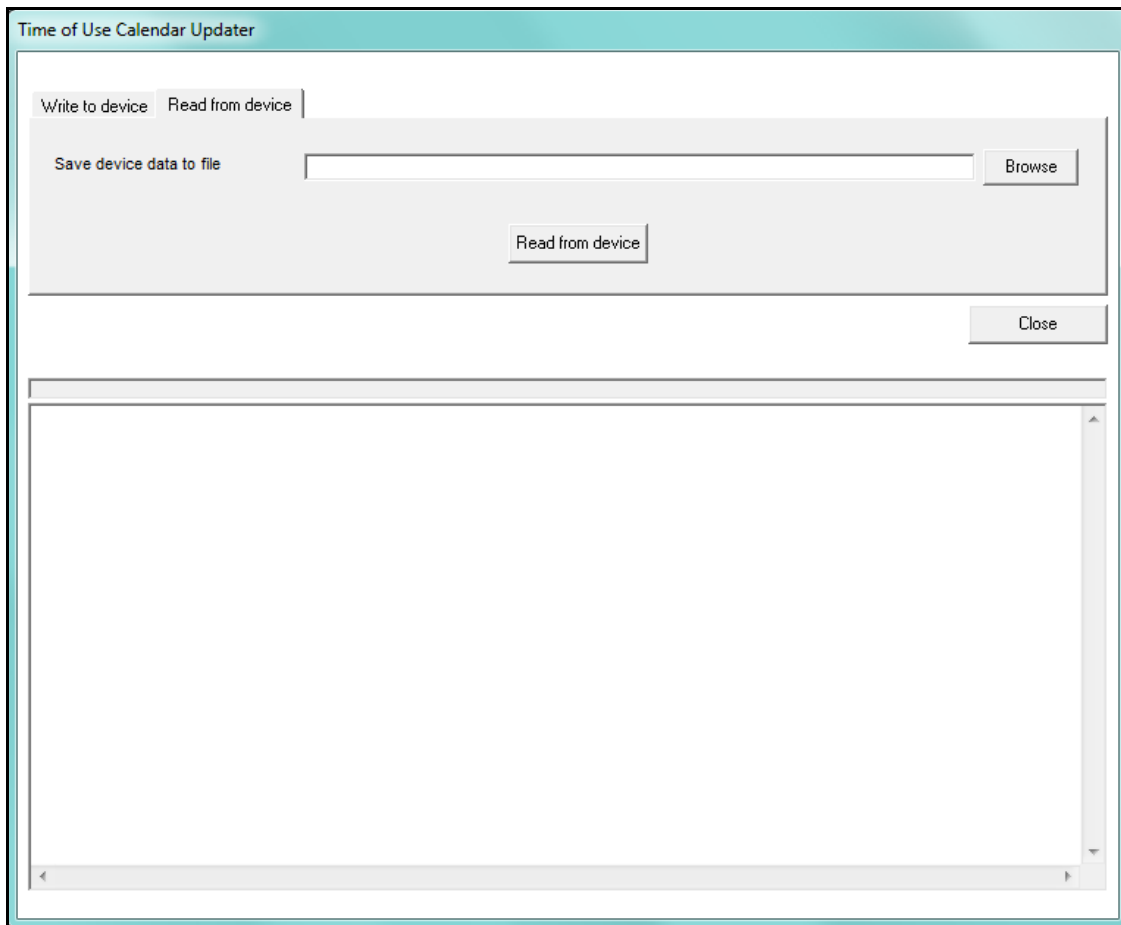


2. A screen opens that shows all TOU Profile files. Select the one you want and click Open.
3. You will see a message window as the TOU Profile is being uploaded to the meter, and another message window will tell you when the file has finished uploading.

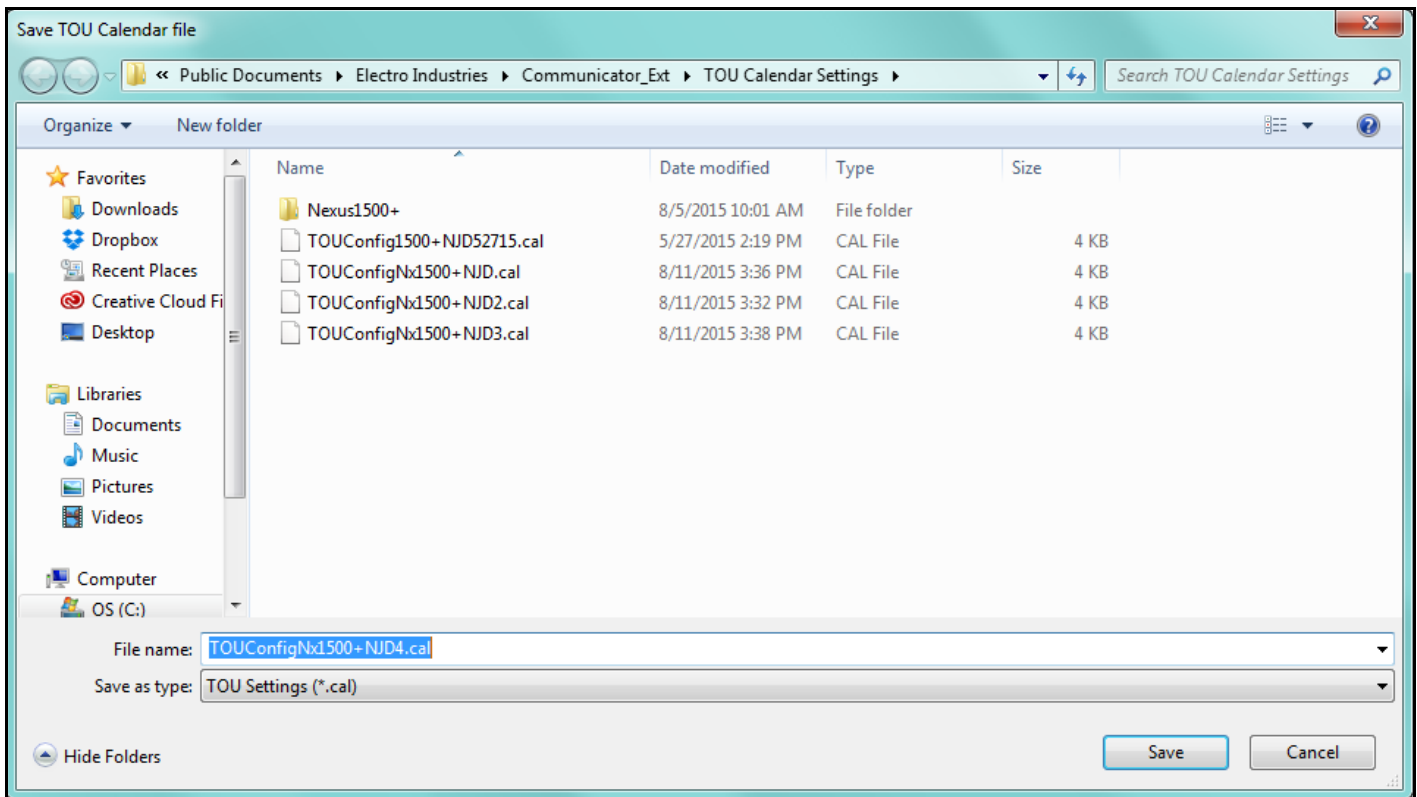
### 15.3.4: Saving a Device's TOU Profile to a File (Nexus® 1450/1500+ Meter)

As explained in 15.3.2: Editing an Existing TOU Profile, on page 15-71, you can use the Edit Current Device Rate Profile option to open the device's configuration file and then make changes to it and save it as a file. If you want to save the device's configuration file as a file, but do not want to make any changes to it, the simplest way is to use the TOU Calendar Utility screen shown in 15.3.3: Importing a TOU Profile to the Meter, on page 15-72. Follow these instructions.

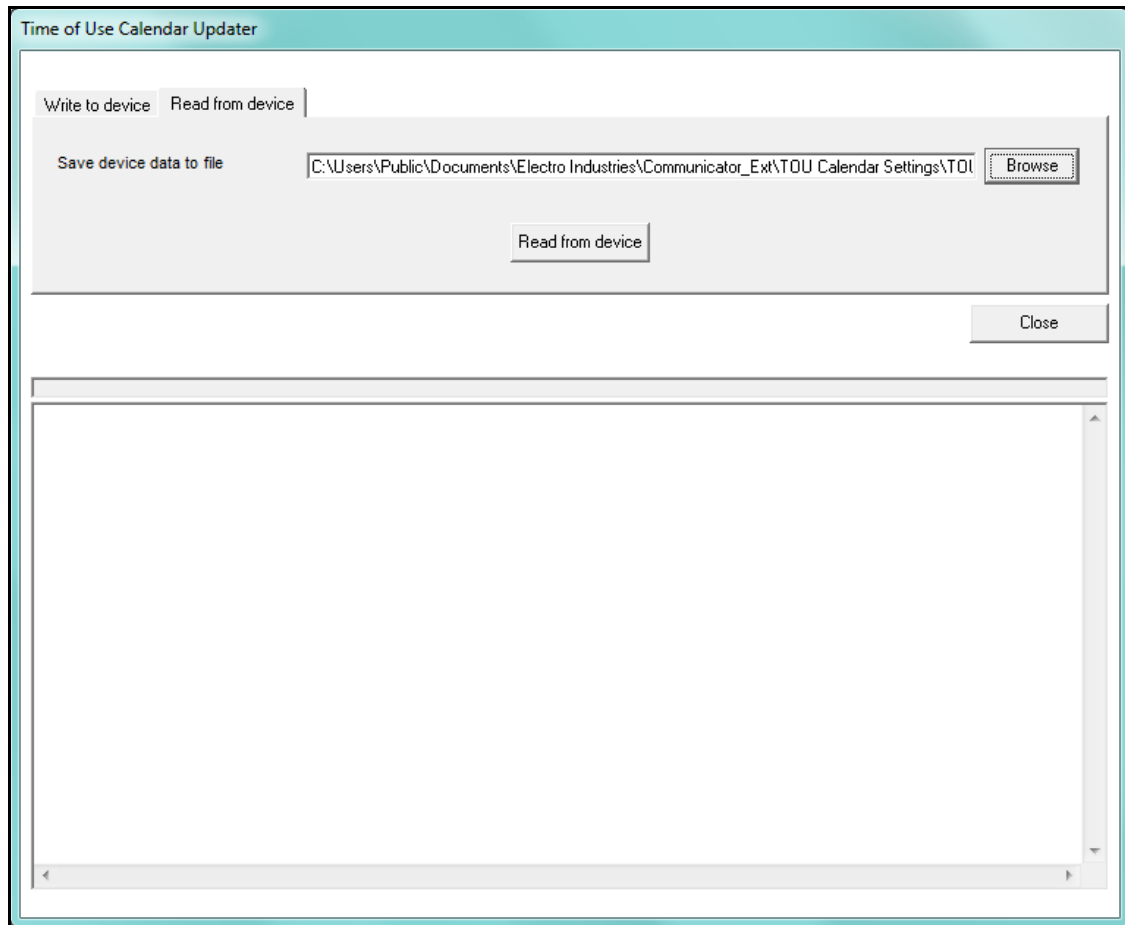
1. Click TOU Calendar>Nexus 1500+ TOU Calendar Settings>TOU Calendar Utility.
2. Click the Read From Device tab.



3. Click Browse. You will see the screen shown below.



4. Give a name to the file and click Save. The file and its path will be listed on the screen shown below.



5. Click the Read From Device button. You will see messages while the file is being saved.
6. Click Close once the messages stop (the file will be saved).



### 15.3.5: Performing a TOU Read through the Modbus Map

To perform a TOU read through the Modbus map, you need to poll the appropriate registers. The TOU data is located in Modbus input registers 0xD037H- 0xEF16H for the Nexus® 1500+ meter and 41000-48918 for the Shark® 250/270 meter. Data includes current billing month/season and previous billing month/season.

#### **IMPORTANT!**

- Refer to the *Nexus® 1500+ Meter Modbus User Manual*, the *Shark® 250 Meter Modbus Application Guide*, or the *Shark® 270 Meter Modbus Application Guide* for detailed Modbus Map information.
- For Manual Read mode, or for a TOU profile configured with weekly or daily self reads, the user should not read the initial and final parts of the current and prior month blocks. These are used for regular Self Read mode. The parts that should not be read are:
  - For all current month/season/weekly/daily blocks, energy scaling information is in the meter's Device Profile. Coincident demand data identifiers are in the Current TOU profile.
  - For all prior month/season/weekly/daily blocks, energy scaling and coincident demand data identifiers are in Modbus input registers EF1BH to EF6EH.
- The TOU registers contain scaled readings, based on the scaling set up in the meter's Device Profile (see 11.2.1: Energy Scaling, on page 11-28, for the Nexus® 1500+ meter; 28.2.1: Configuring Energy, Power Scaling, and Averaging, on page 28-36 for the Shark® 250 meter; or 26.2.1: Configuring Energy, Power Scaling, and Averaging Method, on page 26-41, for the Shark® 270 meter). If you are making changes to the meter's scaling, follow these steps before doing so:
  1. Perform a read before applying the new meter profile.
  2. Update the meter's Device Profile. See Chapter 11 for instructions for the Nexus® 1500+ meter, Chapter 26 for instructions for the Shark® 270 meter, and Chapter 28 for instructions for the Shark® 250 meter.
  3. Perform a reset of all meter energy, accumulations and TOU readings (see 20.1.7: Reset Device Information, on page 20-7, for reset instructions).

### 15.3.6: Example of Programming a TOU Profile

Following is an example of programming a TOU Profile, with these settings:

- Self Read mode
- 12 months: 1/15, 2/15, 3/15, 4/15, 5/15, 6/15, 7/15, 8/15, 9/15, 10/15, 11/15, 12/15
- Four seasons: 3/15(Spring), 6/15(Summer), 9/15(Autumn), 12/15 (Winter)
- Holiday: 1/1
- Day Types: Saturday, Sunday, and Weekday
- Rate Names: On Peak, Off Peak, Holiday
- Day Type Assignments: Weekday (Monday - Friday), Saturday, Sunday
- Schedules: Schedule 1 (8 am On Peak rate, 6 pm Off-Peak rate) Schedule 2 (12 am Off Peak rate), Schedule 3 (12 am Holiday rate)
- Annual Profile:
  - Spring (Holidays - Schedule 3; Weekdays - Schedule 1; Saturdays - Schedule 2; Sundays - Schedule 2)
  - Summer (Holidays - Schedule 3; Weekdays - Schedule 1; Saturdays - Schedule 2; Sundays - Schedule 2)
  - Autumn (Holidays - Schedule 3; Weekdays - Schedule 1; Saturdays - Schedule 2; Sundays - Schedule 2)
  - Winter (Holidays - Schedule 3; Weekdays - Schedule 1; Saturdays - Schedule 2; Sundays - Schedule 2)
- Monitored Data Sets: Wh Q1+4, Wh Q2+3, -Varh, + Varh

1. Seasons tab: Self Read Mode; Four Seasons set up, with programmed transition dates.

The screenshot displays the 'TOU Rate Configurator' application window. The 'Read Mode' section on the left has 'Self Read Mode' selected. The 'Seasons' tab is active, showing a 'Customized Season' configuration. The 'Number of Seasons' is set to 'Four Seasons'. Below this, there are two columns: 'Season Names' and 'Season Transition Dates'. The 'Season Names' column lists 'Season One' (Spring), 'Season Two' (Summer), 'Season Three' (Autumn), and 'Season Four' (Winter). The 'Season Transition Dates' column lists 'Season One' (March ,15), 'Season Two' (June ,15), 'Season Three' (September,15), and 'Season Four' (December ,15). At the bottom, the 'Self Read Time of Day' section shows 'Season Self Read' set to '12:00 AM'. The status bar at the bottom indicates 'Device Type: Nexus 1500+ Demand Type: Block Window Demand Interval: 15'.

**TOU Rate Configurator**

File Rate Profile Help

**Read Mode**

- ☒ Self Read Mode
- ☐ Manual Read Mode

**Seasons** Billing Periods Holidays Day Type Assignment Rate Names Schedules Annual Profile Monitored Data Sets Accumulation Method

☐ Customized Season

Number of Seasons: Four Seasons

**Season Names**

- Season One: Spring
- Season Two: Summer
- Season Three: Autumn
- Season Four: Winter

**Season Transition Dates**

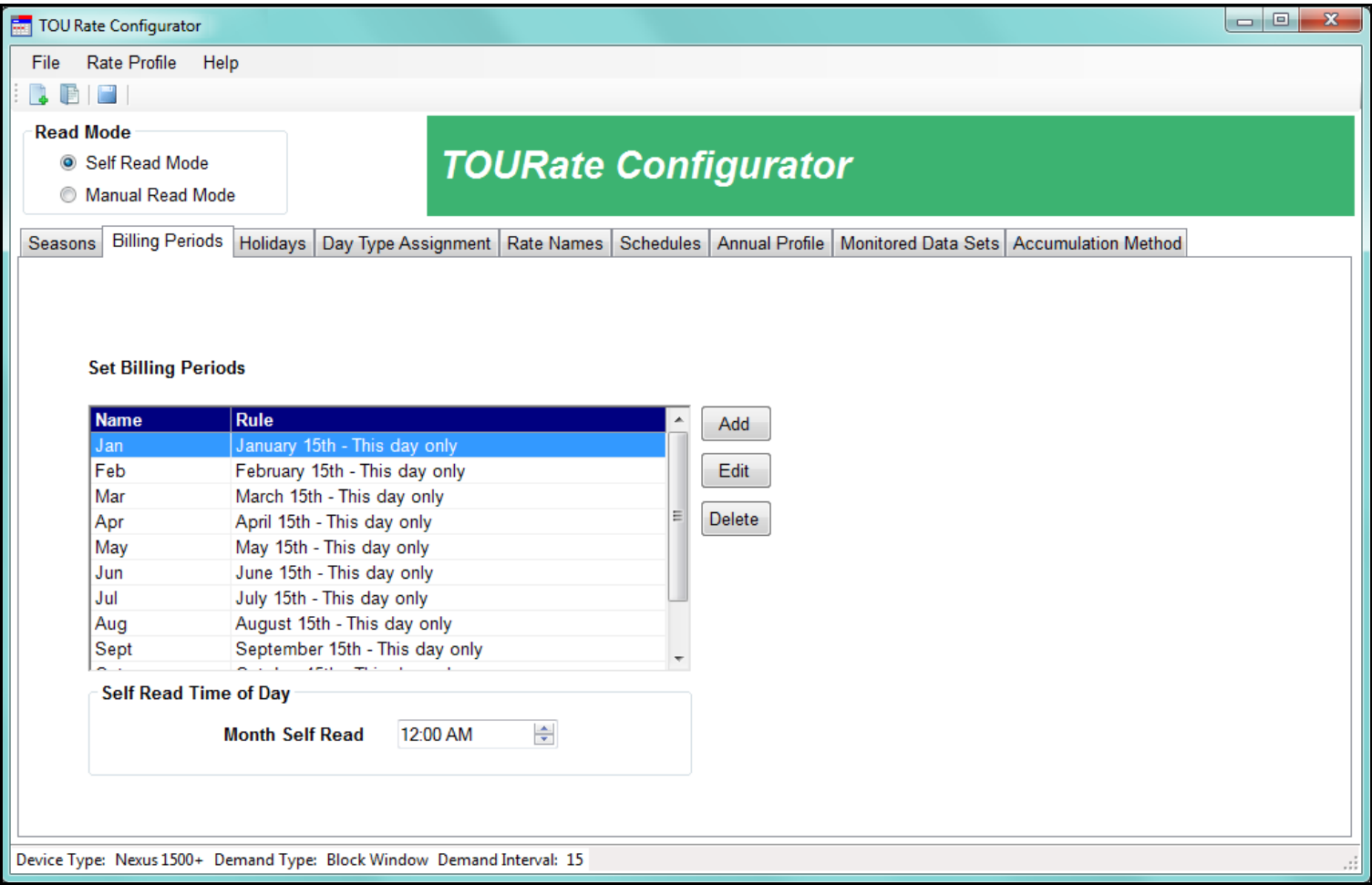
- Season One: March ,15
- Season Two: June ,15
- Season Three: September,15
- Season Four: December ,15

**Self Read Time of Day**

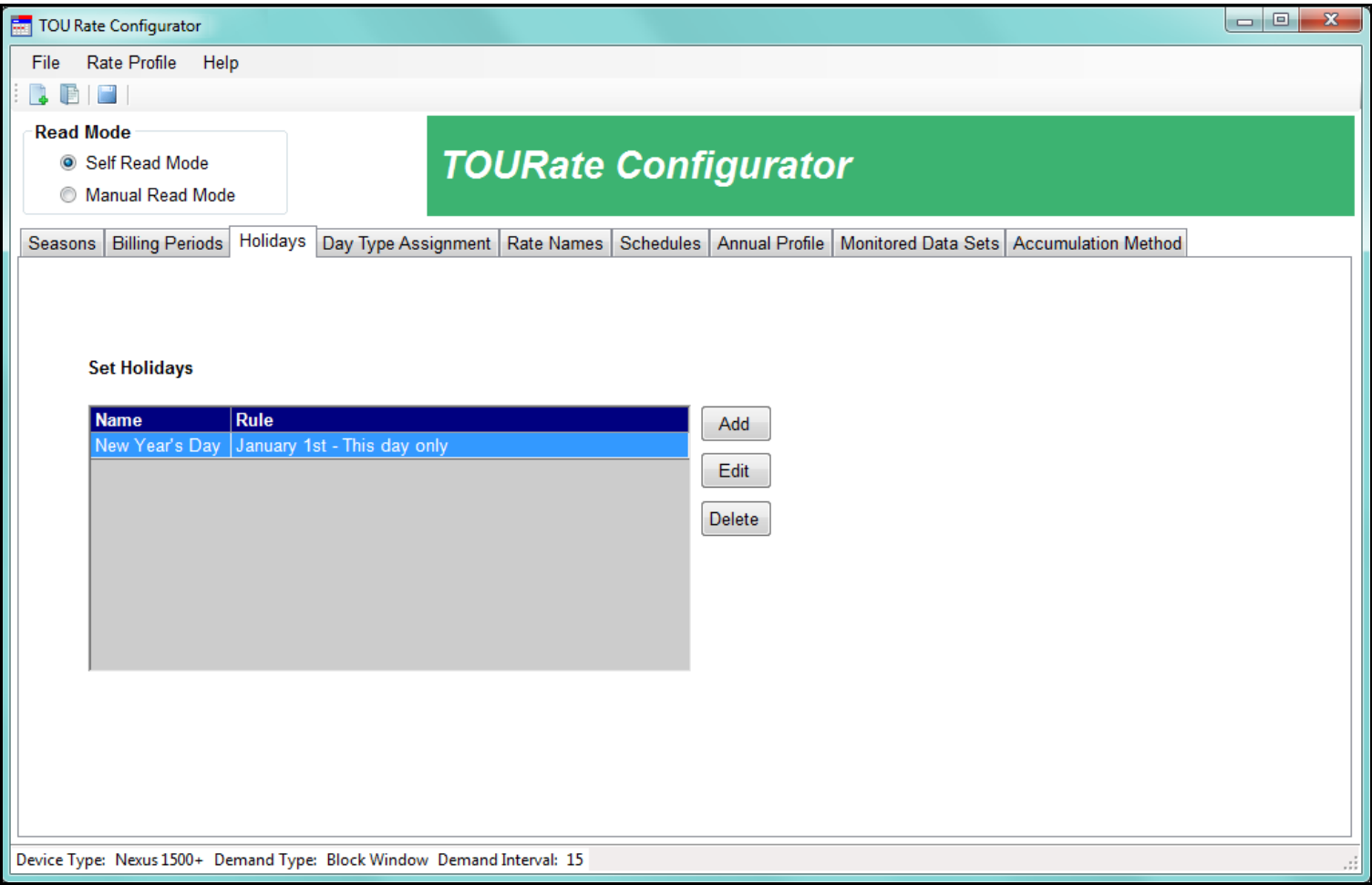
Season Self Read: 12:00 AM

Device Type: Nexus 1500+ Demand Type: Block Window Demand Interval: 15

2. Monthly Billing Periods set to the 15th of every month.



3. New Year’s Day set as a holiday.



4. Day types set and all three assigned - as Saturday, Sunday, and Weekday (Mon-Fri).

**TOU Rate Configurator**

File Rate Profile Help

Read Mode

☒ Self Read Mode

☐ Manual Read Mode

**TOURate Configurator**

Seasons Billing Periods Holidays Day Type Assignment Rate Names Schedules Annual Profile Monitored Data Sets Accumulation Method

**Set Day Type Names**

Day Type	Name
1	Weekday
2	Saturday
3	Sunday

Edit selected Name

**Configure Day Type Assignments**

Sunday type Sunday

Monday type Weekday

Tuesday type Weekday

Wednesday type Weekday

Thursday type Weekday

Friday type Weekday

Saturday type Saturday

Device Type: Nexus 1500+ Demand Type: Block Window Demand Interval: 15

## 5. Rates set up (named) - On-Peak, Off-Peak, and Holiday.

TOU Rate Configurator

File Rate Profile Help

Read Mode

☒ Self Read Mode

☐ Manual Read Mode

**TOURate Configurator**

Seasons Billing Periods Holidays Day Type Assignment **Rate Names** Schedules Annual Profile Monitored Data Sets Accumulation Method

Set Rate Names

Rate	Name
1	On-Peak
2	Off-Peak
3	Holiday
4	Tier 4
Total	Total Tier

Such as On Peak and Off Peak

Edit selected Name

Device Type: Nexus 1500+ Demand Type: Block Window Demand Interval: 15

6. Three schedules set up: Schedule 1 On-Peak at 8 am, Off-Peak at 6 pm; Schedule 2 Off-Peak at 12 am (and all day); Schedule 3 Holiday at 12 am (and all day).

TOU Rate Configurator

File Rate Profile Help

Read Mode

☒ Self Read Mode

☐ Manual Read Mode

**TOURate Configurator**

Seasons Billing Periods Holidays Day Type Assignment Rate Names Schedules Annual Profile Monitored Data Sets Accumulation Method

**Daily Schedules and Rate Change**

Schedule	Tier	Start Time
Schedule 1	On-Peak	8:00 AM
	Off-Peak	6:00 PM
Schedule 2	Off-Peak	12:00 AM
Schedule 3	Holiday	12:00 AM

Add Schedule

Delete the Schedule

Add Rate Change

Edit the Rate Change

Delete the Rate Change

Add a schedule for each daily profile

Change the daily profile of your schedule by adding rates

Note: If a Schedule is deleted from the middle of the list, each schedule that is below the deleted one will have its id number subtracted by one.

Device Type: Nexus 1500+ Demand Type: Block Window Demand Interval: 15



7. Annual Profile set up as: for Spring/Summer/Autumn/Winter seasons - Schedule 3 applied to holidays, Schedule 1 applied to weekdays, and Schedule 2 applied to Saturday and Sunday.

**TOU Rate Configurator**

File Rate Profile Help

Read Mode

☒ Self Read Mode

☐ Manual Read Mode

Seasons Billing Periods Holidays Day Type Assignment Rate Names Schedules Annual Profile Monitored Data Sets Accumulation Method

**Assign a Schedule to Day Type**

Season	Holiday	Weekday	Saturday	Sunday
Spring	Schedule 3	Schedule 1	Schedule 2	Schedule 2
Summer	Schedule 3	Schedule 1	Schedule 2	Schedule 2
Autumn	Schedule 3	Schedule 1	Schedule 2	Schedule 2
Winter	Schedule 3	Schedule 1	Schedule 2	Schedule 2

Configure selected Season

Device Type: Nexus 1500+ Demand Type: Block Window Demand Interval: 15

8. Monitored data sets of Wh in Quadrants 1 and 4 and 2 and 3; and + and - VARh accumulators, set up for TOU accumulations.

**TOU Rate Configurator**

File Rate Profile Help

**Read Mode**

☒ Self Read Mode  
☐ Manual Read Mode

Seasons Billing Periods Holidays Day Type Assignment Rate Names Schedules Annual Profile **Monitored Data Sets** Accumulation Method

**Configure Monitored Data Sets (1 - 16)**

#	Register Identifier	Data Set Options	Label
1	Accumulator Register: 1B05 Peak Demand Register: 1EF9 Coincident Demand Register: 0	Accumulator Register Monitoring: Enabled Coincident Demand Association: Disabled Coincident Demand Entity: PF Cumulative Demand: Disabled Continuous Cumulative Demand Use: No	Dataset Label: +Wh Q14
2	Accumulator Register: 1B0F Peak Demand Register: 1EFB Coincident Demand Register: 0	Accumulator Register Monitoring: Enabled Coincident Demand Association: Disabled Coincident Demand Entity: PF Cumulative Demand: Disabled Continuous Cumulative Demand Use: No	Dataset Label: -Wh Q23
3	Accumulator Register: 1B01 Peak Demand Register: 1EFD Coincident Demand Register: 0	Accumulator Register Monitoring: Enabled Coincident Demand Association: Disabled Coincident Demand Entity: PF Cumulative Demand: Disabled Continuous Cumulative Demand Use: No	Dataset Label: +VARh Q12
4	Accumulator Register: 1B03 Peak Demand Register: 1EFF Coincident Demand Register: 0	Accumulator Register Monitoring: Enabled Coincident Demand Association: Disabled Coincident Demand Entity: PF Cumulative Demand: Disabled Continuous Cumulative Demand Use: No	Dataset Label: -VARh Q24

This screen allows you to pick the Energy values for creating TOU function

Add Data Set Edit selected Data Set Remove the selected Data Set

Device Type: Nexus 1500+ Demand Type: Block Window Demand Interval: 15

9. Accumulation Method set to continue from the previous billing period and start at zero for a new season.

The screenshot shows the 'TOU Rate Configurator' application window. The title bar includes 'File', 'Rate Profile', and 'Help' menus. Below the title bar are buttons for 'Reload Settings From Device' and 'Update Device'. The 'Read Mode' section on the left has two radio buttons: 'Self Read Mode' and 'Manual Read Mode', with 'Manual Read Mode' selected. The main area has a green header with the text 'TOU Rate Configurator'. Below this is a tabbed interface with tabs for 'Holidays', 'Day Type Assignment', 'Rate Names', 'Schedules', 'Annual Profile', 'Monitored Data Sets', and 'Accumulation Method'. The 'Accumulation Method' tab is active, displaying the 'Configure the Accumulation Method' section. This section contains two groups of radio buttons. The first group, 'When a new Billing period starts', has two options: 'TOU Accumulators continue where the previous period left off' (selected) and 'TOU Accumulators starts from zero'. The second group, 'When a new Season period starts', also has two options: 'TOU Accumulators continue where the previous period left off' (selected) and 'TOU Accumulators starts from zero'. At the bottom of the window, a status bar displays 'Device Type: Nexus 1450', 'Demand Type: Block Window', and 'Demand Interval: 5 Minutes'.

TOU Rate Configurator

File Rate Profile Help

Reload Settings From Device Update Device

Read Mode

- ☐ Self Read Mode
- ☒ Manual Read Mode

Holidays Day Type Assignment Rate Names Schedules Annual Profile Monitored Data Sets Accumulation Method

Configure the Accumulation Method

When a new Billing period starts

- ☒ TOU Accumulators continue where the previous period left off
- ☐ TOU Accumulators starts from zero

When a new Season period starts

- ☒ TOU Accumulators continue where the previous period left off
- ☐ TOU Accumulators starts from zero

Device Type: Nexus 1450 Demand Type: Block Window Demand Interval: 5 Minutes

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# 16: Databases and Log Data

## 16.1: Overview

The CommunicatorPQA® application accesses meter readings and stores the information in databases. The Polling screens and the meter logs use these databases to display the meter data. The Polling screens are described in Chapter 5, and the logs and LogViewerPQA are described in Chapter 19. This chapter explains the retrieval of log data.

## 16.2: Retrieving Log Data

There are two methods for retrieving log data from the CommunicatorPQA® application database:

- Retrieve logs manually - you use the CommunicatorPQA® application to retrieve the log data; this process is described in this chapter.
- Retrieve logs using the MeterManagerPQA® application - you set up the MeterManagerPQA® application to automatically retrieve log data from your meters. See Chapter 18 for complete instructions on using the MeterManagerPQA® application to retrieve log data.

**NOTE:** Nexus® 12xx meters allow only one Ethernet connection at a time to download logs.

### 16.2.1: Manual Log Retrieval

If your meter has memory for logging, you can retrieve the logs manually in the following way:

1. Connect to your meter (see Chapter 3 for instructions).
2. From the CommunicatorPQA® application's Main screen, click either the Ret Log (retrieve logs) icon or Logs>Retrieve Log(s) from Device. You will see the Log Status screen for the meter, which lists the available logs and information about them. The screen varies depending on the meter type and the logs available for it. See the example screen, below, from a Shark® 200 meter.

Log	% In Use	# Records	Max Records	Record Size	Newest Record	Logging Started	Retrieve Log	Status
Historical 1	100.0%	14552	14552	30	9/11/2014 19:30:00	4/13/2014 06:00:00	<input type="checkbox"/>	Available
Historical 2	100.0%	24561	24561	18	9/11/2014 19:35:00	8/25/2014 18:15:00	<input type="checkbox"/>	Available
Historical 3	100.0%	19103	19103	18	9/11/2014 19:35:00	8/29/2014 13:13:00	<input type="checkbox"/>	Available
Alarm Log	1.1%	45	4094	10	7/9/2014 19:09:19	8/27/2013 15:23:12	<input type="checkbox"/>	Available
System Events	100.0%	3275	3275	14	9/11/2014 05:03:20	5/11/2014 07:09:00	<input checked="" type="checkbox"/>	Available
I/O Change	0.0%	0	4094	10		10/24/2011 14:43:19	<input type="checkbox"/>	Available
PQ Log	1.2%	134	11253	58	7/9/2014 19:09:19	3/8/2013 15:40:02	<input type="checkbox"/>	Available
Waveform	100.0%	20	20	~25220	7/9/2014 19:04:41	12/8/2013 09:21:33	<input type="checkbox"/>	Available

☒ Polling [Alarm]
 **Retrieval Mode**  
 Partial Retrieval

Select Retrieval Mode from the pull-down menu

Retrieve Cancel Help

3. The pull-down menu for Retrieval Mode allows you to select one of two options:

- Partial Retrieval - this is the default Retrieval Mode. In Partial Retrieval mode, only the newest records are retrieved for any logs you select. This increases retrieval speed, since records that have previously been retrieved are ignored. When the log is full, it will roll over. Partial Retrieval mode should be used for billing and continuous logging.
- Time Range Retrieval (Use Time Range) - the Time Range Retrieval mode is useful if you want to retrieve specific events. If you select Use Time Range from the pull-down menu, date range fields will display, allowing you to select the

time range for data retrieval. Only records (within the specified time range) that are newer than the latest records in the log database can be retrieved for any selected logs. For this reason, Time Range Retrieval should not be used for billing or continuous logging purposes. The only way to retrieve earlier records using Time Range Retrieval is to delete the existing log database(s) before retrieving the log(s). See the example screen, below.

Log Status for Shark200\_IP124

Log	% In Use	# Records	Max Records	Record Size	Newest Record	Logging Started	Retrieve Log	Status
Historical 1	100.0%	5845	5845	50	9/11/2014 15:00:00	7/12/2014 18:00:00	<input checked="" type="checkbox"/>	Available
Historical 2	100.0%	3720	3720	82	9/11/2014 15:00:00	8/3/2014 21:15:00	<input checked="" type="checkbox"/>	Available
Historical 3	100.0%	10235	10235	26	9/11/2014 15:00:00	5/28/2014 00:30:00	<input type="checkbox"/>	Available
Alarm Log	100.0%	4094	4094	10	8/16/2014 07:11:10	8/5/2013 05:00:24	<input type="checkbox"/>	Available
System Events	100.0%	3275	3275	14	9/11/2014 02:30:23	5/10/2014 19:59:14	<input checked="" type="checkbox"/>	Available

☒ Polling

**Retrieval Mode**  
 Use Time Range

From 8 /11/2014 5 :00:24 AM  
 To 9 /12/2014 3 :15:59 PM

Retrieve Cancel Help

Use these fields to specify time range

**NOTE:** The Nexus® 1450/1500/1500+ meter does not have a time range option. It always performs a partial log retrieval when possible.

4. The Log Status screen tells you which logs are available for retrieval. Follow the instructions for your meter type.

**IMPORTANT!** Only one person at a time can download a log. If someone else is downloading a log, it will be unavailable until the download is complete.

### Shark® 200 meter, MP200™ metering system, and ST40 meter

To select a log or logs for retrieval, 1. click in the Retrieve Log box next to the log(s), 2. select your Retrieval Mode and 3. Click Retrieve (see following screens).

Log Status for ip199

Log	% In Use	# Records	Max Records	Record Size	Newest Record	Logging Started	Retrieve Log	Status
Historical 1	100.0%	14552	14552	30	9/11/2014 19:30:00	4/13/2014 06:00:00	<input type="checkbox"/>	Available
Historical 2	100.0%	24561	24561	18	9/11/2014 19:35:00	8/25/2014 18:15:00	<input type="checkbox"/>	Available
Historical 3	100.0%	19103	19103	18	9/11/2014 19:35:00	8/29/2014 13:13:00	<input type="checkbox"/>	Available
Alarm Log	1.1%	45	4094	10	7/9/2014 19:09:19	8/27/2013 15:23:12	<input type="checkbox"/>	Available
System Events	100.0%	3275	3275	14	9/11/2014 05:03:20	5/11/2014 07:09:00	<input checked="" type="checkbox"/>	Available
I/O Change	0.0%	0	4094	10		10/24/2011 14:43:19	<input type="checkbox"/>	Available
PQ Log	1.2%	134	11253	58	7/9/2014 19:09:19	3/8/2013 15:40:02	<input type="checkbox"/>	Available
Waveform	100.0%	20	20	~25220	7/9/2014 19:04:41	12/8/2013 09:21:33	<input type="checkbox"/>	Available

■ Polling [Alarm]

**Retrieval Mode**  
Partial Retrieval

Retrieve Cancel Help

2. Select Retrieval mode

3. Click Retrieve

1. Click the box of logs you want to retrieve

Shark® 200 Meter Log Status Screen



Log Status for MP200\_6

Log	% In Use	# Records	Max Records	Record Size	Newest Record	Logging Started	Retrieve Log	Status
Historical 1	2.1%	14035	681512	14	9/11/2014 15:15:00	4/18/2014 10:32:17	<input type="checkbox"/>	Available
Historical 3	11.7%	14035	119727	110	9/11/2014 15:15:00	4/18/2014 10:32:17	<input type="checkbox"/>	Available
System Events	100.0%	13106	13106	14	9/11/2014 15:00:29	6/29/2014 23:37:30	<input checked="" type="checkbox"/>	Available
I/O Change	100.0%	16382	16382	10	4/16/2014 15:29:15	5/20/2013 14:16:09	<input type="checkbox"/>	Available
Alarm Log	0.0%	0	16382	10		4/18/2014 10:32:17	<input type="checkbox"/>	Available

☐ Polling

Retrieval Mode: **Partial Retrieval**

Retrieve Cancel Help

2. Select Retrieval mode

3. Click Retrieve

1. Click the box of logs you want to retrieve

### MP200-S Metering System Log Status Screen

Log Status for MP200\_1

Log	% In Use	# Records	Max Records	Record Size	Newest Record	Logging Started	Retrieve Log	Status
Historical 1	14.4%	48920	340756	34	9/11/2014 15:15:00	4/17/2013 03:03:13	<input type="checkbox"/>	Available
Historical 2	18.3%	48920	267120	46	9/11/2014 15:15:00	4/17/2013 03:03:13	<input type="checkbox"/>	Available
System Events	100.0%	13106	13106	14	9/11/2014 15:00:39	7/4/2014 15:03:30	<input checked="" type="checkbox"/>	Available
I/O Change	75.4%	12354	16382	10	7/9/2014 15:09:23	4/17/2013 03:03:16	<input type="checkbox"/>	Available
Alarm Log	100.0%	16382	16382	10	7/9/2014 15:09:23	7/29/2013 22:03:24	<input type="checkbox"/>	Available

☒ Polling [Hist2]

Retrieval Mode: **Partial Retrieval**

Retrieve Cancel Help

2. Select Retrieval mode

3. Click Retrieve

1. Click the box of logs you want to retrieve

### MP200-Y Metering System Log Status Screen

## Nexus® 1500/1500+ Meter

To select a log or logs for retrieval, 1. click in the Select box next to the log(s) and 2. click Start (see screen below).

Log Statistics for N1500-64Mb\_IP212\_0000000078181833

Log	Records	Memory Used	Newest Record Time	Oldest Record Time	Record Size	Max Records	Memory(k)	Select
Historical 1	32767	100.0000%	09/11/2014 14:45:00.00	10/22/2013 08:45:00.00	128	32767	8192	<input type="checkbox"/>
Historical 2	32767	100.0000%	09/11/2014 14:45:00.00	10/22/2013 08:45:00.00	32	32767	8192	<input type="checkbox"/>
Historical 3	32823	21.0880%	09/11/2014 14:45:00.00	10/04/2013 17:00:00.00	64	155648	10240	<input type="checkbox"/>
Historical 4	88939	100.0000%	09/11/2014 14:59:00.00	07/11/2014 20:39:00.00	112	88939	10240	<input type="checkbox"/>
Historical 5	47889	100.0000%	09/11/2014 14:59:00.00	08/09/2014 08:51:00.00	208	47889	10240	<input type="checkbox"/>
Historical 6	88939	100.0000%	09/11/2014 14:59:00.00	07/11/2014 20:39:00.00	112	88939	10240	<input type="checkbox"/>
Historical 7	49235	86.5047%	09/11/2014 14:50:00.00	10/04/2013 17:00:00.00	140	56916	8192	<input type="checkbox"/>
Historical 8	49235	75.1278%	09/11/2014 14:50:00.00	10/04/2013 17:00:00.00	76	65535	5120	<input type="checkbox"/>
Event Triggered	3018530	100.0000%	09/11/2014 14:59:15.97	07/21/2014 03:49:30.64	66	3018530	204800	<input type="checkbox"/>
Sequence of Events (Limits)	29021	25.6387%	08/16/2014 07:19:15.15	10/29/2013 15:03:29.72	88	113192	10240	<input type="checkbox"/>
Digital Inputs	69169	100.0000%	09/11/2014 14:59:15.52	09/05/2014 15:12:30.63	144	69169	10240	<input type="checkbox"/>
Digital Outputs	0	0.0000%	00/00/0000 00:00:00.00	00/00/0000 00:00:00.00	120	8301	1024	<input type="checkbox"/>
Flicker	53333	42.8322%	09/11/2014 14:50:01.20	10/04/2013 17:00:01.19	40	124516	5120	<input type="checkbox"/>
Waveform	93	97.8947%	07/24/2014 08:27:48.77	10/07/2013 09:25:44.76	696032	95	102400	<input type="checkbox"/>
Power Quality	96	0.5513%	07/24/2014 08:27:48.86	10/07/2013 09:25:44.85	572	17413	10240	<input type="checkbox"/>
System Events	562	1.7151%	09/11/2014 14:57:41.10	00/00/0000 00:00:00.00	16	32767	1024	<input checked="" type="checkbox"/>
Transients	0	0.0000%	00/00/0000 00:00:00.00	00/00/0000 00:00:00.00	29152	3325	102400	<input type="checkbox"/>
EN50160 / IEC 61000-4-30	Yes	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	<input type="checkbox"/>

☐ Polling Historical 1 Header

To retrieve a log, click on the checkbox in the 'Selected' column of log(s) that you want to retrieve.  
Next click the 'Start' Button to begin the retrieval.

Retrieve Selected Log(s) Start Close

Retrieve logs using Modbus

2. Click Start

1. Click the box of logs you want to retrieve

## Nexus® 1500 Meter Log Retrieval Screen

The Nexus® 1500/1500+ meter does not have partial or time range log retrieval options, but it has another option. You can choose to perform a manual waveform capture to add a record (or records) to the Waveform log before you download it. This is useful if you want to analyze the current power quality. Click in the pull-down menu to select Manual Waveform Capture. When you select Start, the application performs a Waveform capture, and the number of records in the Waveform log field increases by one (see screen capture on the next page).

Log Statistics for Nexus\_1500\_NJD\_0000000047380527

Log	Records	Memory Used	Newest Record Time	Oldest Record Time	Record Size	Max Records	Memory(k)	Select
Historical 1	10295	31.4188%	09/11/2014 12:15:00.00	08/20/2012 13:15:00.00	16	32767	1024	<input type="checkbox"/>
Historical 2	10295	39.2729%	09/11/2014 12:15:00.00	08/20/2012 13:15:00.00	32	26214	1024	<input type="checkbox"/>
Historical 3	10295	11.5753%	09/11/2014 12:15:00.00	08/20/2012 13:15:00.00	112	88939	10240	<input type="checkbox"/>
Historical 4	10295	3.3071%	09/11/2014 12:15:00.00	08/20/2012 13:15:00.00	32	311296	10240	<input type="checkbox"/>
Historical 5	10295	11.9891%	09/11/2014 12:15:00.00	08/20/2012 13:15:00.00	116	85870	10240	<input type="checkbox"/>
Historical 6	10295	2.8938%	09/11/2014 12:15:00.00	08/20/2012 13:15:00.00	28	355765	10240	<input type="checkbox"/>
Historical 7	10295	4.7541%	09/11/2014 12:15:00.00	08/20/2012 13:15:00.00	46	216552	10240	<input type="checkbox"/>
Historical 8	10295	3.9272%	09/11/2014 12:15:00.00	08/20/2012 13:15:00.00	38	262143	10240	<input type="checkbox"/>
Event Triggered	0	0.0000%	00/00/0000 00:00:00.00	00/00/0000 00:00:00.00	32	31129	1024	<input type="checkbox"/>
Sequence of Events (Limits)	0	0.0000%	00/00/0000 00:00:00.00	00/00/0000 00:00:00.00	64	15564	1024	<input type="checkbox"/>
Digital Inputs	0	0.0000%	00/00/0000 00:00:00.00	00/00/0000 00:00:00.00	32	31129	1024	<input type="checkbox"/>
Digital Outputs	0	0.0000%	00/00/0000 00:00:00.00	00/00/0000 00:00:00.00	96	10375	1024	<input type="checkbox"/>
Flicker	16730	67.1807%	09/11/2014 12:20:01.21	08/20/2012 13:10:01.21	40	24903	1024	<input type="checkbox"/>
Waveform	8	21.0526%	09/05/2014 14:35:02.25	08/20/2012 13:05:59.06	614512	38	40960	<input type="checkbox"/>
Power Quality		0.0230%	09/05/2014 14:35:02.42	08/20/2012 13:05:59.23	572	34827	20480	<input type="checkbox"/>
System Events	164	5.0264%	09/11/2014 06:31:33.84	03/25/2010 17:24:19.57	16	32767	1024	<input checked="" type="checkbox"/>
Transients		0.0000%	00/00/0000 00:00:00.00	00/00/0000 00:00:00.00	25984	380	10240	<input type="checkbox"/>
EN50160 / IEC 61000-4-30	Yes	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	<input type="checkbox"/>

☐ Polling Digital Inputs Header  
 To manually trigger a wave capture, click on the 'Start' Button to request a capture.

Manual Waveform Capture Start Close

3. The waveform is added to the Waveform log

1. Select Manual Waveform Capture from the pull-down menu

2. Click Start to capture the waveform

When you are ready to view the Waveform log, 1. select Retrieve Selected log(s) from the pull-down menu, 2. select the Waveform log and 3. click Start to retrieve it.

## Nexus® 1450 Meter

The Log Status screen for the Nexus® 1450 meter is shown below.

Log Status for 0177962133\_0000000177962133

Log	Memory Used (%)	Records	Maximum Records	Newest Record	Oldest Record	Select	Status
Historical Core	20.4%	3348	16384	2019/09/17 11:45:00	2019/08/12 11:15:00	<input type="checkbox"/>	Available
Historical 1	20.5%	3352	16384	2019/09/17 11:45:00	2019/08/12 11:30:00	<input type="checkbox"/>	Available
Historical 2	20.5%	3352	16384	2019/09/17 11:45:00	2019/08/12 11:30:00	<input type="checkbox"/>	Available
Historical 3	20.5%	3352	16384	2019/09/17 11:45:00	2019/08/12 11:30:00	<input type="checkbox"/>	Available
Historical 4	20.5%	3352	16384	2019/09/17 11:45:00	2019/08/12 11:30:00	<input type="checkbox"/>	Available
Historical 5	20.5%	3352	16384	2019/09/17 11:45:00	2019/08/12 11:30:00	<input type="checkbox"/>	Available
Historical 6	20.5%	3352	16384	2019/09/17 11:45:00	2019/08/12 11:30:00	<input type="checkbox"/>	Available
Historical 7	0.0%	0	16384			<input type="checkbox"/>	Not Available
Historical 8	0.0%	0	16384			<input type="checkbox"/>	Not Available
Flicker	0.0%	0	16384			<input type="checkbox"/>	Not Available
Event Triggered	0.0%	0	16384			<input type="checkbox"/>	Not Available
System Event	14.5%	9523	65536	2019/09/17 11:49:38	2019/05/10 13:59:21	<input type="checkbox"/>	Available
Digital Inputs	0.0%	0	16384			<input type="checkbox"/>	Not Available
Limits	100.0%	16384	16384	2019/09/17 11:58:12	2019/09/17 11:13:48	<input type="checkbox"/>	Available
Power Quality	100.0%	16384	16384	2019/09/17 11:58:12	2019/09/17 09:08:26	<input type="checkbox"/>	Available
Waveform	100.0%	1365	1365	2019/09/17 11:58:11	2019/09/17 11:31:36	<input type="checkbox"/>	Available

3. Click Start

2. Click to open a window that lets you enter the HTTP port for log retrieval.

1. Click the box of any log(s) you want to retrieve.

Refresh Start Close

Trigger Waveform Capture

- To select a log or logs for retrieval, 1. click in the Select box next to the log(s); 2. if you are using an HTTP port other than 80 for log retrieval, click the Settings icon to enter the HTTP port; and 3. click Start.
- Click Trigger Waveform Capture to perform a manual waveform capture.
- Once the log status has been retrieved for all of the logs, status retrieval stops. To see updated log status information, click Refresh.

**NOTE:** For backwards compatibility, if you are using the serial port to download logs, you must select Logs>Legacy Retrieval. You will only be able to download historical logs 1 and 2 through the serial port.

Select Log(s) to be Retrieved from Device

Meter Designation: 0000000246191932

Retrieval Mode  
Partial Retrieval

Log Type	Status	Retrieve
Historical Log 1	Available	No
Historical Log 2	Available	No

**Nexus® 1252/1262/1272 Meter**

To select a log or logs for retrieval, 1. click in the Retrieve field next to the log(s) - the No will change to Yes; 2. select your Retrieval Mode and 3. click Start (see following screens).

Select Log(s) to be Retrieved from Device

Meter Designation: 00202054

Retrieval Mode  
Partial Retrieval

Log Type	Status	Retrieve
Historical Log 1	Available	No
Historical Log 2	Available	No
Limits	Available	No
Digital Inputs	Available	No
Digital Outputs	Available	No
Flicker	Available	No
Waveform / PQ	Available	No
System Events	Available	No

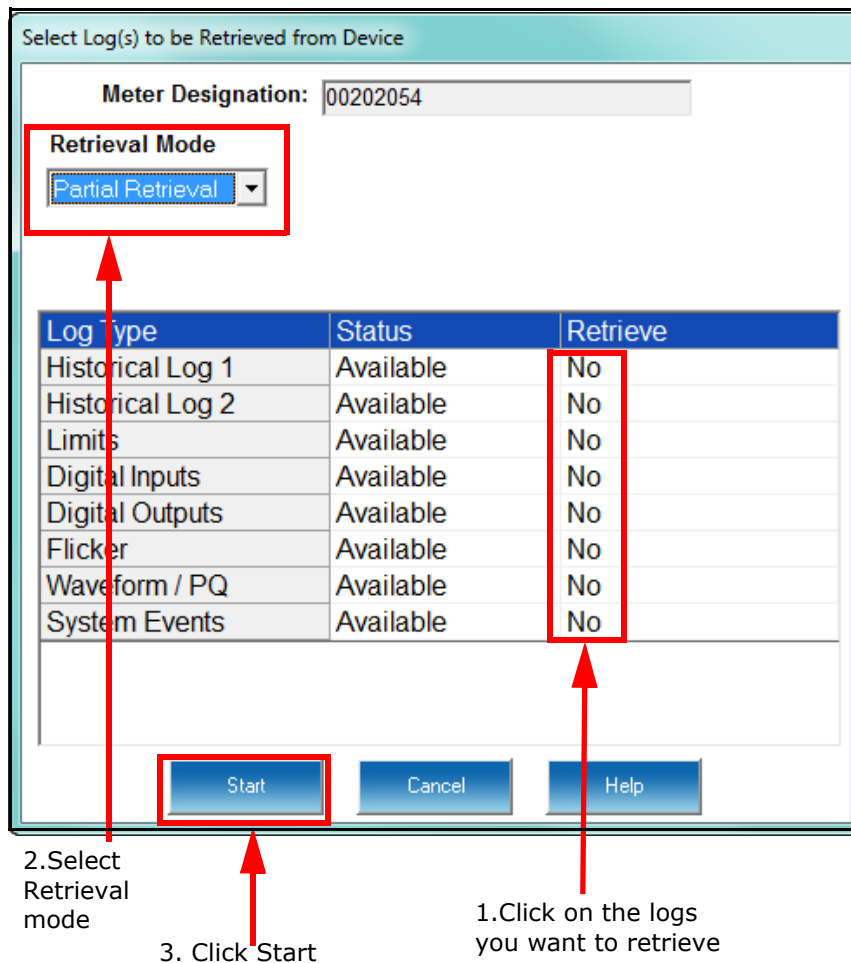
Start Cancel Help

2. Select Retrieval mode

3. Click Start

1. Click on the logs you want to retrieve

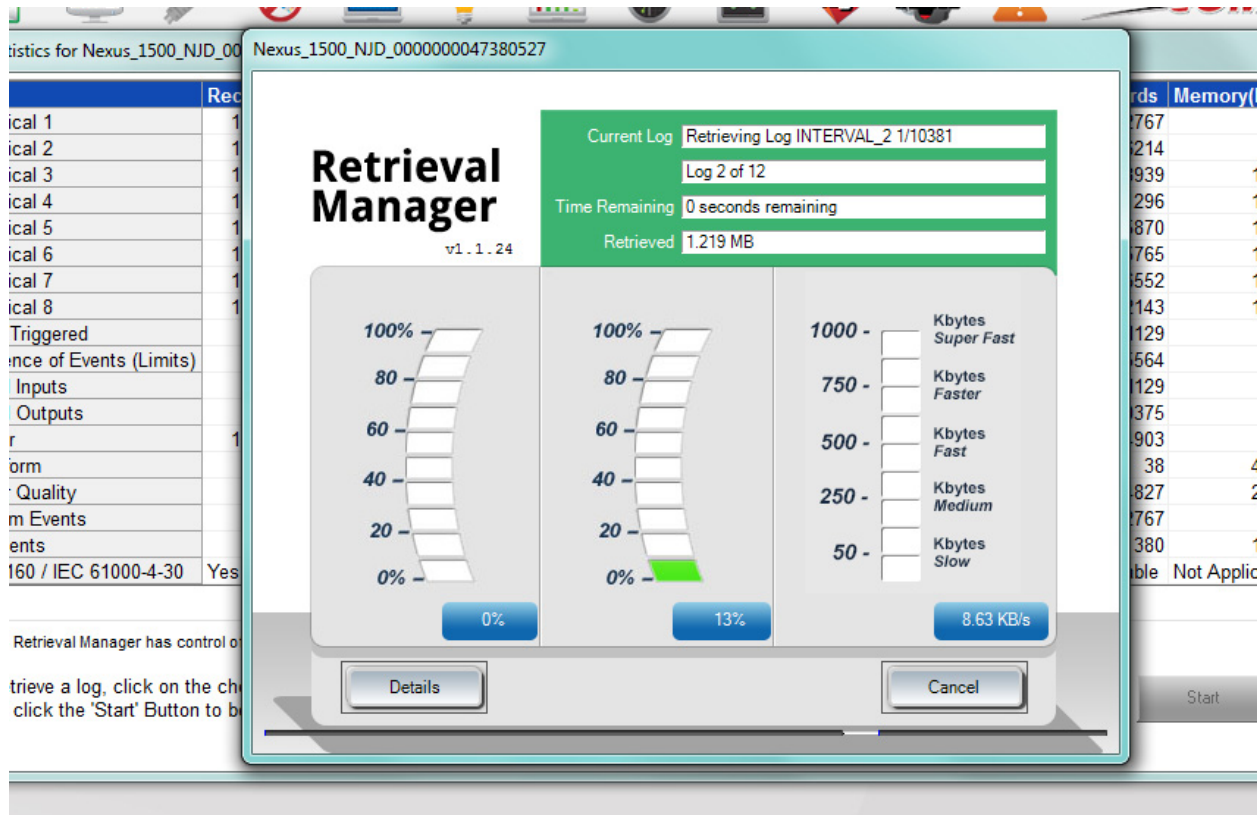
**Nexus® 1262/1272 Meter Log Retrieval Screen**



### Nexus® 1252 Meter Log Retrieval Screen

**NOTE:** The Nexus® 1252 meter's Log Status screen doesn't list the System Events log, but it is retrieved every time you perform a log retrieval.

- Click Cancel or Close (Nexus® 1500/1500+ meter only) to close the Log Status screen.
- You will see progress messages as the logs are being retrieved. See the following example screen from a Nexus® 1500 meter.



The messages show you what logs are currently being retrieved. Note that for the Shark® 250/270 and Nexus® 1450 meters, you can customize the colors shown in the log retrieval screen - see [20.2.3: Log Retrieval, on page 20-65](#).

7. The Log Viewer opens. Refer to Chapter 19 for instructions on opening the logs and using LogViewerPQA to view them.

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## 17: Script & Scheduler

**NOTE:** Script & Scheduler has been deprecated in CommunicatorPQA software's version 6. If you are using a previous version of the software and want to use Script & Scheduler to schedule log downloads, refer to the manual embedded in that software version (click Help>Contents from the Title Bar).

1. When you are done, re-start the Script & Scheduler application by clicking the Run/Stop button. Your log data will now be retrieved according to the interval you set and the Log Converter will prepare the data and send it to the log database.

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# 18: MeterManagerPQA® Application

## 18.1: Overview

The MeterManagerPQA® application is the CommunicatorPQA® software's automation and meter management module. It automatically locates and collects energy data from all installed meters within your power system. The MeterManagerPQA® application performs its location and collection actions autonomously, so that even novice users can get the full benefits of the application.

The MeterManagerPQA® application also acts as a launchpad and automation engine for the CommunicatorPQA® application by letting you perform many tasks for all the meters in your network, and providing a central location for you to:

- View meter status - Online or Offline - and check meter connections.
- App launcher - launch any of the EIG meter applications, like EnergyPQA.com®\*, CommunicatorPQA®, Log Viewer, or the EnergyReporterPQA™ application's Dashboard Viewer to view real time or stored data.
- Connect to the meter to perform meter configuration and other tasks using CommunicatorPQA® software.
- View meters' real time readings.
- Retrieve and view meter logs, such as historical or waveform fault records.
- Set up automatic log retrieval.
- Access the EnergyReporterPQA™ application to generate and view usage reporting and billing data.
- Update meter firmware.
- Search for newly installed meters on the network. When locating network meters, MeterManagerPQA® software puts them into groups for maximum control and efficiency.

\* MeterManagerPQA® software supports the Cloud-based EnergyPQA.com® system in multiple ways. See the *EnergyPQA.com AI Driven Energy Management System Setup Guide* for specific instructions related to the EnergyPQA.com® system (click Downloads>Tech Documents from this webpage:

<https://www.electroind.com/products/energypqa-com-energy-management-system/> to download the Setup Guide). Only instructions related to the CommunicatorPQA® application are given in this chapter.

In addition, the MeterManagerPQA® application features an easy-to-use automatic report generator, Report Exporter, that lets you create custom spreadsheet reports on all aspects of electrical usage, such as energy consumption, voltage deviation, watt/VAR distribution and many other parameters. The MeterManagerPQA® application enables you to email these reports, on a regular programmable interval, to the needed parties, upload them to an FTP location, and/or save them in various file formats for additional processing (see [18.6: Report Exporter, on page 18-58](#)).

Additional important features of the MeterManagerPQA® application are as follows:

- The MeterManagerPQA® application lets you set up scripts to automatically download meter logs, and export them to the EnergyReporterPQA™ application, which uses the log data to generate usage and billing reports and analysis. Once activated, scripts run even if no one is signed onto the computer. In this way, the MeterManagerPQA® application can retrieve logs from multiple meters automatically, according to the script's schedule, without your having to do anything once the script is set up. For more information on the EnergyReporterPQA™ application, see the *EnergyReporterPQA™ Application User Manual*.
- You can synchronize time for a group of meters or an individual meter. This is useful when a meter doesn't have other means of time synchronization, like NTP.
- You can be alerted when a meter goes offline, to minimize meter downtime.
- You can set up automatic archiving of meter log data, reducing the amount of data stored in the meter log databases. See [18.11.1: System Options, on page 18-142](#) for details on archiving. Note that meter log data archiving is new in MeterManagerPQA version 6; the old version 5 log archiving has been deprecated.
- The MeterManagerPQA® application has a security feature in which a unique PostgreSQL database password is assigned to each new install.
- For secure access, the MeterManagerPQA® application offers login capability. The login feature is initially disabled; to enable it requires user activation and setting up of an administrator password. The administrator user has full access to all features of both the MeterManagerPQA® application and the EnergyReporterPQA™ application. The password is set up when security is enabled for the first time. Once set, only the administrator can change the admin (administrator) password or disable security.
- The MeterManagerPQA® application facilitates the EnergyPQA.com® Cloud system by building a list of meters and automatically uploading meter log data for use in

the EnergyPQA.com® system. See specific instructions in the *EnergyPQA.com® AI Driven Energy Management System Setup Guide*.

Because of the MeterManagerPQA® application's extensive organizational capabilities, you may choose to use it as the Base application and access the other applications, such as CommunicatorPQA® software, through it.

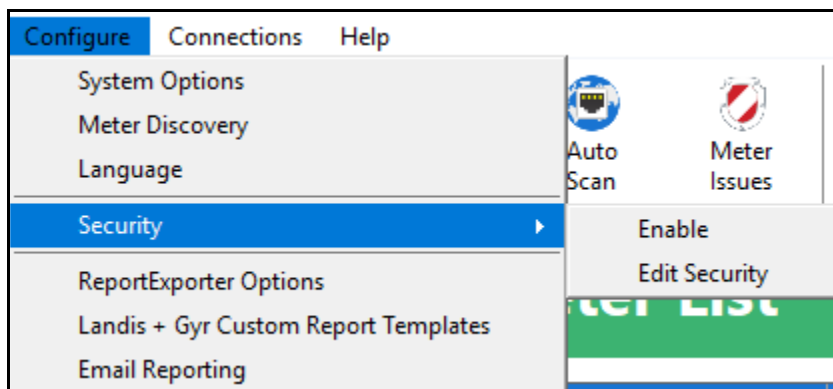
To open the MeterManagerPQA® application, click Start>All Programs>Electro Industries>Meter Manager>Meter Manager Viewer to open the MeterManager Monitor screen. The MeterManager Monitor screen has two main screen views: Meter List and Scripts Status. These are explained in the following sections.

**NOTE:** See [1.2: Installation Requirements, on page 1-3](#) for important storage and database information.

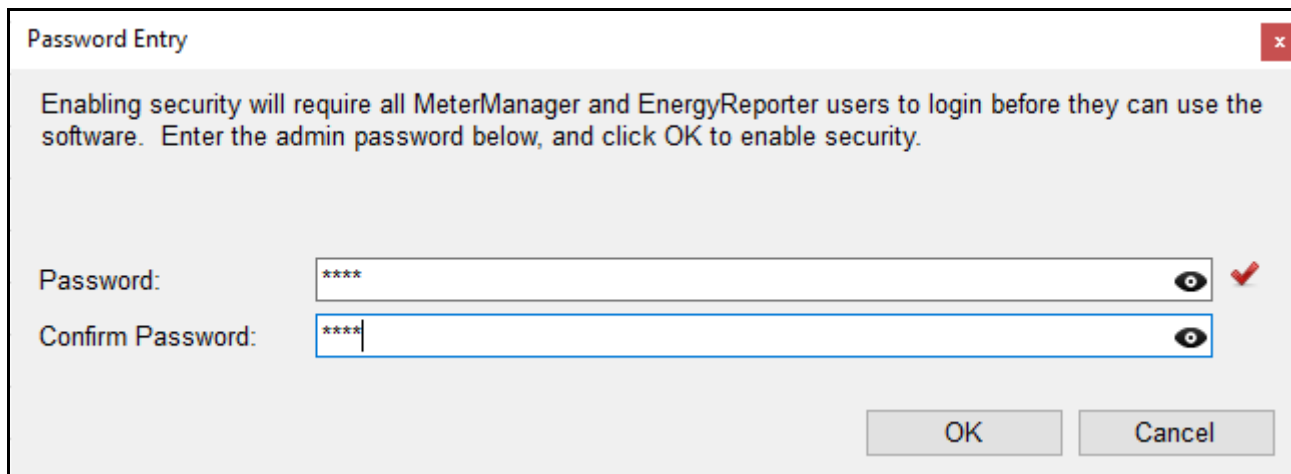
## 18.2: Setting up Security

To assure only authorized users can configure the MeterManagerPQA® application settings, start by enabling security and setting an administrative password. The administrative user has access to all the MeterManagerPQA® application features and can create and assign single or multiple roles to sub users. See the User Roles and Permissions Table for level of access for each role.

- 1.To enable security, Configure>Security>Enable from the top of the MeterManager-PQA® application screen.



2. Enter the Admin password you want to use two times in the screen below and click OK.



The 'Password Entry' dialog box has a title bar with a close button (X). The main text reads: 'Enabling security will require all MeterManager and EnergyReporter users to login before they can use the software. Enter the admin password below, and click OK to enable security.' Below this, there are two password input fields. The first is labeled 'Password:' and the second is labeled 'Confirm Password:'. Both fields contain four asterisks (\*\*\*\*). To the right of each field is an eye icon. A red checkmark is visible to the right of the first field. At the bottom right, there are two buttons: 'OK' and 'Cancel'.

- The software will check that the password is correct and that the Confirm password is the same as the Password. If not, you will see an error message.
  - You can click on the eye icon to display the password rather than asterisks.
3. You will see the following Login screen: enter admin as the username and the admin password and click OK.

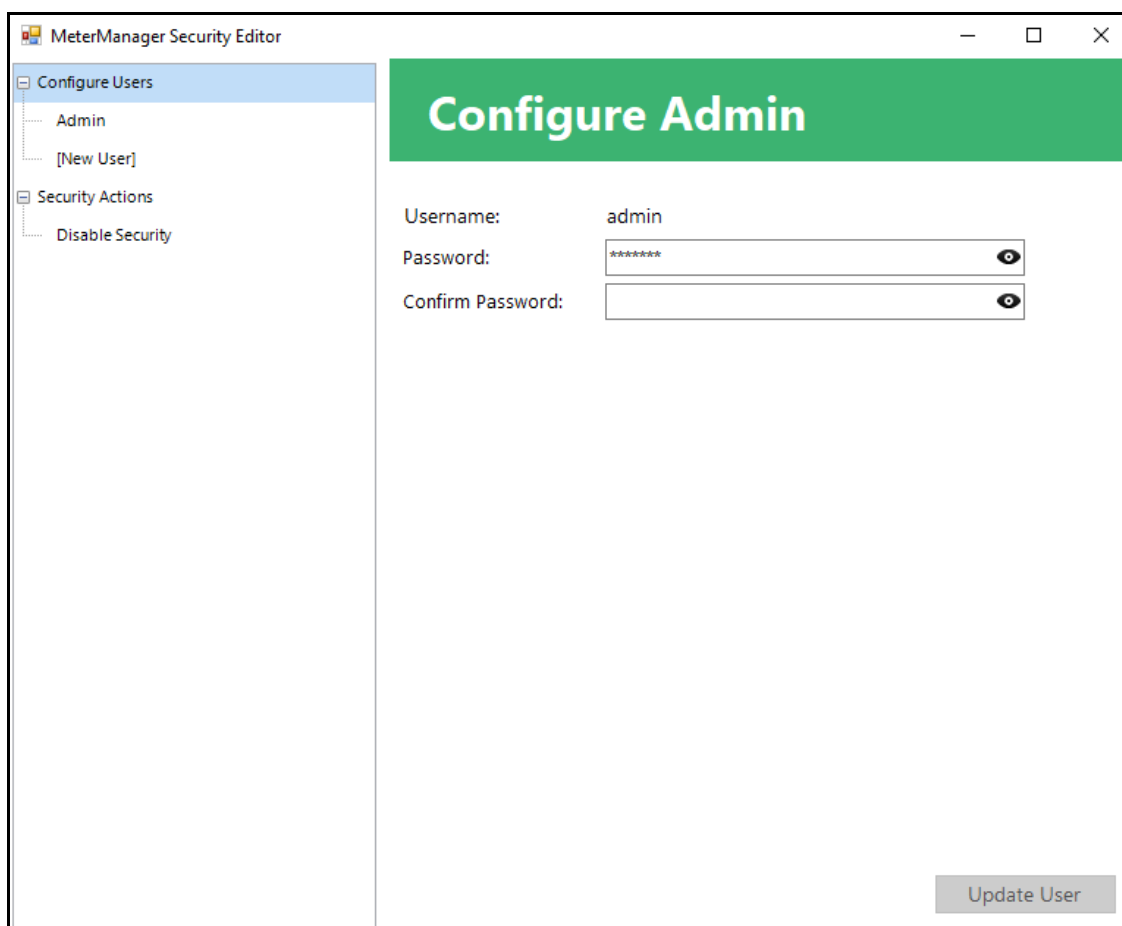


The 'Login' dialog box has a title bar with a close button (X). It contains two input fields: 'Username' with the text 'admin' and 'Password' with four asterisks (\*\*\*\*). To the right of the password field is an eye icon. At the bottom right, there is a 'Login' button.

4. Now that security is enabled, you can set up users, Click Configure>Security>Edit Security.

**IMPORTANT!** Make sure to store the password since it cannot be reset once it is set up.

5. You will see the MeterManager Security Editor, shown below.



Using this screen, you (the admin) can:

- Change the administrator password.
- Add, update, or disable a user.
- Assign roles to a user (the roles control what software features the user can access).
- Disable security.

**To change the administrative password:**

6. Type the new password, and type it again to confirm. When the passwords match, click Update User to save the new password. Note that if the passwords don't match, you will see a yellow warning triangle next to the confirmation password.

**To add a user:**

1. Click on New User in the box on the left of the screen.

**Create New User**

Username:

Password:

Confirm Password:

Permissions

Read Information	<input type="checkbox"/>
Write Information	<input type="checkbox"/>
Configure System	<input type="checkbox"/>
Control Operation	<input type="checkbox"/>

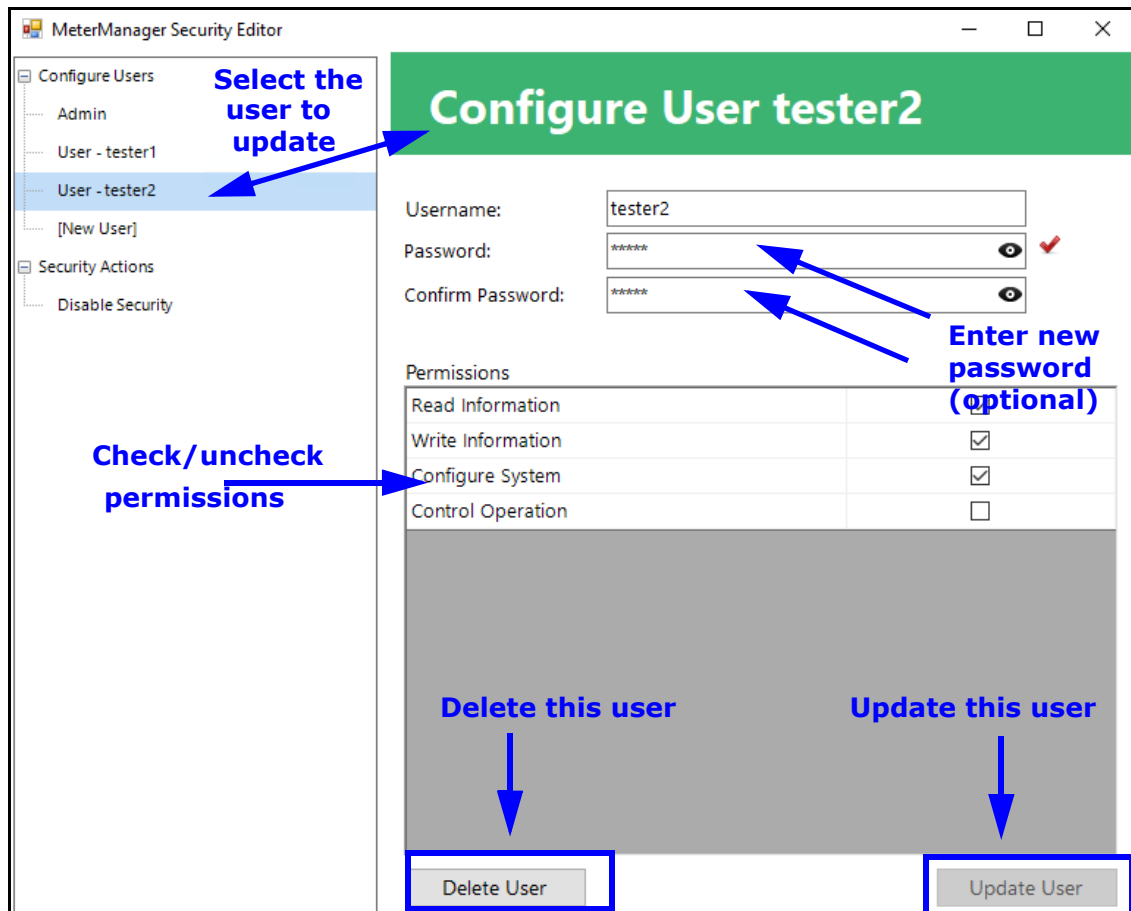
Create User

2. Enter a name for the user, and enter a password for the user twice. Note that user-names and passwords are case-sensitive.
3. Check the Permissions box(es) of the role(s) you want to assign to this user. See the table on the next page for the specific actions that the permissions allow.  
**NOTE:** If you select Configure System or Control Operation permissions, both the Read Information and Write Information are automatically added, since they are necessary for the Configure and Operate actions.
4. Click Create User. The new user will be displayed in the box on the left of the screen.



**To update a user:**

1. Click on the username in the box on the left. The user's information will be shown in the screen.



2. You can edit the following:

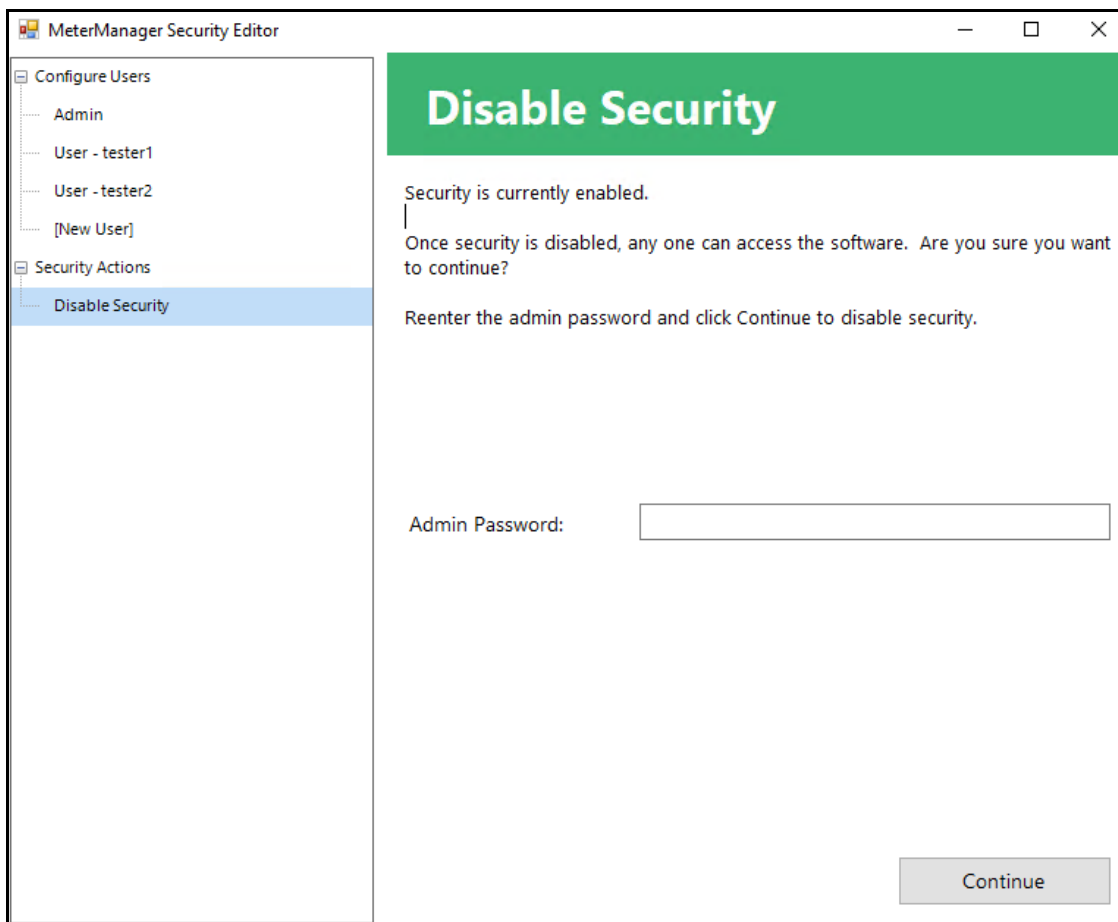
- Create a new password by entering it in the Password and Confirm Password fields and clicking Update User.
- Assign new roles to the user by checking or unchecking the Permissions boxes and clicking Update User.
- Disable the user by unchecking all of the Permissions boxes and clicking Update User.

**To delete a user:**

Follow step 1 of the "To edit a user" instructions and then click Delete User.

**To disable security (Admin only):**

1. From the left side of the screen, select Disable Security, under Security Actions.



2. Enter the Admin password and click Continue.

**Permissions and their specific allowed actions:**

See the table on the next page for the allowable actions for the Administrative, Read Information, Write Information, Configure System, and Control Operation permissions.

Allowable Actions	Permissions				
	Admin only	Read Information	Write Information	Configure System	Control Operation
Configure Security	✓				
Meter List	✓	✓	✓	✓	✓
Auto Scan	✓			✓	
Script Status	✓	✓	✓	✓	✓
Configure Meter Scripts	✓	✓(view)	✓(view)		✓(view)
Configure Group Scripts		✓(view)	✓(view)		✓(view)
Manual Connect		✓	✓		✓
View History		✓	✓		✓
View Meter Logs		✓	✓		✓
Add Groups		✓	✓		✓
Meter Discovery		✓	✓		✓
Email Reporting		✓	✓		✓
Retrieve Meter Logs		✓	✓		✓
System Options		✓	✓		✓
Energy Reporter Integration		✓	✓		✓
Cloud Options		✓	✓		✓
Test Meter Issues		✓	✓		✓
Report Exporter		✓	✓		✓
Report Exporter Options		✓	✓		✓
Test All Connection		✓	✓		✓
Import Connections		✓	✓		✓
Generate Connection List		✓	✓		✓
Remove offline connections		✓	✓		✓
View Communication Quality of Service Analysis		✓	✓		✓
Refresh all statuses		✓	✓		✓
Update Monitor		✓	✓		✓
Poller Status		✓	✓		✓
Command Console		✓	✓		✓
Disable all Meter Scripts		✓	✓		✓
Language		✓	✓		✓
Search Meters		✓	✓		✓
Remove meter		✓	✓		✓
Move to Group		✓	✓		✓
Group Favorite		✓	✓		✓
View Webpage		✓	✓		✓
CommPQA Connect to Meter		✓	✓		✓
CommPQA Real time readings		✓	✓		✓
CommPQA Show Phasor		✓	✓		✓
CommPQA Configure Meter Profile		✓	✓		✓
CommPQA Update Meter Firmware		✓	✓		✓

### 18.3: Meter List

The Meter List is the main launchpad that gives you a central location where you can add and group your meters so that you do not need to connect to each meter individually to perform tasks, such as:

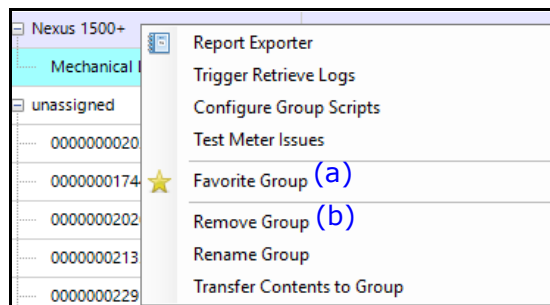
- Viewing meter status
- Configuring and enabling security and setting up user accounts and access
- Configuring meters and groups of meters
- Connecting to a meter to view real time data
- Viewing meter logs, waveforms, or events
- Configuring automatic reporting
- View communication status/history for network and meters

Note that the MeterManagerPQA® application also has a feature that lets you perform actions on multiple meters at one time. See [18.13: Search Meters, on page 18-163](#) for an explanation of Meter Search and its features.

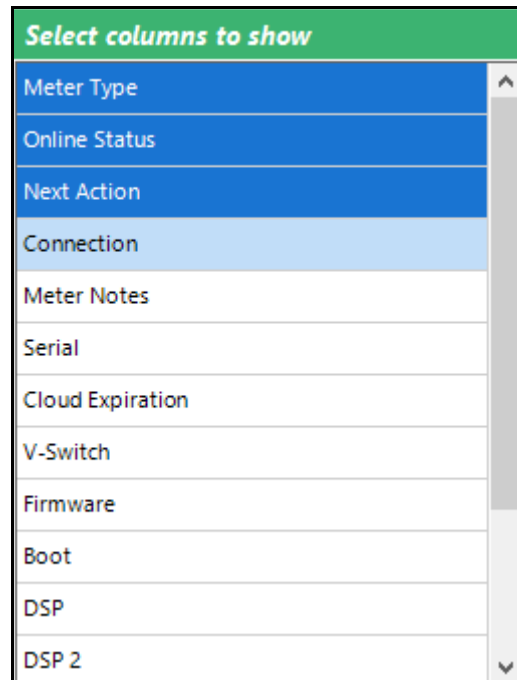
The first screen you see when you open the MeterManagerPQA® application is the Meter List screen. (To return to the screen from another screen, click the Meter List icon.)

Meter Name	Meter Type	Online Status	Next Action	Connection
[-] Nexus 1450 Meter				
..... 0168028631	Nexus 1450	Online	8/2/2023	
..... 0220696833	Nexus 1450	Online	8/2/2023	
[-] Nexus 1500+				
..... Mechanical Load	Nexus 1500+	Online	8/2/2023	
[-] unassigned				
..... 0000000020375017	Nexus 1252	Online		
..... 000000017444226	Nexus 1272	Online		
..... 0000000202609524	Nexus 1500+	Online		
..... 0000000213531419	Nexus 1450	Online		
..... 0000000229118225	Nexus 1500+	Online		
..... 00005821	Nexus 1250	Online		
..... 00774292	Nexus 1250	Online		
..... 0090258428	Shark 200	Online		
..... 0101672118	Shark 100	Online		
..... 0101673725	Shark 100	Online		
..... 0101675424	Shark 100	Online		
..... 0120637625	Shark 100	Online		
..... 0167969341SOMHAI	Shark 270_2	Online		
..... 0194607229	MP200	Online		

- If you have already added meters to the list, they are displayed in the middle of the screen, in the groups to which they have been assigned; or if they are not assigned to a group, then in the Unassigned group.
- You can move a group to the top of the meter list by right-clicking on the group name and selecting Favorite Group (a) from the sub-menu. The group will move to the top of the list and display a star next to its name.
- You can remove a group by right-clicking on the group name and selecting Remove Group (b) from the sub-menu.



- For each meter in the screen, information is displayed in the screen columns. The columns that display when you first start the application are the default selections. You can change the fields that are displayed by right-clicking in the Title field where Meter Name, Meter Type, etc., are written and clicking on "Select Columns to Show." You will see this menu.




















- The fields already showing are highlighted in blue. Click on any fields that are white to display them in the Meter List screen. If you want to remove a field that is already showing, click on it. The line will change from blue to white.
- When you are done, click outside of the menu to close it.
- You can move the columns around by clicking on the title and moving them left or right.
- You can resize the columns by clicking on the lines dividing them and pulling out or in with your cursor.
- The available fields are:
  - Meter Name - the name assigned to the meter during Device Profile configuration.
  - Meter Type - the meter's type, e.g., Shark.
  - Online Status - whether the meter is Online or Offline.

- Next Action - whether a script for the meter is running, or if not running, when the next script action for the meter is scheduled.
- Connection - the IP address at which the application is connecting to the meter.
- Meter Notes - any notes that have been entered for the meter (see [18.3.1.2: Add Meters to Meter List Manually, on page 18-28](#), for instructions on adding meter notes).
- Serial - the meter's serial number.
- Cloud Expiration - for meters that have been activated in the EnergyPQA.com® system, this column shows the date their activation will expire.
- V-Switch - the meter's current V-Switch™ key (this can help you easily locate meters that need to be updated to a higher key).
- Firmware - the current firmware version (this can help you easily locate meters that need to be updated to a later firmware).  
**NOTE:** This column shows the most "important" firmware for the meter, which is also more likely to have newer versions. There are other, specific firmware columns you can choose to view (e.g., Boot Firmware, DSP Run firmware) which can be chosen if those are more relevant to you.
- You can choose to sort a group of meters by one of the columns, by left-clicking the column header. This lets you sort through large groups of meters more quickly. For example, to find all meters within a group that are offline, left-click in the Online Status column to sort the meters by their status, and allow you to easily see which meters are offline.

- Doc# E107707



- | Meter Name  | Meter Type  |
|---|-------------|
| unassigned  |             |
|                | Nexus 1272  |
| 0000000020375017  | Nexus 1252  |
| 0000000174444226   | Nexus 1272  |
| 0000000202609524   | Nexus 1500+ |
| 0000000213531419  | Nexus 1450  |

- 



- MeterManagerPQA® software performs meter setup verification. If there is a possible problem with a meter, i.e., it is offline or there is a possibility of a wiring issue, an exclamation point is displayed next to the meter in the Meter List. As shown in the screen below, if you move the cursor over the exclamation point next to the meter, you will see a message about the possible problem, and if you move the cursor over the exclamation point in the Status Bar, you will see a display of all of the possible problems for the meters (note that the red, dashed lines are shown here for clarity - they won't appear on the screen).

The screenshot displays the MeterManagerPQA application interface. On the left is a sidebar with navigation options: Manual Connect, Configure Group, View History, and Add Groups. The main area is titled 'Meter List' and contains a table with columns: Meter Name, Meter Type, Online Status, and Next Action. The table lists various meters, including Nexus 1272, Nexus 1500+, and Shark 200. A red dashed box highlights a warning message for meter 000000017444226: 'Voltage Out of Phase - The voltage phases may be incorrect.' Another red dashed box highlights a warning message for meter 0167969341SOMHAI: 'Voltage Phase C may be incorrect'. The Status Bar at the bottom left shows 'Meters Online: 218', 'Meters Offline: 0', 'Meter Warnings: 2/16', 'Scripts Status: 2/16', 'Script Errors: 0', and 'Searching IP: 172.20.164.29:502'.

Meter Name	Meter Type	Online Status	Next Action
unassigned			
0000000020375017	Nexus 1272	Online	
000000017444226	Nexus 1500+	Online	
0000000202609524	Nexus 1250	Online	
0000000213531419	Nexus 1250	Online	
0000000229118225	Nexus 1500+	Online	
00005821	Nexus 1250	Online	
00774292	Nexus 1250	Online	
0090258428	Shark 200	Online	
0101672118	Shark 100	Online	
0101673725	Shark 100	Online	
0101675424	Shark 100	Online	
0120637625	Shark 100	Online	
0167969341SOMHAI	Shark 270_2	Online	
0168004322		Online	
0000000168025628		Online	
0000000168026225		Online	
0187877240		Online	
0196658944		Online	

#### NOTES:

- Meter setup verification doesn't provide a list of all problems that meters encounter. Specifically, it provides static issues, not transitory issues, i.e., if a meter is offline (a continuous problem) or there are wiring problems (which won't change until fixed) they can be reported, but bad timestamps detected in a meter's log (an issue with a specific record), for example, won't be reported.
- Meters that are connected to a serial port are displayed as Offline.

- If you click on an exclamation point, a screen showing possible problems is displayed. **NOTE:** You can also click the Meter Issues icon toward the top of the screen to display the possible problems screen.

**154 Problems Detected**

Filter

Filter Type: All

Date Range: All

Refresh

Rescan

Report

Scan All

Group	Meter	Issues	Detected	Description
Shark 250	0209442627	offline	7/18/2018 10:29:13	Unable to communicate with meter
Shark 270	0196652029	wiring	7/18/2018 10:29:13	Voltage Low - One or more of the voltage phases
Shark 270	0167973740	wiring	7/18/2018 10:29:13	Va and Vc may be swapped.
Shark 200	0176696237	wiring	7/18/2018 10:29:13	Voltage Low - One or more of the voltage phases
Shark 200	0176659842	wiring	7/18/2018 10:29:13	Voltage Low - One or more of the voltage phases
Shark 200	0176687237	wiring	7/18/2018 10:29:13	Unable to communicate with meter
Shark 200	0212516825	wiring	7/18/2018 10:29:13	Voltage Low - One or more of the voltage phases
Shark 200	0176673232	wiring	7/18/2018 10:29:13	Unable to communicate with meter
Shark 250	0209444528	wiring	7/18/2018 10:29:13	Voltage Bad - The voltage phases are incorrect.
Shark 200	0177728133	offline	7/18/2018 10:29:13	Unable to communicate with meter
Shark 200	0176673838	offline	7/18/2018 10:29:13	Unable to communicate with meter
Shark 200	0176689239	offline	7/18/2018 10:29:13	Unable to communicate with meter
Shark 200	0176673434	offline	7/18/2018 10:29:13	Unable to communicate with meter
Shark 200	0214492224	offline	7/18/2018 10:29:13	Unable to communicate with meter
Shark 200	0176666840	wiring	7/18/2018 10:29:13	Voltage Low - One or more of the voltage phases
Shark 200	0176665940	offline	7/18/2018 10:29:13	Unable to communicate with meter
Shark 200	0167990032	offline	7/18/2018 10:29:13	Unable to communicate with meter
Shark 200	0176669641	offline	7/18/2018 10:29:13	Unable to communicate with meter
Shark 200	0176667235	wiring	7/18/2018 10:29:13	Voltage Low - One or more of the voltage phases
Shark 200	0167964134	offline	7/18/2018 10:29:13	Unable to communicate with meter

- The meters with possible problems are shown in the list on the right. For each meter, the Group, Serial Number, Issues (Offline or Wiring), the time the possible problem was detected, and the description of the possible problem are shown.
  - "Offline" means that the software is not able to communicate with the meter.
  - "Wiring" indicates that the voltage and current hookups may not be correct or the CTs may be reversed. The specific hookups that can be validated by the MeterManagerPQA® application are 3 Element Wye and 2 CT Delta.
- The meters that are supported for meter verification are: Shark® 100/200/250/270, MP200, and Nexus® 1272/1450/1500/1500+ meters.
- You can filter the possible problems you see by type (Filter Type - Wiring or Offline) and/or Date Range (Last Week, Last 2 Weeks, Last Month).
- If you right-click on a possible problem in the list, you can choose to retest the issue, clear the issue from the list (note that the issue will be shown again if the list is recreated by a Refresh command or if the MeterManagerPQA® application restarts), or show the Phasor diagram

to analyze the issue. Note that the Phasor diagram is shown in CommunicatorPQA® software, and is only available if the meter is online.

- Click Refresh to reload the possible problems list.
- Click Rescan to rescan all of the possible problems in the list.
- Click Report to display the possible problems in a spreadsheet. The fields shown are Meter Name, Serial Number, Connection, Issue Type, and Description.
- Click Scan All to scan all of the meters in the system and generate a new possible problems list.
- The table below shows the possible warning messages.

Message	Meaning
<b>General</b>	
OK	Both voltage and current are correctly wired.
Not supported	Supports 3 Element Wye and 2 CT Delta, only.
Unable to communicate with meter	Meter is offline.
Voltage Low - One or more of the voltage phases has too low of an RMS value.	Below 5 V secondary
Current Low - One or more of the current phases has too low of an RMS value.	Below 0.05 A secondary
Phase A CT Reversal - A current phase may be reversed.	Current phase $180^\circ \pm 45$ of the voltage phase.
Phase B CT Reversal - B current phase may be reversed.	Current phase $180^\circ \pm 45$ of the voltage phase.
Phase C CT Reversal - C current phase may be reversed.	Current phase $180^\circ \pm 45$ of the voltage phase.
<b>3 Element Wye</b>	
Current Out of Phase - The current phases may be incorrect.	Current phase $\pm 45^\circ$ from corresponding voltage.
Voltage Out of Phase - The voltage phases may be incorrect.	Voltage phase $120^\circ \pm 5$ apart.
<b>2 CT Delta</b>	
Voltage Phases A-C Swapped - Two of the voltage phases may be swapped.	Vab $60^\circ \pm 5$ from Vcb
Voltage Phases B-C Swapped - Two of the voltage phases may be swapped.	Vcb $60^\circ \pm 5$ from Vab
Voltage Phase C may be incorrect.	Vcb $60^\circ \pm 5$ from Vab
Current Phase A Bad may be incorrect.	Ia must be $-30^\circ \pm 45^\circ$ from Vab.
Current Phase C Bad may be incorrect.	Ic phase must be $+30^\circ \pm 45^\circ$ from Vcb.

### 18.3.1: Set Up a Meter List

You add meters to the Meter List in one of two ways:

- Automatic Connect Using Auto Discovery - This is the simplest method. In this mode the software searches out and locates any meters on the network. Once the meters are found, they can be automatically added to groups (based on the meter type), and the software can automatically begin to download stored meter data.
- Manual Connect (Manually adding meters) - In this mode, you manually connect to the meter using its IP address. Once the address is entered, the software adds it to a group (based on the meter type), and automatically begins to collect stored meter data for that meter.

#### 18.3.1.1: Add Meters to the Meter List Using Auto Discovery

There are four methods to configure Auto Discovery. Use whichever one best suits your needs.

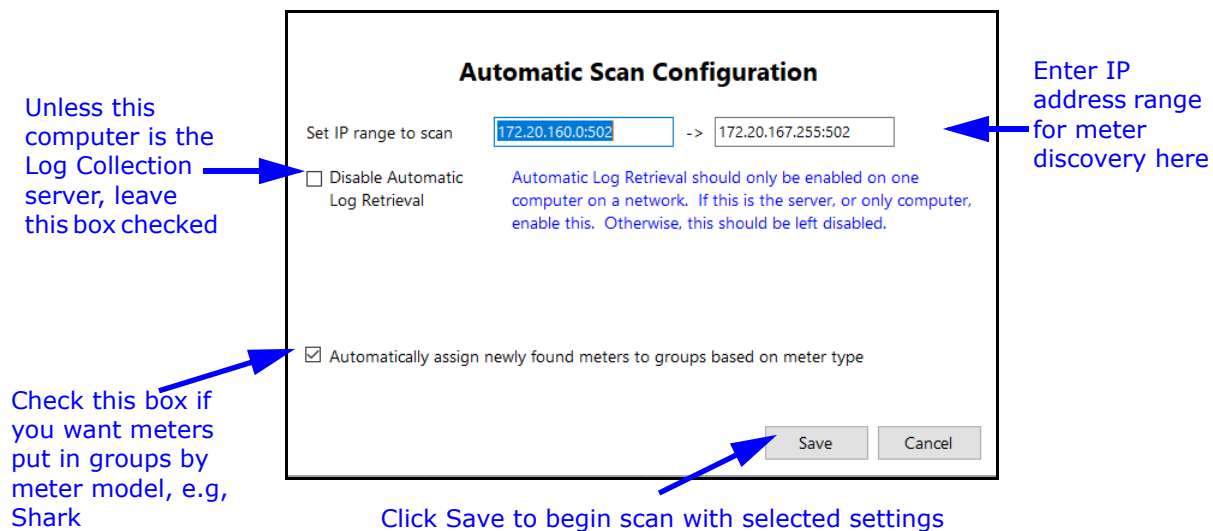
- Auto Scan - searches an IP range you enter for network meters and adds them to the Meter List. This is the most common meter search method.
- Meter Discovery Configuration - gives you access to additional settings for customizing scanning for meters.
- Network Scan - use this feature to perform parallel network scans for meters - see [18.12.5: Manual Network Scan, on page 18-161](#), for instructions. This feature scans large groups of Network IP ranges for high-speed discovery of meters.
- Manual Entry - manually signing on to the meter automatically puts the meter on to the Meter List.

## Add Meters Using Auto Scan

When you use Auto Scan, the application looks for and adds Network meters in the IP address range you enter. Note that this is not a fast process. The software intentionally runs rather slowly, in order to not use up network resources. It may take up to one hour, or longer, to find all of the meters within the IP range. You have the option of putting the meters into groups based on meter type, e.g., Shark® meters.

**NOTE:** The first time you start the Meter Manager Monitor after installation, you are asked if you want to enable Auto Scan. EIG recommends that you do enable Auto Scan.

1. Click the Auto Scan icon at the top of the screen.



2. In the Automatic Scan Configuration screen, you set:

- The IP range in which you want the application to search for meters: the starting and ending IP addresses.

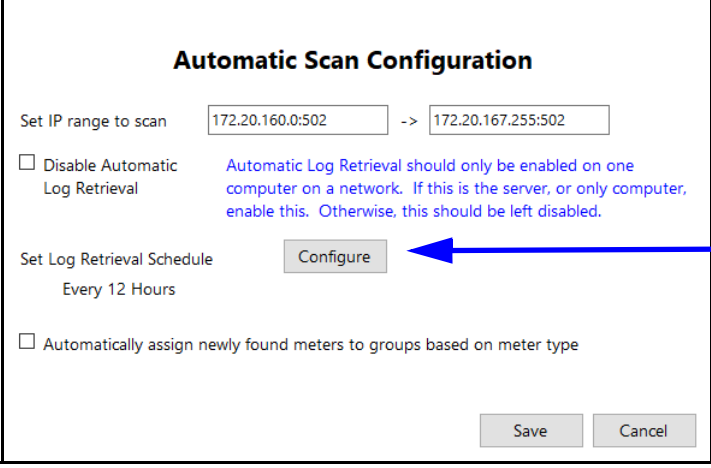
**NOTE:** EIG meters natively use Modbus for communication, which defaults to Port 502. However, if you have changed the Modbus port on the meter, or are using a network device that changes the port mapping, you can specify the port range to scan by adding ":[port]" after the IP address.

For example, range 192.168.0.1:503 to 192.168.0.255:505 will scan all IP addresses from 192.168.0.1 to 192.168.0.255, and attempt to connect to those IP addresses via ports 503, 504, and 505.

- Whether or not meters are grouped by meter model. Leave the checkbox selected to group any discovered meters this way, for example, into Shark® or Nexus® groups. Groups are used to perform tasks on multiple meters at one time. See [18.4: Meter Groups, on page 18-31](#), for information on groups.

**NOTE:** Any combination of groups can be created, and the user can assign any of the meters to any group. Though the default grouping is by meter type, so that it is easier to locate meters within the meter list once they are found, the meters in a group do not need to be the same meter type.

- Disable automatic log retrieval - the default of this screen is that automatic log retrieval is disabled for the computer (the box is checked). That is because only one computer in the network - the server, should be enabled for automatic log retrieval.
  - If this computer is not the Log Collection server, leave the box checked.
  - If this computer is the Log Collection server, click on the box to uncheck it - the screen will change as shown below.



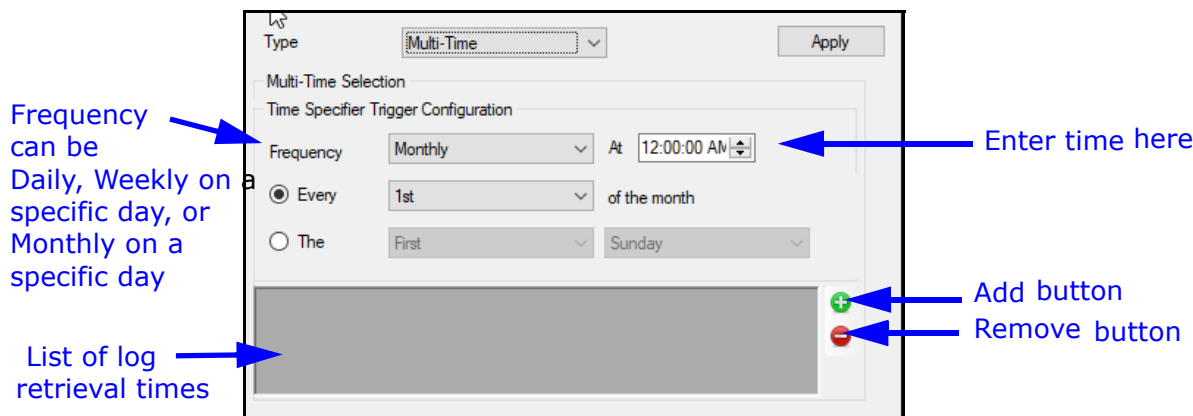
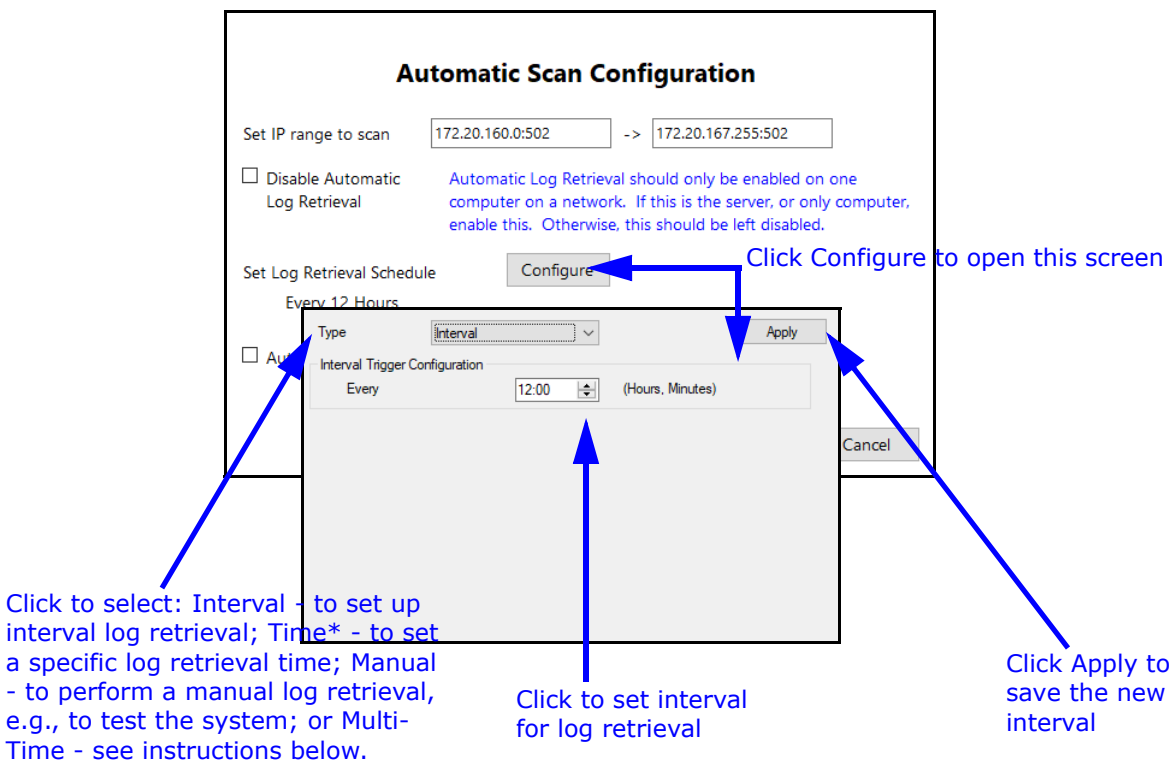
The image shows a dialog box titled "Automatic Scan Configuration". It contains the following elements:

- Set IP range to scan:** Two text boxes with values "172.20.160.0:502" and "172.20.167.255:502" separated by a "->" symbol.
- Disable Automatic Log Retrieval:** A checkbox that is currently checked. To its right is a blue text note: "Automatic Log Retrieval should only be enabled on one computer on a network. If this is the server, or only computer, enable this. Otherwise, this should be left disabled."
- Set Log Retrieval Schedule:** A label "Every 12 Hours" and a "Configure" button. A blue arrow points from the right side of the dialog to this button.
- Automatically assign newly found meters to groups based on meter type:** A checkbox that is currently unchecked.
- Buttons:** "Save" and "Cancel" buttons at the bottom right.

Click to set up a log retrieval interval of other than every 12 hours (not generally recommended)

- Now that you have enabled automatic log retrieval for the computer, you can set the log retrieval interval. The default is every 12 hours, which is the recommended setting. If you want to change the interval, click the Configure button and then enter the new interval. See the example screen on the next page.

## Changing Log Retrieval Interval screen



- i. If you select Multi-Time for Type, you will see the screen shown above. It lets you set specific times for log retrieval: either on a daily schedule, weekly on a specific day, or monthly on a specific day. This setting can be used if you want to retrieve logs more often at certain times or days than on other times or days, e.g, retrieving logs every hour during the night and every eight hours during the day. To add a time, enter it in the time field

and click the Add button. To remove a time, click on it in the list of log retrieval times and click the Remove button.

2. Click Save to begin the automatic scan for meters with these settings. In the Searching IP Address field of the Status section, the Meter List screen will show the IP addresses as the application searches for meters. When searching is complete, the discovered meters will be shown in the Meters List.

- Note that any IP address that is in the Scan Block List will not show up in the auto search (see page 18-27 for information on the Scan Block List).



## Add Meters Using Meter Discovery Configuration

Meter Discovery is a more advanced method of finding meters. It allows the user to specify multiple IP ranges and to block ranges that should not be scanned. Meter Discovery configuration gives you added flexibility compared to Auto Scan, since you can specify this additional criteria for Auto Discovery.

1. From the MeterManager Monitor's Menu bar, click Configure>Meter Discovery.

Meter Discovery Configuration

Settings

☒ Enable Scan

Network Scan Interval
[Every 4 Hours](#)

Online Check Interval
[Every 10 Minutes](#)

☐ Automatically assign newly found meters to groups based on meter type
☐ Override scan settings

Warning - Configuring the scan any faster than default may be detected by some systems as invalid.

Min Sleep Time

15

☐ Query Gateway Modbus Devices

Ping Interval

5000

Ping Timeout

100

Store Status Interval

1000

Update

Cancel

Address Range

☒ Manually Configure Meter Discovery Address

	Address/Start	Mask/End
range	172.20.160.0:502	172.20.167.255:502

Scan Block list

Start Address

172 . 20 . 166 . 1

End Address

172 . 20 . 167 . 255

+

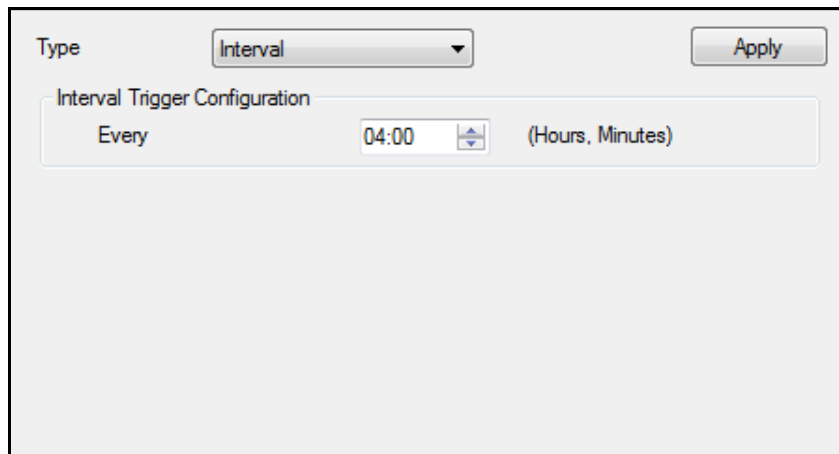
-

✕

Start IP	End IP
----------	--------

2. The entry fields are:

- Enable Scan - click the checkbox to toggle between enabling and disabling Auto Discovery - when the box is checked Auto Discovery is enabled; when it is empty, Auto Discovery is disabled. Note that Auto Discovery must be enabled for automatic Time Sync ([18.5.2: Time Sync, on page 18-39](#)) to work.
- Network Scan Interval - this setting determines how often the network is scanned for new devices. Because new devices are not added frequently, and a scan can take time to complete, this interval should be kept at not less than 4 hours. Click on the underlined field (Every Four Hours) to open a screen that lets you adjust the time (see the screen beneath the Online Check Interval explanation, below).
- Online Check Interval - this setting determines how often meters which have already been discovered are checked to see if they are still online. This feature acts as a supervisor, checking the integrity of the metering system. With this feature, a user knows immediately if there is a communication problem with the meter. Click on the underlined field (Every Ten Minutes) to open a screen that lets you adjust the time.

A screenshot of a software dialog box titled "Interval Trigger Configuration". At the top left, there is a label "Type" followed by a pull-down menu currently showing "Interval". To the right of the menu is an "Apply" button. Below the "Type" label, the text "Interval Trigger Configuration" is displayed. Underneath this, the word "Every" is followed by a time input field showing "04:00" with up and down arrows, and the text "(Hours, Minutes)" to its right.

a. Choose type from the pull-down menu. The choices are:

- Interval - this is the default. Use the up and down arrows in the time field to set the hours and minute values you want.

- b. Click Apply to implement your settings.

- IMPORTANT!** EIG recommends that you keep the default of this setting, i.e., don't check the box. The reason for this is that even though changing the settings in this section may improve scan speed, if settings are too fast they can be seen by some anti-virus systems as a malicious attack.

If you are sure you want to use this setting, check the Override Scan Settings box and refer to the following instructions (up until Address Range bullet on the next page).

**Settings**

☒ Enable Scan

Network Scan Interval

[Every 4 Hours](#)

☐ Automatically assign newly found meters to groups based on meter type

Online Check Interval

[Every 10 Minutes](#)

☐ Override scan settings

Warning - Configuring the scan any faster than default may be detected by some systems as invalid.

Min Sleep Time

15

☐ Query Gateway Modbus Devices

Ping Interval

5000

Ping Timeout

100

Store Status Interval

1000

- **Min Sleep Time** - this setting determines the minimum time between each action taken by the scanner, in milliseconds.

- Ping Interval - this setting determines the minimum time between each IP address to be tested, in milliseconds. Do not set this value to less than 5 seconds.
- Store Status Interval - this is an internal setting that updates the status of the meter search. There is no reason to edit this value.
- Query Gateway Modbus Devices - by default, the Discovery Scan only finds meters attached to the network. If you have meters behind a Modbus Gateway, enabling this setting can be used to find these meters. However, as this greatly slows down the scan, EIG recommends that gateway devices be manually added through the CommunicatorPQA® application. When you connect to a meter via the CommunicatorPQA® application's Quick Connect (see [3.2: Connecting Directly to Your Meter, on page 3-6](#), for instructions), a successful connection will be added to the Meter List. If the meter is new, it will be listed under the "Unconfigured" group. Otherwise, the connection last active will be updated for the meter.
- Address Range - this setting specifies the range of IP addresses to scan.

Address Range		
<input checked="" type="checkbox"/> Manually Configure Meter Discovery Address		
+	Address/Start	Mask/End
-	range	172.20.160.0:502
		172.20.167.255:502

- The Manually Configure Meter Discovery Address box is checked by default. Manually configure one or more IP address ranges to scan. Note that if you don't specify a range, the scan won't take place.
  - To add a range to the table, press the green plus icon (+) on the right of the table; to remove a range from the table, press the red minus icon (-) on the right of the table.
  - Click in the first field on the left to choose either range or mask.
    - Using a range is the simplest way to specify a scan address. You enter a start and end IP address for each range.
    - To use a mask for the scan, you specify a base IP address and a

network mask, to specify the range of accessible IP addresses. The scan will look for all meters within the network mask, beginning with the base IP address.

- Scan Block List - this setting lets you eliminate (block) certain IP addresses from meter discovery. Once configured, the block list is used by both the Manual Network scan and the Automatic Network Discovery. Each address in the block list ranges will be ignored.

Scan Block list					
Start Address	172 . 20 . 166 . 1				
End Address	172 . 20 . 167 . 255				
<div><div><div>+</div><div>-</div><div>✕</div></div><div><table><tr><th>Start IP</th><th>End IP</th></tr><tr><td colspan="2"></td></tr></table></div></div>		Start IP	End IP		
Start IP	End IP				

Clear Block List Button      Block List Box

- To add an IP address range to the block list, enter the start and end IP addresses, and click the plus button. The IP address range is added to the Block List box on the right.
  - To remove an IP address range from the block list, select the IP address range in the Block List box and click the minus button.
  - To clear the Block List box, click the Clear Block List button (x).
3. Click Update to save your settings. When the Discovery Scan is next run, any new meters will be added to the Meter List.

### 18.3.1.2: Add Meters to Meter List Manually

When you enter meters manually, you assign the meter to a group at the time you enter its data. Note that this method does not use the Blacklist, so you can use it to discover meters that are blacklisted from the auto scan.

1. From the Meter List screen, click Manual Connect on the left side of the screen. You will see the screen shown below.

**Enter New Meter Connection**

Connect

**Manual Connect Settings**

Connection Type: Network

IP Address:

Port: 502

Protocol: Modbus TCP

Modbus Address: 1

2. Click Connect to add meter

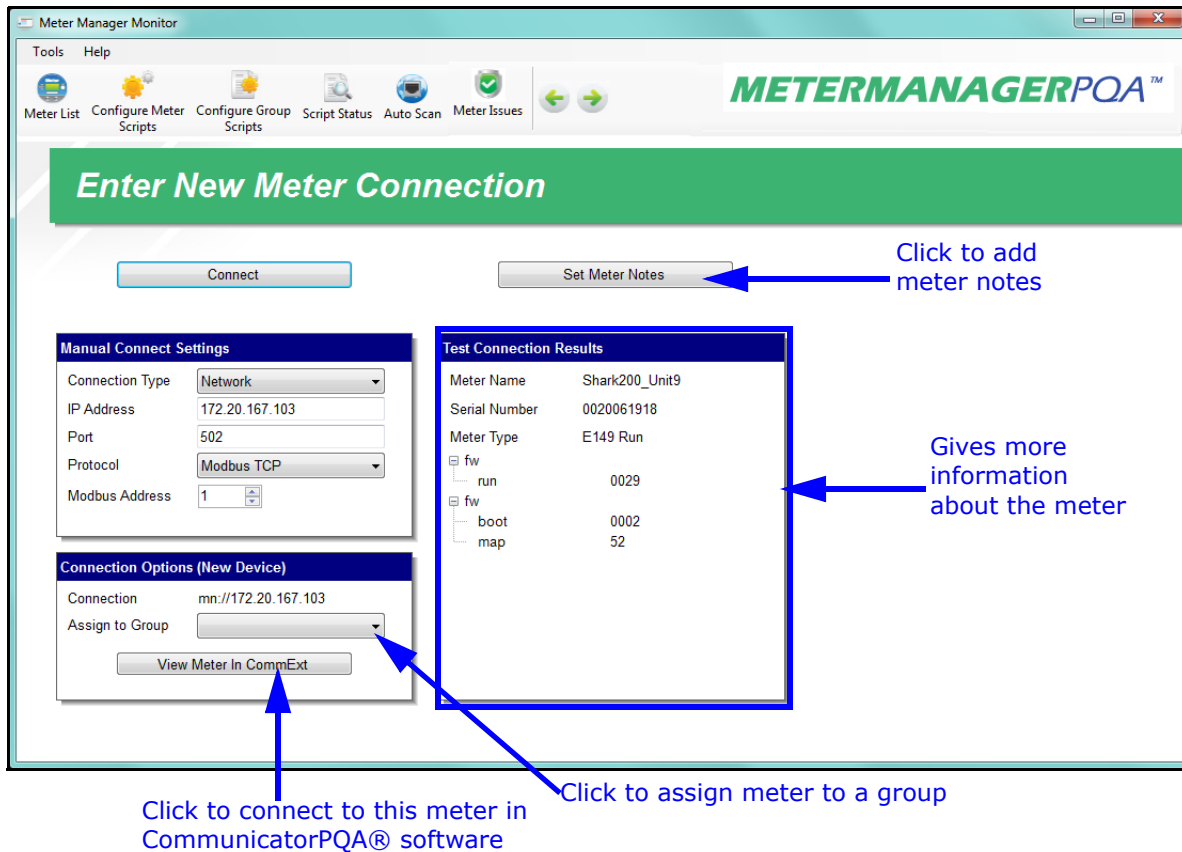
1. Enter meter's connection data, e.g., IP address, port, Modbus® TCP, and Modbus® address for Network connection

2. Enter these settings:

- Connection Type is Network or Serial.
- Enter the meter's IP address if the connection is Network.
- Enter the serial port, or leave the default port 502 (for Network connection).
- Protocol is Modbus TCP for a Network connection; or Modbus RTU or Modbus ASCII for a Serial connection.

- Enter the Modbus address using the Up and Down arrows: valid addresses are between 1 - 247.

3. Click Connect.



4. The screen now:

- Gives you information about the meter in the Test Connection Results box: meter name, serial number, type, and firmware versions.
- Lets you assign the meter to a group in the Connection Options (New Device) box: click the pull-down menu and select from one of the already created groups, create a new group for the meter, or assign the meter to the Unassigned group if you are not ready to assign it to a group, yet (see [18.4: Meter Groups, on page 18-31](#), for an explanation of, and instructions for, grouping meters).
- Lets you open the meter connection in the CommunicatorPQA® application, to configure meter settings, see polling screens, etc.
- Lets you add notes for the meter: click the Set Meter Notes button a screen where you can type notes for the meter. You can use this option to record infor-

mation about the meter, e.g., location. The notes are saved with the meter and can be accessed later.

5. Click Meter List or use the green back button at the top of the screen to return to the Meter List screen.



## 18.4: Meter Groups

The MeterManagerPQA® application groups meters together, which lets you perform tasks on multiple meters at a time, e.g., downloading logs for all of the meters in the group. The default method is grouping them by meter type. Once they are in a group, they are all managed on a group basis. It is common for a user to decide to change the grouping to something more useful, for example, grouping by substation, location, or function. This is up to the user. Whether you want to re-assign a meter to another group, or to assign an Unassigned meter to a group, follow these instructions. Scripts such as log retrieval work on a particular group of meters at once.

1. From the Meter List screen, right-click on the meter you want to assign (a).

The screenshot shows the MeterManagerPQA application interface. The 'Meter List' table is displayed with columns: Meter Name, Meter Type, Online Status, Next Action, and Connection. A right-click context menu is open over a meter entry, with the 'Move Meter to Group' option highlighted. The menu also includes options like 'Connect to Meter', 'View Meter Logs', 'View EnergyReporter Dashboard', 'Retrieve Meter Logs', 'Report Exporter', 'Configure Meter Scripts', 'Remove Meter', 'Test Meter Connection', 'Test Meter Issues', 'Real Time Readings', 'Show Phasor', 'Configure Meter Profile', 'Update Meter Firmware', 'View Communications Quality of Service Analysis', and 'View Webpage'.

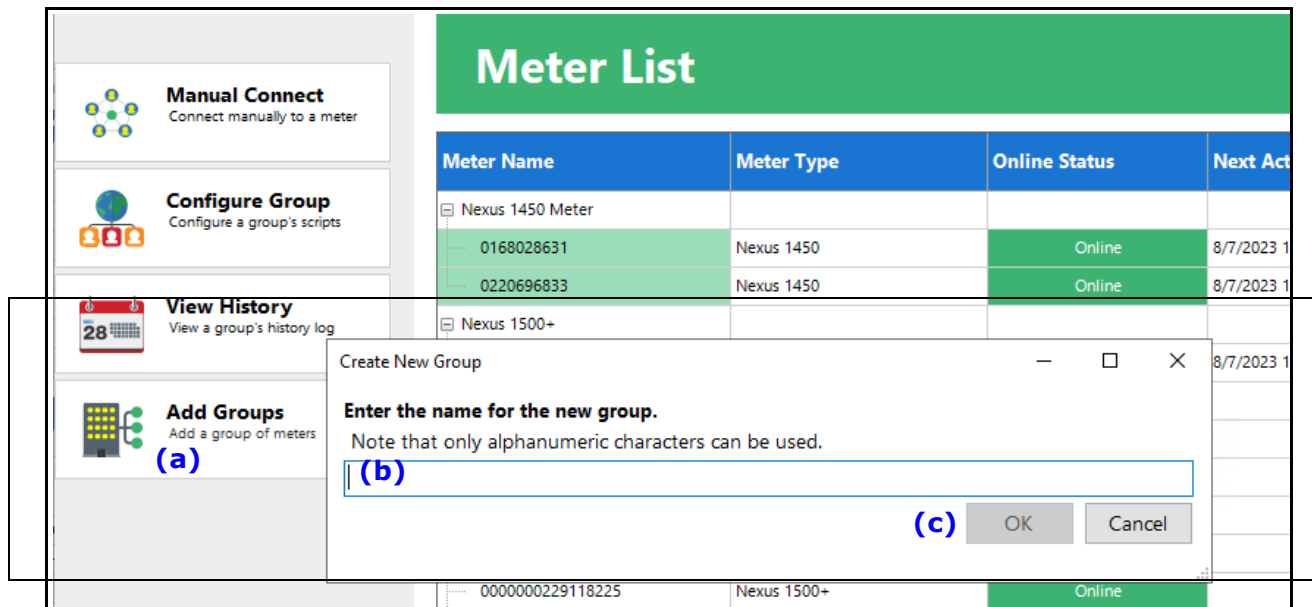
Meter Name	Meter Type	Online Status	Next Action	Connection
Nexus 1450 Meter				
0168028631	Nexus 1450	Online	8/7/2023 12:00 PM	mn//172.20.167.129:502
0220696833	Nexus 1450	Online	8/7/2023 12:00 PM	mn//172.20.167.222:502
Nexus 1500+				
Mechanical Load	Nexus 1500+	Online	8/7/2023 12:00 PM	mn//myxusmeter.com:511
unassigned				
000000020375017	Nexus 1	Online		mn//172.20.167.150:502
0000000174444226	Nexus 1	Online		mn//172.20.166.107:502
0000000202609524	Nexus 1	Online		mn//172.20.165.250:502
0000000213531419	Nexus 1	Online		mn//172.20.167.54:502
0000000229118225	Nexus 1	Online		mn//172.20.160.150:502
00005821	Nexus 1	Online		20.167.132:502
00774292	Nexus 1	Online		20.167.188:502
0090258428	Shark 20	Online		20.167.57:502
0101672118	Shark 10	Online		mn//172.20.167.249:502
0101673725	Shark 10	Online		mn//172.20.167.245:502
0101675424	Shark 10	Online		mn//172.20.167.247:502
0120637625	Shark 10	Online		mn//172.20.167.139:502
0167969341SOMHAI	Shark 27	Online		mn//172.20.166.60:502
0194607229	MP200	Online		mn//172.20.167.117:502
0231753425	Shark 27	Online		mn//172.20.166.61:502

2. You will see a sub-menu that lets you perform actions for the meter. Move your cursor to the line Move Meter to Group (b).

3. Another sub-menu opens. Click on a previously created group to move the meter to that group (c).
4. The Meter List screen will display the meter in its new assignment.

To create a new group:

1. Click Add Groups on the left side of the screen (a).



2. Enter a name for the group (b) and click OK (c). You can then assign meters to the new group.

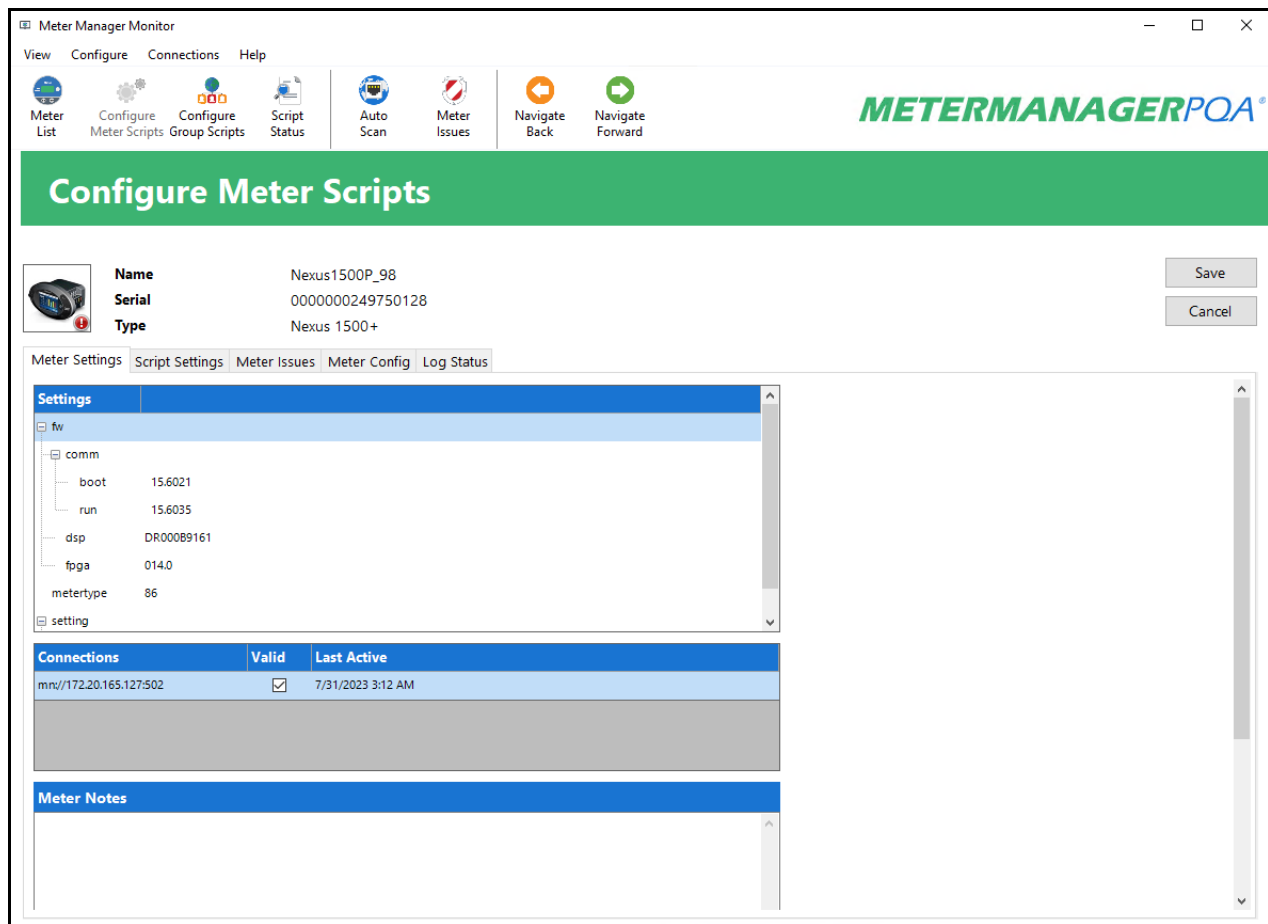
## 18.5: Additional Meter Tasks

This section gives information about other tasks you can perform for the meters in the Meter List.

### 18.5.1: Configure Meter Scripts

The configure meter scripts feature is used to provide information about a specific meter, and to set security passwords to that meter, so that the MeterManagerPQA® application can successfully download data from the meter. Note that this feature is not used for general meter configuration (profile programming) - see your meter's chapter for instructions on Device Profile configuration. You can view information about the meter settings and connections, see any problems with the meter, and set security and log retrieval options through the Configure Meter Scripts screen. You can also enable time synchronization for the meter, and you can override group log archiving settings for a specific meter.

1. Click on a meter in the Meter List and either:
  - Right -click and select Configure Meter Scripts from the menu.
  - Click the Configure Meter Scripts icon at the top of the screen.



2. The top of the Configure Meter Scripts screen lists the meter name, serial number, and type, as well as an image of the meter type. The screen has three tab views: Meter Settings, Script Settings, and Meter Config.

- Meter Settings - this is the first tab you see when the screen opens. This screen gives you information on the settings history - firmware versions and log directory path, and connections for the meter, and the time each connection was last active, etc. Click on a firmware (e.g., run) to display history of its updates. You can also set the time sync for individual meters from this tab. See [18.5.2: Time Sync, on page 18-39](#), for Time Sync explanation and instructions.
- Script Settings - this tab lets you set security settings and log retrieval.
  - a. If the meter requires the user to log in to retrieve logs, click the checkbox and enter the Username and Password. For meters which do not require user names, such as the Nexus® 12xx meter's, you can enter anything in

the Username field. Note that security is also used by the software time sync, and should be configured if software time sync is enabled.

- b. You can uncheck the box next to any logs you don't want to retrieve, or uncheck the Log Retrieval Enabled box to disable all retrieving of the meter logs. The default MeterManagerPQA® application settings will download all data to the host server. This setting lets you limit that data. This is very important when collecting data from devices with large amounts of memory, such as the Nexus® 1500/1500+ meter, from which you may not want to archive all data on the host server. You can configure this for all meters in a group using the Configure Group Scripts screen (see [18.10: Scripts, on page 18-112](#)).

**Meter Manager Monitor**

View Configure Connections Help

Meter List Configure Meter Scripts Configure Group Scripts Script Status Auto Scan Meter Issues Navigate Back Navigate Forward

**METERMANAGERPQA®**

## Configure Meter Scripts

**Name** Nexus1500P\_98  
**Serial** 0000000249750128  
**Type** Nexus 1500+

Save  
Cancel

Meter Settings **Script Settings** Meter Issues Meter Config Log Status

### Meter Security

☐ Meter Requires Login

Username   
 Password

### Log Retrieval

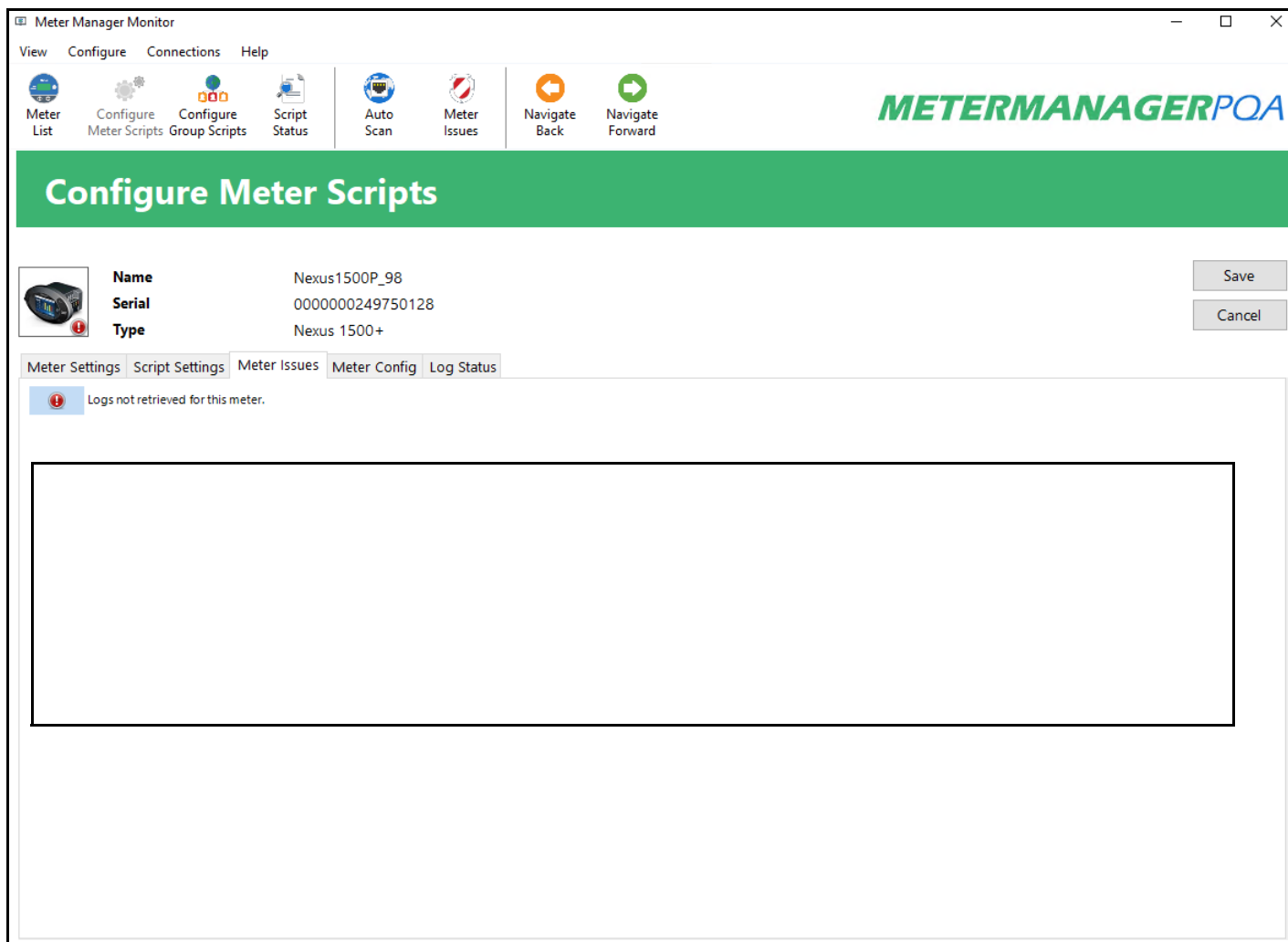
☒ Log Retrieval Enabled

Log	Retrieve
INTERVAL_1	<input checked="" type="checkbox"/>
INTERVAL_2	<input checked="" type="checkbox"/>
INTERVAL_3	<input checked="" type="checkbox"/>
INTERVAL_4	<input checked="" type="checkbox"/>
INTERVAL_5	<input checked="" type="checkbox"/>
INTERVAL_6	<input checked="" type="checkbox"/>
INTERVAL_7	<input checked="" type="checkbox"/>

### Meter Resets

☐ Override Group Setting  
☐ Enable Max/Min Reset

- Meter issues. Click this tab to see any warnings or meter problems. See the example screen, in which the message tells us that logs weren't retrieved for the meter.



- **Meter Config** - this tab lets you change the web interface port of the meter. The default setting is TCP port 80, most often used by Hypertext Transfer Protocol, but if you are using a different port, select it here.

**Configure Meter Scripts**

**Name** 0000000229118225  
**Serial** 0000000229118225  
**Type** Nexus 1500+

Save Cancel

Meter Settings Script Settings Meter Issues **Meter Config** Log Status

**Web Port:** 80 The port to use when connecting to meter via the Web.

Add Remove

Label	Value
-------	-------

Landis+Gyr Custom Report Configurable Field Settings: Add or remove configurable fields specific to the selected meter. This feature allows for user settable tags and values such as addresses, locations, service dates, etc. To add a configurable field click the Add button. A new row will appear in the grid, simply type in a label and value to add a field. To remove a field, select a row from the grid and click the remove

This section of the Meter Config tab is used to set up the Landis+Gyr custom reports. This features is explained in Appendix F.

- Log Status - this tab shows you the status of meter logs.

**Configure Meter Scripts**

**Name** Mechanical Load  
**Serial** 0000000181528833  
**Type** Nexus 1500+

Save Cancel

Meter Settings Script Settings Meter Config **Log Status**

Name	Key	Value	Time Range	Status
Warnings				
Database Status				
Root db size		1.07GB		
Last Updated		8/1/2023 12:03 PM		
Scan Status				
Historical				
Block Window Average: VA	item.26003	191356	[2018/08/02 - 2023/08/01]	
Block Window Average: VAR	item.26004	175254	[2018/08/02 - 2023/08/01]	
Block Window Average: W	item.26005	175254	[2018/08/02 - 2023/08/01]	
EN50160 10Min Avg: V AN	item.30001	71159	[2022/03/25 - 2023/08/01]	
EN50160 10Min Avg: V BN	item.30002	71159	[2022/03/25 - 2023/08/01]	
EN50160 10Min Avg: V CN	item.30003	71159	[2022/03/25 - 2023/08/01]	
EN50160 10Min Avg: Van 10tl	item.30012	71159	[2022/03/25 - 2023/08/01]	
EN50160 10Min Avg: Van 11tl	item.30013	71159	[2022/03/25 - 2023/08/01]	
EN50160 10Min Avg: Van 12tl	item.30014	71159	[2022/03/25 - 2023/08/01]	
EN50160 10Min Avg: Van 13tl	item.30015	71159	[2022/03/25 - 2023/08/01]	
EN50160 10Min Avg: Van 14tl	item.30016	71159	[2022/03/25 - 2023/08/01]	

- If you have changed anything in the Configure Meter Scripts tabs, click the Save button.

3. You will return to the Meter List screen.



### 18.5.2: Time Sync

As explained previously, Time Sync is available from the Meter Settings tab. The Time Sync feature allows for tracking the time difference of meters from the MeterManagerPQA® application server. When Time Sync is enabled, it also sets the meter's time when it drifts beyond a configured threshold. Meters which have software time sync enabled will be shown with a clock icon in the Meter List. Scanning the meter times is done automatically at one hour intervals - no configuration is required.

**NOTE:** For Time Sync to work automatically, the online scan must be enabled by checking the Enable Scan box in the Meter Discovery Configuration screen- see [Add Meters Using Meter Discovery Configuration, on page 18-23](#) for instructions.

To enable software time sync on a meter:

- a. Scroll to the bottom of the Meter Settings tab.

Time Synchronization		
<input type="checkbox"/> Enable software time synchronization	Meter Time Difference:	00:00:00
Adjust for Timezone: <span>Default (group) ▼</span>	Timezone Difference:	N/A
	Current Timezone:	-05:00:00
	Last Time Sync:	N/A

- b. In the Time Synchronization section, the most recently scanned meter time difference is displayed. It will be marked in red if this time is too far different.
- c. Select Enable software time synchronization.

- d. Select the Timezone offset from UTC, which is Coordinated Universal Time (UTC is the mean solar time at 0° longitude; and is the main time standard used worldwide to regulate clocks and time); or leave the Default, which is the same as the group setting (see [18.10.1: Script Status, on page 18-119](#) for instructions on setting Time Sync for a group).

The purpose of adding a UTC Zone descriptor is that the meter may not be located in the same timezone as the server. Thus, the server needs to know what the connect synchronizing time should be.

The current timezone offset is listed, along with the adjustment factor (timezone difference), to assist in configuring the time. The Timezone Offset works by offsetting the PC time being compared against the meter.

PC Time	Meter Time	PC Timezone	Meter Timezone	Difference
2015/04/28 01:00	2015/04/28 01:01	-4	-4	00:01
2015/04/28 01:00	2015/04/27 23:01	-4	-6	00:01
2015/04/28 01:00	2015/04/27 23:01	-4	0	-05:59
2015/04/28 01:00	2015/04/28 05:01	-4	0	00:01
2015/04/28 01:00	2015/04/27 23:01	-4	disabled	-01:59

#### NOTES:

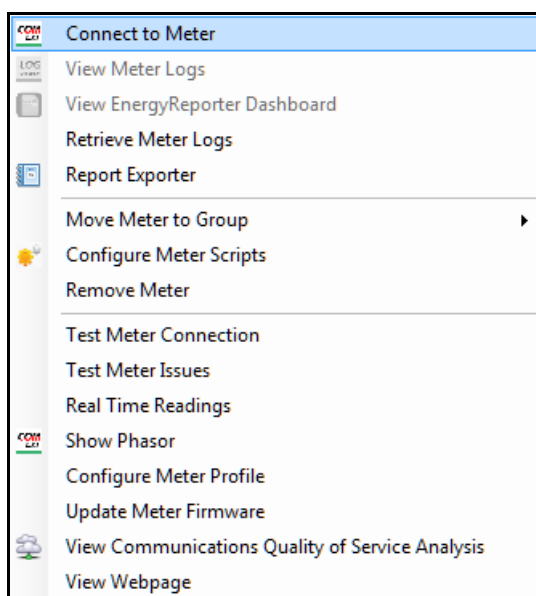
- The UTC offset specified should be current daylight savings offset, if applicable. For example, for the eastern timezone of the United States, EST is -5:00, EDT is -4:00. If you are currently in Daylight Savings, specify -4, otherwise -5.
- The Allowed Time Drift is set in the System Options screen. See [18.11.1: System Options, on page 18-142](#) for instructions.

- Only use Time Sync when other time synchronization options are not being used. For example, if you are using NTP or IRIG-B, do not allow time sync through this method.
- Time Sync is especially useful with Shark® 200S meters, which do not offer time sync through NTP. Shark® 200 meters equipped with an INP100S card, on the other hand, offer NTP time sync.
- Time Sync will be disabled for 12 hours before and after the DST transition time for the PC's current regional settings, in order to prevent updating the meter's time while it is automatically updating for its own internal DST transition times.
- If security is enabled in the meter, you may need to enter login information.

### 18.5.3: Connect to a Meter

From the Meter List, you can connect directly to a meter in the CommunicatorPQA® application, for example, to view real time data like power and energy use, alarms, max/min, the status of inputs, etc. and/or to configure the meter's Device Profile and other settings. Using Meter Search you can connect to multiple meters at one time - see [18.13: Search Meters, on page 18-163](#), for instructions.

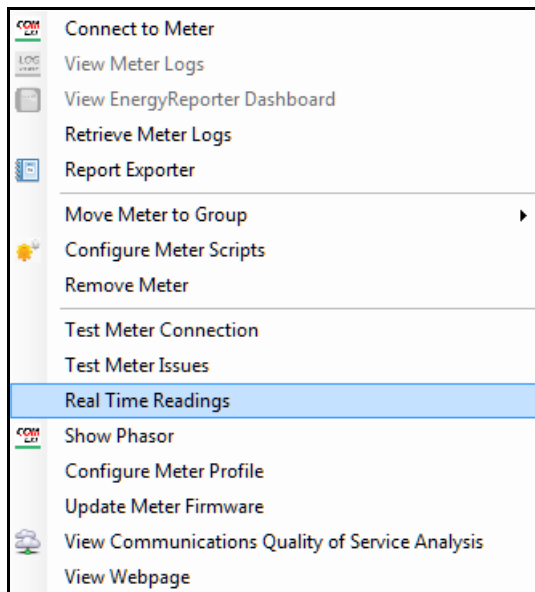
Either double-click or right-click on the meter in the Meter List screen, and select Connect to Meter.



The CommunicatorPQA® application connects to the meter and opens at the Main screen. Refer the rest of this manual for instructions on the tasks you can perform with the software. Clicking Help>Contents opens this manual online.

If you want to go directly to the poll real time readings screen to view power and energy readings, double-click to the Real Time Readings in the menu list. See the

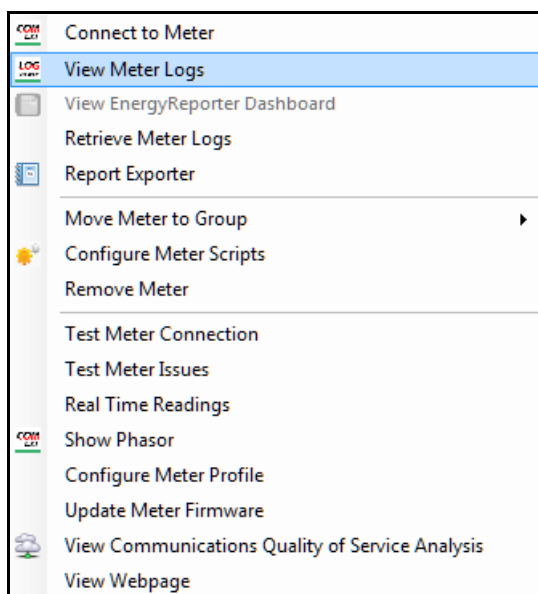
example screen below (from a Nexus 1500+ meter), and see [5.2.1: Instantaneous Polling](#), on page 5-3, for a detailed explanation of the screen.



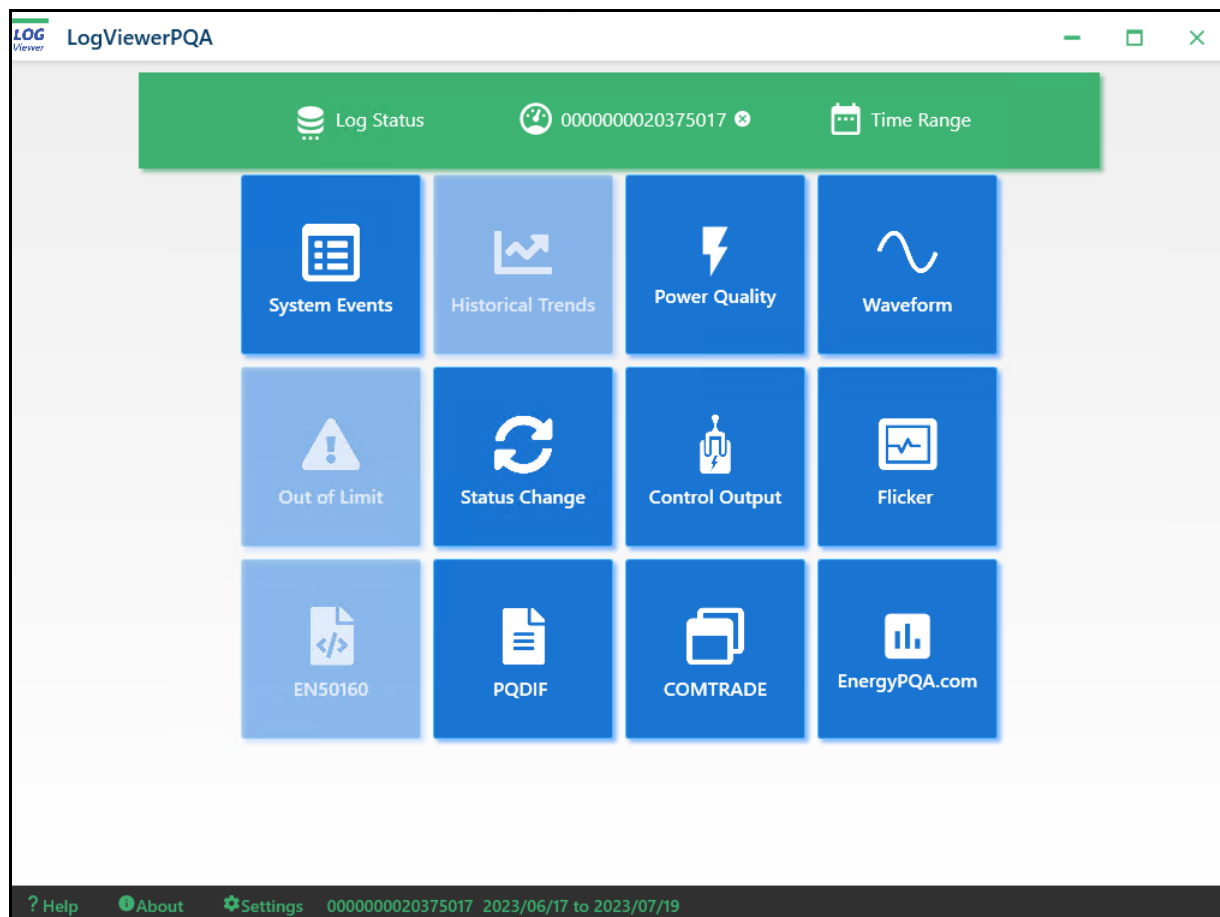
### 18.5.4: View Meter Logs

Meter logs are the log data stored in the meter that was automatically collected and brought into the software. They allow you to view historical log data, alarm data, and power quality fault and surge/sag waveform data.

To view, copy, or print retrieved logs for a meter directly from the Meter List, double-click or right-click on the meter in the Meter List screen and select View Meter Logs. Note that the View Meter Logs button will be disabled if logs have not been retrieved or if the meter does not support logs.



LogViewerPQA opens, letting you view any logs for the meter.

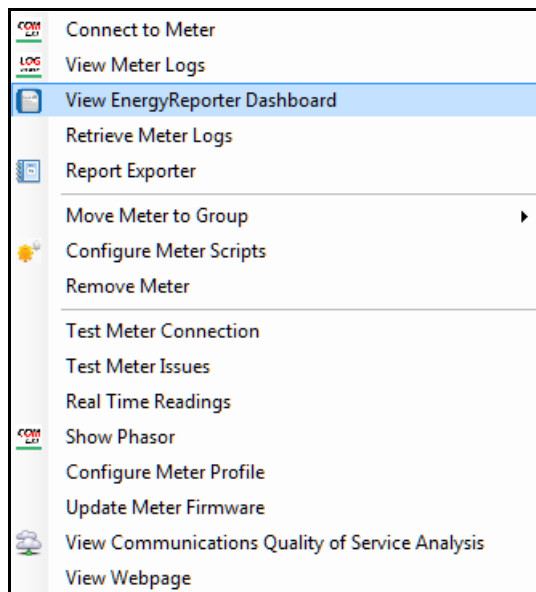


Refer to [Chapter 19: Viewing Logs, on page 19-1](#), for detailed information on using LogViewerPQA.

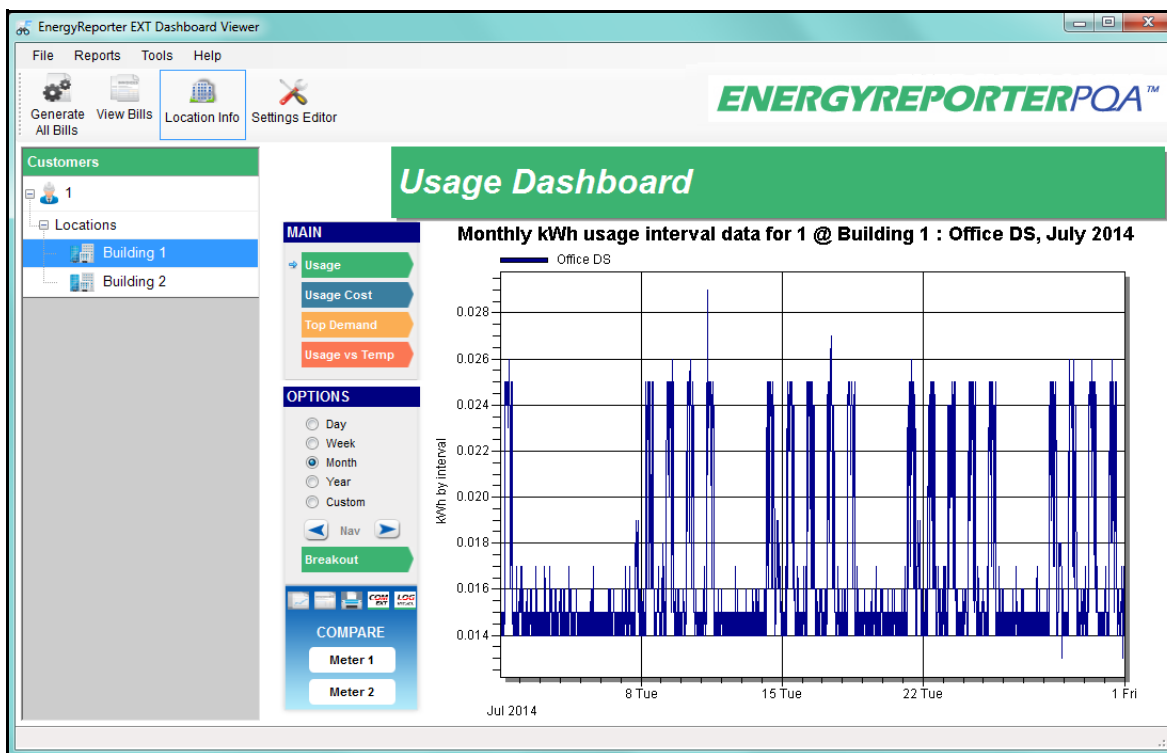
**NOTE:** LogViewerPQA allows you to analyze, chart and graph, and view all data collected from stored memory in deployed EIG metering systems. This is a very commonly used application module; it allows you to conduct deep engineering analysis on your power distribution system.

### 18.5.5: View EnergyReporterPQA™ Dashboard

The EnergyReporterPQA™ application provides automatic energy reporting, energy dashboards and customer energy billing. A user can access this data for the particular metering point, here, directly from a meter in the Meter List. Double-click or right-click on a meter in the Meter List screen and select View EnergyReporter Dashboard.



The EnergyReporterPQA™ application's Dashboard Viewer opens.

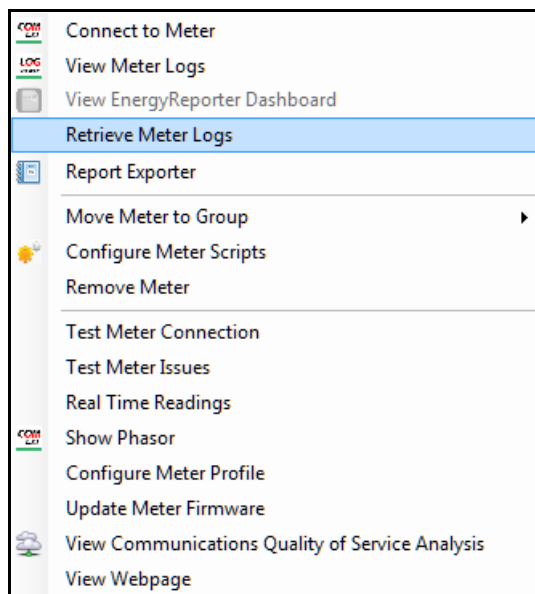




The Dashboard Viewer gives you multiple options for viewing the meter's usage data. For complete information, see the *EnergyReporterPQA™ Application User Manual*.

### 18.5.6: Retrieve Meter Logs

The MeterManagerPQA® application is designed to automatically retrieve all stored data in a meter on a scheduled interval. However, if a user desires to view stored data at the current moment, that can be accomplished here, directly from the Meter List. This is useful if a user wishes to look at an event that just occurred, rather than waiting for the next log retrieval to capture the event, since the usual log retrieval interval is one hour. Double-click or right-click on a meter in the Meter List screen and select Retrieve Meter Logs to start the script that will retrieve logs for the meter (see [18.6: Report Exporter](#), on page 18-58, for information on scripts).



#### NOTES:

- The log retrieval history is not saved for individual meter log retrievals. If viewing this history is necessary, add the meter to a group and use the Group Retrieve Log Script (see [18.5.7: Move Meter to Group](#), on page 18-49, and [18.5.15: Groups Menu](#), on page 18-56).
- The MeterManagerPQA® application provides logging capability for meters without logs, i.e., the Shark® 50 and Shark® 100 meters. See [18.11.1: System Options](#), on page 18-142, for instructions.

In the Next Action field of the Meter List screen you will see the log retrieval progress (see the example below).

Meter List

Meter Name	Meter Type	Online Status	Next Action
[-] Nexus 1450 Meter			
0168028631	Nexus 1450	Online	8/2/2023
0220696833	Nexus 1450	Online	8/2/2023
[-] Nexus 1500+			
Mechanical Load	Nexus 1500+	Online	hist.5 -1/0

The software will give feedback on the download status of each log being retrieved. Once the downloads have completed you can view any data you want.

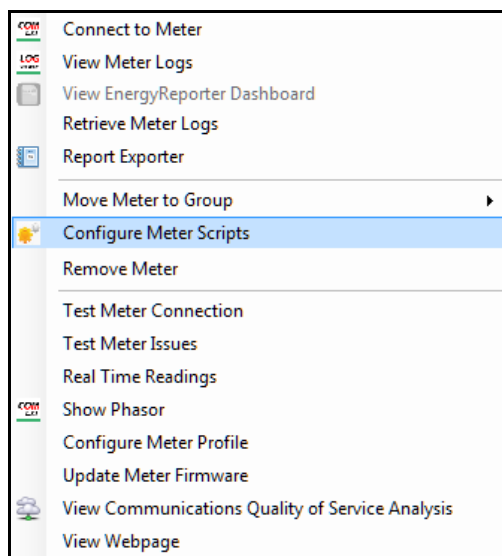
**NOTE:** See [18.11.1: System Options, on page 18-142](#) for additional log retrieval options.

### 18.5.7: Move Meter to Group

See [18.4: Meter Groups, on page 18-31](#) for instructions.

### 18.5.8: Configure Meter Scripts Option

Configure meter scripts lets a user configure the data retrieval server to optimize log data and security for the automated download process. Double-click or right-click on a meter in the Meter List screen and select Configure Meter.

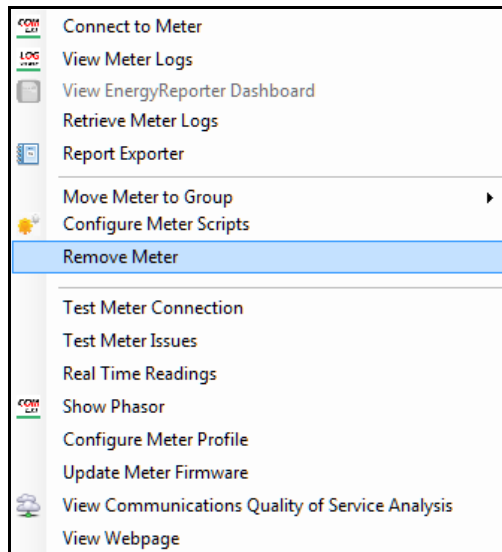


The Configure Meter screen opens - see [18.5.1: Configure Meter Scripts, on page 18-33](#), for instructions.

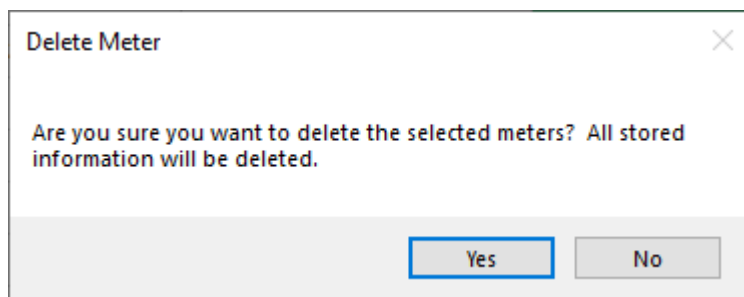
**NOTE:** Configure Meter Scripts is used for setting up custom scripts. Configure Meter Profile is used to make a change to the meter's device profile configuration.

### 18.5.9: Remove Meter

Double-click or right-click on a meter in the Meter List and select Remove Meter.



You will see the following message window.



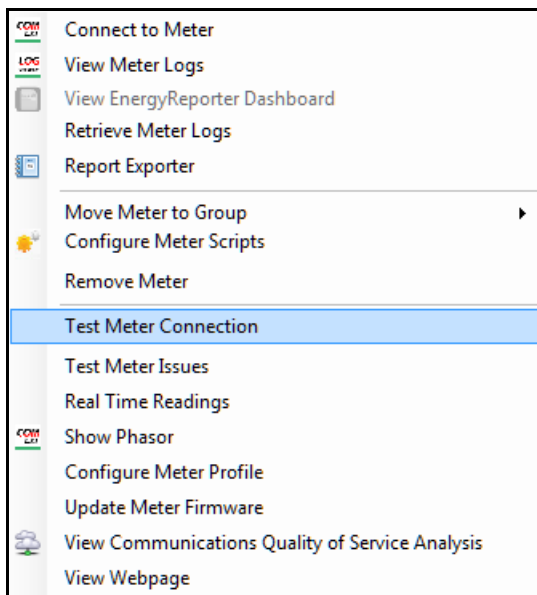
Click Yes to remove the meter from the list or click No to keep the meter on the list. You can use the Search Meters feature to remove multiple meters at one time. See [18.13: Search Meters, on page 18-163](#) for instructions.

Note, that deleting the meters from the Meter List does not delete the meter's log data. If you add the meter back into the Meter List at a later date, the meter's log data will still be available.

### 18.5.10: Test Meter Connection

Test Meter Connection will verify that the system is able to communicate successfully with the installed remote meter.

You can right-click on a meter in the Meter List screen and select Test Meter Connection to make sure you are able to connect to the meter.



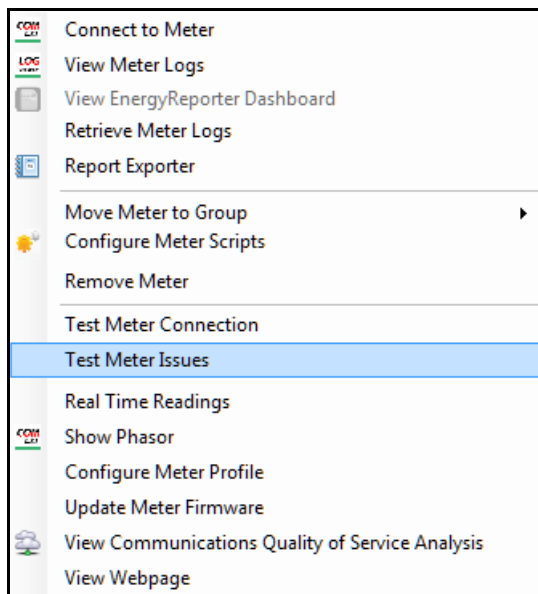
You will see an error message if you are not able to connect to the meter. If you get an error message, check to make sure that the meter's connection information - IP address, etc., is correct. You can test connections for multiple meters at one time using the Search Meters feature - see [18.13: Search Meters, on page 18-163](#), for instructions.

**NOTE:** The system periodically self-tests its connection to the meter. The Test Meter Connection option is used if a user wants to test the meter connection on demand.

### 18.5.11: Test Meter Issues

Test Meter Issues will perform meter setup verification on the selected meter (see pp. 18-16 - 18-17 for details).

Right-click on a meter in the Meter List screen and select Test Meter Issues.

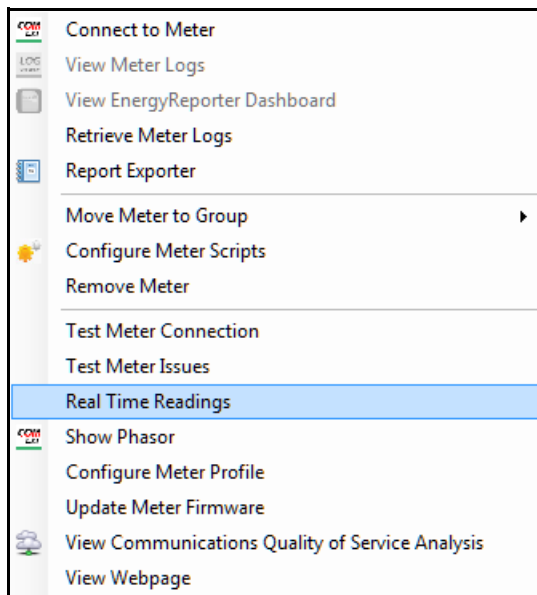


The software performs meter setup verification and then displays the Meter Issues screen, showing the meter you selected on the top of the list, if any possible meter issues are found.

### 18.5.12: Real Time Readings

Real Time Readings allows a user to view electrical parameters as they are happening. For example, the user can view real time voltage, harmonics, power, and current flow.

Double-click or right-click on a meter in the Meter List screen and select Real Time Readings.

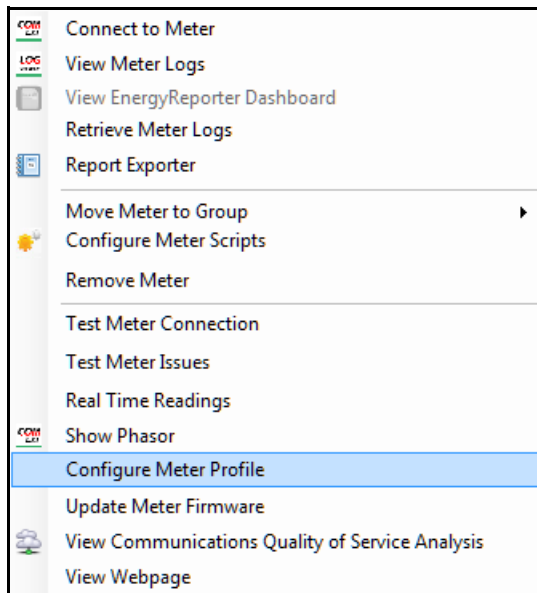


The CommunicatorPQA® application opens and displays the real time polling screen for the meter (see [5.2: Real Time Readings, on page 5-2](#), for details on this polling screen). You can view Real Time readings for multiple meters using the Search Meters feature - see [18.13: Search Meters, on page 18-163](#) for instructions.

### 18.5.13: Configure Meter Profile

Configure Meter Profile allows a user to edit the actual configuration settings stored in the meter.

Double-click or right-click on a meter in the Meter List screen and select Configure Meter Profile.



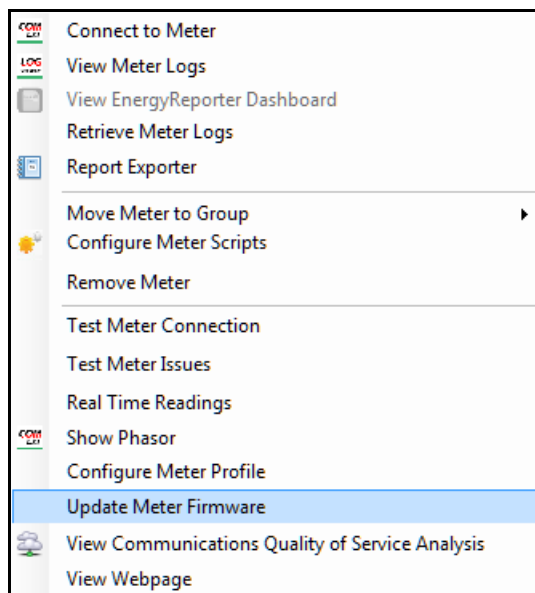
The CommunicatorPQA® application opens and displays the Device Profile screen for the meter (see [Chapter 7: Configuring Your Meter: the Device Profile Screen, on page 7-1](#), for details on this screen). You can program multiple meters, consecutively, using the Search Meters feature - see [18.13: Search Meters, on page 18-163](#) for instructions.



### 18.5.14: Update Meter Firmware

This feature is used to update the meter's firmware and activate the advanced features, directly from the Meter List.

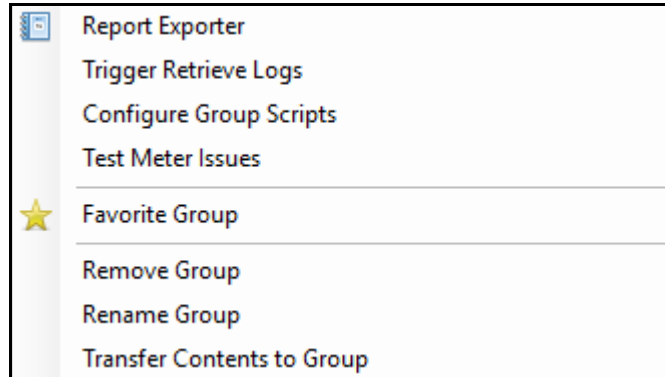
1. Double-click or right-click on a meter in the Meter List screen and select Update Meter Firmware.



2. The CommunicatorPQA® application opens and displays the Firmware Update screen for the meter (see [Chapter 25: Firmware Updating, on page 25-1](#) for details on this screen). You can update firmware for multiple meters, consecutively, using the Search Meters feature - see [18.13: Search Meters, on page 18-163](#) for instructions.

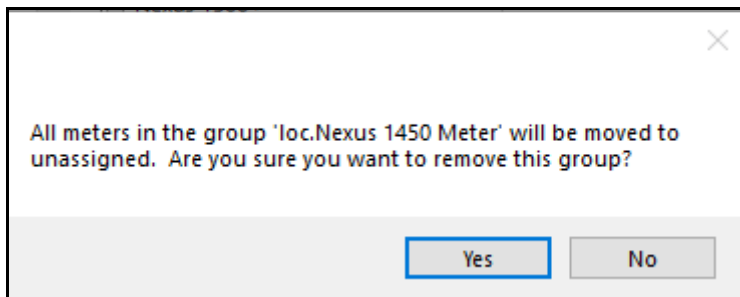
### 18.5.15: Groups Menu

Double-click or right-click on a group name in the Meter List screen to see the sub-menu shown below.



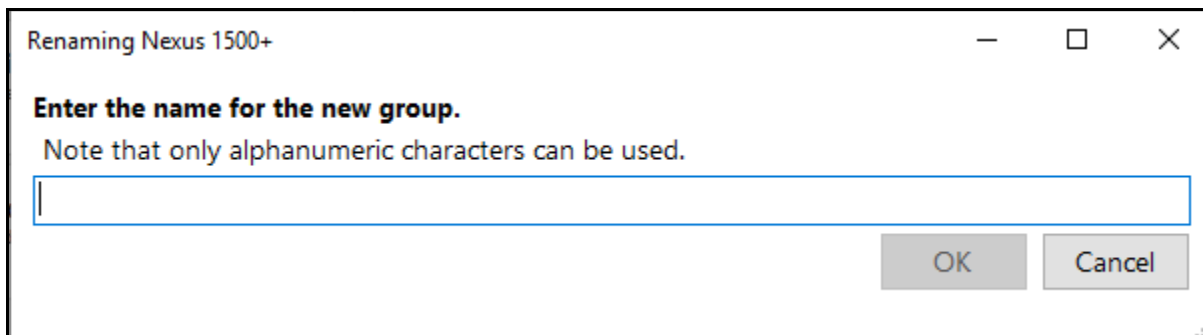
- Click Report Exporter to set up automatic reporting for the group meters. See [18.6: Report Exporter, on page 18-58](#) for instructions.
- Click Trigger Retrieve Logs to start log retrieval for all meters in the group automatically. Note that automatic log retrieval must be enabled in order to retrieve logs for a group. If automatic retrieval is disabled, and you still want to retrieve the logs, trigger retrieval for the meters individually. See [18.5.1: Configure Meter Scripts, on page 18-33](#) for instructions.
- Click Configure Group Scripts to open the screen that lets you set up scripts. See [18.10: Scripts, on page 18-112](#) for instructions.
- Click Test Meter Issues to perform meter setup verification for the meters in the group. See pages 18-8 - 18-10 for details.
- Click Favorite Group to mark this group as a favorite. When a group is selected as a favorite, the software moves the group to the top of the Meter List. This lets a user move the most often viewed groups to the top of the list.

- Click Remove Group to remove this group. You will see the following confirmation message.

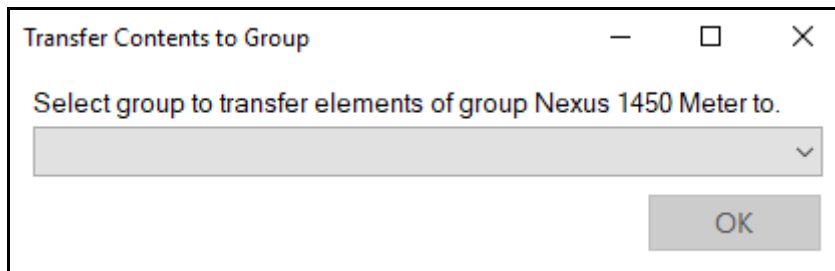


Click Yes to remove the group and move all of its meters to the Unassigned group or click No if you do not want to do that.

- Click Rename Group to give a new name to the group. In the screen shown below, enter the name and click OK.



- Click Transfer Contents to Group if you want to move the group meters into another group, e.g., if you want to combine groups. In the screen shown below, select from the pull-down menu, the group into which you want to move the meters.



## 18.6: Report Exporter

The MeterManagerPQA® application's Report Exporter feature lets you easily create report templates and then automatically generate and distribute the reports on a configured schedule. Report Exporter is a software product that allows a user to set up custom reports that generate a spreadsheet-type tabular data format. This allows a user to customize a report for the specific fields of energy consumption they need.

The Report Exporter is designed to not only create the report, but also to send that data out to the user automatically. A user can select which report and the frequency of the report they wish to send. Features of Report Exporter include:

- Provide tabular format of differing values for one or more meters in a spreadsheet format report.
- Create formulas to automatically calculate derivative values on the data in the report.
- Report files are automatically sent to a selected folder, which is specified when the report template is created. This can be a folder on the local computer or on the network.
- Reports can be sent as email attachments.
- Reports can be uploaded to an FTP server for availability to multiple users.

There are five types of scheduled reports:

- Hourly Reports, which begin at HH:00:00 and end at HH:59:59 each hour.
- Multi-Hour Reports, of between 2 and 23 hours, can be configured.
- Daily Reports, which begin at 12:00:00 AM and end at 11:59:59 PM each day.
- Weekly Reports, which start on any day of the week at 12:00:00 AM and end at 11:59:59 PM on the 7th day (e.g., if a weekly report started on Monday at 12:00:00 AM, it would end the next Sunday at 11:59:59 PM).
- Monthly Reports, which begin at 12:00:00 AM on the selected day of the month (any day from 1 to 28) and end at 11:59:59 PM a month later (e.g., a monthly report beginning on June 6 at 12:00:00 AM will end July 5 at 11:59:59 PM).

Note that scheduled reports need to have available historical log data in order to run:

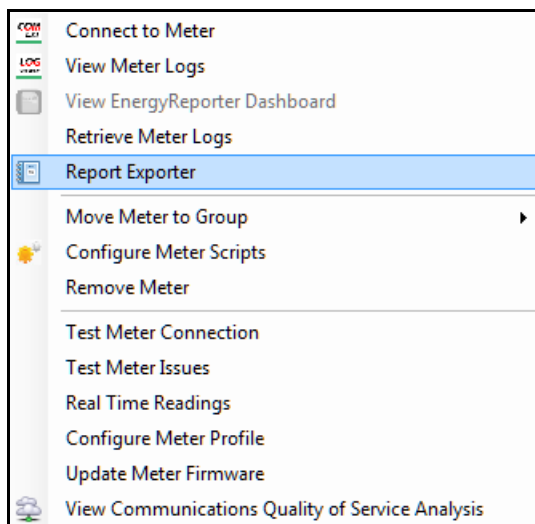
- A report is exported only if there is data available for the next scheduled report period. If there is incomplete data for the report at the time the export is triggered, a message will be added to the system log to that effect, and the export will be attempted again on the next scheduled export cycle.
- If there is historical log data with a time stamp greater than the next scheduled period end time, but there is no data for the scheduled report period, an empty report is generated. The report period will then be incremented to the next report period. For example, if a Daily Report was configured and the power went down for a day and then resumed the next day, an empty report would be exported for the day the power was out.
- The scheduled report period will only advance to the next report period when there has been a successful export for the period. For example, if an hourly report has been scheduled but the Historical Logs have not been retrieved for a day or more, all hourly reports up to the latest data will be generated after the logs have been retrieved and the next export schedule is executed.

Additional information about Report Exporter is as follows:

- In addition to the scheduled reports, reports may be generated manually at any time. Manual reports offer a great deal of flexibility:
  - Report Exporter offers multiple styling options for manual reports.
  - User-defined date ranges and formulas may be added to manual reports.
  - You can create multiple manual reports for the same meter group or meter, which gives you flexibility in data analysis.
- Reports may be saved as one of two file types (.xlsx which can be opened by Microsoft® Excel or Open Office, which is an open source application, or .csv files, which can be imported into many applications) and/or printed.
- Report Exporter scheduled export activities are logged and can be reviewed in the MeterManagerPQA® application's Script Status logs (see [18.10.2: View Script Logs, on page 18-124](#)).

- Reports may not include multiple meter groups or individual meters from multiple meter groups, but if your data requirements need this capability, you can create a group containing the set of meters desired for a report. When a meter group is selected for a report, only the set of data points (channels) common to all of the meters in the group are displayed for selection for inclusion in a report.
- Reports will not be exported when scheduled for groups or meter whose configuration was modified after the report template was created - this includes adding or removing meters from a group, or changing the logged items configured in the meters. The report template must be edited or replaced for scheduled exports to resume for that group or meter. In this situation, a "Broken Report" icon is displayed in the Meter Manager Meter List, a warning message is displayed when opening the report template for editing, and a warning message is logged when a scheduled export cycle is run.
- Report Exporter can only be run from the computer that is the server, since that is the only computer that controls log retrieval. However, multiple users can have access to the report files through email, saving to shared locations, and/or FTP.
- Automatic log retrieval must be enabled for Report Exporter to be configured. See [18.3.1.1: Add Meters to the Meter List Using Auto Discovery, on page 18-18](#), for instructions on enabling automatic log retrieval. In addition, if you are creating a report template for a group of meters or a meter that belongs to a group, automatic log retrieval must be enabled for the group. See [18.10: Scripts, on page 18-112](#) for instructions on enabling automatic log retrieval for groups of meters. Note that you will see a warning message when you try to select Report Exporter if automatic log retrieval is not enabled.
- Report Exporter uses the PC's default system time format to display the time stamps in the report. If you need to override this setting, for example, if you are using a report internationally, you can customize your Report Exporter's date time format. See [18.6.2: Report Preview Feature, on page 18-81](#), for instructions.
- See [18.6.3: Report Exporter Example, on page 18-97](#), for an example report creation.
- See [18.6.4: Report Exporter Troubleshooting, on page 18-101](#), for information on any possible Report Exporter errors and their resolutions.

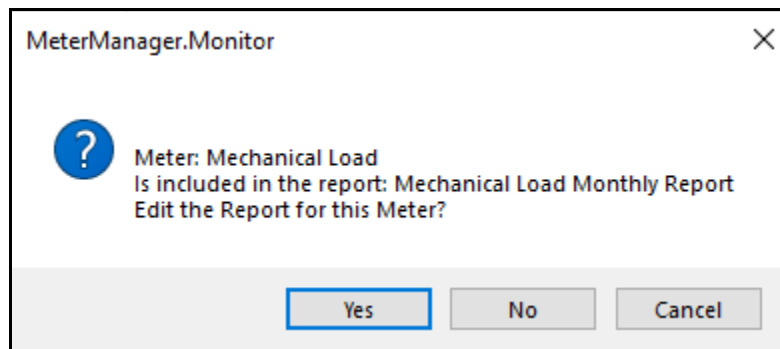
1. Right-click on a meter and select Report Exporter. (You can also right-click on a group name and select Report Exporter).



2. You will see the Report Exporter screen.

- (a) Saved report templates are listed in the pull-down menu.
- (b) Report settings are made in this section.
- (c) This is the export location for the report
- (d) These are the channels that can be selected.
- (e) These are the application commands.

- The example screen is for an individual meter. If you are using the Report Exporter for a group of meters, the screen and settings will be the same, except that the default report and header names will be based on the name of the group, and the Channels section will only contain data points common to all of the meters.
- Note that if there is already a report template for this meter or group of meters, you will be asked to confirm that you want to edit the report.



- If you click Yes, the Report Exporter screen opens with the settings for the existing report template, which you can change if you wish. Once you have made changes you can Save the report template, which will write over the previous version.
- If you click No, the Report Exporter opens, letting you set up a new report template.
- If you click Cancel, the message window closes and the Report Exporter does not open.



- Use the middle of the screen to set up information for the template:

**Report Settings for Meter: Mechanical Load**

Report Frequency: Monthly Hours: 2 Next Report Period Starts: Saturday July 1 2023 12 AM Report Template Name: Mechanical Load Monthly Report

Export File Format: Excel File (\*.xlsx) Next Report Period Ends: Tuesday, August 1, 2023 12:00 AM Report Heading: Mechanical Load Monthly Report

Scheduling: None

Exported Report File Name and Path: (Period start time stamp is added on export)  
C:\Users\Public\Documents\Electro Industries\Communicator\Ext\Retrieved Logs\Report Exporter\Mechanical Load\_Monthly\_Rep ..

**The date and time here are determined by the report frequency, the start time, and, in the case of the Multi-Hour report, by the number of hours in the Hours field.**

- Report Frequency - your choices are Hourly, Multi-Hour, Daily, Weekly, or Monthly. Note that Report Exporter will suggest an appropriate starting date and time for the report, based on the stored data, but you can set the report to start at any date or time you want. To edit the date, click on the up/down arrows in the date field. To edit the hour, click on the number and use the up and down arrows; to set AM or PM, click on the AM/PM and click the up or down arrow.

**NOTE:** The report data starts at the first interval after the start of the report period. Similarly, the last value in the report will include the end of the report period. For example, a daily report for 15 minute interval data, would contain values from 12:15 AM to 12:00 AM the next day. Since data is time stamped at the end of the logging interval, this is done to ensure the data reported is for the data within the day, month, or otherwise, included by the report period.

- Hourly reports - the report period starts at the top of the hour and goes to the last second, for example, from 8:00:00 to 8:59:59. Then the next hourly report would be from 9:00:00 to 9:59:59.
- Multi-Hour reports - the report period starts at the top of the hour and ends at NN:59:59, where N is the number of hours selected in the Hours field, minus 1. For example, if you select 6 Hours, a report starting at midnight will go from 12:00:00 AM to 5:59:59 AM; the next Multi-Hour

report will go from 6:00:00 AM to 11:59:59 AM; the third for 12:00:00 PM to 5:59:59 PM, etc. You can select between 2 and 23 hours for the Multi-Hour report.

- Daily - the report period starts at the hour you select and goes for 24 hours. For example, if you choose to start the report at 6 AM, the daily report will begin at 6 A.M and go until 6 A.M the following day.
- Weekly - the report period starts on Sunday at the hour you set and goes until that same time a week later; e.g., Sunday at 5 AM until the next Sunday at 5 AM.
- Monthly - the report period starts at the hour you set on the selected day of the month (1 to 28) and goes until the hour you set a month later; e.g., from March 4 at 12 PM to April 4 at 12 PM).
- Hours - the number of hours to be included in a Multi-Hour report.
- Date the next report period starts. This is determined by the current date and type of report; e.g., Weekly reports start on Sunday, while an Hourly report would start on the current day.
- Time the next report period starts - This setting was discussed earlier, in relation to the Report Frequency. Note that normally reports will start to be generated automatically at the time set, after the report has been configured. If you want to generate reports starting at an earlier date, (or generate new reports for old data), set this field to when the report generation should start. All possible reports from that date will be generated.
- Report Template name - the default is the meter name followed by the type of report, i.e., Hourly, Daily, Weekly, or Monthly. You can change this name if you wish, but you should select the Report Frequency first so that your chosen name is not overwritten.

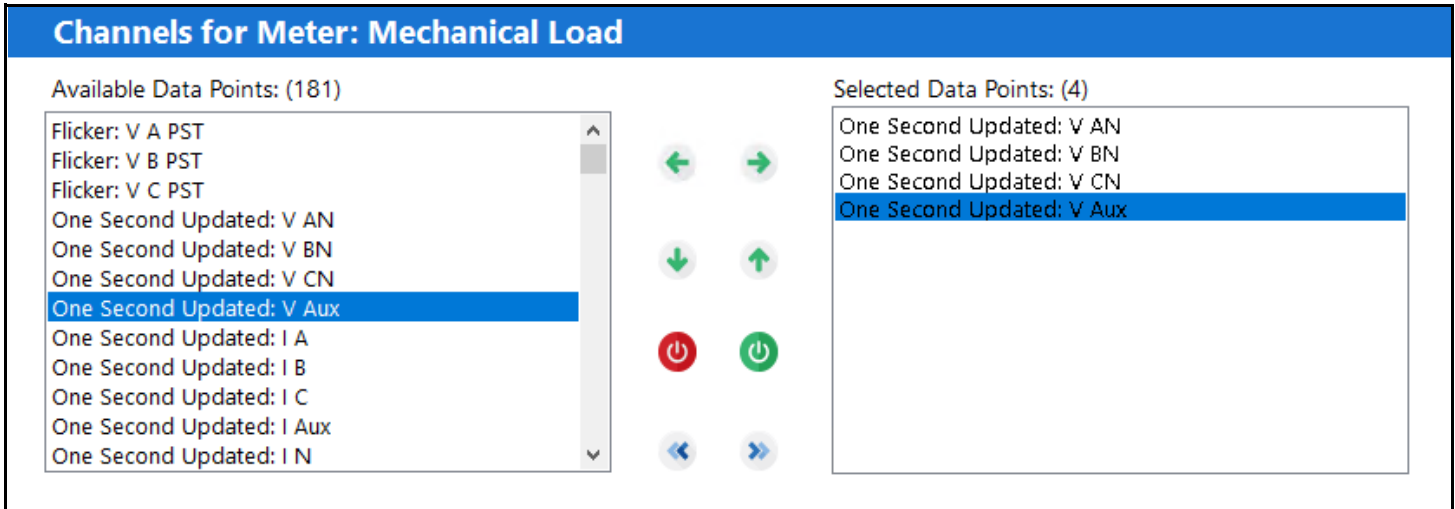
Exported Report File Name and Path: (Period start time stamp is added on export)

C:\Users\Public\Documents\Electro Industries\Communicator\_Ext\Retrieved Logs\Report Exporter\Mechanical Load\_Monthly\_Rep



- Format for the exported report file - the choices are Excel file (\*.xlsx), or CSV file (\*.csv). What you choose depends on how you want to use the data, for example, if you will be using Microsoft® Excel or Open Office applications, choose .xlsx, if you are using another application, choose .csv, since .csv files are compatible with multiple applications.
- Date the next report period ends - this field is display only and is determined by the report frequency setting and report starting time. For example if the report frequency is daily, and the starting time is 6 AM, the date the next period ends is 6 AM of the of the next day. This lets you determine what data the next report generated will contain, given the configured settings and the data stored in the meters' logs.
- Report Heading - this heading displays on the first line of the report. The default is the same as the default report template name, but you can enter another heading if you wish. You should select the Report Frequency first, so that your chosen heading is not overwritten.
- Scheduling - this field lets you set up how reports with missing data are handled. Select from the pull-down menu:
  - None (the default) - nothing different occurs.
  - Time - a time selection field opens and a screen message says that reports without data won't be generated until the time you enter.
  - Missing Days - an Allowed Missing Days field opens and a screen message says that reports without data will be generated after the number of days you select.
- Exported report file name and path - the default path is shown. Click on the [...] button to choose another name and/or location if you wish. You should select the Report Frequency before changing the file name, so that your chosen name is not overwritten. When the file is exported a time stamp is added at the end of the file name. The time stamp is formatted YYYYMMDDHHMM (Year, Month, Day, Hour (0 - 23), Minute).

- The bottom of the screen displays the available data points from the historical file (for a group report template, only the data points shared by all of the meters are displayed).



- To include a data point in the report, click on it in the left column and click the right arrow. (To remove a data point from the report, click on it in the right column and click the left arrow.)

**NOTE:** There is a maximum of 256 channels across all meters, per report.

- You can add a computed channel in this way: To include a data point that will be calculated across a time frame, click on the data point in the left column and click on the round, green button on the right. (To remove that data point, click on the data point in the right column and then click on the round, red button on the left.)

**NOTES:**

- The data point you selected will be copied to the column on the right, with "Computed\_XX" next to its name XX.
- Any computed data points are displayed in green in the column on the right, to distinguish them easily from "regular" data points.
- The data point you selected will still be listed in the column on the left and can be selected, so that you can have a data point and also a computation for that data point in the report.

- Once the data point for the computed channel is listed in the right column, right-click on it and select "Define Computed Settings for [the data point name]."

Computed Channel Settings

Name

Cell Calculations

Operation

Value

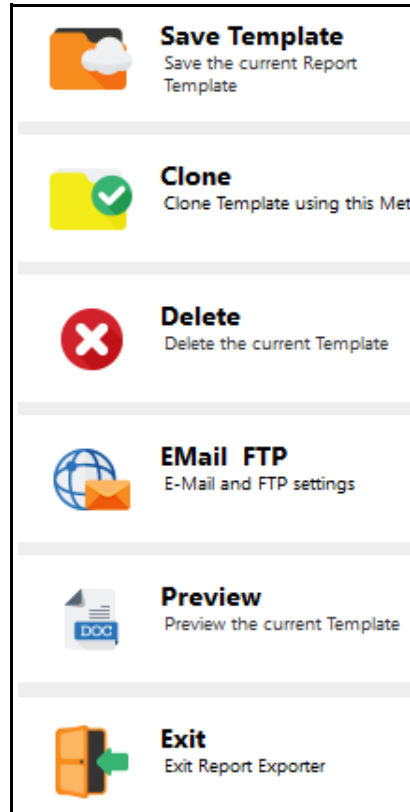
Compute Intervals

Formula

Interval

- You can compute the channel data by either a value or over an interval of time.
- To compute the channel data by a value: under cell calculations, select Multiply or Divide for Operation and enter a number in Value; e.g., Multiply and 2 to multiply the channel data by 2.
- To compute the channel data over an interval of time: select the computation Formula: SUM, AVG, MAX, or MIN; select the computation Interval: 15 (minutes), 30 (minutes), 60 (minutes), or Daily.
- Click OK. (See [18.6.2: Report Preview Feature, on page 18-81](#) for an example of a report using computed channels.)
- To move a data point higher or lower in the list, use the up/down arrows.
- To move all of the data points from one column to the other, use the double arrow symbols.

- The right side of the screen contains the Report Exporter commands:



- **Save Template**- click to save the template - the name will be displayed in the Saved Templates field at the top of the screen.
- **Clone** - click to make a copy of this report template with a new name. This allows you to easily create multiple reports for the meter or group.
- **Delete** - click to delete the currently selected template - you will see a confirmation message window - click Yes to delete or No/Cancel to not delete.
- **Exit** - click to close the Report Exporter screen once you have finished setting up and saving the report template.
- The other options: Email/FTP Server and Preview, are explained in the following sections.

### 18.6.1: Email/FTP Feature

Once automatic reports are generated, it is important to get the reports to the appropriate people, as they are needed. Use the Email/FTP feature to send all of the reports generated by the Report Exporter software to an email or file location on a regular schedule. This fully automates the process of getting reports to the proper person or entity, so they can make informed energy management and business decisions.

1. Click Email FTP from the right side of the screen.

2. To set up report email:

- In the User Email Settings section:
  - a. Click the Enable Email Notification checkbox.
  - b. To send the report as an email attachment, click the Attach Report to Email checkbox.
  - c. Enter the person sending the email's name in the Email User Name field.
  - d. Enter the email password in the Email User Password field. The password will be stored in an encrypted method, for security.
  - e. Enter the person sending the email's email address in the Email From field.

- f. Enter the person receiving the email's email address in the Email To field; multiple recipients can be configured by separating the addresses with semi-colon, as shown in the example above.
- In the Host Email Settings section:
  - a. Enter the Email Host Server Fully Qualified Domain Name (FQDN) or IP Address name in the Email Host field.  
**NOTE:** If you are using Gmail as your host server, there are additional considerations. See [For Users of Gmail, on page 18-71](#).
  - b. Select the Email port number from the pull-down menu. Most email servers use Port 25 for SMTP (Simple Mail Transfer Protocol).
  - c. Select the number of retries for the email from the pull-down menu.
  - d. Select the retry timeout (in milliseconds) from the pull-down menu.
  - e. If the Email Server requires SSL security, click the checkbox next to the option.
  - f. Click OK to save your changes or continue to the FTP instructions.
- Note that you can send a test email to confirm that the setup is working:
  - a. Click Test E-Mail.
  - b. Any messages related to the test email will be shown in the Test E-Mail Results box.
- 3. An FTP server provides a centralized network file storage location. Setting up an FTP server for makes it easy for multiple users to access the reports over an internal company network or an Internet-facing FTP server. For security reasons, we recommend that you don't use an anonymous public FTP server. Access to an FTP Server and the proper credentials (i.e., username and password) for file upload and download are required to use this feature. The default FTP Port is Port 21. Please consult your IT department for the correct port and access credentials for your FTP server.



- To set up an FTP server (IMPORTANT - this is not an SFTP server) for report access, in the FTP settings section:
  - a. Click the Enable FTP checkbox.
  - b. Enter the host name in the FTP Host field.
  - c. Select the FTP port number from the pull-down menu.
  - d. Enter the FTP path in the FTP Folder Path field. Note that this field is case-sensitive and the FTP folder name must be entered exactly the same as used for the destination FTP server. In addition, don't use a forward slash at the beginning or ending of the path. See the following examples:  
CORRECT PATH: agftp/reports  
INCORRECT PATHS:  
    /agftp/reports  
    agftp/reports/  
    /agftp/reports/
  - e. Enter the log in name in the FTP Login Name field.
  - f. Enter the password for accessing FTP in the FTP Password field. The password will be stored in an encrypted method, for security.
  - g. Click OK to save your settings.

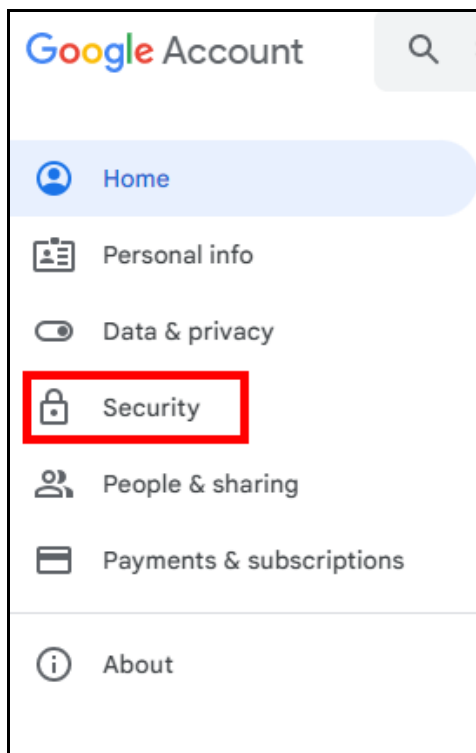
### **For Users of Gmail**

Because of changes made to Gmail functionality, there are additional settings needed to use a Gmail account as the Host account in MeterManagerPQA® software.

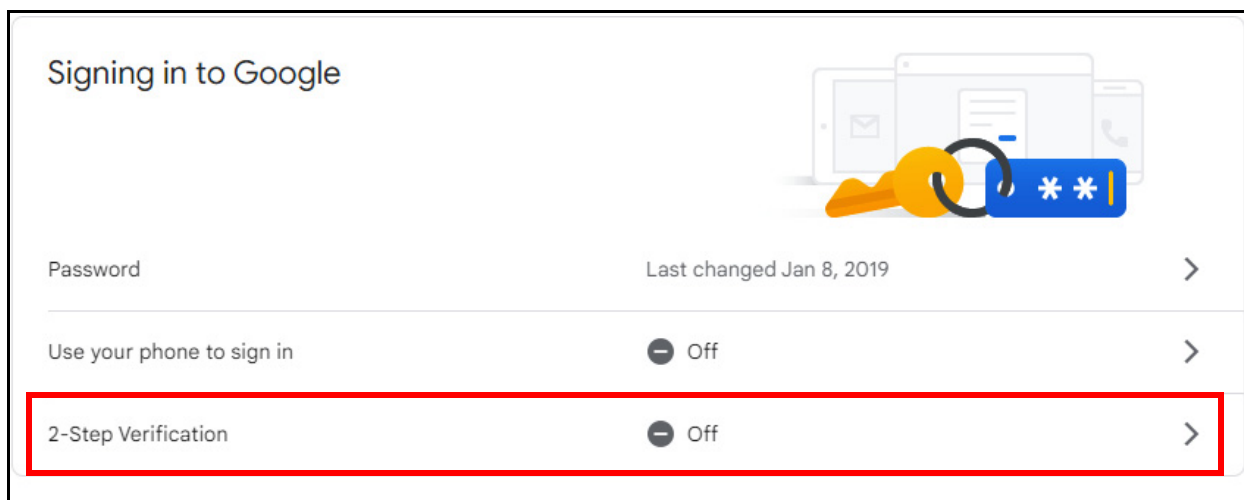
You will need to set up an app password to use google authentication. Follow these steps:

1. Log in to your google account by entering <https://myaccount.google.com/> in your browser.

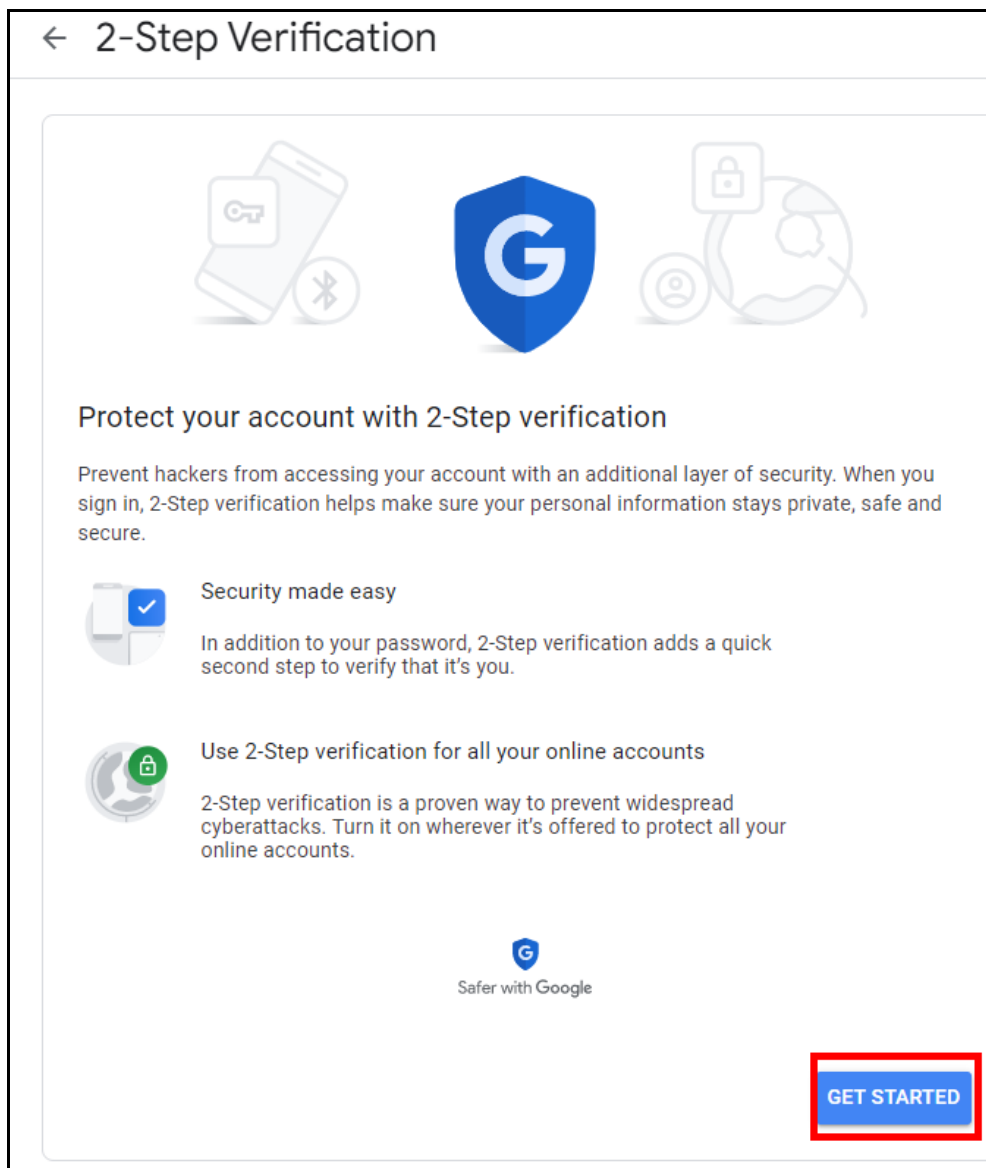
2. Click Security.



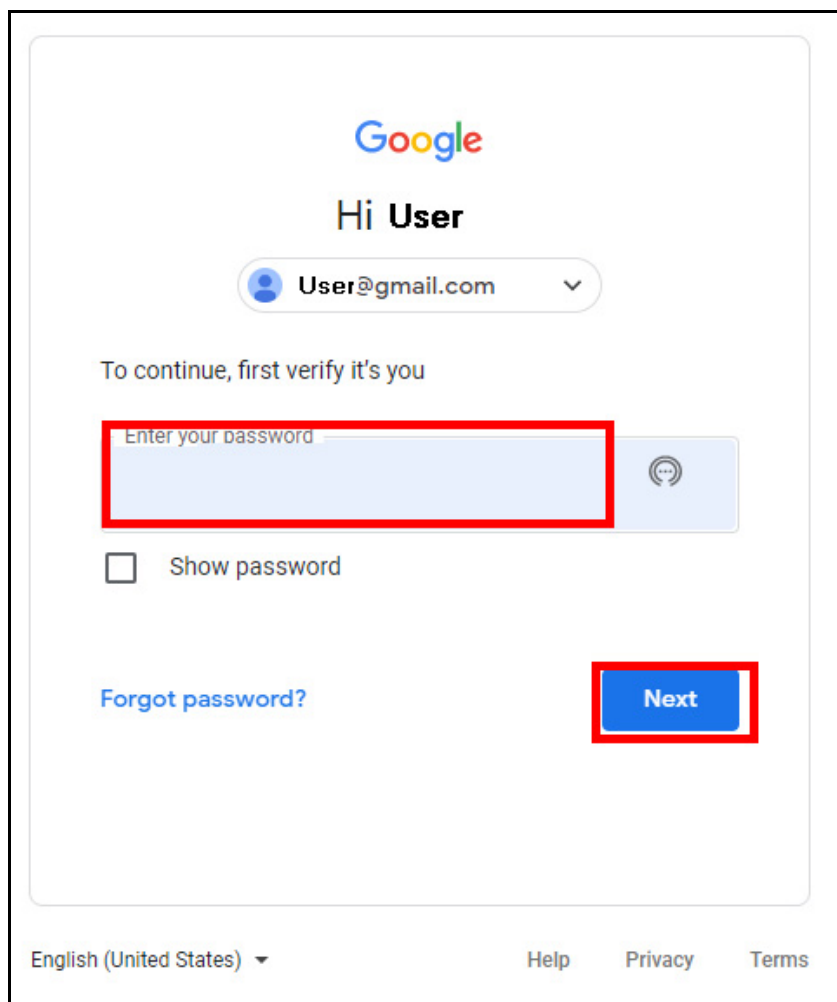
3. Scroll to the section shown below. If you haven't yet set up 2-factor authentication for your google account, click on 2-Step Verification. If you have set it up already, proceed to step 10.



4. Click Get Started.

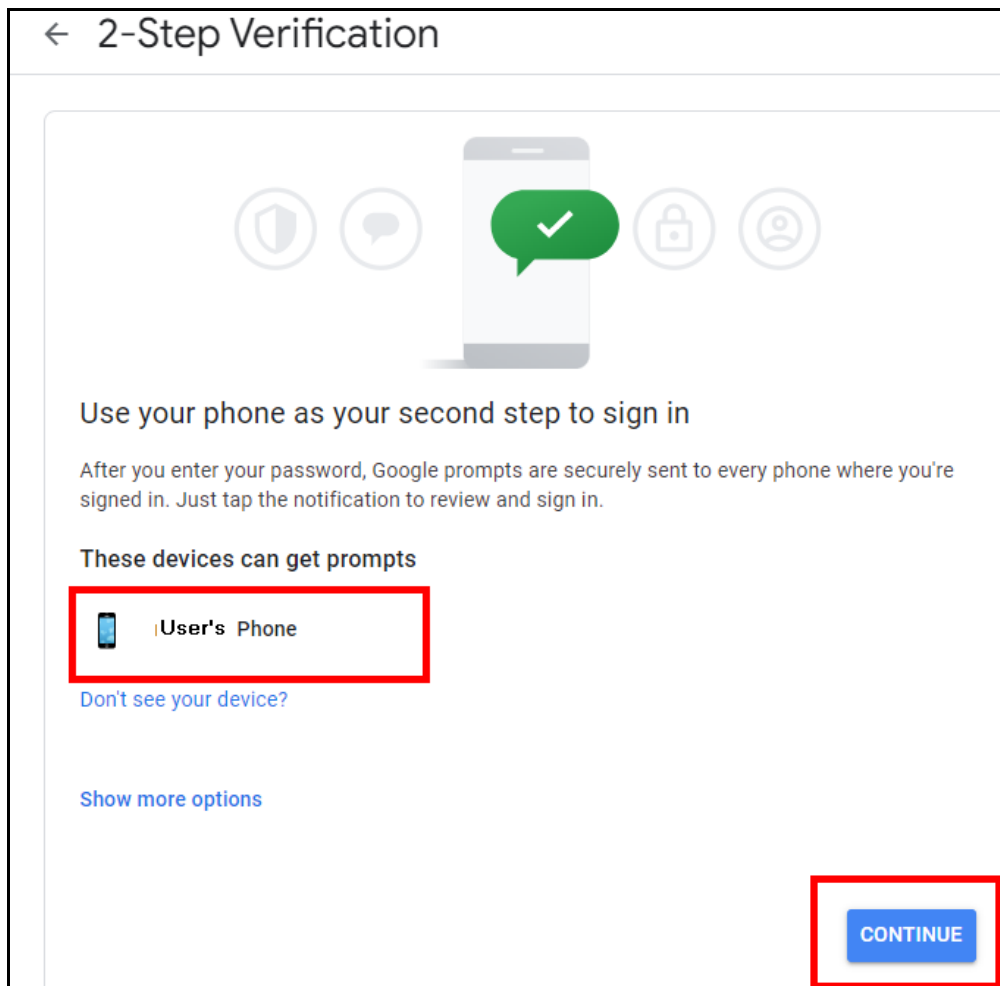


5. You will be prompted to enter your google password again. Then click Next.



The image shows a Google login verification screen. At the top is the Google logo, followed by "Hi User". Below this is a dropdown menu showing "User@gmail.com" with a downward arrow. The text "To continue, first verify it's you" is displayed. A password input field is highlighted with a red border, containing the placeholder text "Enter your password". To the right of the input field is a small icon of a person's head. Below the input field is a checkbox labeled "Show password". At the bottom left is a link "Forgot password?". At the bottom right is a blue button labeled "Next", which is also highlighted with a red border. At the very bottom, there is a language selector "English (United States)" with a dropdown arrow, and links for "Help", "Privacy", and "Terms".

6. Select the phone you want to receive the verification code and click Continue.



7. Enter a backup phone number, select to receive Text or a phone call, and click Send.

← 2-Step Verification

Almost there! Add a backup option

If you lose your phone or your second step is unavailable, you'll need a backup option to help you get in to your account.

Google will only use this number for account security.  
Don't use a Google Voice number.  
Message and data rates may apply.


How do you want to get codes?

Text message

Phone call

USE ANOTHER BACKUP OPTION

SEND


 **Electro Industries**  
GaugeTech

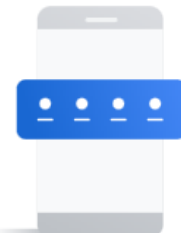
Doc# E107707

18-76

8. Enter the verification code you receive and click Next.

← 2-Step Verification





Confirm that it works

Google just sent a text message with a verification code to xxx-xxx-xxxx (your selected cell phone)

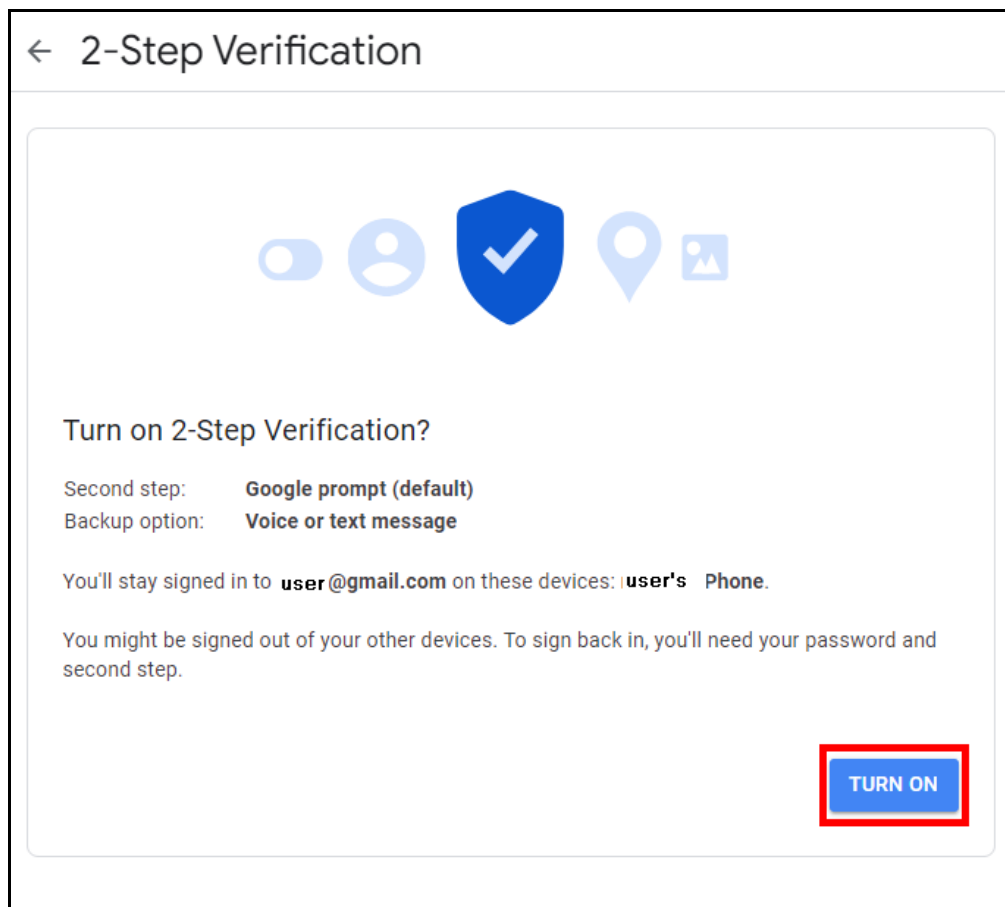
Enter the code

Didn't get it? [Resend](#)

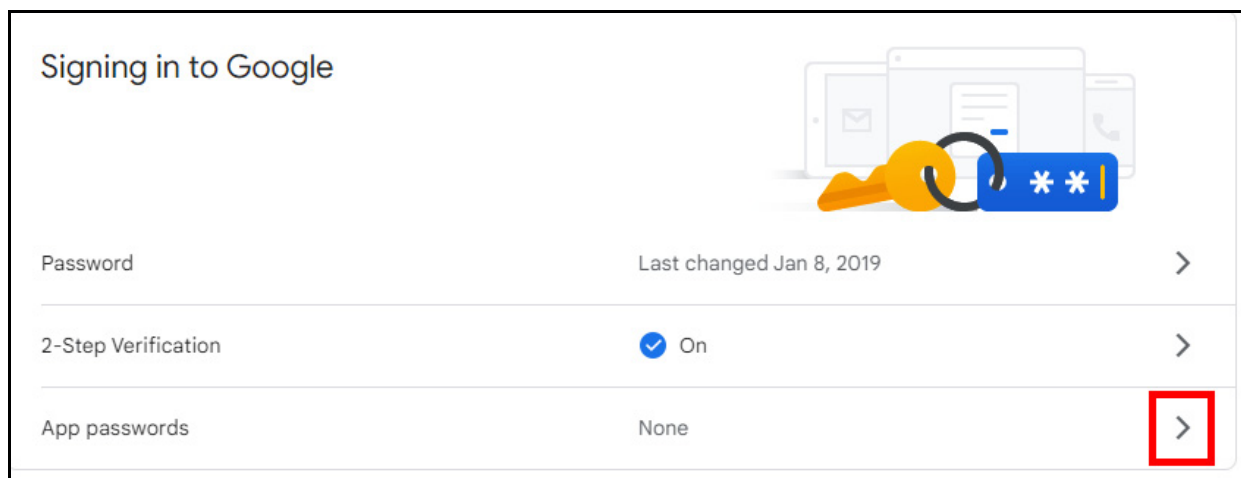
BACK

NEXT

9. Click Turn On to finish setting up 2-factor authentication. Then use the back arrow next to the screen title to return to the Security webpage.



10. Once 2-factor authentication is set up, you will see App Passwords under the two-step authentication setting. Click on the arrow to continue to the next webpage.





11. You will be prompted to sign into your google account, again, and then will see the webpage shown below.

← App passwords

App passwords let you sign in to your Google Account from apps on devices that don't support 2-Step Verification. You'll only need to enter it once so you don't need to remember it. [Learn more](#)

You don't have any app passwords.

Select the app and device you want to generate the app password for.

Select app      Select device ▼

Mail  
Calendar  
Contacts  
YouTube  
Other (Custom name)

GENERATE

12. Select Other from the app pull-down menu and enter a name for this password. You can name it whatever you wish. It will be used to enable the gmail account as your host email account in MeterManagerPQA® software. Then click Generate.

← App passwords

App passwords let you sign in to your Google Account from apps on devices that don't support 2-Step Verification. You'll only need to enter it once so you don't need to remember it. [Learn more](#)

You don't have any app passwords.

Select the app and device you want to generate the app password for.

MeterManagerPQA Email X

GENERATE

13. You will see the webpage shown below.

**Generated app password**

Your app password for your device

**zkao wuvi rlpy xjge**

**How to use it**

Go to the settings for your Google Account in the application or device you are trying to set up. Replace your password with the 16-character password shown above. Just like your normal password, this app password grants complete access to your Google Account. You won't need to remember it, so don't write it down or share it with anyone.

**DONE**

Email: securesally@gmail.com

Password: ••••••••••••••

14. Enter the password in the MeterManagerPQA® software's Email Options setup screen, as shown below.

**Email Reporting Configuration**

**Email Options:**

**Host (Server) Settings:**

Host: smtp.gmail.com

Port: 25

User: user@gmail.com

Password: **zkao wuvi rlpy xjge**

SSL: ☒ Email Server Requires SSL

**Email Addresses:**

From: user@gmail.com

To: user2@gmail.com

**Reporting:**

☐ Enable Email reporting of script errors

☐ Enable Email reporting when meter is offline for a period

☐ Enable Email reporting when meters go offline

☒ Enable Email on time synchronization

☐ Enable Email reporting when there's new software update

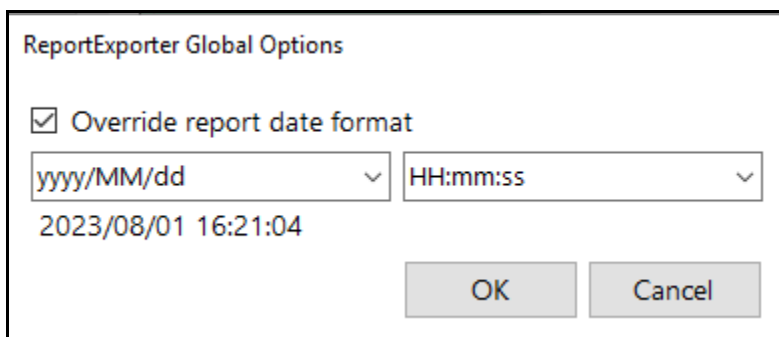
**Test** **Cancel** **Save**

### 18.6.2: Report Preview Feature

Use the Report Preview feature to: see what the report will look like before it is generated; add mathematical formulas to manipulate the data as needed, for example to get a total of energy use for a day; save the report to a file; copy the report data; generate a one-time, manual report.

**NOTE:** Report Exporter uses the PC's default system time format to display the time stamps in the report. If you need to override this setting, for example, if you are using a report internationally, you can customize your Report Exporter's date time format. Follow these instructions:

1. From the Meter Manager Monitor, click >Configure>Report Exporter Options.



ReportExporter Global Options

☒ Override report date format

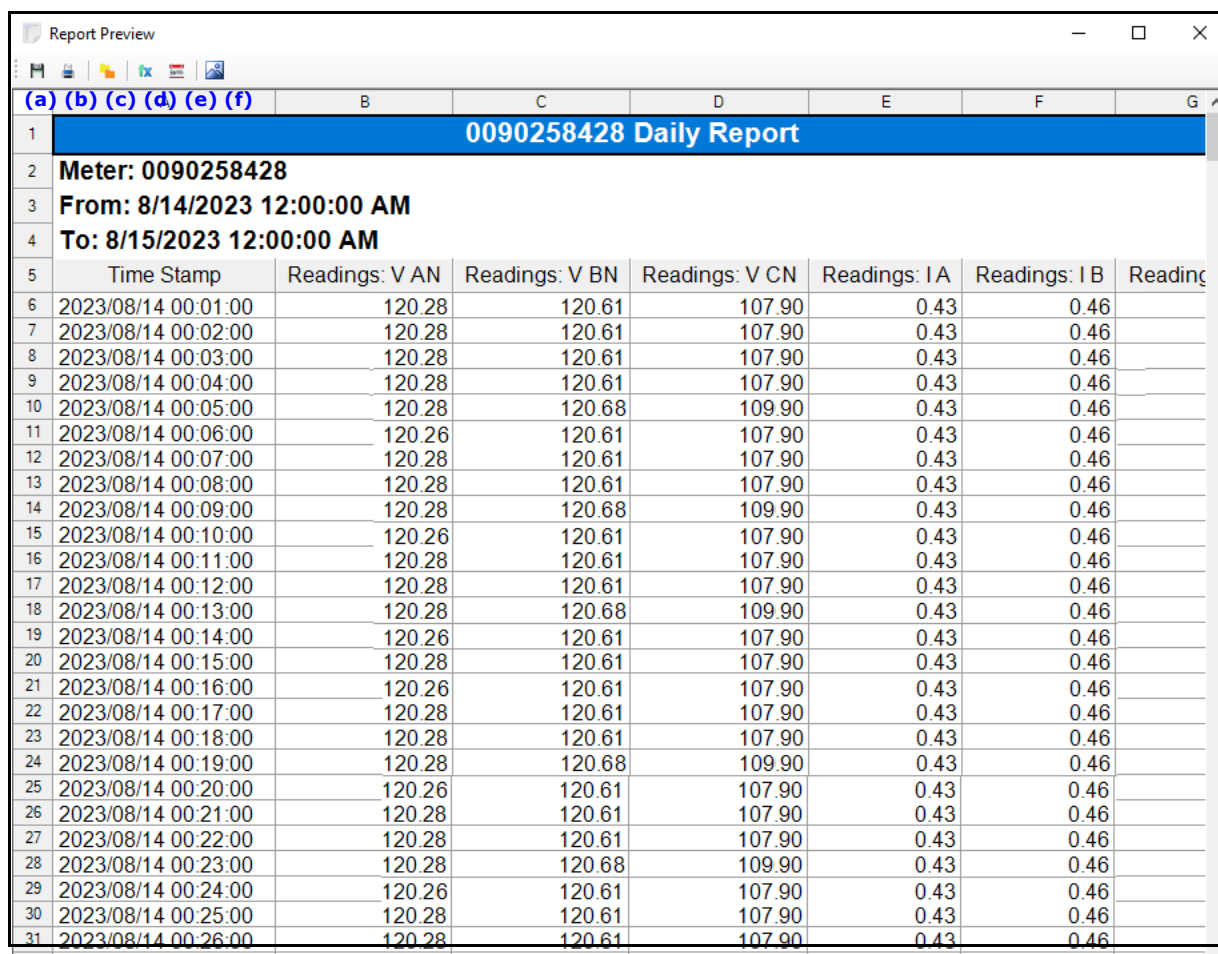
yyyy/MM/dd HH:mm:ss

2023/08/01 16:21:04

OK Cancel

2. Check the box next to Override report date format and choose the date and time format you want to use for the report from the pull-down menus.
3. Click OK.

1. To use the Report Preview feature, click Preview from the right side of the screen to open the Report Preview screen. See the example below.

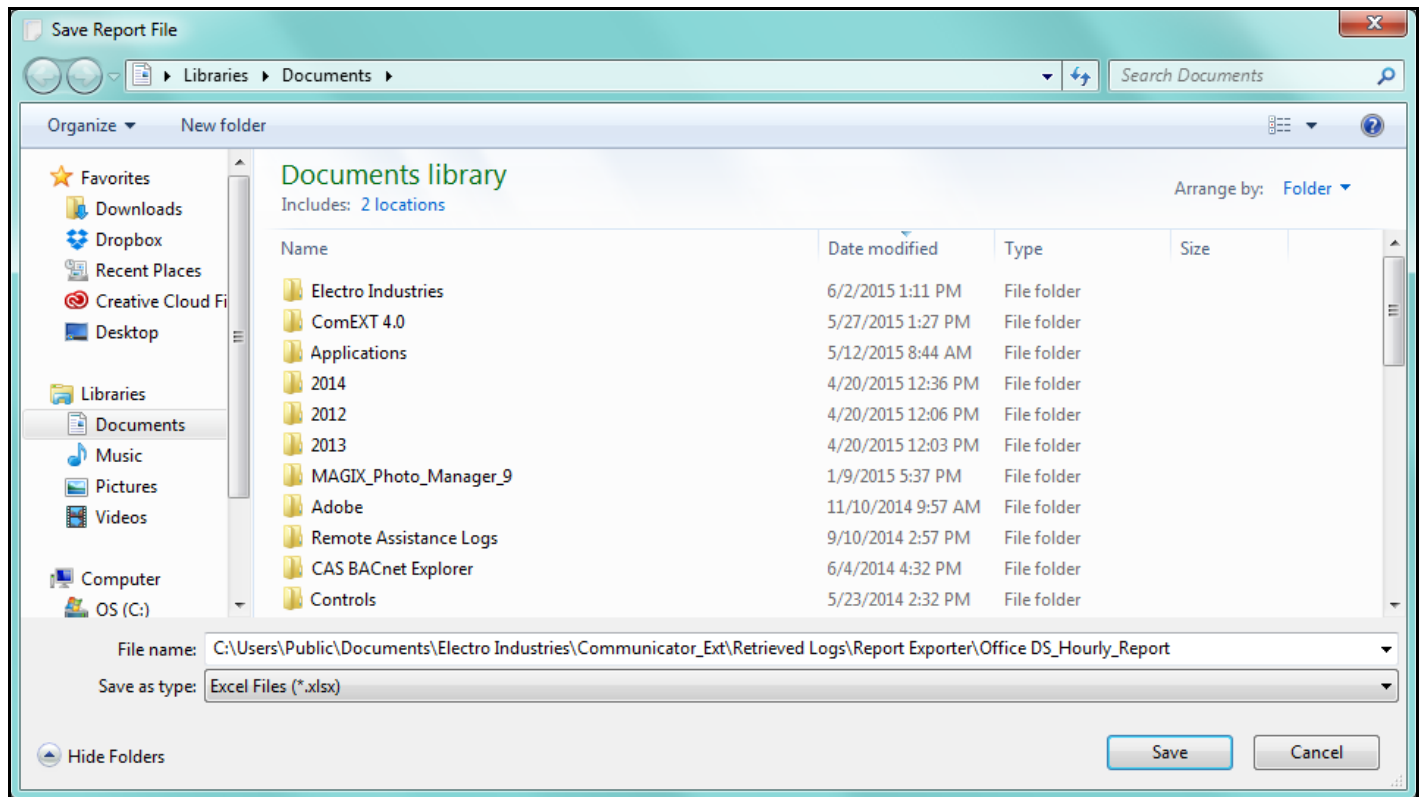


	(a)	(b)	(c)	(d)	(e)	(f)
1	<b>0090258428 Daily Report</b>					
2	<b>Meter: 0090258428</b>					
3	<b>From: 8/14/2023 12:00:00 AM</b>					
4	<b>To: 8/15/2023 12:00:00 AM</b>					
5	Time Stamp	Readings: V AN	Readings: V BN	Readings: V CN	Readings: IA	Readings: IB
6	2023/08/14 00:01:00	120.28	120.61	107.90	0.43	0.46
7	2023/08/14 00:02:00	120.28	120.61	107.90	0.43	0.46
8	2023/08/14 00:03:00	120.28	120.61	107.90	0.43	0.46
9	2023/08/14 00:04:00	120.28	120.61	107.90	0.43	0.46
10	2023/08/14 00:05:00	120.28	120.68	109.90	0.43	0.46
11	2023/08/14 00:06:00	120.26	120.61	107.90	0.43	0.46
12	2023/08/14 00:07:00	120.28	120.61	107.90	0.43	0.46
13	2023/08/14 00:08:00	120.28	120.61	107.90	0.43	0.46
14	2023/08/14 00:09:00	120.28	120.68	109.90	0.43	0.46
15	2023/08/14 00:10:00	120.26	120.61	107.90	0.43	0.46
16	2023/08/14 00:11:00	120.28	120.61	107.90	0.43	0.46
17	2023/08/14 00:12:00	120.28	120.61	107.90	0.43	0.46
18	2023/08/14 00:13:00	120.28	120.68	109.90	0.43	0.46
19	2023/08/14 00:14:00	120.26	120.61	107.90	0.43	0.46
20	2023/08/14 00:15:00	120.28	120.61	107.90	0.43	0.46
21	2023/08/14 00:16:00	120.26	120.61	107.90	0.43	0.46
22	2023/08/14 00:17:00	120.28	120.61	107.90	0.43	0.46
23	2023/08/14 00:18:00	120.28	120.61	107.90	0.43	0.46
24	2023/08/14 00:19:00	120.28	120.68	109.90	0.43	0.46
25	2023/08/14 00:20:00	120.26	120.61	107.90	0.43	0.46
26	2023/08/14 00:21:00	120.28	120.61	107.90	0.43	0.46
27	2023/08/14 00:22:00	120.28	120.61	107.90	0.43	0.46
28	2023/08/14 00:23:00	120.28	120.68	109.90	0.43	0.46
29	2023/08/14 00:24:00	120.26	120.61	107.90	0.43	0.46
30	2023/08/14 00:25:00	120.28	120.61	107.90	0.43	0.46
31	2023/08/14 00:26:00	120.28	120.61	107.90	0.43	0.46

2. The icons at the top of the screen let you save, print, copy selected parts of the report to the clipboard, add formulas to the report, or change the date range of the report to generate a manual report. The options are:

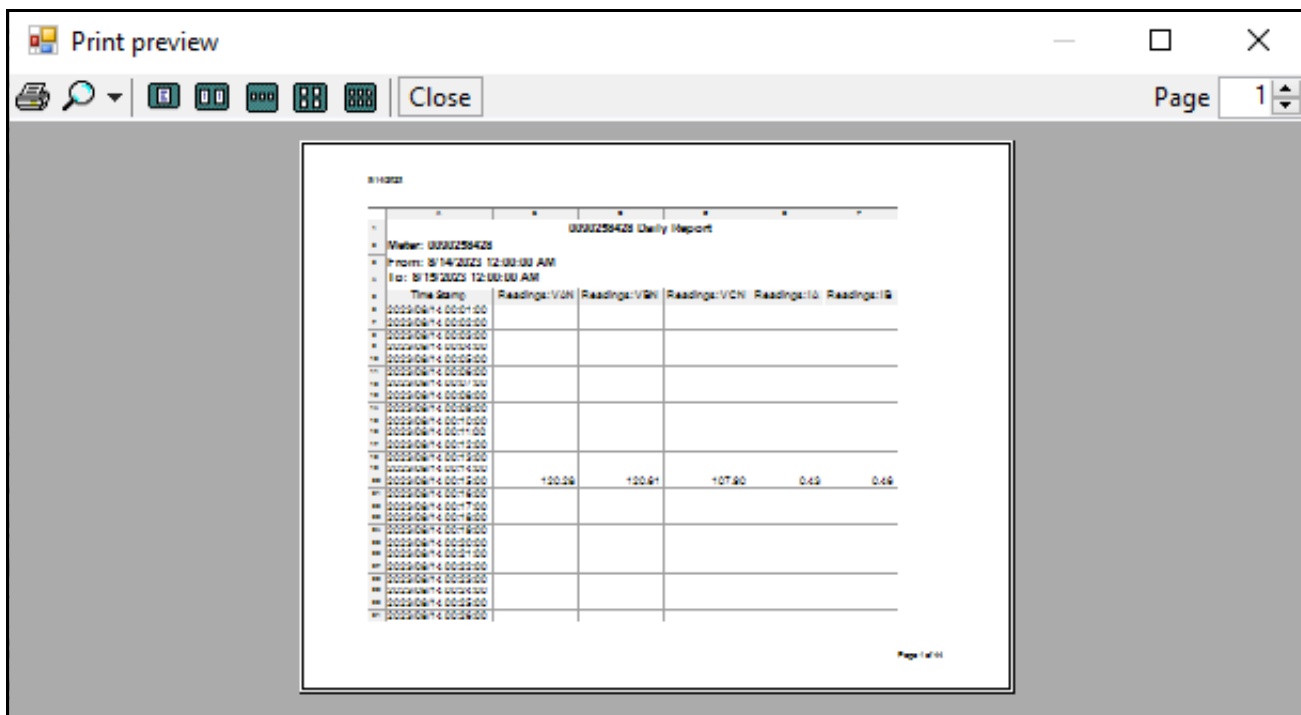
- (a) Export File (save).
- (b) Print Report.
- (c) Copy Selection.
- (d) Formula.
- (e) Report Dates.
- (f)

- Click the Export File icon to save a copy of this report.



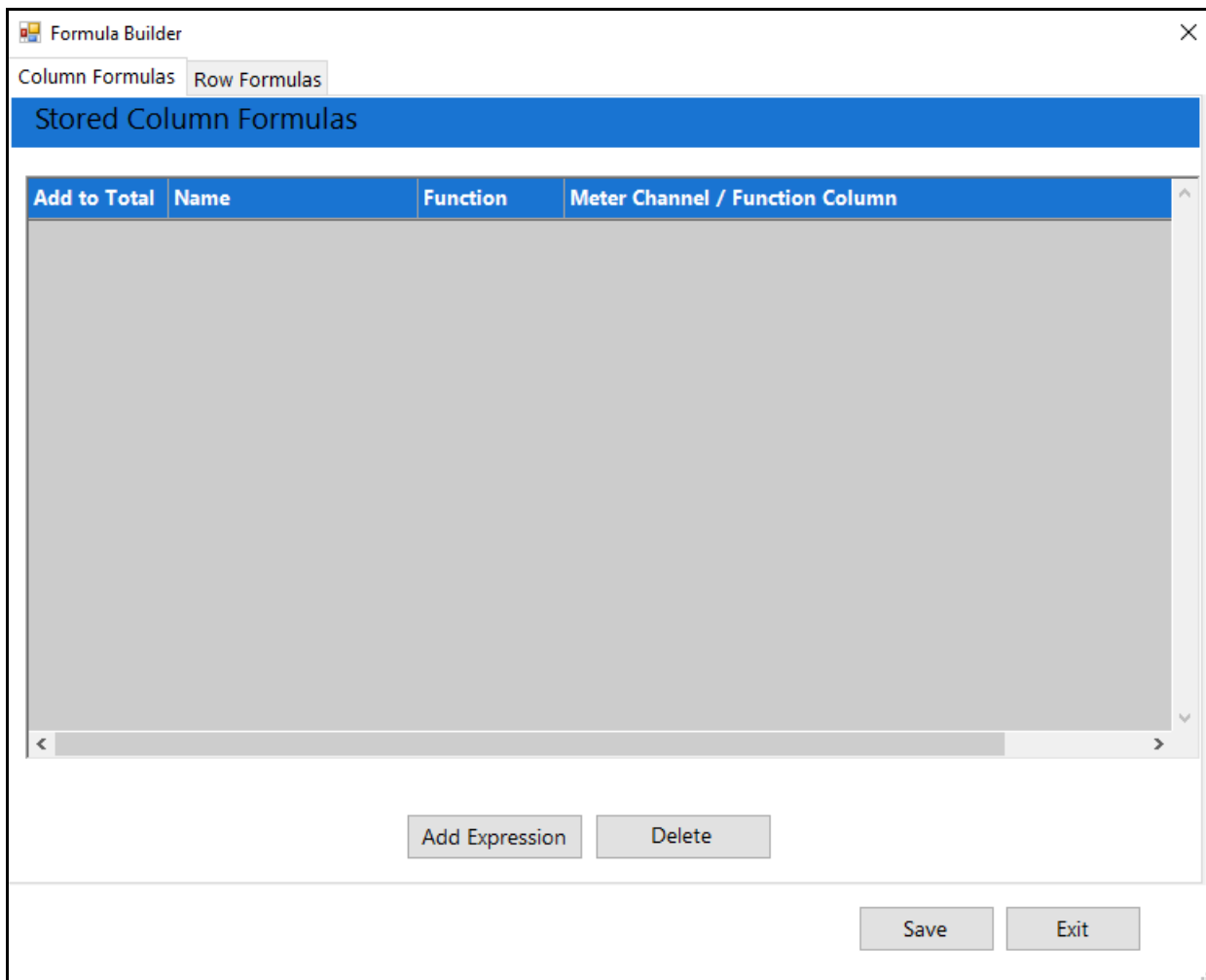
- The path that is shown is the default path for the reports, but you can change that if you wish.
- You can save the file as a .xlsx file or select .csv file type from the pull-down menu.
- Click Save to save the file.

- Click the Print Report icon to open a print preview of the report. See the example below.



- Click the Printer icon from the Print Preview screen to send the report to your default printer.
- Click the Zoom icon to expand the report display.
- Click the other icons to choose how to display the report preview, i.e., from one page to six pages.
- Click the Close button to close this print preview screen.

- To add a formula to the report, click the **fx** icon. You will see the Formula Builder screen, shown below. This screen lets you add formulas to a report template or a manually generated report.



- You can add two types of formulas: a column formula or a row formula, depending on the type of information you want for your report. The tabs at the top of the screen let you select Column Formulas or Row Formulas.
- The column formula takes data in one meter data channel (e.g., Volts A-N) and performs a function (e.g., totaling) on all of the values in the column.

For example, if this is a daily report, and you select the function AVERAGE, all of the hourly values for Volts A-N would be averaged to get the

result, which will be displayed at the bottom of that column in the report.

- The row formula performs mathematical operations (e.g., add) on selected meter data channels (e.g., Volts A-N and Volts B-N) and/or constant values (e.g., 1).
- To add a column formula:
  - a. Click the Column Formula tab (this is the initial tab when the screen opens). Note that if column formulas have already been created, they will be shown on this screen.
  - b. Click the Add Expression button.

The screenshot shows the 'Formula Builder' dialog box with the 'Column Formulas' tab selected. The dialog has a title bar with a close button. Below the tabs, there is a blue header bar labeled 'Build New Formula'. To the right of this bar are three buttons: 'Add' (labeled with a blue '(d)'), 'Clear', and 'Cancel'. Below the header, there are three input fields: 'Name' with a text box (labeled with a blue '(a)'), 'Functions' with a dropdown menu (labeled with a blue '(b)'), and 'Meter Channel' with a dropdown menu (labeled with a blue '(c)'). At the bottom right of the dialog are two buttons: 'Save' and 'Exit'.



c. The screen you see lets you build a new column formula. To create the formula, enter:

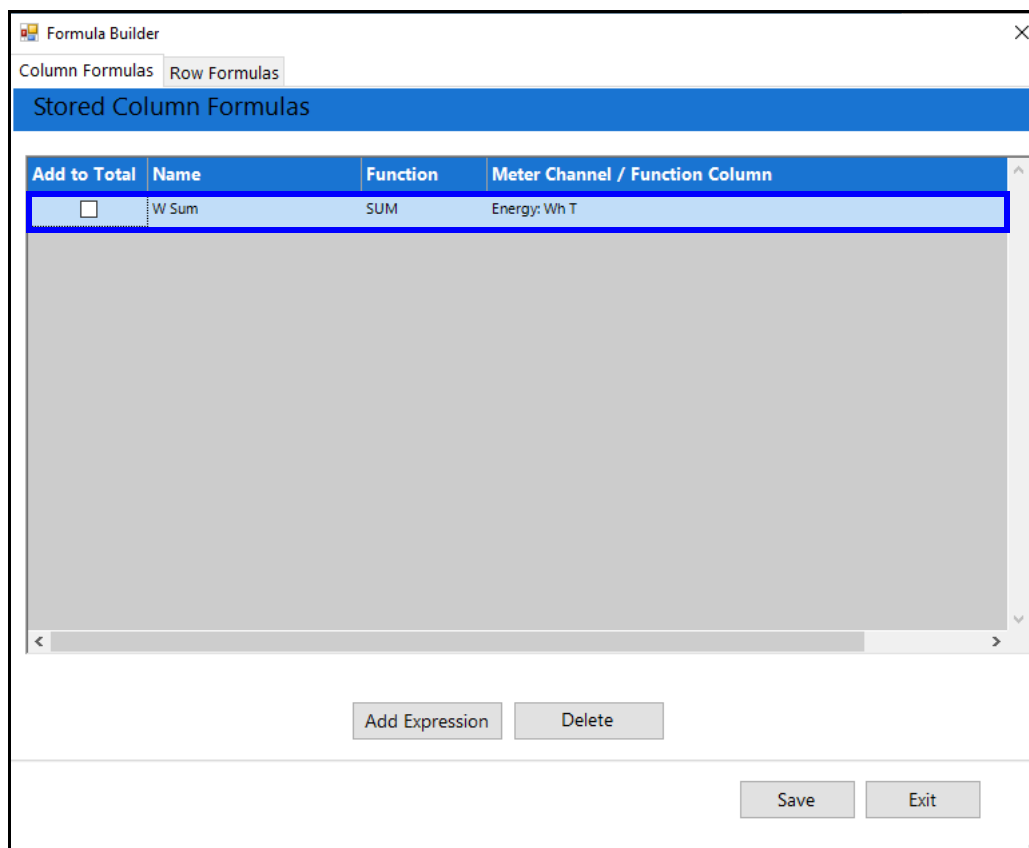
- Name (a): give the formula a name. This name will be used in the report.
- Function (b): select from the pull-down menu. The available functions for a Column formula are:
  - SUM: total of the values in the column.
  - AVERAGE: average value for the column.
  - MIN(IMUM): smallest value in the column.
  - MAX(IMUM): largest value in the column.
  - STDEV (Standard Deviation): the standard deviation for the data in the column, which is a measure of the amount of variation in the data in the column.
- Meter Channel (c): select the channel to perform the function on. You can create a column formula for as many meter data channels as are available, but you can only use one function per meter data channel; i.e., you cannot add some of the Wh values, and take an average of others.

d. When you have entered your formula, click Add to accept it.

The screenshot shows the 'Formula Builder' dialog box with the 'Row Formulas' tab selected. The 'Build New Formula' section is active. It contains three input fields: 'Name' with the text 'W Sum', 'Functions' with a dropdown menu showing 'SUM', and 'Meter Channel' with a dropdown menu showing 'Energy: Wh T'. To the right of these fields are three buttons: 'Add', 'Clear', and 'Cancel'. At the bottom right of the dialog are two buttons: 'Save' and 'Exit'.

- Click Clear if you want to remove the entries you have made.
- Click Cancel if you want to return to the Stored Column Formulas screen without saving anything entered in the Build New Formula screen.

- You will see the Stored Column Formulas screen, showing your new formula.



- Click the Add to Total box next to any formula whose result you want to add to a Columns total. See the example below.

8/1/2016 10:00:00 PM	125.32	218.93	125.19	39.74	0.99	50.60	9,247.70
8/1/2016 10:15:00 PM	125.56	219.43	125.43	39.46	0.99	49.89	9,152.14
8/1/2016 10:30:00 PM	123.29	214.54	123.17	40.22	0.94	51.06	9,238.54
8/1/2016 10:45:00 PM	123.87	215.75	123.75	40.45	0.95	50.66	9,272.90
8/1/2016 11:00:00 PM	124.12	215.93	124.01	40.54	0.96	50.14	9,265.50
8/1/2016 11:15:00 PM	124.26	216.22	124.11	40.53	0.96	53.61	9,792.30
8/1/2016 11:30:00 PM	123.91	215.31	123.77	41.38	0.95	53.37	9,742.37
8/1/2016 11:45:00 PM	123.84	215.42	123.73	41.48	0.95	51.31	9,433.83
Column Total 77,218,770.33	Total of Result Columns				Result of Column Formula	W Sum 77,218,770.33	
8/2023 12:00:00 AM To 8/1/2023 11:59:59 PM   2984 Rows   25 Columns   Add Pos and Neg VARhr							

Note that the above fields are the same value because there is only one column formula in this report example.

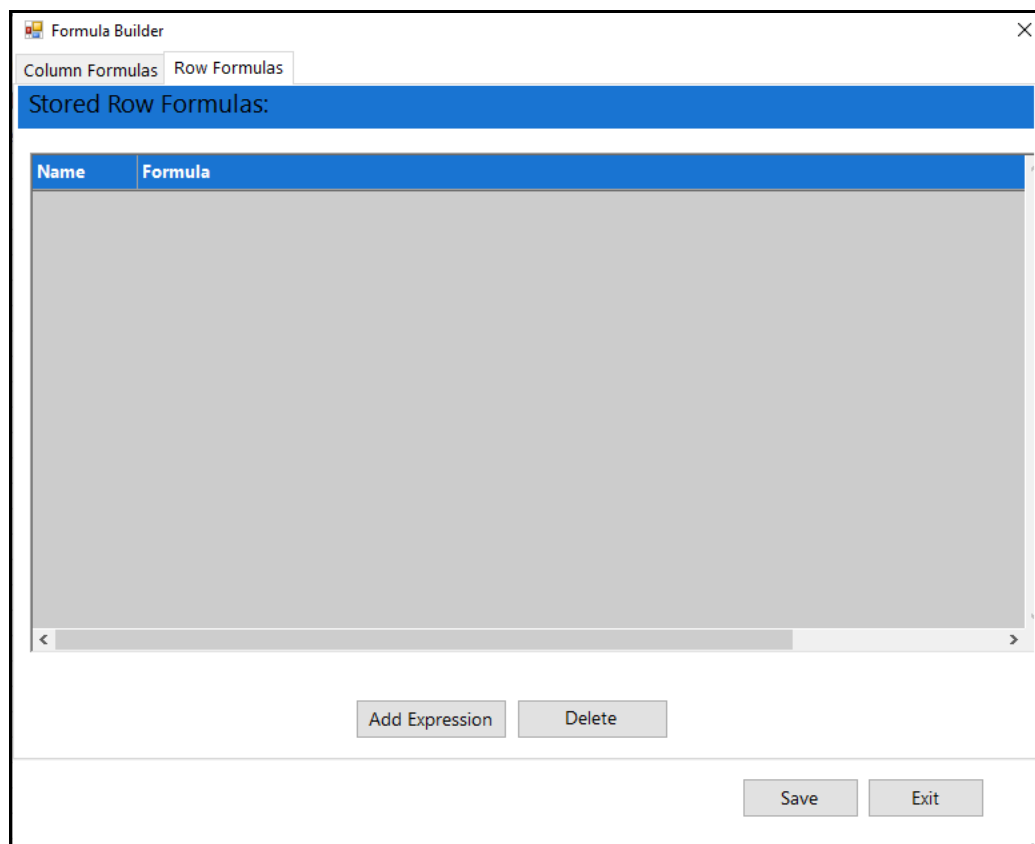
- If you want to delete a formula, highlight it in the list and click Delete.

e. Repeat steps b-e to add additional column formulas.

f. If you want to add a Row Formula, continue to the next section.  
Otherwise, click Save to save the column formula(s) and see the Preview screen with the new fields displayed.

- To add a row formula:

a. Click the Row Formula tab.



b. Click the Add Expression button.

Formula Builder

Column Formulas Row Formulas

Build New Formula:

Name (a) (e) Add Clear Cancel

Type (b) Meter Channel, Function Column or Constant (c)

(d)

Save Exit

c. With a row formula, you can perform multiple operations; for example, you can add two columns of meter data channels, add a constant value, and then subtract a third column of a meter data channel. The formula is applied across each data row of the selected columns in the report and the result is displayed in the rightmost columns in the report. To create the formula, enter:

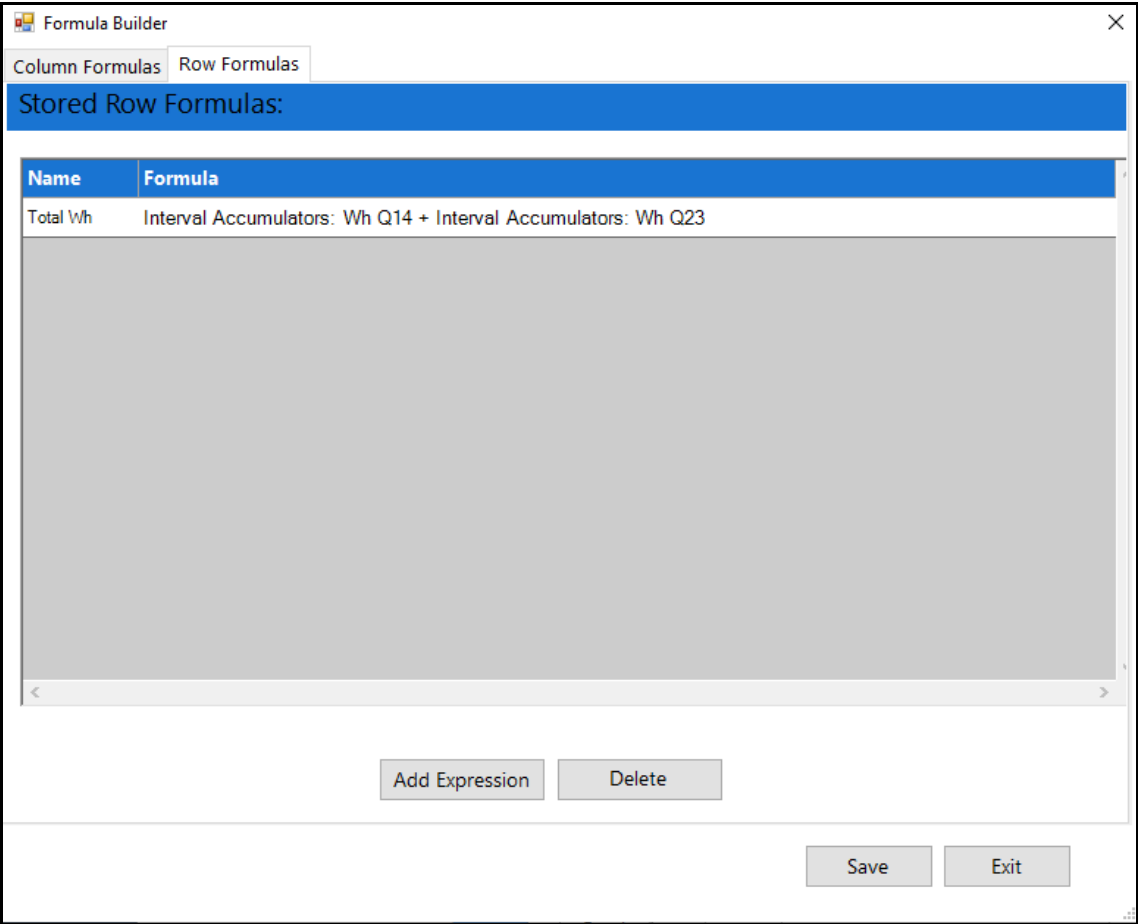
- Name (a): give the formula a name. This name will be used in the report, for the new column.
- Type (b): click in this field and select Column or Constant from the pull-down menu.
- Meter Channel or Constant (c): depending on your type entry, either enter the constant you want to use or click in the field to select the column you want to use for the formula, from the pull-down menu.

- Operator (d): use the scroll bar to display this field and select the operator you want to use, from the pull-down menu. The operations available for a row formula are:
  - "+": addition.
  - "-": subtraction.
  - "\*": multiplication.
  - "/": division.
- d. Repeat selecting Type, Meter Channel or Constant value, and Operator until you have built the formula you want. Note that you cannot end a formula with an operator - the last line of the formula must have the Operator field blank.
- e. When you have finished entering the formula, click Add (e) to accept it. You will see the Stored Row Formulas screen with your new row formula listed.
  - Click Clear if you want to remove the entries you have made.
  - Click Cancel if you want to return to the Stored Row Formula screen without saving anything entered in the Build New Formula screen.
- f. When you have finished adding Row formulas, click Save to save all the column and row formulas you entered. The formula calculations will be performed and displayed in the report preview screen.

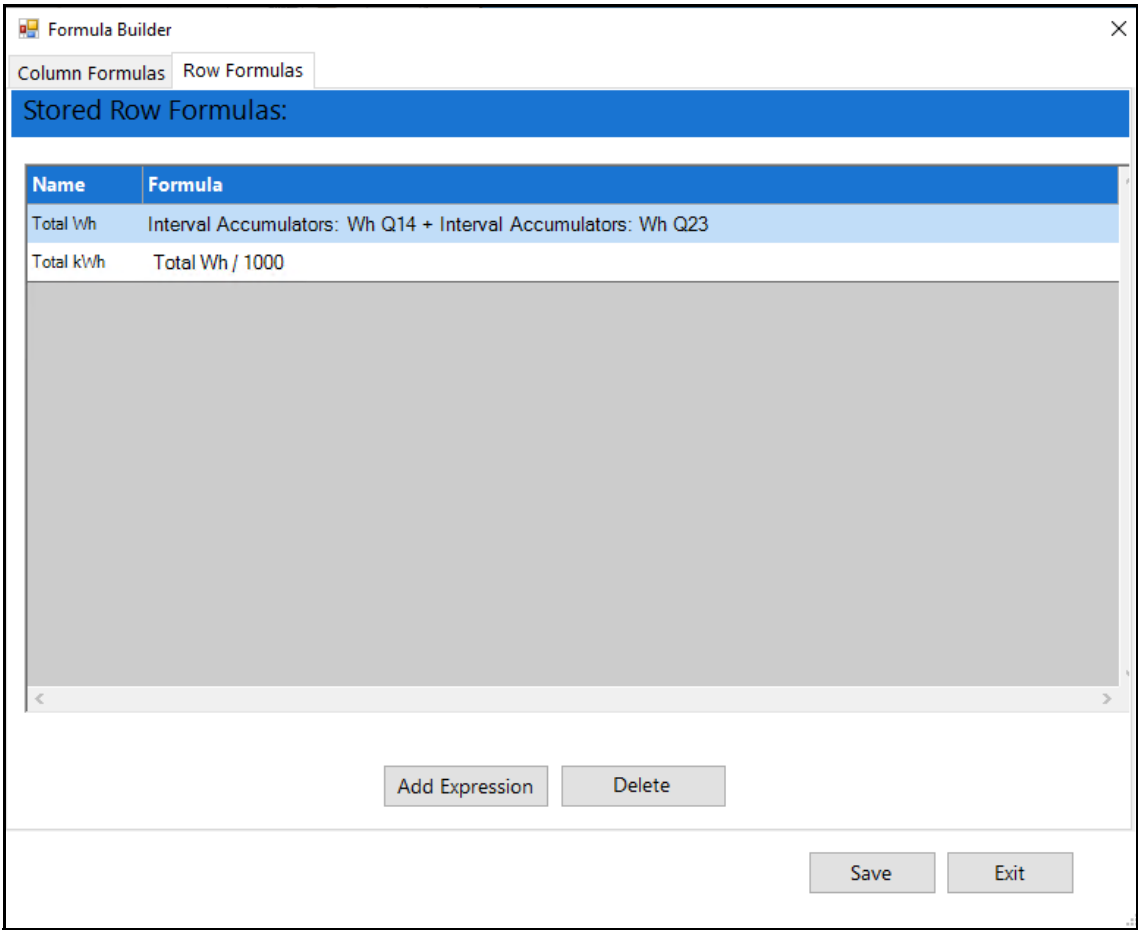
Note that the ability to save the report in a variety of formats allows you to perform additional calculations using the report data. For example, saving the report as an .xlsx file lets you add additional mathematical functions.

Also, after a row formula has been added, the column that is generated with the calculation becomes a new column that can be used in another row formula.

For example, the “Total Wh” row formula is set up to add the Interval Accumulators Wh Q1+4 and Wh Q 2+3.



Then another row formula - "Total kWh," is added to calculate the total kWh using the Total Wh column divided by 1000.



The example of the Report Preview screen is shown on the next page. The new row formulas are shown in the two rightmost columns.



Report Preview					
0220696833 Monthly Report					
Meter: 0220696833					
From: 8/1/2023 12:00:00 AM					
To: 9/1/2023 12:00:00 AM					
CN	Interval Accumulators: Wh Q14	Interval Accumulators: Wh Q23	Total Wh	Total kWh	
.46	183,248,137,565.16	46,841,374,751.77	230,089,512,316.92	230,089,512.32	
.04	183,248,137,565.16	46,841,376,708.46	230,089,514,273.61	230,089,514.27	
.03	183,248,137,565.16	46,841,378,671.22	230,089,516,236.37	230,089,516.24	
.30	183,248,137,565.16	46,841,380,632.41	230,089,518,197.57	230,089,518.20	
.88	183,248,137,565.16	46,841,382,589.87	230,089,520,155.03	230,089,520.16	
.53	183,248,137,565.16	46,841,384,544.33	230,089,522,109.48	230,089,522.11	
.83	183,248,137,565.16	46,841,386,498.94	230,089,524,064.10	230,089,524.06	
.38	183,248,137,565.16	46,841,388,457.63	230,089,526,022.79	230,089,526.02	
.62	183,248,137,565.16	46,841,390,412.43	230,089,527,977.58	230,089,527.98	
.60	183,248,137,565.16	46,841,392,369.64	230,089,529,934.80	230,089,529.93	
.00	183,248,137,565.16	46,841,394,332.68	230,089,531,897.83	230,089,531.90	
.79	183,248,137,565.16	46,841,396,294.04	230,089,533,859.19	230,089,533.86	
.92	183,248,137,565.16	46,841,398,224.90	230,089,535,790.06	230,089,535.79	
.18	183,248,137,565.16	46,841,400,172.60	230,089,537,737.75	230,089,537.74	
.94	183,248,137,565.16	46,841,402,118.47	230,089,539,683.62	230,089,539.68	
.18	183,248,137,565.16	46,841,404,071.89	230,089,541,637.05	230,089,541.64	

- Click the Report Dates icon to set the date range for a manual report.

Report Date Range

Report Date Range:

From:

To:

9/ 1/2023

10/ 1/2023

12:00:00 AM

12:00:00 AM

☒ By Date and Time
 ☐ Last Week

☐ Today
 ☐ Last Week to Now

☐ Yesterday
 ☐ This Month

☐ Yesterday to Now
 ☐ This Month to Now

☐ This Week
 ☐ Last Month

☐ This Week to Now
 ☐ Last Month to Now

OK

Cancel

- You can either use the From and To date and time fields to choose the date range, or you can select one of the options listed on the screen, e.g., Last Week to Now, to select that range for the report.

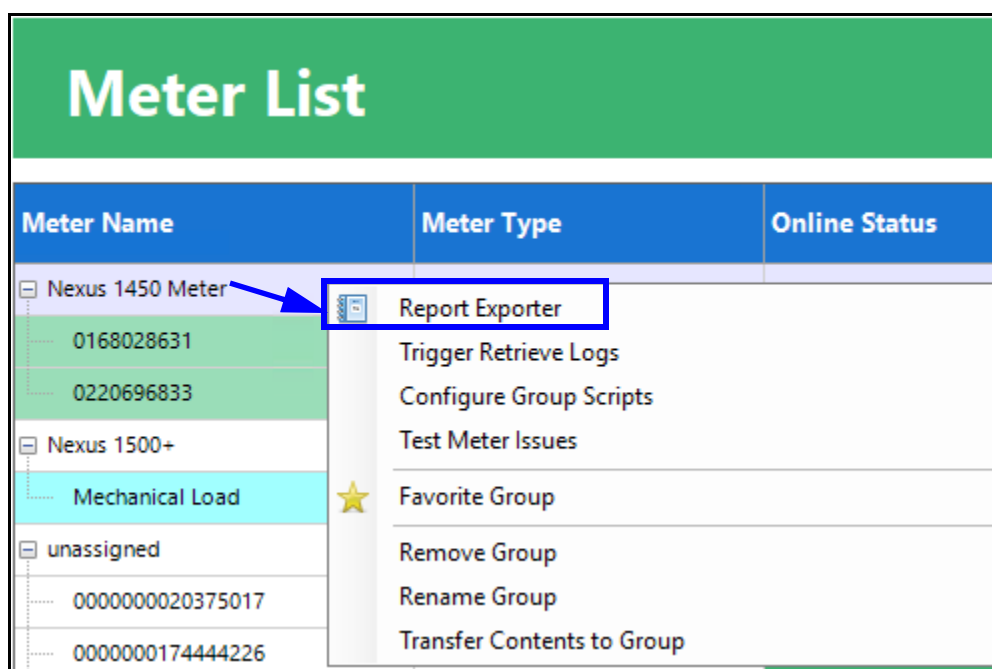
- Click OK to implement your selection. The report will re-process and display the results for the new date range. You can then save the file and/or print the manual report.
3. Click the X in the upper right-hand corner of the screen to close the Report Preview screen.

### 18.6.3: Report Exporter Example

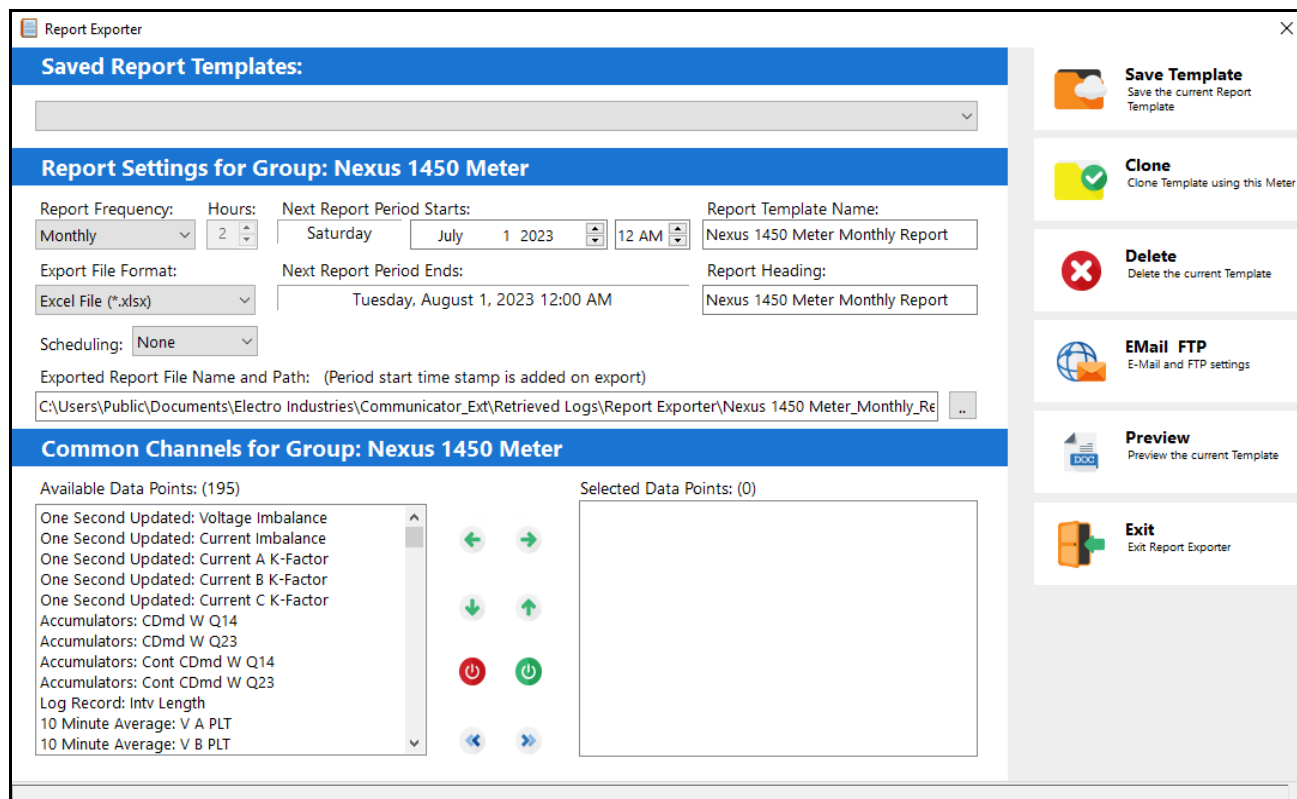
This section gives an example using:

- A meter group containing two meters.
- A Report Exporter script set up for a one hour interval.
- Historical logs retrieved for the meter group.

1. Open the MeterManagerPQA® application.
2. From the Meter List screen, right-click on the meter group you want to create a report for, and select Report Exporter.

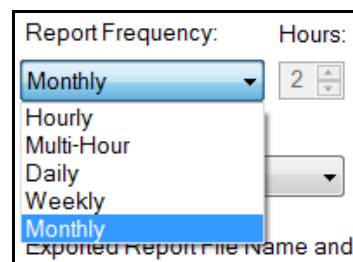


## 3. Report Exporter opens.

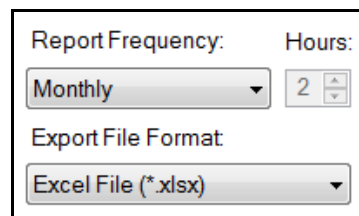


**NOTE:** Common channels are stored measurements that are available for all the meters in the group.

- a. Select report frequency, in this case, Monthly.  
Note that the report Template Name and Heading fields change to reflect your choice.



- b. Select the Export File Format, in this case Excel File (\*.xlsx).



- c. Enter the Report Template Name, which is used for saving the report template, and the Report Heading, which will appear at the top of the report.

Report Template Name:
Nexus 1450 Meter Monthly Report
Report Heading:
Nexus 1450 Meter Monthly Report

- d. The application suggests a starting date and time for the report. You can click on the up/down arrows next to the date and time to change the starting date/time.

Next Report Period Starts:			
Saturday	July	1 2023	12 AM
Next Report Period Ends:			
Tuesday, August 1, 2023 12:00 AM			

The Next Report Period Ends date display only, and is based on the starting date, time, and the report frequency.

Note that you can set the starting date for the initial report period to any date for which there is available data.

- e. Available data points for the report are listed in the bottom, left of the screen. When you select a data point for the report, it is moved to the Selected Data Points list on the right. In this example, "Interval Accumulators: Wh Q1" and "Interval Accumulators: Wh Q4" have been moved to the selected list.

The screenshot shows the 'Report Exporter' application window. The main area is titled 'Report Settings for Group: Nexus 1450 Meter'. It contains several sections:

- Saved Report Templates:** A dropdown menu.
- Report Settings:**
  - Report Frequency: Monthly (dropdown)
  - Hours: 2 (spin box)
  - Next Report Period Starts: Saturday, July 1, 2023, 12 AM (calendar and time picker)
  - Report Template Name: Nexus 1450 Meter Monthly Report (text field)
  - Export File Format: Excel File (\*.xlsx) (dropdown)
  - Next Report Period Ends: Tuesday, August 1, 2023 12:00 AM (calendar and time picker)
  - Report Heading: Nexus 1450 Meter Monthly Report (text field)
  - Scheduling: None (dropdown)
  - Exported Report File Name and Path: (Period start time stamp is added on export)  
C:\Users\Public\Documents\Electro Industries\Communicator\_Ext\Retrieved Logs\Report Exporter\Nexus 1450 Meter\_Monthly\_Re (text field with browse button)
- Common Channels for Group: Nexus 1450 Meter**
  - Available Data Points: (195)**
    - Interval Accumulators: Uncomp VAh Q1234
    - Interval Accumulators: Uncomp Wh Q14
    - Interval Accumulators: Uncomp Wh Q23
    - Interval Accumulators: Uncomp VARh Q12
    - Interval Accumulators: Uncomp VARh Q34
    - Interval Accumulators: Wh Q1
    - Interval Accumulators: Wh Q2
    - Interval Accumulators: Wh Q3
    - Interval Accumulators: Wh Q4** (highlighted)
    - Block / Rolling Average: W Q14
    - Block / Rolling Average: W Q23
    - Block / Rolling Average: VAR Q12
  - Selected Data Points: (2)**
    - Interval Accumulators: Wh Q1
    - Interval Accumulators: Wh Q4** (highlighted)

On the right side of the window, there is a sidebar with several buttons:

- Save Template:** Save the current Report Template
- Clone:** Clone Template using this Meter
- Delete:** Delete the current Template
- Email FTP:** E-Mail and FTP settings
- Preview:** Preview the current Template
- Exit:** Exit Report Exporter

- f. Once the report is generated, it is saved in the folder shown in the Report Exporter screen, in the Exported Report File Name and Path field. You can also set up emailing and/or uploading of the report file to a network FTP server. To do so, click Email FTP on the right side of the screen. See [18.6.1: Email/FTP Feature, on page 18-69](#), for detailed instructions for this screen.
- g. You can use the Report Preview screen to add any formulas to the data. See [18.6.2: Report Preview Feature, on page 18-81](#), for detailed instructions.

### 18.6.4: Report Exporter Troubleshooting

Following is a list of possible Report Exporter messages and steps to resolve any error conditions:

- "Automatic Log Retrieval is Disabled for all Groups. Enable "Automatic Log Retrieval" in "System Options" for automated report generation": since Automatic Log Retrieval is turned off for all meters, you cannot create a report with Report Exporter. To remedy this, click Tools>Configure>System>System Options from the MeterManagerPQA® application screen, un-check the Disable Automatic Log Retrieval checkbox, and click Save.
- "Automatic Log Retrieval is Disabled for the Group: *Group Name*. Enable Automatic Log Retrieval in Configure Group Scripts for automated report generation": since Automatic Log Retrieval is turned off for the selected group of meters, you cannot create a report for that group with Report Exporter. To remedy this, click Configure Group Scripts, select the desired group from the pull-down list at the top of the screen, check the "Retrieve Logs for this group" checkbox, select each log to be retrieved in the list below the checkbox, and click Save.
- "No Historical Log data is available for the Meter: *Meter Name*. Retrieve the *Meter Name* Logs now?": before you can create a report template, there must be historical log data for the selected meter. Click Yes to retrieve the logs from the meter.
- "No Historical log data is available for: Meter: *Meter Name*; Group: *Group Name*. Retrieve "*Meter Name*" logs now?": before a report template can be created to automatically generate reports, there must be historical log data for all of the meters in a meter group. This will be either the meter selected to create a report, or the first meter in a group of meters, for which there is no historical log data. Click Yes to retrieve the logs for that meter.
- "WARNING! Group: *Group Name*; Report: *Report Template Name*. Group configuration has been modified since report creation! Be advised report data may not match meters contained in the group. Edit this Report?": note that a broken report icon This error occurs when the group that the report was originally created for has been modified in some manner since the report template was created. For example, a meter was added to the group, or a channel was removed from one of the

logs. Click Yes to edit the report as needed, and then save the modified report template.

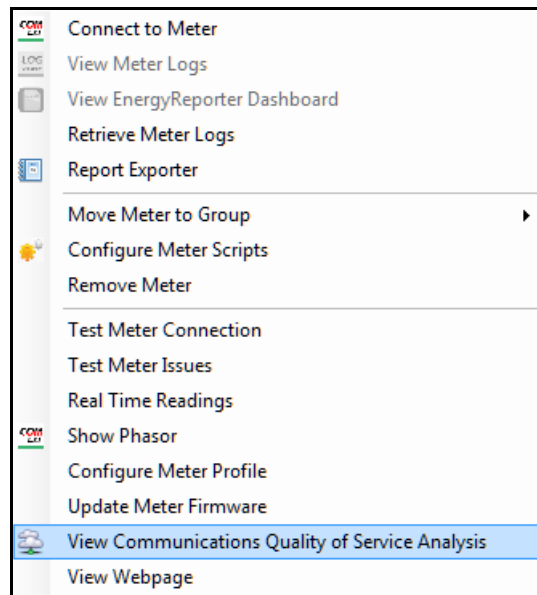
- “Group: *Group Name* is included in the Report: *Report Template Name*. Edit this Report?”: you will see this message when a group of meters already has a report template configured for it. Click Yes to edit the existing report template; or, click No to create a new, additional report template for this group of meters. For example, you may need both weekly and monthly reports for the same meter or group of meters.
- “Group: *Group Name*; Meter: *Meter Name* is included in the report: *Report Template Name*. Edit the Report for this Meter?”: you will see this message when a meter you are trying to create a report for is already included in a group’s report template. Click Yes to edit the existing report template that contains the meter; or, click No to create a new report template for this meter.



## 18.7: View Communications Quality of Service Analysis

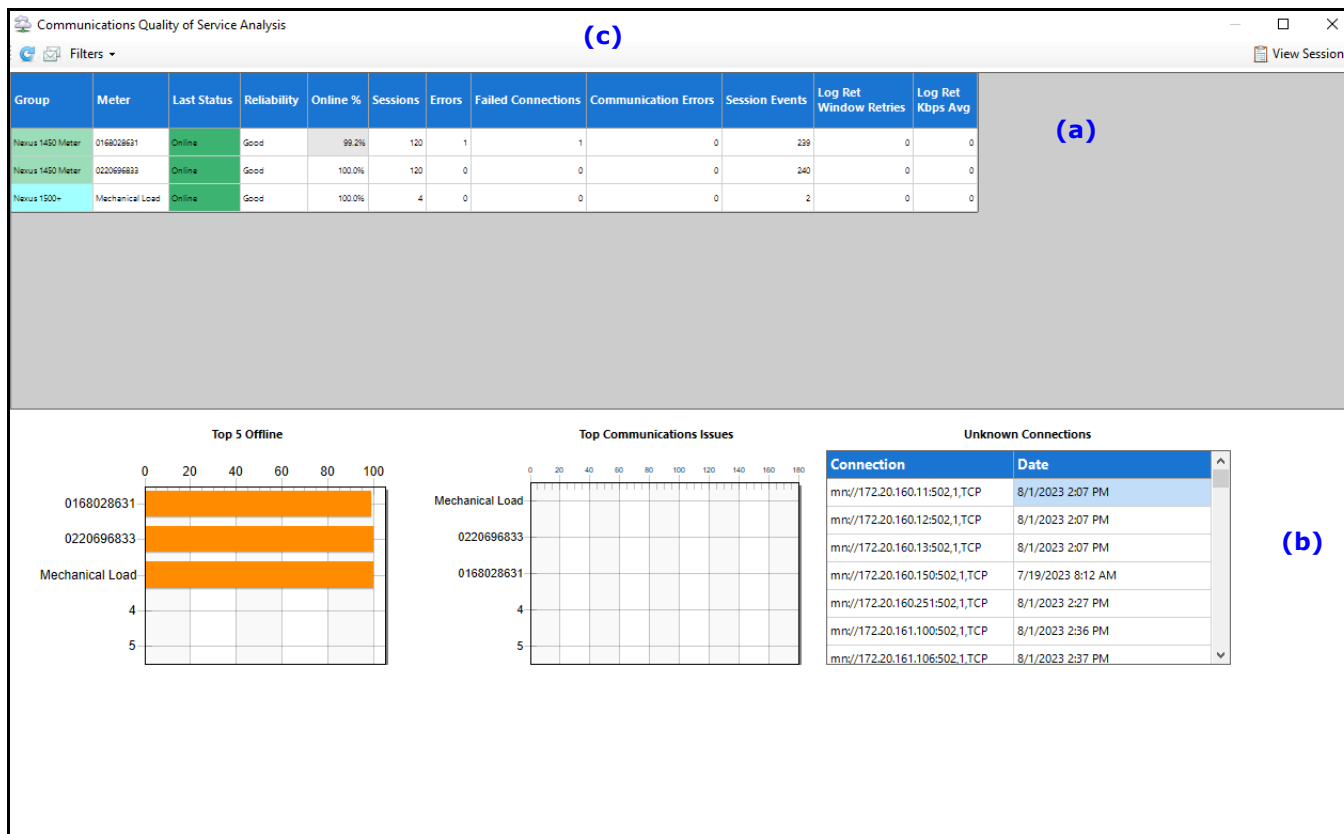
This feature lets you analyze the quality of communications for the network and meters. You can use it to identify any problems occurring within the system's communication infrastructure and with individual meters.

- The start and end of each connection session is logged, along with any communication and framework errors detected during the session.
  - Events are stored in rolling day files by connection, allowing logs to be quickly cleaned up based on connection or age. Note that only the previous 30 days of events are saved.
1. Double-click or right-click on a meter in the Meter List screen and select View Communications Quality of Service Analysis.



Note that you can also access the Communication Quality of Service Analysis screen by clicking Connections>View Communications Quality of Service Analysis.

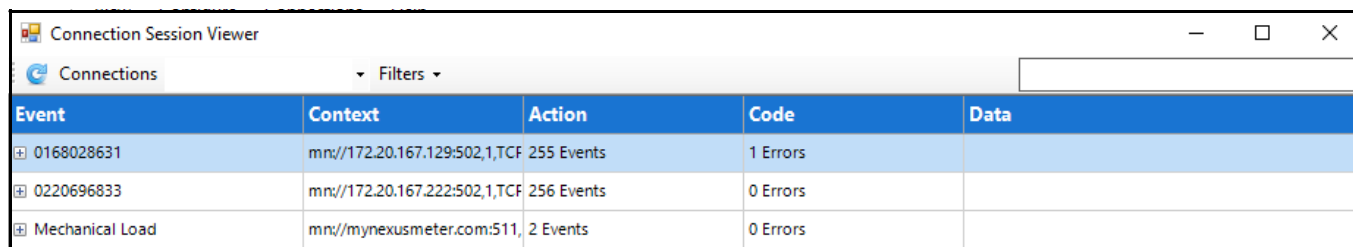
2. The screen shown below opens. From this screen you can get a quick overview of meters that are having communication problems, see how reliable the connection is, and view information showing how the software communicates with the meter.



- The grid in the middle of the screen (a) displays a list of all the meters in the system, along with their group, an analysis of how good their communication is, and information about each connection session, including:
  - Last Status: the current status of the meter, as of the last update for the current day. This can be one of Online, Offline, or Unknown.
  - Reliability: an indication of how reliable communication with the meter is.
    - Good: no problems found.
    - Comm Issues: connections to the meter are successful, but errors were detected while communicating to it.
    - Intermittent: while some connections failed, later attempts succeeded.
    - Offline: the meter is currently offline, and has been for multiple attempts to connect.

- Online %: a percentage of how often connections with the meter succeed. 100% indicates the meter was able to connect 100% of the time.
- Sessions: the number of connection sessions recorded.
- Errors: the number of connection sessions which contain an error of one sort or another.
- Failed connections: the number of connection sessions which failed to connect to the meter.
- Communication Errors: the number of connection sessions which had a communication error after connecting.
- Session Events: the total number of communication events recorded across all connection sessions.
- Log Ret Window Retries: the number of times the log retrieval windows were retried due to an error.
- Log Ret Kbps Avg: the average kilobytes per second of data transfer during log retrieval; measured from the transferred log retrieval windows.
- Right-click on a meter in the list to see these options:
  - View Analysis File: this opens the connection analysis file for this meter.
  - View Raw Events: this opens the Connection Session Viewer which shows the raw session events for this meter.
  - Copy: copies the currently selected cells to the clipboard.
  - Copy All: copies all the displayed cells to the clipboard.
- The bottom of the screen (b) shows:
  - Top 5 Offline: this view displays the five meters which have the worst online %.
  - Top Communications Issues: this view displays the five meters which have the most communication issues.

- **Unknown Connections:** this view lists all connections which failed to respond, or responded with an unknown device, and the last time they were tested.
- The top of the screen (c) gives you the following options:
  - **Refresh** (the blue arrow on the top left): the Communication Analysis data is refreshed in the background, so clicking Refresh can reload the most recent data.
  - **Email Reporting** - opens a screen you can use to set up emails of meter status and issues. See [18.11.4: Email Reporting Configuration, on page 18-156](#).
  - **Filters** - lets you add additional data to the meter table, by displaying a menu with two options:
    - **Show Comm Counts** - this view also shows Modbus communication counts, such as which types of requests are made, in the grid.
    - **Show Error Counts** - this view also shows the raw communication error counts in the grid.
  - **View Sessions:** this opens the Connection Session Viewer to display the raw session events for the meters. When the Connection Session Viewer is opened, it may take a while to load all of the events. A progress bar is displayed while events are being loaded. If you select Cancel, all of the connection sessions loaded so far will be displayed. See the example screen below.

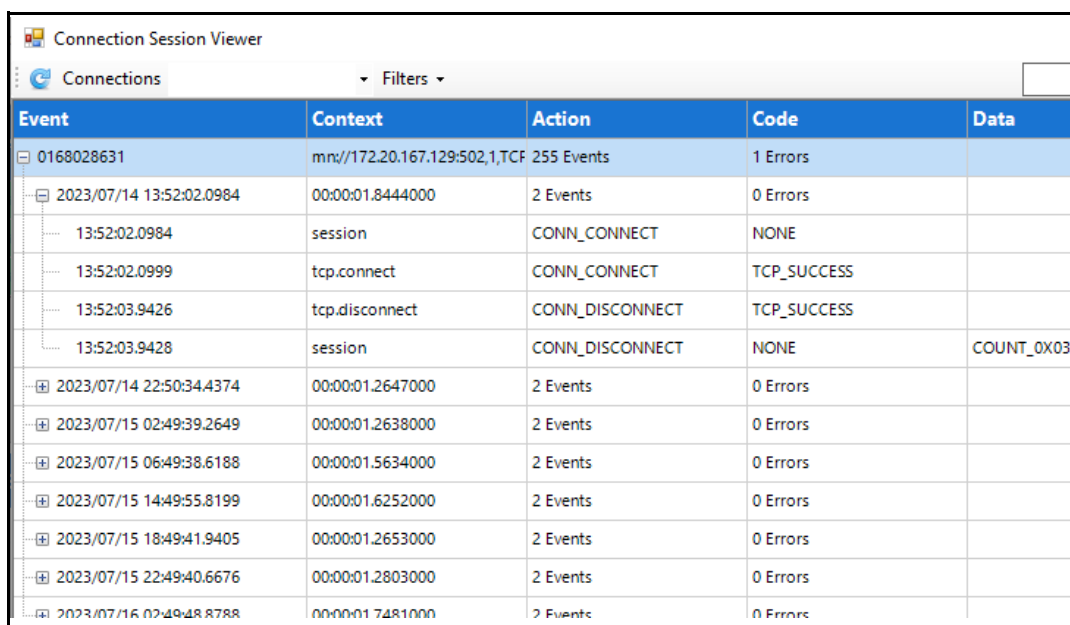


The screenshot shows a window titled "Connection Session Viewer" with a "Connections" tab and a "Filters" dropdown. Below is a table with 5 columns: Event, Context, Action, Code, and Data.

Event	Context	Action	Code	Data
0168028631	mn://172.20.167.129:502,1,TCF	255 Events	1 Errors	
0220696833	mn://172.20.167.222:502,1,TCF	256 Events	0 Errors	
Mechanical Load	mn://mynexusmeter.com:511,	2 Events	0 Errors	

- Once loaded, all of the meters and connections found are displayed. The number of events found and a count of the errors that occurred during those sessions is displayed for each connection.

- You can click the plus sign next to a meter to view a list of connections for the meter by initial connect date, along with the computed duration of the event, and the number of events and errors found in the session.
- You can click on one of the connections to view the list of events for that session, flagging any errors. See the example screen, below.

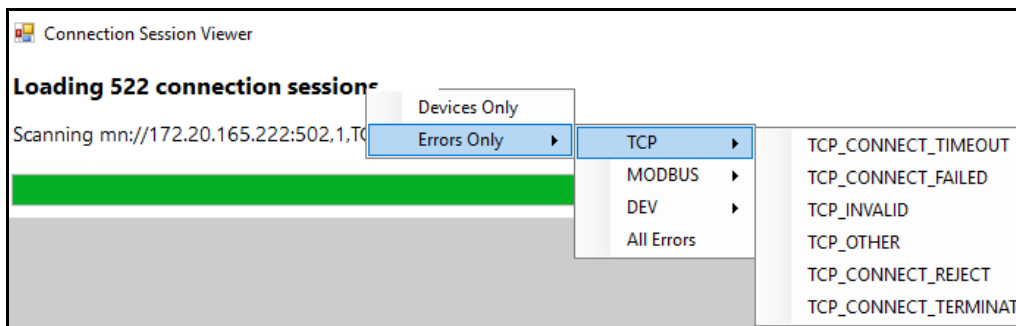


Event	Context	Action	Code	Data
0168028631	mn://172.20.167.129:502,1,TCF	255 Events	1 Errors	
2023/07/14 13:52:02.0984	00:00:01.8444000	2 Events	0 Errors	
13:52:02.0984	session	CONN_CONNECT	NONE	
13:52:02.0999	tcp.connect	CONN_CONNECT	TCP_SUCCESS	
13:52:03.9426	tcp.disconnect	CONN_DISCONNECT	TCP_SUCCESS	
13:52:03.9428	session	CONN_DISCONNECT	NONE	COUNT_0X03=
2023/07/14 22:50:34.4374	00:00:01.2647000	2 Events	0 Errors	
2023/07/15 02:49:39.2649	00:00:01.2638000	2 Events	0 Errors	
2023/07/15 06:49:38.6188	00:00:01.5634000	2 Events	0 Errors	
2023/07/15 14:49:55.8199	00:00:01.6252000	2 Events	0 Errors	
2023/07/15 18:49:41.9405	00:00:01.2653000	2 Events	0 Errors	
2023/07/15 22:49:40.6676	00:00:01.2803000	2 Events	0 Errors	
2023/07/16 02:49:48.8788	00:00:01.7481000	2 Events	0 Errors	

- Additional commands/options for this screen are:

- Refresh (blue arrow): this reloads the Communication logs.

- Filters: the Filters menu is shown here:



- Devices Only: this selection shows only connections which have a matching discovered device. Un-checking this option will show unknown devices, which can be useful for debugging invalid

connections.

- Errors Only: this selection shows only sessions which contain errors. See the example screen below. You can narrow down your selection to specific TCP errors, Modbus errors, Dev(ice) errors, or all errors.

Connections				
Filters				
Event	Context	Action	Code	Data
	mnz/172.20.160.12:502,1,TCP	140 Events	140 Errors	
	mnz/172.20.160.13:502,1,TCP	140 Events	140 Errors	
	mnz/172.20.161.106:502,1,TCP	140 Events	140 Errors	
	mnz/172.20.161.111:502,1,TCP	140 Events	140 Errors	
	mnz/172.20.161.131:502,1,TCP	140 Events	140 Errors	
	mnz/172.20.161.132:502,1,TCP	140 Events	140 Errors	
	mnz/172.20.161.136:502,1,TCP	140 Events	140 Errors	
	mnz/172.20.161.139:502,1,TCP	136 Events	136 Errors	
	mnz/172.20.161.140:502,1,TCP	140 Events	140 Errors	
	mnz/172.20.161.142:502,1,TCP	140 Events	140 Errors	
	mnz/172.20.161.144:502,1,TCP	140 Events	140 Errors	
	mnz/172.20.161.172:502,1,TCP	78 Events	78 Errors	
	mnz/172.20.161.182:502,1,TCP	140 Events	140 Errors	
	mnz/172.20.161.23:502,1,TCP	140 Events	140 Errors	
	mnz/172.20.161.244:502,1,TCP	139 Events	139 Errors	
	mnz/172.20.161.248:502,1,TCP	39 Events	39 Errors	
	mnz/172.20.161.7:502,1,TCP	140 Events	140 Errors	
	mnz/172.20.162.106:502,1,TCP	139 Events	139 Errors	
	mnz/172.20.162.121:502,1,TCP	78 Events	78 Errors	
	mnz/172.20.162.126:502,1,TCP	37 Events	37 Errors	
	mnz/172.20.162.146:502,1,TCP	126 Events	126 Errors	

- Search Box on the right performs an exact string search on the meter name, connection, context, action, code, and data fields. This option is useful for rapidly finding specific errors, or all meters in a specific subnet. Press enter to start the search, and clear the box to remove the search filter.

For example:

\_REJECT will show all sessions which the TCP connection has rejected.

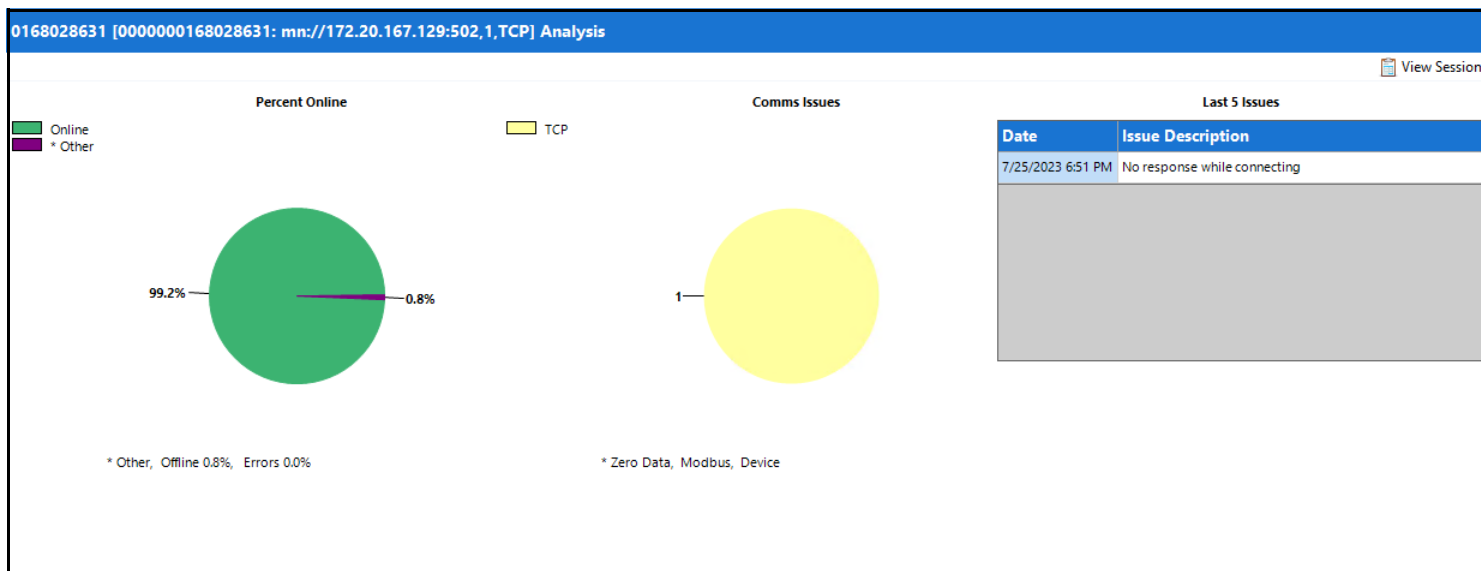
172.20.166 will show all meters in the 172.20.166 subnet.

tcp.read will show all sessions which had errors reading from the TCP interface.

- Some common connection errors are shown in the table, below.

Context	Action	Code	Data	Description
tcp.connect	CONN_CONNECT	TCP_CONNECT_TIMEOUT		No response during connect.
tcp.connect	CONN_CONNECT	TCP_CONNECT_REJECTED		The meter rejected the connection.
tcp.connect	CONN_CONNECT	TCP_INVALID	Host not known	The computer doesn't know how to reach the destination address. Verify that it is a valid address.
tcp.read	MSG_READ	TCP_OTHER	WSAETIMEDOUT	Connect was successful, but a read request timed out waiting for a response.
tcp.read	MSG_READ	TCP_CONNECT_TERMINATED		The connection was terminated while trying to read from the device.
SCAN_KNOWN	DEV_LOOKUP	DEV_UNEXPECTED_DEV	(id)	When querying the device id at the specified connection, the device found did not match what is recorded in the MeterManagerPQA® application.

- To view communication analysis for a specific meter, click on the meter name in the Communication Quality of Service Analysis screen.



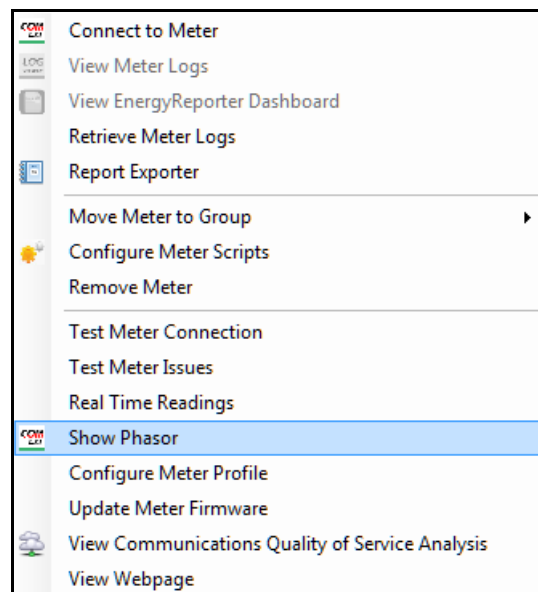
- The bottom portion of the screen changes to show data for the meter you chose:
  - **Percent Online:** this summarizes the number of Connection Sessions which were Good (Online), Failed to Connect (Offline), or contained communications issues (Errors).
  - **Comms Issues:** this summarizes the count of communications issues in the categories of TCP Errors, Modbus Errors, and Device Errors.

- Last 5 Issues: this displays a summary of the last five issues detected for this meter, and when they occurred.
  - If you click View Sessions in this part of the screen, you will see session information for just this meter.
4. Close the Communication Quality of Service Analysis to see the screen you were on when you opened it.

## 18.8: Show Phasor

CommunicatorPQA® software has a polling screen that shows Phasor information.

1. Double-click or right-click on a meter in the Meter List screen and select Show Phasor.



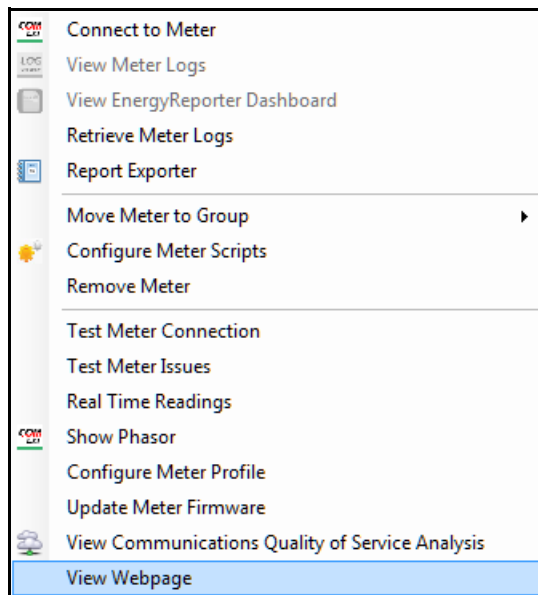
2. The Phasor polling screen opens. See [5.4.1: Poll Phasors, on page 5-56](#), for information on the Phasors screen.



## 18.9: View Webpage

EIG meters with Ethernet communication offer a web server application that lets you view meter readings a standard Internet browser.

1. Double-click or right-click on a meter in the Meter List screen and select View Webpage.



2. The meter's webpage opens in your computer's browser. Note that the webpage uses the port configured in the Meter Configure Scripts screen. See [18.5.1: Configure Meter Scripts, on page 18-33](#) for instructions, if the port being used is other than port 80. See the meter's User Manual for more information on the meter's web server.

## 18.10: Scripts

The MeterManagerPQA® application runs automated scripts for meter discovery. It also lets you set up scripts that automate log retrieval for a group of meters or an individual meter. This makes it easy to manage trending for large groups of meters, by eliminating the need for manual retrieval of logs.

Another use of automated log retrieval is to easily build the EnergyReporterPQA™ application's usage database, which is used for usage reporting and analysis. For more information on the EnergyReporterPQA™ application, see the *EnergyReporter-PQA™ Application User Manual*.

Note that when a meter's log database gets too large, archiving it makes room for new data. The MeterManagerPQA® application can automatically compress and archive the log database before retrieving logs, so that the database only contains new data. See [18.11.1: System Options, on page 18-142](#) to learn how to configure log archiving.

1. Click Configure Group Scripts from the top of the Meters List screen.

Select Group: Nexus 1450 Meter (a)

Save Cancel

Meter Name	Meter Type	Online Status	Connection	Security
0220696833	Nexus 1450	Online	mrc://172.20.167.222:	Not Enabl
0168028631	Nexus 1450	Online	mrc://172.20.167.129:	Not Enabl

(b)

**Retrieve Logs**

☒ Retrieve Logs for this Group (c)

Frequency: Every 12 Hours (d)

☐ Retrieve from meters one at a time

Log	Retrieve
HIST_CORE	<input checked="" type="checkbox"/>
INTERVAL_1	<input checked="" type="checkbox"/>
INTERVAL_2	<input checked="" type="checkbox"/>
INTERVAL_3	<input checked="" type="checkbox"/>
INTERVAL_4	<input checked="" type="checkbox"/>
INTERVAL_5	<input checked="" type="checkbox"/>

(e)

**Resets**

☐ Enable Max/Min Reset (f)

Frequency: Every 12 Hours

**Software Time Synchronization**

☐ Enable software time synchronization (g)

Adjust for Timezone: Disabled

Timezone Difference: N/A

Current Timezone: -05:00:00

Meter →  
Connection →  
Detail of Connections →

2. Select a group from the pull-down menu (a). The meters in that group are displayed in the box on the left (b) (see example screen above).
3. Make sure the box next to Retrieve logs for this group is checked (c). The Retrieve Log box also tells you the frequency of log retrieval. The default log retrieval interval is every 12 hours. You can set the log retrieval interval to any time you want, from every hour to once every 30 days. EIG recommends every 12 hours as optimal, unless you require a more frequent update.
  - Check the Retrieve from Meters One at a Time box if you want logs to be retrieved serially from meters, rather than in parallel from all meters. This option is ideal for working with meters on a daisy chain.

- a. To change the log retrieval interval click the Configure button in the Retrieve Logs (d) box. The screen shown below will open.

Click to select: Interval - to set up interval log retrieval; Time\* - to set a specific log retrieval time; Manual - to perform a manual log retrieval, e.g., to test the system; or Multi-Time - see Changing Log Retrieval Interval screen, on page 18-21, for instructions.

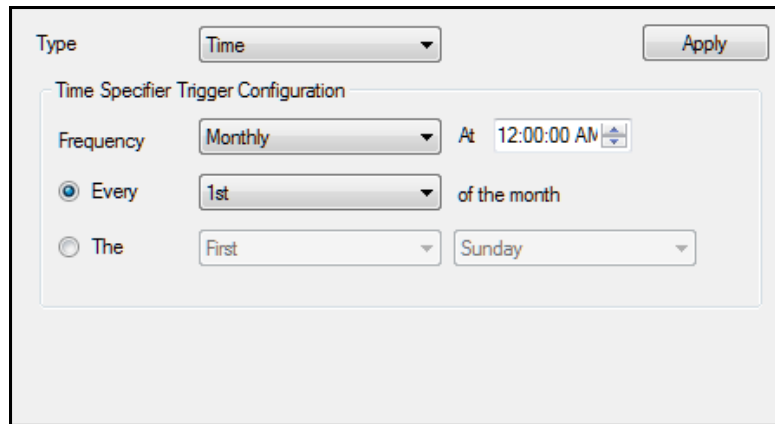
Click to set interval for log retrieval.

Click Apply to save the new interval.

- b. Make sure the boxes are checked next to any of the logs you want to retrieve for the group (e).
4. The Resets section (f) is used to schedule a download of peak Demand and/or usage values and then to set the values back to 0. The values are downloaded into a .csv file located in:  
 C:\Users\Public\Documents\Electro Industries\Communicator\_Ext\Retrieved Logs>Reset\_Logs; the filename is <meter\_serial>\_<meter name>.processed.csv. Each time a reset occurs, another line is added to the file, along with a timestamp.

- a. You can select to enable Max/Min reset by checking the box.

- b. The download/reset frequency default is every first of the month, but you can configure a new time or interval by clicking the Configure button. The window shown below will open.

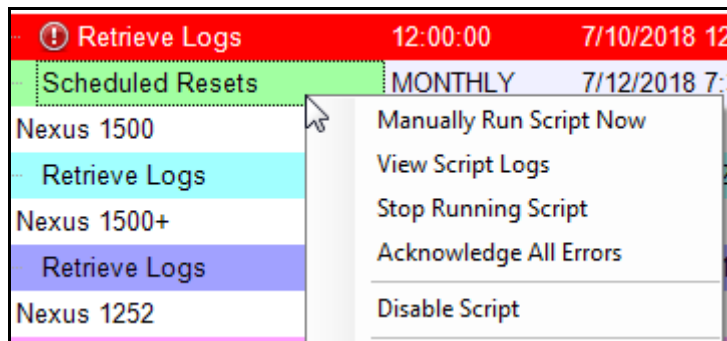


The screenshot shows a configuration window titled "Time Specifier Trigger Configuration". At the top, there is a "Type" dropdown menu set to "Time" and an "Apply" button. Below this, the "Frequency" dropdown is set to "Monthly". To the right of "Frequency" is a time field set to "12:00:00 AM". Under the "Frequency" section, there are two radio button options: "Every" (selected) and "The". The "Every" option is followed by a dropdown set to "1st" and the text "of the month". The "The" option is followed by a dropdown set to "First" and another dropdown set to "Sunday".

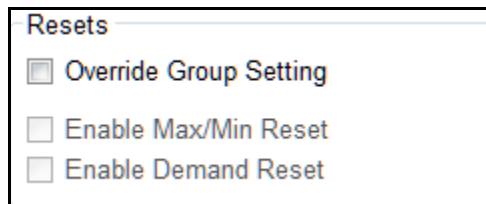
- To download/reset at a specific time: select Time from the Type pull-down menu; select the Frequency - Monthly, Weekly, or Daily, and the time of day for the download/reset.
  - If you selected Monthly, you will see the additional settings shown above. Select either "Every" and the day of the month (for example, Every 1st of the month) or "The" and number and day (for example, The last Thursday (of the month)).
  - If you selected Weekly, there will be a pull-down menu that lets you select the day of the week to perform the download/reset.
  - If you selected Daily, you just need to enter the time of day.
- To download/reset at a specific Interval: select Interval from the Type pull-down menu and select the hour and minute interval (for example, 06:00 to perform the download/reset every 6 hours).
- To download/reset manually, select Manual from the Type pull-down menu. Note that you must also set up the download/reset with either a Time or Interval setting. Manual allows you to perform the download/reset at will, rather than waiting for the programmed time/interval.

- c. When you have made your selections, click Apply.

- d. The download/reset will take place as scheduled. If you selected a manual download/reset, go to the Scripts Status screen, right-click on the Scheduled Resets script, and select Manually Run Script Now to perform the download/reset immediately.



- e. You can override the Reset settings for a meter within a group. to do so, go to Configure Meter Scripts for the meter and scroll to the Resets section of the screen.



- i. Check the Override Group Setting box.
- ii. If you are overriding the download/reset completely, you don't need to select anything else. To override the Group setting and select one or both of the Min/Max and Demand download/resets, check the appropriate boxes.
- iii. Click the Save button.

**NOTE:** All meters in the group will adhere to the same schedule for download/reset that was configured in step b.

5. Software Time Synchronization (g) is used to set up Time Sync for all of the meters in a group. The Time Sync feature allows for tracking the time difference of meters from the MeterManagerPQA® application server. When Time Sync is enabled, it also sets the meter's time when it drifts beyond a configured threshold. Scanning the meters' times is done automatically - no configuration is required. Note that if a meter is configured individually for Time Sync, that will take precedence over the group setting (see [18.5.1: Configure Meter Scripts, on page 18-33](#)).

**NOTE:** For Time Sync to work automatically, the online scan must be enabled by checking the Enable Scan box in the Meter Discovery Configuration screen- see [Add Meters Using Meter Discovery Configuration, on page 18-23](#) for instructions.

Software Time Synchronization	
<input type="checkbox"/>	Enable software time synchronization
Adjust for Timezone:	Disabled ▼
Timezone Difference:	N/A
Current Timezone:	-05:00:00

- Check Enable software time synchronization to enable time sync for all meters in the group.
- Select the Timezone Offset from UTC (Coordinated Universal Time). This will be applied to all meters in the group, unless they already have a time-zone offset specified.
- The current timezone offset is listed, along with the adjustment factor (timezone difference), to assist in configuring the time. The Timezone Offset works by offsetting the PC time being compared against the meter.

PC Time	Meter Time	PC Timezone	Meter Timezone	Difference
2015/04/28 01:00	2015/04/28 01:01	-4	-4	00:01
2015/04/28 01:00	2015/04/27 23:01	-4	-6	00:01
2015/04/28 01:00	2015/04/27 23:01	-4	0	-05:59
2015/04/28 01:00	2015/04/28 05:01	-4	0	00:01
2015/04/28 01:00	2015/04/27 23:01	-4	disabled	-01:59

**NOTES:**

- The UTC offset specified should be current daylight savings offset, if applicable. For example, for the eastern timezone of the United States, EST is -5:00, EDT is -4:00. If you are currently in Daylight Savings, specify -4, otherwise -5.
  - The Allowed Time Drift is set in the System Options screen. See [18.11.1: System Options, on page 18-142](#), for instructions.
  - Time Sync will be disabled for 12 hours before and after the DST transition time for the PC's current regional settings, in order to prevent updating the meter's time while it is automatically updating for its own internal DST transition times.
7. If you have changed anything on the screen, "Settings Changed" will be displayed underneath the Device Type, on the upper right of the screen. Click Save to implement any new settings.



### 18.10.1: Script Status

The MeterManagerPQA® application gives you two ways to view the status of the configured scripts.

- You can view script status in the Meter List screen, where any meters with active scripts display "Running" in the Next Action field; and those with scripts scheduled to run display the time they will run in the Next Action field (see example screen, below).
- You can view detailed status information of group scripts in the Scripts Status screen, which is the MeterManager Monitor's second main screen view (the first being the Meter List screen).

- To see the Script Status screen view, click the Script Status icon from the top of the Meter List screen view.

#### Script Status icon

**Meter List**

Meter Name	Meter Type	Online Status	Next Action
unassigned			
0000000020375017	Nexus 1272	Online	Running
0000000174444226	Nexus 1272	Online	
00000000202609524	Nexus 1500+	Online	8/4/2023
0000000213531419	Nexus 1450	Online	8/4/2023
0000000229118225	Nexus 1500+	Online	8/4/2023
00005821	Nexus 1250	Online	8/4/2023
00774292	Nexus 1250	Online	
0090258428	Shark 200	Online	
0101672118	Shark 100	Online	
0101673725	Shark 100	Online	
0101675424	Shark 100	Online	
0120637625	Shark 100	Online	

2. You will see all script actions, as shown in the example screen, below.

**(b)**

**View Completed**  
View all log entries for the selected script

**View Errors**  
View all log entries for the selected script

**Acknowledge Errors**  
Acknowledge all errors for all scripts.

**Filter In-Progress**  
Only show scripts which are currently running

**Show Meter Scripts**  
Show only the meter scripts

**Pause Server**  
Service is running. Click to pause and stop all scripts.

**METERMANAGERPQA®**

## Script Status

Script Name	Interval	Last Run At	Status	Progress
<b>System</b>				
Runlog Archiving	01:00:00	7/19/2023 9:00 AM	Next at 7/19/2023 10:00:00 AM	
Runlog Analysis	00:01:00	7/19/2023 9:22 AM	Next at 7/19/2023 9:23:00 AM	
Updates Check	1:00:00:00	7/19/2023 12:00 AM	Next at 7/20/2023 12:00:00 AM	
Comms QoS Analysis	00:10:00	7/19/2023 9:19 AM	Next at 7/19/2023 9:30:00 AM	
Internal.update.cleanup.folders	DAILY		Not Enabled	
Discovery Scan	04:00:00	7/19/2023 7:59 AM	Running	Scanning
Online Scan	00:10:00	7/14/2023 10:53 AM	Not Enabled	
Meter Time Sync	01:00:00	7/19/2023 8:59 AM	Next at 7/19/2023 10:00:00 AM	
Meter Logs Scan	12:00:00	7/18/2023 11:59 PM	Next at 7/19/2023 12:00:00 PM	
Energy Reporter Import		7/18/2023 4:51 PM	Not Enabled	
Energy Reporter Reporting		7/18/2023 4:52 PM	Not Enabled	
Custom Reports		7/12/2023 4:52 PM	Not Enabled	
Report Exporter		7/19/2023 8:52 AM	Not Enabled	
Software Poller		7/12/2023 4:52 PM	Offline	Offline:
Log Actions		7/12/2023 4:52 PM	Not Enabled	

**(a)**

The screen shows all group script activity (script activity is not shown for meters not assigned to a group), including all configured meter log retrieval scripts; EnergyReporterPQA™ application activity, such as Importing and Reporting; and the MeterManagerPQA™ application system activity, such as Discovery Scan and Runlog Archiving.

- The right side of the screen (a) lists the following information for each script:
  - Script name, e.g., Online Scan
  - Interval the script runs, e.g., 12:00:00 - every 12 hours
  - The date and time the script last ran
  - The script status, i.e., Running, or the date and time the script will next run

- The progress of a running script.
- The left side of the screen (b) gives you additional viewing options. Click on a script in the list to select it, and then click one of the following buttons:
  - View Completed - click to view all log history for the script (see [18.10.2: View Script Logs, on page 18-124](#)).
  - View Errors - click to view all errors for the script (see [18.10.4: View Script Errors, on page 18-132](#)).
  - Acknowledge Errors - click to acknowledge all of the errors for all of the scripts - this will remove them from being displayed when View Errors is selected.
  - Filter In-Progress - click to view only currently running scripts. The Filter In-Progress button changes to Show All scripts - click the button to return to the total scripts display.
  - Show Meter Scripts - click to view only the configured meter scripts. The button changes to Show All scripts - click to return to the total scripts display.
  - Pause Server - click to pause the server and stop all scripts. The button changes to Start Server - click to restart the server and continue running the scripts.
- The possible scripts are as follows:
  - Runlog Archiving [internal.update.runlog.archive]: this script is used to clean up old logs by collecting the runlogs and archiving them to zip files if they are older than the configured number of days. If the feature is enabled, older runlog archives will be deleted after the configured number of days.
  - Runlog Analysis [internal.update.runlog.analysis]: this script scans the runlog for errors, which, if found, are reported to the user when a script is completed.
  - Updates Check [internal.update.check]: this script contacts the Updates server once a day to check if there are any available software updates. If

any are found, the user is notified the next time the Monitor software is opened.

- **Report Exporter [report.exporter]:** this script performs the automated generation of Report Exporter reports. It generates a report for every available period from the current report start date to the last available data retrieved from the meter.
- **Online Scan [scan.known]:** this script runs through all known meters and checks if the meter is offline or online by attempting to connect to it. If a meter is offline, the status is reported in the log, and if email notification is configured, a notification email is sent out.
- **Meter Time Sync [meter.time\_sync]:** this script performs a software time synchronization for meters without a built-in time sync feature, such as IRIG-B or NTP. If the configured meter is more than 15 seconds off from the server's PC time, the script attempts to synchronize the meter's time with the PC's time. The Meter Time Sync script works with the Online Scan script. The Online Scan script first determines if the time is off, and then Meter Time Sync updates any meters whose time is off.
- **EnergyReporter Reporting [ebilling.reportgen]:** this script automatically generates all the bills, executive summary usage reports, and custom usage reports for the EnergyReporterPQA™ application. Note that reports will automatically be generated when new data is imported to the EnergyReporterPQA™ database.
- **Energy Reporter Importing [ebilling.import]:** this script automatically imports retrieved logs into the EnergyReporterPQA™ database. Note that imports will automatically occur when a meter's logs are retrieved.
- **Weather Import [ebilling.import.weather]:** this script automatically reads the weather information from a weather service and logs it into the EnergyReporterPQA™ database.
- **Discovery Scan [scan.ping]:** this script automatically scans your network for new meters to add to the Meter List. You can configure the range the

script scans via Auto Scan and Tools>Configure>System>Meter Discovery.

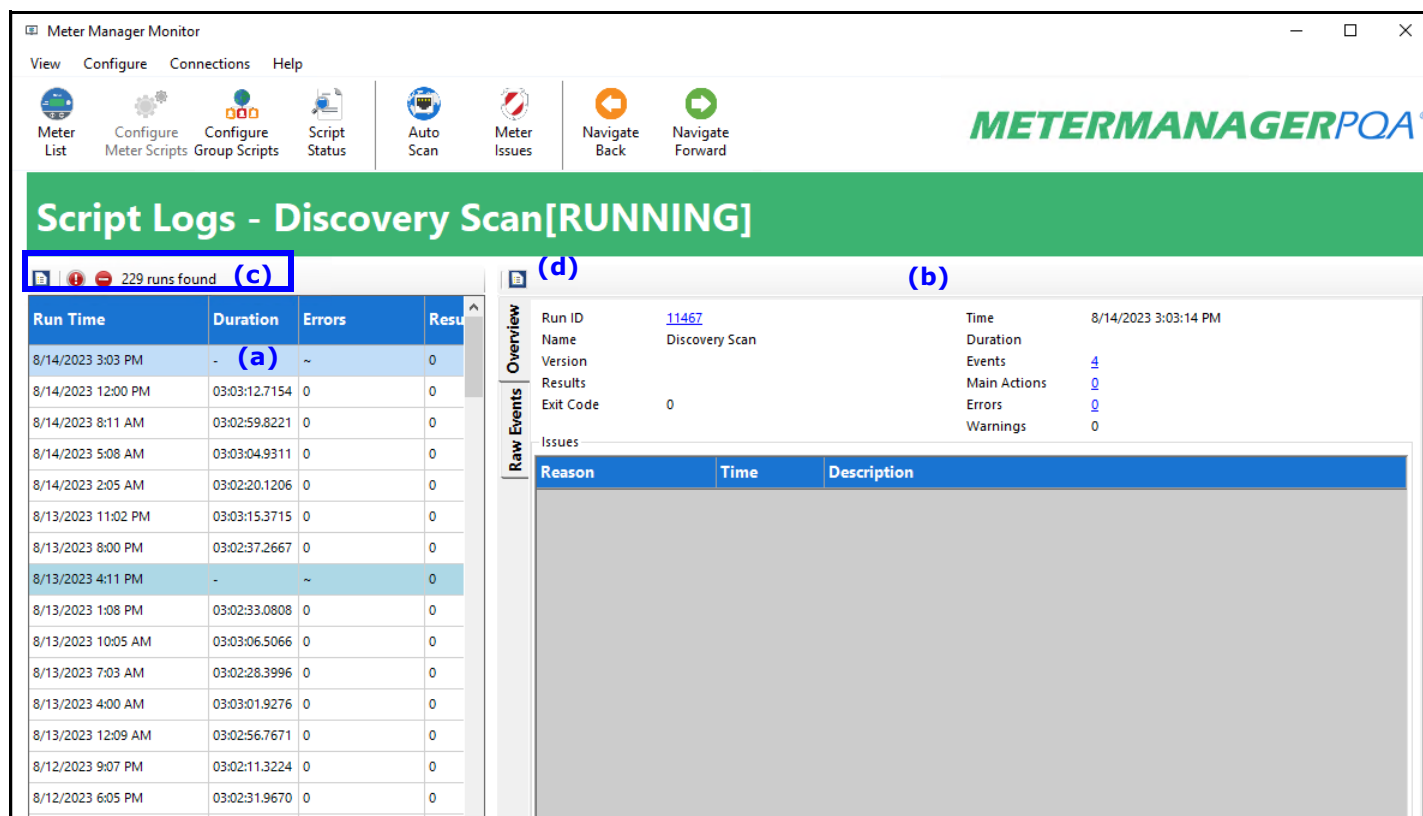
- Retrieve Logs [loc.{group}.retrieve.logs]: this script performs the automatic log retrieval for each group. Note that Automatic Log Retrieval must be enabled globally, i.e., for the entire application, for this script to perform the log retrieval.
- Scheduled Resets [resets]: schedule a download of Peak Demand and/or usage values and then to set the values back to 0.
- Right-click on a script in the list to select from these script actions:

Manually Run Script Now	Click to run the script before the next programmed interval
View Script Logs	Same result as View Completed button (18.5.1: Configure Meter Scripts, on page 18-33)
Stop Running Script	Stop a currently running script
Acknowledge All Errors	Acknowledge and remove all errors for this script from the scripts log
Disable Script	Prevent this script from running
Remove Script	Remove this script from the script's list

**NOTE:** Not all actions are available for all scripts.

### 18.10.2: View Script Logs

1. To view script logs, either:
  - Click on a script and then click the View Completed button from the Script Status screen.
  - Right-click on a script and select View Script Logs from the sub-menu.
2. You see a screen that gives you access to detailed information.



- The left side of the screen (a) lists:
  - The time the script ran (Run Time).
  - The amount of time the script took to run (Duration).
  - The number of Errors, if any.
  - A code related to the script results (Results) - you may need to scroll to see the entire Results column.

- The result code is unique to each script. For example: The EnergyReporterPQA™ script normally returns a 0; but if it had a problem during import, and failed to connect to the database, it might store 1 as its result code, 2 if there were errors in the data, or 3 if it failed to read the data.
- The right side of the screen (b) shows details about the script (click on a script in the list on the left of the screen to view its details), and has two tabs:
  - Overview tab (shown in the screen on the previous page): shows an overview of the script, with details of any errors: this is the first tab you'll see on the screen. The right top of the screen view shows:
    - The internal Run ID number of the script.
    - The script name.
    - The time the script began running.
    - The amount of time the script ran (Duration field).
    - The number of events in the script run, which are steps in a script's main actions, e.g., importing a log from an individual meter; you can click on the underlined number of events to see the Event Tree screen view (see the Event Tree and Raw Events tab descriptions for more information).
    - The number of Main actions, which are the actions composed of events, e.g., Log retrieval for all meters in a group.
    - The number of errors in the script run (see [18.10.4: View Script Errors, on page 18-132](#) for a description of script errors).
    - Version of script, if applicable.
    - Internal codes, such Results, Exit, and Warnings.

- Raw Events tab (shown below):

Run Time	Duration	Errors	Results
8/14/2023 3:03 PM	-	~	0
8/14/2023 12:00 PM	03:03:12.7154	0	0
8/14/2023 8:11 AM	03:02:59.8221	0	0
8/14/2023 5:08 AM	03:03:04.9311	0	0
8/14/2023 2:05 AM	03:02:20.1206	0	0
8/13/2023 11:02 PM	03:03:15.3715	0	0
8/13/2023 8:00 PM	03:02:37.2667	0	0
8/13/2023 4:11 PM	-	~	0
8/13/2023 1:08 PM	03:02:33.0808	0	0
8/13/2023 10:05 AM	03:03:06.5066	0	0
8/13/2023 7:03 AM	03:02:28.3996	0	0
8/13/2023 4:00 AM	03:03:01.9276	0	0
8/13/2023 12:09 AM	03:02:56.7671	0	0
8/12/2023 9:07 PM	03:02:11.3224	0	0
8/12/2023 6:05 PM	03:02:31.9670	0	0
8/12/2023 3:02 PM	03:02:47.7834	0	0

Time	Type	ID	Section	Message
15:03:14.722	LOG	11467	runstart	scan.ping, CONFIG.ADDRESSES.SPACE~MAX=<172.20.167.255>, CONFIG.ADDRESSES.SPACE~MIN=<172.20.160.0>, CONFIG.OPTS~CREATE_GROUP_FOR_DEVICE=<False>.
15:03:14.723	LOG	11467	SCAN_PING	Started ping scan
15:03:14.724	INFO	11467	SCAN_PING	CONFIG.ADDRESSES.SPACE~MAX=<172.20.167.255>, CONFIG.ADDRESSES.SPACE~MIN=<172.20.160.0>, CONFIG.OPTS~CREATE_GROUP_FOR_DEVICE=<False>.
15:42:14.335	LOG	11467	SCAN_PING	Device detected [mru//172.20.161.175:502]: ~~~~~~ (0000000000202041) <0128 Nexus 1272>

The Raw Events screen view shows every event which occurred during the running of the script. Each event is timestamped, and may have one of the following types:

- Log - a log of occurrences during the running of the script.
- Info - displays information about what is taking place during the running of the script. You may disregard this field unless you are investigating a specific issue.
- Warning - displays problems which may have occurred during the running of the script, but which may be common (i.e., not something you need to address), such as retries on reading files, or an action that was attempted, but which is not supported.
- Error- displays problems which prevent the operation of the script, such as the meter being offline, unable to retrieve logs at this time, or bad values, such as invalid timestamps, being found in the log.



- The three icons at the top of the screen (c), from left to right, let you:
  - Export All logs - click to save the script logs to a file. You will be prompted to name the file and choose a location for it. Note that the Document icon (d) in the right side of the screen lets you save the currently selected script log to a file.
- Filter by Errors - click to view only the errors in this log - see [18.10.4: View Script Errors, on page 18-132](#).
- Clear All Script Logs - click to clear the script log files for this script.  
**WARNING!** Clear All Script Logs will delete the script's history.



**NOTE:** The Clear All Logs function can be automated from Tools>Configure>System>System Options - see [18.11.1: System Options, on page 18-142](#).

In general, most of the information on the right side of the Script Logs screens is diagnostic. For example:

- The online scan will tell you when devices go offline, and when meters are confirmed to be online
- Log Retrieval may tell you problems with the connection, or errors in the logs, or problems with the meter
- The issues list will inform you of problems with the script, such as:
  - Meter offline.
  - Problem retrieving logs.
  - Errors in the log records.
  - Software locking up.

### 18.10.3: View Import/Report Script Status

You can access information on the Energy Reporter Import and Energy Reporter Reporting scripts from the Scripts Status screen.

Script Name	Interval	Last Run At	Status
System			
Runlog Archiving	01:00:00	02/23/2017 07:00	Next at 02/23/2017 08:00
Runlog Analysis	00:01:00	02/23/2017 07:01	Next at 02/23/2017 07:01
Updates Check	1.00:00:00	02/23/2017 00:00	Next at 02/24/2017 00:00
Report Exporter	01:00:00	02/23/2017 07:00	Next at 02/23/2017 08:00
⚠ Meter Time Sync	01:00:00	02/23/2017 07:00	Next at 02/23/2017 08:00
Weather Import	01:00:00	02/21/2017 12:00	Not Enabled
Comms QoS Analysis	00:10:00	02/23/2017 07:00	Next at 02/23/2017 07:10
Discovery Scan	04:00:00	02/23/2017 04:00	Next at 02/23/2017 08:00
⚠ Online Scan	00:10:00	02/23/2017 07:00	Running
Energy Reporter Import		02/22/2017 09:32	Idle
Energy Reporter Reporting		02/22/2017 09:34	Idle

Double-click on the Import script or the Reporting script to see additional information. The screen you see will list current status and history of the script. See the example screen, below.

EnergyReporter Import History						
Import Status		Import History				
Queue	0	21 Imports, 6 Failed, 2 No Action, 6 Errors				
Status	Idle	Import Start	Device	Meter	Duration	Data Start
		08/18/2023 09:31		[Loc] test_loc	00:00:05.5563721	
		08/18/2023 09:31		[Loc] test_loc	00:00:04.7204070	
		08/18/2023 09:31		[Loc] test_loc	00:00:05.3959069	
		08/18/2023 09:30		[Loc] test_loc	00:00:11.7884214	
		08/18/2023 09:30		[Loc] test_loc	00:00:05.3790812	
		08/18/2023 09:30		[Loc] test_loc	00:00:05.1550993	

- The Import History screen shows:
  - Import Status provides information about the imports currently being processed:
    - Queue: number of currently pending imports.
    - Status: the action being performed by the current import.

- Device: if the meter being imported is connected to the Meter List, the device will be listed here.
- Meter: the meter currently being imported.
- Time Start: when the import started.
- Import History provides information about the last 1000 imports that have been performed (this history will be reset when the MeterManagerPQA® application service is restarted):
  - Import Start: starting date and time of the import.
  - Device: same as above.
  - Meter: same as above.
  - Duration: the amount of time the import took to run.
  - Data Start: the first timestamp of the data being imported.
  - Data End: the last timestamp of the data being imported.
  - Error#: any errors that occurred during importing are listed here.

EnergyReporter Report History

Report Status		Report History						
Queue0		27 Reports, 3 Errors						
Status Generating meter report for Default(9, from [11/01/2022 00:00:00 to 12/01/2022 00:00:00])								
Report TypeCustomUsage								
Report ScopeSpecific_Period								
IDDefault								
Date Range2022/11/01 00:00:00.0000								
Time Start08/18/2023 09:30:37								

- The Reporting History screen shows:
  - Report Status provides information about the reports currently being generated:
    - Queue: number of currently pending reports.
    - Status: the action being performed by the current report generation.
    - Report Type: the type of report being generated: Bill, Usage Report, or Custom Report.
    - ID: the customer or location the report is being generated for.
    - Date Range: the range of data to be included in the report.
    - Time Start: when the report generation started.
  - Report History provides information about the last 1000 reports that have been generated (this history will be reset when the MeterManagerPQA® application service is restarted):
    - Generation Start: when the report generation started.
    - ID: same as above.
    - Report Type: same as above.

- Report Scope: Specific Period, which means the report is being generated for a specific time range.
- Gen Duration: the amount of time the reporting generation ran.
- Report Period: the period this report was generated for.
- Error#: any errors that occurred while generating the report are listed here. If there is more than one error, hover over the history item with your mouse to see the list of errors.

Some common errors are:

- Generate Usage Report Failed [NOT\_FOUND] - There is not enough data in the month to generate the Executive Summary Usage Report.
- Generate Bill Failed [MISSING\_VALUE] - There is not enough data in the month to generate the Bill Report.

### 18.10.4: View Script Errors

1. To view script errors, either:

- Click the Filter by Errors button in the View Script Logs screen (see previous section for instructions)
- Click on a script and then click the View Errors button from the Script Status screen

2. You see the Script Logs screen described in the previous section ([18.10.2: View Script Logs, on page 18-124](#)). The only difference is that this screen only displays script error information.

**Script Logs - EnergyPQA: Retrieve Logs[NOT\_RUNNING]**

30 runs found

Run Time	Duration	Errors	Results
8/14/2023 10:55 PM	00:27:31.5525	4	1
8/13/2023 10:55 PM	00:17:45.0228	2 (a)	1
8/12/2023 10:55 PM	00:18:50.5399	4	1
8/11/2023 10:55 PM	00:17:57.9005	6	1
8/10/2023 10:55 PM	00:18:53.2832	5	1
8/9/2023 10:55 PM	00:30:19.5461	5	1
8/7/2023 10:55 PM	00:01:51.4148	49	1
8/6/2023 10:55 PM	00:04:13.6069	54	1
8/5/2023 10:55 PM	00:05:08.7891	53	1
8/4/2023 10:55 PM	00:04:13.5108	55	1

**Overview (b)**

Run ID	303766	Time	8/13/2023 10:55:00 PM
Name	EnergyPQA: Retrieve Logs	Duration	17 Minutes, 44 Seconds
Version		Events	1538
Results		Main Actions	15
Exit Code	1	Errors	2
Issues		Warnings	36

**Raw Events**

Reason	Time	Description
Marketing	22:55:39.446	Invalid timestamp found while scanning for partial records [#7930:FFFFFFFF], retrieving all records.
Admin Offices	22:56:28.241	Admin Offices [5000000000000014]: Connection Failed to: miz/172.20.166.129:502

3. To view an error, click on it in the left column of the screen (a). The right side of the screen will show details for the error in the Overview (b) and Raw Events screen views, as described in [18.10.2: View Script Logs, on page 18-124](#).

- Some possible script errors and their recovery information is as follows:
  - Updates Check [internal.update.check]:
  - “Failed to retrieve current version info from server [FAILED]”: this error is usually caused by being unable to connect to the server. Verify that the computer has access to the Internet, and is not behind a proxy server.

- Report Exporter [report.exporter]:
  - “No Data for Period”: this error occurs when there is a gap in data for a meter or group. This may be caused by the meter being offline, or by the meter’s device profile being changed and the data channel no longer being available. Verify that the meter still has the channel configured in its device profile and that the data is available in the logs, via Log Viewer. Note that this error is not caused by the retrieval of logs from this meter not being “caught up,” since reports are only generated if there is newer data than that of the period of the report being generated.
- Online Scan [scan.known]:
  - “Device Offline”: this error occurs when the online scan tried to connect to a meter previously connected to, and failed. Check the following items:
    - Check to see if the meter has gone offline: make sure the meter is operational and the connection is OK.
    - If multiple meters have gone offline, check to see if their segment of the network is operational.
    - If the server loses network connections, you may see all of the meters go offline, since the server can no longer contact the meters.
    - If there are meters that go offline frequently, they may have unreliable network connections, such as wireless connections. Verify that the connection is stable and reliable, and does not drop communication packets.
- Meter Time Sync [meter.time\_sync]:
  - “Device described by connection does not match Device Info, not updating”: this error occurs when time sync finds a different meter than it expected. Verify that the meter at the specified connection is the correct one, and that the network does not have multiple meters with the same IP address. Note that this message is informational only, the error will be corrected by the Online Scan script.

- Meter time not updating: if the meter's time doesn't seem to be updating even though time sync is configured, and the runlog says that time update is being attempted, verify the following:
  - That the meter doesn't require login to set time, and if it does, that the correct username and password have been entered.
  - That the meter doesn't have any other time sync protocol connected, since multiple time synchronization methods cause problems in the meter time.
  - That Online Scan is enabled (this is necessary for Meter Time Sync).
- Weather Import [ebilling.import.weather]:
  - "Failed to query weather info. SocketException: A connection attempt failed because the connected party did not properly respond after a period of time": this error means that the application failed to connect to the weather service; try connecting, again, later.
  - "Failed to query weather info. XmlException: Data at the root level is invalid": this error means that the data returned from the weather service is not valid; try connecting, again, later.
  - "Failed to query weather info. WebException: The remote name could not be resolved": this error means that the DNS lookup could not find the weather service URL; verify that your DNS or Firewall is not blocking the URL.
  - "Failed to query weather info. Bad Gateway": this error means that the network gateway on the machine was invalid; verify that the computer's network connection is configured correctly.
- Discovery Scan [scan.ping]
  - Meters not found: if the Discovery Scan does not detect a meter that you know should be there, use one of the following options:



- Make sure the meter can be pinged. The Discovery Scan pings the IP address before attempting to connect, and if it gets no response, it will not try to connect to the meter.
- Manually connect to the meter. If this fails, make sure the meter is actually online.
- Retrieve Logs [loc.{group}.retrieve.logs]:
  - The script runs, but no logs are retrieved; verify that Automatic Log Retrieval is enabled.
  - "Connection Failed to: {connstr}": this error indicates the meter may not be online; verify that you are able to connect to the meter.
  - "Failed to create log retrieval session [CONNECTION\_TIMEOUT]": this error indicates the meter may not be online; verify that you are able to connect to the meter.
  - "Failed to create log retrieval session [INVALID\_TYPE]": this error indicates that log retrieval is not valid for this meter. If the meter doesn't support logging, disable Automatic Log Retrieval for the meter.
  - "Failed to create log retrieval session [CE\_CNORESP]": this error indicates the meter may not be online, or may not be responding to Modbus; verify that you are able to connect to the meter.
  - "Failed to open location [CONNECTION\_LOGIN\_FAILED] {connstr}": this error indicates a Nexus® 1500/1500+ meter may not be online; verify that you are able to connect to the meter.
  - "Connection failed, unable to login with user '": this error indicates a Nexus® 1500/1500+ meter requires a username and password to retrieve logs, but none was supplied. Go to Configure Meter Scripts > Scripts Settings, enable security, and specify the username and password (see [18.5.1: Configure Meter Scripts, on page 18-33](#)).
  - "Connection failed, unable to login with user 'user'": this error indicates the username or password specified for a Nexus® 1500/1500+ meter is

invalid, and the software was unable to log in. Go to Configure Meter Scripts > Scripts Settings, and verify that the correct username and password is entered (see [18.5.1: Configure Meter Scripts, on page 18-33](#)).

- “Invalid record (#) timestamp: {time}”: this error indicates that Log-Converter detected that there was a problem with one of the time-stamps recorded in the meter.
- “Unable to retrieve log [#], port # is already retrieving a log”: Shark® 200 meters and MP200™ metering systems allow only one user at a time to retrieve logs. Since the meter has multiple ports, this error indicates that another software may already be retrieving logs from the meter; in this case, you can try again, later. If the message itself is in error, and there is no other software retrieving logs from the meter, verify that there are no other MeterManagerPQA® applications installed on your network.
- “Unable to engage log, log failed to engage after 10000ms”: Shark® 200 meters and MP200™ metering systems allow only one user at a time to retrieve logs. This error indicates that another software may already be retrieving logs from the meter on the same network connection; in this case, you can try again, later. If the message itself is in error, and there is no other software retrieving logs from the meter, verify that there are no other MeterManagerPQA® applications installed on your network.
- “Username and password not specified, unable to login”: the Shark® 250/270 meter requires a username and password to retrieve logs. this error indicates that the username and password were not supplied. Go to Configure Meter Scripts > Scripts Settings, enable security, and specify the username and password (see [18.5.1: Configure Meter Scripts, on page 18-33](#)).

- "Retries exceeded setting waveform record window: NOT\_READY": or "Currently engaged log {log1} is not the one desired {log2}": the Shark® 250/270 meter allows only one user at a time to retrieve logs. Since the meter has multiple ports, this error indicates that another software may already be retrieving logs from the meter, and you can try again, later. If the message itself is in error, and there is no other software retrieving logs from the meter, verify that there are no other MeterManagerPQA® applications installed on your network.
- "Bad record crc bit set in timestamp": this error indicates that LogRetrieval detected that there was a problem with one of the timestamps recorded in a Shark® 250/270 meter.
- "Invalid timestamp found while scanning for partial records [#]": in order to perform partial log retrieval for the Shark® meters, the software must search for the last record retrieved. If it finds an invalid timestamp during this process, it must retrieve all the records.
- "OutOfMemoryException," "Out of Memory," "Error # 7," or "Log Converter: Not enough memory to run; quitting": this error indicates that too many applications are running for the server to handle. Either decrease the number of applications, or increase the server memory.

### 18.10.5: Manually Run Scripts

You have the ability to force a script to run. You might want to do this in order to test the script.

1. From the Script Status screen, right-click on a script and select Manually Run Script Now.
2. The Script's status will change to Running and its Progress will be shown.

### 18.10.6: Acknowledge Script Errors

Errors remain in the script logs even after they are acknowledged, but the red highlighting and exclamation point are no longer shown in the Script Status screen, and the errors are highlighted in pink, rather than red, in the Script Logs screen (see the example below). For this reason you may not want to acknowledge the errors even after you've viewed them, e.g., if you want someone else to see them before they are acknowledged.

**Script Logs - Nexus 1450 Meter: Retrieve Logs[NOT\_RUNNING]**

56 runs found

Run Time	Duration	Errors	Results
8/15/2023 12:00 AM	00:12:00.5876	1	1
8/8/2023 12:12 PM	00:04:20.1759	1	1
8/1/2023 4:25 PM	00:25:17.3008	1	1

**Overview**

Run ID	<a href="#">11636</a>	Time	8/15/2023 12:12:03 AM
Name	Nexus 1450 Meter: Retrieve Logs	Duration	4 Minutes, 44 Seconds
Version		Events	<a href="#">201</a>
Results		Main Actions	<a href="#">2</a>
Exit Code	1	Errors	<a href="#">0</a>
		Warnings	9

**Raw Events**

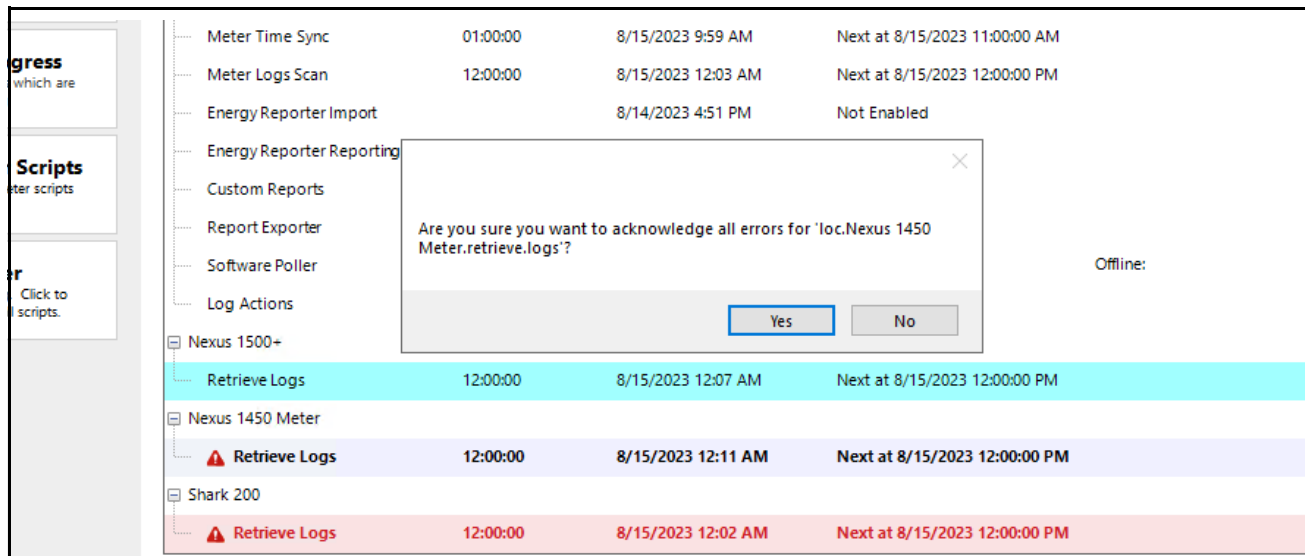
Reason	Time	Description

If you have viewed script errors and do want to indicate that you have viewed them, you have two options:

- Acknowledge all script errors:
  - a. Click Acknowledge Errors from the left side of the Script Status screen (a).
  - b. You are asked to confirm your choice (b): click Yes to acknowledge all of the errors; click No to leave the errors unacknowledged.

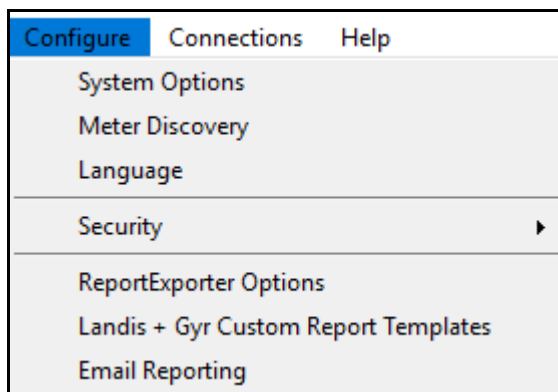
Script Name	Interval	Last Run At	Status	Progress
Meter Time Sync	01:00:00	8/15/2023 9:59 AM	Next at 8/15/2023 11:00:00 AM	
Meter Logs Scan	12:00:00	8/15/2023 12:03 AM	Next at 8/15/2023 12:00:00 PM	
Energy Reporter Import		8/14/2023 4:51 PM	Not Enabled	
Energy Reporter Reporting		8/14/2023 4:52 PM	Not Enabled	
Custom Reports		7/12/2023 4:52 PM	Not Enabled	
Report Exporter		8/15/2023 9:53 AM	Not Enabled	
Software Poller		7/12/2023 4:52 PM	Offline	Offline:
Log Actions		7/12/2023 4:52 PM	Not Enabled	
Nexus 1500+				
Retrieve Logs	12:00:00	8/15/2023 12:07 AM	Next at 8/15/2023 12:00:00 PM	
Nexus 1450 Meter				
Retrieve Logs	12:00:00	8/15/2023 12:11 AM	Next at 8/15/2023 12:00:00 PM	
Shark 200				
Retrieve Logs	12:00:00	8/15/2023 12:02 AM	Next at 8/15/2023 12:00:00 PM	

- Acknowledge errors for a specific script:
  - a. Right-click on the script in the Script Status screen and select Acknowledge all Errors.
  - b. You will be asked to confirm that you want to acknowledge the errors. Click Yes to acknowledge the errors for this script; click No to leave the errors unacknowledged.



## 18.11: Configuration Tasks

From the top of Meter Manager Monitor, click Configure in the Menu Bar. You will see this sub-menu.



- Meter Discovery is explained in [18.3.1.1: Add Meters to the Meter List Using Auto Discovery, on page 18-18](#).
- Security is explained in [18.2: Setting up Security, on page 18-3](#).
- Landis + Gyr Report Templates are explained in [Appendix F: Landis + Gyr Custom Reports, on page F-1](#).

The other options are explained in the following sections.

### 18.11.1: System Options

The System Options screen allows a user to configure base settings for the MeterManagerPQA® application as a whole.

1. Click Configure>>System Options.

**System Options**

Configurations Paths Polling Log Retrieval Log Archive

**Script Configurations**

Minimum Trigger Interval 00:00 (Hours, Minutes)

Max Concurrent Downloads 10

☐ Disable Automatic Log Retrieval Automatic Log Retrieval should only be enabled on one computer on a network. If this is the server, or only computer, enable this. Otherwise, this should be left disabled.

☐ Disable Update Check Script

☐ Delete Old Script

**Meter Configurations**

Allowed time drift 15 Seconds

Save Cancel

2. System Options has five tabs: Configurations, Paths, Polling, Log Retrieval, and Log Archive.

3. The first tab lets you set up Script configurations. Make the following settings:

- Minimum Trigger Interval - click the arrows to set a minimum log retrieval interval time. This prevents any user from setting log retrieval to be more frequent than this value, e.g., four hours (04:00). Click in the hours field to set hours, and in the minutes field to set minutes.
- Max Concurrent Downloads - click the arrows to set the largest number of downloads that can be made at one time by currently running scripts. Use this setting to make adjustments for your computer's capacity. For example, for a computer that has lower resources you might want to set this to 1, so as to not overload



the server. On a powerful machine, this can be set higher; however do not set it any higher than 10.

- Disable Automatic Log Retrieval - unless this computer is the Log Collection server, leave this box checked (see [18.3.1.1: Add Meters to the Meter List Using Auto Discovery, on page 18-18](#)).
- Delete Old Script Run Logs - when you click this checkbox a field opens that lets you select the number of days to keep script logs before they are deleted.  
**WARNING!** Deleting the script logs will delete the history of the script.
- Disable Update Check Script- check this box to disable automatic update of the software.
- Meter Configurations: Allowed time drift - select the amount of time, in seconds, that will be considered an acceptable time difference for meters using the Time Sync feature - see [18.5.1: Configure Meter Scripts, on page 18-33](#) and [18.10: Scripts, on page 18-112](#) for details on Time Sync. Anything greater than this time will be corrected.

**IMPORTANT!** This value should not be set less than 5 seconds, as it may result in the accuracy of the meter's time being made worse.

- Click the Paths tab to enter the directory paths for the CommunicatorPQA® application, the LogViewerPQA application, and the Archived Logs files. This only needs to be changed if the CommunicatorPQA® application was installed in a non-default location.

System Options

Configurations Paths Polling Log Retrieval Log Archive

Paths

CommExt Path C:\Program Files (x86)\Electro Industries\Communicator\_Ext\commext.exe

LogViewer Path C:\Program Files (x86)\Electro Industries\LogViewer\LogViewer.exe

Retrieved Logs Path C:\Users\Public\Documents\Electro Industries\Communicator\_Ext\Retrieved Logs

Archived Logs Path C:\Users\Public\Documents\Electro Industries\Communicator\_Ext\Retrieved Logs\log\_archive

Mapped Drive

Mapped Drive Disable mapped to

Username

Password

☒ Override existing drives

Map Drive

Un-map Drive

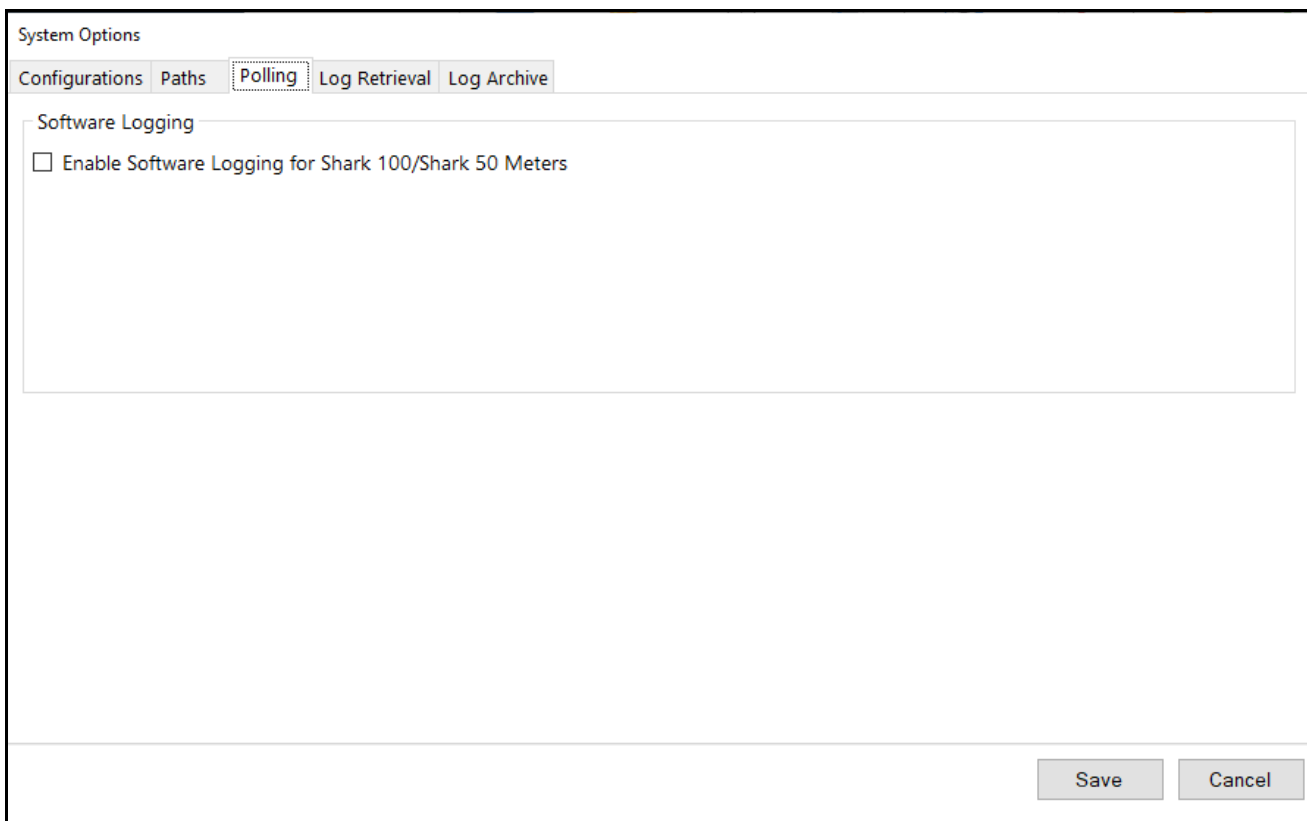
Mapped drive is not connected

Save Cancel

You can also use this setting to map a drive that can be used to store retrieved logs on a network drive. This lets you free space on the drive where the MeterManagerPQA® application is located. To map a drive, make these settings:

- Select the mapped drive from the pull-down menu and enter the path in the "mapped to" field (the default of this setting is Disable).
- If the mapped drive is secured with a username and password, enter them. Note that due to operating system limitations, passwords cannot be more than 14 characters.
- Override existing drives - if this box is checked, if the MeterManagerPQA® application tries to connect to the mapped drive and the drive has already been mapped, but to a different path than the one you have configured, the MeterManagerPQA® application forces a connection with the (new) mapped drive.

- Click Map Drive to immediately map the drive. If the drive is unavailable, the message at the bottom of the screen will indicate that. Otherwise, the message says that the mapped drive is connected.
  - Click Unmap Drive to immediately un-map the drive.
  - Once the drive settings are saved, the MeterManagerPQA® application automatically reconnects the mapped drive whenever the PC is rebooted. In addition, the MeterManagerPQA® application periodically checks if the mapped drive is connected, and reconnects to it, if necessary.
5. Click the Polling tab to enable data polling for the Shark® 50 and Shark® 100 meters.



The screenshot shows the 'System Options' dialog box with the 'Polling' tab selected. The 'Software Logging' section contains a checkbox labeled 'Enable Software Logging for Shark 100/Shark 50 Meters', which is currently unchecked. At the bottom right of the dialog are 'Save' and 'Cancel' buttons.

- To enable polling, check the box. The data polled will be available for the EnergyReporterPQA™ application and viewable in the Log Viewer - see [18.5.4: View Meter Logs, on page 18-44](#).
- Once enabled, the Software Poller will log the following readings every 15 minutes:
  - Voltage A-N/B-N/C-N

- Voltage A-B/B-C/C-A
- Current A/B/C
- Frequency
- Voltage A/B/C THD%
- Current A/B/C THD%
- Voltage A/B/C Phase
- Current A/B/C Phase
- W/VAR/VA Total
- Wh  $(Q1+4)/(Q2+3)$
- VARh  $(Q1+2)/(Q3+4)$
- VAh  $(Q1+2+3+4)$

**NOTES:**

- **IMPORTANT!** The Software Poller polls and logs the values as quickly as it can, so that values are polled as closely as possible to the 15 minute interval. Under noisy conditions or with many meters, there can be a significant delay between the interval and the time that the value is actually polled: in some cases the delay can be more than a minute. Because of this, the Software Poller cannot guarantee the same level of data integrity as a meter with logging, and should not be used for critical systems, such as Billing.
- The MeterManagerPQA® application offers a diagnostic screen that shows the status of the software polling process. To access the screen, click Help>Tech Tools>>Poller Status. This screen is most helpful for technical support purposes.

6. Click the Log Retrieval tab to configure specific settings for log retrieval and file output.

System Options

Configurations Paths Polling **Log Retrieval** Log Archive

Log Retrieval Settings

☐ Retry Log Retrievals for Meters when an error prevents retrieval **(a)**

Retry After 30 minutes

☐ Apply log retrieval limit to all retrievals managed by MeterManager **(b)**

☐ Split Log Retrieval into sub processes **(c)**

☐ Advanced Manual Retrieval **(d)**

Output **(e)** ☒ Override Defaults

☐ Enable CSV Logs **(f)** Delete after: Never

☐ Enable Log Replay Files **(g)** Delete after: Never

Save Cancel

- Check the first box (a) to enable retries when an error is detected that has blocked log retrieval and select a time after which log retrieval will be retried from the drop-down menu. When enabled, Retry Log Retrievals on Errors causes the MeterManagerPQA® application to scan the runlogs of Log Retrieval scripts after they have completed. If it finds an indication that retrieval was blocked, such as another log retrieval session was already in progress, that meter (and only that meter) will be marked for retrying log retrieval at a later time.

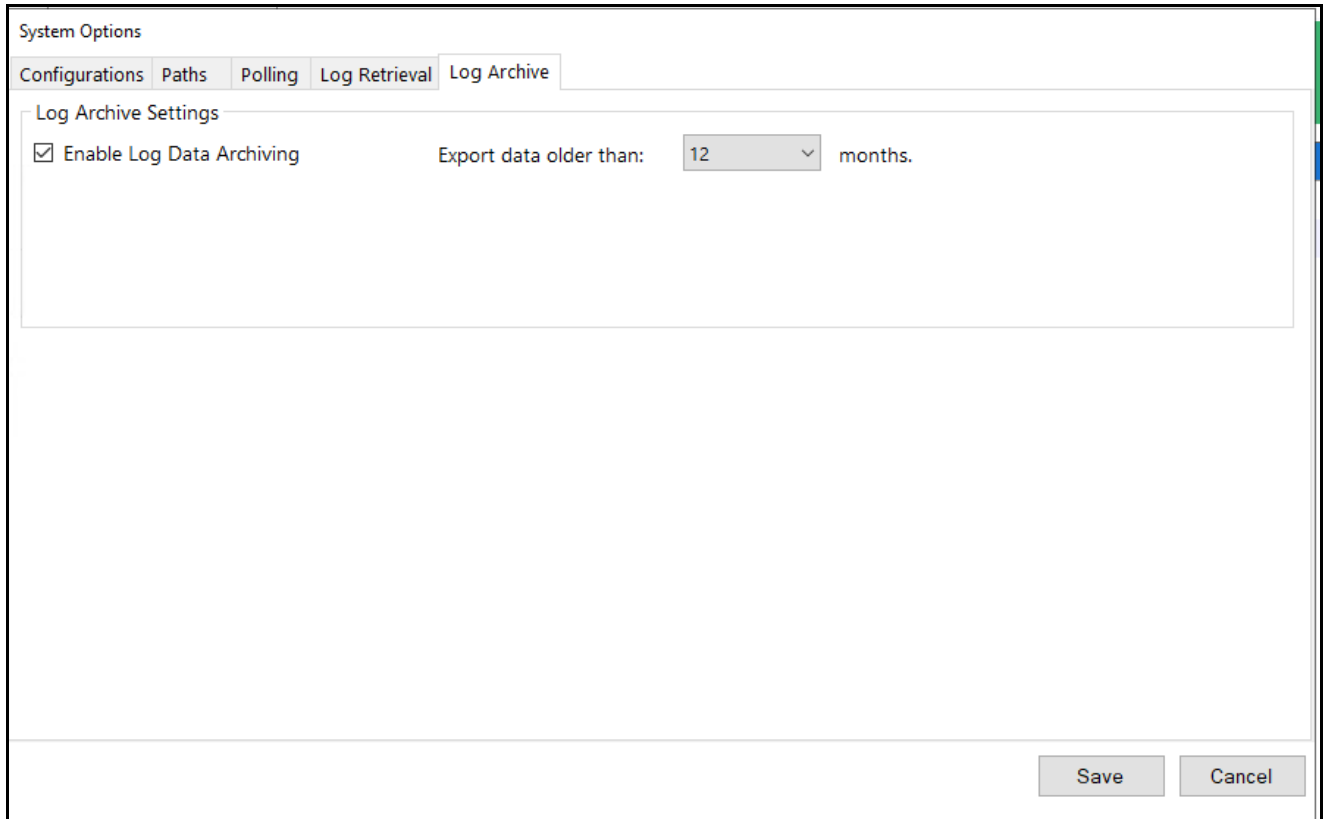
**NOTE:** This feature only detects retrieval issues with the Shark® 200 meter at the current time.

- Normally, the log retrieval limits are applied to retrievals within any one group. Check the second box (b) to apply the log retrieval limits to all retrievals across the entire MeterManagerPQA® system.
- Check the third box (c) to enable Split Log Retrieval, which causes all log retrievals to be performed in a separate process from the MeterManagerPQA® service. While

this setting takes a small amount of extra system resources, it ensures that the log retrieval is isolated from the MeterManagerPQA® service, and will not impact it. Note that this is automatically configured for the Nexus® 1450/1500/1500+ meters, regardless of whether or not the box is checked.

- Check the fourth box (d) to display a popup screen during a manual retrieval. The screen allows you to configure the range of data and the specific logs to retrieve.
- When the settings in the Output section are enabled by checking the box next to Override Defaults (e), CSV and Replay files are created as part of log retrieval.
- Check the box to enable the CSV output (f) if you are automating integration with another system.
- Check the box to enable Replay output files (g) if you need them for debugging or conversion at a later date.
  - Note that these files can use up a lot of disk space, so make sure to set the Delete After option.

7. Click Log Archive to enable automatic archiving of meter data logs. This ensures that only recent data is stored in the meter log database. When the data is archived, it is compressed and sorted at the configured Archived Path location set in the Paths tab. While this data cannot be used with exporter softwares, it will still be accessible from the LogViewerPQA application.



The screenshot shows the 'System Options' dialog box with the 'Log Archive' tab selected. The 'Log Archive Settings' section contains a checked checkbox for 'Enable Log Data Archiving' and a dropdown menu for 'Export data older than:' set to '12' months. At the bottom right are 'Save' and 'Cancel' buttons.

System Options				
Configurations	Paths	Polling	Log Retrieval	Log Archive
Log Archive Settings				
<input checked="" type="checkbox"/> Enable Log Data Archiving	Export data older than: 12 months.			
Save Cancel				

- Check the Enable Log Data Archiving box.
- Set the number of months that log data will remain before it is archived.
- Once this option is enabled, the group's log archiving limits set up here will automatically be checked after log retrieval. Any data which is older than the configured range will be archived to a compressed file in the Archived Logs folder configured in the System Options screen's Paths tab, explained earlier.

- The file will be named for the range of data it contains:

[metername]\_\_[meterserial]\[metername]\_\_[meterserial].[oldestdate]\_[newest-date].zip

For example, if the MeterName was 1800ShamesDr, the Serial# was 0123995130, and the database contained log data from 2023/01/08 to 2023/08/25, the archive might be:

C:\Users\Public\Documents\Electro Industries\Communicator\_Ext\Retrieved  
Logs\log\_archive\1800ShamesDr\_\_0123995130\1800Shames-  
Dr\_\_0123995130.20230108\_20230825.zip

- A record of the archive will be entered in the Retrieve Logs Script runlog for that group.

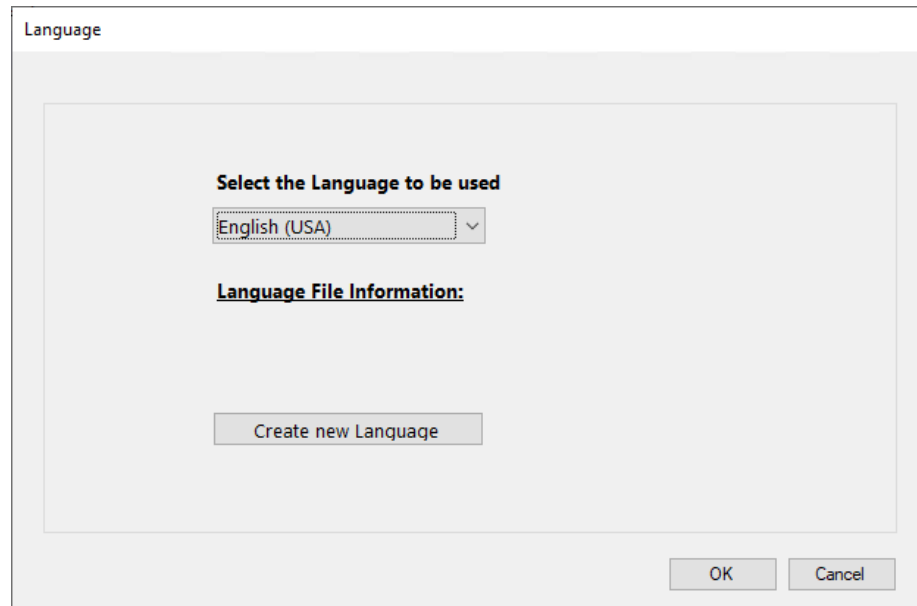
8. Click Save.



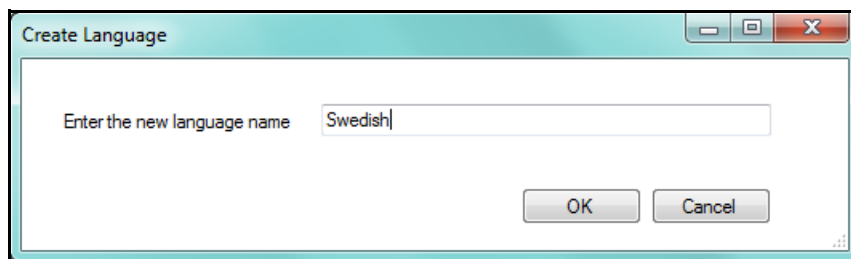
### 18.11.2: Language Tasks

This feature allows you to select the language the software will use. It also lets you create a new language file for the software. Note that the only embedded language is English.

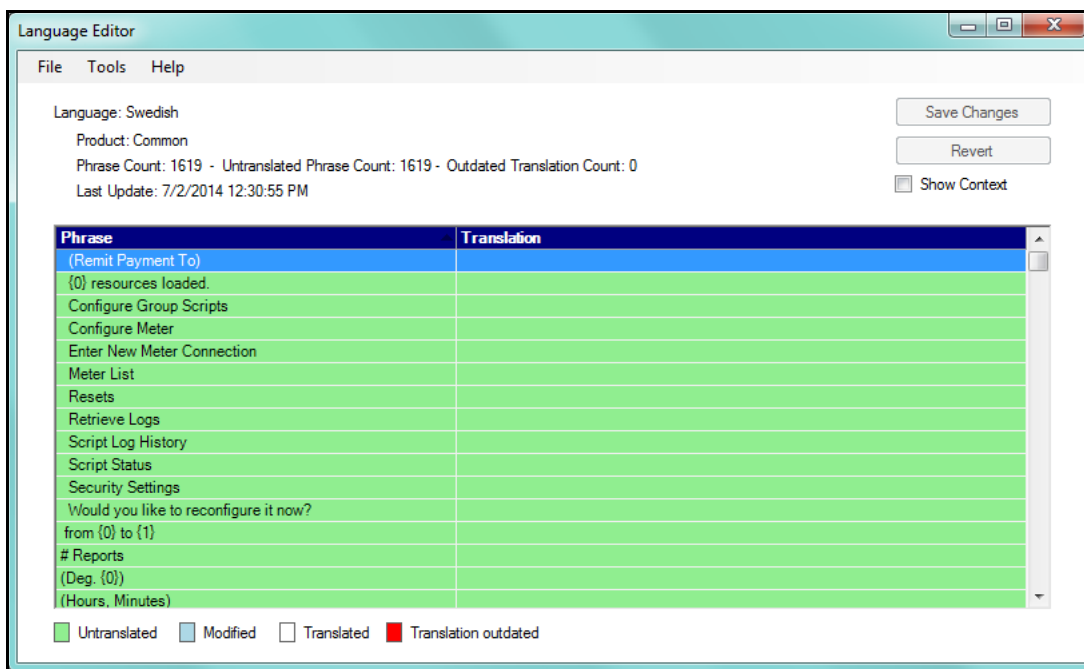
1. Click Configure>Language from the Meter Manager Monitor screen's Menu bar.



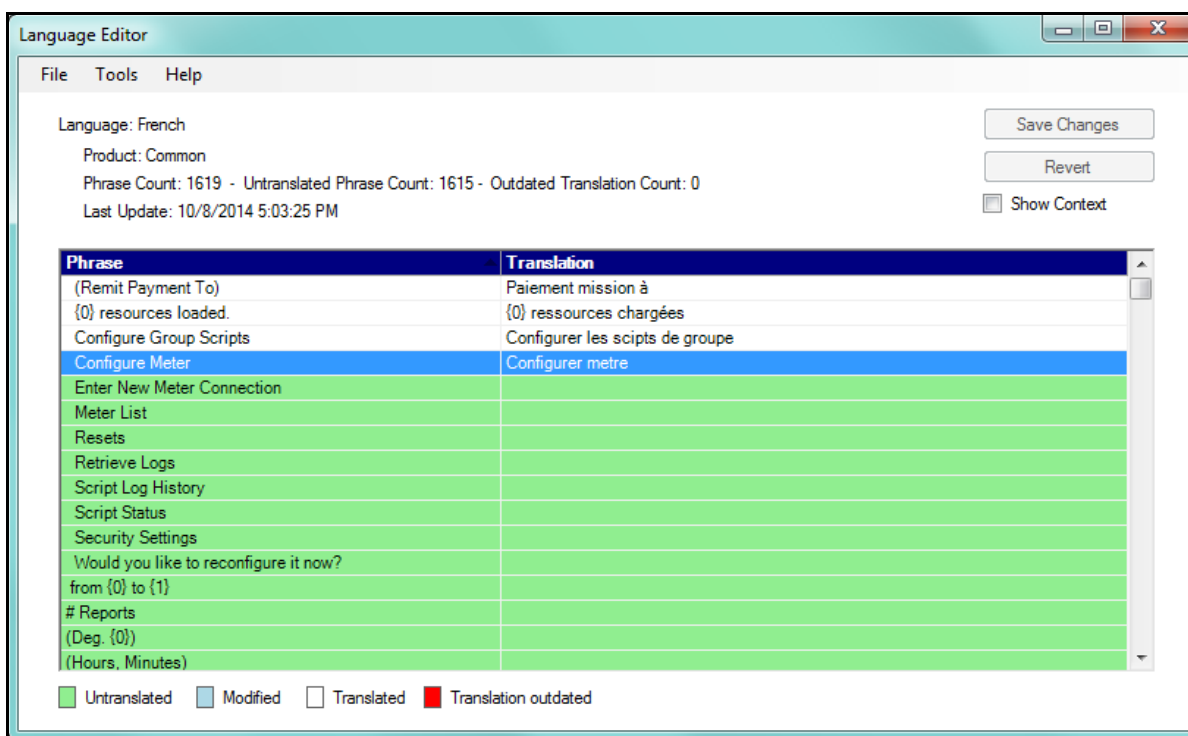
2. Select one of the available languages from the pull-down menu. You can click Language File Information to view details of the selected Language file.
3. To add a new translation, click the Create New Language button.



4. Enter the language name and click OK.

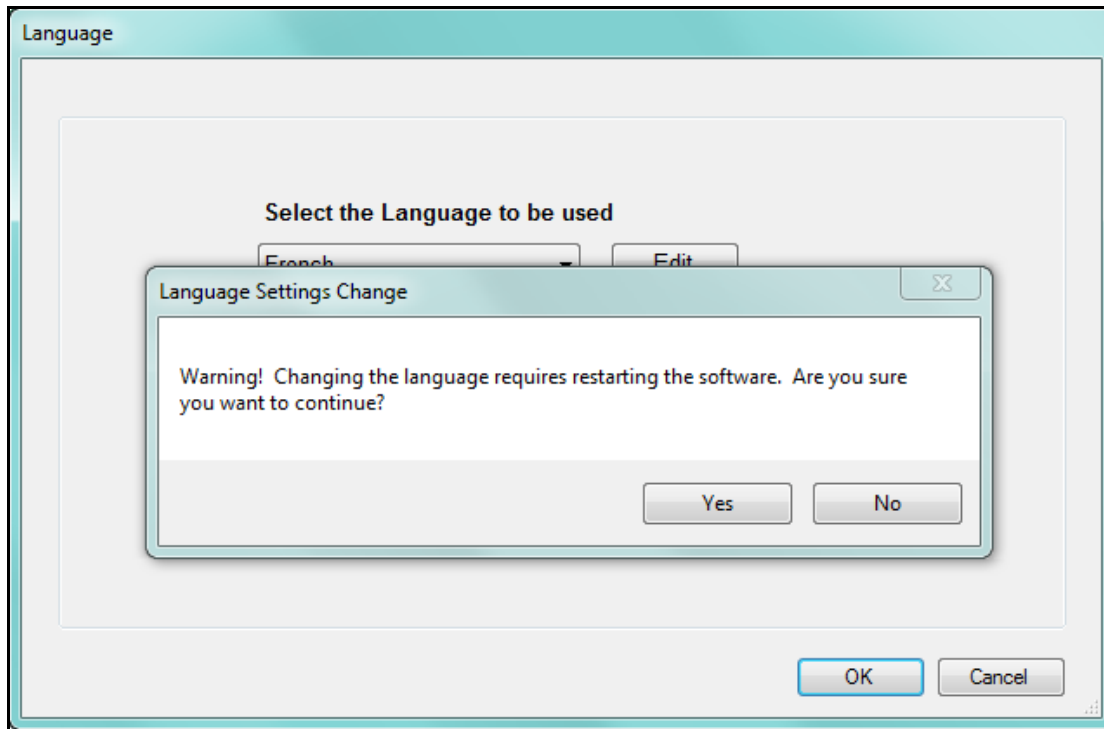


5. Use the screen shown above to enter the translations. You enter the translation in the Translation column for each term in the Phrase column. See the example screen on the next page.



6. When you have finished entering the translations, click Save Changes to save the language file.

7. The Language screen is redisplayed. Select the language you want to use from the pull-down menu and click OK. You will see the following confirmation window.

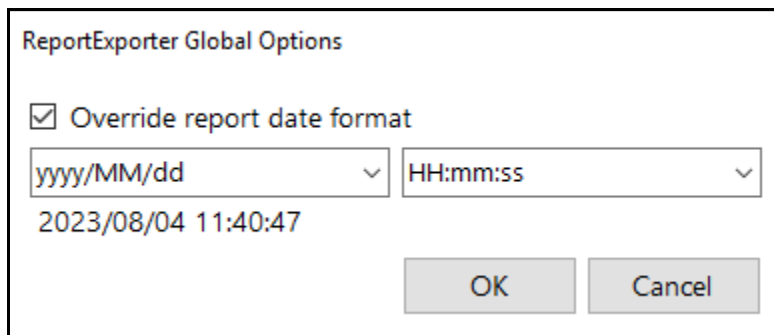


8. Click Yes. The software will shut down. Open it again to display the translated application.

### 18.11.3: ReportExporter Options

ReportExporter Options lets you perform a global change to the date and time formatting for all ReportExporter-generated reports.

1. Click Configure>ReportExporter Options from the Meter Manager Monitor screen's Menu bar.



The screenshot shows a dialog box titled "ReportExporter Global Options". It contains a checked checkbox labeled "Override report date format". Below the checkbox are two pull-down menus. The first menu shows the format "yyyy/MM/dd" and the second shows "HH:mm:ss". Below these menus, the date and time "2023/08/04 11:40:47" are displayed. At the bottom right of the dialog are "OK" and "Cancel" buttons.

2. Check the Override report date format box and select the date and time format you want to use for all of the reports from the pull-down menus.
3. Click OK to implement your new date and time settings for ReportExporter-generated reports.

### 18.11.4: Email Reporting Configuration

It is important to be notified if there is a script error or if a meter goes offline. The MeterManagerPQA® application lets you generate an email whenever there is a script error and/or whenever a meter goes offline. This feature alerts you to problems when they arise, so that you can respond to them quickly.

1. To set up email for MeterManagerPQA® software problems, click Tools>Configure>System>Email Reporting.

Email Reporting Configuration

Host (Server) Settings	Email Addresses
Host: <input type="text"/>	From: <input type="text"/>
Port: <input type="text"/>	To: <input type="text"/>
User: <input type="text"/>	
Password: <input type="password"/>	
SSL: <input type="checkbox"/> Email Server Requires SSL	

Reporting Options	
<input type="checkbox"/> Enable Email reporting of script errors	<input type="checkbox"/> Enable Email reporting when meter is offline for a period
<input type="checkbox"/> Enable Email reporting when meters go offline	<input type="checkbox"/> Enable Email reporting when there's new software update
<input type="checkbox"/> Enable Email on time synchronization	

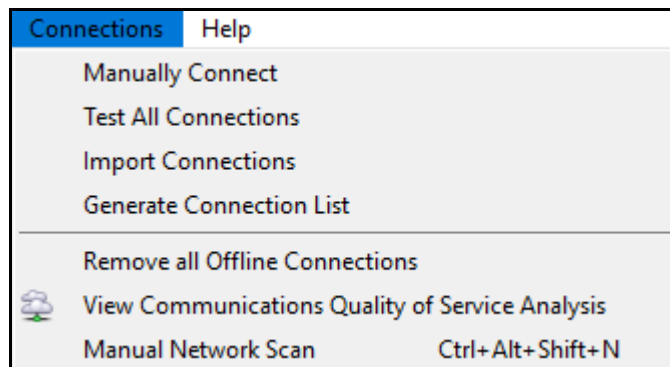
2. Enter:

- The Host (Server) email settings: Host, Port, User, Password.  
**NOTE:** For gmail host server settings, see [For Users of Gmail, on page 18-71](#).
- SSL: if the email server you are using requires SSL security, check this box.
- The From and To Email Addresses
- Reporting options: check the boxes next to the following options to implement those selections:
  - Enable Email Reporting of Script Errors - an email will be sent if a script encounters an error, e.g., if an error occurred while trying to convert a meter's logs, or it failed to retrieve a meter's logs.

- Enable Email Reporting When Meters Go Offline - an email will be sent if connection to a meter is lost.
  - Enable Email on Time Synchronization - an email will be sent when time is synchronized for a meter.
  - Enable Email Reporting When Meter is Offline for a Period.
  - Enable Email Reporting When There's New Software Update.
3. Click Test to send a test email.
  4. Click Save to save your settings.

## 18.12: Connections Tasks

Click Connections to see this sub-menu.



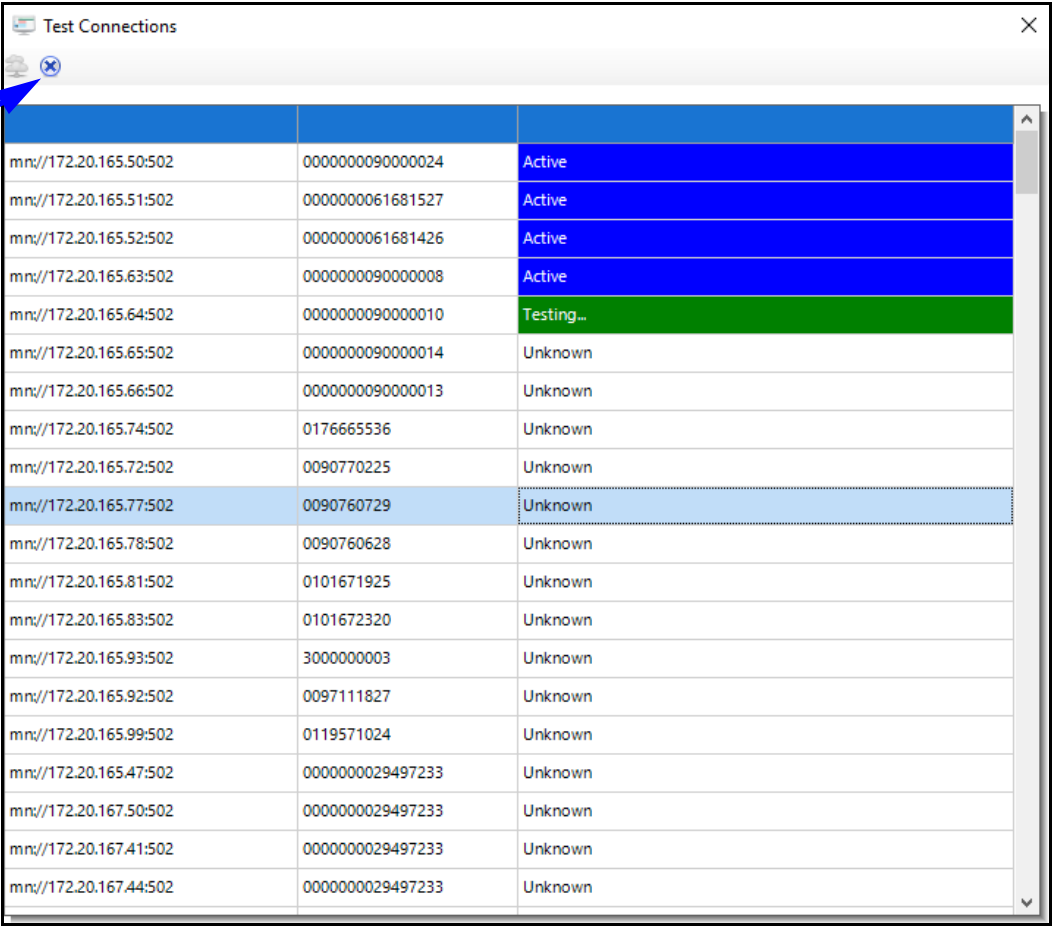
- Manually Connect is explained in [18.3.1.2: Add Meters to Meter List Manually, on page 18-28](#)).
- View Communications Quality of Service Analysis is explained in [18.7: View Communications Quality of Service Analysis, on page 18-103](#).

The other options are explained in the following sections.

18.12.1: Test All Connections

Click to test all of the meters to see if they are active. You will see the screen shown below as this process takes place.

Click this button to stop the testing



Test Connections		
mnz//172.20.165.50:502	0000000090000024	Active
mnz//172.20.165.51:502	0000000061681527	Active
mnz//172.20.165.52:502	0000000061681426	Active
mnz//172.20.165.63:502	0000000090000008	Active
mnz//172.20.165.64:502	0000000090000010	Testing...
mnz//172.20.165.65:502	0000000090000014	Unknown
mnz//172.20.165.66:502	0000000090000013	Unknown
mnz//172.20.165.74:502	0176665536	Unknown
mnz//172.20.165.72:502	0090770225	Unknown
mnz//172.20.165.77:502	0090760729	Unknown
mnz//172.20.165.78:502	0090760628	Unknown
mnz//172.20.165.81:502	0101671925	Unknown
mnz//172.20.165.83:502	0101672320	Unknown
mnz//172.20.165.93:502	3000000003	Unknown
mnz//172.20.165.92:502	0097111827	Unknown
mnz//172.20.165.99:502	0119571024	Unknown
mnz//172.20.165.47:502	0000000029497233	Unknown
mnz//172.20.167.50:502	0000000029497233	Unknown
mnz//172.20.167.41:502	0000000029497233	Unknown
mnz//172.20.167.44:502	0000000029497233	Unknown



### 18.12.2: Import Connections

A window will open prompting you to find the .csv connections file that you want to import. See the next section - Generate Connections List. for more information.

- During import, only the Group, Connection Str, and Meter Notes columns are used. All other fields will be automatically queried from the meter during meter discovery.
- In fact, the import file only needs to contain the "Connection Str" column. All other columns are optional.

**NOTES:**

- The new file format requires that the header be included, and thus will not work with any older imported files that were created with an earlier version of the MeterManagerPQA® application.
- The network connection string must be prefixed with "mn://", which indicates that a Modbus network connection is being specified. A serial connection can be specified with "ms://", such as "ms://COM29:57600,8,N,1".

### 18.12.3: Generate Connection List

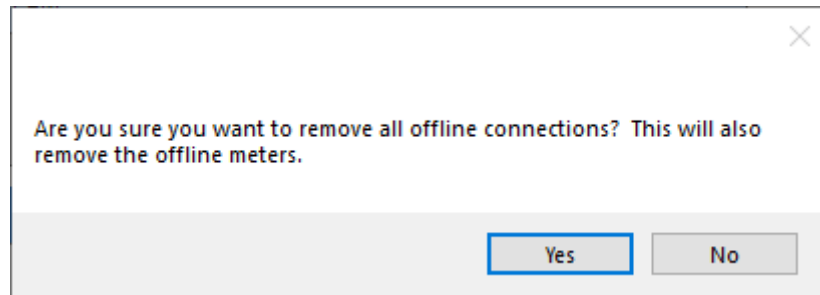
Click to save a list of the meter connections to a .csv file. You will be prompted to select a location for the file. The file will contain the following fields:

- Serial Number - the unique identifier of the meter
- Display Name - the meter designation programmed in the meter
- Device Type - the type of the meter, e.g., Shark® meter
- Connection Str - the connection information used to connect to the meter. Note that a single meter may have multiple connection entries
- Connection Status - the current status of the connection
- Last Active - the last time the software successfully connected to the meter
- Last Updated - the last time the software tried to connect to the meter

Once you have exported the list, you can make changes to it and then use the Import Connections feature (previous section) to import it back into the application.

#### 18.12.4: Remove All Offline Connections

Remove All Offline Connections - click to remove connections to meters that are offline. Since this will also remove the meters, you will be asked to confirm.



Click Yes to remove the offline connections and meters; click No to leave them.

### 18.12.5: Manual Network Scan

This feature is used to perform a parallel network meter scan. While the recommended method of meter discovery has already been explained (see 18.2.1.1: Add Meters to the Meter List Using Auto Discovery, on page 18-12), this method may be preferred for very large networks with many meters to discover, as it discovers meters more quickly due to: 1. the scan being run in parallel mode, and 2. there being no speed limiter, as with Auto Discovery. It also has the advantages of being manually begun whenever you want and allowing you to see the progress of meter discovery. Note that this will only detect meters at address 1, listening on Modbus TCP Port 502.

1. Click **Connections>Manual Network Scan**.

**Network Scan**

**Configuration**

Start Address: 172.20.166.1

End Address: 172.20.167.255

Address Search List:

Start IP	End IP
----------	--------

# Workers: 10

Scan Type: Ping

Ping Timeout: 100 ms

☐ Scan Gateway

00:00:13.0900000  
228/511

Cancel

---

**Scan**

Scanning IP	Status
172.20.166.210	Connected
172.20.166.225	Connected
172.20.166.226	Scanning
172.20.166.224	Connected
172.20.166.105	Connected
172.20.166.228	Scanning
172.20.166.222	Connected
172.20.166.223	Scanning
172.20.166.227	Scanning
172.20.166.221	Connected

---

**Results**

IP	Designation	Serial	Meter Type	Connection
172.20.166.202	0277149131	0277149131	E169 Run	mnx//172.20.166.202:502
172.20.166.203	wm-shark250-v3	0243278733	E169 Run	mnx//172.20.166.203:502
172.20.166.212	Rack_Dev_200	RACKDEV200	E149 Run	mnx//172.20.166.212:502

2. Enter the IP range to scan in start/end address and click the Plus button to add them to the scan list.
3. Select the number of parallel worker scans to use. This lets you scan multiple separate ranges of IP addresses. The example uses ten scans.
4. Scan Type is either Ping or TcpConnect:
  - Ping: a ping is first performed to make sure that a device is there to connect to. This method of scanning is faster than TcpConnect, but it may not work if the device or network doesn't allow pinging. You have the option of increasing the ping timeout to accomodate discovery of slow devices, but this will slow down the scanning time, significantly.
  - TcpConnect: this scan is performed by opening a TCP connection to port 502. This is a very slow method, as each connection must wait the full 30 seconds (minimum) TCP timeout before giving up.
5. Click Start to begin the scan.
  - Each scan displays its current status on the top right of the screen.
  - Discovered meters are displayed on the bottom of the screen.
  - The scan progress is displayed next to the cancel button.
  - Click the cancel button at any time to abort the scan. Note, if the software is attempting to connect to a meter at that time, the scan may continue for a short time after you click the Cancel button.
  - All discovered meters will automatically be added to the Meter List, in the Unassigned Group.
6. When you are done, click the X in the upper right-hand corner of the screen, to close it.

### 18.13: Search Meters

The Search Meters feature lets you perform functions on multiple meters at one time, as well as to find specific meters in a large list of meters. To open the Meter Search screen, press Ctrl+F from anywhere in the Meter Manager Monitor.

Meter Name	Serial #	Group	Primary Connection
Nexus1500P_82	0000000113599533		mn://
Nexus1500P_83	0000000090007723		mn://
Nexus1500P_86	0000000176837234		mn://
Nexus1500P_87	0000000054211013		mn://
Nexus1500P_84	0000000113599028		mn://
Nexus1500P_85	0000000078181631		mn://
Nexus1500P_IP110	0000000113599432		mn://
Nexus1500P_99	0000000181528631		mn://

1. This screen gives you the following search options:

- The bar at the top of the screen is a string comparison against all meter fields, including meter name, serial, group, connection, meter type, and notes. You can enter any value in it that you want to search on.
- Serial - enter part or all of a serial number.
- Name - enter part or all of a meter name.
- Meter Type - select the meter type from the pull-down menu.
- Online status - select Online, Offline, or Inactive (if the meter's last connection activity is more than a day ago, it is considered inactive) from the pull-down menu.

2. Click Search. When meter(s) are found that match the search criteria, they are displayed in the lower portion of the screen.
  - The filters restrict the results to only those fields that match. A blank in a search field will bring up all results for that field. However, if you specify no search criteria, you will get no results.
3. From the list of found meters, you can perform all actions that are available from the main screen, including connecting, viewing logs, and moving meters to a group, for either one meter or a group of meters.
  - To perform actions on one meter, right-click on the meter in the list and select the action from the pull-down menu.
  - To perform actions on multiple meters, hold down Ctrl while clicking meter entries. When you right-click and select an action from the pull-down menu, the action will apply to all selected meters. You can select a range of meters by holding Shift while selecting the first and last meter in the range.
4. Click outside of the Search Meters screen to close it. When you open it again, the last search options will be displayed.

## 18.14: Service Control

The Service Control functions: Restart Service, Stop Service, Kill All, Kill Processes, all require admin permission to execute. Following is a description of the functions:

- Restart Service: This will restart the MeterManagerPQA® application Scheduler.
- Stop Service: This will stop the MeterManagerPQA® application Scheduler.

**WARNING!** This will prevent the MeterManagerPQA® application from working.

**NOTE:** The MeterManagerPQA® application Service will automatically restart the next time you reset your PC.

- Kill All: This will “kill” all processes related to the MeterManagerPQA® application, including the CommunicatorPQA® application, Log Retrieval, Log Converter, and the MeterManagerPQA® application Scheduler.

**WARNING!** This will prevent the MeterManagerPQA® application from working.

**NOTE:** The MeterManagerPQA® application Service will automatically restart the next time you reset your PC.

- Kill Processes: This will kill all processes which are launched by the MeterManagerPQA® application, including the CommunicatorPQA® application, Log Retrieval, and Log Converter.

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# 19: Viewing Logs

## 19.1: Overview

Most EIG meters have the ability to store in internal memory information about the circuit they are monitoring. There are multiple types of logs that are created in meter memory that store this data along with its timestamp. The meters have a variety of different logs. These logs are designed to provide data about a specific aspect of the electrical circuit being measured.

LogViewerPQA® is the charting and graphing application that comes with the CommunicatorPQA® V6 Sofsoftware. This application is database driven, and it normalizes data that comes from any meter, so that LogViewerPQA displays the data in a concise easy-to-understand presentation.

Chapter 16 explained the CommunicatorPQA® application's databases and log data, log retrieval, and log archiving; Chapter 17 explained using Script & Scheduler to automate log retrieval; and Chapter 18 explained using the MeterManagerPQA® application to automate log retrieval. This chapter explains how to use the LogViewer-PQA application to view the meter's data logs, and gives details on the available logs.

**NOTE:** Software versions earlier than V6 have the legacy LogViewerPQA. If you are not upgrading to V6 yet, see the software manual in the earlier versions (click Help>Contents from the software's Main screen to open the manual) for instructions on using LogViewerPQA.

### 19.1.1: Available Logs

- Historical Trends logs:
  - These logs are collections of timestamped records (or "snapshots") used to track any parameter over time. Each record or snapshot can contain multiple data items, which are recorded at specific intervals and stamped with the time of recording. The following programmable criteria determine when the meter will take a snapshot:
    - The user-specified time interval.
    - A parameter's exceeding of a limit or a return to within limits.
    - An I/O event (a change in a relay or high-speed input).
    - EN 50160/IEC 61000-4-30 data.

- The Nexus® 1252/1262/1272 meters have two historical logs; the Shark® 200/200S meters have three historical logs; the Shark® 250/270 meters have six historical logs; the MP200-Y/MP200-S metering system has two historical logs; the Nexus® 1500/1500+ meters have eight historical logs; and the Nexus® 1450 meter has eight historical logs and a CORE™ log that automatically records readings for 172 parameters at the programmed logging interval.

**NOTES:**

- End of Interval (EOI) Demand settings will not trigger an entry into a historical log. Historical logs record only on the programmed interval. If you have configured EOI triggered Demand calculation, the computed value closest to the time the log is recorded will be saved in the log.
- Historical logs are recorded sequentially for all logs with the same recording interval, i.e., Log 1, then Log 2, and so on. For this reason, if you record the same channel reading in multiple logs, the values of the readings may not be the same.
- Out of Limit (Limits) Log: the log retrieves independent out-of-limit information, creating a sequence of events for any occurrence.
- (Event-Triggered) Waveform log: the event-triggered Waveform log records a waveform when a user-programmable value goes out of limit and when the value returns to normal. All information is timestamped to the nearest 1 ms. A new feature for interharmonic analysis observes further frequencies.
- Power Quality (CBEMA) log: this log records magnitude and duration of voltage and current surges and sags for every power quality (PQ) event.
- Status Change (Input) log: this log displays the inputs change status for a selected meter file and time range.
- Control Output (Relay) log: this log displays the relay change status for a selected meter file and time range.
- System Events log: the System Events log provides data for security and anti-tampering. It contains information on instances of the following: power up/power down, password access/modification, change of programmable settings, change of a run time, change of clock time by communication (Modbus or DNP), Test Mode usage, and meter resets (Logs, Max/Min, Energy).

- Flicker log: the log records Flicker information for a selected meter and time range (only available for Nexus® meters).
- EN 50160.: for the EIG meters that support EN 50160, this log is the EN 50160 report.

### **19.1.2: Log Procedure Sequence**

The following is the general sequence for working with all meter logs:

1. Program parameters specific to each log in the meter's Device Profile (see the programming chapter for your meter type). Logs run automatically on the programmed interval/criteria.
2. Retrieve the logs manually from the meter; or retrieve logs automatically using the MeterManagerPQA® application or the Script & Scheduler application. See chapters 16, 17, and 18 for details.
3. View and analyze log data using LogViewerPQA (explained in [19.2: LogViewerPQA, on page 19-4](#)).
4. Diagnose PQ Events from meter logs; create comprehensive reports; use the EnergyReporterPQA™ application to generate usage reports and billing.

## 19.2: LogViewerPQA

The CommunicatorPQA® application's LogViewerPQA displays retrieved logs in a variety of formats.

1. You can access LogViewerPQA in one of two ways:

- Right-click on the meter in the MeterManagerPQA software's Meter List and select View Meter Logs. Go to step 2.

**OR**

- Click the Open Log icon in the Icon bar of the CommunicatorPQA® V6 software's Main screen.

Pick Meter to Open Log

Meter Name	Meter Type	Online Status	Next Action
unassigned			
0000000020375017	Nexus 1252	Online	
MP200			
MP200_1	MP200	Online	
MP200_2	MP200	Online	
MP200_3	MP200	Online	
MP200_4	MP200	Online	
MP200_5	MP200	Online	
MP200_6	MP200	Online	

Log Location      datasource=<127.0.0.1>,dataname='m\_0000000020375017',port=5432,db\_type=POSTGRE

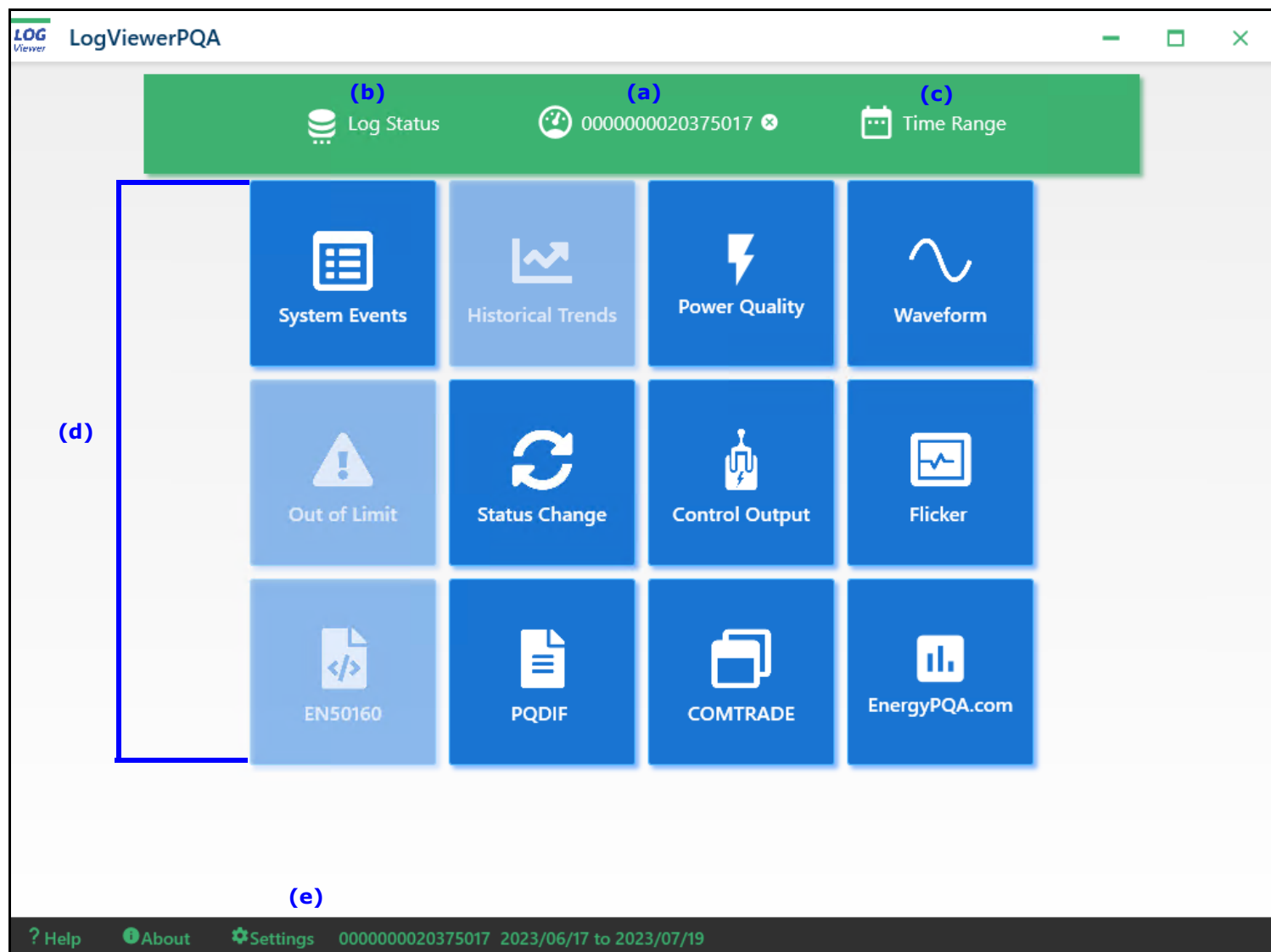
Select Log      **Select**      Cancel

a. Click on the meter whose log you want to view and click Select.

**NOTE:** The location of the log is displayed at the bottom of the screen. If you want to select another, specific log, click Select Log to open the Retrieved Logs directory, from which you can locate the downloaded file you want to view.

Note that if you are in Lite mode, the CommunicatorPQA® application will open the Retrieved Logs directory, prompting you to pick a previously stored log file

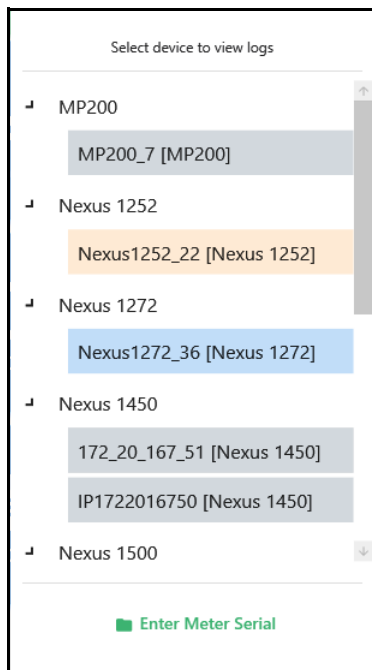
2. LogViewerPQA opens.



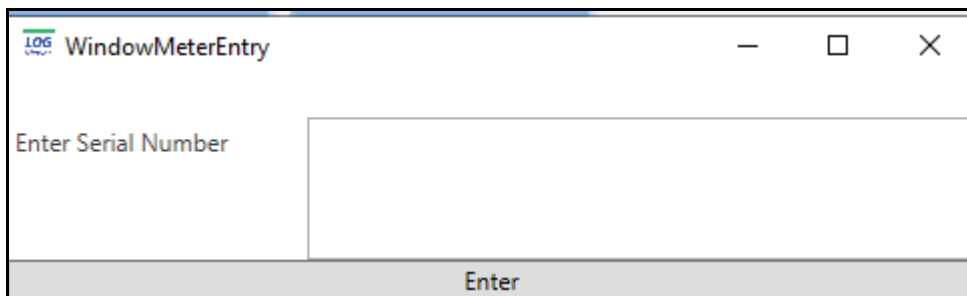
2. The main LogViewerPQA screen displays:

- The meter you selected (a).
  - To remove the meter, click the X to the right of its name.

- To select another meter, click the meter icon to the left of the meter name (a). You will see this screen.



- Click on the name of the meter whose logs you want to view.
- You can click Enter Meter Serial to select a meter by entering the serial number. You will see this screen.

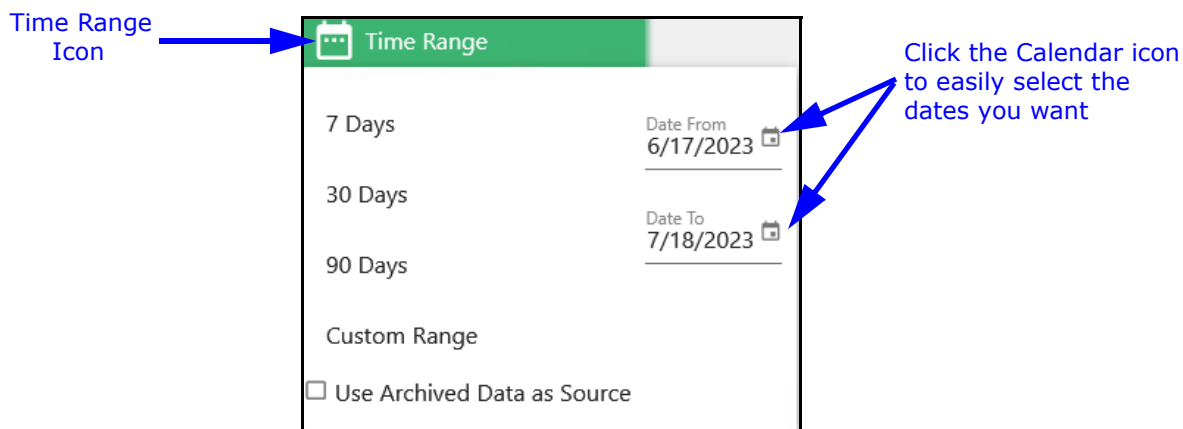


- Enter the meter's serial number and click Enter.
- The new meter will be displayed in the LogViewerPQA's main screen.

- The Log Status icon (b). Click this icon to display the meter's log history.

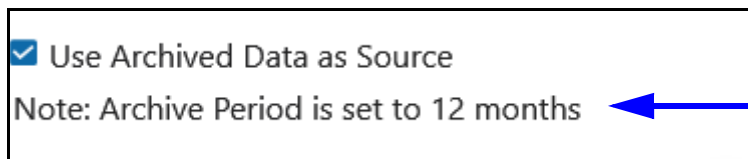
Log Status				
Designation	Serial	Meter Type	Database Size	Database Age ^
0000000020375017	0000000020375017	Nexus 1252	19.76MB	135 days
Log Name      First Time    Last Time    # Days    # Records				
<ul style="list-style-type: none"> <li>&gt; Historical</li> <li>&gt; System Events</li> <li>&gt; PQ</li> <li>&gt; Waveform Samples</li> </ul>				

- The Time Range icon lets you set the time range for the log's data display. Click the icon to specify the time range you want.



- Select from 7 days, 30 days, 90 days, or click Custom Range to edit the Date From and Date To fields.

- Check the Use Achived Data as Source to view only archived data rather than more recent data.



This message shows the programmed Archive period.

The selection here will return data older than 12 months.

- The logs are listed on the bottom of the screen (d). You click the Log's button to view the data for that log. The buttons of unavailable logs are grayed out and unselectable.
  - The bottom of the LogViewerPQA's main screen contains links to the *CommunicatorPQA® and MeterManagerPQA® Software User Manual (? Help)*, details of the LogViewerPQA application (About), Data and Graph display settings (Settings), Meter ID, and time range of data display.
3. Click on the icon of the log you want to view.

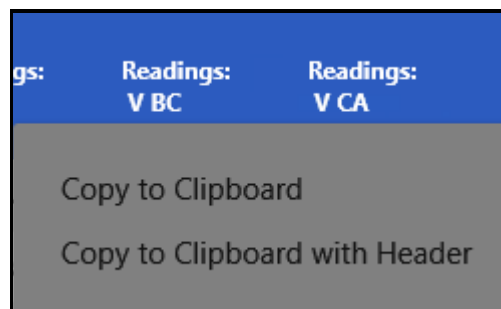
### 19.3: LogViewerPQA Log Screens

The following sections explain the available LogViewerPQA screens. Note that not all logs are available for all meters.

#### 19.3.1: General LogViewerPQA Instructions

Following is an explanation for general commands for the log screens.

- You can copy all the log data to the clipboard by right-clicking in the column title. Click Copy to Clipboard to copy only the data. Click Copy to Clipboard with Header to copy the column headings as well.
- You can sort the log data in the columns between ascending and descending order by clicking next to the column title. You will see an up or down arrow, which you can use to change the data display to ascending or descending order.
- Some of the LogViewerPQA screens have a Filter button that lets you select specific data to view.





- You can export the log data to a CSV file, by clicking the Export button at the top of a log screen. You will be prompted to give the file a name and save it to the location you want.
- Click the Back arrow to return to the main LogViewerPQA screen.

### 19.3.2: System Events Log

The System Event Log records and timestamps a variety of events, including the following:

- Download started or ended for one of the meter logs.
- Run Time is active, started or stopped.
- Firmware has been changed.

To view the System Event log, click the System Events button.

Start Date/Time	Event Type	Description
7/7/2023 1:30:07.950 AM	Log Download	Download ended for System Event Log from Port 2: 10/100 BaseT Ethernet
7/7/2023 1:29:58.680 AM	Log Download	Download ended for PQ Log from Port 2: 10/100 BaseT Ethernet
7/7/2023 1:29:30.990 AM	Log Download	Download ended for Waveform Trigger Log from Port 2: 10/100 BaseT Ethernet
7/7/2023 1:29:30.990 AM	Log Download	Download ended for Waveform Sample Log from Port 2: 10/100 BaseT Ethernet
7/7/2023 1:29:29.430 AM	Log Download	Download started (while logging) for System Event Log from Port 2: 10/100 BaseT Ethernet
7/7/2023 1:22:24.860 AM	Log Download	Download ended for Flicker Log from Port 2: 10/100 BaseT Ethernet
7/7/2023 1:22:02.440 AM	Log Download	Download ended for Digital Input State Log from Port 2: 10/100 BaseT Ethernet
7/7/2023 1:22:00.370 AM	Log Download	Download ended for Historical Log 2 from Port 2: 10/100 BaseT Ethernet
7/7/2023 1:21:34.220 AM	Log Download	Download started (while logging) for Flicker Log from Port 2: 10/100 BaseT Ethernet
7/7/2023 1:19:14.020 AM	Log Download	Download ended for Historical Log 1 from Port 2: 10/100 BaseT Ethernet
7/7/2023 1:18:44.080 AM	Log Download	Download started (while logging) for Historical Log 2 from Port 2: 10/100 BaseT Ethernet
7/7/2023 1:16:55.020 AM	Log Download	Download started (while logging) for Historical Log 1 from Port 2: 10/100 BaseT Ethernet
6/27/2023 12:53:17.560 PM	Log Download	Download ended for System Event Log from Port 2: 10/100 BaseT Ethernet
6/27/2023 12:51:54.920 PM	Log Download	Download started (while logging) for System Event Log from Port 2: 10/100 BaseT Ethernet
6/27/2023 12:48:36.990 PM	Log Download	Download ended for Flicker Log from Port 2: 10/100 BaseT Ethernet
6/27/2023 12:46:39.220 PM	Log Download	Download started (while logging) for Flicker Log from Port 2: 10/100 BaseT Ethernet

? Help About Settings 0000000020375017 2023/06/16 to 2023/07/18

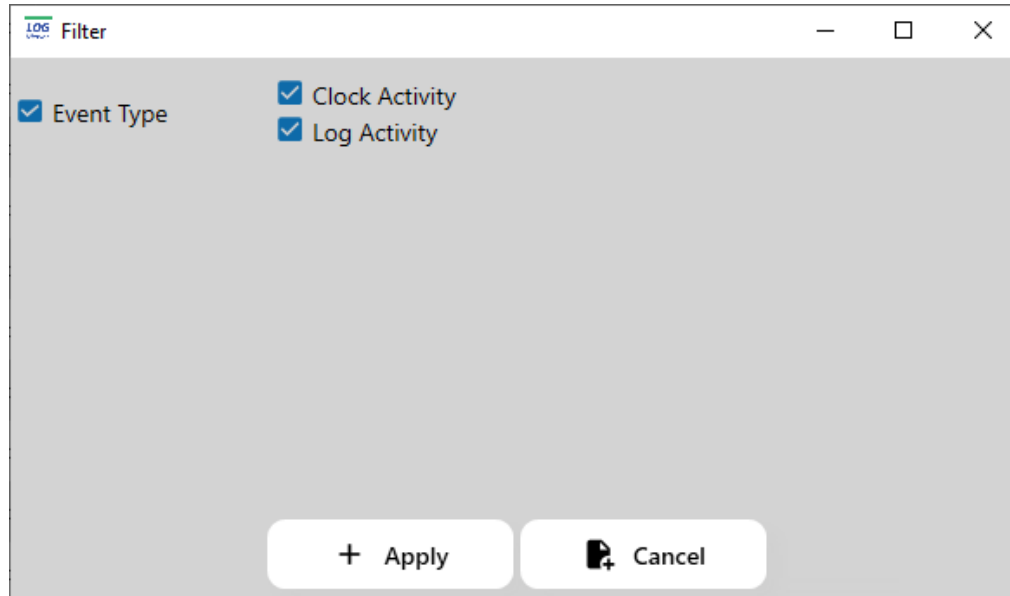
The screen fields are as follows:

- (a) Event timestamp.
- (b) Event type, e.g., Log Activity.
- (c) Description of the event.
- (d) Time Range icon.

(e) Export icon.

(f) Filter icon.

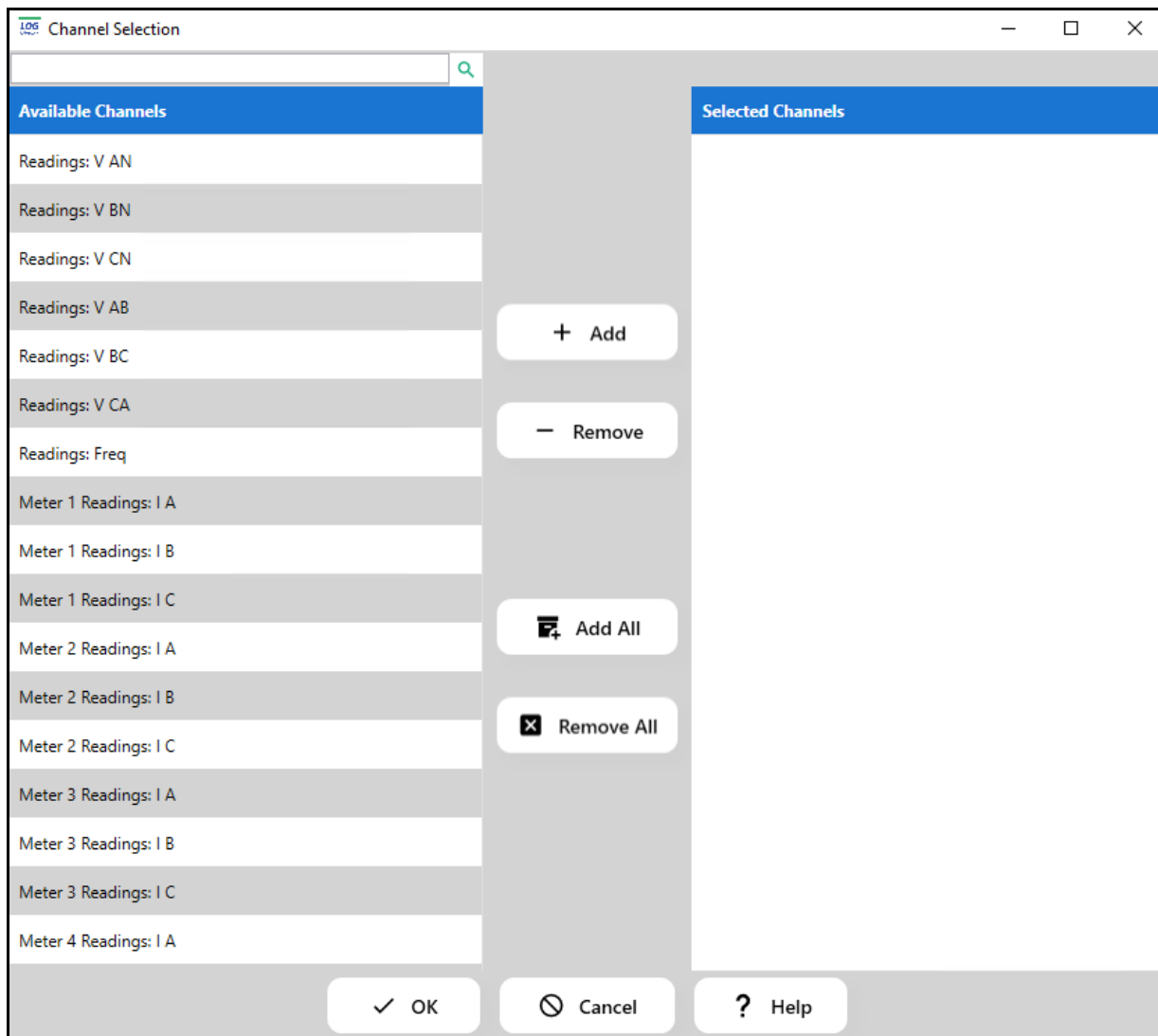
- To filter the events that are listed, click the Filter icon.



This Filter screen lets you select which Event Type you want to see. All event types in the System Events log for the time range you selected will be listed. Check the box of the events you want to see and leave the box unchecked for any event types you want to exclude from the display.

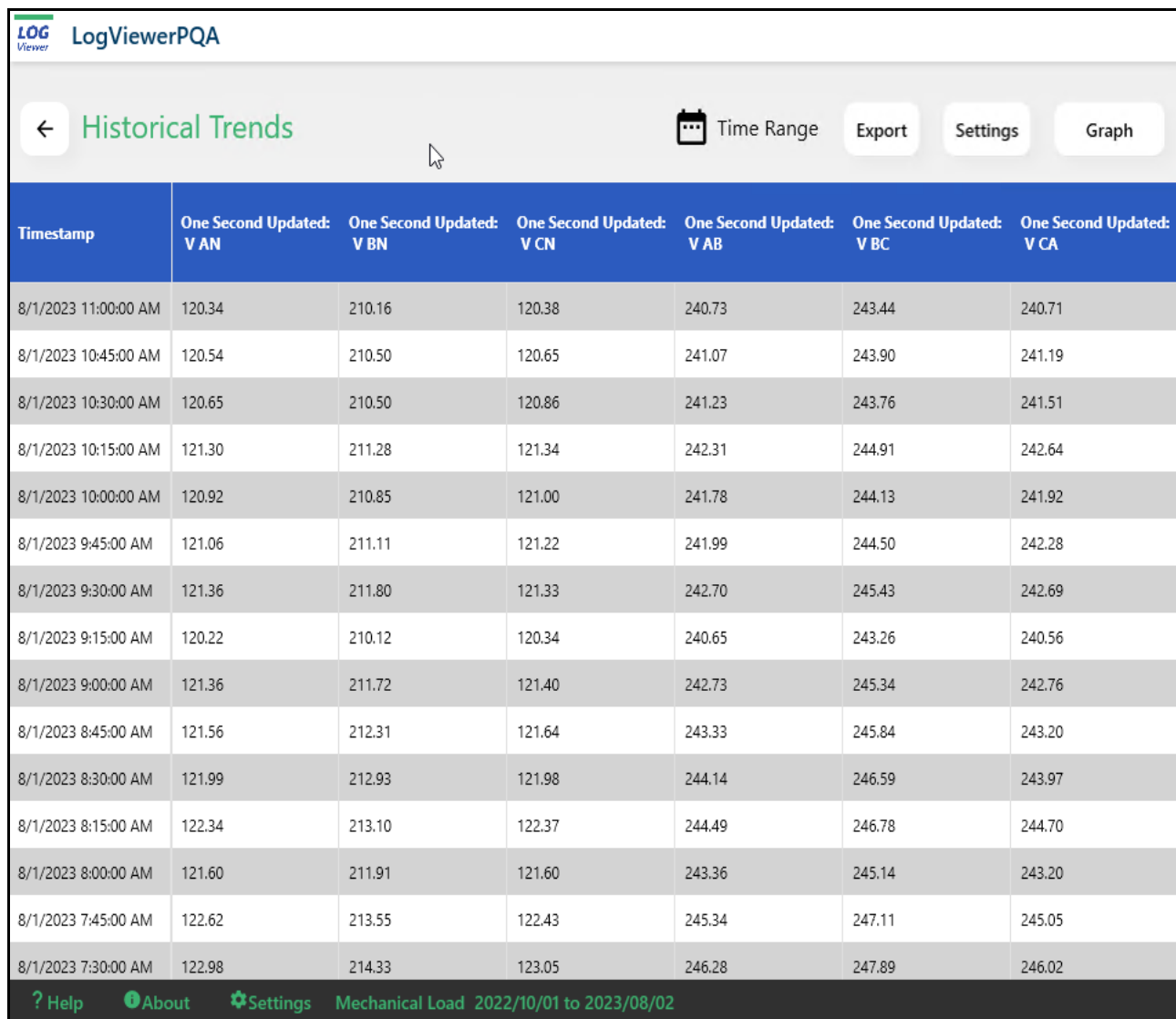
### 19.3.3: Historical Trends Log

1. From LogViewerPQA's main screen, click the Historical Trends button. The Channel Selection screen opens, displaying available channels from the Historical logs.



2. Click and Add individual items with the +Add button or click Add All. The selected items are copied to the Selected Channels box.
  - You can use the Shift button to highlight a range of channels and then click Add to add them all to the Selected Channels box.

3. Click OK. The Historical Trending screen opens, displaying information for the selected channels based on the time range selected.



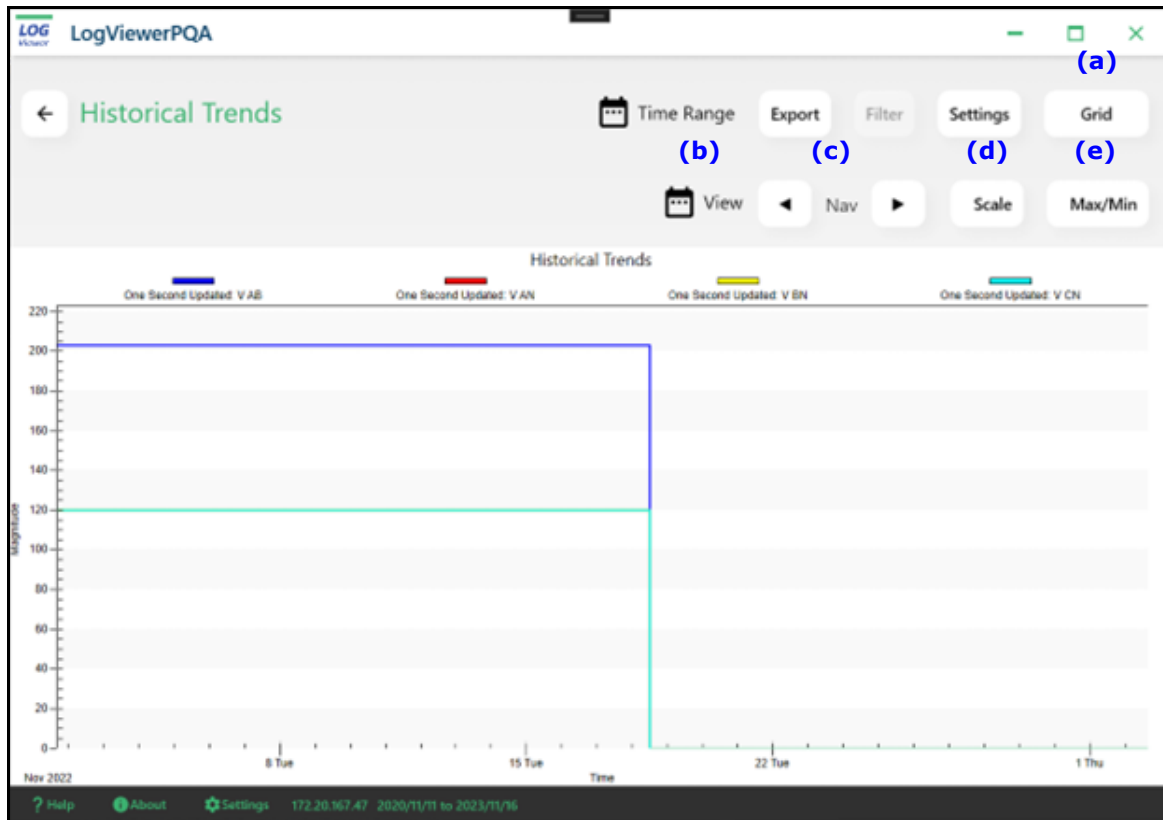
Timestamp	One Second Updated: V AN	One Second Updated: V BN	One Second Updated: V CN	One Second Updated: V AB	One Second Updated: V BC	One Second Updated: V CA
8/1/2023 11:00:00 AM	120.34	210.16	120.38	240.73	243.44	240.71
8/1/2023 10:45:00 AM	120.54	210.50	120.65	241.07	243.90	241.19
8/1/2023 10:30:00 AM	120.65	210.50	120.86	241.23	243.76	241.51
8/1/2023 10:15:00 AM	121.30	211.28	121.34	242.31	244.91	242.64
8/1/2023 10:00:00 AM	120.92	210.85	121.00	241.78	244.13	241.92
8/1/2023 9:45:00 AM	121.06	211.11	121.22	241.99	244.50	242.28
8/1/2023 9:30:00 AM	121.36	211.80	121.33	242.70	245.43	242.69
8/1/2023 9:15:00 AM	120.22	210.12	120.34	240.65	243.26	240.56
8/1/2023 9:00:00 AM	121.36	211.72	121.40	242.73	245.34	242.76
8/1/2023 8:45:00 AM	121.56	212.31	121.64	243.33	245.84	243.20
8/1/2023 8:30:00 AM	121.99	212.93	121.98	244.14	246.59	243.97
8/1/2023 8:15:00 AM	122.34	213.10	122.37	244.49	246.78	244.70
8/1/2023 8:00:00 AM	121.60	211.91	121.60	243.36	245.14	243.20
8/1/2023 7:45:00 AM	122.62	213.55	122.43	245.34	247.11	245.05
8/1/2023 7:30:00 AM	122.98	214.33	123.05	246.28	247.89	246.02

? Help About Settings Mechanical Load 2022/10/01 to 2023/08/02

4. The screen displays the timestamp of the data and the selected channel readings.

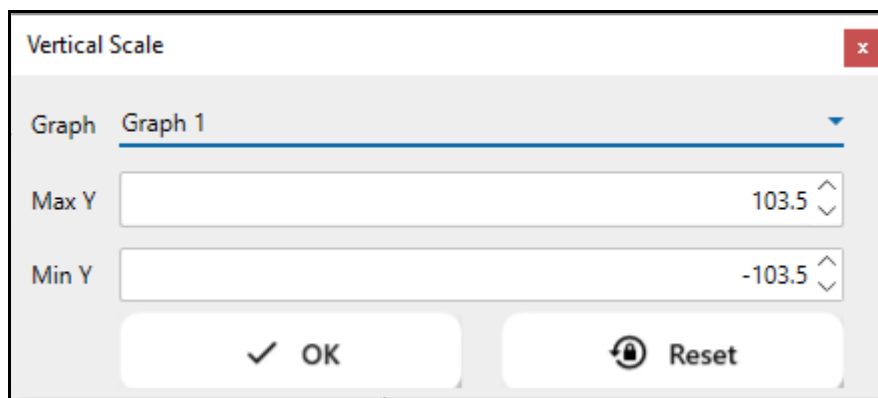
- You can select different data channels to view by clicking Settings.

- Click Graph to see the historical log data in a graph format. See the example below.



- Click Grid (a) to return to the Historical Trends log list of data records.
- Click View (b) to set a time range for the data in the graph.
- Use the Nav (c) forward and back arrow buttons to see all of the graph data. You can also scroll up and down in the screen using your mouse.

- Click Scale (d) to scale the data. You will see the screen shown below.



A dialog box titled "Vertical Scale" with a close button (X) in the top right corner. It contains a dropdown menu labeled "Graph" with "Graph 1" selected. Below this are two input fields: "Max Y" with a value of 103.5 and "Min Y" with a value of -103.5. At the bottom are two buttons: "OK" with a checkmark icon and "Reset" with a circular arrow icon.

- Use the up and down arrows to set the vertical scaling you want to use for the graph.
- Click OK to apply your changes or Restore to set the scaling back to its default. You will see the display change as you adjust the scaling.
- Click Max/Min (e) to display a screen with the timestamped maximum, minimum, and average values for the selected Historical Trends log data channels.



A table titled "Historical Max/Min" with a close button (X) in the top right corner. The table has six columns: Channel, Max Value, Max Time, Min Value, Min Time, and Average. It contains four rows of data for channels I A, I B, I C, and V AB.

Channel	Max Value	Max Time	Min Value	Min Time	Average
One Second Updated: I A	0.00	7/30/2023 11:59:00 PM	0.00	5/2/2023 12:00:00 AM	0.00
One Second Updated: I B	0.00	7/30/2023 11:59:00 PM	0.00	5/2/2023 12:00:00 AM	0.00
One Second Updated: I C	0.00	7/30/2023 11:59:00 PM	0.00	5/2/2023 12:00:00 AM	0.00
One Second Updated: V AB	0.00	7/30/2023 11:59:00 PM	0.00	5/2/2023 12:00:00 AM	0.00

- Click Close when you are finished with the Historical Max/Min screen.

### 19.3.4: Power Quality Log

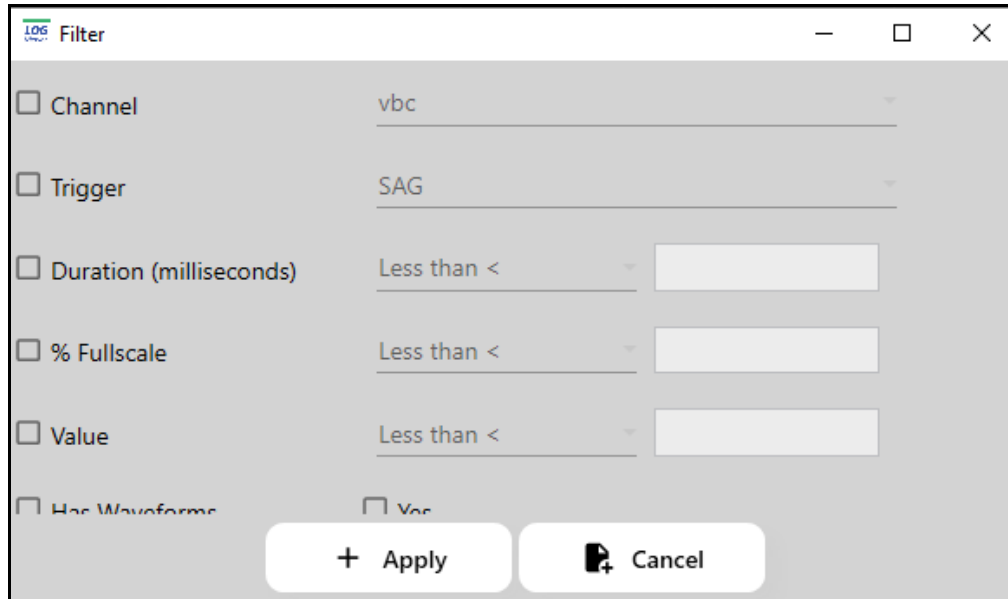
From LogViewerPQA's main screen, click the Power Quality button. LogViewerPQA will display power quality information for the selected time range.

Start Date/Time	End Date/Time	Duration (ms)	Condition	% of FullScale	Value	Has Waveforms
7/15/2023 5:15:41.740 AM	7/15/2023 5:15:42.855 AM	1,115.00	VAB Sag	0.00	0.00	✓
7/15/2023 5:15:39.640 AM	7/15/2023 5:15:42.855 AM	3,215.00	VBC Sag	0.00	0.00	✓
7/12/2023 7:13:26.367 AM	7/15/2023 5:15:38.772 AM	252,132,405.00	VCA Sag	212.49	254.99	✓
7/12/2023 7:13:26.282 AM	7/15/2023 5:15:39.640 AM	252,133,358.00	VAB Surge	212.21	254.65	✓
7/12/2023 7:13:26.282 AM	7/15/2023 5:15:38.772 AM	252,132,490.00	VBC Surge	213.01	255.61	✓
7/12/2023 7:13:26.082 AM	7/12/2023 7:13:26.267 AM	185.00	VCA Surge	165.89	199.07	✓
7/12/2023 7:13:25.750 AM	7/12/2023 7:13:25.932 AM	182.00	VBC Sag	3.18	3.82	✓
7/12/2023 7:13:25.267 AM	7/12/2023 7:13:25.450 AM	183.00	VBC Surge	185.83	223.00	✓
7/12/2023 7:13:25.067 AM	7/12/2023 7:13:25.150 AM	83.00	VBC Surge	3.77	4.52	✓
7/12/2023 7:13:18.750 AM	7/12/2023 7:13:18.832 AM	82.00	VBC Surge	3.79	4.55	✓
7/12/2023 7:13:18.750 AM	7/12/2023 7:13:18.832 AM	82.00	VAB Surge	1.91	2.29	✓
7/12/2023 7:13:18.017 AM	7/12/2023 7:13:18.100 AM	83.00	VAB Surge	0.17	0.20	✓
7/12/2023 7:13:17.482 AM	7/12/2023 7:13:17.567 AM	85.00	VCA Surge	3.78	4.54	✓
7/12/2023 7:13:17.250 AM	7/12/2023 7:13:17.567 AM	317.00	VBC Sag	0.24	0.29	✓
7/12/2023 7:13:16.832 AM	7/12/2023 7:13:17.150 AM	318.00	VBC Surge	169.53	203.44	✓
7/12/2023 7:12:54.167 AM	7/12/2023 7:12:54.250 AM	83.00	VCA Surge	1.90	2.28	✓

? Help   About   Settings   0000000020375017   2023/06/17 to 2023/07/18



- Click Filter to restrict the data records that are shown.



The screenshot shows a 'Filter' dialog box with the following options and settings:

- ☐ Channel: vbc
- ☐ Trigger: SAG
- ☐ Duration (milliseconds): Less than < [ ]
- ☐ % Fullscale: Less than < [ ]
- ☐ Value: Less than < [ ]
- ☐ Has Waveforms: ☐ Yes

At the bottom, there are two buttons: '+ Apply' and 'Cancel'.

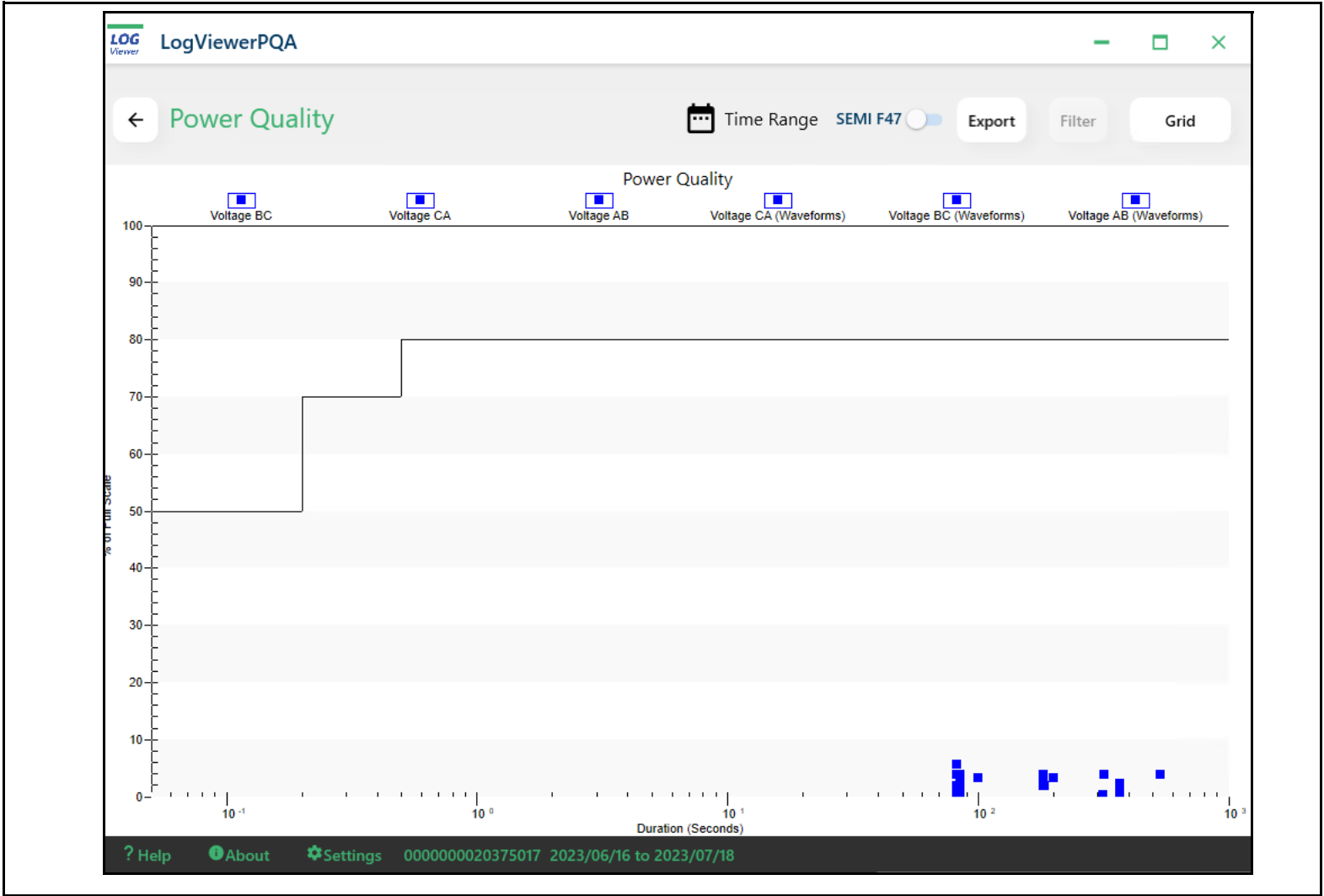
- You can specify a channel, trigger, duration, % (of) Fullscale, Value, and whether or not the record has a waveform.
- Click Apply to apply the filters you selected. Click Cancel if you want to cancel filtering.
- Note that a 1500+ meter with runtime firmware version 15.2 or higher has an additional column called Reference Usr. If the  $U_{SR}$  setting has been used for the waveform rather than the Full Scale setting, the value used is shown here and the % of Full Scale column says % of Usr. See [11.3.3: PQ Thresholds \(Waveform Recording\)](#), on page 11-68, for information on the  $U_{SR}$  setting.

- To view a graph of any PQ record, click on the record and then click the Graph button. The first graph is the CBEMA Curve graph.



- To see the SEMI F47 graph, click on CBEMA at the top of the screen to change it to SEMI F47.





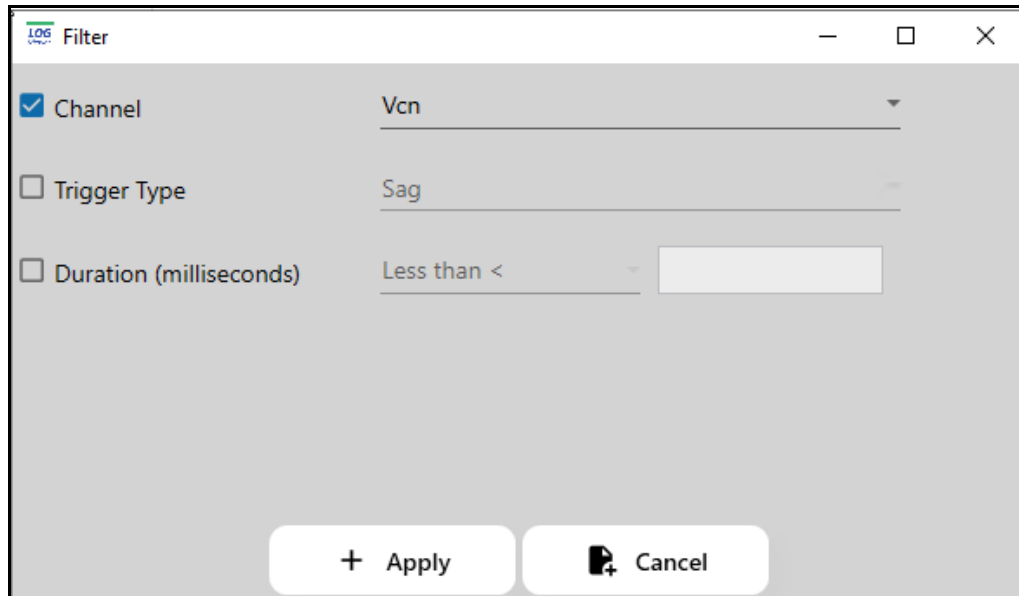
- This diagram meets the standards of the Specification for Semiconductor Processing Equipment Voltage Sag Immunity.

### 19.3.5: Waveform Log

From LogViewerPQA's main screen, click the Waveform button. LogViewerPQA will display waveform information for the selected time range.

LogViewerPQA													
Waveform													
Time Range Export Filter Graph													
Start Date/Time	End Date/Time	Trigger Date/Time	Duration (ms)	Trigger	Vab RMS	Vbc RMS	Vca RMS	Vaux RMS	Ia RMS	Ib RMS	Ic RMS	In RMS	
7/15/2023 5:15:43.907 AM	7/15/2023 5:15:44.040 AM	7/15/2023 5:15:43.940 AM	133.33	Va=Sag, Vb=Sag	15.09	15.14	0.35	0.00	0.01	0.00	0.00	0.01	
7/15/2023 5:15:42.822 AM	7/15/2023 5:15:42.955 AM	7/15/2023 5:15:42.855 AM	133.33	Vb=Normal, Va=Normal	113.22	113.30	0.54	0.00	0.00	0.00	0.01	0.01	
7/15/2023 5:15:41.707 AM	7/15/2023 5:15:41.840 AM	7/15/2023 5:15:41.740 AM	133.33	Va=Sag, Vc=Sag	52.74	0.64	52.72	0.00	0.00	0.00	0.00	0.00	
7/15/2023 5:15:39.607 AM	7/15/2023 5:15:39.740 AM	7/15/2023 5:15:39.640 AM	133.33	Va=Normal, Vb=Sag	126.77	48.44	113.03	0.00	0.00	0.00	0.01	0.00	
7/15/2023 5:15:38.739 AM	7/15/2023 5:15:38.872 AM	7/15/2023 5:15:38.772 AM	133.33	Vb=Normal, Vc=Normal	207.38	121.97	119.82	0.00	0.00	0.00	0.00	0.00	
7/12/2023 7:13:26.434 AM	7/12/2023 7:13:26.567 AM	7/12/2023 7:13:26.367 AM	133.33	Vc=Surge, Vb=Normal, Va=Surge, Vc=Normal, Vb=Surge, Va=Normal	244.13	244.59	189.00	0.00	0.95	0.00	0.93	0.00	
7/12/2023 7:13:26.301 AM	7/12/2023 7:13:26.434 AM	7/12/2023 7:13:26.282 AM	133.33	Va=Normal, Vb=Normal, Vc=Sag, Va=Sag, Vb=Sag	4.35	22.87	18.69	0.00	0.00	0.00	0.13	0.01	
7/12/2023 7:13:26.166 AM	7/12/2023 7:13:26.299 AM	7/12/2023 7:13:26.167 AM	133.33	Vb=Surge, Va=Normal, Va=Surge, Vc=Surge, Vb=Normal, Vc=Normal	182.29	188.39	181.47	0.00	0.84	0.00	0.80	0.01	
7/12/2023 7:13:26.034 AM	7/12/2023 7:13:26.167 AM	7/12/2023 7:13:25.950 AM	133.33	Vc=Normal, Va=Normal, Vc=Surge, Vb=Surge, Va=Surge	187.79	196.02	211.25	0.00	1.30	0.00	1.28	0.00	
7/12/2023 7:13:25.901 AM	7/12/2023 7:13:26.034 AM	7/12/2023 7:13:25.850 AM	133.33	Va=Normal, Vc=Sag, Vb=Sag, Vc=Normal, Va=Sag, Vb=Normal	10.06	38.94	28.94	0.00	0.00	0.00	0.19	0.02	
7/12/2023 7:13:25.766 AM	7/12/2023 7:13:25.899 AM	7/12/2023 7:13:25.750 AM	133.33	Vc=Surge, Va=Surge, Va=Normal, Vc=Normal, Vb=Surge, Vb=Normal	204.27	229.56	214.37	0.00	1.28	0.00	1.21	0.01	
7/12/2023 7:13:25.634 AM	7/12/2023 7:13:25.767 AM	7/12/2023 7:13:25.650 AM	133.33	Vb=Sag, Va=Normal, Va=Sag, Vc=Normal, Vb=Normal, Vc=Sag	4.21	42.73	39.48	0.00	0.07	0.00	0.24	0.02	
7/12/2023 7:13:25.501 AM	7/12/2023 7:13:25.634 AM	7/12/2023 7:13:25.467 AM	133.33	Vb=Sag, Va=Normal, Va=Sag	1.87	18.27	19.40	0.00	0.00	0.00	0.13	0.00	
7/12/2023 7:13:25.366 AM	7/12/2023 7:13:25.499 AM	7/12/2023 7:13:25.350 AM	133.33	Va=Normal, Vc=Normal, Va=Surge, Vc=Surge, Vb=Normal, Vb=Surge	202.16	223.00	185.30	0.00	0.85	0.00	0.90	0.02	
7/12/2023 7:13:25.234 AM	7/12/2023 7:13:25.367 AM	7/12/2023 7:13:25.167 AM	133.33	Vb=Surge	177.42	199.96	197.41	0.00	1.34	0.00	1.28	0.01	
7/12/2023 7:13:25.101 AM	7/12/2023 7:13:25.234 AM	7/12/2023 7:13:25.067 AM	133.33	Vc=Normal, Vb=Sag, Va=Sag, Vb=Normal, Vc=Sag, Va=Normal	10.94	32.11	21.24	0.00	0.00	0.00	0.14	0.02	
<a href="#">? Help</a> <a href="#">About</a> <a href="#">Settings</a> 0000000020375017 2023/06/17 to 2023/07/18													

- Filter will let you select the channel, trigger type, and duration you want to apply. Only the data records matching the selections you make will be shown in the list.



The screenshot shows a 'Filter' dialog box with a title bar containing a 'LOG Viewer' icon and standard window controls. The dialog has three filter criteria, each with a checkbox and a selection field:

- ☒ Channel: The selection field shows 'Vcn' with a dropdown arrow.
- ☐ Trigger Type: The selection field shows 'Sag' with a dropdown arrow.
- ☐ Duration (milliseconds): The selection field shows 'Less than <' with a dropdown arrow and an adjacent empty text input box.

At the bottom of the dialog are two buttons: '+ Apply' and a button with a trash icon followed by 'Cancel'.

- To view a waveform, click on one of the data records.

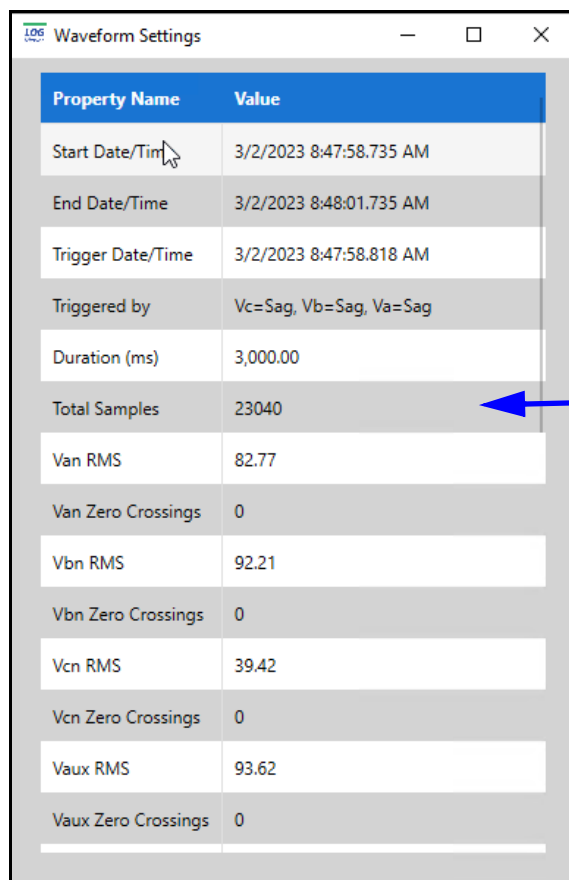


#### **NOTE Regarding Transients:**

Transients are voltage spikes that lasts less than one cycle. A transient can be either “impulsive,” i.e., a single, high impulse event, such as that caused by a lightning strike, or “oscillatory,” i.e., oscillating at the natural system frequency and dying down within a cycle. Oscillatory transients (also known as switching transients) can occur when an inductive or capacitive load, such as a motor or capacitor bank, is turned off. Since transients can damage equipment, it is important to measure and analyze them.

To view the transient log data, use the Filter to select “Positive Transient” or “Negative Transient” in the Trigger Type field. Then click on one of the waveforms in the list and click Graph to view the transient’s waveform.

- To view the Waveform Settings, click Settings at the top of the screen.

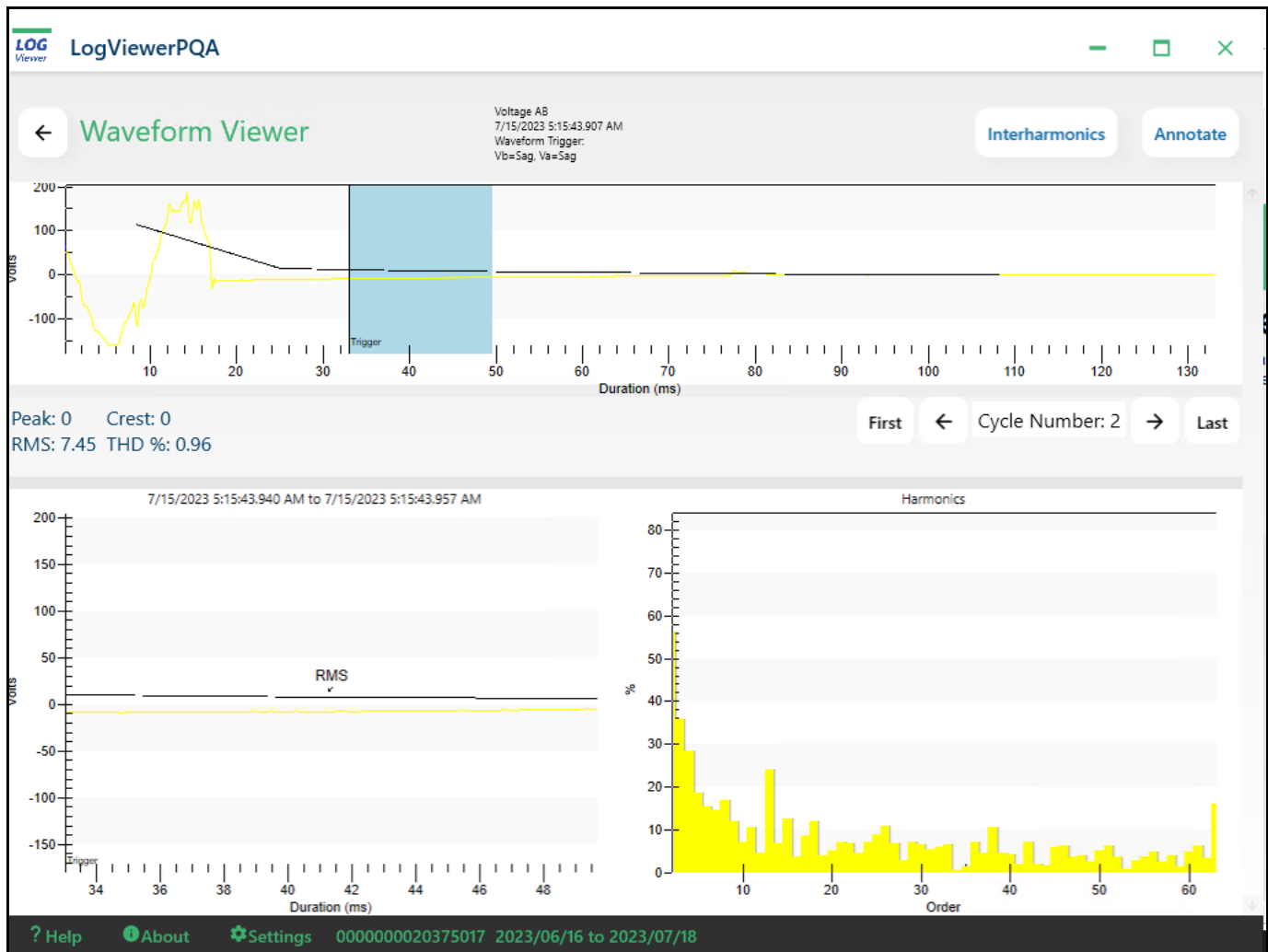


Property Name	Value
Start Date/Time	3/2/2023 8:47:58.735 AM
End Date/Time	3/2/2023 8:48:01.735 AM
Trigger Date/Time	3/2/2023 8:47:58.818 AM
Triggered by	Vc=Sag, Vb=Sag, Va=Sag
Duration (ms)	3,000.00
Total Samples	23040
Van RMS	82.77
Van Zero Crossings	0
Vbn RMS	92.21
Vbn Zero Crossings	0
Vcn RMS	39.42
Vcn Zero Crossings	0
Vaux RMS	93.62
Vaux Zero Crossings	0

Place your cursor in the middle of the screen and scroll to see all of the data

- To overlay two or more waveforms check the boxes to the right of the waveforms and then click Overlay at the top of the screen.

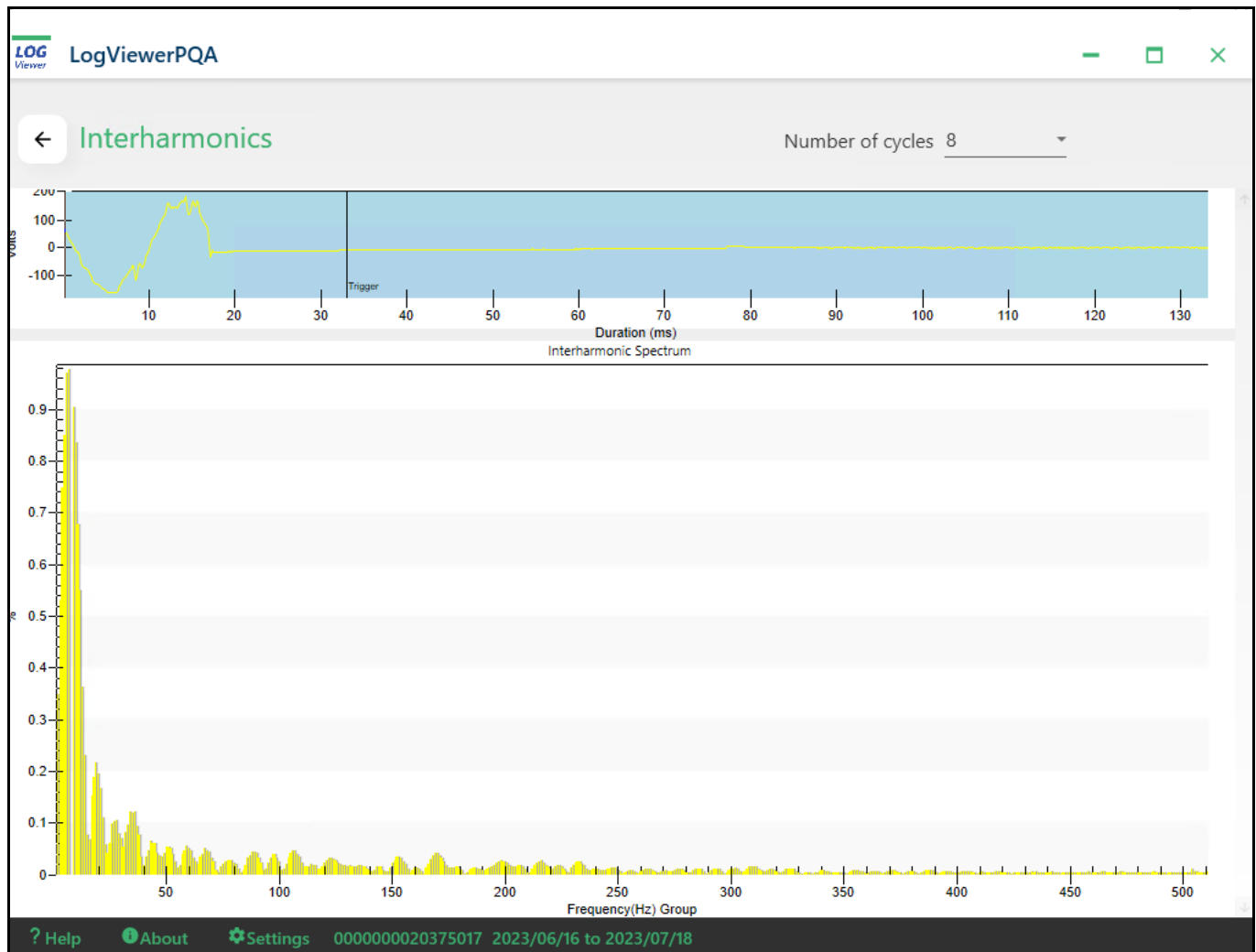
- To see detailed information for a waveform click the Single View button to the right of the waveform. Note that you can also double-click on one of the waveform cycles.



- The single cycle waveform viewer shows the RMS readings and Harmonic values for the waveform.



- Click Interharmonics from the top of the screen to view the screen shown below.



### NOTES on Interharmonic Analysis:

Interharmonic analysis is only supported for Nexus® meters, and only for voltage (VA, VB, VC) and current channels (IA, IB, IC, IAUX). The IEC-1000-2-1 [1] standard states, "Between the harmonics of the power frequency voltage and current, further frequencies can be observed which are not an integer multiple of the fundamental. They can appear as discrete frequencies or as a wide-band spectrum."

To perform the interharmonic analysis, there must be a waveform record with a 200 ms duration. For a 50 Hz system, the waveform is 10 cycles; for a 60 Hz system, the waveform is 12 cycles. By default, the starting point for interharmonic analysis of a waveform is its first point. But a user can set a starting point (place the mark) anywhere in the waveform, assuming that there will be enough sample points available

after the starting point. If there are not enough points in this waveform capture, the software will check the next waveform record(s) stored in the database. If it is contiguous, additional points up to 200 ms will be retrieved for analysis.

- For a waveform with a sampling rate equal to or less than 64, the software will only check the next contiguous record.
- For a waveform with a sampling rate equal to or greater than 128, the software will check the next two contiguous records.

Resetting the mark will set the starting point back to the waveform's first point.

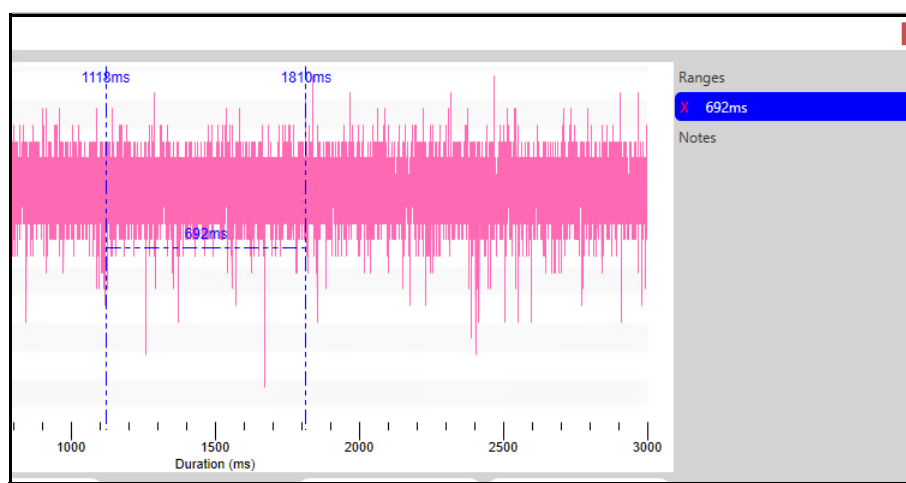
Measurement: IEC 61000-4-7 (First Edition) establishes a well disciplined measurement method for harmonics which utilizes 10 (50 Hz systems) or 12 cycle (60 Hz systems) sample windows upon which to perform the Fourier transform. The result is a spectrum with 5 Hz resolution for both 50 Hz and 60 Hz systems. The standard further defines ways of combining individual 5 Hz bins to produce various groupings and components for referenced limits and guidelines.

The IEC Measurement Method defines interharmonic groups. These indices are the RMS values of the interharmonic components between adjacent harmonic components. The frequency bins directly adjacent to the harmonic bins are omitted.

- Click Annotate at the top of the single cycle waveform viewer screen to add range markers and/or notes to the waveform.



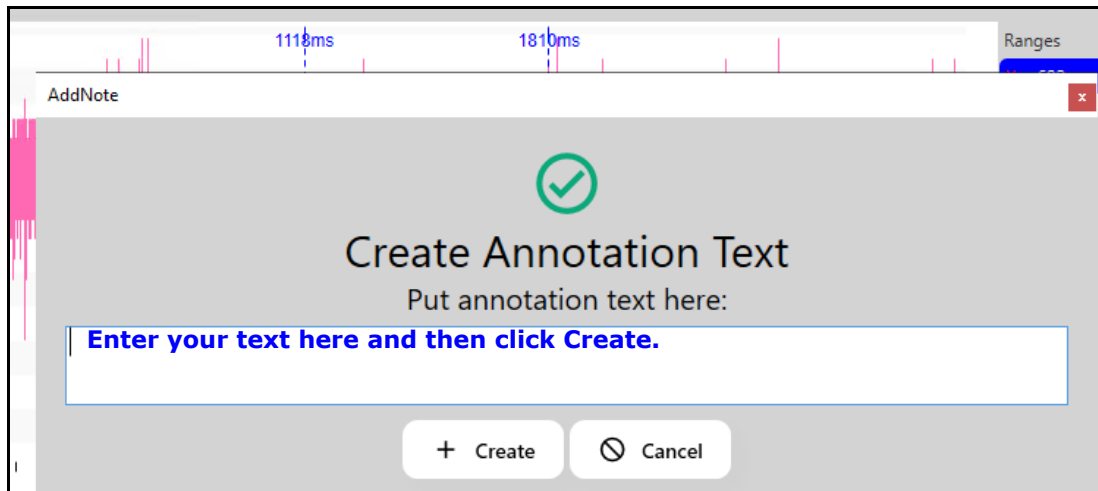
- To add ranges, place your cursor where you want to start the range and then click the Add range button. You can repeat this process to mark the end of the range. The range duration is shown in a list on the right of the screen.



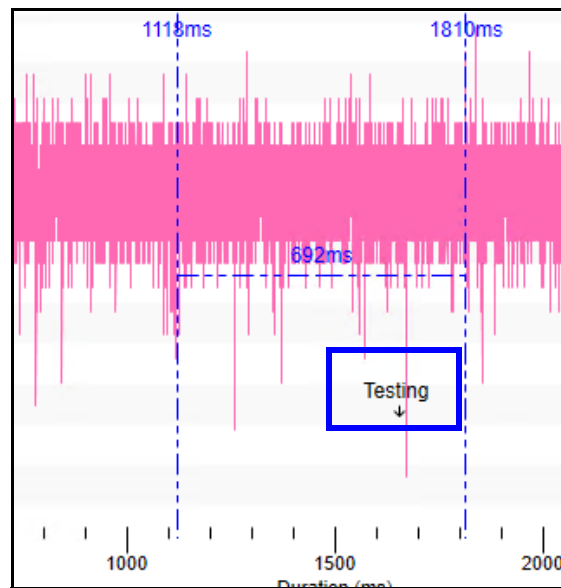
Dashed lines show the range added

Range duration  
is shown here

- To add notes, click in the waveform where you want to add the note and then click the Add Note button.

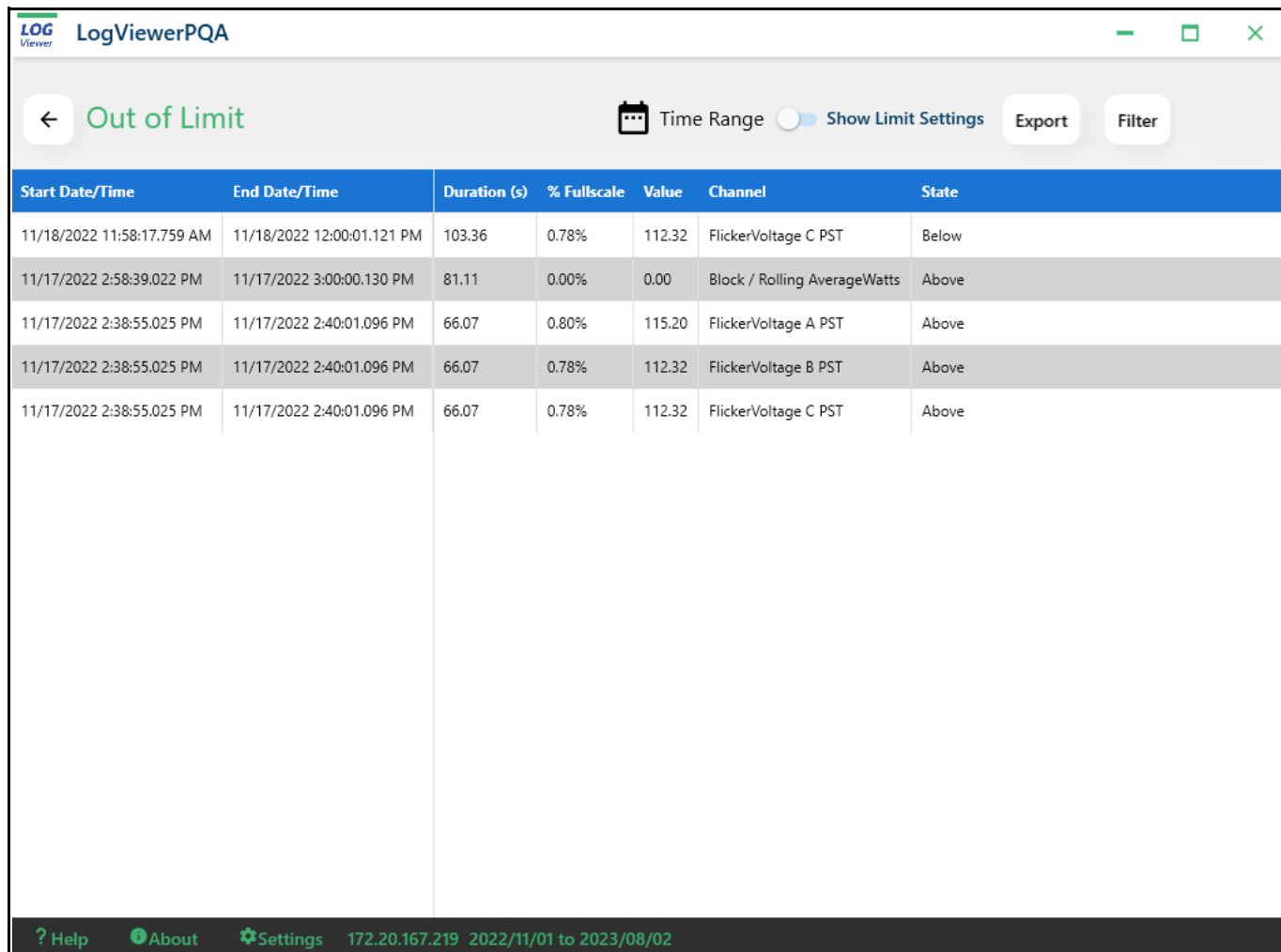


The note is added to the waveform record.



### 19.3.6: Out of Limit Log

From LogViewerPQA's main screen click the Out of Limits button. LogViewerPQA displays limit information for the selected log file(s) based on the selected time range.



Start Date/Time	End Date/Time	Duration (s)	% Fullscale	Value	Channel	State
11/18/2022 11:58:17.759 AM	11/18/2022 12:00:01.121 PM	103.36	0.78%	112.32	FlickerVoltage C PST	Below
11/17/2022 2:58:39.022 PM	11/17/2022 3:00:00.130 PM	81.11	0.00%	0.00	Block / Rolling AverageWatts	Above
11/17/2022 2:38:55.025 PM	11/17/2022 2:40:01.096 PM	66.07	0.80%	115.20	FlickerVoltage A PST	Above
11/17/2022 2:38:55.025 PM	11/17/2022 2:40:01.096 PM	66.07	0.78%	112.32	FlickerVoltage B PST	Above
11/17/2022 2:38:55.025 PM	11/17/2022 2:40:01.096 PM	66.07	0.78%	112.32	FlickerVoltage C PST	Above

- Click the bar next to Show Limit Settings to display the limits' setpoints.

### 19.3.7: Status Change Log

The Status Change Log (Input Log) displays the input change status for the selected time range. From the main LogViewerPQA screen, click the Status Change button

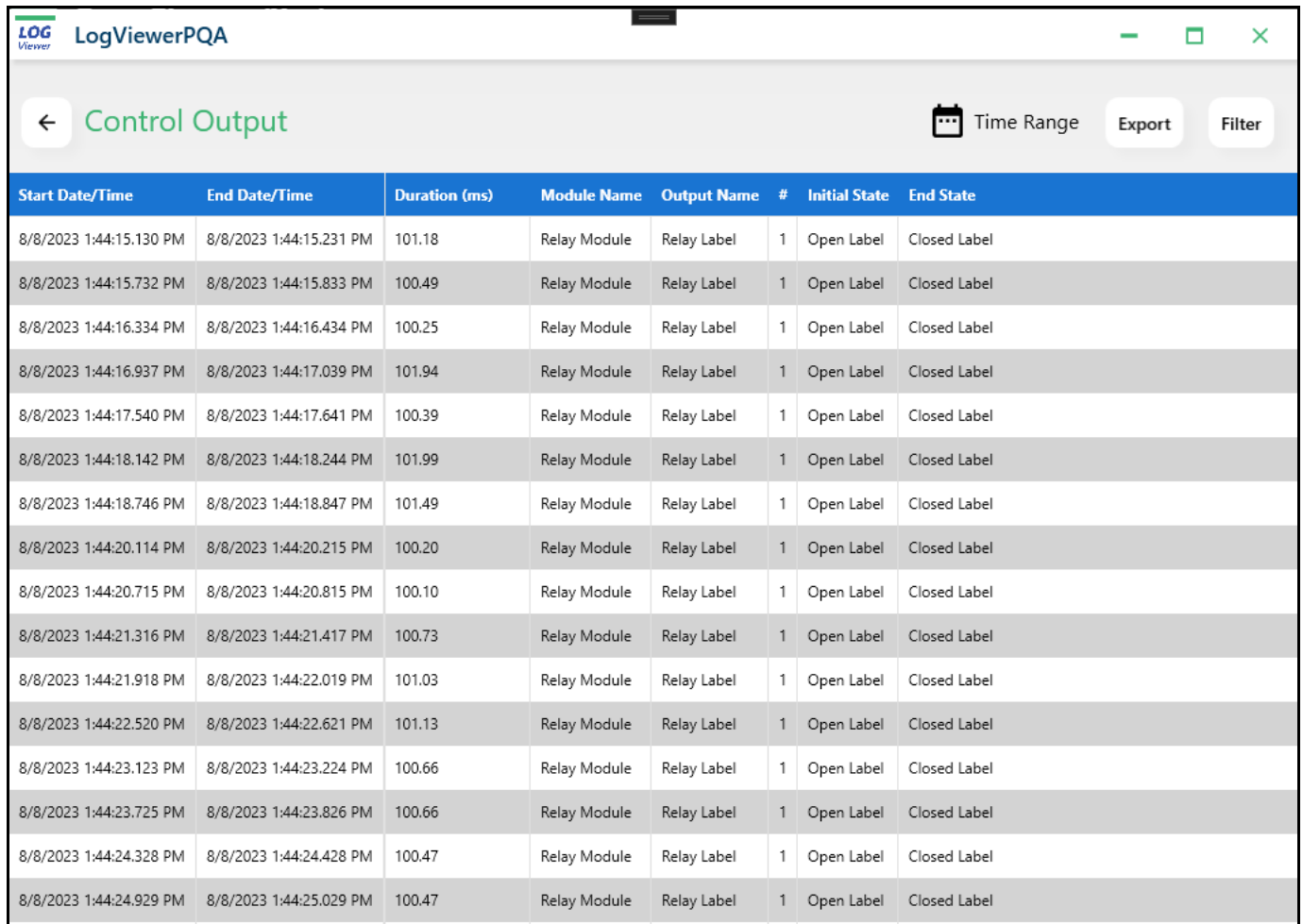
Start Date/Time	End Date/Time	Duration (ms)	Module Name	Input Name	#	State	Initial State	End State
11/10/2021 3:28:25.056 PM	11/10/2021 3:28:25.131 PM	75.00	Module 0	Input 1	1	Open	Open	Closed
11/10/2021 3:28:25.031 PM	11/10/2021 3:28:25.035 PM	4.00	Module 0	Input 1	1	Open	Open	Closed
11/10/2021 3:28:25.018 PM	11/10/2021 3:28:25.022 PM	4.00	Module 0	Input 1	1	Open	Open	Closed
11/10/2021 3:28:24.964 PM	11/10/2021 3:28:24.977 PM	13.00	Module 0	Input 1	1	Open	Open	Closed
11/10/2021 3:28:24.927 PM	11/10/2021 3:28:24.931 PM	4.00	Module 0	Input 1	1	Open	Open	Closed
11/10/2021 3:28:24.835 PM	11/10/2021 3:28:24.852 PM	17.00	Module 0	Input 1	1	Open	Open	Closed
11/10/2021 3:28:24.827 PM	11/10/2021 3:28:24.831 PM	4.00	Module 0	Input 1	1	Open	Open	Closed
11/10/2021 3:28:24.764 PM	11/10/2021 3:28:24.793 PM	29.00	Module 0	Input 1	1	Open	Open	Closed
11/10/2021 3:28:22.564 PM	11/10/2021 3:28:22.789 PM	225.00	Module 0	Input 1	1	Open	Open	Closed
11/10/2021 3:28:18.568 PM	11/10/2021 3:28:18.897 PM	329.00	Module 0	Input 1	1	Open	Open	Closed

- Usually, if a record being displayed in the grid box has a start date/time and an end date/time, the state being displayed is out of normal state.
- You can use Filter to narrow down the display by selecting input number, duration, initial state, and/or end state.

**NOTE:** Module Name 0 refers to HSI Internal Meter Inputs.

### 19.3.8: Control Output Log

The Control Output Log (Relay Log) displays the relay change status for the selected time range. From the main LogViewerPQA screen, click the Control Output button.

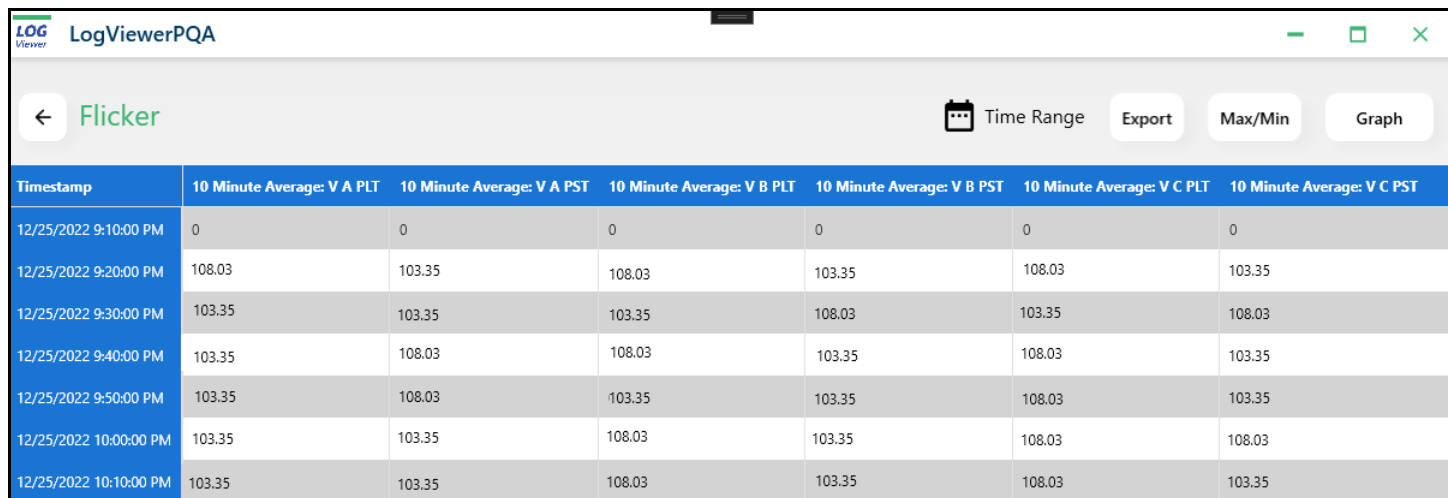


Start Date/Time	End Date/Time	Duration (ms)	Module Name	Output Name	#	Initial State	End State
8/8/2023 1:44:15.130 PM	8/8/2023 1:44:15.231 PM	101.18	Relay Module	Relay Label	1	Open Label	Closed Label
8/8/2023 1:44:15.732 PM	8/8/2023 1:44:15.833 PM	100.49	Relay Module	Relay Label	1	Open Label	Closed Label
8/8/2023 1:44:16.334 PM	8/8/2023 1:44:16.434 PM	100.25	Relay Module	Relay Label	1	Open Label	Closed Label
8/8/2023 1:44:16.937 PM	8/8/2023 1:44:17.039 PM	101.94	Relay Module	Relay Label	1	Open Label	Closed Label
8/8/2023 1:44:17.540 PM	8/8/2023 1:44:17.641 PM	100.39	Relay Module	Relay Label	1	Open Label	Closed Label
8/8/2023 1:44:18.142 PM	8/8/2023 1:44:18.244 PM	101.99	Relay Module	Relay Label	1	Open Label	Closed Label
8/8/2023 1:44:18.746 PM	8/8/2023 1:44:18.847 PM	101.49	Relay Module	Relay Label	1	Open Label	Closed Label
8/8/2023 1:44:20.114 PM	8/8/2023 1:44:20.215 PM	100.20	Relay Module	Relay Label	1	Open Label	Closed Label
8/8/2023 1:44:20.715 PM	8/8/2023 1:44:20.815 PM	100.10	Relay Module	Relay Label	1	Open Label	Closed Label
8/8/2023 1:44:21.316 PM	8/8/2023 1:44:21.417 PM	100.73	Relay Module	Relay Label	1	Open Label	Closed Label
8/8/2023 1:44:21.918 PM	8/8/2023 1:44:22.019 PM	101.03	Relay Module	Relay Label	1	Open Label	Closed Label
8/8/2023 1:44:22.520 PM	8/8/2023 1:44:22.621 PM	101.13	Relay Module	Relay Label	1	Open Label	Closed Label
8/8/2023 1:44:23.123 PM	8/8/2023 1:44:23.224 PM	100.66	Relay Module	Relay Label	1	Open Label	Closed Label
8/8/2023 1:44:23.725 PM	8/8/2023 1:44:23.826 PM	100.66	Relay Module	Relay Label	1	Open Label	Closed Label
8/8/2023 1:44:24.328 PM	8/8/2023 1:44:24.428 PM	100.47	Relay Module	Relay Label	1	Open Label	Closed Label
8/8/2023 1:44:24.929 PM	8/8/2023 1:44:25.029 PM	100.47	Relay Module	Relay Label	1	Open Label	Closed Label

- The Start Date/Time is when the trigger occurred.
- The End/Date Time is when the relay returned to its initial state.
- The Duration is the amount of time the relay stayed in its triggered state in ms.
- The Module Name and Output Name identify the relay.
- The number is the number of the relay.
- The Initial State is the relay state at the time of the trigger.
- The End State is the relay state after the relay returns to its normal state.

### 19.3.9: Flicker Log

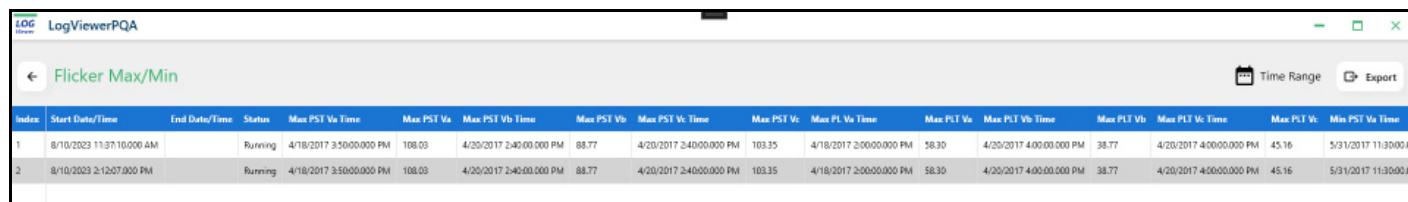
From LogViewerPQA's main screen, click the Flicker button.



The screenshot shows the LogViewerPQA application window. The title bar says "LogViewerPQA". Below the title bar, there is a navigation bar with a back arrow, the word "Flicker", and buttons for "Time Range", "Export", "Max/Min", and "Graph". The main area displays a table with 7 columns: Timestamp, 10 Minute Average: V A PLT, 10 Minute Average: V A PST, 10 Minute Average: V B PLT, 10 Minute Average: V B PST, 10 Minute Average: V C PLT, and 10 Minute Average: V C PST. The table contains 7 rows of data for timestamps from 12/25/2022 9:10:00 PM to 12/25/2022 10:10:00 PM.

Timestamp	10 Minute Average: V A PLT	10 Minute Average: V A PST	10 Minute Average: V B PLT	10 Minute Average: V B PST	10 Minute Average: V C PLT	10 Minute Average: V C PST
12/25/2022 9:10:00 PM	0	0	0	0	0	0
12/25/2022 9:20:00 PM	108.03	103.35	108.03	103.35	108.03	103.35
12/25/2022 9:30:00 PM	103.35	103.35	103.35	108.03	103.35	108.03
12/25/2022 9:40:00 PM	103.35	108.03	108.03	103.35	108.03	103.35
12/25/2022 9:50:00 PM	103.35	108.03	103.35	103.35	108.03	103.35
12/25/2022 10:00:00 PM	103.35	103.35	108.03	103.35	108.03	108.03
12/25/2022 10:10:00 PM	103.35	103.35	108.03	103.35	108.03	103.35

- The screen displays the 10 minute average PLT and 10 minute average PST for VA, VB, and VC for each timestamp.
- Click the Max/Min box toward the top right of the screen to display Max/Min information for the Flicker readings. See the example below.



The screenshot shows the LogViewerPQA application window with the "Flicker Max/Min" screen. The title bar says "LogViewerPQA". Below the title bar, there is a navigation bar with a back arrow, the text "Flicker Max/Min", and buttons for "Time Range" and "Export". The main area displays a table with 16 columns: Index, Start Date/Time, End Date/Time, Status, Max PST Va Time, Max PST Va, Max PST Vb Time, Max PST Vb, Max PST Vc Time, Max PST Vc, Max PLT Va Time, Max PLT Va, Max PLT Vb Time, Max PLT Vb, Max PLT Vc Time, and Max PLT Vc. The table contains 2 rows of data.

Index	Start Date/Time	End Date/Time	Status	Max PST Va Time	Max PST Va	Max PST Vb Time	Max PST Vb	Max PST Vc Time	Max PST Vc	Max PLT Va Time	Max PLT Va	Max PLT Vb Time	Max PLT Vb	Max PLT Vc Time	Max PLT Vc
1	8/10/2023 11:31:10:000 AM		Running	4/18/2017 3:50:00:000 PM	108.03	4/20/2017 2:40:00:000 PM	88.77	4/20/2017 3:40:00:000 PM	103.35	4/18/2017 2:00:00:000 PM	58.30	4/20/2017 4:00:00:000 PM	38.77	4/20/2017 4:00:00:000 PM	45.16
2	8/10/2023 2:12:07:000 PM		Running	4/18/2017 3:50:00:000 PM	108.03	4/20/2017 2:40:00:000 PM	88.77	4/20/2017 3:40:00:000 PM	103.35	4/18/2017 2:00:00:000 PM	58.30	4/20/2017 4:00:00:000 PM	38.77	4/20/2017 4:00:00:000 PM	45.16

- The Min/Max screen displays the Max and Min PST and PLT for VA, VB, VC, with the timestamp of their occurrence.



### 19.3.10: EN 50160 Log

From the main LogViewPQA page, click EN 50160 to see a list of EN 50160 data for the selected time range.

LogViewerPQA												
<div> <div>← EN50160</div> <div>Time Range</div> <div>Export</div> </div>												
Start Date/Time	End Date/Time	Flicker	Frequency	Harmonics	Long Interruption	Mains Signaling	RMS Rapid Changes	RMS Sag	RMS Swell	RMS Variation	Short Interruption	Unbalance
7/23/2023 1:00:00.000 AM	7/30/2023 12:59:59.000 AM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7/16/2023 1:00:00.000 AM	7/23/2023 12:59:59.000 AM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7/9/2023 1:00:00.000 AM	7/16/2023 12:59:59.000 AM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7/2/2023 1:00:00.000 AM	7/9/2023 12:59:59.000 AM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6/25/2023 1:00:00.000 AM	7/2/2023 12:59:59.000 AM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6/18/2023 1:00:00.000 AM	6/25/2023 12:59:59.000 AM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6/11/2023 1:00:00.000 AM	6/18/2023 12:59:59.000 AM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6/4/2023 1:00:00.000 AM	6/11/2023 12:59:59.000 AM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5/28/2023 1:00:00.000 AM	6/4/2023 12:59:59.000 AM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5/21/2023 1:00:00.000 AM	5/28/2023 12:59:59.000 AM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5/14/2023 1:00:00.000 AM	5/21/2023 12:59:59.000 AM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5/7/2023 1:00:00.000 AM	5/14/2023 12:59:59.000 AM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4/30/2023 1:00:00.000 AM	5/7/2023 12:59:59.000 AM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4/23/2023 1:00:00.000 AM	4/30/2023 12:59:59.000 AM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4/16/2023 1:00:00.000 AM	4/23/2023 12:59:59.000 AM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<div> <div>? Help</div> <div>📖 About</div> <div>⚙️ Settings</div> <div>Nexus1500P_100</div> <div>2022/11/01 to 2023/08/02</div> </div>												

- See [Chapter 23: EN 50160 / IEC 61000-4-30 Power Quality Analysis](#), on page 23-1 for full details concerning the EN 50160 report and its settings.

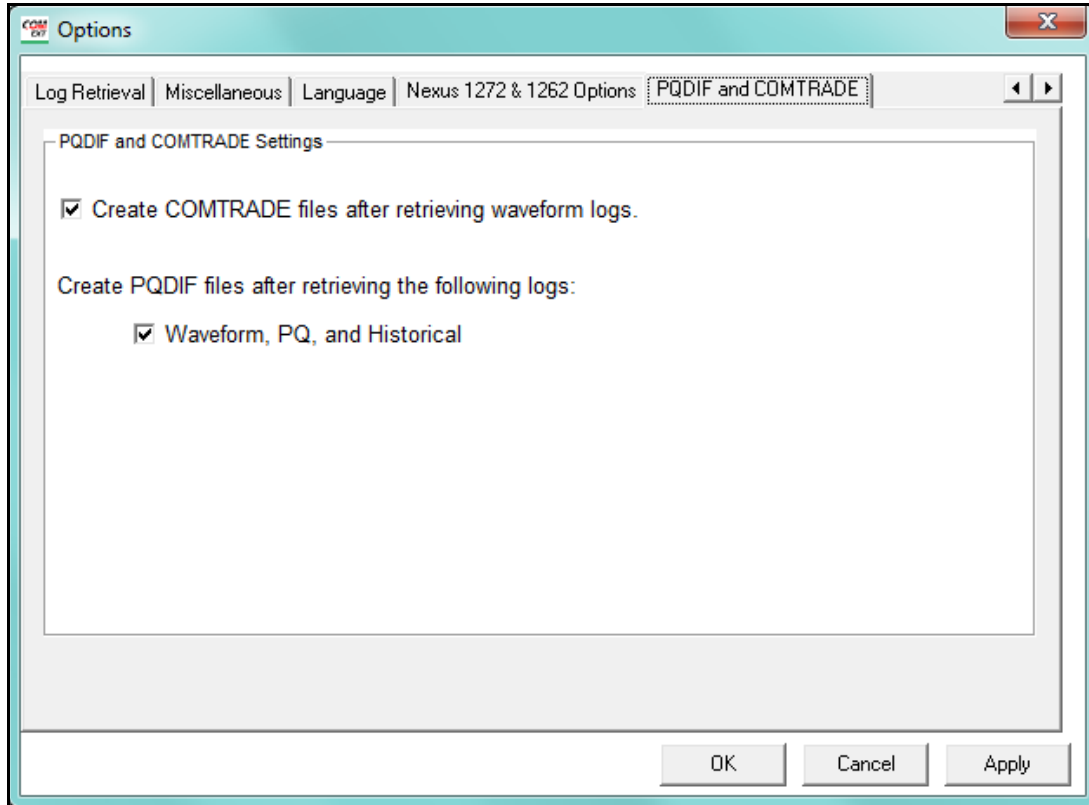
### 19.3.11: PQDIF

When you click PQDIF from the main LogViewerPQA screen, the Log Retrieval folder opens so you can select the PQDIF file. Power Quality Data Interchange Format (PQDIF) is a tagged, compressible binary file format which offers a platform-neutral, flexible means of exchanging power quality data between instruments and data management and analysis software. PQDIF is currently under adoption by EPRI as the standard file format for power quality data and under consideration by IEEE as its standard file format. The CommunicatorPQA® application offers a PQDIF converter, referred to as PQDIF Exporter.

When the PQDIF Exporter is enabled in the CommunicatorPQA® application, it will automatically generate PQDIF files after retrieving any Waveform, PQ, and Historical logs, as long as the meter/log support PQDIF (see [19.3.11.4: Supported Files and Meters, on page 19-39](#), for more information on supported meters and log items). The PQDIF Exporter provides a reliable way to access a meter's log data from applications other than the CommunicatorPQA® application.

### 19.3.11.1: Configuring the PQDIF Exporter

1. From the Options screen, click the PQDIF and COMTRADE tab and enable PQDIF file automatic creation when the logs are retrieved from the meter, by clicking the box to check it.



2. Click Apply to save the setting.

### 19.3.11.2: Using the Command Line Interface

In addition to the automated exports that PQDIF Exporter performs, you can perform manual exports on a given PERIOD\_INTERVAL, using the Command Line Interface. This may be necessary if you need to utilize PQDIF files/data with other software applications.

#### NOTES:

- All command line arguments must be preceded by -- (e.g., --PERIOD\_INTERVAL "day").
- All command line arguments are optional; running the program without arguments will show the screen (see 19.3.11.3: Using the PQDIF Exporter, on page 19-38).

These are the command line arguments for manual PQDIF exports:

- DATABASE "FILE" - Path to the log data.

```
--DATABASE "C:\Users\Public\Documents\Electro Industries\Communicator_Ext\Retrieved  
Logs\128Mb_IP203_0000000054211013\128Mb_IP203_0000000054211013.dml"
```

- EXPORT\_PATH "PATH" - Path to export the PQDIF data to.

```
--EXPORT_PATH "C:\Users\Frank\Documents\PQDIF\
```

- TIME\_START "yyyy/mm/dd hh:mm:ss" - (Optional) The Start Time for imported data in the format yyyy/mm/dd hh:mm:ss.

```
--TIME_START "2016/04/15 07:12:18"
```

- TIME\_END "yyyy/mm/dd hh:mm:ss" - (Optional) End Time for imported data in format yyyy/mm/dd hh:mm:ss.

```
--TIME_END "2016/06/06 08:15:15"
```

- EXPORT\_TYPE "TYPE" - (Optional) Limits type of PQDIF output to generate to specified format (when not specified, all types will be exported):

- "waveform"
- "historical"
- "pq"

```
--EXPORT_TYPE "historical"
```

- PERIOD\_INTERVAL "TYPE" - (Optional) Specifies if data is to be grouped in files by (defaults to "unlimited"):

- "day" - Stores data with the period of a day.
- "month" - Stores data with the period of a month.
- "year" - Stores data with the period of a year.
- "unlimited" - Stores as much data as possible in a single file.

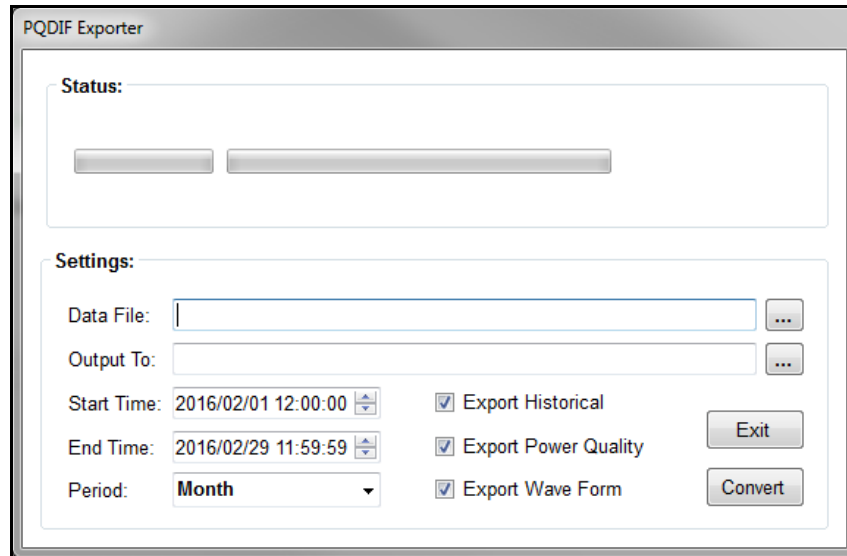
```
--PERIOD_INTERVAL "unlimited"
```

For example, if you wanted to output the waveform data from May 1st 2016 to June 30th 2016, on a daily period, to a subfolder of your Public Documents folder:

```
"C:\Program Files (x86)\Electro Industries\LogViewer\PQDIF\PQDIFExporter.exe"  
--DATABASE "C:\Users\Public\Documents\Electro Industries\Communica-  
tor_Ext\Retrieved  
Logs\128Mb_IP203_0000000054211013\128Mb_IP203_0000000054211013.dml"  
--TIME_START "2016/05/01 05:30:00"  
--TIME_END "2016/06/30 23:59:59"  
--EXPORT_PATH "C:\Users\Ndeibler\Documents\PQDIF"  
--EXPORT_TYPE "WAVEFORM"  
--PERIOD_INTERVAL "day"
```

### 19.3.11.3: Using the PQDIF Exporter

Although PQDIF files are automatically exported upon retrieval of Historical, PQ, and Waveform logs, you can also use PQDIF Exporter outside of CommunicatorPQA® software by running the PQDIF Exporter executable. If no command line parameters are detected upon program execution, the software will start in graphical mode, letting you select program parameters and manually export database files in PQDIF format.



Follow these instructions to use the PQDIF Exporter:

1. Run PQDIFExporter.exe without command line arguments. The program is found in this directory path:  
[CommunicatorExt Install Dir] \LogViewer\PQDIF\PQDIFExporter.exe
2. Select a source database file: \*.db or \*.dml by clicking on the "... " button next to the Data File field.
3. Select the destination folder for the PQDIF output files by clicking on the "... " button next to the Output To field.
4. Select the period Start Time from the pull-down menu.
5. Select the period End Time from the pull-down menu.
6. Select the Period to group data by from the pull-down menu. The default grouping period is by Month.

7. Check the types of data to be exported: Historical, Power Quality, and/or Waveform by clicking in the checkboxes next to the options.
8. Click the Convert button. Once clicked, the Convert button is disabled until the export is finished.
9. The generated PQDIF files will be available in the destination folder (if any valid data was found in the selected log(s)).

#### **19.3.11.4: Supported Files and Meters**

The meters supported for PQDIF export are the Nexus® 12xx, 1450, 1500+; and the Shark® 200, 250, and 270 meters. Following are the lists of the supported log items (i.e., data channels) for the meters:

- Shark® 200/250/270 meter:
  - 1s: Van, Vbn, Vcn, Vab, Vbc, Vca, Ia, Ib, Ic, In (calculated), FQ, V\_Imb, I\_Imba, Wa, Wb, Wc, W, VARa, VARb, VARc, VAR, VAa, VAb, VAc, VA, PFa, PFb, PFc, PF
  - Avg.: Ia, Ib, Ic, In (calculated), Wa, Wb, Wc, VARa, VARb, VARc, VAa, VAb, VAc, VA
  - %THD: Ia, Ib, Ic, Van/Vab, VBn/VBc, VCn/VCa
  - 10 min Avg. Sym. Comp. Mag. Pos.
  - 10 min Avg. Sym. Comp. Mag. Neg.
  - Energy +Wh (Q1 & Q4)
  - Energy -Wh (Q2 & Q3)
  - Energy +VARh
  - Energy -VARh
  - Phase A Voltage: 1st Harm. Mag., 2nd Harm. Mag., 3rd Harm. Mag., 4th Harm. Mag., 5th Harm. Mag., 6th Harm. Mag., 7th Harm. Mag., 8th Harm. Mag., 9th Harm. Mag., 10th Harm. Mag., 11th Harm. Mag., 12th Harm. Mag., 13th Harm. Mag., 14th Harm. Mag., 15th Harm. Mag., 16th Harm. Mag., 17th Harm. Mag.
  - Phase B Voltage: 1st Harm. Mag., 2nd Harm. Mag., 3rd Harm. Mag., 4th Harm. Mag., 5th Harm. Mag., 6th Harm. Mag., 7th Harm. Mag., 8th Harm. Mag., 9th Harm. Mag.

- Harm. Mag., 10th Harm. Mag., 11th Harm. Mag., 12th Harm. Mag., 13th Harm. Mag., 14th Harm. Mag., 15th Harm. Mag., 16th Harm. Mag., 17th Harm. Mag.
- Phase C Voltage: 1st Harm. Mag., 2nd Harm. Mag., 3rd Harm. Mag., 4th Harm. Mag., 5th Harm. Mag., 6th Harm. Mag., 7th Harm. Mag., 8th Harm. Mag., 9th Harm. Mag., 10th Harm. Mag., 11th Harm. Mag., 12th Harm. Mag., 13th Harm. Mag., 14th Harm. Mag., 15th Harm. Mag., 16th Harm. Mag., 17th Harm. Mag.
  - Phase A Current: 1st Harm. Mag., 2nd Harm. Mag., 3rd Harm. Mag., 4th Harm. Mag., 5th Harm. Mag., 6th Harm. Mag., 7th Harm. Mag., 8th Harm. Mag., 9th Harm. Mag., 10th Harm. Mag., 11th Harm. Mag., 12th Harm. Mag., 13th Harm. Mag., 14th Harm. Mag., 15th Harm. Mag., 16th Harm. Mag., 17th Harm. Mag.
  - Phase B Current: 1st Harm. Mag., 2nd Harm. Mag., 3rd Harm. Mag., 4th Harm. Mag., 5th Harm. Mag., 6th Harm. Mag., 7th Harm. Mag., 8th Harm. Mag., 9th Harm. Mag., 10th Harm. Mag., 11th Harm. Mag., 12th Harm. Mag., 13th Harm. Mag., 14th Harm. Mag., 15th Harm. Mag., 16th Harm. Mag., 17th Harm. Mag.
  - Phase C Current: 1st Harm. Mag., 2nd Harm. Mag., 3rd Harm. Mag., 4th Harm. Mag., 5th Harm. Mag., 6th Harm. Mag., 7th Harm. Mag., 8th Harm. Mag., 9th Harm. Mag., 10th Harm. Mag., 11th Harm. Mag., 12th Harm. Mag., 13th Harm. Mag., 14th Harm. Mag., 15th Harm. Mag., 16th Harm. Mag., 17th Harm. Mag.
  - Sym. Comp. Voltage Mag. Zero Seq. Min.
  - Sym. Comp. Voltage Mag. Pos. Seq. Min.
  - Sym. Comp. Voltage Mag. Neg. Seq. Min.
  - Nexus® meters:
    - High Speed: Van, Vbn, Vcn, Vaux, Ia, Ib, Ic, Vab, Vbc, Vca, VA, VAR, W, FQ, PFa, PFb, PFc, PFTotal
    - 1s: VAn, VBn, Vcn, Vaux, Ia, Ib, Ic, In (measured), In (calculated), VAb, VBc, VCa, VAa, VAb, VAc, VA, VARa, VARb, VARc, VAR, Wa, Wb, Wc, W, FQ, PFa, PFb, PFc, PF, V\_Imb, I\_Imb
    - Thrm. Avg.: Ia, Ib, Ic, In (calculated), VAb, VBc, VCa, VAa, VAb, VAc, VA, VARa, VARb, VARc, VAR, Wa, Wb, Wc, W, FQ, PFa, PFb, PFc, PF
    - Energy: +VARh, -VARh, +Wh, -Wh, +Wh (Q1 & Q4), -Wh (Q2 & Q3)



- Phase A-B Voltage: 0th Harm. Mag., 1st Harm. Mag., 2nd Harm. Mag., 3rd Harm. Mag., 4th Harm. Mag., 5th Harm. Mag., 6th Harm. Mag., 7th Harm. Mag., 8th Harm. Mag., 9th Harm. Mag., 10th Harm. Mag., 11th Harm. Mag., 12th Harm. Mag., 13th Harm. Mag., 14th Harm. Mag., 15th Harm. Mag Phase B-C Voltage: 0th Harm. Mag., 1st Harm. Mag., 2nd Harm. Mag., 3rd Harm. Mag., 4th Harm. Mag., 5th Harm. Mag., 6th Harm. Mag., 7th Harm. Mag., 8th Harm. Mag., 9th Harm. Mag., 10th Harm. Mag., 11th Harm. Mag., 12th Harm. Mag., 13th Harm. Mag., 14th Harm. Mag., 15th Harm. Mag., 16th Harm. Mag., 17th Harm. Mag., 16th Harm. Mag., 17th Harm. Mag.
- Phase B-C Voltage: 0th Harm. Mag., 1st Harm. Mag., 2nd Harm. Mag., 3rd Harm. Mag., 4th Harm. Mag., 5th Harm. Mag., 6th Harm. Mag., 7th Harm. Mag., 8th Harm. Mag., 9th Harm. Mag., 10th Harm. Mag., 11th Harm. Mag., 12th Harm. Mag., 13th Harm. Mag., 14th Harm. Mag., 15th Harm. Mag., 16th Harm. Mag., 17th Harm. Mag.
- Phase C-A Voltage: 0th Harm. Mag., 1st Harm. Mag., 2nd Harm. Magn., 3rd Harm. Mag., 4th Harm. Mag., 5th Harm. Mag., 6th Harm. Mag., 7th Harm. Mag., 8th Harm. Mag., 9th Harmonic Mag., 10th Harm. Mag., 11th Harm. Mag., 12th Harm. Mag., 13th Harm. Mag., 14th Harm. Mag., 15th Harm. Mag., 16th Harm. Mag., 17th Harm. Mag.
- Phase A Current: 0th Harm. Mag., 1st Harm. Magn., 2nd Harm. Mag., 3rd Harmonic Mag., 4th Harm. Mag., 5th Harm. Mag., 6th Harm. Mag., 7th Harm. Mag., 8th Harm. Mag., 9th Harm. Mag., 10th Harm. Mag., 11th Harm. Mag., 12th Harm. Mag., 13th Harm. Mag., 14th Harm. Mag., 15th Harm. Mag., 16th Harm. Mag., 17th Harm. Mag.
- Phase B Current: 0th Harm. Mag., 1st Harm. Mag., 2nd Harm. Mag., 3rd Harm. Mag., 4th Harm. Mag., 5th Harm. Mag., 6th Harm. Mag., 7th Harm. Mag., 8th Harm. Mag., 9th Harm. Mag., 10th Harm. Mag., 11th Harm. Mag., 12th Harm. Mag., 13th Harm. Mag., 14th Harm. Mag., 15th Harm. Mag., 16th Harm. Mag., 17th Harm. Mag.
- Phase C Current: 0th Harm. Mag., 1st Harm. Mag., 2nd Harm. Mag., 3rd Harm. Mag., 4th Harm. Mag., 5th Harm. Mag., 6th Harm. Mag., 7th Harm. Mag., 8th Harm. Mag., 9th Harm. Mag., 10th Harm. Mag., 11th Harm. Mag., 12th Harm. Mag., 13th Harm. Mag., 14th Harm. Mag., 15th Harm. Mag., 15th Harmonic Mag., 17th Harm. Mag.

- %THD: Ia, Ib, Ic, Van/Vab, VBn/VBc, VCn/VCa
- Block Window Avg.: VA, VAR, W
- Flicker PST: Va, Vb, Vc
- Flicker PLT: Va, Vb, Vc
- Flicker Inst.: VAN, VBN, VCN
- 10 min Avg. Van/Ab THD%
- 10 min Avg. VBn/Bc THD%
- 10 min Avg. VCn/Ca THD%
- Sym. Comp. Voltage Mag. 3s Zero Seq.
- Sym. Comp. Voltage Mag. 3s Pos. Seq.
- Sym. Comp. Voltage Mag. 3s Neg. Seq.
- Sym. Comp. Voltage Mag. 10m Avg. Pos. Seq.
- Sym. Comp. Voltage Mag. 10m Avg. Neg. Seq.
- Sym. Comp. Voltage Mag. 10m Avg. , Neg/Pos 100%

#### 19.3.11.5: PQDIF Files

##### **Storage:**

- The PQDIF files automatically generated by the CommunicatorPQA® software are stored in this directory:

C:\Users\Public\Documents\Electro Industries\Communicator\_Ext\Retrieved  
Logs\PQDIF

- If command line argument is used to generate the exported files or if the PQDIF Exporter is used in standalone mode (see 19.3.11.3: Using the PQDIF Exporter, on page 19-38) the files are stored where specified in the EXPORT\_PATH command or PQDIF Exporter screen.

**NOTE:** Each meter's output files are stored in a subdirectory with the meter's designation, an underscore, and the meter's serial number; for example:

C:\Users\Public\Documents\Electro Industries\Communicator\_Ext\Retrieved  
Logs\PQDIF\128Mb\_IP203\_0000000054211013\

**File Structure:**

- PQDIF files have .pqd as their extension.
- PQDIF output files begin with "yyyy-mm-dd". However if there's too much data for a single file, the file is split into multiple files named "yyyy-mm-dd\_##" where ## is the index of the file in the sequence of data.
- If "year" or "month" was specified for the file period, some of the date will be truncated, since days, for a monthly period, and months, for a yearly period, would not be relevant.
- If the period interval was set to "unlimited," output files will begin with "unassigned." If there is too much data to be stored in one .pqd file the multiple files will be named 'unassigned\_##' where ## is the index of the file in the sequence of data.
- The PQDIF formatted files can be viewed with PQDIF viewers such as Top or PQDif-fractor.
- Below are some examples of PQDIF output files.

- A PQDIF file generated for May 2017:

C:\Users\Public\Documents\Electro Industries\Communicator\_Ext\Retrieved Logs\PQDIF\128Mb\_IP203\_0000000054211013\2017-05-01.pqd

- A PQDIF file generated for an unspecified time range:

C:\Users\Public\Documents\Electro Industries\Communicator\_Ext\Retrieved Logs\PQDIF\128Mb\_IP203\_0000000054211013\unassigned.pqd

### 19.3.12: COMTRADE

When you click COMTRADE from the main LogViewerPQA screen, the Log Retrieval folder opens so you can select the COMTRADE file. Common Format for Transient Data Exchange (COMTRADE) is a standard that defines a format for the files containing transient waveform and event data collected from power systems or power system models. The format is intended to provide an easily interpretable form for use in exchanging data. As such, it does not make use of the economies available from data encoding and compression that proprietary formats depend upon for competitive advantage. The standard is for files stored on physical media, such as digital hard drives and diskettes. It is not a standard for transferring data files over communication networks. This standard defines a common format for the data files and exchange medium needed for the interchange of various types of fault, test and simulation data.

The CommunicatorPQA® application offers a COMTRADE converter, which carefully adheres to COMTRADE specification IEC 60255-24 (2001) and produces files with a data format compliant with the IEEE Standard C37.111-1999 COMTRADE for Power Systems.

The COMTRADE converter will generate the following types of files (see 19.3.12.4: COMTRADE Files, on page 19-48, for additional information):

- filename.cfg
- filename.dat
- filename.inf
- filename.d##
- filename\_\*.cfg
- filename\_\*.dat
- filename\_\*.inf
- filename\_\*.d##
- The term 'filename' represents the user specified file name.
- The symbol '##' represents a value from '00' through '99'.

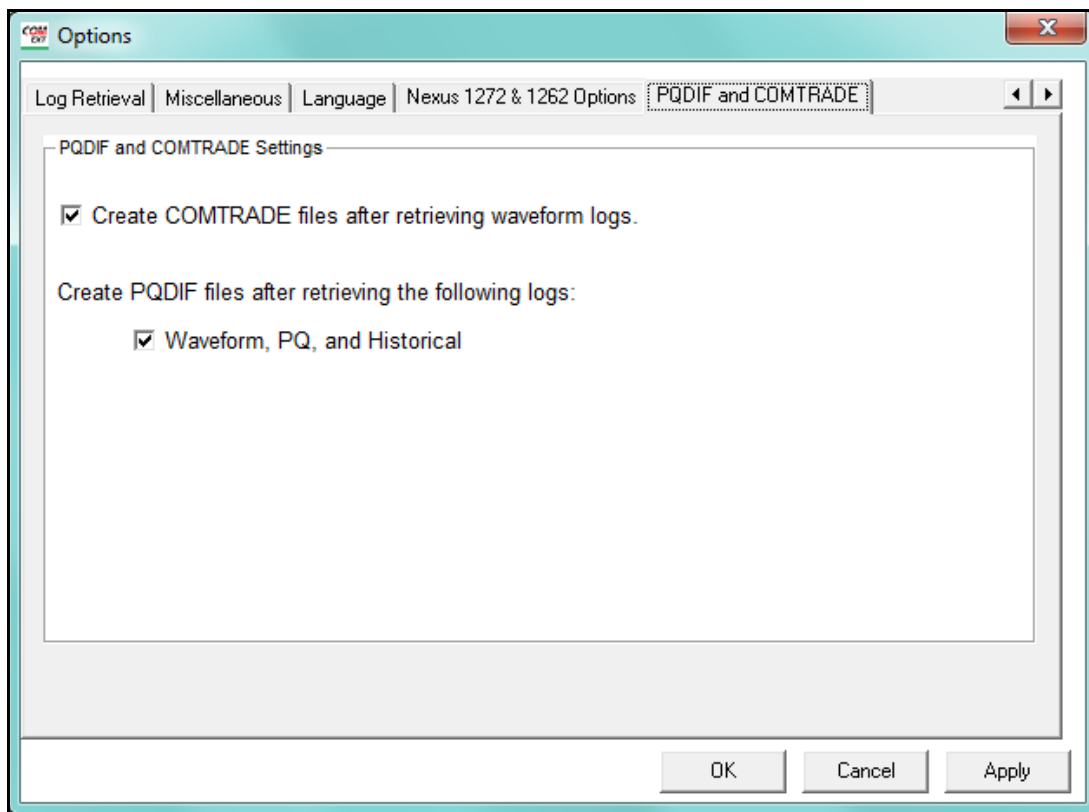
- The symbol '\*' is the number of 1 or above for each additional waveform record.
- File type 'cfg' is for Configuration.
- File type 'dat' is for Data.
- File type 'inf' is for Information.

**NOTE:** The software will not overwrite an existing file; it will only convert to a new filename.

### 19.3.12.1: Configuring the COMTRADE Converter

To use the COMTRADE Converter, you first need to enable it.

1. From the Options screen, click the PQDIF and COMTRADE tab and enable COMTRADE file creation by clicking the box to check it.



2. Click Apply to save the setting.

### 19.3.12.2: Using the Command Line Interface

When it is enabled, the COMTRADE Converter works with CommunicatorPQA® software to automatically export the COMTRADE files. However, you may need to customize the export in order to use the log data with other software. You can do so using the Command Line interface.

#### NOTES:

- All command line arguments must be preceded by -- (e.g., --TIME\_START "2017/02/04 12:24:36").
- All command line arguments are optional except for DATABASE.

These are the command line arguments for COMTRADE exports:

- DATABASE "FILENAME" - Path to the log database file to convert data from.

--DATABASE

"C:\Users\Public\Documents\ElectroIndustries\Communicator\_Ext\RetrievedLogs\128Mb\_IP203\_0000000054211013\128Mb\_IP203\_0000000054211013.dml

- TIME\_START "yyyy/mm/dd hh:mm:ss" - Start date and time for data conversion.

--TIME\_START "2017/01/05 12:23:24"

- TIME\_END "yyyy/mm/dd hh:mm:ss" - End date and time for data conversion.

--TIME\_END "2017/01/24 18:32:10"

- EXPORT\_PATH "PATH" - Path to the directory where data will be exported.

--EXPORT\_PATH "C:\Users\NDeibler\Documents\COMTRADE"

- OUTPUT\_FILE\_FORMAT "FORMAT" - File output format - either ASCII or BINARY.

--OUTPUT\_FILE\_FORMAT "BINARY"

For example, if you wanted to export log data from February 1, 2017 until February 28, 2017:

"C:\Program Files (x86)\Electro Industries\LogViewer\COMTRADE\ComtradeExporter.exe"  
--DATABASE "C:\Users\Public\Documents\Electro Industries\Communica-

```

tor_Ext\Retrieved
Logs\128Mb_IP203_0000000054211013\128Mb_IP203_0000000054211013.dml"
--TIME_START "2023/02/01 06:45:00"
--TIME_END "2023/02/28 13:05:20"
--EXPORT_PATH "C:\Users\NDeibler\Documents\COMTRADE"
--OUTPUT_FILE_FORMAT "BINARY"

```

### Example:

To export a single waveform from log data:

1. Find the start time of the waveform you are interested in, from LogViewer.



2. Using the time of the waveform, subtract one second for the start time and add 1 second for the end time. Your command line argument will be as follows:

```
"C:\Program Files (x86)\Electro Industries\LogViewer\COMTRADE\ComtradeExporter.exe"  
--DATABASE "C:\Users\Public\Documents\Electro Industries\Communica-  
tor_Ext\Retrieved Logs\SubStation1_0000000054211013\SubSta-  
tion1_0000000054211013.dml"  
--TIME_START "2023/12/01 11:28:19"  
--TIME_END "2023/12/01 11:28:21"  
--EXPORT_PATH "C:\Users\NDeibler\Documents\COMTRADE"
```

3. Once the COMTRADE Converter is finished, you should see two output files:

```
(File 1) C:\Users\Frank\Documents\COMTRADE\SubStation1_0000000054211013\2016-12-  
01_11-28-20-450.cfg  
(File 2) C:\Users\Frank\Documents\COMTRADE\SubStation1_0000000054211013\2016-12-  
01_11-28-20-450.dat
```

### 19.3.12.3: Supported Files and Meters

The Waveform log is the supported file for the COMTRADE Converter. The meters supported for COMTRADE export are the Nexus® 12xx and 1500+; and the Shark® 200 and 270 meters.

### 19.3.12.4: COMTRADE Files

#### Storage:

- The COMTRADE files automatically generated by the CommunicatorPQA® software are stored in this directory:

```
C:\Users\Public\Documents\Electro Industries\Communicator_Ext\Retrieved  
Logs\COMTRADE
```

- If command line argument is used to generate the exported files, the files are stored where specified in the EXPORT\_PATH command.

**NOTE:** Each meter's output files are stored in a subdirectory with the meter's designation, an underscore, and the meter's serial number; for example:

```
C:\Users\Public\Documents\Electro Industries\Communicator_Ext\Retrieved  
Logs\COMTRADE\128Mb_IP203_0000000054211013\
```



**Naming Conventions:**

- All output files start with "YYYY-MM-DD\_hh-mm-ss-fff" where fff is the time in milliseconds.

**Details of Files (see 19.3.12: COMTRADE, on page 19-44, for a list of COM-TRADE files):**

- cfg - Config files specify how the COMTRADE viewer should handle the data in the 'dat' or 'd##' files. For example, the config file could specify the format of data as well as how to scale it.
  - E.g., 2016-01-27\_04-21-13-283.cfg
- dat - Data files contain the waveform data that has been parsed into the COMTRADE format.
  - E.g., 2016-01-27\_04-21-13-283.dat
- d## - When there is too much waveform data for a single .dat file, the file is split into multiple files with extensions containing the letter 'd' followed by their sequential number ranging from '00' to '99'. For example:
  - 2016-02-01\_10-45-23-225.d00
  - 2016-02-01\_10-45-23-225.d01
  - 2016-02-01\_10-45-23-225.d02
  - ...

**19.3.13: EnergyPQA.com**

You can access the usage dashboard viewer of the EnergyReporterPQA™ energy management, analysis, reporting, and billing software by clicking the EnergyReporter-PQA™ button. See the *EnergyReporterPQA™ Application Installation and Operation Manual* for details on the application.

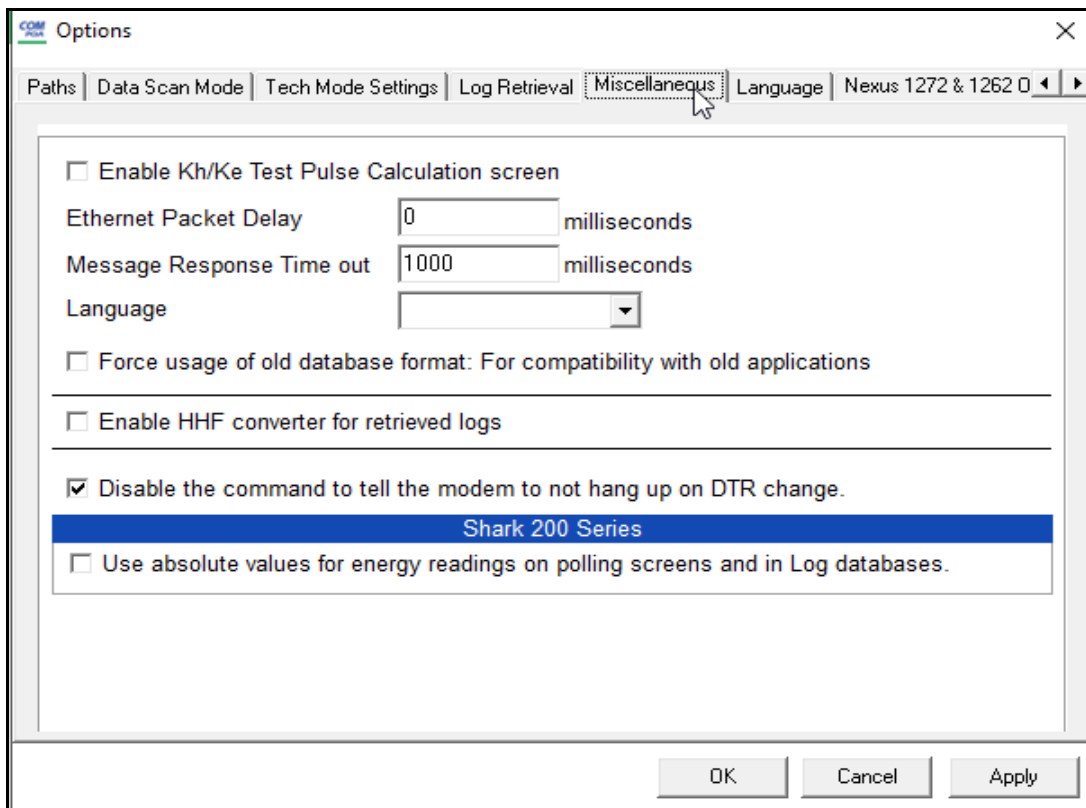
## 19.4: HHF Converter

The HHF Converter converts downloaded historical logs from Nexus®/Shark® 200 meters to HHF format for use with Itron's MV-90 Meter Reading System. The HHF Adapter converts data as it is downloaded to a meter. It cannot retroactively convert data that has already been stored in the CommunicatorPQA® software database. This limitation is due to the method MV-90 uses to retrieve HHF format files.

The HHF Converter is a standalone executable application module that is called from the CommunicatorPQA® application whenever historical logs are downloaded from the meter and HHF is enabled. This process is automatic once HHF is enabled. This application intercepts the data being downloaded and simultaneously converts the data to HHF format.

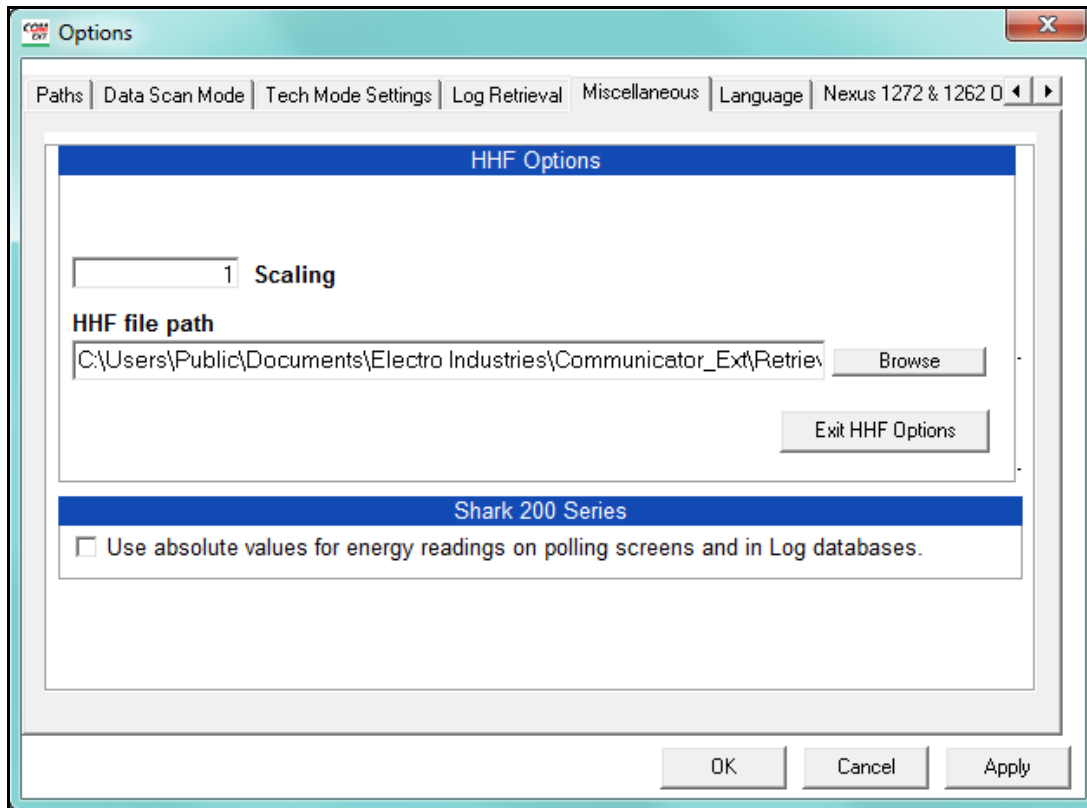
### 19.4.1: Configuring the HHF Converter

1. From the Main screen's Menu Bar, click View>Options to open the Options screen.
2. Click the Miscellaneous tab. You will see the screen shown below.



3. Click the checkbox next to Enable HHF converter for retrieved logs.

4. Click the HHF Options button. The screen changes as shown below.



5. Key in the Scaling Value. This value is an integer by which all input values are divided before being placed into the HHF files. Values must be rescaled when loaded into MV-90.

**NOTE on Scaling:** If Input Values exceed 1,000,000, a Scaling Value must be used to bring the values below 1,000,000. This is due to the limitations of the HHF File Format.

6. HHF File Path is the root directory for all HHF files. A folder for each meter with converted files is created in this path and .hhf files for that meter are placed in that folder. The default directory for HHF Folders is shown in the screen. Click Browse if you wish to designate another path.

7. Click Apply to save changes.

8. Click OK to close the screen.

### 19.4.2: Setting up Logs for Use with the HHF Converter

1. Open the Device Profile for the currently connected meter.
2. Click on Trending Profile Settings > Trending Setup > Log 1 (or Log 2). The Trending Log Profile screen.
3. Click the "<HHF>" button in the center of the screen. The HHF button automatically sets up a default Historical log and settings for the log.

Trending Log Profile Log 1

Group: Measured Values Sub Group: High Speed Updated

Selectable Item(s)		Selected Item(s)
Voltage A-N	Add >> << Remove < HHF > Check HHF	Interval Energy(Primary):Quadrant 1+4 Wh
Voltage B-N		Interval Energy(Primary):Quadrant 2+3 Wh
Voltage C-N		Interval Energy(Primary):Quadrant 1+2 VARh
Voltage Aux		Interval Energy(Primary):Quadrant 3+4 VARh
Current A		
Current B		
Current C		
Current N Measured		
Voltage A-B		
Voltage B-C		
Voltage C-A		
VAA		
VAB		
VAC		
VA Total		
Var A		
Var B		
Var C		
Var Total		
Watt A		
Watt B		
Watt C		
Watt Total		
Frequency		
Power Factor A		
Power Factor B		
Power Factor C		
Power Factor Total		
Volts A - Aux Phase Angle		

Total bytes used 20 Estimated Log Timespan 2594days 3hour 0min 0sec  
 Bytes remaining 236 Total Records 249036

OK Cancel Set Interval Help

The HHF changes include the following:

- All items are removed.

- Four items are added: Q1+4 Interval Primary, Q2+3 Interval Primary, Q1+2 Interval Primary, Q3+4 Interval Primary
- The Interval between Records is set at 15 minutes
- The Accumulation Interval is set at 15 minutes

**NOTE:** These settings can be changed. However, keep the following considerations in mind:

- Only Interval Energy items can be used.
  - The Record Interval and the Accumulation Interval **MUST** be the same. If they are not, the .hhf file created may be corrupt. These intervals are set in the Device Profile.
    - Record Interval is set in the Trending Log Time Interval.
    - Accumulation Interval is set in Energy, Pulses and Accumulations in the Interval.
  - There can be 16 items, maximum.
4. Click OK to go back to the Device Profile screen.
  5. Click Update Device to save the settings to the meter.
  6. A "Resetting Logs" Warning appears. Click OK to update the meter with the new settings.

### 19.4.3: Using the Command Line Interface

When it is enabled, the HHF Converter works with CommunicatorPQA® software to automatically generate converted HHF files when historical logs are retrieved. However, you may want to convert HHF files for a specific period interval in order to use them with another software. You can do so using the Command Line interface.

#### NOTES:

- All command line arguments must be preceded by -- (e.g., --PERIOD\_INTERVAL "day").
- All command line arguments are optional; running the program without arguments will show the screen (see 19.4.4: Using the HHF Converter, on page 19-56).

These are the command line arguments for manual HHF conversion:

- DATABASE "FILENAME" - (Optional) The path of the database file to be converted (\*.db, \*.sbl, \*.nbl, \*.mf nbl).

```
--DATABASE "C:\Users\Public\Documents\Electro Industries\Communica-
tor_Ext\Retrieved Logs\Shark200Unit8.sbl"
```

- OUTPUT\_PATH "FOLDER" - (Optional) The folder where the converted output files will be saved. The default output path is C:\Users\Public\Documents\Electro Industries\Communicator\_Ext\Retrieved Logs\HHF Files\

```
--OUTPUT_PATH "C:\Users\Ndeibler\Documents\HHF"
```

- START\_TIME "yyyy/mm/dd" - (Optional) The start date in log data for conversion. The default is 1 year earlier than the current date, on the first day of the current month; e.g, if today is February 24, 2017, the default start time would be February 1, 2016.

```
--START_TIME "2017/01/05"
```

- END\_TIME "yyyy/mm/dd" - The end date in log data for conversion. The default is a month from the current date, on the last day of the month, at 23:59:59; e.g., if today is February 24, 2017, the default end time would be March 31, 2017.

```
--END_TIME "2017/03/06"
```

- `PERIOD_INTERVAL "PERIOD"` - The interval on which to split files. The default is "month."
- "unlimited" - The entire input date range will be processed at one time.
- "year" - The input date range will be broken into years and be processed one period at a time.
- "month" - The input date range will be broken into months and be processed one period at a time.
- "week" - The input date range will be broken into weeks and be processed one period at a time.
- "day" - The input date range will be broken into days and be processed one period at a time.

```
--PERIOD_INTERVAL "week"
```

For example, if you wanted to convert the log data from January 1st 2017 to January 15th 2017, with a period interval of week, you could use:

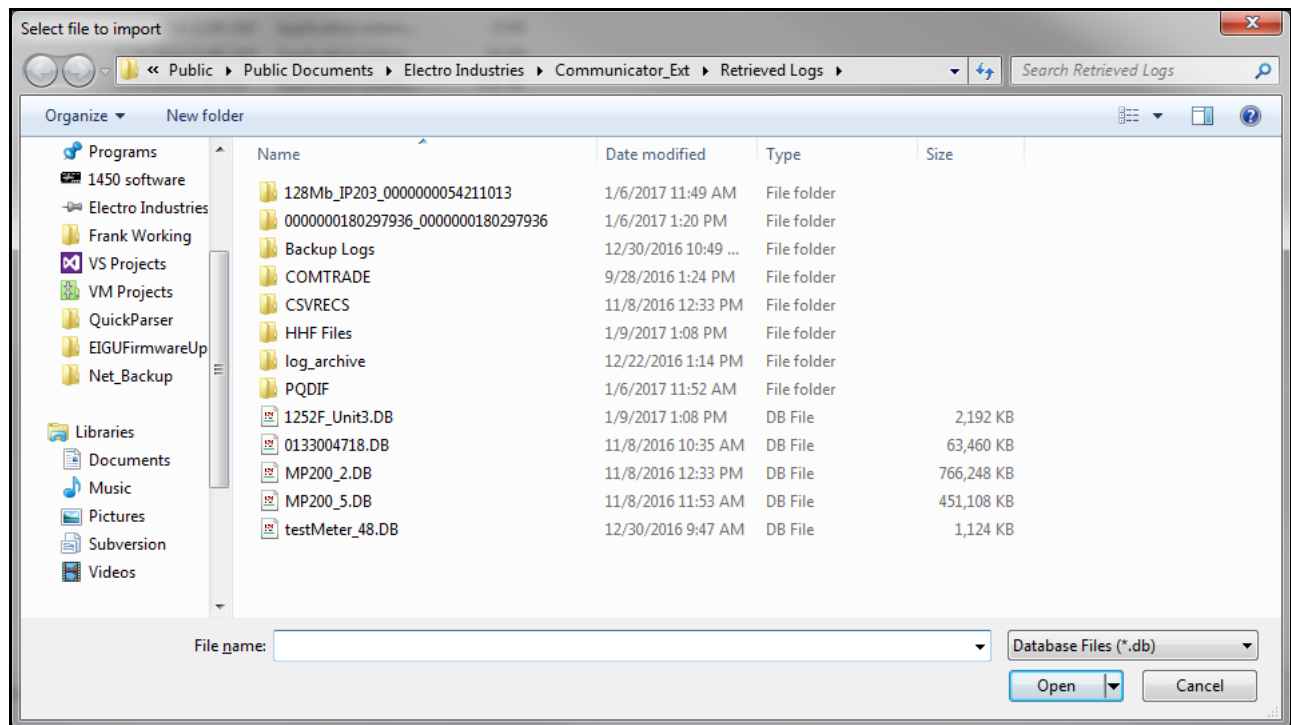
```
"C:\Program Files (x86)\Electro Industries\LogViewer\HHFConverter\HHFConverter.exe"  
--DATABASE "C:\Users\Public\Documents\Electro Industries\Communicator_Ext\RetrievedLogs\Shark200Unit8.sbl"  
--START_TIME "2017/01/01"  
--END_TIME "2017/04/15"  
--PERIOD_INTERVAL "week"
```

### 19.4.4: Using the HHF Converter

Although HHF files are automatically converted, when enabled, by the CommunicatorPQA® application, you can also use the HHF Converter independently, either through Command Line, shown in the previous section, or as shown in the instructions in this section.

1. Run HHFConverter.exe without command line arguments. The program is found in this directory path:

[Communicator EXT Install Dir]\LogViewer\HHFConverter\HHFConverter.exe



2. Locate the database file of the meter you want to convert data for.
3. Wait for conversion to take place (conversion may take several minutes).
4. The converted file is stored in the location shown in [19.4.6: HHF Files, on page 19-57](#).



### 19.4.5: Supported Files and Meters

The only supported data for the HHF Converter is interval energy items from a historical log. The meters supported for HHF export are the Nexus® 12xx and 1500+; and the Shark® 200 and 270 meters.

### 19.4.6: HHF Files

#### Storage

- The HHF files automatically generated by the CommunicatorPQA® application (or the HHF Converter run manually, as shown in [19.4.4: Using the HHF Converter, on page 19-56](#)) are stored in this directory:

C:\Users\Public\Documents\Electro Industries\Communicator\_Ext\Retrieved Logs\HHF Files

- If Command Line argument is used to generate the files, they are stored where OUTPUT\_PATH was specified.

**NOTE:** Each meter's output files are stored in a subdirectory with the name of the meter's designation meter, for example:

C:\Users\Public\Documents\Electro Industries\Communicator\_Ext\Retrieved Logs\HHF Files\MyMeterDesignation

#### Naming Conventions

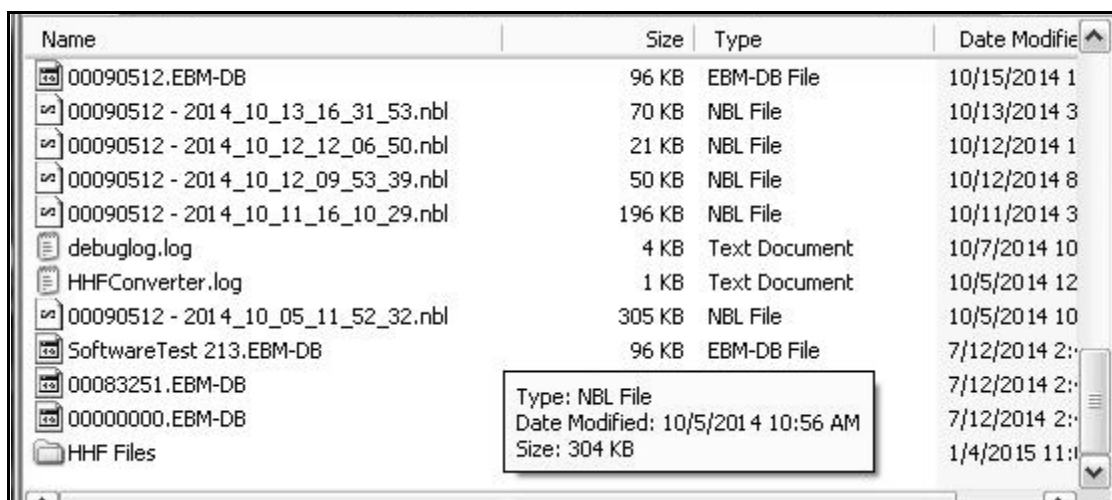
- The extension for the HHF output files is .hhf.
- .hhf output files are named using the following template:  
with [meter\_designation]\_[start\_date]\_[start\_time]-[log\_name]
  - meter\_designation - The name given to the meter by the user.
  - start\_date - The start date used by the converter; the format is yyyy-mm-dd.
  - start\_time - The start time used by the converter; the format is hh:mm:ss.
  - log\_name - The name of the log that was converted to HHF.

- An HHF output file example is as follows:

C:\Users\Public\Documents\Electro Industries\Communicator\_Ext\Retrieved  
Logs\HHF Files\SubStation1\SubStation1\_2017-01-11\_16-30-00-INTERVAL\_1.hhf

### Additional File Details

**NOTE:** The Date (year, month and day) is the date of the oldest record in the log.



Name	Size	Type	Date Modified
00090512.EBM-DB	96 KB	EBM-DB File	10/15/2014 1
00090512 - 2014_10_13_16_31_53.nbl	70 KB	NBL File	10/13/2014 3
00090512 - 2014_10_12_12_06_50.nbl	21 KB	NBL File	10/12/2014 1
00090512 - 2014_10_12_09_53_39.nbl	50 KB	NBL File	10/12/2014 8
00090512 - 2014_10_11_16_10_29.nbl	196 KB	NBL File	10/11/2014 3
debuglog.log	4 KB	Text Document	10/7/2014 10
HHFConverter.log	1 KB	Text Document	10/5/2014 12
00090512 - 2014_10_05_11_52_32.nbl	305 KB	NBL File	10/5/2014 10
SoftwareTest 213.EBM-DB	96 KB	EBM-DB File	7/12/2014 2:
00083251.EBM-DB			7/12/2014 2:
00000000.EBM-DB			7/12/2014 2:
HHF Files			1/4/2015 11:

Type: NBL File  
 Date Modified: 10/5/2014 10:56 AM  
 Size: 304 KB

- Log File: Contains a list of actions taken by the converter in the process of converting the Nexus® meter's file into .hhf format that may cause irregularities in the data. Additionally, it contains any errors that were encountered while converting. For example: Data that cannot be represented in .hhf format is found in this file. Shown in the previous figure is a typical example of Retrieved Log Files.

[HHF file list]

[Conversion action list]

[Error list]

- Conversion Action List: List of all the conflicts with the HHF format that occurred in the Nexus® meter's file and the action taken to convert the files.
- Trim <Time><Reason>: Value discarded from the .hhf file. "Time" is the time stamp of the value discarded and "Reason" is one of the following:
  - Invalid Interval: Timestamp falls off the even time intervals. Value time-stamps are rounded and overlaps are deleted.

- Invalid Time: Timestamp either lies before the given beginning of the log or after the given end of the log. The record containing the timestamp has been removed from the list.
- Pad <Time start>"-"<Time end><Reason>: The values for the interval before "Time start" are repeated until "Time end". "Reason" can be:
  - Missing Interval: Original log missing values to make a continuous log. Values are added to maintain proper timestamps.
- Error List: List of all errors encountered during conversion.
  - Error in file <File Name> "at" <Position>: Parsing error while extracting data from the input file. Position is the number of bytes from the beginning of the file to where the error occurred. This error most often occurs when an invalid log record type is included in the input.
  - Value out of range <Timestamp> <Channel> <Value>: The given channel's value in the interval given by timestamp is outside of the range HHF can represent.
  - File not found <File Name>: The given input file (with path) does not exist.
  - File overwritten <File Name>: One of the created files in the path has the same name as an existing file. The old file has been overwritten.
  - File collision <File Name>: One of the created files in the path has the same name as an existing file and that file cannot be deleted. The new file was not created.
  - Invalid file <File Name>: The given input file is not a valid .nbl file.
  - Invalid data type <Data Type>: One of the channels contains data that HHF cannot represent.
  - Path not found <Path Name>, Created: The given path was not found and the folder structure was created.

### 19.4.7: Troubleshooting the HHF Converter

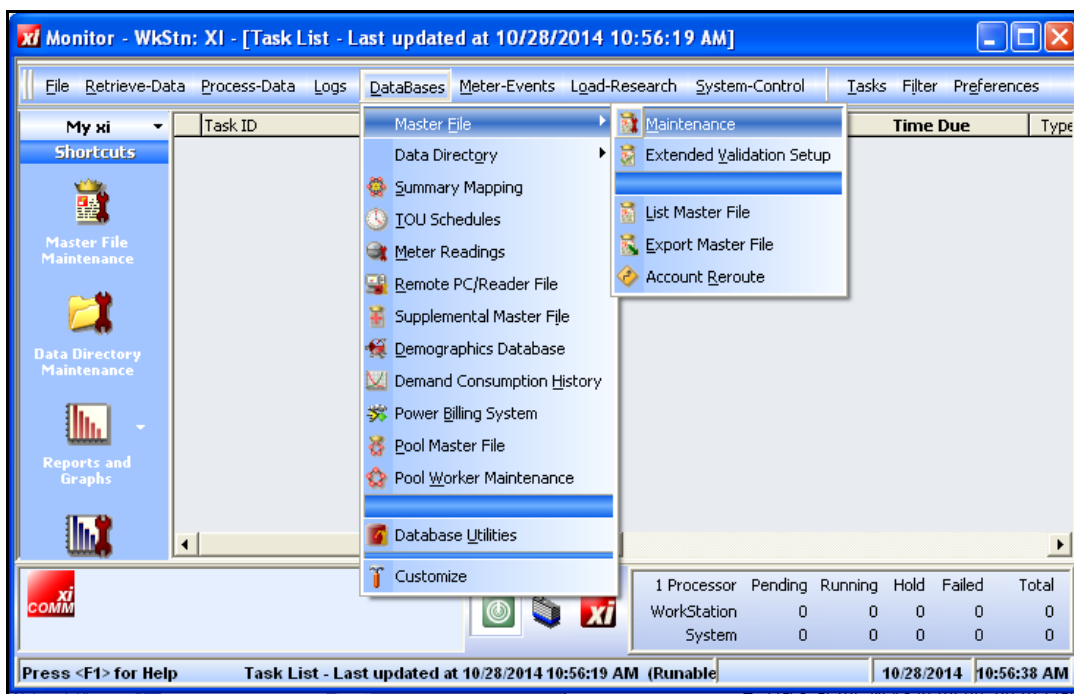
For your information, this is a short list of occasional problems with the probable solution.

- Problem: Program quits while trying to create the HHF file.
  - Solution: This can be caused by too many values that are too large for the HHF file to hold. Try a larger scaling value.
- Problem: Program quits right after opening; no file is created.
  - Solution: This is most often caused by an item in the historical log that the converter does not recognize. Only Intervalled Energies are valid values for the converter. Remove all invalid items from the log. Make sure that the correct log is selected in the HHF Options.
- Problem: MV-90 will not load the file.
  - Solution: This can be caused by giving MV-90 a file or path that contains `` (spaces). Make sure that all files and paths leading to the HHF file contain no spaces.
- Problem: MV-90 downloaded and converted log, but values are either incorrect or nonexistent.
  - Solution: This can be caused by downloading both logs and the wrong log is converted. Make sure that the correct log is selected in the HHF Options.
- Problem: Log is OK, convert is OK, but when loaded into MV-90, it is rejected.
  - Solution: There may be too many errors in the historical log, including power off gaps, flashing, etc. MV-90 expects no gaps in the data in the .hhf file and tries to verify the integrity of the data. If data must be loaded, despite gaps, make sure Verification Feature in MV-90 is OFF.

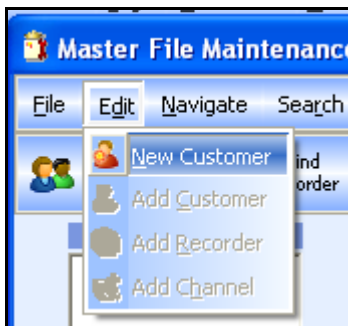
### 19.4.8: Set up MV-90 for Use with HHF Files

Follow these steps to set up the MV-90 application:

1. Open MV-90 and go to the MV-90 menu.
2. From the Menu Bar, click System-Control > System Parameters > Operations > Data Retrieval > Portable Readers and then click Enable Edit.
3. Change the value of "Retrieval/Import Key" to "Device ID" and click Save.
4. Go to Operations > UOM Codes > Descriptions. Verify that Code 1 is kWh/kW and Code 3 is kVARh/kVAR. These are the default MV-90 Mappings.
5. Exit System Parameters. From the Menu Bar, go to Databases > Master File > Maintenance.



6. Click Edit > New Customer.



The "Add Customer, Recorder & Channels" screen opens. On this series of screens, you will create a new Master File entry.

 A screenshot of the 'Add Customer, Recorder & Channels' dialog box. It contains several input fields and checkboxes.
 

- ☒ Add New Customer
- ☒ Add New Recorder
- New Customer ID: CUSTOMER1
- New Recorder ID: CUSTOMER1 (dropdown menu)
- ☐ Copy From Existing Customer
- ☐ Copy From Existing Recorder
- New Device ID: CUSTOMER1
- Number of Channels to Add: 4 (spinner box)

 Below these fields is a table with 4 columns: Log Chan, Phys Chan, Meter S/N, and Create From...
 

Log Chan	Phys Chan	Meter S/N	Create From...
1	1		default values
2	2		default values
3	3		default values
4	4		default values
0	0		
0	0		
0	0		
0	0		
0	0		

 At the bottom are 'OK' and 'Cancel' buttons.

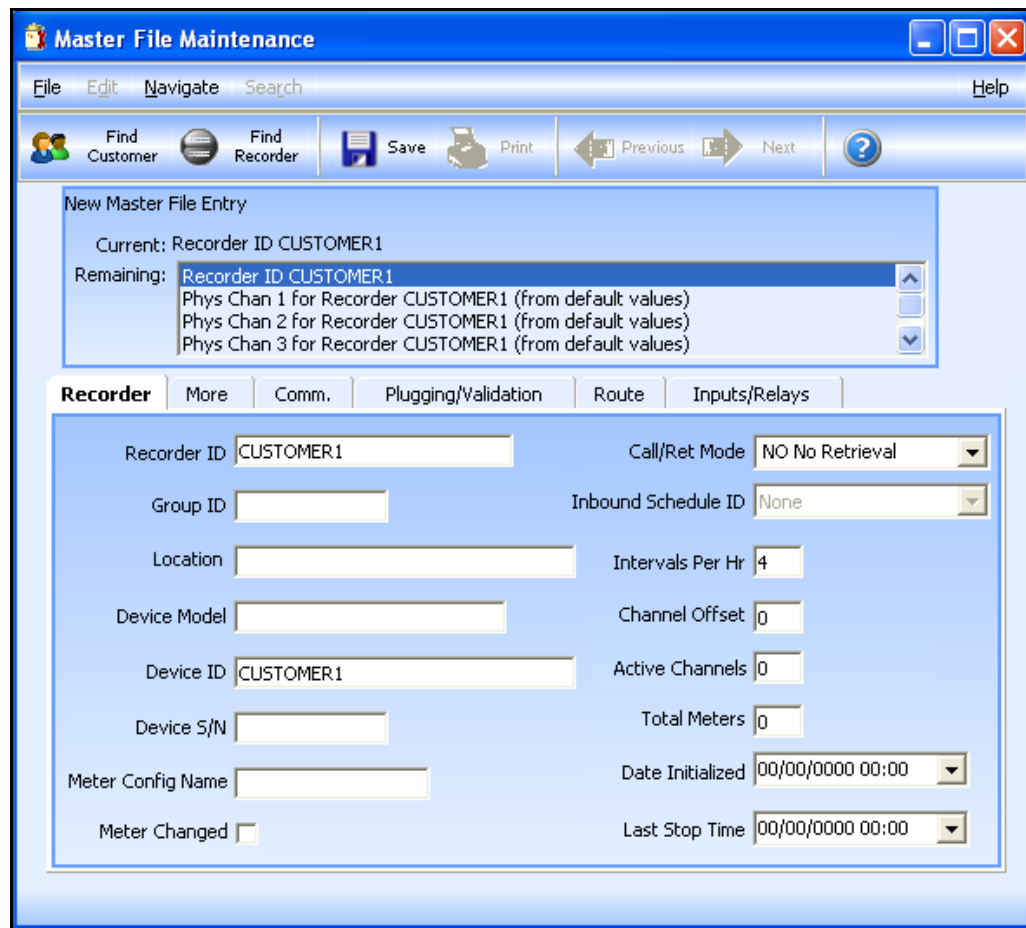
7. Enter the Customer, Recorder and Device ID.

**NOTE:** The Device ID must match the Meter name of the meter being used.

8. Set the Number of Channels to 4 and click OK. The next screen opens.

9. On this screen, Enter Customer Information.

10. Click the Save button to continue to the next screen.



**Master File Maintenance**

File Edit Navigate Search Help

Find Customer Find Recorder Save Print Previous Next ?

**New Master File Entry**

Current: Recorder ID CUSTOMER1

Remaining:

- Recorder ID CUSTOMER1
- Phys Chan 1 for Recorder CUSTOMER1 (from default values)
- Phys Chan 2 for Recorder CUSTOMER1 (from default values)
- Phys Chan 3 for Recorder CUSTOMER1 (from default values)

**Recorder** More Comm. Plugging/Validation Route Inputs/Relays

Recorder ID: CUSTOMER1 Call/Ret Mode: NO No Retrieval

Group ID: Inbound Schedule ID: None

Location: Intervals Per Hr: 4

Device Model: Channel Offset: 0

Device ID: CUSTOMER1 Active Channels: 0

Device S/N: Total Meters: 0

Meter Config Name: Date Initialized: 00/00/0000 00:00

Meter Changed: Last Stop Time: 00/00/0000 00:00

- a. On this screen, Enter Recorder (Device) Information.
  - If the meter has its Daylight Savings Time Option turned on, make sure the DST Option is checked in the Recorder Information: click the More tab >Device Follows DST.



- b. Highlight one of the channels in the list at the top to see the channel setting tabs - see the example below.

The screenshot shows the 'Master File Maintenance' application window. At the top, there is a menu bar with 'File', 'Edit', 'Navigate', 'Search', and 'Help'. Below the menu bar is a toolbar with icons for 'Find Customer', 'Find Recorder', 'Save', 'Print', 'Previous', 'Next', and a help icon. The main content area is titled 'New Master File Entry'. It shows 'Current: Phys Chan 1 for Recorder CUSTOMER1 (from default values)' and a list of 'Remaining' channels. The first item in the list, 'Phys Chan 1 for Recorder CUSTOMER1 (from default values)', is highlighted. Below this list are five tabs: 'Channel (Meter)', 'Multipliers & Readings', 'Losses', 'Std. Checks', and 'TOU Checks'. The 'Channel (Meter)' tab is active, displaying various input fields for channel configuration. These fields include: Physical Channel (1), Logical Channel (1), Channel Mapping # (0), Group ID, Register Type (Visual Usage Readings), Meter S/N, Encoder Type, Unit of Measure (1), UOM Scale, Number Of Dials (5), Set Number (0), Pulse Contact Type (C Form (three wire)), Meter Install Date (00/00/0000 00:00), Service Type (WYE), Export Account #, Power Flow (Delivered), Omit on Upload (checkbox), and Perform Extended Validation (checkbox).

- Enter Channel Information in the first tab.

- Enter Multipliers & Readings Information in the second tab - see the example below.

The screenshot shows the 'Master File Maintenance' application window. The 'Multipliers & Readings' tab is selected. The 'New Master File Entry' section shows 'Current: Phys Chan 1 for Recorder CUSTOMER1 (from default values)' and a list of 'Remaining' entries. The 'Channel (Meter)' tab is also visible. The 'Enter Meter Readings' section contains several input fields: PT/CT Ratio, Meter Read Decimal, Start Meter Reading, Encoder Base Reading, Meter Multiplier, Pulse Multiplier, Pulse Offset, and Total Pulses. A 'Non-Recording KVARH' sub-form is also present with fields for Option, Meter S/N, Multiplier, Number Of Dials, and Start Reading.

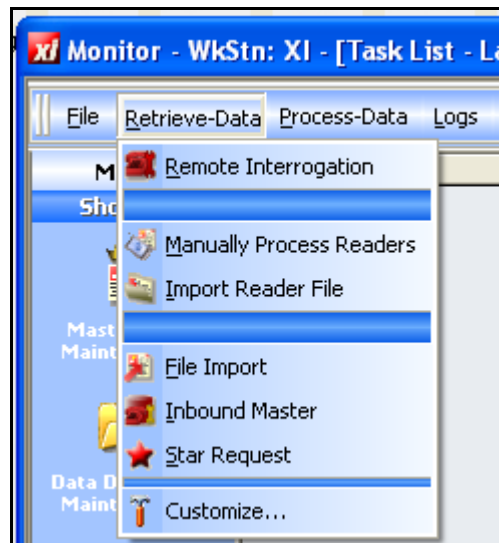
- For Channel 1: On the Channel tab, set the Unit of Measure to 1 and on the Multipliers & Readings tab, set Meter & Pulse Multiplier to 0.0001 (kWh). Fill out any other relevant information.
- For Channel 2: On the Channel tab, set the Unit of Measure to 1 and on the Multipliers & Readings tab, set Meter & Pulse Multiplier to 0.0001 (kWh). Fill out any other relevant information.
- For Channel 3: On the Channel tab, set the Unit of Measure to 3 and on the Multipliers & Readings tab, set Meter & Pulse Multiplier to 0.0001 (kVARh). Fill out any other relevant information.

- For Channel 4: On the Channel tab, set the Unit of Measure to 3 and on the Multipliers & Readings tab, set Meter & Pulse Multiplier to 0.0001 (kVARh). Fill out any other relevant information.

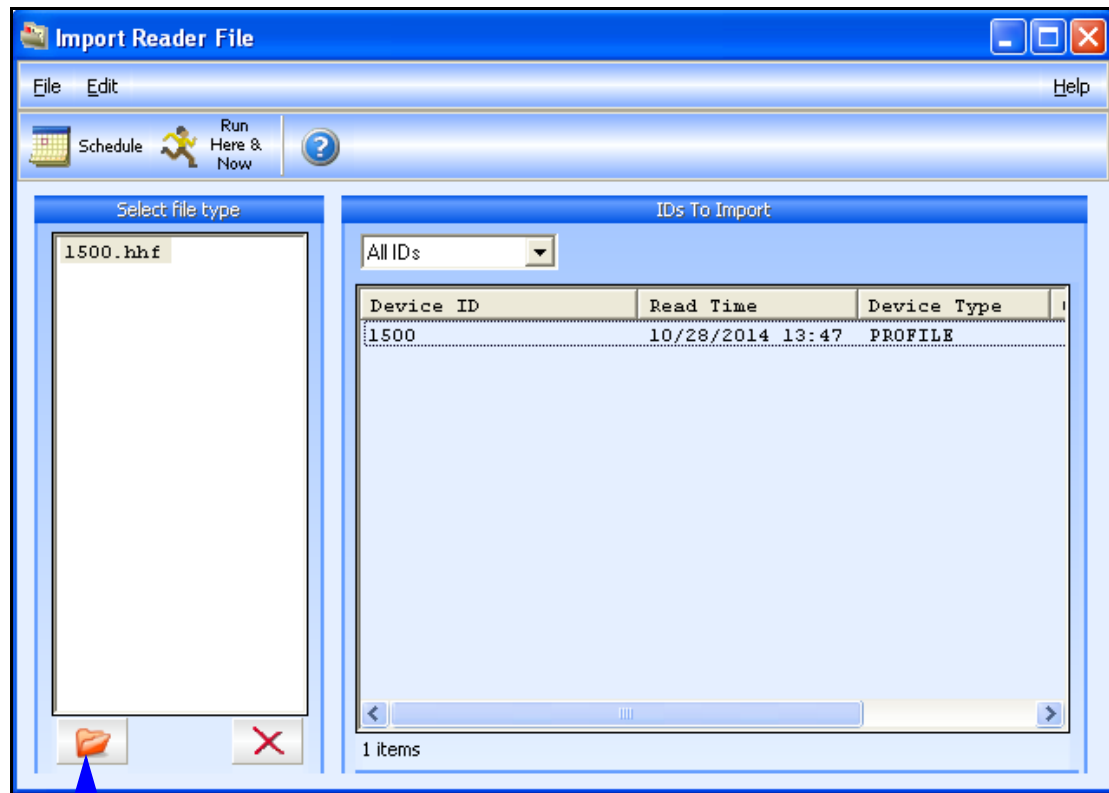
### 19.4.9: Import an HHF File into MV-90

Follow these steps to import a file:

1. Open MV-90 and go to the MV-90 menu. In MV-90's Menu Mode, go to Retrieve-Data > Import Reader File.



2. The "Import Reader File" screen opens.



Browse Icon

Click the Browse icon to locate an HHF file to import.

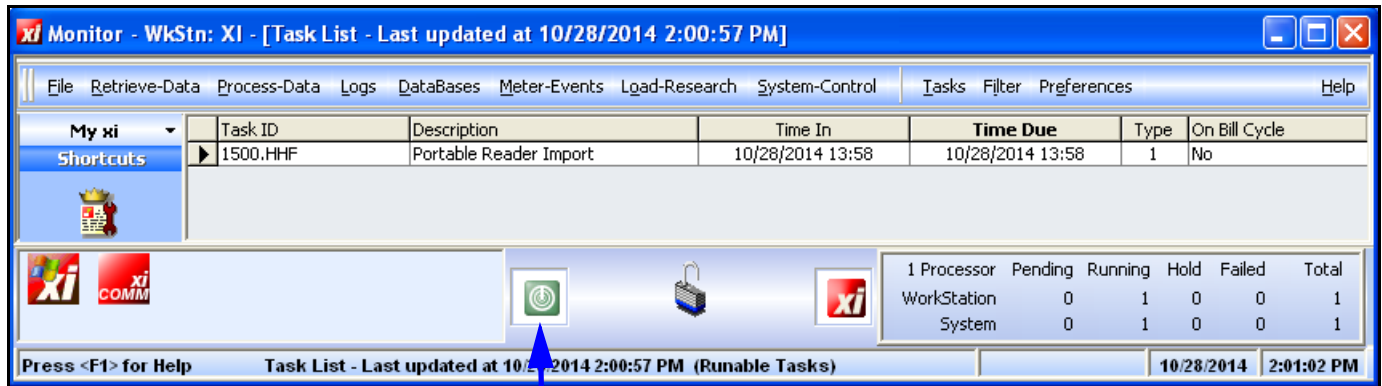
- Verify that the Device ID and Read Time are correct.
- The HHF file is saved with the retrieved logs:  
C:\Users\Public\Documents\Electro Industries\Communicator\_Ext\Retrieved Logs\HHF Files

3. Click either the Schedule icon or the Run Here & Now icon:

- The Schedule option imports the file later.
- The Run Here & Now option imports the file now.

4. When a file is imported, a report is generated (overview of data and success of importing). See your MV-90 documentation to locate the report.

5. The HHF file import task should show up in the Task List box - see example below.  
If it doesn't, click the "Scan for Tasks" icon.



Scan for Tasks Icon

- The Time In field lists when the task was loaded; The Time Due fields lists when the task is scheduled to run.
- When an HHF file is imported, it is added to the database for that client. This data can be viewed in many ways. See your MV-90 documentation for details.

**NOTE:** MV-90 is based on a DOS Program. File names (including folder names) must not contain blank spaces. All blank spaces should be represented by "\_" (underscore). Folder names cannot be longer than 8 characters. When setting up MV-90, make sure that all paths follow these limitations.

- The Progress Window is displayed while converting the logs. This window is always displayed. The window is composed of two parts:
  - Progress Bar: A bar which displays the percentage complete in graphical (bar) and text (%) format.
  - Text: Output which specifies the actions being taken by the converter, including errors encountered.

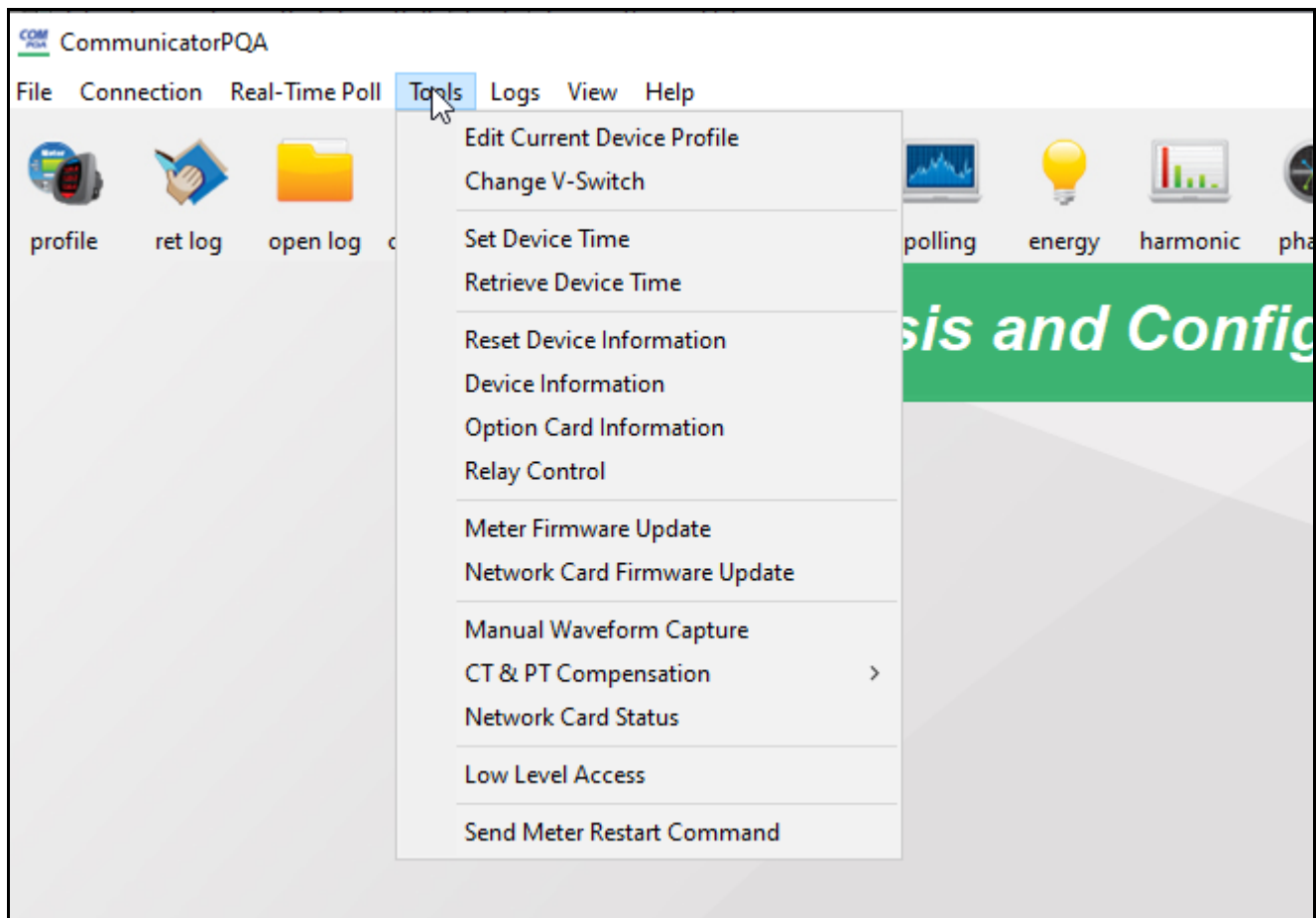
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## 20: Other Functions and Screens

This chapter explains how to use the Tools Menu options, the Options screen, and other CommunicatorPQA® software features. The Tools section of the software provides a series of settings and features that enable a user to perform a variety of functions and commands in the meters. The features include setting device time, upgrading firmware, and many other functions. The Options screen lets you change the application's language, among other features. Note that most of the example screens in this chapter are from a meter with the maximum V-Switch™ key - not all options are available at lower level V-Switch™ keys.

### 20.1: Tools Menu

The Tools Menu, available from the Main Screen's Menu Bar, gives you access to additional software features. Not all meters have the same Tools Menu options. See the examples below, from a Shark® 200 meter.



The following sections explain the options and, where applicable, how they differ between meters. Note that some of the Tools menu options are explained in other chapters of this manual:

- Passwords are explained in Chapter [6: Meter Security on page 6- 1](#).
- Firmware Update is explained in Chapter [25: Firmware Updating on page 25- 1](#).
- Flash Network Card is explained in [25.2.1: Update the Internal Network Card's Firmware on page 25- 3](#).

### **20.1.1: Edit Current Device Profile**

The first Tools Menu item for all of the meters is Edit Current Device Profile. It performs the same action as clicking the Profile icon - opens the Device Profile screen for the currently connected meter, allowing you to configure programmable settings for the meter. See Chapter 7 for more information on the Device Profile screen.

The Nexus® 1262/1272 meter has an additional Tools Menu option:

Tools>Edit Current Device Profile (Without the LCD Programmable Settings), which lets you load the meter's Device Profile without loading the LCD display's programmable settings, which can take a while to load. This gives you the option of opening the Device Profile more quickly, if you do not need to make changes to the display's settings, or if you would rather make those changes separately from the rest of the Device Profile. See the next section for instructions on programming the display separately.

### **20.1.2: Edit LCD Programmable Settings**

This option lets you set up a meter's on-board display. The specific fields and programming you perform depend on the meter type.

1. From the Menu Bar, select Tools>Edit LCD Programmable Settings.



- If you are connected to a Nexus® 1500/1500+ meter, you will see the screen shown below. It lets you customize the time and date presentation for the meter's touch-screen display.

**Date & Time Format For LCD Display Footer**

Date	
Format	YYYY-MM-DD
Date Separator	- (Dash)
Example:	2014-09-19

Time	
Format	HH:MM:SS 24hr
Time Separator	: (Colon)
Example:	14:46:58

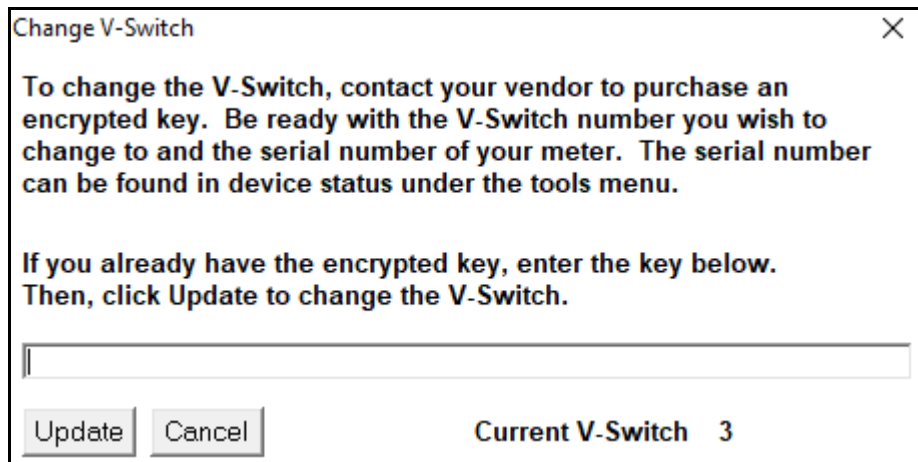
- a. Use the pull-down menus to select the date and time format you want to display on the touch-screen display. The example fields change to show you what your selections will look like.
  - b. Click the Update button to implement your selections and exit the screen; click Cancel to exit the screen without making any changes.
- If you are connected to a Nexus® 1262/1272 meter, this option will open the same screen you see when you select Revenue and Energy Settings>Display Configuration from the meter's Device Profile screen. See 12.2.4: Display Configuration on page 12- 37, for instructions on programming the screen, which has extensive capabilities and options. This feature lets you program the LCD display separately from the rest of the Device Profile.

### 20.1.3: Change V-Switch™ Key

EIG's Nexus® 1450/1500/1500+, Nexus® 1252, Shark® 200, Shark® 250, Shark® 270, Shark® 50 meter, Shark® 100, Shark® 100S, MP200™ Metering System, and ST40 meters offer V-Switch™ key upgrade. This feature allows the meter to be upgraded to more advanced functionality, in the field, without needing to be removed from installation. The specific features and the specific V-Switch levels differ for the different meter types. Refer to the Installation and Operation manual for your meter for information.

All of the meters that support V-Switch™ key use the same screen to update the key.

- For the meters other than the Shark® 50/100/100S meter, click Tools>Change V-Switch to open the screen.
- For the Shark® 50/100/100S meter, click the Change V-Switch button from the meter's Device Profile screen, System Settings tab (see 9.1.4: Configuring Settings on page 9- 10).

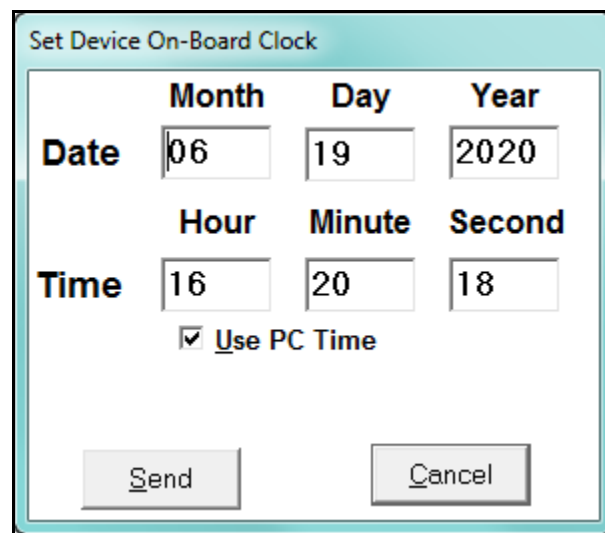


- a. As explained in the screen, you need to contact EIG with your meter's serial number, the number of the V-Switch™ upgrade you want, and a credit card for payment. You will be given a V-Switch™ key. (See your meter's Installation and Operation manual for detailed instructions.)
- b. Enter the V-Switch™ key in the screen and click Update. You will see a message when the meter has been updated with the new V-Switch™ key.

### 20.1.4: Set Device Time

The meters that support logging use an on-board clock for time stamping any logs being recorded. If you do not have the meter set to line frequency time synchronization, IRIG-B, or SNTP the meter's time is being controlled by its internal crystal. Different meters differ in terms of drift, but typically meters with 20 ppm crystals will drift 30 seconds per month when set to internal crystal. You may want to use this feature to reset the meter's time if it drifts too far from actual time. Please refer to the specific meter specification for actual clock ratings.

1. From the Main screen's Menu Bar, select Tools>Set Device Time. You will see the screen shown below.



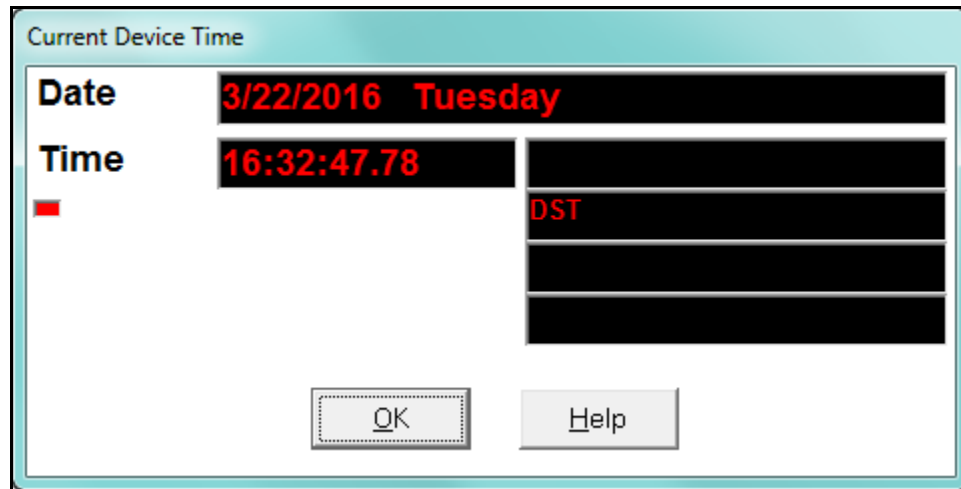
The image shows a dialog box titled "Set Device On-Board Clock". It contains two rows of input fields. The first row is for the date, with labels "Month", "Day", and "Year" above the fields. The fields contain the values "06", "19", and "2020" respectively. The second row is for the time, with labels "Hour", "Minute", and "Second" above the fields. The fields contain the values "16", "20", and "18" respectively. Below the time fields is a checkbox labeled "Use PC Time" which is checked. At the bottom of the dialog are two buttons: "Send" and "Cancel".

- To synchronize the meter and your computer, leave the Use PC Time box checked.
  - To set the date and time independently from the PC, de-select the Use PC Time box and enter the time and date settings.
2. Click the Send button to update the meter's time settings and exit the screen; click Cancel to exit the screen without making any changes.

### 20.1.5: Retrieve Device Time

To retrieve the meter's current time and date settings:

1. From the Main screen's Menu Bar, select Tools> Retrieve Device Time. You will see the screen shown below. Date and running time display in the LEDs.

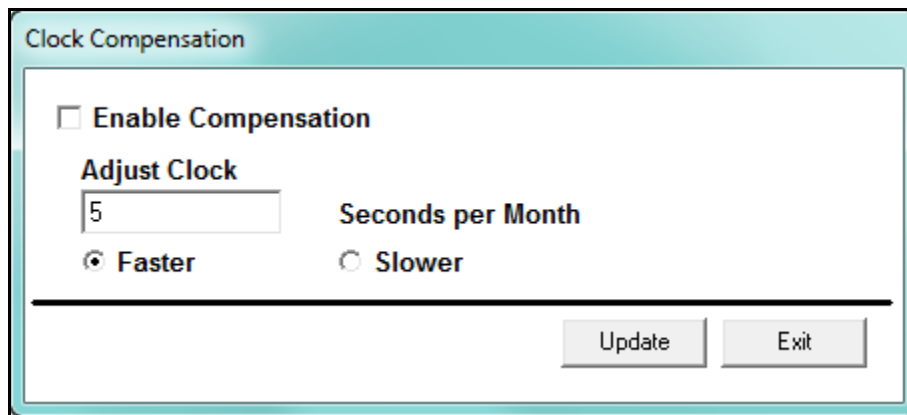


- If IRIG-B is enabled for your meter, IRIG-B is displayed next to the time.
  - If Line Frequency Clock Synchronization is enabled for your meter, LINE SYNC is displayed next to the time.
  - If Daylight Savings Time is active, DST is displayed.
  - If Cold Load Pickup is active, Active Cold Load is displayed.
  - If clock compensation is active, Clock Compensation Operational is displayed.
2. Click OK to exit the screen.

### 20.1.6: Set Clock Compensation (Nexus® 1252/1262/1272 Meters)

Nexus® meters have a feature that allows a user to manually trim the internal clock timing. The feature allows the user to determine what the meter's actual monthly error is and compensate for it by adding or subtracting those seconds into the time. This feature will trim the clock but is not the preferred meter for improving timing accuracy. The more traditional time frequency line synchronization will work better in jurisdictions with controlled frequency.

From the Main screen's Menu Bar, select Tools>Set Clock Compensation to set the meter's clock to be faster or slower. You will see the screen shown below.



- Click the box next to Enable Compensation.
- Enter the number of seconds per month you want the time adjusted.
- Click the Faster or Slower button.
- Click Update to save the setting.

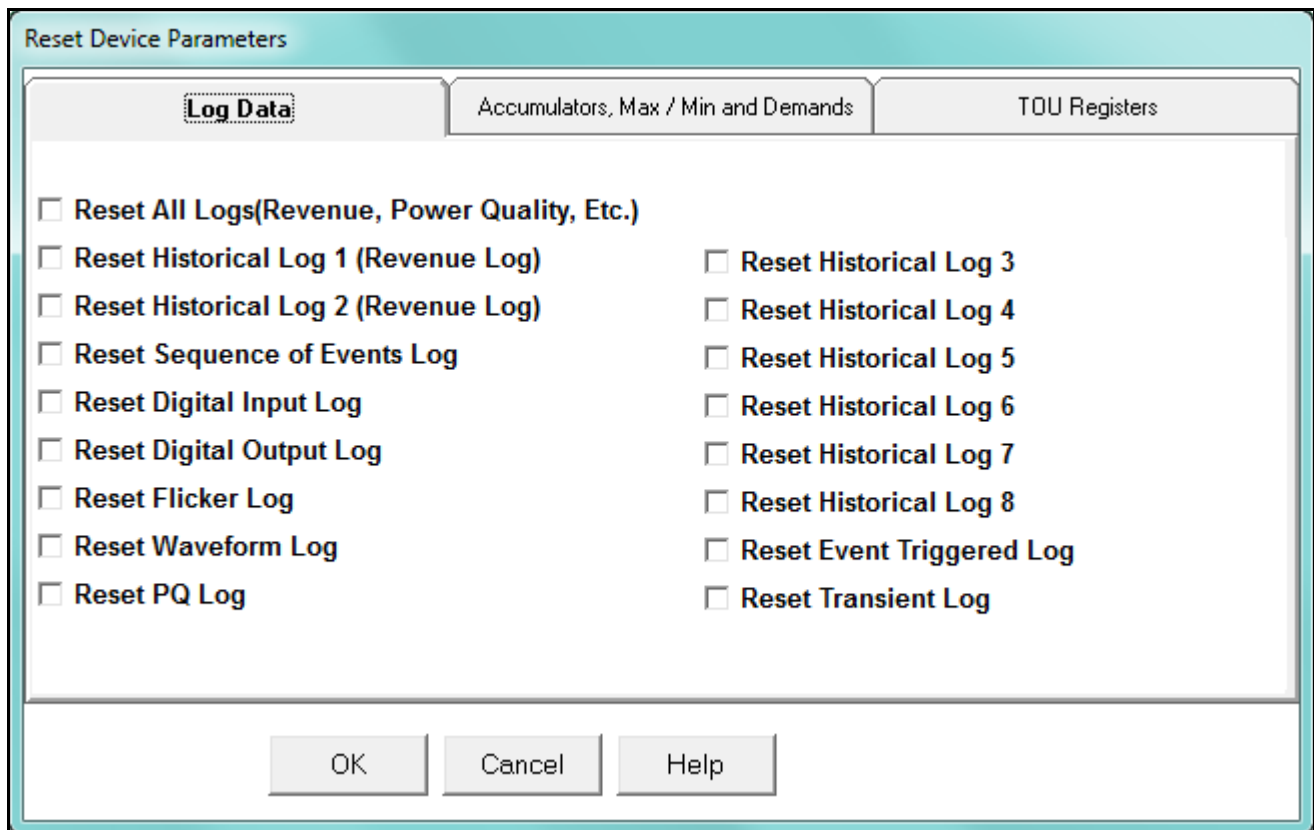
### 20.1.7: Reset Device Information

This feature lets you reset logs, accumulators, and TOU data. The options your meter has determine the exact data you can reset.

This feature will normally be disabled under password control. Resetting the parameters is not reversible so be careful not to reset energy or log data before saving the readings elsewhere.

1. From the Main screen's Menu Bar, select Tools>Reset Device Information. The screen you see depends on the meter type you are connected to.

- The screen below is from a Nexus® 1500/1500+ meter. The screen for the other Nexus® meters is the same, except that there are less logs to reset; and for the 1450 meter there is a message that resetting all logs may take up to two minutes.



a. This screen has three tabs. The Log Data Reset screen is shown above.

b. Click the tabs to view the Accumulators, Max/Min, and Demands screen and the TOU Registers screen.

**NOTE:** If you are updating a 1500+ with firmware version 15.2, you must first reset the PQ log.

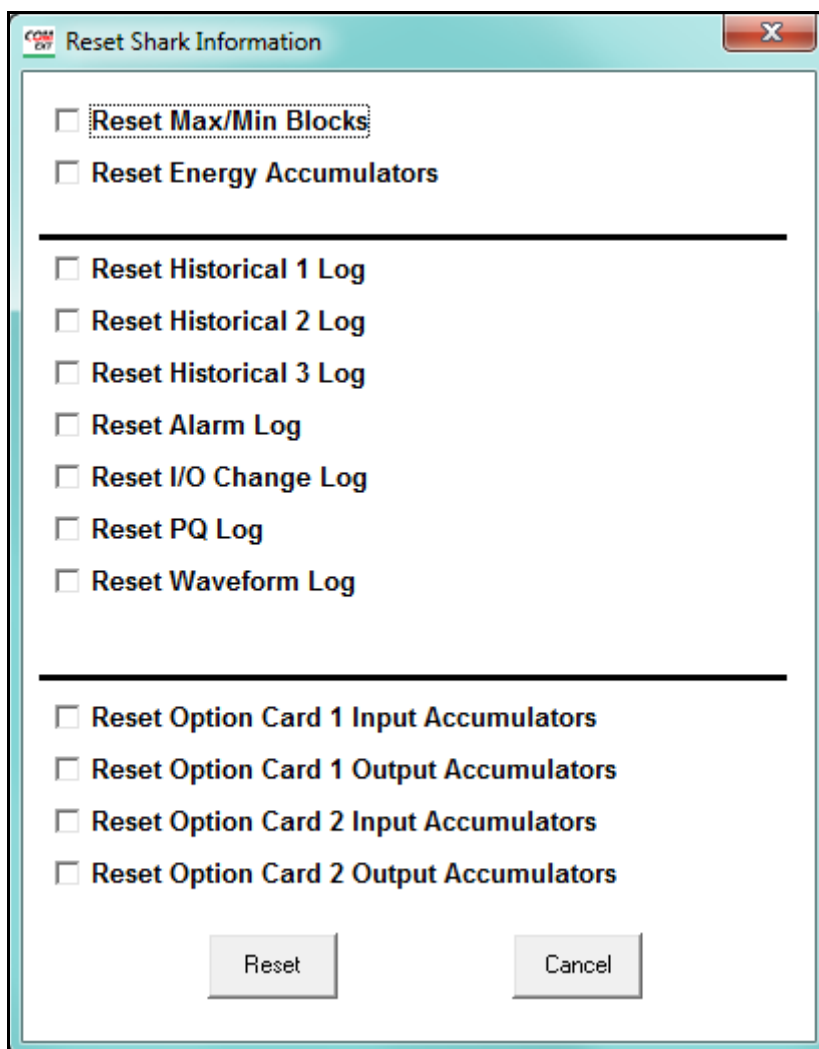
- For a Nexus® 1500+ meter that is running TOU in Self Read mode, there are restrictions on what can be reset from the TOU tab. See the screen below.

The screenshot shows a dialog box titled "Reset Device Parameters" with three tabs: "Log Data", "Accumulators, Max / Min and Demands", and "TOU Registers". The "TOU Registers" tab is selected. It contains a list of checkboxes for resetting various TOU parameters. The "Time of Use Master Reset" checkbox is checked, while all other checkboxes are unchecked. At the bottom, there are "OK", "Cancel", and "Help" buttons. A note at the bottom right states: "Time of Use in Self Read Mode. Disabled items cannot be reset".

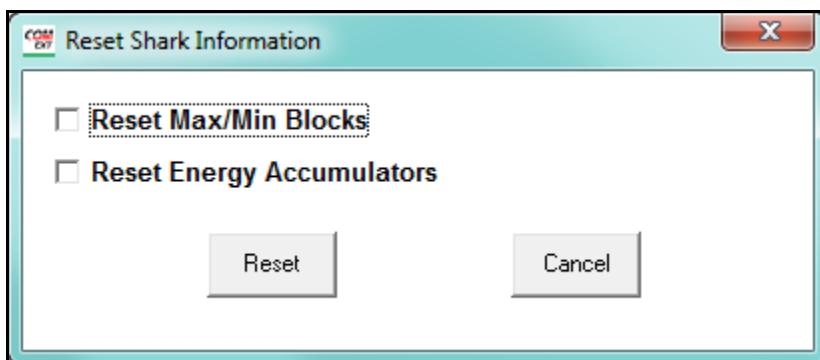
Reset Device Parameters
<div>Log Data      Accumulators, Max / Min and Demands      <b>TOU Registers</b></div> <input type="checkbox"/> Reset Time of Use Current Month Registers <input checked="" type="checkbox"/> <b>Time of Use Master Reset</b> <input type="checkbox"/> Reset Time of Use Current Season <input type="checkbox"/> Reset Time of Use Demands <input type="checkbox"/> Initialize Time of Use Cumulative Demands <input type="checkbox"/> Time of Use Manual Read Season Block Data <input type="checkbox"/> Time of Use Manual Read Month Block Data
<div> <div>OK      Cancel      Help</div> <div>Time of Use in Self Read Mode. Disabled items cannot be reset</div> </div>

- None of the disabled/grayed out items can be reset individually when the Nexus® 1500+ meter is in TOU Self Read mode.
- The TOU Master Reset option will reset all current and prior TOU data, meter Max/Min values, meter energy values, meter pulse accumulation values, and meter cumulative demand values. It should **only** be used in either of the two following conditions: 1. Meter initial deployment with new meter profile and/or new TOU profile; 2. Updates to meter profile and/or TOU profile which may affect the TOU readings, for example, meter scaled energy format changes, Demand Type change, access of TOU data via DNP with DNP scaling changes, or Pulse accumulation setup changes.  
**IMPORTANT!** The user should back up all existing meter data before performing this reset operation.  
 Note that this reset command is only available under the meter's Level 2 password access, if meter security is enabled.
- See [15.3: Nexus® 1450/1500+/Shark® 250/270 Meter's TOU Settings on page 15- 45](#), for additional information on TOU for the Nexus® 1500+ meter.

- The screen below is from a Shark® 200 meter.



- The screen below is from a Shark® 100 meter.





- The screen below is from an MP200-Y meter. The screen for the MP200-S meter is very similar, except that there are 24 individual meters that can be reset for Max/Min and/or Energy.

**Reset Device Information**

Reset All Meters	Reset Individual Meters Max/Min	Reset Individual Meters Energy
<input type="checkbox"/> Reset Max/Min Blocks	<input type="checkbox"/> A	<input type="checkbox"/> A
<input type="checkbox"/> Reset Max/Min Demand	<input type="checkbox"/> B	<input type="checkbox"/> B
<input type="checkbox"/> Reset Energy Accumulators	<input type="checkbox"/> C	<input type="checkbox"/> C
<input type="checkbox"/> Reset Max/Min Voltage/Frequency	<input type="checkbox"/> D	<input type="checkbox"/> D
	<input type="checkbox"/> E	<input type="checkbox"/> E
	<input type="checkbox"/> F	<input type="checkbox"/> F
	<input type="checkbox"/> G	<input type="checkbox"/> G
	<input type="checkbox"/> H	<input type="checkbox"/> H

**Global Resets**

☐ Reset Historical 1 Log

☐ Reset Historical 2 Log

☐ Reset Alarm Log

☐ Reset I/O Change Log

☐ Reset Input Accumulators

☐ Reset Output Accumulators

Reset Cancel

- The screen below is from a Shark® 250/270 meter.

**Reset Device Information**

*You do not have permission to reset grayed out check boxes*

☐ Reset Max/Min Blocks ☐ Reset Energy Accumulators

☐ Reset Cumulative and Continuous Cumulative Demand

**Historical Logs**

☐ Reset Historical Log 1 ☐ Reset Historical Log 2

☐ Reset Historical Log 3 ☐ Reset Historical Log 4

☐ Reset Historical Log 5 ☐ Reset Historical Log 6

**Logs**

☐ Reset Alarm Log ☐ Reset VO Change Log

☐ Reset PQ Log ☐ Reset Waveform Log

**Option Cards**

☐ Reset Option Card 1 Input Accumulators ☐ Reset Option Card 2 Input Accumulators

☐ Reset Option Card 1 Output Accumulators ☐ Reset Option Card 2 Output Accumulators

**Time of Use in Manual read mode**

☐ Initialize Time of Use Data based upon Accumulator method

☐ Perform Manual Read of Season Accumulator and demand data

☐ Perform Manual Read of Monthly Accumulator and demand data

Cancel Select All Reset

- The screen below is from an ST40 meter.

**Reset Shark Information**

☐ Reset Max/Min Blocks

☐ Reset Energy Accumulators

---

☐ Reset Historical 1 Log

☐ Reset Historical 2 Log

☐ Reset Historical 3 Log

☐ Reset Alarm Log

☐ Reset PQ Log

☐ Reset Waveform Log

Reset Cancel

- For any of the Reset screens, click on the box(es) beside the value(s) you want to reset.
- Click OK (Nexus® meters) or Reset to process your selections and exit the screen; click Cancel to exit the screen without making any selections.

- For each box you select, a message window opens, telling you the reset is complete. Click OK to close the message window(s).

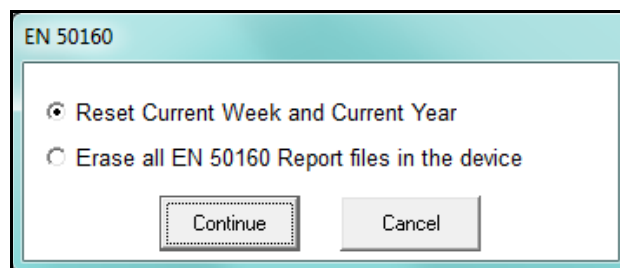
#### NOTES:

- The screen options you see may vary depending on your meter's V-Switch™ key.
- For the Shark® 250/270 meter, when resetting the non-TOU energy in the meter, the TOU energy must be also initialized, in order to keep the TOU module synchronized correctly.
- For the Shark® 250/270 meter, "Initialize Time of Use Data based upon Accumulator method" will clear time of use data as follows:
  - If the TOU accumulation method is set to "Continue Time of Use accumulation where previous energy left off," then the total accumulations will use the current energy values of the meter.
  - If the TOU accumulation method is set to "Start from zero," then the accumulations will be set to zero.
- For the Shark® 200 meter, when installing a Pulse Output/Digital Input card or a Relay Output/Digital Input Card, we recommend you reset the accumulators for the card, in order to prevent erroneous counts.
- This feature requires a Password if Password for Reset is enabled in the meter. See Chapter 6 for more information on passwords.
- For the MP200-Y and MP200-S, you can perform a reset for all of the meters or individual meters.

### 20.1.8: Reset EN 50160/IEC 61000-4-30 Information (Nexus® Meters)

Use this feature to reset the EN 50160/IEC 61000-4-30 counters and accumulators for the current period.

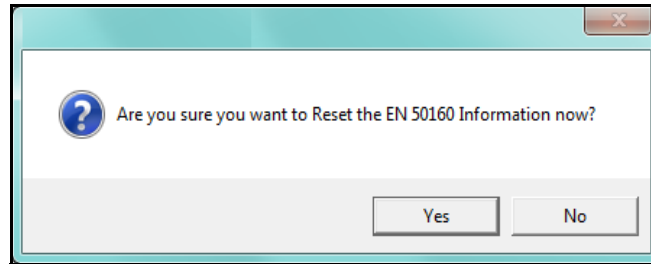
- From the Main screen's Menu Bar, select Tools>Reset EN50160/IEC61000-4-30 Information. You will see the message window below.



2. Select the option you want: to reset the current week and year data, or to erase all of the EN 50160 report files in the meter.

**IMPORTANT!** Exercise care as with the other reset options. Be sure you select the correct option and/or make sure the data is backed up somewhere if there is the possibility you will need it again.

3. You will see a message window asking if you are sure you want to perform the reset. Note that the wording is slightly different for the 1252 meter.



4. Click either:

- Yes - to perform the reset.
- No - to close the message window without resetting the information.

### 20.1.9: Retrieve Device Status

This option opens the Device Status screen for your meter. See Chapter 4 for information on the Device Status screens.

### 20.1.10: Device Information

For the Nexus® 1500/1500+ meter, the Shark® meters, and the MP200 metering system, this option performs the same action as the Retrieve Device Status option.

For the Nexus® 1252/1262/1272 meters, from the Main screen's Menu Bar, select Tools>Device Information to see the screen shown below. This is an example from a Nexus® 1272 meter.

The screenshot shows a 'Device Status' window with two main tables. The left table lists device details, and the right table lists various status items and their values.

Device	Device Type	Serial Number
1272_Unit2	Nexus 1272	0000000090000008

Item	Value
Comm Boot	602
Comm Run	626
Comm Xilinx	2
Comm State	Healthy
DSP Boot	600
DSP Run	644
DSP Xilinx	6
DSP State	Healthy
Protection	Full Protection - Password Protection Enabled and Sealing Switch Disabled
NVRAM	2 MB
On Time	Thursday, July 24, 2014 14:02:08.00
Comm Boot	0000 1000/1070 0000 M-1-1L 0000 1000

At the bottom left, there is a checkbox labeled 'Polling 1272\_Unit2'. At the bottom right, there are 'OK' and 'Copy' buttons.

- This screen is the same as the newer Device Status screen. It contains information concerning the versions of the meter's firmware and other, related information.

### 20.1.11: Option Card Information/Board Information/ I/O Board Status

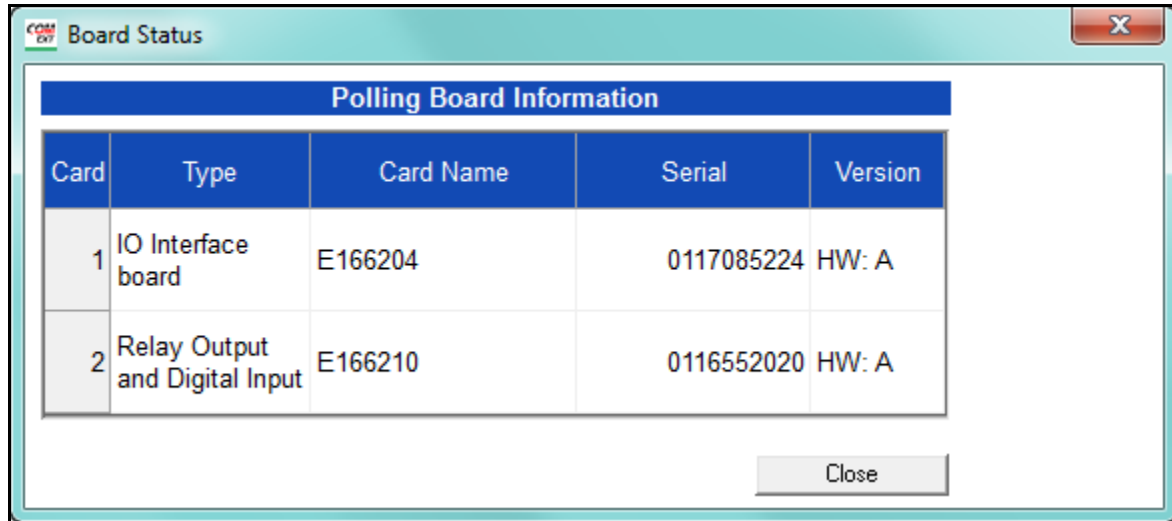
The Nexus® 1500/1500+ meter, Shark®200/250/270 meter, and MP200™ metering system have optional or embedded I/O cards and boards. This option lets you view status information for the cards/boards that are in the meter. Refer to your meter's Installation and Operation manual for additional information about I/O cards and boards for your meter.

- For the Shark® 200/250/270 meter, from the Main screen's Menu Bar, select Tools>Option Card Information to display the screen shown below. It displays

information about any Option cards installed in the meter: Type, Sub Type, Card Name, Serial Number, and Version. Click Close when you are done with the screen.

Option Card Status					
Option Card Information					
Card	Type	SubType	Card Name	Serial Number	Version
1	Communication	IEC 61850	INP300	0020116010	HW: H BFW: 3.10 RFW: 3.48
2	Digital	Pulse Output and Digital Input	KYZ&Input Card	0196634029	HW: h
					Close

- For the MP200™ metering system, from the Main screen's Menu Bar, select Tools> Board Information to display the screen shown below. It displays information about the Relay Output/Digital Input card: Type, Card Name, Serial Number, and Version. Click Close when you are done with the screen.



- For the Nexus® 1500/1500+ meter, from the Main screen's Menu Bar, select Tools>I/O Board Status to display the screen shown below. All installed I/O Boards are listed, along with the following information for the board:
  - Location ID
  - Hardware Name
  - Serial Number
  - Slot Mask
  - Hardware Version
  - Firmware Version
  - Required PPC Run Version
  - Board Status
  - Test Status
  - Test Error
  - Test Location
  - Test Operator

- Test Date/Time

Click Refresh to update the display with the most current information; click OK to close the screen.

Nexus 1500 I/O Board Status

Detected Boards 4 All Data Retrieved

Location ID	ID	Hardware Name	Serial Number	Slot Mask	Assembly Revision	Firmware Version	Required PPC Ver.		Board Status	Status	Error	Test		
							Run	Boot				Location	Operator	Date/Time
0	1	Voltage/Current Inputs	0037624022	0000000000000000	0	0			0x40	Passed	None	Engineering	0	03/23/2009 15:09:00.00
1	2	Ether1-TP/IRIG-B/Digital In	0022984126	0000000000000000	2	0			0x40	Passed	None	Engineering	0	02/27/2009 12:23:00.00
2	7	Front Panel	0071211113	0000000000000000	4	1	1	1	0x40	Passed	None	Production	222	03/09/2012 07:31:00.00
7	9	Main Digital Board	0000000000000002	0000000000000000	0	0	1	1	0x40	Passed	None	Engineering	255	12/01/2013 11:13:06.00



### 20.1.12: Relay Control

This feature allows you to manually change the state of an installed relay output for the Shark® 200/250/270 meter optional Relay Output/Digital Input card and the MP200™ metering system's embedded Relay Output/Digital Input card. For instructions for using relay control for the Nexus® meters' optional external Relay Output module, see Chapter 14.

1. From the Main screen's Menu Bar, click Tools>Relay Control. You will see the screen shown below.

Option Card 2	Relay State	Check to change
Relay 1	Common shorted to normally closed	<input type="checkbox"/>
Relay 2	Common shorted to normally closed	<input type="checkbox"/>

Select New State: Common shorted to normally closed ▼

Apply OK

2. The screen displays the current state of the relay outputs. To change the state:
  - a. Click the checkbox next to the relays you want to change.
  - b. Select the desired state in the Select New State field.
  - c. Click Apply. If this feature is Password Protected, the Enter Password screen opens. You must enter the correct password to make the change.
3. Click OK to close the screen.

#### NOTES:

- A relay output cannot be manually controlled if a Limit has been assigned to it.
- If the Relay State field is "State is Unknown," verify that the Relay Output card's configuration is correct. You may also see this message after you have performed a Reset. Select a new state for the relay and click Apply.

### 20.1.13: Manual Waveform Capture

This feature gives you the ability to force the meter to capture a waveform.

- For the Shark® 200/250/270.ST40 meter and the Nexus® 1252/1262/1272 meters, from the Main screen's Menu Bar, click Tools>Manual Waveform Capture.

**Manual Waveform Capture**

**Manual Waveform**

Waveform Log Statistics					Current Time
% Memory Used	# Captures	# Records	Max Records	Newest Timestamp	
97.500%	39	39	40	3/22/2016 14:43	3/23/2016 08:55:11

**Commands**

Trigger Manual Capture

☐ Polling Waveform Log Status

OK

- You will see the screen shown above if you are connected to a Shark® 200/250/270 meter. It gives you information on the Waveform log: the amount of memory being used by it, the number of Waveform captures, the number of records in the log, the maximum records the log can hold, the time stamp of the most recent Waveform capture, and the current time.
  - To perform a waveform capture, click Trigger Manual Capture.
  - Click OK to close the screen.

**Manual Waveform Capture**

**Waveform Log Statistics**

Log	Records	Memory Used	Newest Record Time	Oldest Record Time	Record Size	Max Records	Memory
Waveform Triggers	63	100%	07/09/2014 15:27:10.00	12/06/2013 16:03:54.27	256	63	16K
Waveform Samples	63	100%	07/09/2014 15:27:10.00	12/06/2013 16:03:54.27	16384	63	1024K

OK Trigger Now Help

- You will see the screen shown above if you are connected to a Nexus® 1252/1262/1272 meter. It gives you information on the Waveform Triggers and Waveform Samples: the number of records for each, the amount of memory being used, the timestamps of the newest and oldest records, the record size, the

maximum records that can be held by each, and the amount of memory used by each.

- To perform a waveform capture, click Trigger Now.
- Click OK to close the screen.
- For the Nexus® 1450/1500/1500+ meter, click either the Ret Logs icon or Logs>Retrieve Log(s) from Device. You will see the screen shown below.

Log Statistics for N1500-64Mb\_IP212\_0000000078181833

Log	Records	Memory Used	Newest Record Time	Oldest Record Time	Record Size	Max Records	Memory(k)	Select
Historical 1	32767	100.0000%	09/11/2014 14:45:00.00	10/22/2013 08:45:00.00	128	32767	8192	<input type="checkbox"/>
Historical 2	32767	100.0000%	09/11/2014 14:45:00.00	10/22/2013 08:45:00.00	32	32767	8192	<input type="checkbox"/>
Historical 3	32823	21.0880%	09/11/2014 14:45:00.00	10/04/2013 17:00:00.00	64	155648	10240	<input type="checkbox"/>
Historical 4	88939	100.0000%	09/11/2014 14:59:00.00	07/11/2014 20:39:00.00	112	88939	10240	<input type="checkbox"/>
Historical 5	47889	100.0000%	09/11/2014 14:59:00.00	08/09/2014 08:51:00.00	208	47889	10240	<input type="checkbox"/>
Historical 6	88939	100.0000%	09/11/2014 14:59:00.00	07/11/2014 20:39:00.00	112	88939	10240	<input type="checkbox"/>
Historical 7	49235	86.5047%	09/11/2014 14:50:00.00	10/04/2013 17:00:00.00	140	56916	8192	<input type="checkbox"/>
Historical 8	49235	75.1278%	09/11/2014 14:50:00.00	10/04/2013 17:00:00.00	76	65535	5120	<input type="checkbox"/>
Event Triggered	3018530	100.0000%	09/11/2014 14:59:15.97	07/21/2014 03:49:30.64	66	3018530	204800	<input type="checkbox"/>
Sequence of Events (Limits)	29021	25.6387%	08/16/2014 07:19:15.15	10/29/2013 15:03:29.72	88	113192	10240	<input type="checkbox"/>
Digital Inputs	69169	100.0000%	09/11/2014 14:59:15.52	09/05/2014 15:12:30.63	144	69169	10240	<input type="checkbox"/>
Digital Outputs	0	0.0000%	00/00/0000 00:00:00.00	00/00/0000 00:00:00.00	120	8301	1024	<input type="checkbox"/>
Flicker	53333	42.8322%	09/11/2014 14:50:01.20	10/04/2013 17:00:01.19	40	124516	5120	<input type="checkbox"/>
Waveform	93	97.8947%	07/24/2014 08:27:48.77	10/07/2013 09:25:44.76	696032	95	102400	<input type="checkbox"/>
Power Quality	96	0.5513%	07/24/2014 08:27:48.86	10/07/2013 09:25:44.85	572	17413	10240	<input type="checkbox"/>
System Events	562	1.7151%	09/11/2014 14:57:41.10	00/00/0000 00:00:00.00	16	32767	1024	<input checked="" type="checkbox"/>
Transients	0	0.0000%	00/00/0000 00:00:00.00	00/00/0000 00:00:00.00	29152	3325	102400	<input type="checkbox"/>
EN50160 / IEC 61000-4-30	Yes	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	<input type="checkbox"/>

☐ Polling Historical 1 Header

To retrieve a log, click on the checkbox in the 'Selected' column of log(s) that you want to retrieve.  
Next click the 'Start' Button to begin the retrieval.

Retrieve Selected Log(s) Retrieve logs using Modbus Start Close

- Click in the pull-down menu that says "Retrieve Selected Log(s) and choose Manual Waveform Capture. The bottom of the screen changes as shown below.

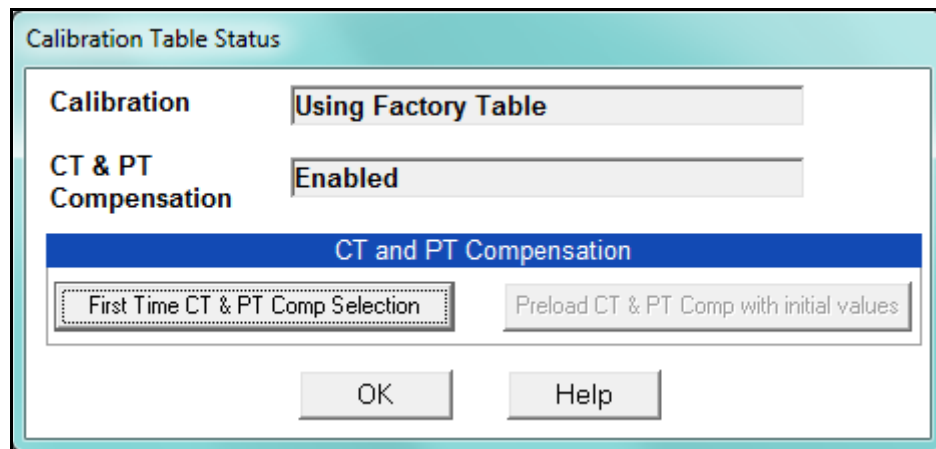
To manually trigger a wave capture, click on the 'Start' Button to request a capture. Manual Waveform Capture Start Close

- Click Start to perform the waveform capture.
- When you are done, click Close.

### 20.1.14: Performing CT and PT Compensation

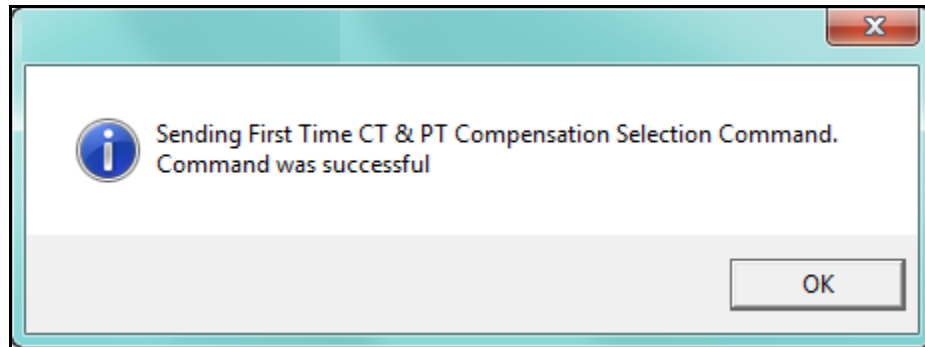
The CT and PT Compensation feature allows you to remove an error caused by the CTs (external to unit) and PTs that are connected to the unit. This section is for the Nexus® meters. See [20.1.14.1: Performing CT and PT Compensation \(Shark® 200 and ST40 Meters\)](#) on page 20- 33, for the Shark® 200 meter's CT and PT Compensation instructions; [28.2.8: CT and PT Compensation on page 28- 55](#), for the Shark® 250 meter's CT and PT Compensation instructions; and [26.2.6: CT and PT Compensation on page 26- 61](#), for the Shark® 270 meter's CT and PT Compensation instructions

1. First make sure that CT/PT Compensation is enabled for your meter (see [11.2.4: CT and PT Compensation on page 11- 43](#) (Nexus® 1500/1500+ meter), [12.2.5: CT and PT Compensation on page 12- 57](#) (Nexus® 1262/1272 meter), and [13.2.5: CT and PT Compensation on page 13- 35](#) (Nexus® 1252 meter)).
2. From the Main screen's Menu Bar, select Tools>CT & PT Compensation>Calibration Table Status. You will see the screen shown below.

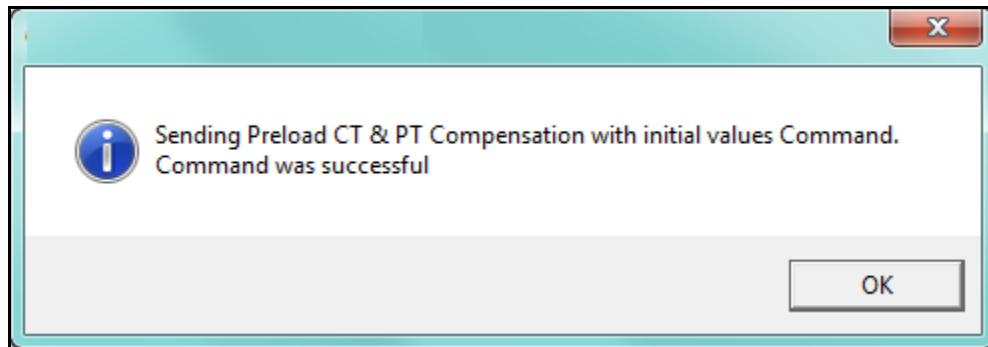


**NOTE:** If the screen says Disabled next to CT & PT Compensation, follow the instructions mentioned in step 1 to enable CT & PT Compensation.

3. Click First Time CT & PT Comp Selection. You will see the message window shown below. Click OK to close the window.



4. Click Preload CT & PT Comp with initial values in the Calibration Status screen. You will see the message window shown below. Click OK to close the window.



5. Click OK to close the Calibration Table Status screen.
6. Click Tools>CT & PT Compensation>View Calibration Tables. You will see the screen shown on the next page.

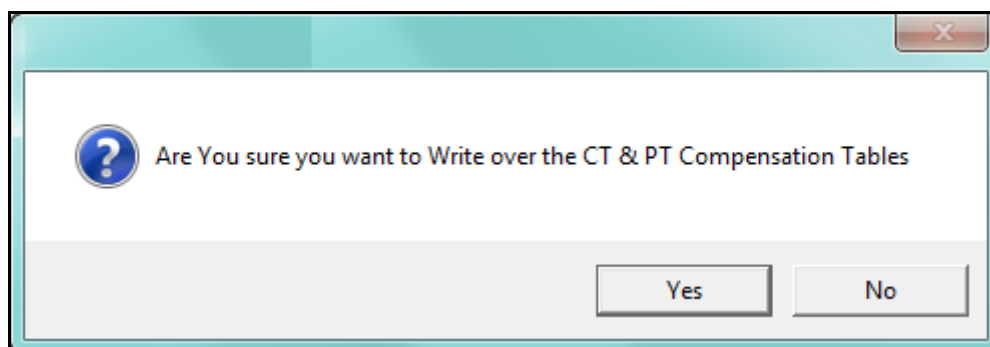
Calibration Tables [V2]

Factory Table Blk Time	09/19/2014 18:29:27.74	CTPT Table Blk Time	09/19/2014 18:29:27.74
Factory Table Cal Time	12/06/2013 15:57:50.00	CTPT Table Cal Time	00/00/0000 00:00:00.00

Calibration Point	Factory Table				CT & PT Compensation Table			
	Phase A	Phase B	Phase C	N-E N	Phase A	Phase B	Phase C	N-E N
120V	1049209	1043846	1046242	1041029	1048576	1048576	1048576	1048576
0.025A	1018981	1020708	1013912	1027978	1048576	1048576	1048576	1048576
0.15A	1023014	1017819	1007961	1027142	1048576	1048576	1048576	1048576
0.25A	1022866	1018255	1008357	1027241	1048576	1048576	1048576	1048576
0.50A	1023515	1019207	1008969	1027653	1048576	1048576	1048576	1048576
1.00A	1023259	1019122	1009044	1027317	1048576	1048576	1048576	1048576
2.50A	1023341	1019649	1009494	1027466	1048576	1048576	1048576	1048576
5.00A	1023459	1019881	1009764	1027633	1048576	1048576	1048576	1048576
0.05A @60	210	173	334		0	0	0	
0.15A @60	177	240	254		0	0	0	
0.50A @60	176	234	247		0	0	0	
1.00A @60	169	221	235		0	0	0	
2.50A @60	152	178	193		0	0	0	
5.00A @60	127	129	144		0	0	0	
10.00A @60	93	87	98		0	0	0	

Current Threshold (Factory)  Current Threshold (CTPT)

7. This screen shows the factory values for CT and PT Compensation and the current CT & PT Compensation table. To make changes, first click Copy Factory Table to CT & PT Comp Table. You will see the message window shown below.



8. Click Yes to continue (click No to cancel). CT & PT Compensation is now enabled and ready for corrections.

9. To perform compensation, click Tools> CT & PT Compensation>Compensate CTs & PTs. You will see the screen shown below. This screen lets you collect data to determine the required correction(s)

CT & PT Compensation [V2]

Voltage Readings		Gain Factors	
	% Error	Existing	New
A	<input type="text"/>	65536	<input type="text"/>
B	<input type="text"/>	65536	<input type="text"/>
C	<input type="text"/>	65536	<input type="text"/>
N-E	<input type="text"/>	65536	<input type="text"/>

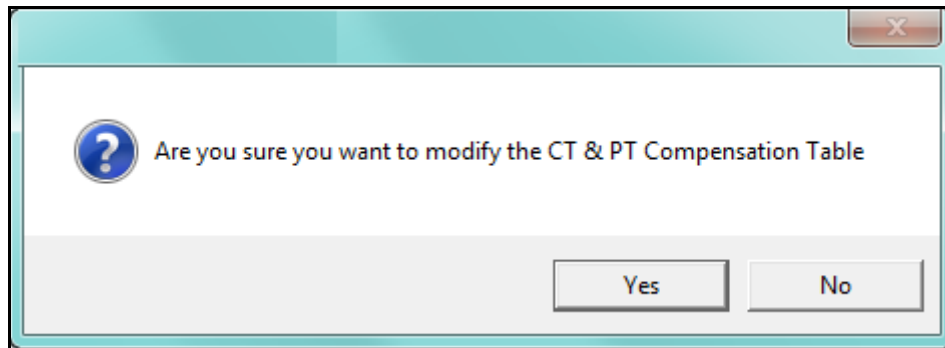
Calibration Point:

**Instructions:** Apply Voltage to each Phase. Write in error in percent for each phase.  
 Press Write New Gain Factors after entering all % Errors for Voltage.  
 Click Step 2 Tab

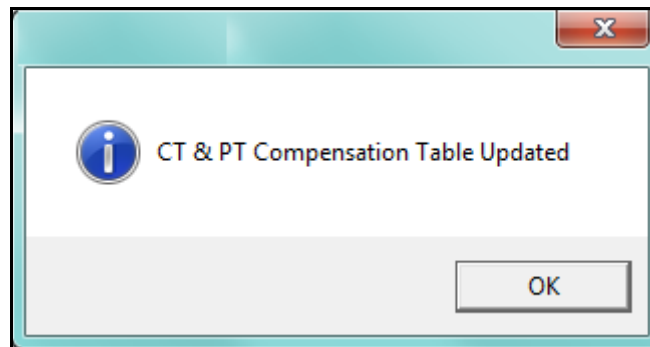
The four step tabs in the middle of the screen - Voltage, Power at Unity, Power at 60° phase, and Current Threshold, display Instructions for performing the step and entry fields you use to calculate the changes that should be made.

- The first step, shown above:
  - Lets you enter the voltage phase error percentage you see when you apply voltage to each phase.
  - When you enter an error percentage, the recommended adjustment appears in the corresponding Gain Factors New field.

- c. When you are done, click Write new Gain Factors. You will see the message window shown below. Click Yes to update the CT & PT Calibration table with the new Gain Factors.



- d. You will see the message window shown below. Click OK to close the window.





CT & PT Compensation [V2]

Energy / Watt Readings		Gain Factors	
	% Error	Existing	New
A	<input type="text"/>	65536	<input type="text"/>
B	<input type="text"/>	65536	<input type="text"/>
C	<input type="text"/>	65536	<input type="text"/>

Write New Gain Factors

Calibration Point:  Previous Next

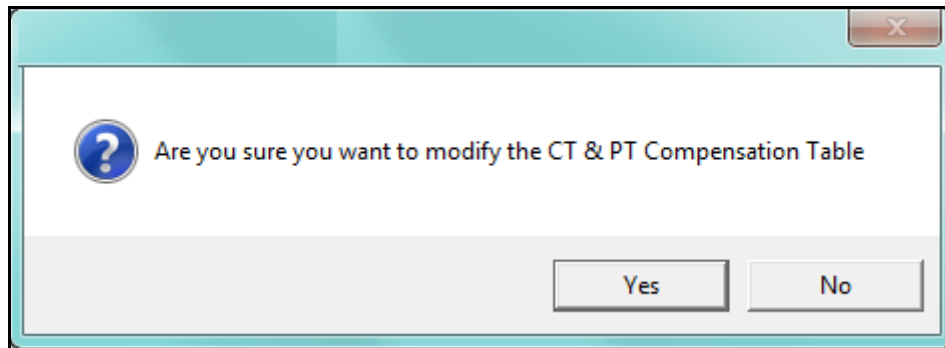
Step 1: Voltage
**Step 2: Power at Unity**
Step 3: Power at 60° Phase
Step 4: Current Threshold

**Instructions:** Apply Current to each Phase. Write in the Power error in percent for each phase. Press Write New Gain Factors after entering all % Errors for this range. Press Next Button and repeat above until all cal points have been entered. Click Step 3 Tab

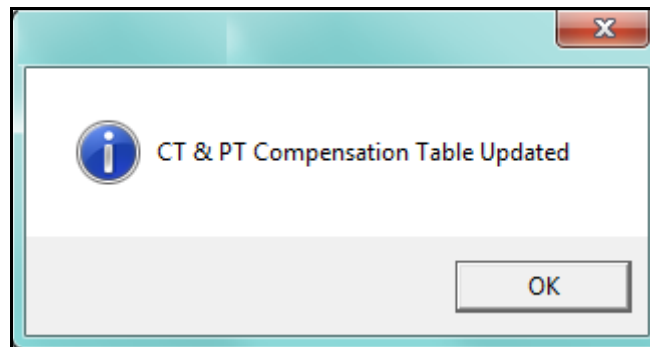
OK Print

- Step 2, shown above:
  - Lets you enter the power error percentage for each phase when current is applied.
  - When you enter an error percentage, the recommended adjustment appears in the corresponding Gain Factors New field.

- c. When you are done, click Write new Gain Factors. You will see the message window shown below. Click Yes to update the CT & PT Calibration table with the new Gain Factors.



- d. You will see the message window shown below. Click OK to close the window.



- e. Click Next to follow the procedure for the next calculation point. When you are done with all of the calculation points for the Power at Unity step, you can continue to the next step.

CT & PT Compensation [V2]

Energy / Watt Readings		Gain Factors	
	% Error	Existing	New
A	<input type="text"/>	0	<input type="text"/>
B	<input type="text"/>	2	<input type="text"/>
C	<input type="text"/>	2	<input type="text"/>

Write New Gain Factors

Calibration Point:  Previous Next

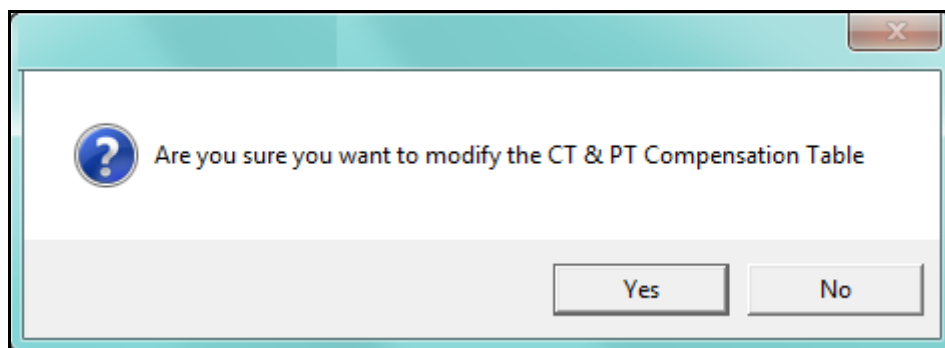
Step 1: Voltage    Step 2: Power at Unity    **Step 3: Power at 60° Phase**    Step 4: Current Threshold

**Instructions:** Apply Current to each Phase at 60 Deg Phase shift from the Voltage. Write in the Power error in percent for each phase. Press Write New Gain Factors after entering all % Errors for this range. Press Next Button and repeat above until all cal points have been entered.

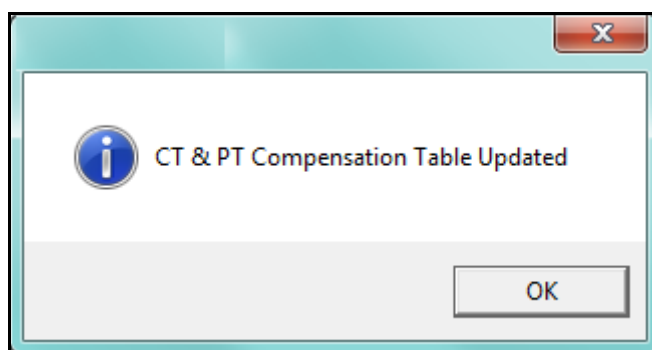
OK Print

- Step 3, shown above:
  - Lets you enter the power error percentage for each phase when current is applied to each phase at a 60 degree phase shift from voltage.
  - When you enter an error percentage, the recommended adjustment appears in the corresponding Gain Factors New field.

- c. When you are done, click Write new Gain Factors. You will see the message window shown below. Click Yes to update the CT & PT Calibration table with the new Gain Factors.



- d. You will see the message window shown below. Click OK to close the window.



- e. Click Next to follow the procedure for the next calculation point. When you are done with all of the calculation points for the Power at 60° Phase step, you can continue to the next step.

CT & PT Compensation [V2]

Current Readings		Current Threshold	
	Current	Existing	New
A	0.0000	0.00781	0.00781
B	0.0000		
C	0.0000		
N	0.0000		

Refresh Current Readings      Write New Threshold

Step 1: Voltage      Step 2: Power at Unity      Step 3: Power at 60° Phase      **Step 4: Current Threshold**

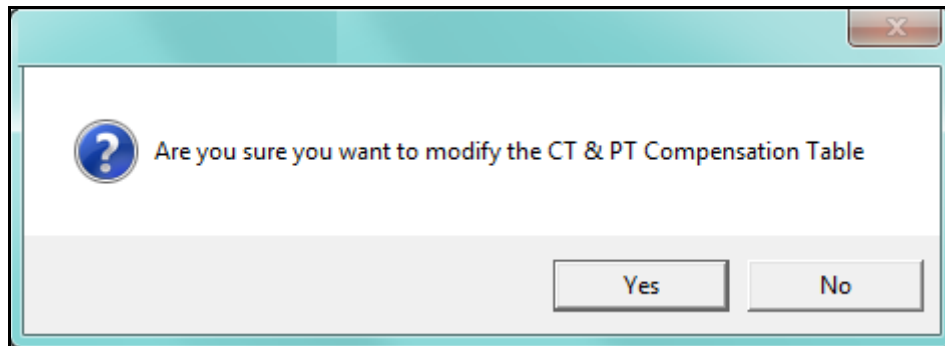
**Instructions:**      **Used to zero out current readings. Apply zero amps to the Current inputs, and modify the threshold value until Current reads zero.**

OK      Print

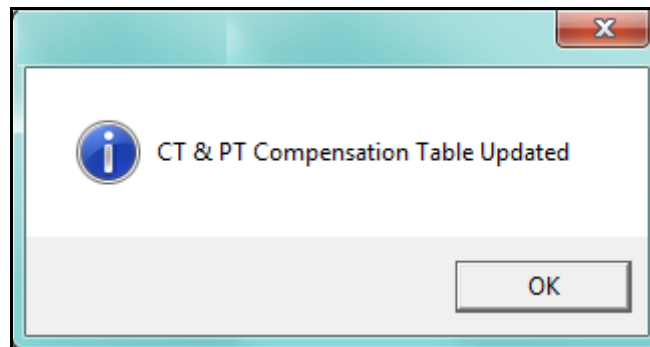
- Step 4, shown above:
  - Lets you enter zero out the current readings by applying zero Amps to the current inputs and modifying the threshold value until the current reads 0.
  - Write the new threshold value in the Current Threshold New field.

**NOTE:** Some meters do not have step 4.

- c. When you are done, click Write New Threshold. You will see the message window shown below. Click Yes to update the CT & PT Calibration table with the new Gain Factors.



- d. You will see the message window shown below. Click OK to close the window.



- e. Click OK to close the CT & PT Compensation screen. You can click **Print** to print the screen information.

### 20.1.14.1: Performing CT and PT Compensation (Shark® 200 and ST40 Meters)

1. From the Main screen, click Tools>CT & PT Compensation>View CT & PT Compensation Factors to see the screen shown below.

**CT and PT Compensation Factors**

☒ Enabled

Note: The sum of the entered errors of a CT Phase and the corresponding PT Phase for a given Cal point must be within -15.00 to +15.00  
Enter values in percent of error: Range -15.00 to +15.00. Example: If a reading is 1% larger than expected enter -1 in the table to adjust it.

CT Factors				PT Factors			
Cal Point	Phase A	Phase B	Phase C	Cal Point	Phase A	Phase B	Phase C
0.25A	0.00	0.00	0.00	69V	0.00	0.00	0.00
0.5A	0.00	0.00	0.00	120V	0.00	0.00	0.00
1A	0.00	0.00	0.00	230V	0.00	0.00	0.00
5A	0.00	0.00	0.00	480V	0.00	0.00	0.00

Enter a Line Frequency between 0.00 and 60.00 Hz  
In the table below, enter a value in the Angle(°) column, or counts column.

Cal Point	Phase Comp		Phase B		Phase C	
	Angle(°)	Counts	Angle(°)	Counts	Angle(°)	Counts
0.25A	0.00	0	0.00	0	0.00	0
0.5A	0.00	0	0.00	0	0.00	0
1A	0.00	0	0.00	0	0.00	0
5A	0.00	0	0.00	0	0.00	0

Notes:  
One count is equal to 1.2 microseconds of time. The range is -50 to +50.  
Each positive count adds 1.2 microseconds of time delay to the phase compensation  
Each negative count adds 1.2 microseconds of time advance to the phase compensation

Load from file    Save to file    Write Factors to Device    Read Factors from Device

OK

2. Click OK to close the message window and then correct the Line Frequency if you don't want it to be set to the calibration frequency, which is the default.

**CT and PT Compensation Factors**

☒ Enabled

Note: The sum of the entered errors of a CT Phase and the corresponding PT Phase for a given Cal point must be within -15.00 to +15.00  
Enter values in percent of error: Range -15.00 to +15.00. Example: If a reading is 1% larger than expected enter -1 in the table to adjust it.

CT Factors				PT Factors			
Cal Point	Phase A	Phase B	Phase C	Cal Point	Phase A	Phase B	Phase C
0.25A	0.00	0.00	0.00	69V	0.00	0.00	0.00
0.5A	0.00	0.00	0.00	120V	0.00	0.00	0.00
1A	0.00	0.00	0.00	230V	0.00	0.00	0.00
5A	0.00	0.00	0.00	480V	0.00	0.00	0.00

Enter a Line Frequency between 45 and 65Hz for your system to be used in the table calculations below:  Hz

In the table below, enter a correction factor for each phase at each cal point in either the angle, percent deviation, or counts column.

Phase Compensation Correction Factors									
Cal Point	Phase A			Phase B			Phase C		
	Angle(°)	% Deviation at a lagging Power Factor of 0.5	Counts	Angle(°)	% Deviation at a lagging Power Factor of 0.5	Counts	Angle(°)	% Deviation at a lagging Power Factor of 0.5	Counts
0.25A	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0
0.5A	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0
1A	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0
5A	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0

Notes:  
One count is equal to 1.2 microseconds of time. The range is -50 to +50.  
Each positive count adds 1.2 microseconds of time delay to the phase compensation  
Each negative count adds 1.2 microseconds of time advance to the phase compensation

3. CT/PT compensation is used to correct for errors caused by the current transformers (CTs) (external to the meter) and Potential/Voltage transformers (PTs) connected to the meter. Use this screen to set compensation factors (Input fields), save them to a file (Save to File button), write them to the meter (Write Factors to Device button), read them from the meter (Read Factors from Device button), load from a file (Load from File button), and enable compensation (Enabled checkbox).

#### NOTES:

- PT compensation is not being applied to symmetrical components.
- For 2.5 Element Wye and 2 CT Delta hookup, set the B phase PT factor to 0.



4. The entry fields and acceptable entries are as follows:

- Enabled: click to enable CT and PT Compensation.
- Percent of error values in voltage reading due to PT: you can enter 4 values per phase for 4 voltage levels 69V, 120V, 230V, and 480V. The allowable range is -15 to +15. For example, if a reading is 1 higher than expected, enter -1 to adjust it.
- Percent of error in current reading due to CT: you can enter 4 values per phase for 4 current levels 0.25A, 0.5A, 1A, and 5A. The allowable range is -15 to +15. For example, if a reading is 1 higher than expected, enter -1 to adjust it.
- Frequency: enter your system's frequency. The allowable range is between 45 and 65 Hz.
- Phase Compensation Correction Factors: Angle, percentage of Deviation, and Counts (time advance or delay in phase shift in term of counts) where 1 count = 1.2 microseconds change. You can enter 4 values per phase for 4 current levels 0.25A, 0.5A, 1A, and 5A.

**NOTES:**

- The allowable range for counts is -50 to +50.
- Each positive count adds 1.2 microseconds of time delay to the phase compensation.
- Each negative count adds 1.2 microseconds of time advance to the phase compensation.

5. Click the buttons on the bottom of the screen to perform the following actions:

- Load from file: click to select a file containing the CT and PT Compensation factors you want to use.
- Save to file: click to save the current entries to a file.
- Write Factors to device: click to load the current entries to a device.
- Read Factors from Device: click to download the CT and PT compensation factors from a device to the screen's entry fields.

6. Click OK to close the screen.

**Formulas and example settings:**

Voltage Compensation

$$V_{comp} = V_{calc} * PT_{cf}$$

$$PT_{cf} = 1 + (0.01 * V_e)$$

where  $V_e$  is the error percentage due to the PT at that voltage level

For example, if  $V_{calc} = 100V$ ; and error percentage @ 100V is 5.

Then:

$$PT_{cf} = 1 + (0.01 * 5) = 1.05$$

$$V_{comp} = 100 * 1.05 = 105$$

Current Compensation

$$I_{comp} = I_{calc} * CT_{cf}$$

$$CT_{cf} = 1 + 0.01 * I_e$$

where  $I_e$  is the error percentage due to CT at that current level

For example, if  $I_{calc} = 5A$ ; and error percentage @ 5A is 5.

Then:

$$CT_{cf} = 1 + 0.01 * 0.5 = 1.05$$

$$I_{comp} = 5 * 1.05 = 5.25$$

### 20.1.15: Test Mode and Preset Energy Accumulators

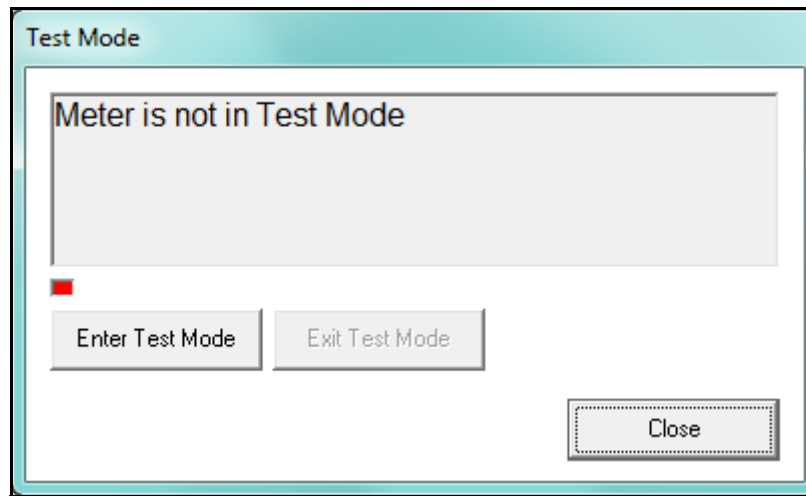
Test Mode lets verify a meter's accuracy. When a meter is put into Test Mode, all of the energy registers are frozen, the display is set to 0, and the user can access the energy measurement test sequences.

The Energy Preset, or Preset Accumulators, feature supports Test Mode. This feature allows you to easily swap a new meter for a meter being removed for testing and verification. Download the energy accumulator register values and upload them to the new meter. This way, the new meter can continue to accumulate where the old meter left off. ®

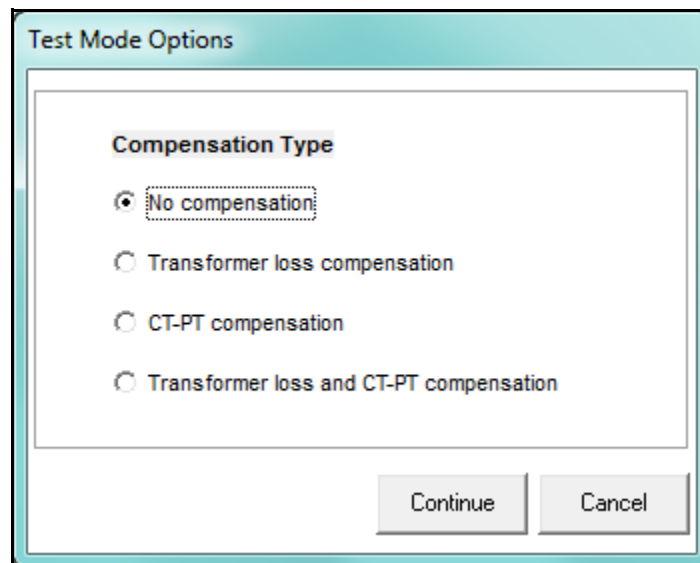
- See the *Nexus® 1262/1272 Meter Installation and Operation Manual* for instructions on using Test Mode for the Nexus® 1262/1272 meter and see 20.1.15.2: Preset Accumulators for the Nexus® 1262/1272 Meter on page 20- 43, for instructions on using Energy Preset for the Nexus® 1262/1272 meter.
- For the Nexus® 1500+ meter, follow the instructions in 20.1.15.1: Test Mode and Preset Energy for the Nexus® 1500+ Meter on page 20- 38.
- For the Shark® 250 meter, follow the instructions in 20.1.15.4: Test Mode and Energy Preset for the Shark® 250 Meter on page 20- 48.
- For the Shark® 270 meter, follow the instructions in 20.1.15.3: Test Mode and Energy Preset for the Shark® 270 Meter on page 20- 45.

### 20.1.15.1: Test Mode and Preset Energy for the Nexus® 1500+ Meter

1. Click Tools>Test Mode>Set Test Mode. The screen shown below opens.

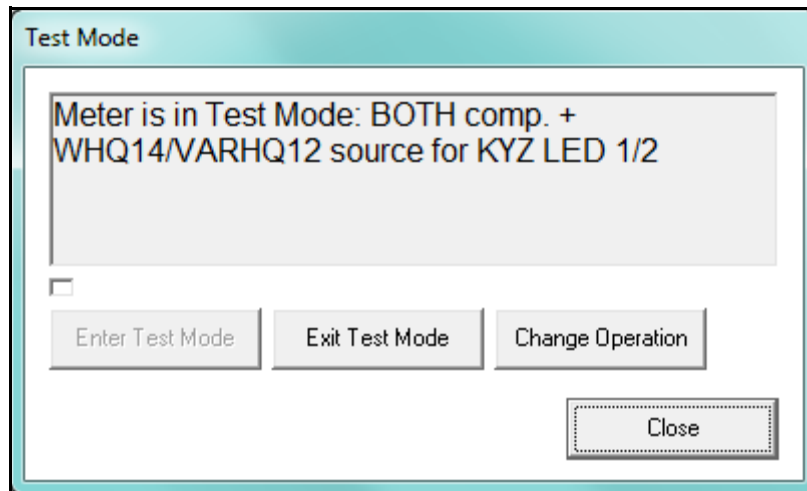


2. Click Enter Test Mode. The screen shown below opens.



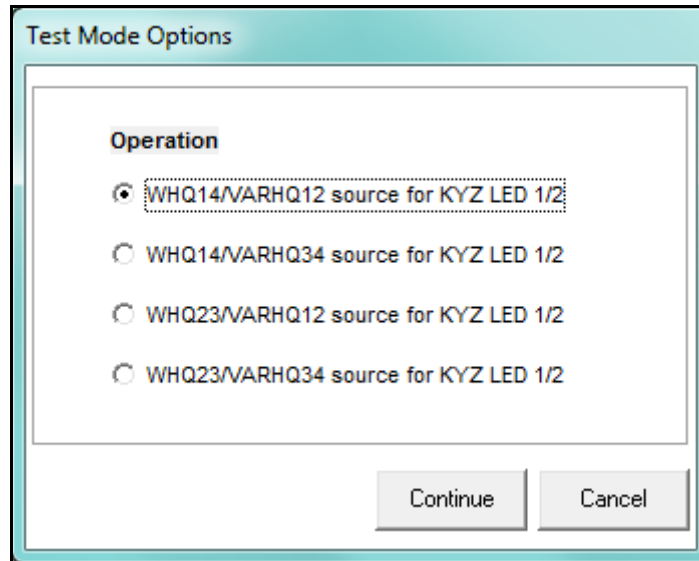
3. Use this screen to select the type of compensation to apply to the Test Mode. You should select the same compensation you are using for the meter. Refer to 11.2.4: CT and PT Compensation on page 11- 43 and 11.2.5: Transformer / Line Loss Compensation on page 11- 43, for instructions on setting the meter's Transformer and CT/PT compensation. Your choices are:
  - No compensation - Test Mode readings will be obtained without any compensation applied.

- Transformer loss compensation - your setting for Transformer Loss compensation will be applied to the readings in Test Mode.
  - CT-PT compensation - your setting for CT/PT compensation will be applied to the readings in Test Mode.
  - Transformer loss and CT-PT compensation - both your settings for Transformer Loss compensation and CT-PT compensation will be applied to the readings in Test Mode.
4. Click Continue. You will see the Test Mode screen again. You will see a message that Test Mode is starting and then you will see a message that the meter is in Test Mode, with the compensation you selected and the values that are being read, also displayed. See the example screen on the next page.



5. WHQ14/VARHQ12 above indicates that the watt-hour readings from quadrants 1 and 4, and the VAR-hour readings from quadrants 1 and 2 are being read in Test Mode. The BOTH comp means that both Transformer loss and CT-PT compensations

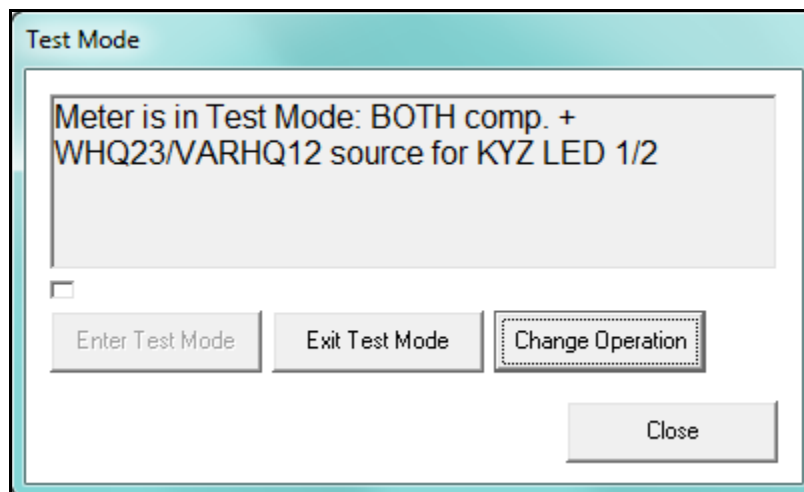
are being applied. To choose a different energy reading source, click the Change Operation button. You will see the screen shown below.



6. The options on this screen are:

- WHQ14/VARHQ12
- WHQ14/VARHQ12
- WHQ14/VARHQ12
- WHQ14/VARHQ12

7. Make your selection and click Continue. The Test Mode screen is redisplayed, with the current reading source reflecting your selections.



8. If you want to set Energy Presets, click Close to close the Test Mode screen (Test Mode will still be active) and continue to step 9. If you do not want to set Energy Presets, once you are done with Test Mode, click Exit Test Mode. You will see a message that the meter is exiting Test Mode and then Test Mode will stop. Note that the timeout that you set up in Test Mode Configuration (see 11.2.10: Test Mode Configuration (Nexus® 1500+ Meter) on page 11- 52) will cause the meter to exit Test Mode after a certain amount of time with no activity, even if you do not actively exit Test Mode.

9. Click Tools>Test Mode>Energy Presets. You will see the screen shown below.

The screenshot shows a window titled "Test Mode Preset" with a table of energy accumulators. The table has five columns: Item, Current Value, New Value, Preset, and Settings. The items listed include Total VAh(Q1234), +VARh (Q12), -VARh (Q34), +Wh (Q14), VAh (Q1), VARh (Q1), VAh (Q4), VARh (Q4), -Wh (Q23), VAh (Q2), VARh (Q2), VAh (Q3), VARh (Q3), Phase A I2T, Phase B I2T, Phase C I2T, Phase A V2T, Phase B V2T, Phase C V2T, Wh (Q1), Wh (Q4), Wh (Q2), Wh (Q3), Uncomp Total VAh, Uncomp VARh(Q12), and Uncomp VARh(Q34). Each row has a corresponding current value, a new value field, a preset checkbox, and a settings field (e.g., 999999.9KWh). At the bottom of the window are four buttons: Save, Load, Set, and Cancel.

Item	Current Value	New Value	Preset	Settings
Total VAh(Q1234)	000338.3 k	000338.3 k	<input type="checkbox"/>	999999.9KWh
+VARh (Q12)	000053.6 k	000053.6 k	<input type="checkbox"/>	999999.9KWh
-VARh (Q34)	000150.9 k	000150.9 k	<input type="checkbox"/>	999999.9KWh
+Wh (Q14)	000105.9 k	000105.9 k	<input type="checkbox"/>	999999.9KWh
VAh (Q1)	000114.2 k	000114.2 k	<input type="checkbox"/>	999999.9KWh
VARh (Q1)	000053.5 k	000053.5 k	<input type="checkbox"/>	999999.9KWh
VAh (Q4)	000022.9 k	000022.9 k	<input type="checkbox"/>	999999.9KWh
VARh (Q4)	000001.1 k	000001.1 k	<input type="checkbox"/>	999999.9KWh
-Wh (Q23)	000125.6 k	000125.6 k	<input type="checkbox"/>	999999.9KWh
VAh (Q2)	000010.6 k	000010.6 k	<input type="checkbox"/>	999999.9KWh
VARh (Q2)	000000.1 k	000000.1 k	<input type="checkbox"/>	999999.9KWh
VAh (Q3)	000190.6 k	000190.6 k	<input type="checkbox"/>	999999.9KWh
VARh (Q3)	000149.9 k	000149.9 k	<input type="checkbox"/>	999999.9KWh
Phase A I2T	0000004 k	0000004 k	<input type="checkbox"/>	9999999KWh
Phase B I2T	0000004 k	0000004 k	<input type="checkbox"/>	9999999KWh
Phase C I2T	0000004 k	0000004 k	<input type="checkbox"/>	9999999KWh
Phase A V2T	0010523 k	0010523 k	<input type="checkbox"/>	9999999KWh
Phase B V2T	0010520 k	0010520 k	<input type="checkbox"/>	9999999KWh
Phase C V2T	0010515 k	0010515 k	<input type="checkbox"/>	9999999KWh
Wh (Q1)	000083.5 k	000083.5 k	<input type="checkbox"/>	999999.9KWh
Wh (Q4)	000022.4 k	000022.4 k	<input type="checkbox"/>	999999.9KWh
Wh (Q2)	000010.5 k	000010.5 k	<input type="checkbox"/>	999999.9KWh
Wh (Q3)	000115.0 k	000115.0 k	<input type="checkbox"/>	999999.9KWh
Uncomp Total VAh	000338.4 k	000338.4 k	<input type="checkbox"/>	999999.9KWh
Uncomp VARh(Q12)	000053.7 k	000053.7 k	<input type="checkbox"/>	999999.9KWh
Uncomp VARh(Q34)	000151.0 k	000151.0 k	<input type="checkbox"/>	999999.9KWh

10. The accumulators that can be pre-set are listed on the left of the screen with their current values. You can scroll to see accumulators not displayed.

11. To enter a preset value, click the preset box on the same line with the value and enter the preset value in the New Value field. The Settings field shows the format your entry needs to be in, that is, the number of digits and decimal places; for example, 999999.9kWh.

12. When you have entered all of the preset values you want, click Set to send them to the meter's memory. Once the meter is out of Test Mode, these new values will take effect.
13. You can also save the preset values in a .csv file or load preset values that are already saved in a .csv file to this screen:
  - To save the values, click the Save button and give the file a name when you are prompted.
  - To load a .csv file, click the Load button and locate the file you want to use.
14. When you have finished with the Test Mode Preset screen, click the red X to close it.
15. When you want to exit Test Mode, click Tools>Set Test Mode to open the Test Mode screen, and then click the Exit Test Mode button.



### 20.1.15.2: Preset Accumulators for the Nexus® 1262/1272 Meter

1. From the Main screen's Menu Bar, select Tools>Test Mode>Preset Accumulators.  
You will see the screen shown below.

Test Mode Preset

Uncompensated Energy

Q Hours

I & V Squared T Accumulators

Cumulative Demand(Secondary)

Primary Energy (Quadrants)

KYZ Output Accumulators

Internal Input Accumulators

Secondary Energy (Quadrants)

**Primary Energy**

Secondary Energy

Accumulator	Current Value	New Value	Preset
Watt Hour (Quadrant 1 + 4)	9999.999 k	9999.999 k	<input type="checkbox"/>
Watt Hour (Quadrant 2 + 3)	9999.999 k	9999.999 k	<input type="checkbox"/>
VAR Hour (Quadrants 1 + 2)	9999.999 k	9999.999 k	<input type="checkbox"/>
VAR Hour (Quadrants 3 + 4)	9999.999 k	9999.999 k	<input type="checkbox"/>
VA Hour (Quadrants 1,2,3,4)	0000.060 k	0000.060 k	<input type="checkbox"/>

Save

Load

Set

Cancel

2. Click the tabs to navigate between the Test Mode Preset screens. There are screens for:

- Primary Energy
- Secondary Energy
- Primary Energy (Quadrants)
- Secondary Energy (Quadrants)
- Internal Input Accumulators
- KYZ Output Accumulators
- I & V Squared T Accumulators
- Cumulative Demand (Secondary)
- Uncompensated Energy
- Q Hours
  - Each screen has a Current Value, New Value and Preset Box for each of its accumulators.
  - A new meter will have zeros for Current Values.

3. For any accumulators you want to preset, enter the new value, click the Preset Box next to it, and when you are done with that tab, go to any other tabs you want to enter preset values for.

4. When you have finished entering all of the preset values you need, click Set to implement the new settings in the currently connected meter. You also have other options:

- Save - to save the new settings to a file.
- Load - to load a file of previously saved settings.
- Cancel - to exit without making changes.

### 20.1.15.3: Test Mode and Energy Preset for the Shark® 270 Meter

The Shark® 270 meter supports Test Mode. This section details the Test Mode and Energy Preset features available through software (see 20.1.15: Test Mode and Preset Energy Accumulators on page 20- 37). The Test Mode sub-menu is shown below.

Test Mode	Preset Energy
Network Card Status	Poll Test Mode Data
Low Level Access	Copy Energy File
Perform Soft Reset	

#### 20.1.15.3.1: Preset Energy

The Shark® 270 meter lets you pre-set billing revenue registers to specific values. This is used when replacing meters in the field, to create continuity with the prior register values.

1. From the Main screen's Menu Bar, click Tools>Test Mode>Preset Energy.

Preset Energy

Energy Accumulator Description	Retrieved value from meter	New value to set in meter	Check to set value	Existing Settings as in Profile
Wh Delivered	4529.41 k	4529.41 k	<input type="checkbox"/>	000000.00 k
Wh Received	-190967.62 k	-190967.62 k	<input type="checkbox"/>	000000.00 k
Wh Total	195497.04 k	195497.04 k	<input type="checkbox"/>	000000.00 k
VARh Delivered	326.79 k	326.79 k	<input type="checkbox"/>	000000.00 k
VARh Received	-200297.50 k	-200297.50 k	<input type="checkbox"/>	000000.00 k
VARh Total	200624.30 k	200624.30 k	<input type="checkbox"/>	000000.00 k
VAh Total	503292.37 k	503292.37 k	<input type="checkbox"/>	000000.00 k
Cumulative Demand W Delivered	0.000	0.000	<input type="checkbox"/>	0000000.0 k
Cumulative Demand W Received	0.000	0.000	<input type="checkbox"/>	0000000.0 k
Continuous Cumulative Demand W Delivered	347124992.000	347124992.000	<input type="checkbox"/>	0000000.0 k
Continuous Cumulative Demand W Received	-158408480.000	-158408480.000	<input type="checkbox"/>	0000000.0 k

Copy Paste Column Set Exit

For setting new value into the meter, first check the box or double click the new value cell.

Enter the new value as per the format given in the last column as per device profile settings. If it is not in the specified format then it will display the zeros in that format.

Note, the values pasted must be copied from Excel.

2. The accumulator fields are listed on the left of the screen, along with their current value. The settings field shows the format for energy scaling that was set in the Configuring Energy, Power Scaling, and Averaging setting of the meter's Device Profile (see 26.2.1: Configuring Energy, Power Scaling, and Averaging Method on page 26- 41).

3. To enter a new value for the accumulator, double-click in the New Value field for that accumulator.

Preset Energy

Energy Accumulator Description	Retrieved value from meter	New value to set in meter	Check to set value	Existing Settings as in Profile
Wh Delivered	4529.41 k	4529.41 k	<input type="checkbox"/>	000000.00 k
Wh Received	-190967.62 k	-190967.62 k	<input type="checkbox"/>	000000.00 k
Wh Total	195497.04 k	195497.04	<input checked="" type="checkbox"/>	000000.00 k
VARh Delivered	326.79 k	326.79 k	<input type="checkbox"/>	000000.00 k
VARh Received	-200297.50 k	-200297.50 k	<input type="checkbox"/>	000000.00 k
VARh Total	200624.30 k	200624.30 k	<input type="checkbox"/>	000000.00 k
VAh Total	503292.37 k	503292.37 k	<input type="checkbox"/>	000000.00 k
Cumulative Demand W Delivered	0.000	0.000	<input type="checkbox"/>	0000000.0 k
Cumulative Demand W Received	0.000	0.000	<input type="checkbox"/>	0000000.0 k
Continuous Cumulative Demand W Delivered	347124992.000	347124992.000	<input type="checkbox"/>	0000000.0 k
Continuous Cumulative Demand W Received	-158408480.000	-158408480.000	<input type="checkbox"/>	0000000.0 k

Copy Paste Column Set Exit

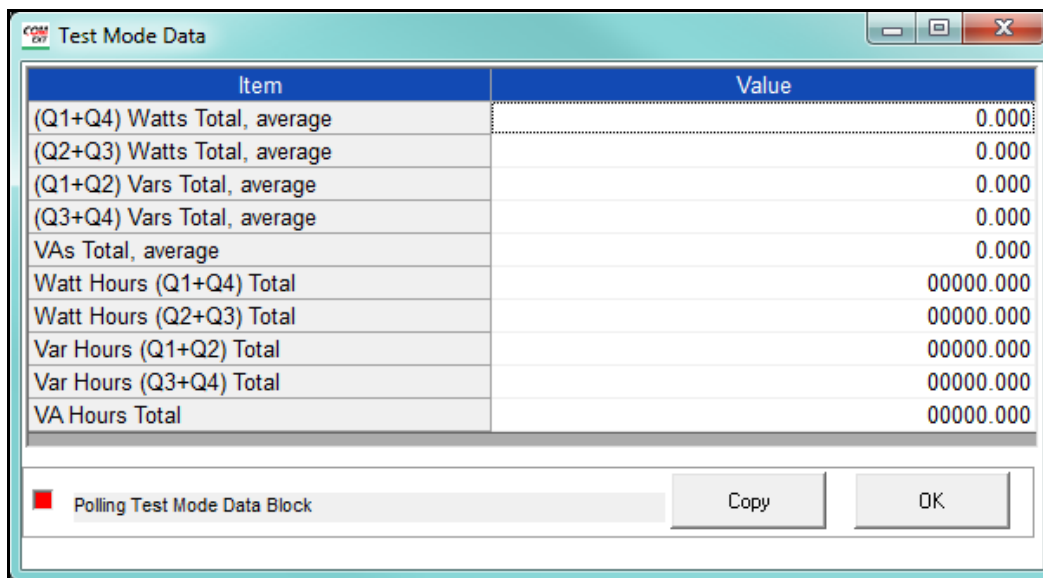
For setting new value into the meter, first check the box or double click the new value cell.  
 Enter the new value as per the format given in the last column as per device profile settings. If it is not in the specified format then it will display the zeros in that format.  
 Note, the values pasted must be copied from Excel.

4. The Preset box is now checked and the New Value field is highlighted. Enter a new value for the accumulator.
5. You can copy a column from an Excel file and then click Paste Column to copy it into the "New Value to set in meter" fields. If you are not replacing the entire column, click in the first field in which you want to copy the Excel data.
6. Click Copy to copy all of the screen data to the clipboard. You can then paste it into another program, e.g., Excel.
7. When you have finished entering the preset values, click the Set button (it becomes selectable when you have made New Value field entries).
8. You will see messages on the bottom of the screen as the preset file is being sent to the meter. Once the meter is updated, click Exit to close the screen.

### 20.1.15.3.2: Poll Test Mode Data

Use this command to view test mode data.

1. From the Main screen's Menu Bar, click Tools>Test Mode>Poll Test Mode Data.



Item	Value
(Q1+Q4) Watts Total, average	0.000
(Q2+Q3) Watts Total, average	0.000
(Q1+Q2) Vars Total, average	0.000
(Q3+Q4) Vars Total, average	0.000
VAs Total, average	0.000
Watt Hours (Q1+Q4) Total	00000.000
Watt Hours (Q2+Q3) Total	00000.000
Var Hours (Q1+Q2) Total	00000.000
Var Hours (Q3+Q4) Total	00000.000
VA Hours Total	00000.000

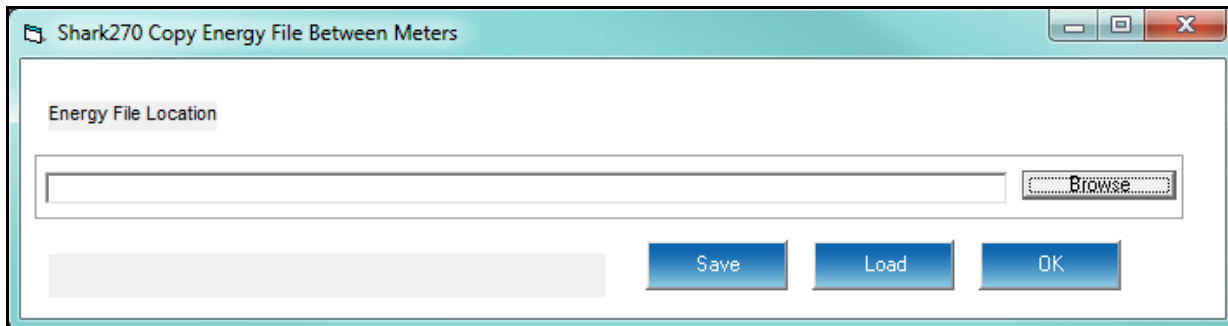
☐ Polling Test Mode Data Block

- The meter's internal energy data is shown in the Values column.
  - You can copy this data to the clipboard (for pasting into another application) by clicking the Copy button.
2. Click OK to close this screen.

### 20.1.15.3.3: Copy Energy File

Use this command to copy a preset energy file to a Shark® 270 meter.

1. From the Main screen's Menu Bar, click Tools>Test Mode>Copy Energy File.



2. Click Browse to locate the saved preset energy file.
3. Click Save to save the file to another location, or click Load to load the energy values from the file to the currently connected meter.
4. Click OK to close the screen.

### 20.1.15.4: Test Mode and Energy Preset for the Shark® 250 Meter

The Shark® 250 meter supports Test Mode. This section details the Test Mode and Energy Preset features available through software. The Test Mode sub-menu is shown below.

Test Mode ▶	Set Test Mode
Network Card Status	Preset Energy
Low Level Access	Poll Test Mode Data
Send Meter Restart Command	Copy Energy File

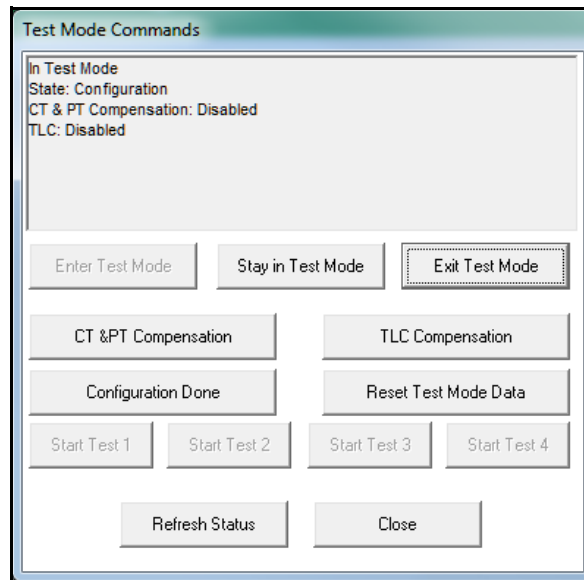
**NOTE:** When the meter is in Test Mode, the following features are blocked or disabled:

- Blocked - Firmware updates
- Blocked - Meter Settings (Unit and TOU)
- Blocked - Energy Preset
- Blocked - Energy Reset

- Blocked - Demand Reset
- Blocked - Log Resets
- Blocked - Reset Pulse Accumulators
- Blocked - Unit Reset
- Disabled - Line Sync Time synchronization

#### 20.1.15.4.1: Set Test Mode

1. To set up test mode for the meter, click Tools>Test Mode>Set Test Mode.



2. Use the buttons on this screen to perform the following functions:

- Enter Test Mode: click to enter Test Mode. You will have the amount of time programmed in the System Settings screen, e.g., 10 minutes, to perform the testing (see [28.1.3: Configuring System Settings on page 28- 7](#) for instructions on setting the Test Mode timeout period).

**NOTE:** As long as the meter recognizes measurable load (i.e., total power is greater than 0), the meter uses an extended timeout period consisting of the programmed timeout plus the programmed Block Interval Time for block window averaging or programmed sub interval time for rolling window average. This is to insure that the meter completes a Demand test without interruption.

- Stay in Test Mode: click to restart the timeout period. For example, if the programmed timeout is 10 minutes and you click Stay in Test Mode, you will have 10 minutes in which to perform the task. Each time you click Stay in Test Mode, the timeout period is restarted.

- Exit Test Mode: click to exit Test Mode.
- CT& PT Compensation: click to have your setting for CT/PT compensation applied to the readings in Test Mode.
- TLC Compensation: click to have your setting for Transformer Loss compensation applied to the readings in Test Mode.
- Configuration Done: click after selecting any compensation options (TLC or CT/PT).
- Reset Test Mode Data: click to reset the Test Mode data to 0.
- Start Test (1-4): click the appropriate button to start tests from 1-4.
- Refresh Status: click to see the current status of Test mode.
- Close: click to close the Test Mode screen.

#### 20.1.15.4.2: Preset Energy

The Shark® 250 meter lets you pre-set billing revenue registers to specific values. This is used when replacing meters in the field, to create continuity with the prior register values.

1. From the Main screen's Menu Bar, click Tools>Test Mode>Preset Energy.

Energy Accumulator Description	Retrieved value from meter	New value to set in meter	Check to set value	Existing Settings
Wh Delivered	31207	44057	<input type="checkbox"/>	00000000 k
Wh Received	00000	00000	<input type="checkbox"/>	00000000 k
Wh Total	31207	31207	<input type="checkbox"/>	00000000 k
VARh Delivered	000000.00 k	000000.00 k	<input type="checkbox"/>	00000000 k
VARh Received	-000031.08 k	-000031.08 k	<input type="checkbox"/>	00000000 k
VARh Total	000031.08 k	000031.08 k	<input type="checkbox"/>	00000000 k
VAh Total	44057	44057	<input type="checkbox"/>	00000000 k
Cumulative Demand W Delivered	0.000	0.000	<input type="checkbox"/>	Not Applicable
Cumulative Demand W Received	0.000	0.000	<input type="checkbox"/>	Not Applicable
Continuous Cumulative Demand W Delivered	272.375	272.375	<input type="checkbox"/>	Not Applicable
Continuous Cumulative Demand W Received	0.000	0.000	<input type="checkbox"/>	Not Applicable

Copy Paste Set Exit

For setting new value into the meter, first check the box or double click the new value cell.

Enter the new value as per the format given in the last column as per device profile settings. If it is not in the specified format then it will display the zeros in that format.

Note, the values pasted must be copied from Excel.



2. The accumulator fields are listed on the left of the screen, along with their current value. The settings field shows the number of digits and decimals for the number, which were set in the Configuring Energy, Power Scaling, and Averaging setting of the meter's Device Profile (see 28.2.1: Configuring Energy, Power Scaling, and Averaging on page 28- 36).
3. To enter a new value for the accumulator, double-click in the New Value field for that accumulator.

Energy Accumulator Description	Retrieved value from meter	New value to set in meter	Check to set value	Existing Settings
Wh Delivered	31207	44057	<input type="checkbox"/>	00000000 k
Wh Received	00000	00000	<input type="checkbox"/>	00000000 k
Wh Total	31207	31207	<input type="checkbox"/>	00000000 k
VARh Delivered	0 k	31567	<input checked="" type="checkbox"/>	00000000 k
VARh Received	-000031.08 k	-000031.08 k	<input type="checkbox"/>	00000000 k
VARh Total	000031.08 k	000031.08 k	<input type="checkbox"/>	00000000 k
VAh Total	44057	44057	<input type="checkbox"/>	00000000 k
Cumulative Demand W Delivered	0.000	0.000	<input type="checkbox"/>	Not Applicable
Cumulative Demand W Received	0.000	0.000	<input type="checkbox"/>	Not Applicable
Continuous Cumulative Demand W Delivered	272.375	272.375	<input type="checkbox"/>	Not Applicable
Continuous Cumulative Demand W Received	0.000	0.000	<input type="checkbox"/>	Not Applicable

Copy Paste Set Exit

For setting new value into the meter, first check the box or double click the new value cell.

Enter the new value as per the format given in the last column as per device profile settings. If it is not in the specified format then it will display the zeros in that format.

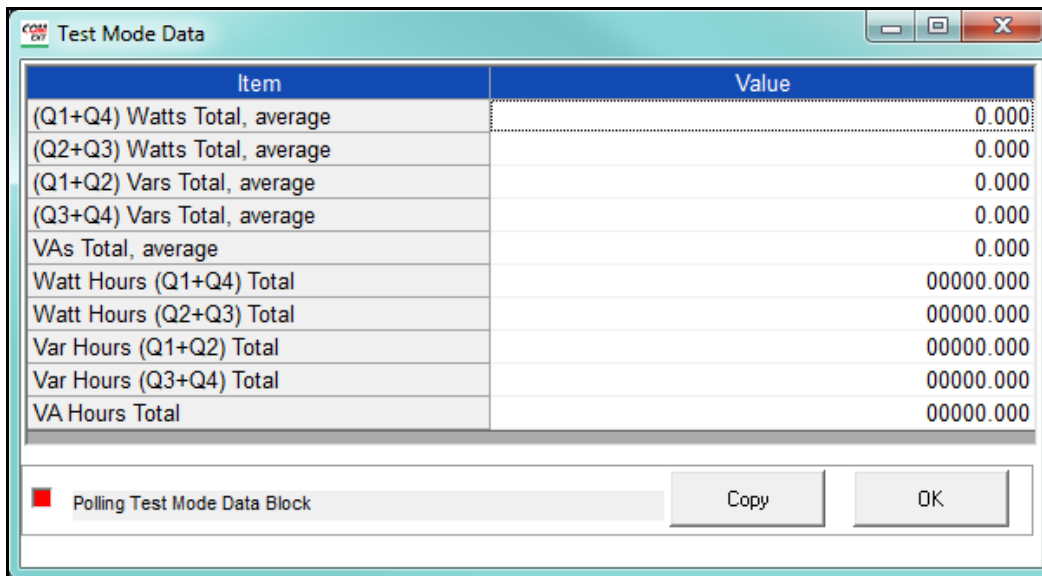
Note, the values pasted must be copied from Excel.

4. The Preset box is now checked and the New Value field is highlighted. Enter a new value for the accumulator.
  5. When you have finished entering the preset values, click the Set button (it becomes selectable when you have made New Value field entries).
- You will see messages on the bottom of the screen as the preset file is being saved.

### 20.1.15.4.3: Poll Test Mode Data

Use this command to view Test Mode data.

1. From the Main screen's Menu Bar, click Tools>Test Mode>Poll Test Mode Data.



Item	Value
(Q1+Q4) Watts Total, average	0.000
(Q2+Q3) Watts Total, average	0.000
(Q1+Q2) Vars Total, average	0.000
(Q3+Q4) Vars Total, average	0.000
VAs Total, average	0.000
Watt Hours (Q1+Q4) Total	00000.000
Watt Hours (Q2+Q3) Total	00000.000
Var Hours (Q1+Q2) Total	00000.000
Var Hours (Q3+Q4) Total	00000.000
VA Hours Total	00000.000

■ Polling Test Mode Data Block

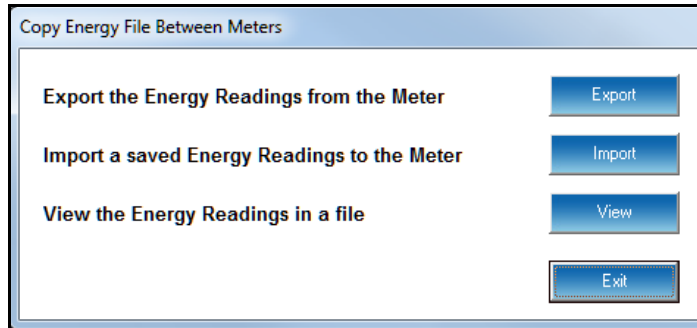
Copy OK

- The test data is shown in the Values column.
  - You can copy this data to the clipboard (for pasting into another application) by clicking the Copy button.
2. Click OK to close this screen.

#### 20.1.15.4.4: Copy Energy File

Use this command to copy a preset energy file to a Shark® 250 meter.

1. From the Main screen's Menu Bar, click Tools>Test Mode>Copy Energy File.



- Click Export to export the meter's energy readings into a saved preset energy file. You will be prompted to give the file a name and location. You can later view the file or import it into a meter.
  - Click Import to import a saved preset energy file into the meter. You will be prompted to select the file to import.
  - Click View to see the preset energy file. You will be prompted to select the file to view.
2. Click Exit to close the screen.

### 20.1.16: Network Card Status (Shark® 200/250/270 Meter)

This feature gives you status information on any installed Network cards in a Shark® 200/250/270 meter.

1. From the Main screen, select Tools>Network Card Status to open the screen shown below.

Network Card Status

Option Card 2

**Status**

Network Card is running

Network Card is healthy

Network Card is using the programmable settings

Modbus TCP Server is running

Using Programmable Settings IP Address

**MAC Address** 00-01-58-00-97-01

**IP Address** 172.20.166.27

**Subnet Mask** 255.255.248.0

■ Network Card Status Refreshed

Refresh

Close

2. This screen displays the location of an installed Network Card (Option Card 1 or Option Card 2), its current status, and information about its settings. Click in the pull-down menu to choose Option Card 2.
3. Click Refresh to see the latest status of the Network card.
4. Click Close to exit the screen.

20.1.17: Hardware Settings (Nexus® Meters)

This feature lets you see the meter’s hardware settings that have been programmed into Boot firmware.

- 1. From the Main screen’s Menu Bar, select Tools>Hardware Settings. See the example screen below.

Electro Industries Device Hardware Settings Programmed into Boot

List of Currently Connected Devices

Device	Device Type	Form	KYZ	Com 4	Com 3	Com 2	Com 1	Current Option	300 Volt	Sealing Switch	NVRAM
202055	Nexus 1272	9S/9Z (Wye, 3 CTs, 3PTs)	Yes	232/485	INP100/200(Net)	Display 38400	232/485	Standard	N/A	Yes	2048k

☐

OK

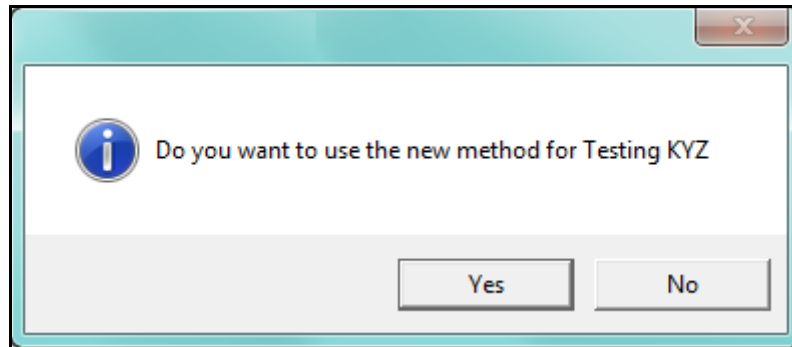
Help

- 2. Click OK to close the screen.

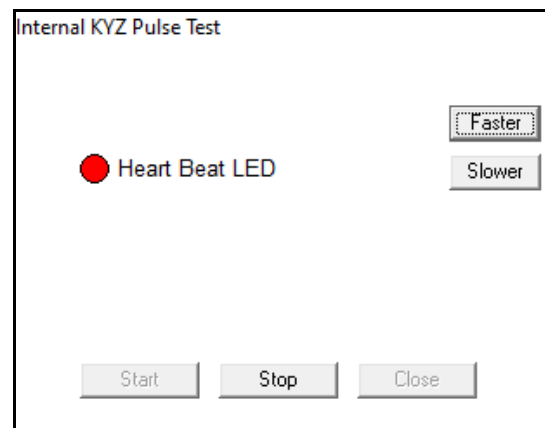
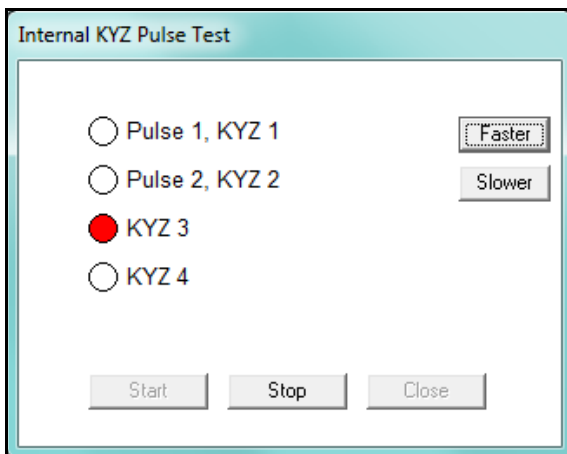
### 20.1.18: Internal KYZ Pulse Test (Nexus® 1252/1500/1500+ Meters)

Use the Internal KYZ Pulse Test feature to test the meter's KYZ pulses.

1. From the Main screen's Menu Bar, click Tools>Internal KYZ Pulse Test. You will see the message window shown below.



2. Click Yes to use the new testing method (this is the correct method to use); you will see one of the screens shown below. (depending on your meter)



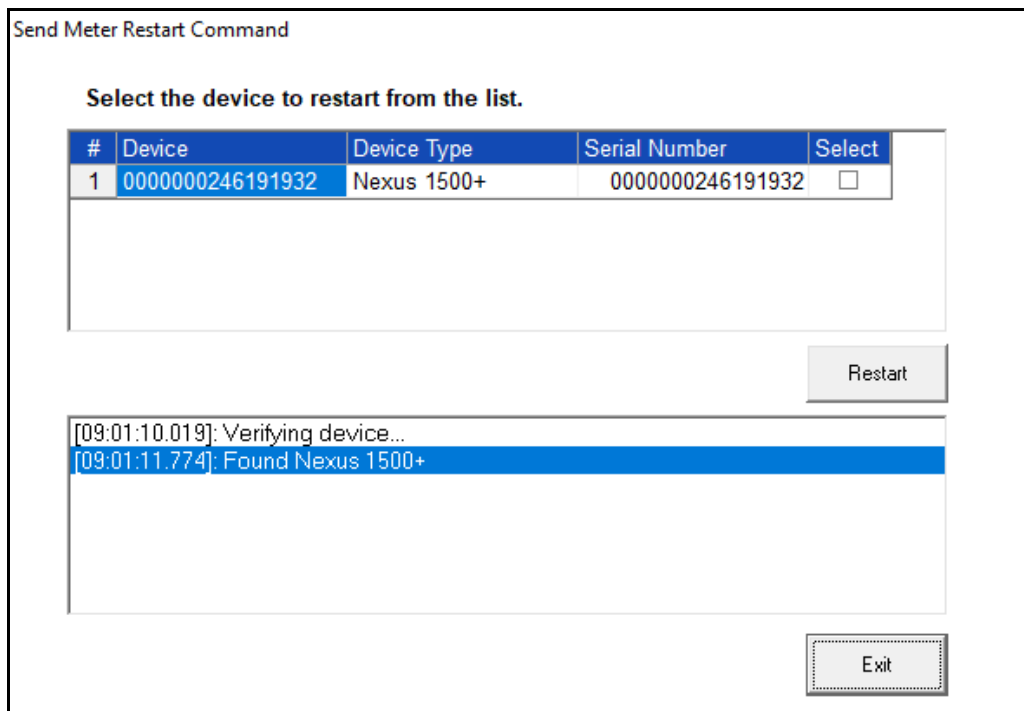
3. Click Start. You will see a red circle as each KYZ pulse is being tested.
  - To speed the test pulses, click Faster.
  - To slow down the test pulses, click Slower.
4. Click Stop to end the KYZ pulse testing.
5. Click Close to close the screen.

**NOTE:** The test pulses are not added to any KYZ pulse accumulators.

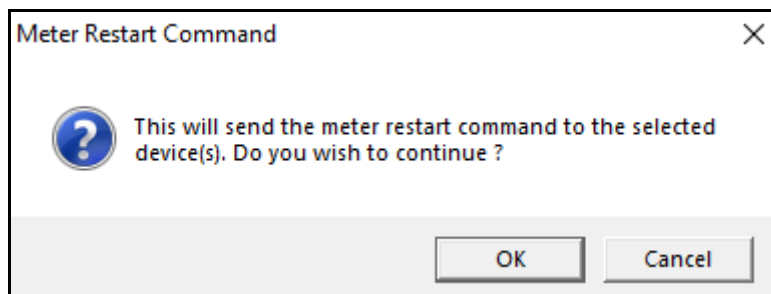
### 20.1.19: Send Meter Restart Command

This feature lets you reset the meter using software rather than performing a manual reset by cycling power to the meter. This option is available for all of the EIG meters.

1. From the Main screen's Menu Bar, click Tools>Send Meter Restart Command. See the example screen below.



2. Click the Select checkbox next to any meter(s) you want to restart.
3. Click Restart. You will see the message window shown below. Click OK to reset the meter(s); click Cancel if you don't want to perform the reset.



4. You will see messages in the bottom portion of the screen and then the window shown below. Click OK to close the message window and the Send Meter Restart Command screen.

### 20.1.20: 4GLTE Cell Modem Status (Shark® 270 Meter)

The Shark® 270 meter has a Verizon-certified 4G LTE™ cellular modem card (4GLTE). To see the card's detailed information, such as connection information, and to verify the cell modem is registered (SIM Card Status field) and the Signal Strength is at least Fair, click Tools>4GLTE Cell Modem Status to display the screen shown below.

4GLTE Card Status	
Description	Value
RunTime version	2
Boot Version	1
SIM Card Status	Healthy
SIM Card ID	89148000004177149872
Radio Device ID (IMEI)	356278076735374
IPv4 Address	63.40.143.47
RunTime Status	Healthy
Modbus Server Port	502
Signal Strength (RSRP)	Excellent (-80 db)
Last Update Timestamp	10/6/2023 11:44:21 AM
ME Error Count	0
ME Reboot Count	0

☐ Polling status

- You can access this screen irrespective of your connection, i.e., whether or not you are connected via the 4GLTE card.
- The Copy button copies the screen's data to the computer's clipboard.
- The SIM Card Status should say "Healthy." If it doesn't, there may be a problem with the SIM card or its registration. The possible error messages are shown below.

Message	Action
SIM card issue	See Note #2 (page 60)
EPS registration Issue	See Note #3 (page 60)
Data Integrity Issue	See Note #2 (page 60)
PDN Registration Issue	See Note #3 (page 60)



- The Runtime Status contains important messages regarding the state of the 4GLTE connection. If there are no connection problems, this field will say "Healthy." If there are problems, error message(s) will be displayed. See the table below for possible messages and actions to take.

Message	Action
Firmware Startup issue	Contact Technical Support
Radio Startup Issue	Contact Technical Support
Server Initialization Issue	See Note #1 (page 60)
Server Startup Issue	See Note #1 (page 60)
SIM Card Read Issue	See Note #2 (page 60)
Tower Connection Issue	See Note #2 (page 60)
APN Not Configured	See Note #3 (page 60)
APN not detected	See Note #3 (page 60)
Radio Power Issue	Contact Technical Support
Error Code (0-15)	See table on the next page

- Error Codes table:

Message	Action
Radio comms Issue	Contact Technical Support
DSP Communication Issue	Contact Technical Support
DSP Configuration read issue	Contact Technical Support
Configuration invalid	See Note #1 (page 60)
Radio power issue	Contact Technical Support
Radio startup issue	Contact Technical Support
No APN detected	See Note #3 (page 60)
Registration issue	See Note #2 (page 60)
No IP address assigned	See Note #3 (page 60)
Server startup Issue	See Note #1 (page 60)
Server Operation Issue	See Note #1 (page 60)
Hardware Issue	Contact Technical Support
SIM card Issue	See Note #2 (below)

<a href="#">IMEI read Issue</a>	<a href="#">Contact Technical Support</a>
<a href="#">Internal Issue</a>	<a href="#">Contact Technical Support</a>

- Note #1 - Configuration issues:  
If there are no registration or SIM card issues, verify that the profile entries are correct:
  - a. APN is entered correctly.
  - a. The "Allow List" IP address is formatted correctly.
- Note #2 - SIM card issues:
  - a. Verify that the SIM card is installed properly.
  - b. Verify that the SIM card has been properly activated.
- Note #3 - APN and Data connection issues:
  - a. Verify that the APN being used is the correct APN for the account.
  - b. Verify that the account is properly configured for data services.
- If the errors show up again after trying the actions, please contact technical support - see [Customer Service and Support on page - ii](#).

**NOTE:** If no one is connected to the cell modem, this status is updated every 20 seconds. If you or someone else is connected to the cell modem, the last status before connection is displayed in the screen.

### 20.1.21: Phasor Measurement Unit Settings

When the Nexus® 1500+ meter is programmed to use the synchrophasor feature, the meter acts as a phasor measurement unit (PMU), sending synchrophasor data to other devices. This setting lets you configure the synchrophasor data format for the meter acting as a PMU. Detailed instructions for the synchrophasor feature and its settings are given in appendices E and F in the Nexus® 1500+ meter's User Manual ((download the manual at <https://www.electroind.com/products/nexus-1500-power-quality-meter-with-phasor-measurement-unit/>: click Downloads>Tech Documents>User Manual from the right side of the webpage).

### 20.1.22: Network Status

For Nexus® meters using a DHCP server to assign an IP address to the meter's Ethernet port, use Network Status to view the IP address:

1. Click Tools>Network Status.

DHCP Status		
Name	Port 5	Port 6
DHCP Client Status	4 2020/10/29 16:45:59	Disabled
Renewal Lease Time		70
DHCP Server IP	10.0.0.2	
IPv4	10.0.0.22	
Subnet Mask	255.0.0.0	
Router (default gateway)	10.0.0.2	
DNS Server IP	8.8.8.8	
SMTP Server IP		
SNTP Server IP		
DHCPv6 Client Status	Disabled	Disabled
SDHCPv6 Renewal Lease Time		
IPv6		
<div> <input type="button" value="OK"/> <input type="button" value="Copy"/> </div>		

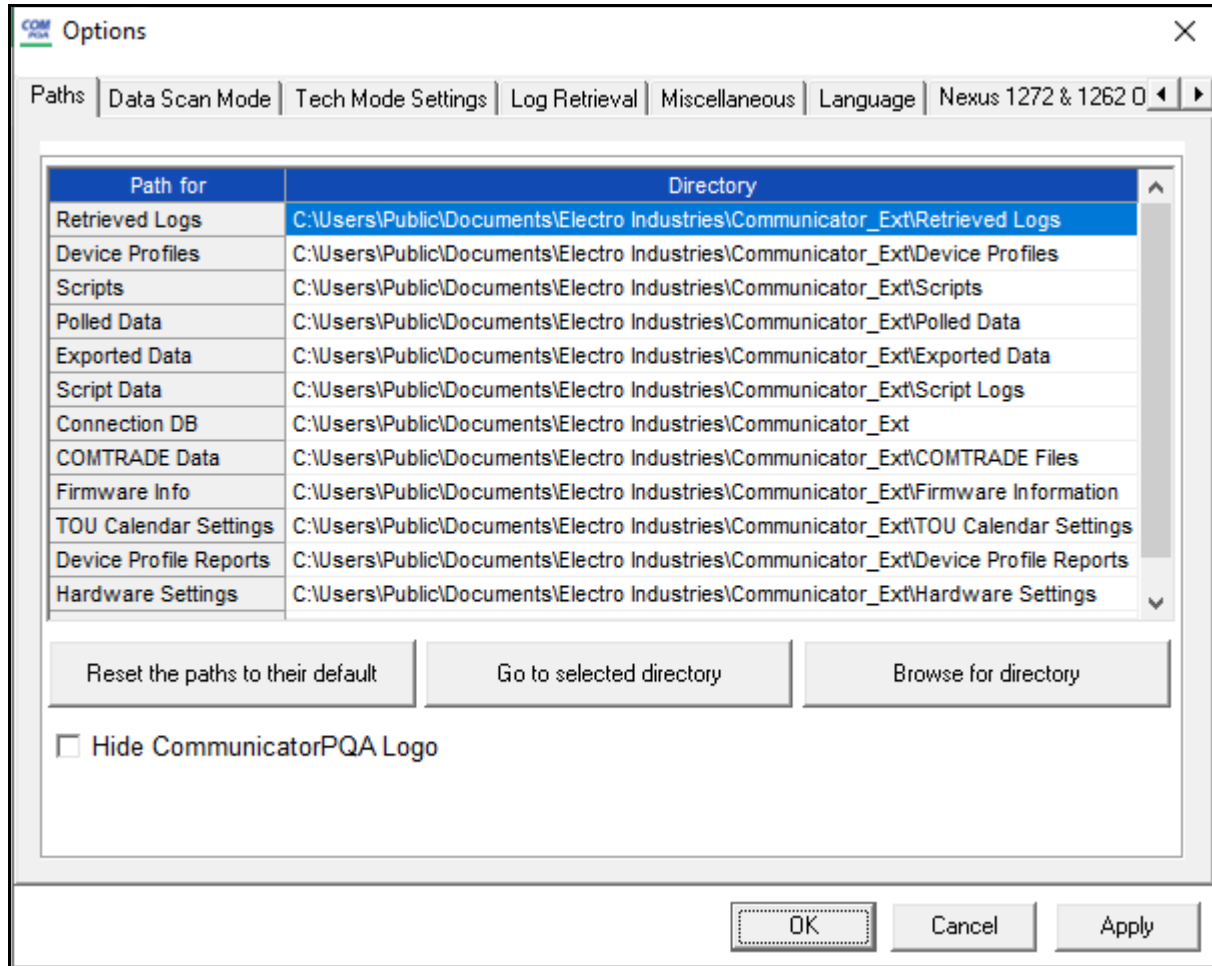
- The DHCP Client Status will indicate if DHCP is disabled or, if enabled, when it assigned an IP address to the port.
- The renewal lease time indicates the amount of time the address will remain active, in seconds. This is set by the DHCP server.
- The other fields display: the DHCP server IP address; the Ipv4 address that was assigned to the port by the DHCP server; the subnet mask and router/default gateway settings; the DNS, SMTP, SNTP server IP addresses, if applicable;

whether or not DHCPv6 Client status is enabled, and if enabled, the time left on the IPv6 address lease, and the IPv6 IP address for the port.

2. Click OK to close the screen.

## 20.2: Options Screen

The Options screen gives you access to additional software functions. To open the screen, from the Main screen's Menu Bar, click View>Options. You will see the Options screen, shown below.

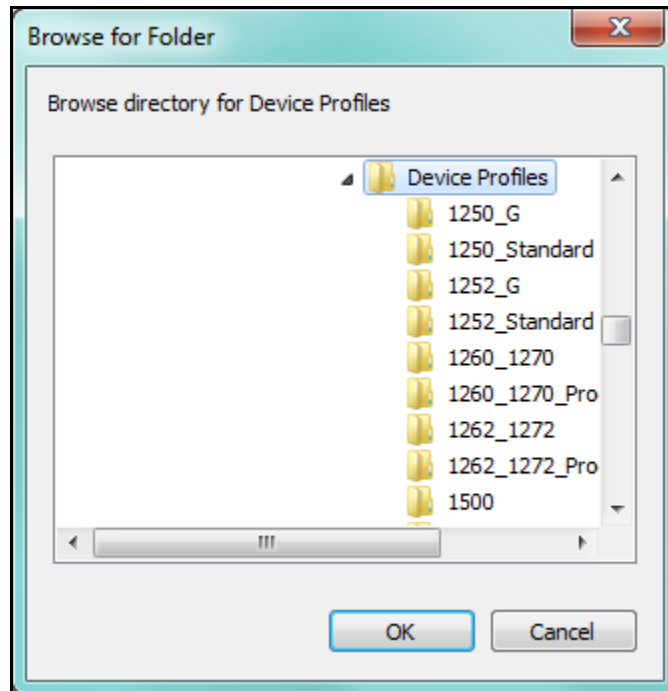


- The tabs at the top of the screen let you access the different settings screens.
- Click Apply on any of the tab screens to implement your changes.

### 20.2.1: Paths

The first tab is the Paths tab (shown on the previous page). This screen shows the location of the data files stored by the CommunicatorPQA® application. You can choose different paths for the data if you want to store the files in different directories. The screen has three buttons:

- Reset the paths to their default - click this button if you have made changes and want to go back to the default directory paths.
- Go to selected directory - click on a directory path, and then click this button to open the directory for those files, e.g., Retrieved Logs.
- Browse for directory - click on a directory path, and then click this button to open a window showing the tree structure of this directory. This lets you easily locate a specific file in the directory. See the example below, for Device Profiles.



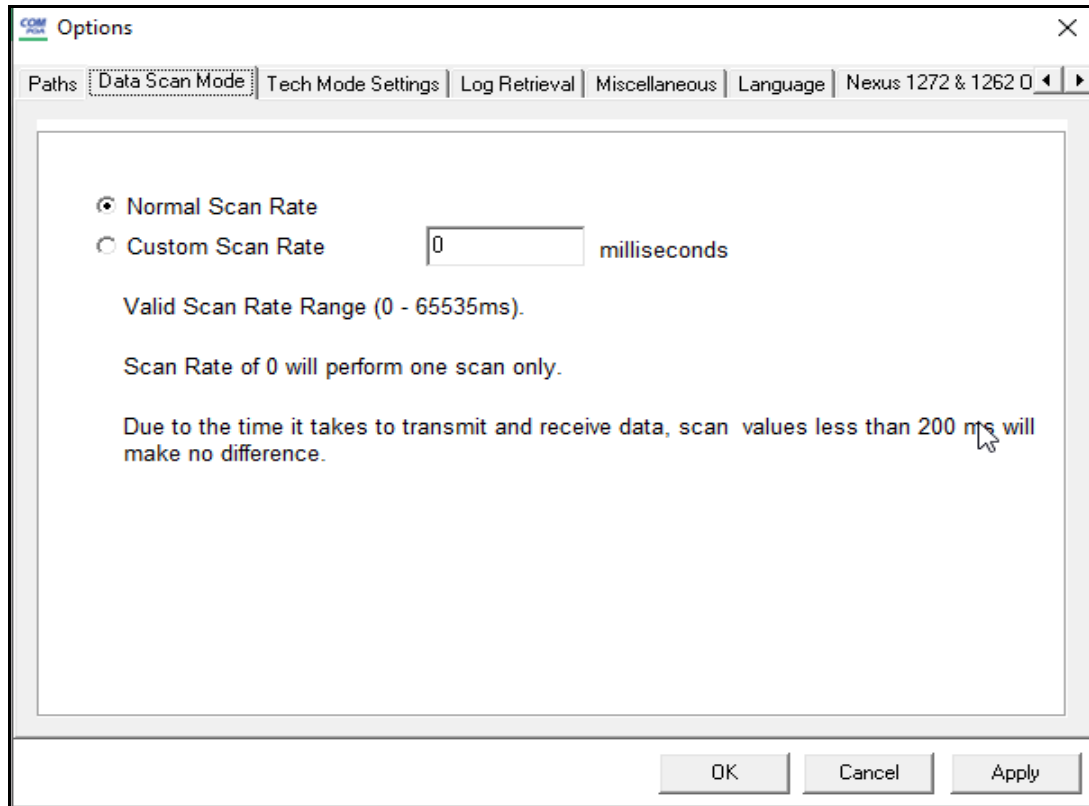
- You can also select a new path from this window and click OK to insert the path in the Directory field.

You can choose to not show the CommunicatorPQA® software logo by checking the box at the bottom of the screen.

Click Apply to implement any changes.

### 20.2.2: Data Scan Mode

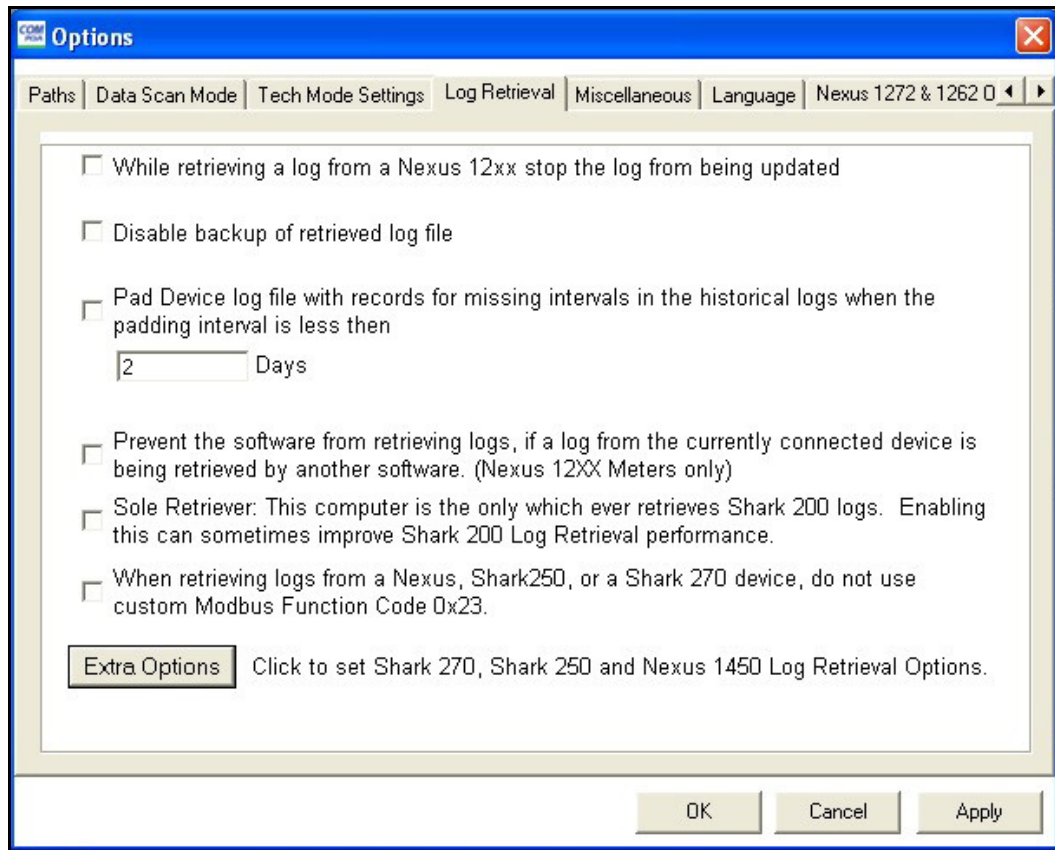
1. Click the Data Scan Mode tab to see the screen shown below.



2. The field on this screen is used to specify how long the meter should wait before performing the next scan. This is a legacy setting for the Nexus® 1252/1262/1272 meters.
3. Click Apply to implement your selections.

### 20.2.3: Log Retrieval

1. Click the Log Retrieval tab to see the screen shown below. This screen allows you to make specific settings related to meter logs.



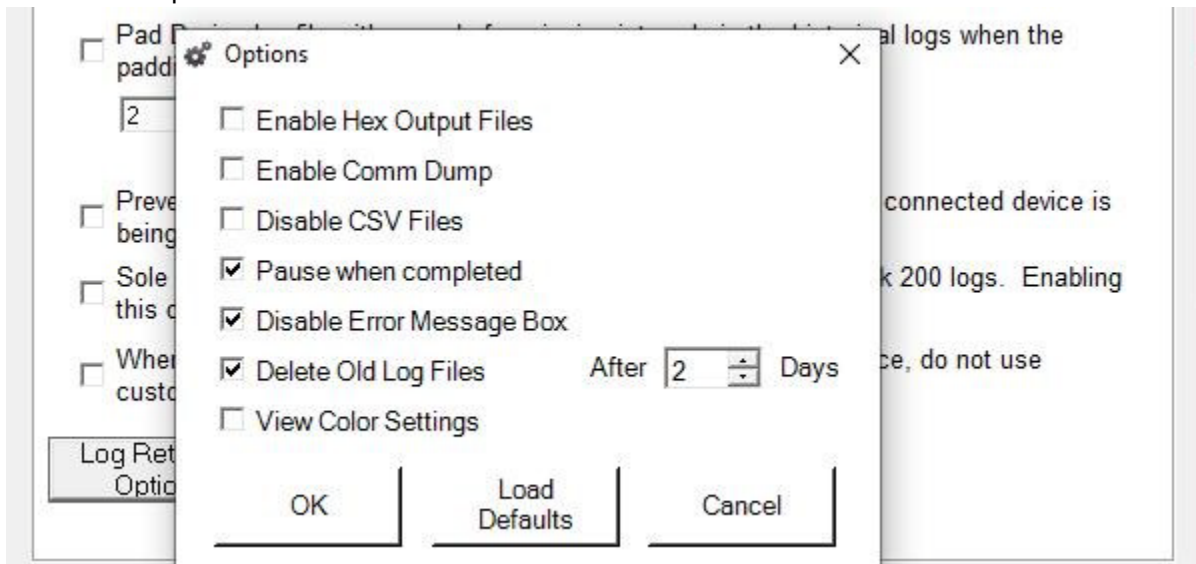
- The first setting is not recommended, but it allows you to stop updates to a log when it is being retrieved from a Nexus® 1252/1262/1272 meter. It is better to continue to log while downloading so you don't lose any newly created snapshots.
- The second setting disables backup of retrieved logs. Generally, unless your hard drive is very small, leave this block un-checked so that log backup is performed.
- If the meter is not in normal operation, it does not record any data for historical logs. For example, during firmware updates or loss of power, data is not saved. Some applications may require that data logs contain those missing records. To remedy this problem, enable the Pad Missing Records for Historical Logs feature. Once enabled, the meter, upon power up after a power down condition, will look at all the intervals that are missing and pad with zeros those intervals in the



historical log (s). Check the box next to the Pad Device option by clicking on it, and enter the number of days in the Days field.

**NOTE:** If the box is already checked, this feature is already functional. You can change the number of days, or click the box to disable this feature.

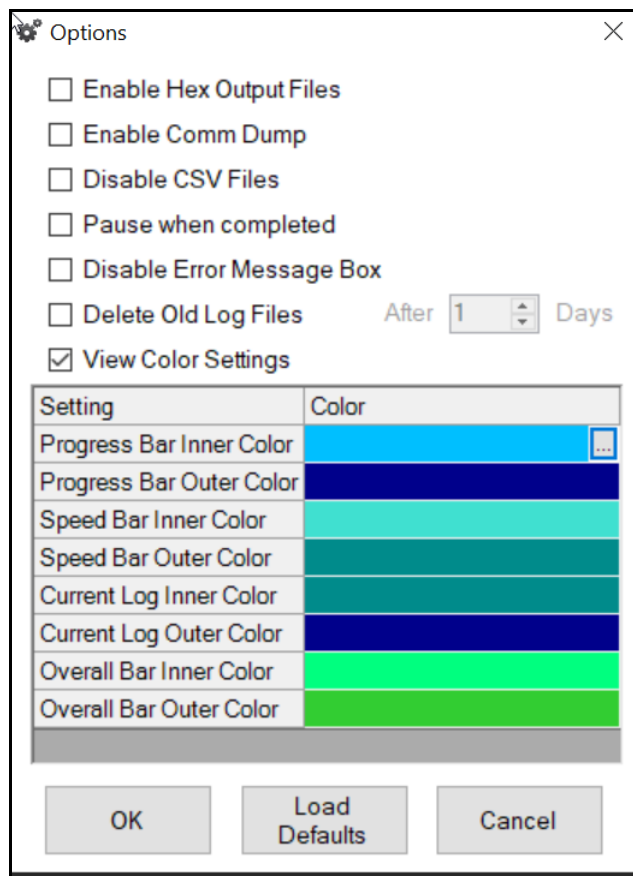
- The fourth setting pertains to Nexus® 1252/1262/1272 meters. It disables log retrieval by more than one application at a time.
- The fifth setting lets you designate this PC as the only log retriever for all Shark® 200 meters on the network. If another log retrieval process is taking place when this computer's log retrieval begins, the software will take control of that log retrieval. This setting may help to improve the Shark® 200 meter's log retrieval performance, but should not be used if the network has multiple computers that should be able to retrieve Shark® 200 meter logs.
- The sixth setting disables Modbus Function code 0x23 when logs are being retrieved from a meter. Modbus Function code 0x23 is a custom Modbus function code created by EIG to allow for large byte transfers in Modbus protocol. Not all Modbus to Modbus TCP converters will support this extended capability. All EIG native network cards have extended buffering to support Function code 0x23.
- The Shark 250/270 and Nexus 1450 meters offer additional settings - click Extra Options to see them.



- Check the box next to any options you want to select: Enable Hex Output, Enable Comm Dump, Disable CSV Files, Pause When Completed\*,

Disable Error Message Box, Delete Old Log Files after 2 days, View Color Settings.

- If you check View Color Settings you will see a selection chart letting you choose the colors to be used in the meter's log retrieval screen.



- Click on the "... " in one of the setting's color lines to choose a different color.
- Click OK to close the new Options window; or click Load Defaults to put the settings back to their original default settings; or click Cancel to close the new Options screen without changing anything.

2. Click the checkbox next to any of the settings you want to select and click Apply to implement your selections.

## 20.2.4: Miscellaneous

1. Click the Miscellaneous tab to see the screen shown below.

The screenshot shows the 'Options' dialog box with the 'Miscellaneous' tab selected. The settings are as follows:

- ☐ Enable Kh/Ke Test Pulse Calculation screen
- Ethernet Packet Delay: 0 milliseconds
- Message Response Time out: 1000 milliseconds
- Language: [Pull-down menu]
- ☐ Force usage of old database format: For compatibility with old applications
- ☐ Enable HHF converter for retrieved logs
- ☒ Disable the command to tell the modem to not hang up on DTR change.
- Shark 200 Series
- ☐ Use absolute values for energy readings on polling screens and in Log databases.

Buttons at the bottom: OK, Cancel, Apply.

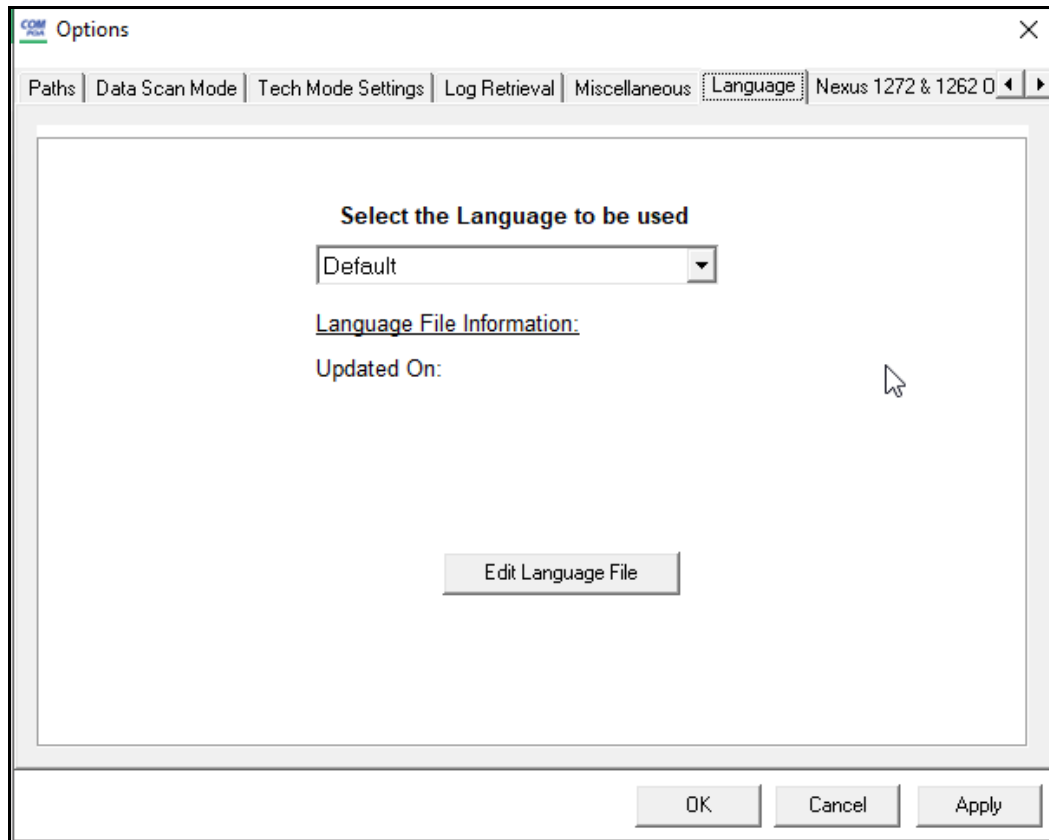
2. This screen lets you make the following settings:

- Enable Kh/Ke Test Pulse Calculation screen - click to enable the screen
- Ethernet Packet Delay - in milliseconds entered in field
- Message Response Timeout - in milliseconds entered in field
- Language - English or Spanish, selected from the pull-down menu
- Enable HHF Converter for Retrieved Logs - click this box if you want to enable the HHF converter. See Chapter 19 for additional information on the HHF Converter and meter logs.
- The Shark® 200 Series meters use signed energy values. Check the box if you need to use unsigned values with your applications.
- The Nexus® 1500+ meter gives you the option of showing the meter's battery status in the Main screen's Status bar. Check the box to display the battery status.

3. Click Apply to implement your selections.

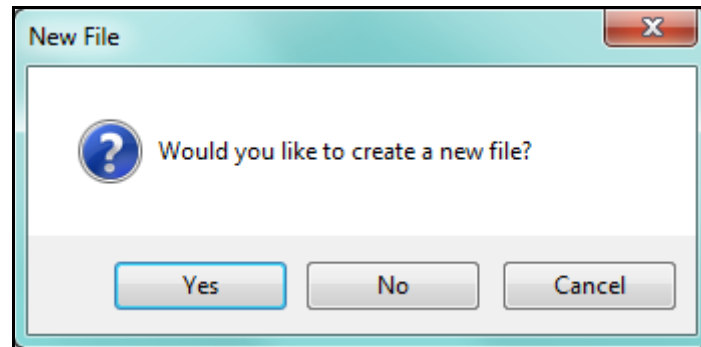
### 20.2.5: Language

1. Click the Language tab to see the screen shown below if you want to change the CommunicatorPQA® application's default language.

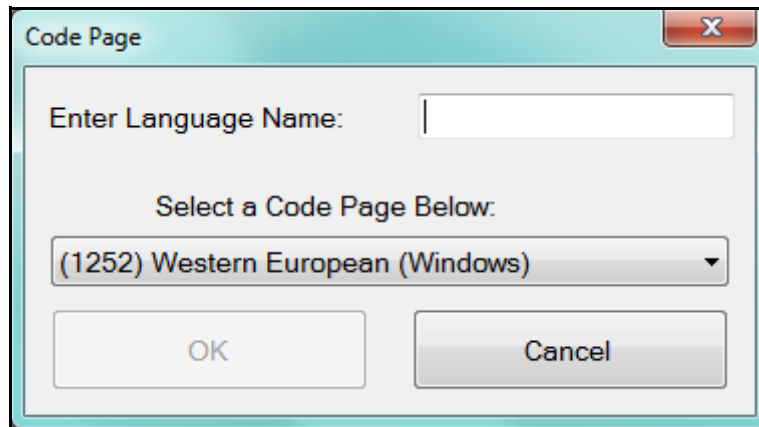


2. This feature gives you the choice of three embedded languages - Default (i.e., English), Spanish and Chinese, to choose from; and also the option to add a new language.
  - To use one of the embedded languages, select it from the pull-down menu and then select either Apply or OK.
  - To modify an embedded language, select it from the pull-down menu and click the Edit Language File button. Continue to step 5.
  - To add a language, select Default from the pull-down menu and click the Edit Language File button. Continue to step 3.

3. When setting up a new language file, you will see the following screen.

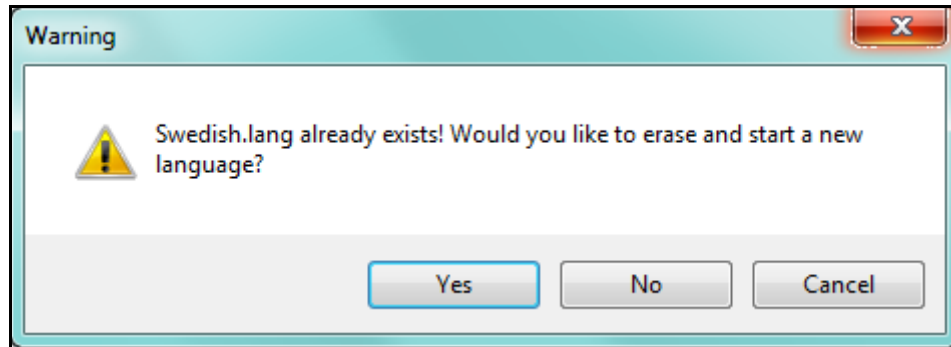


4. Click Yes to continue adding the new language file. You will see the screen below.



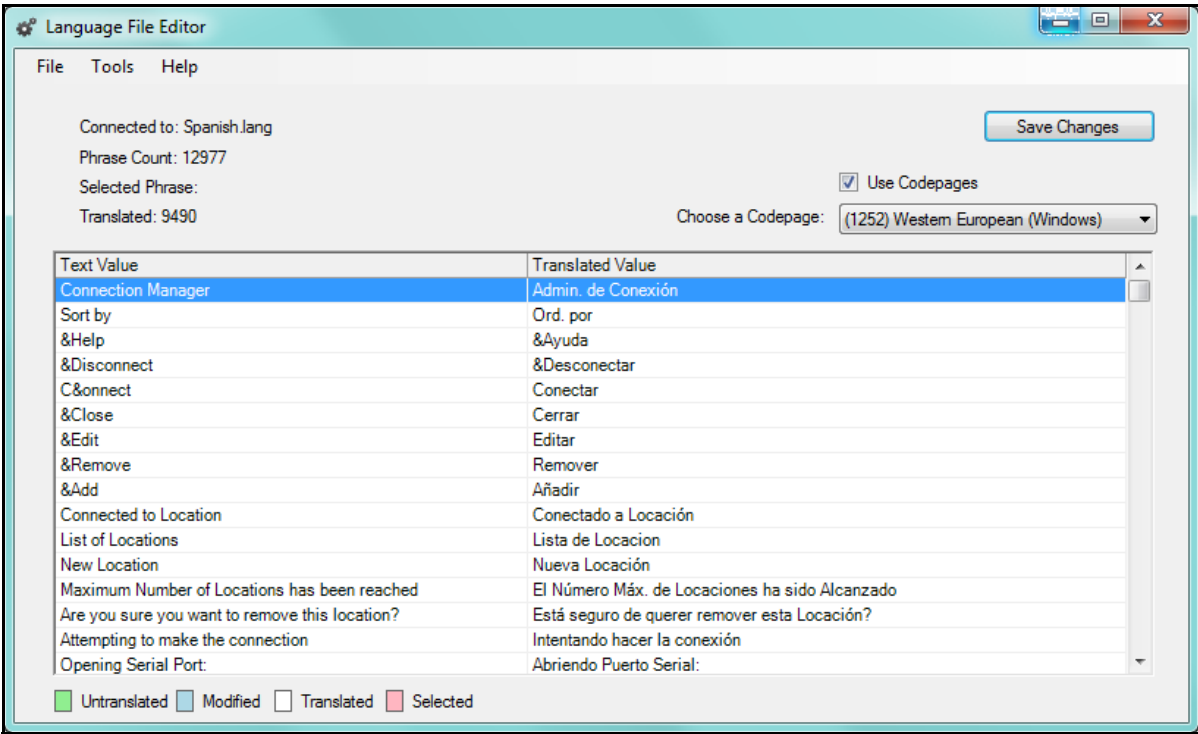
- Enter an appropriate name for the language file, e.g., French.
- The default selection for code page is the code page your computer currently uses. A code page determines how characters are displayed. You will only need to change the selection if you are adding a language that uses a different character set than your default language. For example, if your computer uses a Western European code page (used by languages such as English, Spanish, French, German, etc.) and you are adding Russian, you would choose Cyrillic from the Code Page pull-down menu; if your default code page is Chinese, and you are adding German, you would choose Western European from the Code Page pull-down menu.

- Note that if a language file with that name already exists, you will see the following message.

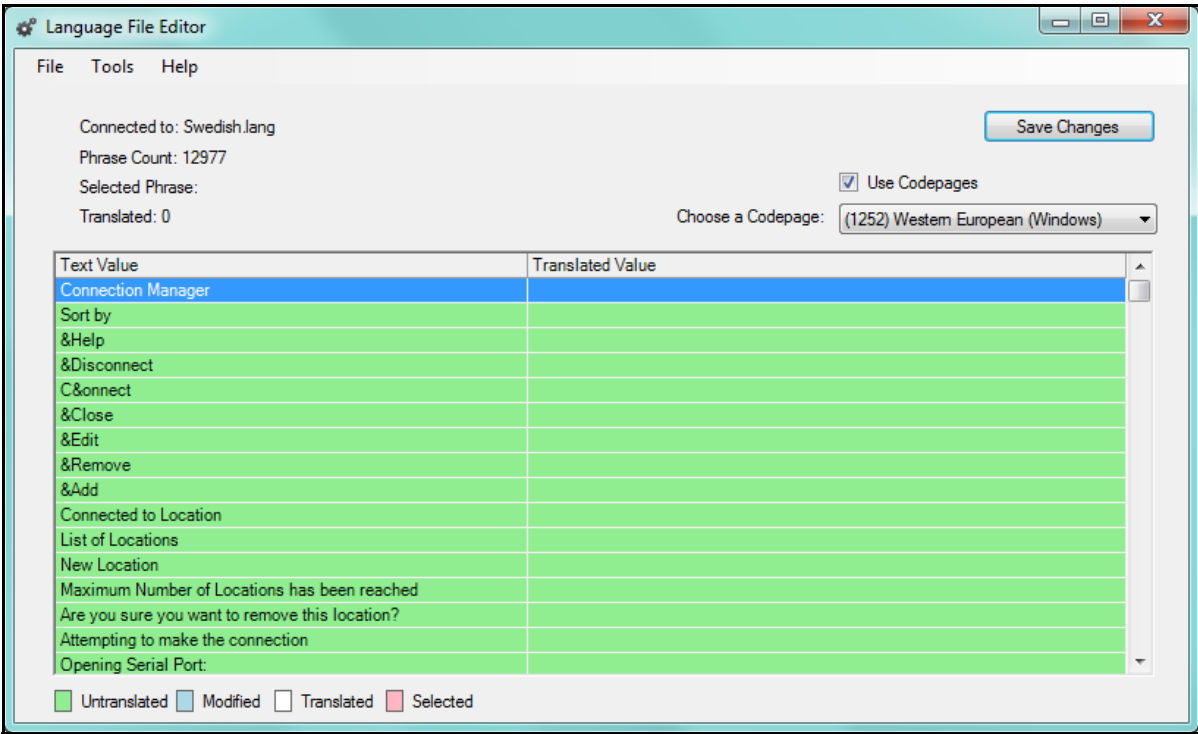


Click Yes to start the translation all over again, or No or Cancel to close the message window.

5. You will see one of the following screens, depending on whether you are adding a new language, or modifying an existing one.



Language Editor Screen with Spanish Language Chosen



Language Editor Screen for New Language

6. The Text Value column contains the English phrases from the application, and the Translated Value column lists the phrase in the new language.

- For an existing language file (example on previous page), there will be entries for each of the English phrases in the Translated Value column. To change an entry, click on the translated value and enter a new value.
- For a new language, click in the Translated Value of each phrase to type in the translation you want to use.
- The color code used by the screen is displayed at the bottom:
  - Green is untranslated phrase
  - Blue is modified translation
  - White is translated phrase (the phrase line will change from blue to white when you click Save Changes)
  - Pink is currently selected phrase

7. When you are done entering translated phrases, click Save Changes and then click the red X to close the screen. Note that you can save a partial language file and then go back to it to finish translating at a later time. You would just select the language from the Language tab's pull-down menu (see step 2) and then click Edit Language file.

**NOTE:**

- The following programs are supported for languages other than English:
  - Log Viewer
  - Script & Scheduler
  - CommunicatorPQA® Main application
- The following programs are not supported for languages other than English:
  - EN50160 Report Generator
  - EN50160 Report Viewer



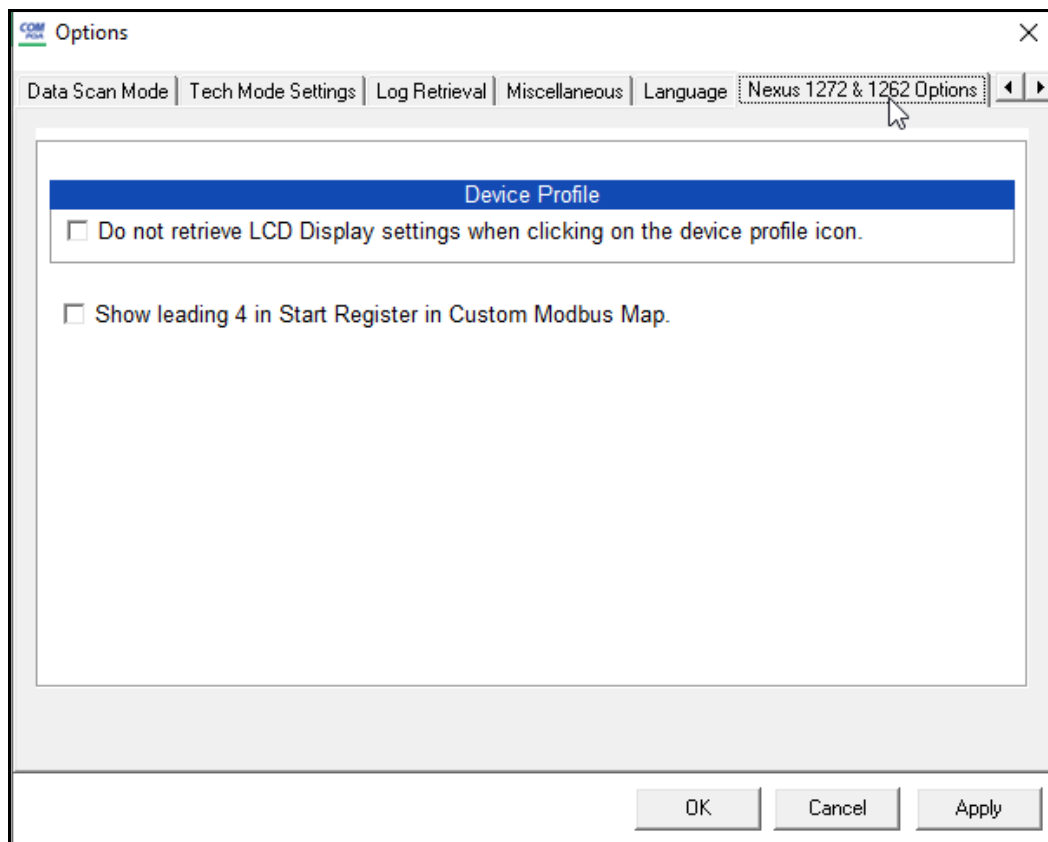
- EN50160 HTML reports
- EN50160 PDF Reports
- PQDIF Converter
- COMTRADE Converter
- Log Retrieval Manager
- Time of Use Editor

### 20.2.6: Nexus® 1262 & 1272 Options

It takes a few minutes longer to load a Nexus® 1262/1272 meter's Device Profile when the LCD (display) settings are retrieved along with the other programmable settings. To address this issue:

- There are two options available from the Tools menu: Edit Current Device Profile and Edit Current Device Profile (Without LCD Programmable Settings). Select the latter if you do not want/need to load the LCD settings along with the other meter settings.
- You also have the option to change the Device Profile icon so that its default action is to load the meter's programmable settings without loading the LCD programmable settings (the default action of the Device Profile is to load all meter programmable settings, including the LCD settings). To do this you use the Nexus® 1262 & 1272 Options tab.

1. Click the Nexus® 1262 & 1272 Options tab to see the screen shown below.

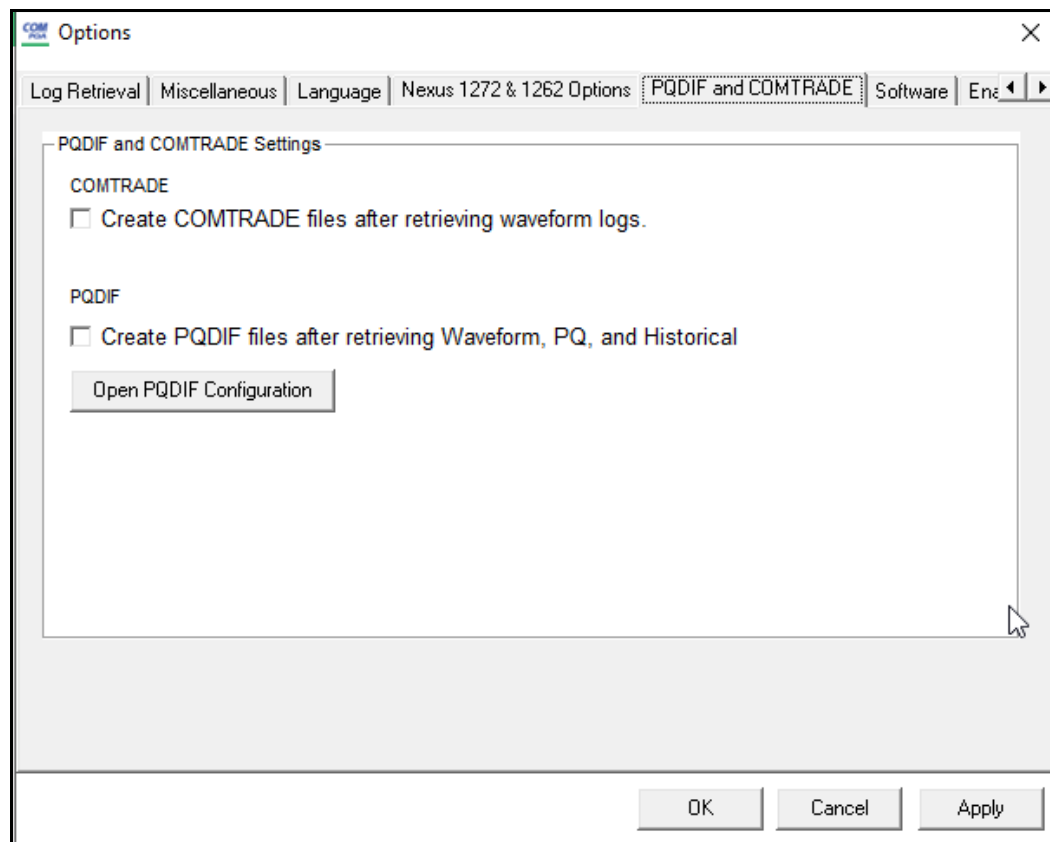


2. Click the checkbox next to "Do not retrieve LCD Display settings when clicking on the device profile icon." Clicking the Device Profile icon now loads the programmable settings without the LCD programmable settings. If you want to change back to the default, un-select the checkbox.

### 20.2.7: PQDIF and COMTRADE

PQDIF and COMTRADE are two different types of file format that are commonly used by third party software applications. The CommunicatorPQA® software application has the ability to automatically create these differing file formats so that waveforms captured by EIG meters can be easily imported into the third party waveform and fault analysis applications.

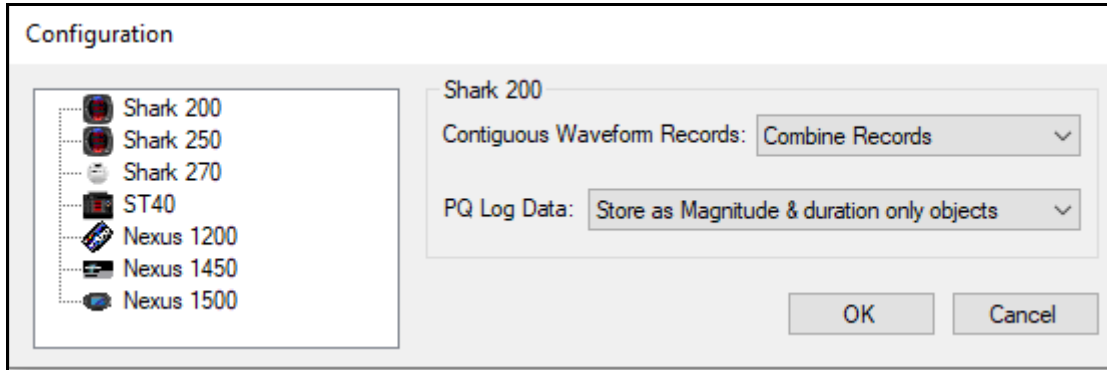
1. Click the PQDIF and COMTRADE tab to enable the creation of PQDIF and/or COMTRADE files.



2. Click either or both of the following to enable PQDIF and CONTRADE file creation:
  - The checkbox next to Create COMTRADE files after retrieving waveform logs

- The checkbox next to Waveform, PQ, and Historical to create PQDIF files after retrieving those logs.
  - To configure the PQDIF file for your system:

a. Click Open PQDIF Configuration.

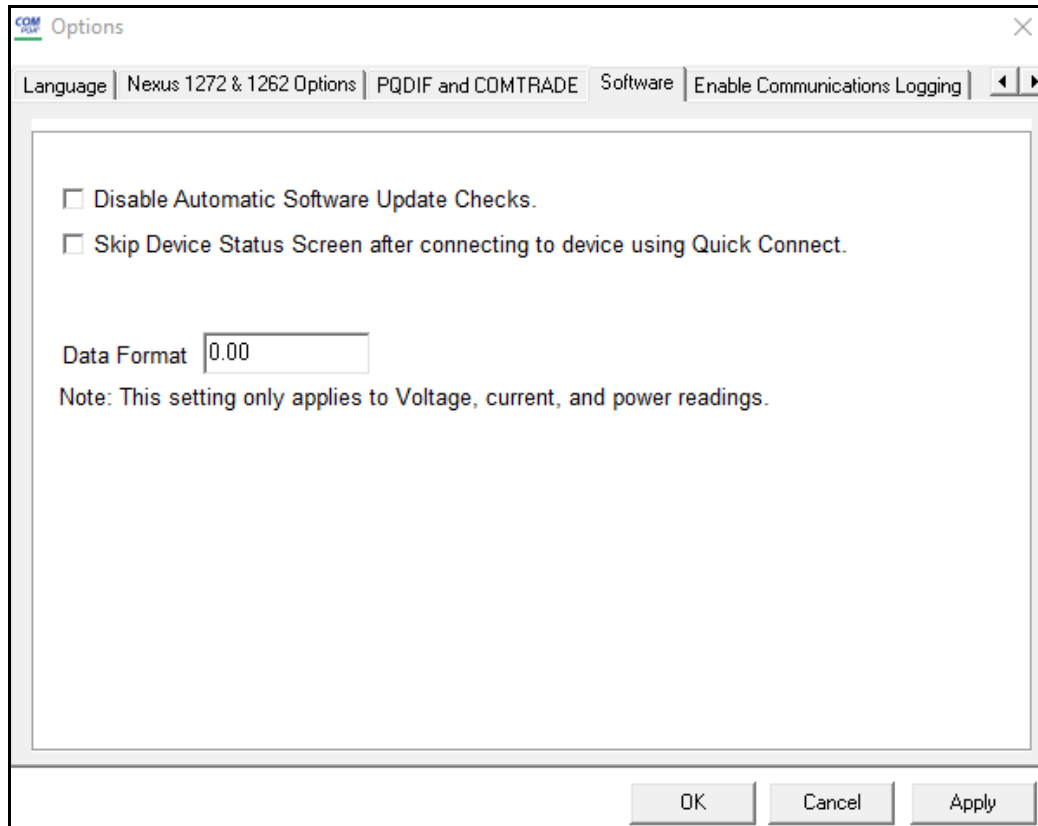


- b. Select your meter model from the menu on the left.
- c. For continuous waveform records, select from Combine Records, Keep as Separate Records, and Discard Records.
- d. For PQ Log Data select from Store as Magnitude & Duration Only Objects; Store as Magnitude, Duration, & Time Objects; Store Both Choice 1 and 2 Objects; and Do Not Store PQ Logs.
- e. Repeat steps b-d for any additional meter models you want to make settings for. When your settings are complete, click OK.
3. Click Apply to implement your selection(s).

### 20.2.8: Software

This setting lets you customize the software functionality.

1. Click the Software tab from the Options screen.



2. You can make these settings:

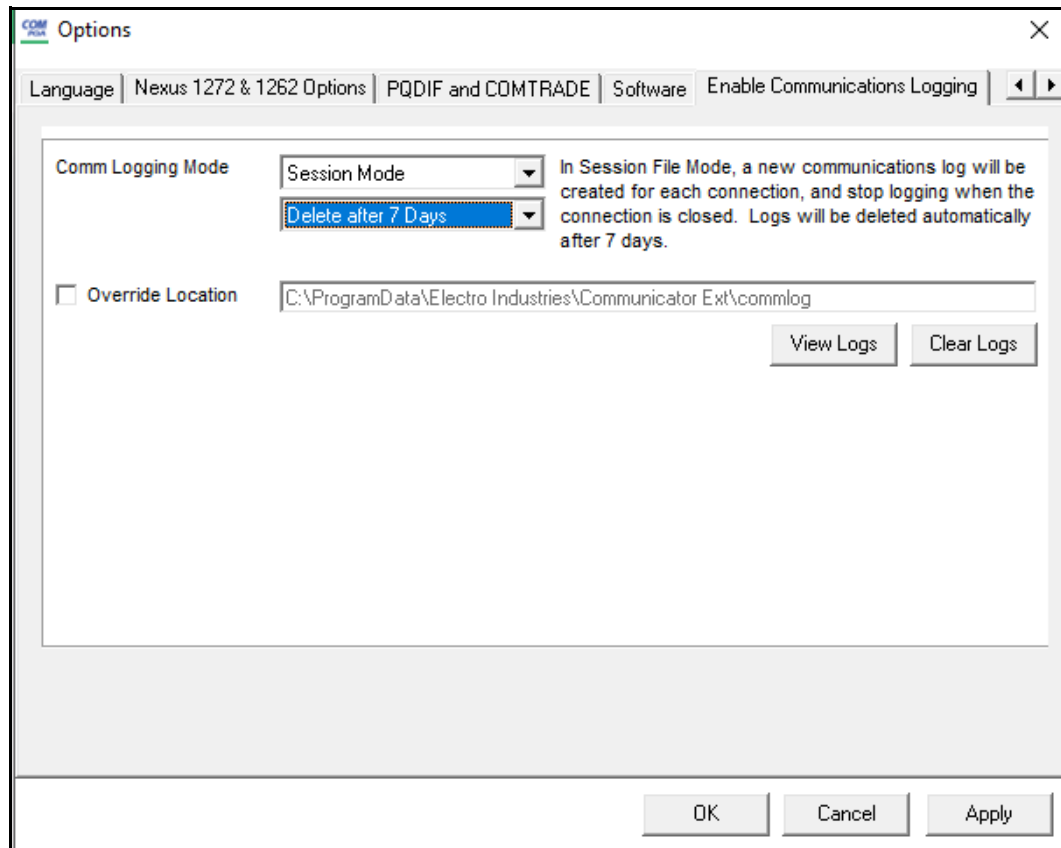
- To disable automatic checking for software updates upon opening the software, click the checkbox next to the first option.
- To not display the Device Status screen when you use Quick Connect, click the checkbox next to the second option.
- To set the data format for voltage, current, and power readings, enter the number of digits and/or decimal places you want.

3. Click Apply to implement your selections. Then click OK to close the screen.

### 20.2.9: Enable Communications Logging

This setting lets the user log all communications with meters via the CommunicatorPQA® application.

1. From the Options screen, click the Enable Communications Logging tab.



2. Select the Comm Logging Mode:

- Disabled - No communications logging will take place.
- Fixed Mode - A single communications log is kept across all connections and instances. While this setting will keep the file small, it is only useful for immediate logging. When enabled, communications are logged to the "Comm\_Logging.txt" file.
- Session Mode - A new log file is created for every connection. This setting is particularly useful in a MeterManagerPQA® application environment (see Chapter 18 for details on the MeterManagerPQA® application), where many device connections are created sequentially and simultaneously. When enabled, communi-

cations are logged to a file with a name made up by the connection parameters and the time the connection was established, in the format [connection]\_[time].commlog; e.g., if the connection is 192.168.1.105, with Modbus TCP, and initiated at 2019/07/10 09:53:22, then the filename would be "mn\_\_\_192.168.1.105\_502\_1\_TCP\_20190710095322.commlog".

3. If you selected Session Mode, specify if old logs should be deleted after 7 days.
  - Even though individual communications log files are small, if many connections are made the number of files can build up. This setting insures that the communications logging doesn't fill up the hard drive.
  - Another option to free up memory is to click Clear Logs, which will delete all the log files.
4. Specify the location for the communications logs. The default location is [AppData]\Electro Industries\Communicator Ext\commlog, but any directory can be specified.
  - To open the directory to view the log files, click View Logs.
5. When you have completed your settings, click Apply, and then restart the CommunicatorPQA® application.

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## 21: Total Web Solutions and the WebView™ Energy Dashboard

### 21.1: Overview

- Electro Industries/GaugeTech's Total Web Solutions™ (TWS™) is a fully customizable Web server, providing access to real-time data via the Internet. TWS has an open design that allows you to communicate with devices through a variety of open protocols. The system incorporates highly programmable network cards with built-in memory that are installed in meters with the 10/100BaseT Option. The Network cards can be programmed to perform an extensive array of monitoring functions.

**NOTE:** A Nexus® meter with the INP10 Option does not support Total Web Solutions™. The other Network cards - INP100/INP102/INP200/INP202/INP100S offer various TWS™ options. Not all of the components are available with all of the Network cards; refer to [21.13: Comparison of Network Cards, on page 21-63](#), for more information.

- EIG's WebView™ Energy Dashboard is a feature of the Nexus® 1450 meter. It is a unique, HTML5-based web server that lets the user access the meter readings, view reports, and perform detailed analysis through the Internet. See the *Nexus® 1450 Meter Installation and Operation Manual* for a detailed explanation of the WebView™ Energy Dashboard. Note that some, but not all, of the settings described in [Click OK to save the settings., on page 21-7](#) are available for the Nexus® 1450 meter; e.g., FTP functions are not available for the 1450 meter. If a setting is not available, its tab will not be shown in the Advanced Network Option Settings screen. Refer to [21.13: Comparison of Network Cards, on page 21-63](#), for more information on the 1450's features.

**NOTE:** The Shark® 270 meter's Gen 2 INP100S also has an HTML5-based Web server. I6t has some, but not all, of the features of the Webview™ Energy Dashboard. Instructions for using the meter's We server are included in the Shark® 270 Meter User Manual, which can be downloaded from EIG's website:

<https://www.electroind.com/products/revenue-meter-shark-270/>

- Chapter 6 contains details of the Nexus® 1450 meter's Security feature. The Security feature also supports security for the WebView™ Energy Dashboard software, requiring the user to log in when security for the meter is enabled and they are attempting to access a restricted permission. In addition, all HTTPS communication with the meter is encrypted. See [6.11.4: Enabling/Disabling the Sealing Switch](#)

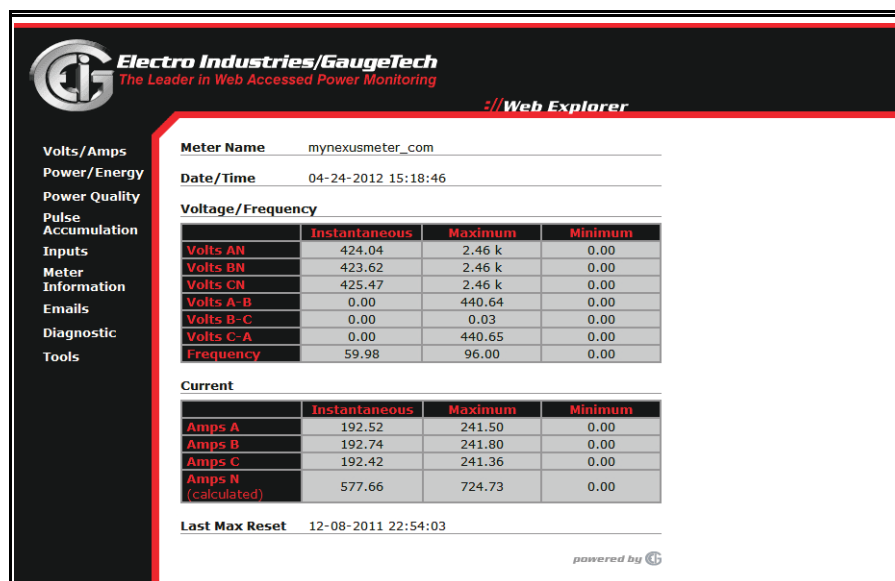
(Shark® 270 Meter), on page 6-31, for meter security details.

**NOTE:** The Legacy user is not able to access any restricted webpages when security is enabled for the meter.

## 21.2: TWS System Components

TWS™ is made up of the following components. For flow charts of the components, see [21.10: WebXML Flowchart, on page 21-60](#), [21.11: WebExplorer Flowchart, on page 21-61](#), and [21.12: WebAlarm Flowchart, on page 21-62](#). For the available components for each of the Network cards, refer to the comparison charts in [21.13: Comparison of Network Cards, on page 21-63](#).

- **WebExplorer™:** This component utilizes your Web browser to provide you with direct access to all power data. Using your browser, you can access any data file. And, because it looks like a standard HTML webpage to an IT department, the data transmits through corporate firewalls. This fully configurable component allows you to customize your own SCADA quality webpages, graphics and configurations via an FTP Server and/or FTP Client. The main Default webpage is shown on the next page. This is just an example, because the webpages for your data may be changed or created to your specifications and needs. To access the meter through the Web, just type the IP address of the Network card into your browser's address bar.



- **WebXML™:** This component allows you to configure data to your specifications. The data is polled, then stored in an XML file for later access by any client on the network. The data can be viewed via multiple applications including Internet Explorer, and Microsoft® Excel®, Power Point® and Word® applications.
- **WebReacher™:** With this component, you can access meters anywhere in the world. WebReacher™ has a built-in Modbus data concentrator that allows you to poll up to 16 devices (8 for the Nexus® 1500/1500+ meter) with up to 64 unique polling points. WebReacher™ can poll items from any device that speaks Modbus RTU and/or Modbus TCP/IP protocols, and it can retrieve data and consolidate it into web-pages without separate software.
- **WebMod™:** The 10/100BaseT design allows the unit to speak Modbus TCP. Once the programmable Network card is placed inside a meter, a gateway port becomes available. The gateway enables a high speed interface between the Network LAN and other Modbus-based IED (Intelligent Electronic Device) equipment. Modbus TCP is an industry-proven open protocol that can be easily integrated with any other software or hardware.
- **WebAlarm™:** With this component, Real Time email alerts are sent via the Internet to up to 9 recipients simultaneously for any combination of event notifications. Email format can be Short Format or Long Format: Short Format is for cellphones with text messaging service; Long Format provides detailed alarm conditions for any devices with full email support (computers, PDAs, cell-phones).

### **21.3: Hardware Connection**

The 10/100BaseT Network cards installed in an EIG meter give it the ability to connect to a network through an Ethernet LAN or the Internet via Modbus TCP, HTTP, SMTP, FTP and/or DHCP. The 10/100BaseT Network cards can auto detect the cable type, and work with either straight or crossover cable. Refer to your meter's Installation and Operation manual for connection details.

### **21.4: Initial Configuration**

Connect to the meter through a Network connection, as shown in Chapter 3. The Factory set IP address for the Network cards except that of the second Nexus® 1500 meter Network card, is 10.0.0.1; the Factory set IP address for the Nexus® 1500 meter's second Network card is 10.0.1.1. If the IP address has been changed and you

do not know the new address, connect to the meter's serial port and program the Network card parameters in the Communications settings of the Device Profile. See chapters 13 (1252), 12(1262/1272), 8 (Shark® 200), 11 (1500/1500+), 26 (Shark® 270 meter), 27 (1450 meter), and 28 (Shark® 250 meter) for details.

## 21.5: Basic Configuration Details

Setting up the 10/100BaseT Option consists of configuring the Web connection and the Advanced Network Card screens so that you can access the data you need from the Web. Once the initial configuration is set, you will not need software, unless you want to make changes to the configuration. With the basic setup, you will be able to access the TWS default screens, which display a variety of Real Time Readings. You also have the option of customizing your screens (see [21.7: Customizing Screens, on page 21-29](#)). In order for the Web to access the data from a meter, the meter must have an IP address that uniquely identifies a computer that uses the Internet. An IP address can be assigned by using a DHCP Server or it can be entered manually.

**NOTE:** For manual IP address setting, see the Communications Setting instructions for your manual.

### 21.5.1: DHCP

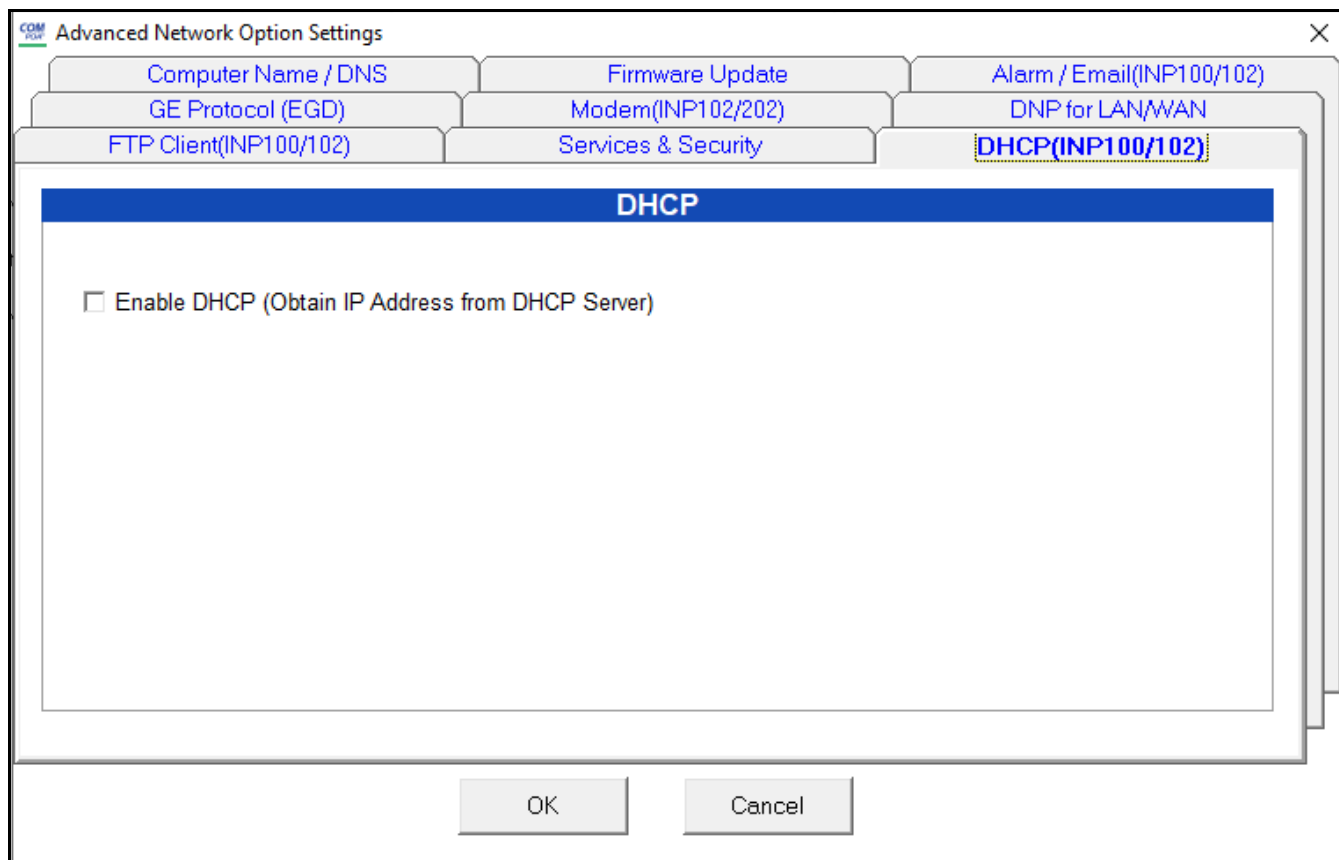
**(Not available in all meters - see 21.13: Comparison of Network Cards, on page 21-63)**

DHCP (Dynamic Host Configuration Protocol) was created by IETF (Internet Engineering Task Force) to enable individual computers on an IP network to extract their configurations from a server (the "DHCP Server") or servers, that have no exact information about the individual computers until they request the information. The DHCP Server "leases" the IP address to the DHCP Client for a period of time defined by the DHCP server. More information can be found in the Internet RFCs (Request for Comments) regarding available servers and technical details.

**NOTE:** In DHCP Mode, if a NACK message is received from the DHCP server, the Network card stops all Ethernet activities immediately and starts a new DHCP process.

1. From the CommunicatorPQA® application's Main screen:
  - a. Click the Device Profile icon.
  - b. Click General Settings>Communications.
  - c. Click on one of the Ports to open the Communications Settings screen.

- d. Click Advanced Settings.
- e. Click DHCP tab if you are connected to a Nexus® 1252/1262/1272 meter. You will see the screen shown below.



- f. Click Enable DHCP.
2. Access a working DHCP Server. DHCP Servers automatically assign an IP address and Subnet Mask. Some DHCP Servers, allow you to assign a Default Gateway IP (DHCP Option #3), DNS IP (DHCP Option #6) and SMTP Server IP (DHCP Option #69) to the meter. If your DHCP Server does not let you assign parameters other than the IP address, enter those values manually. See Click OK to save the settings., on page 21-7 for instructions.
3. Click OK to close this screen.

**NOTES:**

- For the 1450 meter, DHCP is set in the Communications screen - see [27.1.5: Communications, on page 27-16](#).
- For the 270 meter, DHCP is set in the Gen 2 INP100S card's IP address and DNS screen - see [26.5.1: Configuring a Network Card \(INP100S\), on page 26-90](#).

- See [20.1.22: Network Status, on page 20-59](#) for instructions on finding the IP address assigned by the DHCP server and additional related information.

### 21.5.2: Gateway Settings

Follow these steps to configure the Ethernet Gateway. Port 2 is the Gateway port for the Nexus® 1252/1500/1500+ meters; Port 3 is the Gateway port for the Nexus® 1262/1272 meters. If your meter has the INP102/202 Combo card, the Gateway and Modem share the Gateway port.

1. From the CommunicatorPQA® application's Main screen:
  - a. Click the Device Profile icon.
  - b. Click General Settings>Communications. You will see the Communications Settings screen. See the following screens.

**Device Profile: Communications Settings**

**Port 1**

Address: 65

Baud Rate: 57600

Data Bits: 8

Parity: None

Stop Bits: 1

Tx Delay: 0ms

Protocol: Modbus RTU

**Port 4(Ext Devices)**

Address: 205

Baud Rate: 38400

Data Bits: 8

Parity: None

Stop Bits: 1

Tx Delay: 0ms

Protocol: Modbus ASCII

Mode: Slave

**Network Settings (If Network Option was purchased)**

IP Address: 172 20 167 79

Subnet Mask: 255 255 248 0

Default Gateway: 172 20 161 23

Advanced Settings

**Ethernet Gateway (INP10X)**

Baud Rate: 57600

Delay: 5 x 15 ms

OK Cancel Help

For the 12x2 meter, enter the Gateway Baud Rate and Transmission Delay here.

**NOTE:** The time you enter in the Delay field is multiplied by 15 ms. Note that you only need to enter a Delay time if the device you are connecting to needs additional response time, i.e., is a slower device, like a radio modem.

Device Profile: Communications Settings

Serial Port 1	Serial Port 2	Serial Port 3	Serial Port 4
Address: 1	Address: 1	Address: 1	Address: 1
Baud Rate: 9600	Baud Rate: 9600	Baud Rate: 9600	Baud Rate: 9600
Data Bits: 8	Data Bits: 8	Data Bits: 8	Data Bits: 8
Parity: None	Parity: None	Parity: None	Parity: None
Stop Bits: 1	Stop Bits: 1	Stop Bits: 1	Stop Bits: 1
Tx Delay: 20ms	Tx Delay: 20ms	Tx Delay: 20ms	Tx Delay: 20ms
Protocol: Modbus RTU	Protocol: Modbus RTU	Protocol: Modbus RTU	Protocol: Modbus RTU
		Mode: Slave	Mode: Ethernet Gateway

**Port 5 RJ45 (MAC Address 00:01:58:00:25:6c)**

IP Address	172	20	167	52
Subnet Mask	255	255	248	0
Default Gateway	172	20	161	23

Warning: Misconfiguration of these settings could cause issues communicating with the meter.

**Port 6 Fiber (MAC Address 00:01:58:00:25:6d)**

IP Address	10	0	1	1
Subnet Mask	255	255	255	0
Default Gateway	10	0	1	0

Warning: Misconfiguration of these settings could cause issues communicating with the meter.

Advanced Settings

OK Cancel Help

For the 1500+ meter, select Ethernet Gateway as the Mode for Port 4. You must also enable TCP/IP for at least one of ports 5 and 6 - see Section 21.6.1 for instructions.

2. Click OK to save the settings.

## 21.6: Advanced Features

**NOTE:** Not all of these features are available for all meters. See [21.13: Comparison of Network Cards, on page 21-63](#). The settings for the Nexus® 1500+ meter are different as it has additional capabilities. Refer to [21.17: Nexus® 1450/1500+ Meter's Advanced Features Setting, on page 21-74](#) for instructions on setting the Nexus® 1500+ meter's additional Advanced Settings. The Nexus® 1450 meter has slightly different screens, which are explained in the appropriate sections. Many of the Shark® meters' Network card settings are made through either the Device Profile (explained in their chapter of this manual) or Web server (explained in the meter's User Manual).



1. From the Main screen:

- a. Click the Device Profile icon.
- b. Click General Settings>Communications.
- c. Click the Advanced Settings button. You will see the Advanced Network Settings Options screen. The following sections provide information about each of the settings, available by clicking the tabs at the top of the screen.

### 21.6.1: Services & Security

1. Click the Services/Services & Security tab.

The screenshot shows the 'Advanced Network Option Settings' dialog box with the 'Services' tab selected. The dialog has a title bar with a close button (X). Below the title bar are several tabs: 'DNP LAN/WAN Card 2', 'IEC 61850 GOOSE', 'SNMP', 'IEEE 1588 PTP', 'Synchrophasor (PMU)', 'Computer Name / DNS', 'SNTP', 'Alarm / Email', 'GE Protocol (EGD)', 'Services' (selected), and 'DNP LAN/WAN Card 1'. The 'Services' tab contains a table with the following sections:

Services		TCP Ports	
	Enable	Card 1	Card 2
Web Server	Both Card 1 & 2	80	80
Modbus TCP Server	Both Card 1 & 2	502	502
FTP Server	Both Card 1 & 2	Control Port: 21	21
		Data Port: 20	20
		TCP / UDP Port	
GE EGD	Disabled	18246	
DNP LAN/WAN	Disabled	To configure the DNP ports, please go to the DNP for LAN/WAN tab.	
Modbus TCP Client (Master)	Disabled	To configure the TCP port, please see the XML Web Service.	
SMTP Client (email)	Disabled	25 Outgoing Mail Port.	
Network Time Sync	Disabled		
IEC 61850	Enabled	To configure additional settings, go to Appendix C of the meter's manual.	
IEC 61850 GOOSE	Enabled		
SNMP	Disabled		
IEEE 1588 PTP Master	Disabled	To configure additional settings, go to the IEEE 1588 PTP tab.	
Synchrophasor (PMU)	Card 1 Only		

At the bottom of the dialog are three buttons: 'OK', 'Cancel', and 'Help'.

**NOTE:** The Nexus® 1500+ meter Services tab is shown above. Not all options are available for other meters.

2. Check the boxes in front of the listed Services to Enable the features you want.

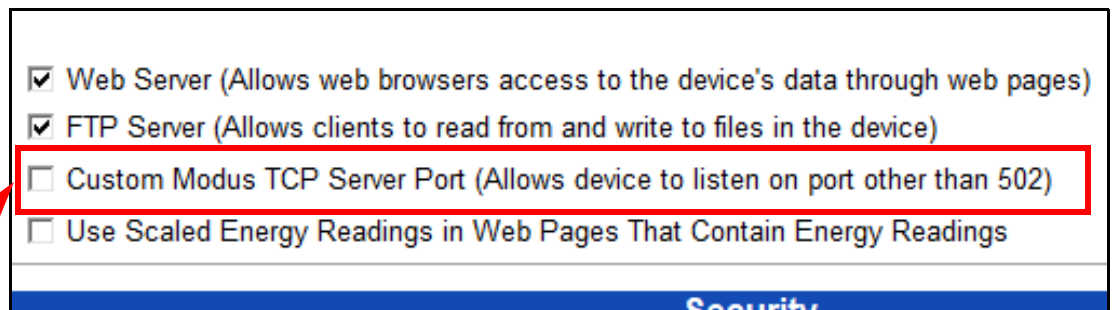
- You can disable or enable Web server and Modbus TCP Server for IP Port 5 only, IP Port 6, only or both ports, for IPv4 (IP version 4) and IPv6 (IP version 6). You can designate a Com port for IPv4 ports 80 and 502 are the default); the same Com port will be assigned to IPv6.

- GE EGD protocol setting: can be disabled, set to Auto (either port can accept), set for Port 5 Only, or set for Port 6 Only. See [21.6.3: GE Protocol \(EGD\)](#), on [page 21-14](#), for additional settings; and [21.14: GE EGD Details](#), on [page 21-65](#), for details on the protocol.
- DNP LAN/WAN: can be disabled or enabled for Port 5, Port 6, or both, for IPv4 (IP version 4) and IPv6 (IP version 6). See [21.6.7: DNP for LAN/WAN](#), on [page 21-24](#).
- SMTP Client (email) can be disabled or enabled for Port 5, Port 6, or Auto (whichever port is available). You can select the Outgoing Mail port from the pull-down menu and there is a field that displays the email encryption status. See [21.6.4: WebAlarm™/Email](#), on [page 21-15](#), for more email instructions.
- Network Time Sync: meter time synchronization through an NTP server can be disabled, set to Auto (either port can accept), set for Port 5 Only, or set for Port 6 Only. For the 1450 meter, see [27.1.3: Time Settings](#), on [page 27-7](#), for instructions on SNTP configuration.
- IEC 61850: select Enabled to enable the IEC 61850 server for one of the Network cards; select Disabled to disable the IEC 61850 server entirely.
- IEC 61850 GOOSE: select Enabled to enable IEC 61850 GOOSE messaging for the Network card that is the IEC 61850 protocol server; select Disabled to disable the IEC 61850 GOOSE messaging feature.  
**NOTE:** If you enable IEC 61850 GOOSE, you also need to make settings for it. See [21.17.2: IEC 61850 GOOSE Tab \(Nexus® 1450 and 1500+ Meters\)](#), on [page 21-80](#), for instructions.
- IEEE 1588 PTP: this option is for the Nexus® 1500+ meter. See [21.17.4: IEEE 1588 PTPv2 Master](#), on [page 21-83](#).
- Synchrophasor (PMU): this feature and its programming are explained in detail in the Nexus® 1500+ meter's User Manual's Appendix E and Appendix F. Download the manual at <https://www.electroind.com/products/nexus-1500-power-quality-meter-with-phasor-measurement-unit/>.

- TCP/UDP Port: enter the TCP port to use. You need to use the DNP LAN/WAN Port 5 and/or 6 tabs to set up the DNP ports. See [21.6.7: DNP for LAN/WAN, on page 21-24](#), for instructions.

**NOTES:**

- The Nexus® 1450/1500/1500+ meter does not use Sleep modem but other meters do offer it.
- Use Scaled Energy readings setting is only available for the Nexus® 1252/1262/1272 meters. See Section [21.6.1.1: Use Scaled Energy Readings in Webpages That Contain, on page 21-12](#).
- Block Password is only available for the Nexus® 1252/1262/1272 meters.
- Network card security for some meters is a different than meter security. See Chapter 6 for details on meter security.
- The Nexus® 1252/1262/1272 meters give you an option to use a different port for Modbus TCP/IP communication.



☒ Web Server (Allows web browsers access to the device's data through web pages)

☒ FTP Server (Allows clients to read from and write to files in the device)

☐ Custom Modbus TCP Server Port (Allows device to listen on port other than 502)

☐ Use Scaled Energy Readings in Web Pages That Contain Energy Readings

Security

Check the box if you want to use a port other than the default port 502. Then see [21.6.2: Computer Name/DNS, on page 21-13](#) to enter the new port number.

3. Click OK to save your settings or continue to the next section.

### 21.6.1.1: Use Scaled Energy Readings in Webpages That Contain Energy Readings

Only Nexus® 1252/1262/1272 meters support scaled energy readings. For these meters, you have the option to specify which energy readings (old-fashioned energy or scaled energy) you want to display in default webpages.

You enable the scaled energy display by selecting that option in Services & Security (see [21.6.1: Services & Security, on page 21-9](#)) and you also set up the poll\_data.xml file to specify scaled energy readings display.

The following Attributes in the poll\_data.xml file are used for the scaled energy display option:

- **SYS\_Scaled\_Energy\_Available**  
An indicator is provided in the XML file that tells if the meter supports scaled energy readings: Yes=scaled energy readings are supported; No=scaled energy readings are not supported.
- **SYS\_Use\_Scaled\_Energy**  
This option is set based on the selection in the device profile and is used by the default webpages to determine which energy readings are displayed in the default webpages: Yes=use scaled energy; No=use regular energy.

An example of scaled energy settings in the poll\_data.xml follows:

```
<EIG_DATA>
<EIG_SYSTEM>
<sys_info SYS_Use_Scaled_Energy="Yes"
      SYS_Scaled_Energy_Available="Yes"/>
</EIG_SYSTEM>
</EIG_DATA>
```

## 21.6.2: Computer Name/DNS

1. Click the Computer Name/DNS tab.

Advanced Network Option Settings

GE Protocol (EGD) Modem(INP102/202) DNP for LAN/WAN  
 FTP Client(INP100/102) Services & Security DHCP(INP100/102)  
**Computer Name / DNS** Firmware Update Alarm / Email(INP100/102)

**Computer Name**

**Domain Name Server (DNS)**

Server 1 IP Address   
 Server 2 IP Address

**Modbus TCP Server**

TCP Port Number (1 to 65535)

OK Cancel

2. Enter the Computer Name (optional). This allows you to access the meter by name, if there is a DNS Server working in conjunction with the DHCP Server. See your network administrator and the servers' User manuals for further details. The Default Computer Name is EIGNET\_XXXXXX where the X's are the last 3 octets of the MAC address.

3. Enter the IP addresses for Domain Name Servers 1 and 2.

4. Enter the port number for the Modbus TCP server. Note that this setting is not shown in the Nexus® 1450 or 1500+ meter's screen, since the TCP server settings are on different screens.

**NOTE:** If you are entering a different port number here, you must also select the checkbox in the Services & Security screen, to enable the port change. See [21.6.1: Services & Security](#), on page 21-9

5. Click OK to save your settings or continue to the next section.

### 21.6.3: GE Protocol (EGD)

(See [21.14: GE EGD Details, on page 21-65](#), for Detailed Information.)

1. Click the Services & Security tab. Click the checkbox next to GE EGD Data Port Server.
2. Click the GE Protocol (EGD)tab.

The screenshot shows the 'Advanced Network Option Settings' dialog box with the 'GE Protocol (EGD)' tab selected. The dialog has several tabs at the top: 'FTP Client(INP100/102)', 'Services & Security', 'DHCP(INP100/102)', 'Computer Name / DNS', 'Firmware Update', 'Alarm / Email(INP100/102)', 'GE Protocol (EGD)', 'Modem(INP102/202)', and 'DNP for LAN/WAN'. The 'GE Protocol (EGD)' tab is active, displaying the following settings:

- IP Address for Multicast or Unicast:** 0.0.0.0
- Connection Type:** Broadcast (dropdown menu)
- Update Interval:** 0.05 Seconds
- Producer Identifier:**
  - ☐ Use Assigned Static IP Address
  - ☒ Use Custom Number: 0
- Data Producer Port Number:** 18246

At the bottom of the dialog are 'OK' and 'Cancel' buttons.

3. The settings you make in this screen support your use of GE's EGD Protocol:
  - Enter the IP address for Multicast or Unicast. The Nexus® 1450 and 1500+ meter screens have information about the Multicast address range. See the screen captures on the next page.
  - Select Connection type
  - Enter Update interval
  - Select the Product identifier
  - Enter the Data Producer Port Number (Note that not all meters have this setting.)

4. Click OK to save your settings or continue to the next section.

NOTE: The Multicast section of the screens for the 1450 meter (top) and 1500+ meter (bottom) are shown below. They give information on the Multicast IP addresses. Click Get Information on Multicast to see more information.

**Advanced Network Option Settings**

Services | DNP LAN/WAN Port 5 | DNP LAN/WAN Port 6 | GE Protocol (EGD)

Computer Name / DNS | SNTP | Alarm / Email

**GE Protocol (EGD)**

Remote IP Address: 224.0.0.1

Connection Type: Multicast

Update Interval: 0.02 Seconds

**Producer Identifier**

☒ Use Assigned Static IP Address  
☐ Use Custom Number

**Multicast**

Range	Description
224.0.0.0 - 224.0.0.255	Reserved for special "well-known" multicast addresses
224.0.1.0 - 238.255.255.255	Globally-scoped (Internet-wide) multicast addresses
239.0.0.0 - 239.255.255.255	Administratively-scoped (local) multicast addresses

Get Information on Multicast

OK Cancel Help

**Advanced Network Option Settings**

DNP LAN/WAN Card 2 | IEC 61850 GOOSE | SNMP | IEEE 1588 PTP | Synchrophasor (PMU) | Services | DNP LAN/WAN Card 1

Computer Name / DNS | SNTP | Alarm / Email | GE Protocol (EGD)

**GE Protocol (EGD)**

IP Address for Multicast or Unicast: 224.0.0.1

Connection Type: Multicast

Update Interval: 0.05 Seconds

**Producer Identifier**

☒ Use Assigned Static IP Address  
☐ Use Custom Number

**Multicast**

Range	Description
224.0.0.0 - 224.0.0.255	Reserved for special "well-known" multicast addresses
224.0.1.0 - 238.255.255.255	Globally-scoped (Internet-wide) multicast addresses
239.0.0.0 - 239.255.255.255	Administratively-scoped (local) multicast addresses

Get Information on Multicast

OK Cancel Help

## 21.6.4: WebAlarm™/Email

**(Not available in all meters - see 21.13: Comparison of Network Cards, on page 21-63)**

This feature enables email when an alarm condition occurs. Settings for one email are configured in the Alarm/Email tab of the Advanced Network Card settings. An additional 8 email addresses can be configured in the poll\_profile.xml file (Nexus® 12xx or Shark® meters) or pprofile.xml file in the directory \C\TWS\ (Nexus® 1450/1500/1500+ meter).

**NOTE:** For the Nexus® 1500 meter, when both Network cards are installed, email can be sent from either card. Generally, the email is sent out on the first network card that has a working path to the gateway IP. For the Nexus 1500+ meter you specify which card (or both):

Example 1:

Network card 1: IP=192.168.0.2, mask=255.255.255.0, gateway=192.168.0.1

Network card 2: IP=192.168.0.3, mask=255.255.255.0, gateway=192.168.0.1

Email will be sent out on Network card 1.

Example 2:

Network card 1: IP=192.168.0.5, mask=255.255.255.0, gateway=0.0.0.0

Network card 2: IP=192.168.0.3, mask=255.255.255.0, gateway=192.168.0.1

Email will be sent out on Network card 2.

1. Click the Services tab. Enable/Disable the sending of email by clicking Alarm Generated Email or enabling SMTP for either or both ports (see [21.6.1: Services & Security, on page 21-9](#)). The Initial Setting is Off or Disabled.



2. Click the Alarm/Email tab. You will see one of the screens shown below.

Advanced Network Option Settings

GE Protocol (EGD) Modem(INP102/202) DNP for LAN/WAN  
 FTP Client(INP100/102) Services & Security DHCP(INP100/102)  
 Computer Name / DNS Firmware Update **Alarm / Email(INP100/102)**

**Alarm / Email**

Email Server IP Address / Name

Email Server Port

Alarm Monitor Email Address (To)

Return / Reply Address (From)

Email Subject Text

☐ Email Server requires authentication

User name

Password

OK Cancel

Advanced Network Option Settings

Services DNP LAN/WAN Port 5 DNP LAN/WAN Port 6  
 Computer Name / DNS SNTP **Alarm / Email** GE Protocol (EGD)

**Alarm / Email**

Email Server IP Address / Name

Alarm Monitor Email Address (To)

Return / Reply Address (From)

Email Subject Text

Internet Protocol Version

☒ Email Server requires authentication

User name

Password

**Send email on**

☐ Limit Status Change  
☐ Digital Input Status Change  
☐ Waveform Capture  
☐ PQ (Sag/Surge) Event

☐ Periodic Snapshot Every  Minutes

OK Cancel Help

3. Enter the following settings for the top screen:

- Email Server IP or Name (Requires DNS Setup).
- Email Server Port Number: 25

- Administrator Email Address/To Address: for user preferred address or any monitoring software receive address such as for EIG's Dial-In Server (INP102/INP202).
- Return/Reply/From Address
- Subject Text: whatever you want to appear in the email subject line.

4. Enter the following settings for the bottom screen:

- Email Server IP Address/Name
- Alarm Monitor Email Address (To): email address Alarm email should be sent to.
- Return/Reply Address (From): email address sending the email and receiving any replies.
- Email Subject Text: whatever you want to appear in the email subject line.
- Email Server requires authentication: if the server is password protected, check this box and enter the username and password.
- Send email on: click the conditions for which you want to send an alarm email. The available conditions are: Limit Status Change, Digital Input Status Change, Waveform Capture, PQ (Sag/Surge) Event, Relay Output Change, Meter Power On, Log Reset, Secure Mode Change, Energy Accumulators Reset, Max/Min and Peak Demand Reset, Pulse Accumulators/Aggregators Reset, Clock Changed, Programmable Settings Changed, V-Switch Changed, Firmware Changed, TOU Settings Changed, Login Failure.
- Periodic Snapshot: to send an email on a regular interval, which can be used to indicate that the meter is online, check the box and enter the interval in minutes, e.g., if you enter 15, an email with the meter readings will be sent every 15 minutes.

Note that for this screen, the SMTP server port is set in the Services tab - see [21.6.1: Services & Security, on page 21-9](#).

5. Click OK to save your settings or continue to the next section.

### 21.6.5: FTP Client

(Not available in all meters - see 21.13: Comparison of Network Cards, on page 21-63)

This feature allows you to substitute your own polling profile, webpages or graphics for the Web server. You must also set up an FTP Server with a user account and read-only access. See sections 21.8: FTP Server, on page 21-55 and 21.13: Comparison of Network Cards, on page 21-63, for details.

1. Click the Services tab. To enable FTP, click the checkbox next to FTP Client.

2. Click the FTP Client tab. You will see the screen shown below.

3. Enter the following settings:

- FTP Client Settings:
  - FTP Server IP or Name (requires DNS setup)
  - FTP Server Port: Initial Setting is xx.

- Startup Directory: where the TWS files are located. The Network card will get the files from this location. When a file in the Startup Directory has the same name as the one in the initial files within the meter, the new file will replace the initial file. If you have set up this directory through your FTP server, leave this field blank.
- User Name
- Password

#### FTP Client Settings Example:

By default, Microsoft®'s FTP Server will use "C:\Inetpub\ftproot\" as the root directory. When you log onto the FTP Server, this is the initial directory you will see.

1. If the files for INP100/INP200/INP102/INP202 are stored in the root directory ("C:\Inetpub\ftproot\"), leave the "Startup Remote Directory" text box empty.

Example Files in FTP Server's Root Directory:

- "C:\Inetpub\ftproot\index.htm"
- "C:\Inetpub\ftproot\poll\_profile.xml"
- "C:\Inetpub\ftproot\logo.gif"

When INP100/INP200/INP102/INP202 starts up, it will check to see what files are in the server's directory and will download all of them.

2. If the files for INP100/INP200/INP102/INP202 are stored in a subdirectory in the root directory, such as "C:\Inetpub\ftproot\nexus\_meters\feeder\_12345\", put "nexus\_meters/feeder\_12345" in the "Startup Remote Directory" text box. Note the different "/" between directory names. When INP100/INP200/INP102/INP202 starts up, it will check for all files in the server's directory ("nexus\_meters/feeder\_12345") and download all files found there. If there is another subdirectory inside this directory that is not listed in the server's directory as above, such as "C:\Inetpub\ftp-root\nexus\_meters\feeder\_12345\info\", INP100/INP200/INP102/INP202 will not locate that subdirectory and no files will be downloaded from that subdirectory to INP100/INP200/INP102/INP202. This may cause an error during the file downloading process and the system may not enter its normal operating mode until the subdirectory is removed from the server.

3. The user should always check the FTP server to ensure it is configured properly. To do this, open the IE browser window and enter the correct address in the URL window. The standard format is: "ftp://[username]:[password]@[ip\_address]".

Example:

"ftp://john:1a2b3c@192.168.1.1" where John is the user name and 1a2b3c is the password.

4. Click OK to save your settings or continue to the next section.

### **21.6.6: INP102/INP202 Ethernet/Modem Combination**

INP102/INP202 is an extension of INP100/INP200. It has all the features of an INP100/INP200, plus a built-in modem. The communication protocol supported by the modem is Modbus ASCII; the communication protocol supported by the RS485 Ethernet/Modem gateway port is Modbus RTU. The INP102/INP202 converts all Modbus ASCII incoming modem requests to Modbus RTU for internal and gateway communication, then it converts all response Modbus RTU messages into Modbus ASCII protocol and sends them out to the modem. Some of the fixed parameters for the Ethernet/Modem gateway port are 8 data bits, no parity, 1 stop bit. The Ethernet/Modem gateway port's baud rate and delay time are configurable.

The modem has three operational modes:

1. Modem Command Mode: Invisible to users. Modem is idle, waiting for an incoming call.
2. User Command Mode: Visible to users. If modem password protection is enabled, you can enter the password in this mode so the modem can grant the user access. In addition, you can query the modem for its boot and runtime firmware version, and modem identification information.
3. Pass-through Mode: Normal Operation mode. Modbus requests and responses are passed through the modem.

<b>INP102/202 Settings</b>	
<b>Setting</b>	<b>Description</b>
Inactivity Timeout Limits (minutes)	In Pass-through mode, if the user does not send anything to the modem, the modem will disconnect when this Limit has been reached.
Rings to Answer (number of rings)	Modem will answer the call after the programmed number if rings.
Identification	User-defined modem ID, up to 32 characters.
Password	User-defined modem password, up to 16 characters.
Enable Password	Option to enable or disable the modem password feature.
Violation Limit (number of attempts)	If password is enabled and the user fails to enter a correct password in three attempts, a Violation (Call Failure) Flag is set and the Violation Counter increments by 1. Once the total number of violations goes over this limit, the modem will enter Lockout mode. The Modem will not answer calls until the Violation Lockout Time is reached.
Violation Lockout Time (hours)	The modem stays in Lockout mode until this Lockout Time is reached.
Call Failure Reset Limit (hours)	If the password is enabled and the Total Violations (Call Failures) has not reached the Violation Limit (not in Lockout mode), the modem resets the Violation (Call Failure) Counter when it reaches the programmed limit.
Share the Phone Line	Option to enable or disable the modem's Share the Phone Line feature.

Example:

call failure reset limit = 1 hour

violation lockout time = 24 hours

incoming connection failure count = 3

The first connection with a bad password occurred at 10AM. Another occurs at 10:05, a third at 10:30, a 4th at 10:45, all with a bad password. That's more than 3 in 1 hour, so the modem will not answer the phone again until 10:45AM the next day. If the 4th connection had come in at 11:31 instead of 10:45, the modem would answer the call because the first 3 failed requests "expired" at 11:30.

<b>INP 102/202 Modem Commands</b>	
<b>Command</b>	<b>Description</b>
[3 seconds pause] :CM [3 seconds pause]	Set the modem into User Command mode
ONLINE<CR>	Set the Modem to Pass-through mode
E<CR>	Command or querying modem's characteristic information. Modem returns "INP-102 Ethernet/Modem<CR>"
MODEM?<CR>	Command for querying modem's ID
PASSWORD?<CR>	If the modem password is enabled, the modem sends this to the user asking for a password once the connection is established. The user must enter the correct password before sending any other user data. The user has 20 seconds to reply with a password. If there is no response from the user, the modem resends this command. If the password was incorrect, the modem resends this command. The user has a total of 3 attempts to enter the correct password before the modem automatically disconnects.
FBOOT?<CR>	Command for querying the modem's boot firmware version
FRUN?<CR>	Command for querying the modem's runtime firmware version.

Additional information about modem operation:

1. When the shared phone line option is set, the modem should drop the connection in about 5 seconds, assuming someone picked up the receiver and didn't hang up. If the receiver was hung up quickly, then the connection would not drop.
2. When the shared phone line option is not set, the modem should not drop the connection and communication should resume after about 10 seconds when the

receiver was picked up and then hung up. The modem could still drop the connection, if the noise level is too high, such as from repeated pick up and hang up, or whistling at the receiver. The performance in this situation is not guaranteed. There will not be any valid communication if the receiver is picked up and not hung up again.

3. There is no dial-out support; you cannot flash upgrade the Ethernet/modem's firmware from the modem connection.
4. Modem and Ethernet connections will close if a change is detected in the device profile or if there is a forced reset from the Web interface.
5. If the firmware does not detect the modem hardware, the modem task will be stopped.
6. A modem status/diagnostic webpage can be found at [diag\\_modem.htm](#).

#### **21.6.7: DNP for LAN/WAN**

The original DNP3 was designed for serial point-to-point communication (e.g. RS232) with limited support for half duplex serial networks (e.g. RS485). In order for devices to exchange DNP messages in a local (LAN) and/or wide area network (WAN), one must either augment the protocol to support a network environment or use an existing network transport mechanism. DNP3 LAN/WAN was specifically defined for transporting DNP traffic on the Internet Protocol Suite.

EIG's DNP3 LAN/WAN implementation was based on the specifications described in DNP3 Specification, Volume 7, Networking, according to the Version 2.0 Draft E of March 12, 2004. The official DNP3 specifications can be found at [www.dnp.org](http://www.dnp.org).



<b>DNP Parameters (Settings in BOLD are default for Standard Mode)</b>		
<b>Name</b>	<b>Settings</b>	<b>Notes</b>
DNP over TCP	Enabled Disabled	If set to Enabled, network Card will receive DNP over TCP requests.
DNP over TCP listen on port	20000 (User Defined)	TCP listening port
DNP over UDP	Enabled Disabled	If set to Enabled, Network Card will receive DNP over UDP requests.
DNP over UDP listen on port	20000 (User Defined)	UDP listening port
UDP respond to	Client Port (User Defined)	If set to Client Port, UDP response will be sent to the UDP Request Port. Otherwise, UDP Response will be sent to a User Defined Port Number. Default is fixed at 20000.
UDP addressing	Unicast Broadcast Unicast & Broadcast	If set to Unicast & Broadcast, all UDP requests are accepted. If set to Unicast, Network Card will check to see if the UDP Destination address matches the meter's IP address. If set to Broadcast, Network Card will check to see if the UDP Destination address is 255.255.255.255. If no match, the UDP connection is refused.
Validate source IPs	Validation Disabled 1 IP Address 2 to 4 IP Addresses	If set to Disabled, Network Card will not perform Validation on any incoming IP Addresses. If set to 1 to 4, Network Card will perform Validations on every IP address defined by user.
Validate source ports	No Yes	If set to No, Network Card will not perform Validations on incoming TCP and UDP Ports for a given IP address.
IP addresses	(User Defined)	Up to 4 IP addresses to Validate.
Subnet mask	(User Defined)	Masking bits applied to IP address. When defined properly, user can specify Validation on a single IP address, or a range of IP addresses.
TCP ports, start and end	(User Defined)	TCP Port Range to be validated.
UDP ports, start and end	(User Defined)	UDP Port Range to be validated.

EIG's DNP3 LAN/WAN feature is available for Nexus® meters with INP100/INP102/INP200/INP202 Network Cards and for the Nexus® 1450 meter. To use this feature,

you must configure the Nexus® meter's DNP Custom Classes Map in the meter's Device Profile.

See chapters 13 (1250/1252), 12 (1262/1272), 11 (1500/1500+), and 27 (1450) of this manual for configuration screens and details.

1. Click the DNP for LAN/WAN tab. You will see the screen shown below. Note that the 1450 meter has two DNP LAN/WAN tabs - one for Port 5 and one for Port 6.

- Mode of operations (at top of screen):
  - Disabled: Feature is disabled, no DNP3 LAN/WAN communication will be accepted.
  - Standard: Feature is enabled. Most communication parameters are fixed, except the port number to which the UDP packets respond. Security features are not available.
  - Manual: Feature is enabled. All communication parameters are configurable. Security features are available.

- For Nexus® 12XX meters, a single DNP Over TCP connection and a single DNP Over UDP connection is available when enabled; the 1500/1500+ has two DNP over TCP connections and one DNP over UDP connection, and the 1450 has up to two DNP over TCP and 2 DNP over UDP connections, when both ports 5 and 6 are used for DNP. While DNP Over TCP connections may be closed at the decision of the Network Card, the master Nexus® meter may also determine that the current DNP Over TCP connection should be closed.
- Since INP100/INP102/INP200/INP202 have several built-in servers, the DNP LAN/WAN TCP and UDP Listen on Ports defined by the user cannot be any of the ports shown below

Name	Port #
Echo	7
FTP Server Data	20
FTP Server Control	21
Web Server	80
Modbus TCP Server	502

- DNP Device Address is configurable.  
Example of setting up validation for IP addresses:
  1. Set Validate Source IPs to 1 IP address.
  2. Set Validate Source ports to Yes.
  3. Enter IP address, such as 10.0.0.101.
  4. Enter Subnet mask, such as 255.255.255.128.
  5. Enter TCP ports range, such as 20000-20000.
  6. Enter UDP ports range, such as 20000-20000.

As the result, a valid DNP3 LAN/WAN request must come from a device with IP address of 10.0.0.1 to 10.0.0.127, with TCP and UDP ports set at 20000.

If a DNP Over TCP connection was established and Validation was also enabled, any new incoming DNP Over UDP connection must have the same IP address as

the TCP connection. If they are different, the UDP connection is closed.

All incoming communication for DNP LAN/WAN goes to the Master meter; no DNP communication goes to the INP100/INP102/INP200/INP202's gateway port.

2. Click OK to save your settings.

## 21.7: Customizing Screens

The following sections explain how to customize the TWS screens for your application's specific needs. Note that the 1450 meter does not support this feature.

### 21.7.1: Configuring WebExplorer™

All polled data for the Nexus® 12xx and the Shark® 200 meters is stored in an XML file, poll\_data.xml. All polled data for the Nexus® 1500/1500+ meter is stored in an XML file called pdata.xml. Each polled item is located in its DEVICE\_x section as it is programmed in the poll\_profile.xml file. The standard data format for each device is:

```
<DEV_NAME> <DEV_TYPE>
```

up to 64 <items>, each with its D\_UID, D\_LABEL and D\_VALUE.

This XML file can be viewed directly in your browser (click View>Source). To display it on a customized webpage, you must set up your browser to run Java Script. (Configuring XML is detailed in Section 21.7.2.)

#### NOTES:

- Auto Refresh Rate is set in the Set Timeout ()Function. See the Java Script example for Internet Explorer, below.
- Java Script code or implementation methods may vary for other types of web browsers. The webpage files currently support 4 type of browsers: IE, FireFox, Safari, and Chrome. You can view the code in each file once it is downloaded from the meter to your PC.

#### Example of the data file:

```
<?xml version="1.0" encoding="UTF-8"?>
```

```
<!--Electro Industries/GaugeTech embedded network server polled data-->
```

```
<EIG_DATA>
```

```
<EIG_SYSTEM>
```

```
</EIG_SYSTEM>
```

```
<DEVICE_1>
```

```
<DEV_NAME>Nexus Demo 1</DEV_NAME>
```

```
<DEV_TYPE>Nexus 1250</DEV_TYPE>

<item D_UID="1_1" D_LABEL="Inst Van" D_VALUE="+122.46"></item>

</DEVICE_1>

<DEVICE_2>

<DEV_NAME>N/A</DEV_NAME>

<DEV_TYPE></DEV_TYPE>

<item D_UID="2_1" D_LABEL="Inst Watt" D_VALUE="+0.08 k"></item>

</DEVICE_2>

</EIG_DATA>
```

Displaying a value in an HTM file: (Use Java Script in the Web browser.)

1. Define a unique name for a value to be displayed, such as data\_name. Insert `<span id="data_name"></span>` in the HTM file where it will be displayed.
2. Create a Java Script code inside the HTM file (Auto Screen Refresh is set at 5000ms in the Set Timeout ()Function); see Example below:

Example:

```
<Script language=Javascript>

<!--var disp_value;

var timerID;

var tmp_name;

var xmlDoc=new ActiveXObject("MSXML.DomDocument");

xmlDoc.async=true;

xmlDoc.onreadystatechange=do_get_data;

function do_get_xml()

{
```

```
xmlDoc.load("poll_data.xml");

{

function do_get_data()

{

if (xmlDoc.readyState == 4)

{

if (xmlDoc.documentElement == null)

{

timerID = setTimeout("do_get_xml();",5000);

}

else

{

disp_value =

xmlDoc.documentElement.selectSingleNode

("//item[@D_UID='1_1']").

getAttribute("D_VALUE");

data_name.innerHTML = disp_value;

timerID = setTimeout("do_get_xml();",5000);

}

}

}

//--></SCRIPT>
```

**NOTE:** Inside the <body> of the HTML file, add the following:

Load="do\_get\_xml()"

### Server Side Include Functions

These functions will send data directly to the browser as part of a requested document.

### Example of using Server Side Include Functions:

1. In HTM file, add the following to the first line of that file

```
<!-- ** THIS FILE DOES CONTAIN REALTIME DATA ** -->
```

Without that line, any server side include functions will not be processed by the Web server.

2. Inside the HTM file where you want the info displayed, add

```
<!--#exec cgi="/[server_side_include_function_name]"-->
```

where [server\_side\_function\_name] can be one of the function names.



3. To display stored email #1's date/time, add the following to your HTML file at the location where you want the data displayed:

```
<!--#exec cgi="/ssi_show_email_date_time 1"-->
```

GENERAL FUNCTIONS		
Server Side Include Function Name	Parameter	Description
get_ip.fn		Show Local IP address

DIAGNOSTIC FUNCTIONS		
Server Side Include Function Name	Parameter	Description
ssi_diag_cpu		Show CPU info
ssi_diag_ethernet_hardware		Show ethernet hardware info
ssi_diag_firmware		Show firmware info
ssi_diag_ftp_server		Show FTP server info
ssi_diag_imported_files		Show FTP Client/Imported files status
ssi_diag_memory		Show memory info
ssi_diag_modbus_com		Show all Modbus communication info
ssi_diag_modbus_tcp_server		Show Modbus TCP server info
ssi_diag_modem		Show internal modem (INP102) status
ssi_diag_system		Show system info, such as start time
ssi_diag_web_server		Show Web server info
stats.fn		Show ethernet communication status

STORED EMAIL FUNCTIONS		
Server Side Include Function Name	Parameter	Description
ssi_show_email_date_time	1 to 10	Show stored email's date/time
ssi_show_email_subject	1 to 10	Show stored email's subject text
ssi_show_email_from	1 to 10	Show stored email's from text
ssi_show_email_to	1 to 10	Show stored email's to text
ssi_show_email_cc	1 to 10	Show stored email's cc text
ssi_show_email_device_name	1 to 10	Show stored email's device name text
ssi_show_email_contact_person	1 to 10	Show stored email's contact person name
ssi_show_email_contact_phone	1 to 10	Show stored email's contact person's phone number
ssi_show_email_alarm_ids	1 to 10	Show stored email's alarm IDs
ssi_show_email_alarm_names	1 to 10	Show stored email's alarm names
ssi_show_email_alarm_details	1 to 10	Show stored email's alarm details
ssi_show_email_send_status	1 to 10	Show stored email's send status

**NOTE: "1" =oldest; "10" = newest.**

<b>SPECIAL FUNCTIONS FOR MODBUS DEVICE 1</b>		
<b>Server Side Include Function Name</b>	<b>Parameter</b>	<b>Description</b>
ssi_show_pt		Show PT ratio
ssi_show_ct		Show CT ratio
ssi_show_system		Show hookup info
ssi_show_dev_type		Show device type/model
ssi_show_dev_name		Show device name
ssi_show_boot		Show boot firmware version
ssi_show_run_time		Show runtime firmware version
ssi_show_dsp_boot		Show DSP boot firmware version
ssi_show_dsp_runtime		Show DSP runtime firmware version
ssi_show_sn		Show device serial number
ssi_show_com_state		Show COM firmware runtime state
ssi_show_dsp_state		Show DSP firmware runtime state
ssi_show_pw_state		Show password protection state
ssi_show_mac		Show Ethernet MAC address
ssi_show_ip		Show IP address
ssi_show_mask		Show subnet mask
ssi_show_gateway		Show default gateway IP address
ssi_show_dnp_lan_wan		Show DNP LAN/WAN status

### 21.7.2: Configuring WebXML™

The term XML stands for Extensible Markup Language. XML is a markup language similar to HTML which is used to describe data. HTML displays the data. XML does not replace HTML; it complements HTML. An XML document is information wrapped in XML tags. A piece of software has to be written to send, receive or display the document.

**IMPORTANT!** You must follow the “Rules” of XML, listed below:

1. The first line of the document, the XML declaration, defines the XML version and the characters used in the document.
2. All XML elements must have a closing tag.
3. XML tags are case sensitive.
4. All XML elements must be properly nested.
5. All XML documents must have a root tag (first tag in an XML document).
6. Attribute values must always be quoted.
7. Comment syntax is similar to HTML. <!-- This is a comment -->

#### Example of Root Tag and Elements:

The first tag in an XML document is the root tag. All XML documents must contain a single tag pair to define the root element. All other elements must be nested within the root element.

All elements can have sub-elements (children). Sub-elements must be correctly nested within their parent elements as shown below:

```
<root>  
  
<child>  
  
<subchild>.....</subchild>  
  
</child>  
  
</root>
```

Example of Attributes:

```
<data id="1" value="123"></data>
```

Poll\_profile.xml: File configured to poll parameters of each device:

**NOTE:** The Nexus® 1500/1500+ meter uses pprofile.xml.

Root tags: <EIG\_POLL\_DATA> and </EIG\_POLL\_DATA>

System elements: <EIG\_SYSTEM> and </EIG\_SYSTEM>

Contains system parameters and email addresses

General attribute:

```
<item DATA_POLL_DELAY="400"
```

```
ALARM_POLL_DELAY="1000"
```

```
SYSTEM_COMM_TIMEOUT="1000"
```

```
ALARM_CONTACT_PHONE=""
```

```
ALARM_CONTACT_PERSON="Administrator"
```

```
></item>
```

SYSTEM ATTRIBUTES		
Attributes	Description	Settings
DATA_POLL_DELAY	Poll delay between each Modbus poll, in milliseconds	Min=500 Max=65536 Default=500
SYSTEM_COMM_TIMEOUT	System communication timeout, in milliseconds	Min=500 Max=32000 Default=500
ALARM_POLL_DELAY	Poll delay between each Modbus poll for each device's alarm polling, in milliseconds	Min= 1000 Max=65535 Default=1000
ALARM_CONTACT_PHONE	Alarm contact phone number	Max size=10 digits
ALARM_CONTACT_PERSON	Alarm contact person name	Max size=64 characters

Email Attributes:

```

<item EMAIL_1=""FORMAT_1="long"

EMAIL_2=""FORMAT_2="long"

EMAIL_3=""FORMAT_3="long"

EMAIL_4=""FORMAT_4="short"

EMAIL_5=""FORMAT_5="short"

EMAIL_6=""FORMAT_6="short"

EMAIL_7=""FORMAT_7="short"

EMAIL_8=""FORMAT_8="short"

></item>

```

EMAIL ATTRIBUTES		
Attributes	Description	Settings
EMAIL_X	Email address, X is from 1 to 8	Max size = 64 characters
FORMAT_Y	Email format, Y is from 1 to 8	Strings 'long' or 'short'

Device Elements: <DEVICE X> and </DEVICE X>, where X is from 1 to 16.

Contain parameters for each device.

General attributes:

```

<item DEV_TYPE="Nexus 1250"

DEV_PROTOCOL="Modbus RTU"

DEV_NAME="Nexus Demo 1"

DEV_ADDRESS="1"

DEV_IP=""

DEV_MAX_PACKET_LEN="127"

```

DEV\_POLL\_ALARM="yes"

DEV\_ALARM\_OPTIONS="1+2+3+4+5+9"

DEV\_ALARM\_DELAY="2000"

DEV\_COMM\_TIMEOUT="750"

DEV\_PARENT="1"

></item>

Polling Data Elements: <DEV\_DATA> and </DEV\_DATA>

Polling data attributes, up to 64 in each <DEV\_DATA> element:

<item D\_UID="1\_1"

D\_LABEL="Inst Van"

D\_ADDR="180"

D\_LENGTH="2"

D\_TYPE="7"

D\_USE\_SPECIAL="3"

D\_VALUMODE="Primary"

&gt;&lt;/item&gt;

SYSTEM ATTRIBUTES		
Device Element	Description	Settings
DEV_TYPE	Supported device name	Generic Modbus Nexus 1250 Nexus 1252 Nexus 1260 Nexus 1262 Nexus 1270 Nexus 1272 Nexus 1500/1500+ [~DEVICE_TYPE_LABEL] = Auto detect device's type (Nexus® devices only)
DEV_PROTOCOL	Protocol name	Modbus RTU Modbus TCP
DEV_NAME	User assigned device name	Max = 32 characters [~DEVICE_LABEL] = Use the name stored inside the device (Nexus® devices only)
DEV_ADDRESS	Device address	Modbus protocol = 1 to 247
DEV_IP	IP address for Modbus TCP devices	xxx.xxx.xxx.xxx
DEV_MAX_PACKET_LEN	Max Modbus registers for a device's response buffer	Nexus® = 127 Futura & DMMS = 50
DEV_POLL_ALARM	Enable or disable device alarm poll function	Yes = Enable No = Disable
DEV_ALARM_OPTIONS	Alarm poll options	1 = Limits changed 2 = Inputs changed 3 = Waveform captured 4 = PQ (CBEMA) event captured 5 = Control output changed 9 = Communication failure
DEV_ALARM_DELAY	Delay time for reporting alarm condition (in milliseconds) for limit and input type alarms	Min = 0 Max = 300000 Default = 0
DEV_COMM_TIMEOUT	Device communication timeout (in milliseconds)	Min = 500 Max = 32000 Default = 500
DEV_DATA_FORMAT	Data format	0 to 0.000000
DEV_PARENT	Parent device ID (see NOTES)	Value from 1 to 16



SYSTEM ATTRIBUTES		
DEV_MODBUS_REG_BASE	Device's modbus register base is either:	0 based integer value or 1 based integer value (default)
DEV_TCP_PORT	Remote Modbus TCP device's port number	Default setting = 502

**NOTES:**

- Parent device ID (DEV\_PARENT), for polling expansion beyond the 64 items per device limitation. If set, it will use the parent device's communication settings.
- In a Nexus® 1500/1500+ meter with factory set LCD configuration, some data displayed on the LCD screens is configured in the pprofile.xml file, which is also used for configuring the data displayed in the webpages. For this reason, modifying the pprofile.xml file may affect the LCD's data presentation.

DATA ELEMENT ATTRIBUTES		
Attribute	Description	Settings
D_UID	User assigned device polling data unique ID	Max = 16 characters
D_LABEL	User assigned data label	Max = 32 characters
D_ADDR	Modbus register address	0 or 1 based integer value
D_LENGTH	Number of Modbus registers	
D_TYPE	Data type	For Nexus® Devices, use Fx Communication Data Formats For Generic Modbus Device Type, see NOTE below the table for values
D_CHANNEL	Channel ID for I/O type values	Nexus® devices only
D_SHOW_KM A	Format value with k or M	auto = auto show k or M k = fixed to k M = fixed to M
D_USE_SPECIAL	Special functions	See NOTE*
D_NA_VAL	If a numerical value is set here and a real polled value matched with this number, a '****' string will be stored in the xml data file.	Numerical Value for '****' (Nexus® devices only)

DATA ELEMENT ATTRIBUTES		
D_VALUEMODE	Value mode	Raw Primary Secondary Value (for Generic Modbus Device Type) Interpreted. See NOTE**
D_FUNCTION_CODE	Modbus protocol function code	1, 2, 3 (default), 4
D_BYTE_ORDER	Data byte order for Generic Modbus device. (Settings if source is 0x12345678)	0 MSR, MSB 0x1234, 0x5678: MS reg first, MS byte first (default) 1 MSR, LSB 0x3412, 0x7856, MS reg first, LS byte first 2 LSR, MSB 0x5678, 0x1234, LS reg first, MS byte first 3 LSR, LSB 0x7856, 0x3412, LS reg first, LS byte first
D_SPECIAL	Generic multiplier value for Generic Modbus device; applied when D_USE_SPECIAL is set to 6	1 = Default
D_TAG_SPECIAL	Cross linked multiplier ID for Generic Modbus device	Setting is any unique D_UID's setting within polling profile
D_MASKING_TYPE	Data masking type for Generic Modbus device	0 = do nothing (default) 1 = NOT 2 = OR 3 = AND 4 = NOR 5 = NAND 6 = XOR 7 = XNOR
D_MASKING_VALUE	Data masking value for Generic Modbus device; setting is hex ASCII string for up to 8 bytes of data	0x0=default Example of a 3 byte value: 0xAB12CD
D_CFG_FILE	Configuration file name for Generic Modbus device	Case sensitive file name up to 128 characters; the file must be available at system start up using FTP download
D_VALUE	Value processed by Total Web Solutions and stored in poll_data.xml file***	
D_REF	Reference info or value for polled item; stored in poll_data.xml file*** Data source is the configuration file	

**NOTE:** Values for Generic Modbus D\_TYPE:

- 1 = ASCII string
- 2 = 1 byte, signed high byte of the Modbus Register
- 3 = 1 byte, signed low byte of the Modbus Register
- 4 = 1 byte, unsigned high byte of the Modbus Register
- 5 = 1 byte, unsigned low byte of the Modbus Register
- 6 = 2 bytes, signed integer
- 7 = 2 bytes, unsigned integer
- 8 = 4 bytes, signed long integer
- 9 = 4 bytes, unsigned long integer
- 10 = 8 bytes, signed long long integer
- 11 = 8 bytes, unsigned long long integer
- 12 = 4 bytes, IEEE float
- 13 = 1 digit, 8 bits representation
- 14 = 1 digit, 4 bits representation (aka Packed BCD)
- 15 = 1 byte, signed
- 16 = 1 byte, unsigned
- 17 = 8 bytes, IEEE float

**NOTE\*:** Parameters for D\_USE\_SPECIAL:

- 0 = do not multiply any number
- 1 = multiply by CT ratio (mainly used for current values)
- 2 = multiply by CT Aux ratio

3 = multiply by PT ratio (mainly used for voltage values)

4 = multiply by PT Aux ratio

5 = multiply by CT and PT ratio (mainly used for power, energy values)

6 = multiply by the value in D\_SPECIAL (generic modbus device only)

**NOTE\*\*:** If D\_VALUEMODE is set to Interpreted, when used with Nexus® Input Values, the result will be a user-defined name in the meter's Device Profile instead of a value of 0 or 1.

**NOTE\*\*\*:** Nexus® 12xx and Shark 200® meters' Network cards use poll\_data.xml; the Nexus® 1500/1500+ meter uses pdata.xml.

Poll\_data.xml/pdata.xml

Root tag: <EIG\_DATA> and </EIG\_DATA>

One (1) system element: <EIG\_SYSTEM> and </EIG\_SYSTEM>

Sixteen (16) device elements: <DEVICE\_X> and </DEVICE\_X>, where X is from 1 to 16.

In each of the 16 device elements: Device info elements: card copies data from poll\_profile.xml/pprofile.xml.

<DEV\_NAME> and </DEV\_NAME>

<DEV\_TYPE> and </DEV\_TYPE>

Up to 64 polling data attributes: card copies data from poll\_profile.xml/pprofile.xml.

<item D\_UID="1\_1"

D\_LABEL="Inst Van"

D\_VALUE="+126.06" (Data value).

></item>

### 21.7.2.1: Configuration File (for Generic Modbus Device)

The purpose of the configuration file is to allow the user to set what real value or information could be available in the poll\_data.xml/pdata.xml file. Each configuration file allows the user to set up 8 interpreted values or strings. The configuration file's format is XML.

Below is an example xml file with three values:

```
<?xml version="1.0" encoding="UTF-8" ?>

<EIG_CONFIGURATION>

<item CFG_COMPARE_TYPE="Value" CFG_VALUE="0" CFG_REF="Disabled" />

<item CFG_COMPARE_TYPE="Value" CFG_VALUE="128" CFG_REF="Enabled" />

<item CFG_COMPARE_TYPE="String" CFG_VALUE="107 Nexus 1250"

CFG_REF="Nexus 1250 Meter" />

</EIG_CONFIGURATION>
```

The root tags are <EIG\_CONFIGURATION> and </EIG\_CONFIGURATION> with up to 8 items between the root tags.

CFG\_COMPARE\_TYPE settings are "Value" for numeric comparison or "String" for text comparison.

CFG\_VALUE can be a numeric value or text string (up to 256 characters) to be used for comparison.

CFG\_REF is any interpreted value or text string when the comparison returned a match (up to 256 characters for a text string).

D\_REF is the corresponding value in the poll\_data.xml/pdata.xml file.

### 21.7.2.2: Order of Data Processing for Generic Modbus Device

The steps in data processing are as follows:

1. Set byte order
2. Apply bit masking
3. Apply multiplying factor
4. Apply interpreted values from generic file(s)

### 21.7.3: Configuring WebReacher™

Through the configuration of poll\_profile.xml, you can poll up to 16 individual devices or up to 1024 unique items via Modbus RTU protocol or Modbus TCP/IP protocol.

**NOTE:** The Nexus® 1500/1500+ meter supports Modbus TCP/IP and a maximum of 8 devices. To set up WebReacher™ for the Nexus® 1500/1500+ meter so that it can use Modbus RTU, you must have the optional RS485 port and follow these steps:

1. In the Communications Settings screen of the Device Profile, set the 2nd RS485 port to RTU Master mode and Modbus RTU protocol.
2. In the meter's device profile set up RTU master polling (see Chapter 11 for instructions).
3. Configure pprofile.xml with a new device allocation, using Modbus RTU and device address 1, to poll data from the main meter, for the polling items set up in the meter's RTU master configuration.

Devices supported: any device that supports Modbus RTU or Modbus TCP protocol (with at least one available socket).

Devices supported for Advanced Features:

Nexus® 1250/1252, 1262, 1272, 1500, 1500+, CPU1000, DMMS300/350/425 (Use generic Modbus device settings for CPU1000 and DMMS meters.)

System set up:

**NOTE:** The instructions below are slightly different for the Nexus® 1500/1500+ meter. The Nexus® 1500/1500+ meter does not use the Poll\_data.xml file. It's Web data is stored in: \I\pdata.xml; for Web access http://[IP]/I/pdata.xml. All user configurable webpage files are physically located in the directory \C\TWS\, including the Web server's index.htm file. All files can be accessed as http://[IP]/C/TWS/[file\_name.ext]. The meter's Web server automatically loads the \C\TWS\index.htm file into the Web server's root as the default webpage file, http://[IP]/index.htm. Be sure to set the reference link in index.htm properly.

Set DATA\_POLL\_DELAY in milliseconds; the system will pause between each Modbus poll.

Set SYSTEM\_COMM\_TIMEOUT in milliseconds.

Example:

```
<EIG_POLL_DATA>

<EIG_SYSTEM>

<item DATA_POLL_DELAY="400"SYSTEM_COMM_TIMEOUT="500"

></Item>

</EIG_SYSTEM>

</EIG_POLL_DATA>
```

Device Set up: within the boundary of <DEVICE X> and </DEVICE X>

1. Assign a device type, DEV\_TYPE.
2. Assign a protocol, DEV\_PROTOCOL
3. Assign user defined device name, DEV\_NAME (should be unique in a system).
4. Assign Modbus device address, DEV\_ADDRESS.
5. If protocol is Modbus TCP, assign the remote device's IP address and the TCP port number: DEV\_IP and DEV\_TCP\_PORT.
6. Set max Modbus packet length in number of registers, DEV\_MAX\_PACKET\_LEN.

7. Set device's communication timeout in milliseconds, DEV\_COMM\_TIMEOUT. The timeout value should be longer for devices that speak Modbus TCP than for devices that speak Modbus RTU, depending on network traffic.
8. Set device's data display format, DEV\_DATA\_FORMAT, from 0 to 0.000000.
9. You can expand the polling item limitation of 64 items per device by setting a device as a child device of a parent device.  
For Example, in <DEVICE\_X> section, if you set it to be the parent device, DEV\_PARENT must be X or 0. Then for <DEVICE\_Y> section, if you set the device to be a child device of X, set DEV\_PARENT to X. Other parameters can be omitted.

Example:

```
<EIG_POLL_DATA>

<DEVICE_1>

<item DEV_TYPE="Nexus 1250"

DEV_PROTOCOL="ModbusRTU"

DEV_NAME="Nexus Demo 1"

DEV_ADDRESS="1"

DEV_IP=""

DEV_TCP_PORT=""

DEV_MAX_PACKET_LEN="127"

DEV_COMM_TIMEOUT="750"

DEV_DATA_FORMAT="0.00"

DEV_PARENT="1"

></item>

</DEVICE_1>

</EIG_POLL_DATA>
```



Polling Item Set up:

In each DEVICE\_X, DEV\_DATA section, you can have up to 64 items. Any extra items will be ignored.

1. Set a unique ID, D\_UID, so any program can easily access this item.
2. Set a data label, D\_LABEL, optional.
3. Set Modbus register in decimal, 1 based, D\_ADDR.
4. Set how many Modbus registers, D\_LENGTH. Note: Each register is 2 bytes long.
5. Set data type, D\_TYPE. (See your meter's Modbus Protocol Register Map Manual.)
6. Set special operations, such as multiplying PT or CT ratio, D\_USE\_SPECIAL.
7. Set value mode, D\_VALUEMODE as primary, secondary or raw value.
8. Set display units, D\_SHOW\_KM, optional.
9. Set a N/A value, D\_NA\_VAL, optional.

Example:

<EIG\_POLL\_DATA>

<DEVICE\_1>

<DEV\_DATA>

<item D\_UID="1\_1"

D\_LABEL="Inst Van"

D\_ADDR="180"

D\_LENGTH="2"

D\_TYPE="7"

D\_USE\_SPECIAL="3"

D\_VALUEMODE="Primary"

></item>

[...up to 64 items...]

</DEV\_DATA>

</DEVICE\_1>

</EIG\_POLL\_DATA>

#### 21.7.4: Configuring WebMod™

WebMOD™ allows the network to interface with Modbus-based IEDs. WebMOD™ supports 12 Modbus TCP/IP sockets (12 simultaneous connections).

**NOTE:** The Nexus® 1500 meter supports 8 Modbus TCP/IP sockets; the Nexus® 1500+ meter supports up to 32 simultaneous Modbus TCP/IP sockets per card; the Nexus® 1450 meter supports up to 16 Modbus TCP/IP sockets each for ports 5 and 6, but up to 28 total, e.g., 12 for one port and 16 for the other.

The Modbus Port Number is 502. The Modbus Port Number is set on the Location Editor screen and Devices are added to the Network on this screen.

**NOTE:** If your system is firewalled, you must ask your network administrator to grant communication access on TCP/IP Port 502.

Modbus TCP Format: [6-byte Header] [Modbus RTU message without checksum]

Header detail:

[2 Bytes - Sequences/Transactions ID] [2 Bytes - 0s] [2 Bytes - Length, Number of Bytes following]

Example:

Request:

01 03 00 00 00 06 01 03 00 00 00 02

Transaction #259, 6 Bytes long, Modbus RTU Request for Address 01, Function Code 03 (read holding registers), Start at Register 0 for 2 registers.

Response:

01 03 00 00 00 07 01 03 04 xx xx xx xx

Transaction #259, 7 Bytes long, Modbus RTU Response for Address 01, Function Code 03, 4 Bytes long data.

It will not support multiple Modbus requests and responses in a single Modbus TCP packet. For INP100/INP200 and INP102/INP202 Options, all requests with Modbus Address 01 will transmit to the meter itself. All other requests with Modbus Addresses other than 01 will transmit to the RS485 Gateway Port.

### 21.7.5: Configuring WebAlarm™

To enable WebAlarm™, see the instructions in [21.6.4: WebAlarm™/Email, on page 21-15](#). Through CommunicatorPQA® software you can configure one email address, which is stored in the meter for single user or administrative use. Eight additional addresses can be programmed in the poll\_profile.xml/pprofile.xml file (see [21.7.2: Configuring WebXML™, on page 21-36](#)).

To configure additional email recipients:

Edit the poll\_profile.xml/pprofile.xml file saved in the FTP Server (see [21.6.5: FTP Client, on page 21-19](#)). From EMAIL\_1 to EMAIL\_8, enter the email address within the double quotes. From FORMAT\_1 to FORMAT\_8, enter the format name as either "short" or "long" within the double quotes. A section of a poll\_profile.xml/pprofile.xml file is shown below without values entered.

```
<EIG_POLL_DATA>
```

```
<EIG_SYSTEM>
```

```
<item EMAIL_1=""FORMAT_1=""
```

```
EMAIL_2=""FORMAT_2=""
```

```
EMAIL_3=""FORMAT_3=""
```

```
EMAIL_4=""FORMAT_4=""
```

```
EMAIL_5=""FORMAT_5=""
```

```
EMAIL_6=""FORMAT_6=""
```

EMAIL\_7=""FORMAT\_7=""

EMAIL\_8=""FORMAT\_8=""

></item>

</EIG\_SYSTEM>

</EIG\_POLL\_DATA>

Short Format:

For all handheld mobile devices with text messaging service capable of receiving up to 160 characters. Character number includes sender address, subject and body plus additional separator characters. This format is defined by EIG - the user cannot modify it.

Example of the Short Format:

[64 characters of sender's email address]##[32 characters of Meter ID]

#Alarm[10digit operator's phone number]

IDs1+2+3+4+5+6+7+8+9+10+11+12+13+14+15+16

Long Format:

For all handheld mobile devices and PC users who can receive regular email. This includes detailed alarm information.

Example of Long Format:

Device Name: Nexus Demo 1

Contact Person: Administrator

Contact Phone: 1234567890

Alarm IDs: 1+2+3+4

Alarm Names:

(1) Limits changed

(2) Inputs changed

(3) Waveform captured

(4) PQ (CBEMA) event captured

Alarm Details:

Limits:

(4) 1s IA, Below Limit 2, Combination=OR, value = +0.38

(5) 1s IB, Below Limit 2, Combination=OR, value = +0.38

(6) 1s IC, Below Limit 2, Combination=OR, value = +0.38

Inputs:

(1) HSI Input 1 BK101 Off

(3) HSI Input 3 Closed

(4) HSI Input 4 Closed

### **21.7.6: Configure Alarm Polling Options (Enter values within the double quotes)**

To enable the polling for a device, set DEV\_POLL\_ALARM to "Yes"; to disable it, set "No".

Alarm polling options: 1 to 9 (See table on the next page.)

The default is sending alarm emails for all options, 1 to 9.

You can configure the polling profile to have any combination of options.

Edit the poll\_profile.xml. Set up the alarm polling options by concatenating the options IDs, such as: "1+2+3+4+5+9".

Set the alarm delay for limits in Milliseconds (a value of 1000 = 1 second). If a limit condition occurs for 1 second or more, an alarm email is sent.

<EIG\_POLL\_DATA>

<DEVICE\_x>

<item DEV\_POLL\_ALARM=""

```
DEV_ALARM_OPTIONS=""
```

```
DEV_ALARM_DELAY=""
```

```
></item>
```

```
</DEVICE_x>
```

```
</EIG_POLL_DATA>
```

**NOTE:** Most of the Alarm Triggering Conditions for Nexus® devices rely on the device's configuration in the Device Profile. Make sure that the settings are correct for Limits, Inputs, Waveforms, etc.

ALARM POLLING OPTIONS		
Option ID	Option Name	Description
1	Limit exceeded	Any exceeded Limit condition
2	Inputs abnormal condition	Any internal digital input abnormal condition
3	Waveform captured	The meter has captured a waveform
4	PQ (CBEMA) event captured	The meter has captured a PQ event
5	Control output changed	A relay module connected to the meter changed state
9	Communication failure	The Network card has difficulty talking to the meter

To configure Alarm polling for more individual devices:

Edit the poll\_profile.xml/pprofile.xml file for each device's section. Configure the parameters.

```
<EIG_POLL_DATA>
```

```
<DEVICE_x>
```

```
<item DEV_POLL_ALARM=""
```

```
DEV_ALARM_OPTIONS=""
```

```
></item>
```

```
</DEVICE_x>
```

</EIG\_POLL\_DATA>

A common problem is described below:

If you entered a name for the SNTP Server instead of an IP address, make sure your DNS Server is working and you have either set a DSP IP inside the meter or your DNS can supply a DNS IP. If it cannot resolve the name to an IP translation, no email will be sent.

Regarding stored emails:

You can access the stored\_emails.htm page from any web browser. The last 10 emails sent will be stored in the RAM on a FIFO basis (First In, First Out) and will be displayed in descending order. The page will be cleared after a complete system restart.

## 21.8: FTP Server

A built-in FTP Server is available for a meter equipped with INP100/INP200. It has a 3-user limit, so no more than three users can connect to the FTP Server simultaneously. The FTP Server logon User Name and Password are stored in the INP100/INP200 card, not in the meter's programmable settings.

The Initial FTP Server User Name and Password are: **eignet** and **inp100**, except for the Nexus® 1500 meter which has **anonymous** as the initial setting for both user name and password. The FTP Server's quota is 4 Megabytes of RAM.

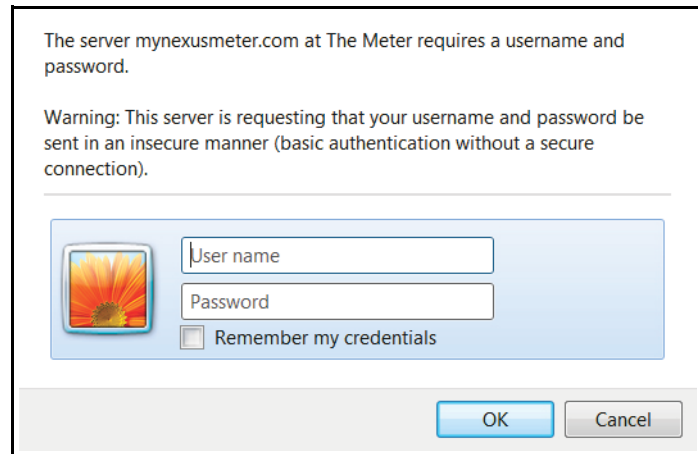
The Nexus® 1450 meter does not support FTP server.

## 21.9: Update Network Card Firmware from Webpage (in Runtime Mode)

Network Card Firmware can be updated through the Web (the Nexus® 1450 meter does not support this). Follow these steps:

1. Start your browser. Type the meter's IP address in the browser's URL address bar. The Main WebExplorer screen is displayed (see page 21-3).

2. Click Tools>Firmware Upgrade or, add /update1.htm to the end of the URL. The Enter Network Password screen opens, prompting you for a User Name and Password. See the example screen shown below.

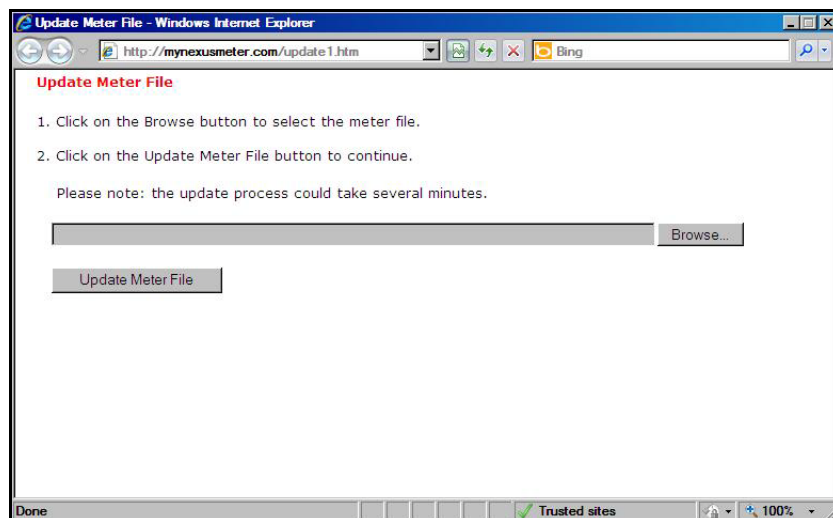


3. Enter User Name and Password.

Initial User Name = **eignet** (**anonymous** for Nexus® 1500 meter)

Initial Password = **inp100** (**anonymous** for Nexus® 1500 meter)

4. Click OK. The Update Run-Time Firmware screen opens- see the screen shown below.



5. Click the Browse button to select the correct Run-time firmware file.



6. Click Update Run-Time Firmware. The update process can take several minutes.  
Make sure that during the process you do not close the Update Run-Time Firmware screen (or update1.htm browser window). During the update process, the INP100/INP200 Update Run-Time Firmware Status screen opens. It displays the current status of the update.
  7. When you get the message that the update was successful, restart the connected meter, in one of the following ways:
    - a. Click Reset or Restart, which take you to reset\_ethernet.htm.
- OR
- b. Power down and then power up the connected meter.

### 21.9.1: Update Network Card Firmware through Software

There are two methods for updating the network card firmware through CommunicatorPQA® software - flash upgrade and the following procedure.

1. From the Device Profile screen, click General Settings>Communications.
2. From the Communications Settings screen, click the Advanced Settings button.
3. Click the Firmware Update tab. You will see the screen shown below.

The screenshot shows a window titled "Advanced Network Option Settings" with a close button (X) in the top right corner. Inside the window, there are several tabs: "GE Protocol (EGD)", "Modem(INP102/202)", "DNP for LAN/WAN", "FTP Client(INP100/102)", "Services & Security", "DHCP(INP100/102)", "Computer Name / DNS", "Firmware Update" (which is selected and highlighted with a yellow border), and "Alarm / Email(INP100/102)".

The "Firmware Update" tab contains a section titled "Network Card Firmware Update via Network". Below this title, it says "Parameters used for network card firmware update". There is a checkbox labeled "Enable" which is currently unchecked. To its right is a "Server Port" field with the value "69".

Below these, there are four rows of fields for network configuration:

- Server IP Address: 0.0.0.0
- Client(Device) IP Address: 0.0.0.0
- Subnet Mask: 255.255.255.0
- Default Gateway: 0.0.0.0

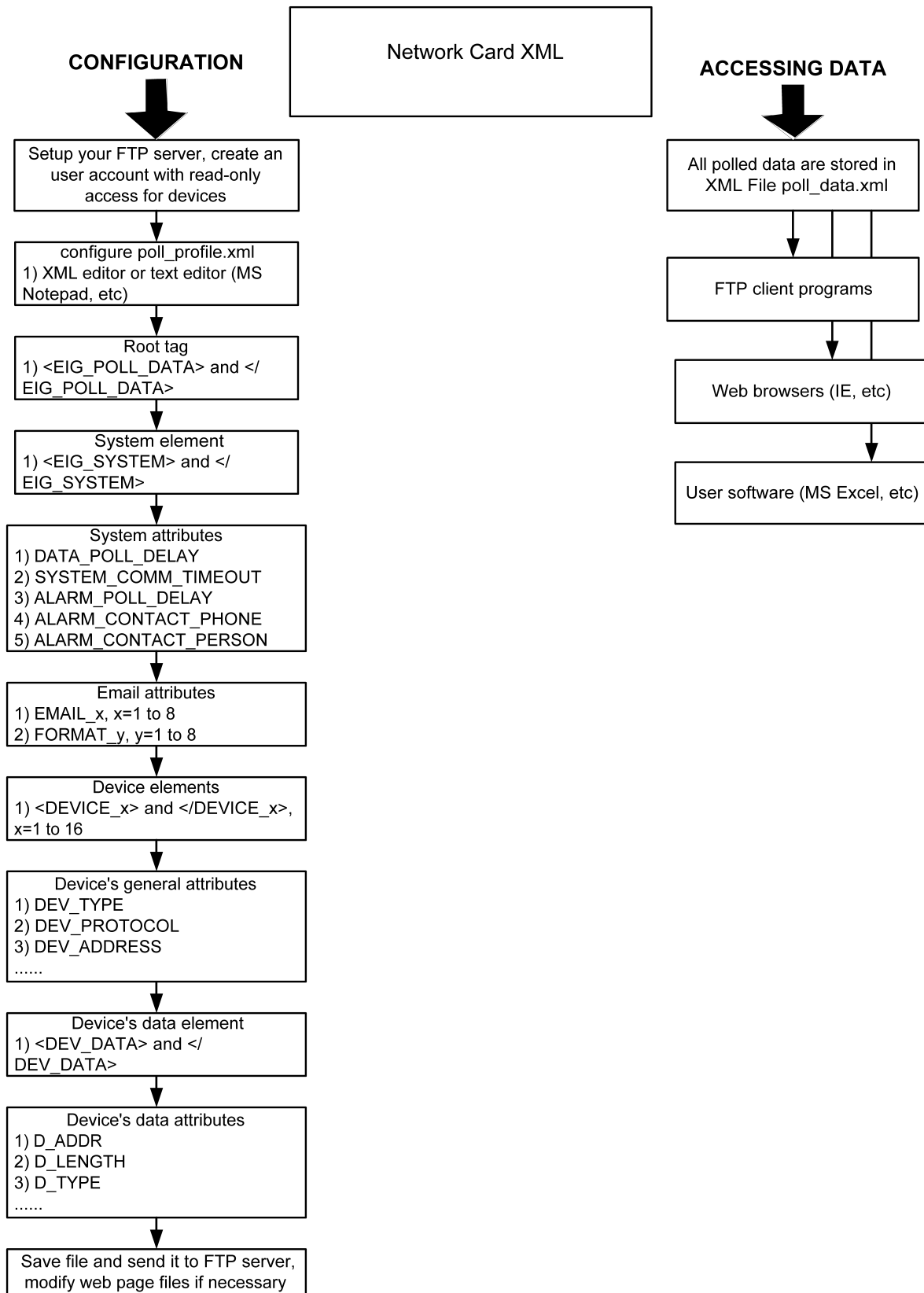
Below these fields is a section titled "Download Filename" with a large empty text box for entering the path to the firmware update file.

At the bottom of the dialog are two buttons: "OK" and "Cancel".

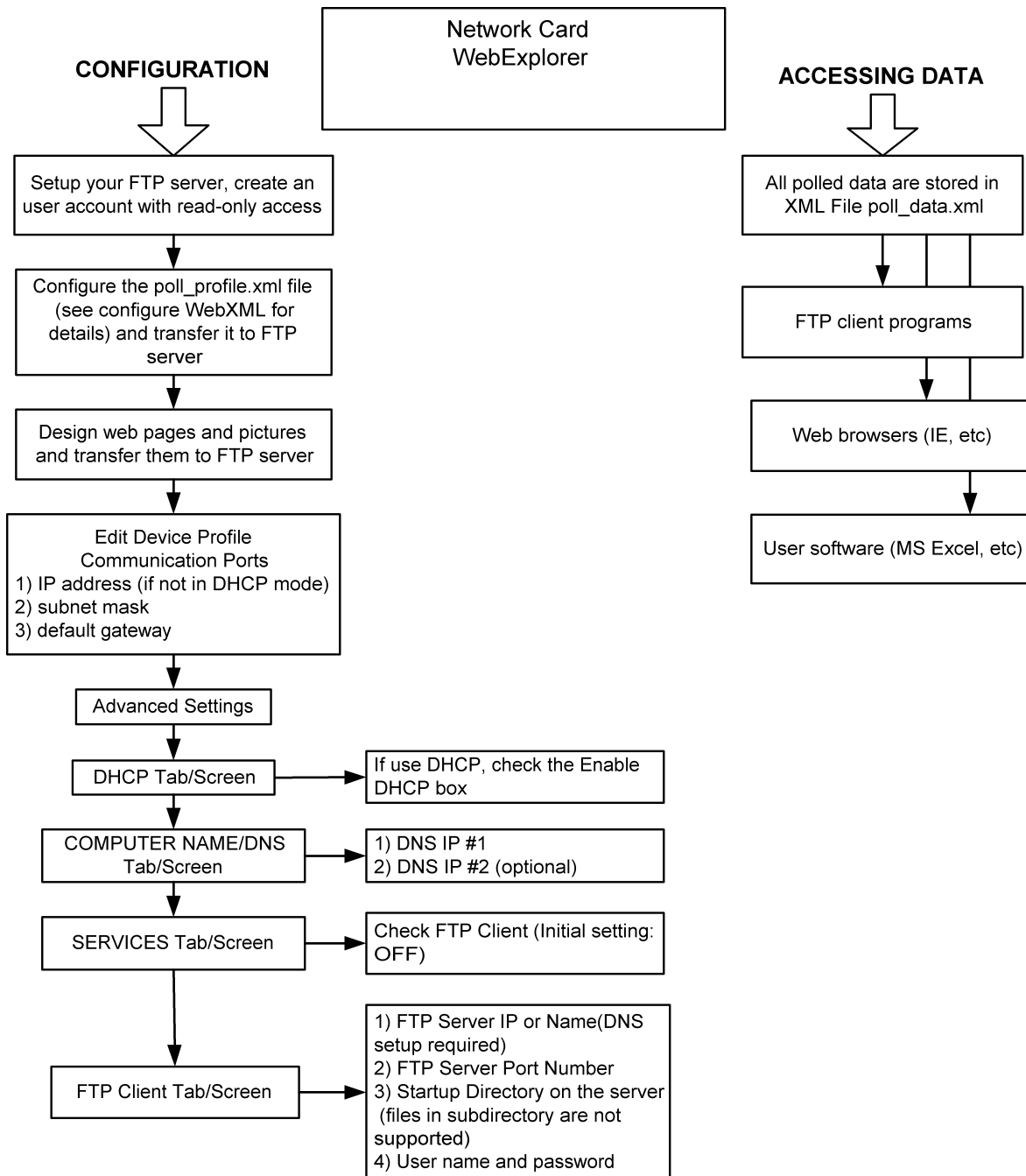
4. Click the Enable checkbox.
5. Enter the Server port and IP address; Device's IP address; Subnet Mask, and Default Gateway.
6. In the Download Filename field, enter the path of the Firmware update file. For example: C:Electro Industries\Updates\Firmware\V.1.2.3.0.
7. Click OK to save your settings.

**NOTES:**

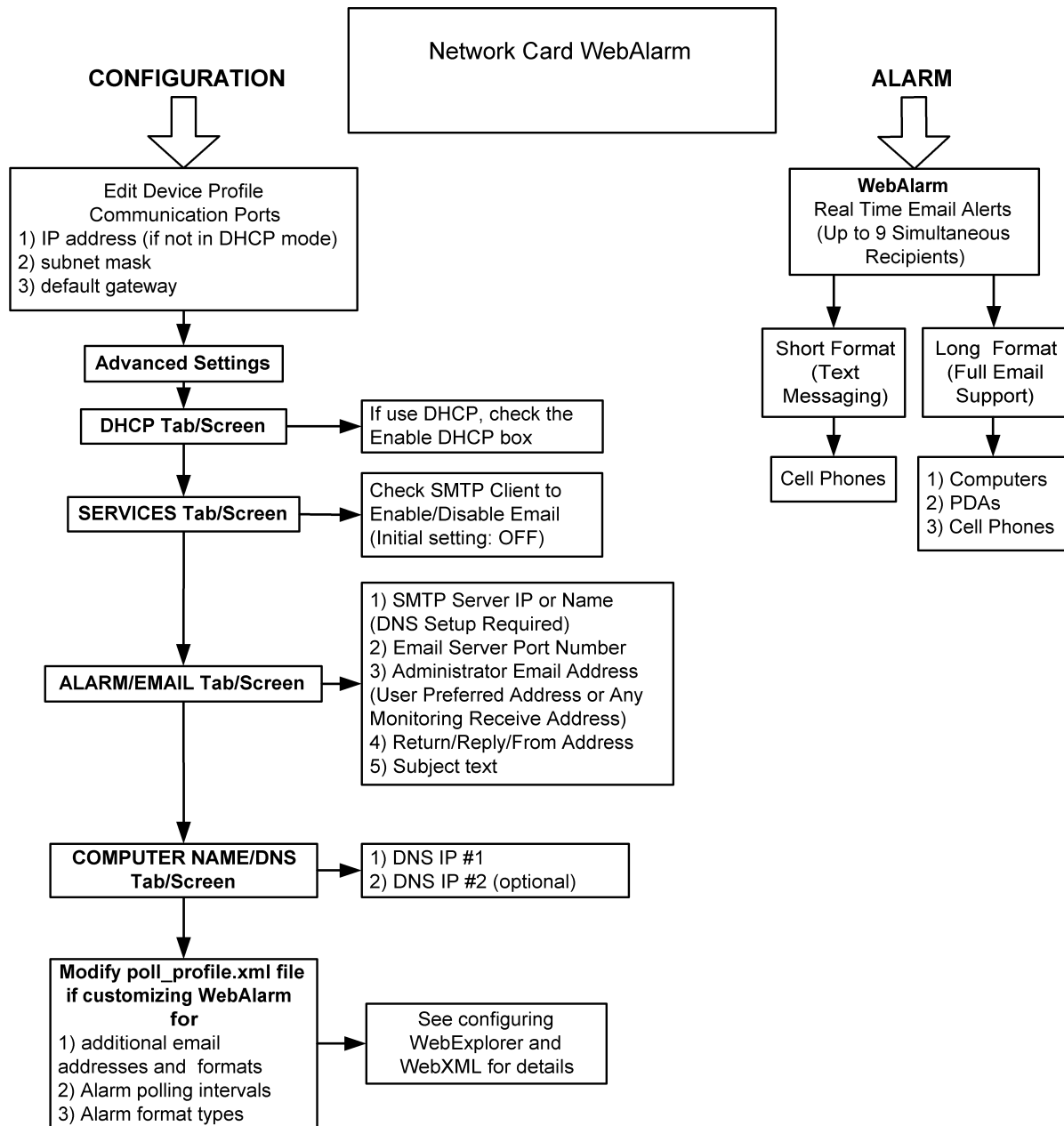
- To flash update Network Card firmware through the CommunicatorPQA® application, see [25.2.1: Update the Internal Network Card's Firmware, on page 25-3](#).
- The Shark® 200/250/270 meter's network card can only be updated via its webpage. See the meter's User Manual for details.
- The Nexus® 1450 meter's Network firmware can only be updated via CommunicatorPQA® software.

**21.10: WebXML Flowchart**

## 21.11: WebExplorer Flowchart



## 21.12: WebAlarm Flowchart



## 21.13: Comparison of Network Cards

The following tables describe the Network features supported by the Nexus® and the Shark® 200 meters.

### Nexus® 1252/1262/1272, 1450, and Shark® 200/250/270 Meters Network Supported Features

EIG Network Features in Runtime Firmware			
Meter	Nexus® 12xx Meter	Nexus® 1450 Meter	Shark® 200/250/270 Meter
Network card	INP100/102/200/202	Standard	INP100S Gen 1 / Gen2
Runtime Firmware Version of Network card			
WebExplorer/Web Server	v1.x.x, v3.x.x	Yes	v1.x, v3.x, Gen 2
WebXML	v1.x.x, v3.x.x	No	v1.x, v3.x, Gen 2 Read access to data file only
WebReacher (FTP client)	v1.x.x, v3.x.x	No	No
WebMod (Modbus TCP)	v1.x.x, v2.x.x, v3.x.x	Yes	v1.x, v2.x, v3.x, Gen 2
WebAlarm/Alarm/Email	v1.x.x, v3.x.x	Yes	Yes
DHCP	v1.x.x, v3.x.x	Yes, for Port 5	v1.x, v3.x, Gen 2
Modbus LDA Access for firmware update (alternative to TFTP in boot and Web in runtime)	v1.x.48+, v2.x.x, v3.x.x	No	v2.x.x, v3.x.x
Ethernet Gateway port	v1.x.x, v3.x.x	No	No
Modem	v1.x.x, v2.x.x, v3.x.x	Yes	Cellular modem for the 270
DNP LAN/WAN (requires meter firmware support)	v1.x.x, v2.x.x, v3.x.x	Yes	Yes for the 270
GE EGD protocol	v1.x.x, v2.x.x, v3.x.x	Yes	No
Firmware update via Web Server	v1.x.x, v3.x.x	No	v1.x, v3.x, Gen 2
Sleep Mode (only active under certain conditions)	v1.x.x, v2.x.x, v3.x.x	N/A	Yes for the 270 Gen 2
SNTP	Yes	Yes	Yes

<b>EIG Network Features in Runtime Firmware</b>			
Cable auto detect	v1.x.x, v2.x.x, v3.x.x	Yes	v1.x, v2.x, v3.x, Gen 2
Accept Debug commands from meter's UART ports	v1.x.x, v2.x.x, v3.x.x		N/A: sends a fixed set of parameters- IP, MAC address, status, etc.
IEC 61850		Yes	200/250/270/200S - yes
IEC 61850 GOOSE		Yes	No
IPv4	Yes	Yes	Yes
IPv6	No	Yes	Yes for the 270 Gen 2

### **Nexus® 1500+ Meter TWS Supported Features**

- IP/Mask/Gateway
- Modbus TCP Server
- Modbus TCP Client
- Web Server
- FTP Server
- DNP LAN/WAN
- Alarm Email
- GE EGD\*
- PING
- DNS
- IEC 61850\*
- IEC 61850 GOOSE\*
- SNTP
- SNMP (with firmware version v15, or higher)
- IEEE 1588 PTPv2 Master (only available on second Ethernet card) or Slave



- Synchrophasor (PMU) (available on one Ethernet card at a time)

\* These features are supported on Network (Ethernet) Card 1, only.

## 21.14: GE EGD Details

### Firmware Requirements

- Network card firmware v1.0.40
- The meter's firmware, DSP, and COM must support a 50 ms update

### Configuring the Meter and Network Card

The GE EGD data producer uses UDP port 18246. The meter must be configured to enable the EGD protocol using CommunicatorPQA® software (this setting is made in the Advanced Network Options Setting screen - see the instructions for programming your meter).

**NOTE:** Only one port at a time can be communicating EGD protocol.

### EGD Data Specifications

This section contains detailed information about the EGD data packet being sent from a configured meter.

#### Packet Details

Exchange ID:	1
Configuration Signature:	Major=1, Minor=0.
Status bit 0:	1=data is old or not ready to be consumed, 0=data is ready to be consumed.
Status bit 1:	1=timestamp is not synchronized (no IRIG-B signal), 0=timestamp is synchronized (IRIG-B signal received).
Production Data:	Nexus® meter's 50 ms second readings, in primary. Total of 124 bytes. Power factor values will be kept in their raw format. Requires Network

card firmware v1.0.40 or higher and supporting meter firmware.

GE EGD times tamp format:

POSIX 1003.4 (1003.1b) timespec format, 4 byte seconds (signed) followed by 4 byte nanoseconds, signed seconds from 01/01/1970, max year is 2038.

Index	Name	Type	Note
1	Timestamp	8 bytes	EIG's date/time format, see note below
2	Van	4 byte float	Little-endian
3	Vbn	4 byte float	Little-endian
4	Vcn	4 byte float	Little-endian
5	Vaux	4 byte float	Little-endian
6	Ia	4 byte float	Little-endian
7	Ib	4 byte float	Little-endian
8	Ic	4 byte float	Little-endian
9	In-measured	4 byte float	Little-endian
10	Vab	4 byte float	Little-endian
11	Vbc	4 byte float	Little-endian
12	Vca	4 byte float	Little-endian
13	VA-a	4 byte float	Little-endian
14	VA-b	4 byte float	Little-endian
15	VA-c	4 byte float	Little-endian
16	VA	4 byte float	Little-endian
17	VAR-a	4 byte float	Little-endian
18	VAR-b	4 byte float	Little-endian
19	VAR-c	4 byte float	Little-endian
20	VAR	4 byte float	Little-endian
21	W-a	4 byte float	Little-endian
22	W-b	4 byte float	Little-endian
23	W-c	4 byte float	Little-endian
24	W	4 byte float	Little-endian

Index	Name	Type	Note
25	Freq	4 byte float	Little-endian
26	PF-a	4 byte float	Little-endian
27	PF-b	4 byte float	Little-endian
28	PF-c	4 byte float	Little-endian
29	PF	4 byte float	Little-endian
30	Van-Vaux Phase Angle	4 byte float	Little-endian

NOTE: See your meter's Modbus Protocol & Register Map for complete detail on special data formats.

#### EIG's Time Stamp Format

Length: 4 Modbus Registers (8 bytes)

Each Modbus register contains two bytes. Each byte contains a binary number representing up to two digits representing a segment of date and time. The units for each byte are:

- Century
- Year
- Month
- Date
- Hour
- Minute
- Second
- 10 Millisecond

Hour is in 24-hour format, i.e., 00H = 0 = 12 AM, 01H = 1 = 1 AM, ..., 0BH = 11 = 11 AM, 0CH = 12 = 12 PM, 0DH = 13 = 1 PM, ..., 17H = 23 = 11 PM.

Example:

Registers 00081 – 00084, On Time, might contain the following data:

June 25, 1999 9:19:48.86 AM

In bytes: 13 63 06 19 09 13 30 56 (lower order byte to higher order byte in UDP packet)

Century: 19 = 13H

Year: 99 = 63H

Month: 6 = 06H

Date: 25 = 19H

Hour: 9 = 09H

Minute: 19 = 13H

Second: 48 = 30H

Millisecond: 86 = 56H,  $86 \times 10 = 860\text{ms}$

**NOTE:** Regarding bit-masking and limit on the values, you have to apply bit-masking to each byte and set a maximum valid value for date/time reconstruction.

- Byte 1: And 63, Max=63
- Byte 2: And 127, Max=99
- Byte 3: And 15, Max=12
- Byte 4: And 31, Max=31
- Byte 5: And 31, Max=24
- Byte 6: And 63, Max=59
- Byte 7: And 63, Max=59
- Byte 8: And 127, Max=99

**NOTE:** With the support of DSP/DSP 1 firmware, the meter can provide an advanced warning indicator prior to performing a RefCal (Reference Calibration). The indicator

flag is set in the MSB of the EIG time stamp's century byte during the final 3 seconds before a RefCal. End user software can use this indicator to avoid generating unnecessary error warnings.

#### Power Factor Format

0.000 to 3.999 (raw)

PF values in Nexus® meters have two types of representation, which can be defined by the user in the meter's device profile. The values can be in either EIG or Edison format.

EIG format

Quadrants	Nexus® PF raw value	Interpreted PF value
1	0 to 1	0 to 1
4 >	1 to 2	<1 to 0
3 >	2 to 3	<0 to -1
2 >	3 to 4 >	-1 to 0

Edison format:

Quadrants	Nexus® PF raw value	Interpreted PF value
1	0 to 1	0 to 1
4 >	1 to 2 >	-1 to 0
3 >	2 to 3 >	0 to 1
2 >	3 to 4 >	-1 to 0

Phase Angle Format: +/-180 degrees

#### **EGD Data Protocol Data Unit (PDU) Descriptions**

##### Data Production

The Data Production PDU supports the production of Global Ethernet Data. This packet contains the user data being produced and sent to the consuming node(s).

This message is unacknowledged, that is, it is transmitted by the producing node at the configured rate without waiting for a response from the consuming nodes. Receiving nodes that detect an encoding error in a received Data Production PDU will discard the PDU and take no action on its contents. The format of the Data Production PDU is shown in the table below.

0	PDU Type (13)	PVN=1	Request ID
4	Producer ID		
8	Exchange ID		
12	Timestamp		
16			
20	Status	Reserved	
24	Configuration Signature	Reserved	
28	Reserved		
32	Production Data (up to 1400 bytes)		

The table below contains additional information about these fields.

PDU field	Size (Bytes)	Description
PVN	1	Must be set to 1 for compatibility with older protocol versions.
Request ID	2	2 byte unsigned integer which is incremented each time a data sample is produced
Producer ID	4	Producer identifier
Exchange ID	4	Exchange identifier
Timestamp	8	The time stamp value should correspond as closely as practical to when the data sample was captured

PDU field	Size (Bytes)	Description
Production Status	2	Bit mask indicating the validity of the data sample produced: Bit 0: Set if there is production error or invalid (old) data Bit 1: Set if time stamp is not synchronized on producer node
Configuration Signature	2	2 byte integer indicating relative version of the user data contained in the sample
Production Data	up to 1400	User data sample matching configuration specified in Configuration Signature

### EGD Data Verification

You can verify the data sent through EGD by polling the meter's Modbus Registers 119 to 175.

## 21.15: Troubleshooting the Network Connection

**NOTE:** If the connection fails, check the connection with the Master meter first. Once that connection is established, check the connections with the Slave devices.

Suggested checkpoints are as follows:

### Master Meter

1. Check cables.
2. Check IP Address, Subnet Mask and Default Gateway settings.
3. Check that the Address is 1.
4. Check that Modbus TCP was selected in Device Properties.

### Slave Devices

1. Check all the above except #3.
2. Check that the Address is unique and not set to 1.

3. Check that the Baud Rate settings for the Ethernet Gateway (Port 2) and the Devices are the same.

### **General**

Try "Pinging" to a known good network device, such as another computer, to verify that your computer is connected properly to the network.

1. From the Start menu, type Run, then cmd to open the command.exe window.
2. Type ping and the IP address, for example, Ping 10.0.0.1

## **21.16: Total Web Solutions (TWS) MEGA PAGE**

### **Displaying Data from Multiple INP100/102 Units on One Webpage**

Using the TWS components WebExplorer and WebReacher, you can design a single webpage that displays data from multiple meters with INP100/102 Network Options. To accomplish this, you should have a basic understanding of TWS, explained earlier in this chapter.

You should modify the Java Script Code on the webpages in use and also make a change to the Internet Explorer browser setting, as detailed below.

1. Using the default files supplied by the INP100/102 Network Options as templates, the user should modify the Java Script code for all webpages using the sample below. This sample portion of Java Script code is for demonstration purpose only. You must insert your own code where needed.

```
<script language=Javascript>

// insert your own code here

// Define multiple XMLDOM Documents objects

var xmlDoc_Nexus_1 = new ActiveXObject("MSXML.DomDocument");

var xmlDoc_Nexus_2 = new ActiveXObject("MSXML.DomDocument");

xmlDoc_Nexus_1.async = true;

xmlDoc_Nexus_1.onreadystatechange = do_get_data_Nexus_1;
```



```
xmlDoc_Nexus_2.async = true;

xmlDoc_Nexus_2.onreadystatechange = do_get_data_Nexus_2;

// function name 'start_process' should be placed in webpage's <body> tag

// such as '<body onLoad="start_process()">'

function start_process()

{

do_get_xml_Nexus_1();

do_get_xml_Nexus_2();

}

// Load each poll_data.xml file from different locations into an XMLDOM Document
objects function

do_get_xml_Nexus_1()

{

xmlDoc_Nexus_1.load("http://192.168.1.2/poll_data.xml");

}

function do_get_xml_Nexus_2()

{

xmlDoc_Nexus_2.load("http://192.168.7.8/poll_data.xml");

}

// functions to read, parse and display data from each XMLfile

function do_get_data_Nexus_1()

{

// insert your own code here

}
```

```
function do_get_data_Nexus_2()  
  
{  
  
  // insert your own code here  
  
}  
  
// insert your own code here</script>
```

2. To enable the MEGA Page on your browser, follow these steps:

- a. From Internet Explorer, click Tools>Internet Options>Security.
- b. Click the Custom Level button and scroll to the Miscellaneous section.
- c. Click the Enable radio button next to "Access data sources across domains" and "Navigate subframes across different domains."
- d. Click OK twice to close the windows.

### **21.17: Nexus® 1450/1500+ Meter's Advanced Features Setting**

The Nexus® 1450 and 1500+ meters have some additional advanced features. This section contains instructions for additional programming of the Nexus® 1450/1500+ meter's Main and optional Ethernet cards. The additional programming features are enabled or set in the Services tab.

### 21.17.1: Services Tab (Nexus® 1450/1500+ Meter)

Services			
	Enable	TCP Ports	
		Card 1	Card 2
Web Server	Both Card 1 & 2	80	80
Modbus TCP Server	Both Card 1 & 2	502	502
FTP Server	Both Card 1 & 2	Control Port: 21	Control Port: 21
		Data Port: 20	Data Port: 20
TCP / UDP Port			
GE EGD	Disabled	18246	
DNP LAN/WAN	Disabled	To configure the DNP ports, please go to the DNP for LAN/WAN tab.	
Modbus TCP Client (Master)	Disabled	To configure the TCP port, please see the XML Web Service.	
SMTP Client (email)	Disabled	25	Outgoing Mail Port.
Network Time Sync	Disabled		
IEC 61850	Enabled	To configure additional settings, go to Appendix C of the meter's manual.	
IEC 61850 GOOSE	Enabled		
SNMP	Disabled		
IEEE 1588 PTP Master	Disabled	To configure additional settings, go to the IEEE 1588 PTP tab.	
Synchrophasor (PMU)	Card 1 Only		

OK Cancel Help

The first tab in the Advanced Network Option Settings screen is Services. The screen shown on the previous page is for the Nexus® 1500+ meter. The Nexus® 1450 meter does not have all of the same options. The settings here let you enable/disable server and other network capabilities for each Network card independently - the Main Ethernet card, which comes standard with the meter, and the optional second Ethernet card. This gives you the flexibility to program each card as best fits your application needs. These are the settings on the screen:

- Web Server: select one of the following choices from the pull-down menu:
  - Card 1 Only to allow Internet access to the meter's readings only through the Main Network card.
  - Card 2 Only to allow Internet access to the meter's readings only through the optional Network card.

- Both Card 1 and 2 to enable Internet access to the meter's readings for either Network card.
- Disabled to not allow Internet access to the meter for either Network card.
- Modbus TCP Server: select one of the following choices from the pull-down menu:
  - Card 1 Only to allow Modbus TCP communication only through the Main Network card.
  - Card 2 Only to allow Modbus TCP communication only through the optional Network card
  - Both Card 1 and 2 to allow Modbus TCP communication through either Network card.
  - Disabled to not allow Modbus TCP communication for either Network card.
- FTP Server (see [21.6.5: FTP Client, on page 21-19](#) for additional information): select one of the following choices from the pull-down menu:
  - Card 1 Only to allow only the Main Network card to support file transfer protocol.
  - Card 2 Only to allow only the optional Network card to support file transfer protocol.
  - Both Card 1 and 2 to allow both Network cards to support file transfer protocol.
  - Disabled to not allow either Network card to support file transfer protocol.
- GE EGD Protocol (see [21.6.3: GE Protocol \(EGD\), on page 21-14](#) for additional information): select one of the following choices from the pull-down menu:
  - Card 1 Only to allow only the Main Network card to GE EGD protocol.
  - Card 2 Only to allow only the optional Network card to support GE EGD protocol.
  - Auto to allow either Network card to support GE EGD protocol (see \*NOTE on page 21-79).
  - Disabled to not allow either Network card to support GE EGD protocol.

- DNP LAN/WAN: select one of the following choices from the pull-down menu:
  - Card 1 Only to allow only the Main Network card to support DNP LAN/WAN communication.
  - Card 2 Only to allow only the optional Network card to support DNP LAN/WAN communication.
  - Both Card 1 and 2 to allow both Network cards to support DNP LAN/WAN communication.
  - Disabled to not allow either Network card to support DNP LAN/WAN communication.

**NOTE:** If you are enabling DNP LAN/WAN communication for either (or both) Network cards, also use the DNP for LAN/WAN Card 1 and/or DNP for LAN/WAN Card 2 tabs to make additional settings. The settings are the same as described in [21.6.7: DNP for LAN/WAN, on page 21-24](#).

- Modbus TCP Client (Master): select one of the following choices from the pull-down menu:
  - Card 1 Only to allow only the Main Network card to act as a Modbus master.
  - Card 2 Only to allow only the optional Network card to act as a Modbus master.
  - Auto to allow both Network cards to act as a Modbus master (see \*NOTE on page 21-79).
  - Disabled to not allow either Network card to act as a Modbus master.
- SMTP Client (Email): select one of the following choices from the pull-down menu:
  - Card 1 Only to allow only the Main Network card to receive email.
  - Card 2 Only to allow only the optional Network card to receive email.
  - Auto to allow both Network cards to receive email (see \*NOTE on page 21-79)
  - Disabled to not allow either Network card to receive email.

- Network Time Sync: select one of the following choices from the pull-down menu:
  - SNTP Card 1 to allow the Main Network card to use a Simple Network Time Protocol (SNTP) server for time synchronization.
  - SNTP Card 2 to allow the optional Network card to use an SNTP server for time synchronization.
  - SNTP Auto to allow either Network cards to use an SNTP server for time synchronization (see \*NOTE on page 21-79).

**NOTE:** The Nexus® 1500+ meter also has an SNTP tab that lets you set up the Simple Network Time Protocol Server if you are using it for Time synchronization: see [11.1.3: Time Settings, on page 11-7](#), for instructions.

- IEEE 1588 PTP - This high-accuracy time synchronization method is available for the meter's synchrophasor PMU feature. See [21.17.4: IEEE 1588 PTPv2 Master, on page 21-83](#).
- Disabled to not allow either Network card to use an SNTP server for time synchronization.
- IEC 61850: select Enabled to enable the IEC 61850 server for one of the Network cards; select Disabled to disable the IEC 61850 server entirely.
- IEC 61850 GOOSE: select Enabled to enable IEC 61850 GOOSE communication; select Disabled to disable it. For the Nexus® 1450 and 1500+ meters, you also need to make settings for GOOSE distributed fault recording - see [21.17.2: IEC 61850 GOOSE Tab \(Nexus® 1450 and 1500+ Meters\), on page 21-80](#) for instructions.
- SNMP: SNMP communication can be disabled; enabled for Network card #1; enabled for Network Card #2; or enabled for both Network cards. Select the option you want.

**NOTE:** When you enable SNMP for one or both of the Network cards, you see additional selections that let you choose to support traps for the card supporting SNMP (see figure below). Traps are messages sent to the SNMP manager in response to specific conditions. When you enable SNMP you must also configure settings in the

SNMP tab. See [21.17.3: SNMP Tab, on page 21-81](#), for instructions.

SNMP	Both Card 1 & 2	<input type="checkbox"/> Enable SNMP Traps for Card 1	<input type="checkbox"/> Enable SNMP Traps for Card 2
IEEE 1588 PTP Master	Disabled	To configure additional settings, go to the IEEE 1588 PTP tab.	
Synchrophasor (PMU)	Disabled		

- IEEE 1588 PTP Master: to set the meter as a Master clock for IEEE 1588 Precision Time Protocol, click Enabled. (Network Card 2 is used for IEEE 1588 PTP communication.) Then configure settings in the IEEE 1588 tab - see [21.17.4: IEEE 1588 PTPv2 Master, on page 21-83](#). **Note that you cannot use IEEE 1588 PTP as a Master if you are using it as a time synchronization source for synchrophasors.**
- Synchrophasors (PMU): you can select either Card to use as a PMU for synchrophasors. Then configure settings in the Synchrophasor tab; this feature and its programming are explained in detail in the Nexus® 1500+ meter's User Manual's Appendix E and Appendix F. Download the manual at <https://www.electroind.com/products/nexus-1500-power-quality-meter-with-phasor-measurement-unit/>.
- TCP Ports: use these fields to set up ports for Cards 1 and 2 for:
  - Web server
  - Modbus TCP server
  - Control port
  - Data port
- TCP/UDP port: enter the port that will be used for IEC 61850 (TCP port) or GE EGD (UDP port) communication.
- Enter the outgoing mail port and the port name if SMTP is enabled.

**\*NOTE:** The Auto setting will let the meter choose which Network card will be used for communication, based on the meter IP/gateway IP settings and available connections to the gateway device. This is most useful when used in a redundant network environment, so that the meter will automatically switch to the network card that has the connection to the gateway device if the other network card has lost the connection to its gateway device.

### 21.17.2: IEC 61850 GOOSE Tab (Nexus® 1450 and 1500+ Meters)

The screenshot shows the 'Advanced Network Option Settings' window with the 'IEC 61850 GOOSE' tab selected. The 'Messages' section contains a text box with instructions and a grid of 16 checkboxes for selecting Boolean data packets for waveform capture.

**Messages**

Use this screen to allow the meter to capture waveforms based on data packets in GOOSE messages received from another device in the IEC 61850 network. The meter has memory to receive up to 16 Boolean data packets from received GOOSE messages. Check the boxes below that contain the data packets that will trigger a waveform capture. The specifics of the data packets in received GOOSE messages and the meter's distributed fault recording feature are set up in the IEC 61850 configuration file (.CID). Refer to the IEC 61850 Application Guide for instructions on setting this up.

1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>	6	<input type="checkbox"/>	7	<input type="checkbox"/>	8	<input type="checkbox"/>
9	<input type="checkbox"/>	10	<input type="checkbox"/>	11	<input type="checkbox"/>	12	<input type="checkbox"/>	13	<input type="checkbox"/>	14	<input type="checkbox"/>	15	<input type="checkbox"/>	16	<input type="checkbox"/>

OK Cancel Help

Use the IEC 61850 GOOSE tab to set waveform capture based on Boolean data embedded in a received GOOSE messages sent from another device in the IEC 61850 network. The Boolean data the meter receives will be related to limits/alarms or digital inputs state. The meter has memory to accept sixteen pieces of Boolean data from received GOOSE messages. The specifics of the Boolean data in specific GOOSE messages is set up in the IEC 61850 configuration file (.CID). Refer to the IEC 61850 Application Guide for instructions on setting this up\*.

- Check the boxes (1-16) which contain the Boolean data that you want to trigger a waveform capture. Refer to Appendix C in the meter's User Manual and the IEC 61850 Application Guide for your meter, for more details\*.

\* Nexus® 1450 meter product literature can be found here:

<https://www.electroind.com/products/nexus-1450-cyber-secure-power-quality-meter-with-multiport-communication/>

Nexus® 1500+ meter product literature can be found here:



<https://www.electroind.com/products/nexus-1500-power-quality-meter-with-pha-sor-measurement-unit/>

### 21.17.3: SNMP Tab

If you selected sending traps in SNMP in the Services tab, click the SNMP tab to make the settings for the trap messages.

Advanced Network Option Settings

Computer Name / DNS    SNTP    Alarm / Email    GE Protocol (EGD)    Services

DNP LAN/WAN Card 1    DNP LAN/WAN Card 2    IEC 61850 GOOSE    **SNMP**

Traps Manager IP Addresses	
1	156.34.180.52
2	156.34.180.55
3	156.34.180.60
4	0.0.0.0
5	0.0.0.0
6	0.0.0.0
7	0.0.0.0
8	0.0.0.0

Generate Traps for	
<input checked="" type="checkbox"/>	Limit Status Changes
<input checked="" type="checkbox"/>	Digital Input Changes
<input checked="" type="checkbox"/>	Waveform Captures
<input checked="" type="checkbox"/>	PQ (CBEMA) Events
<input checked="" type="checkbox"/>	Relay Output Changes
<input checked="" type="checkbox"/>	Transient Captures

Community Names	
Agent	Agent23
Traps	Traps3

OK    Cancel    Help

- You can enter the IP address of up to eight SNMP manager devices in the Traps Managers IP Addresses field. These IP addresses will receive any traps generated by the meter. If you are not using all eight addresses, you can leave the unused ones as 0.0.0.0. Note that the meter will not accept Broadcast IP addresses that are sent to multiple devices in one packet, such as 255.255.255.255 or 12.1.1.255.
- You can select the conditions that will generate trap messages in the Generate Traps for field. Click in the box to the left of any of the listed conditions to generate traps that will be sent to the SNMP managers when the condition occurs. For example, if you select Limit status Changes, anytime a limit is triggered or goes back

within limit, a trap will be generated and sent to the devices at the IP addresses you entered.

- Enter the Community Name for Agent and Traps. The default name for both fields is: public.
- The Agent Community name provides security by ensuring that the SNMP manager will only read (the manager's Read Community name)/write (the manager's Write Community name) from/to a managed object if it matches the Agent community name.
- The Traps Community name provides security by ensuring that only traps that match the Traps Community name of the Agent are received by the SNMP manager.

**NOTE:** Appendix D in the *Nexus® 1500+ Meter Installation and Operation Manual* contains detailed information on SNMP for the Nexus® 1500+ meter.

### 21.17.4: IEEE 1588 PTPv2 Master

If you enabled the IEEE 1588 PTP Master, click the IEEE 1588 PTP tab to make the settings for the Master clock. **Note that you cannot use IEEE 1588 PTP as a Master if you are using it as a time synchronization source for synchrophasors.** In that case, you would set the time synchronization source and then make settings in the Slave Settings tab. Detailed instructions for PMU settings are given in Appendix F of the meter's User Manual (download the manual at <https://www.electroind.com/products/nexus-1500-power-quality-meter-with-phasor-measurement-unit/>: click Downloads>Tech Documents>User Manual from the right side of the webpage).

The settings explained here are for using the meter as a Master clock for other devices.

Advanced Network Option Settings

Computer Name / DNS    SNTP    Alarm / Email    GE Protocol (EGD)    **Services**    DNP LAN/WAN Card 1

DNP LAN/WAN Card 2    IEC 61850 GOOSE    SNMP    **IEEE 1588 PTP**    Synchrophasor (PMU)

Slave Settings    **Master Settings**

Announce Message Send Rate: One per second

Sync Message Send Rate: Sixteen per second

Minimum Delay Request Interval: Every Sync message

Enable Follow-up Messages: No

UTC Vs TAI Offset: 37    Clock Variance: 0

Port ID: 0    Domain Number: 0

Priority Number 1: 0    Priority Number 2: 0

OK    Cancel    Help

The settings are:

- Announce Method Send Rate: choose from One per Second, Two per Second, Four per Second, Eight per Second, or Sixteen Per Second.
- Sync Message Send Rate: choose from Sixteen per second, Eight per second, Four per Second, Two per second, One every second, or One every two seconds.

- Minimum Delay Request Interval: choose from Every sync message, Every two Sync messages, Every four Sync messages, Every eight Sync messages, Every sixteen Sync messages, or Every thirty-two Sync messages.
- Enable Follow-up Messages: Yes or No.
- UTC Vs TAI Offset: the amount of offset (in seconds) between the UTC and TAI clocks.
- Port ID: the meter port used for Master clock communication.
- Priority Number 1: the number of the device that will get communication first.
- Clock Variance: this number defines the stability of the clock.
- Domain Number: this number identifies a logical grouping of clocks that are synchronized to each other using the protocol, but that are not necessarily synchronized to clocks in another domain.
- Priority Number 2: the number of the device that will get communication second.

## 22: DNP3 Configuration

A Nexus® 1252/1262/1272/1450/1500/1500+ meter can measure more than 3000 DNP Static Points, but not all points can be polled at the same time. In order for the meter to have the appropriate data, you should customize the DNP Point Map via CommunicatorPQA® software.

Up to 250 points of Event Data can be created in the Nexus® meter. Refer to the DNP3 Level 2 Protocol Assignments for Nexus® 1252, 1262, 1272, 1450, 1500, 1500+ Meters manual for more details. Refer to chapters 11, 12, 13, and 27 of this manual for details on configuring DNP3 for Nexus® meters. See chapters 26 and 28 for instructions on configuring DNP for the Shark® 270 and 250 meters, respectively.

### 22.1: Opening the DNP Settings Screen

From the meter's Device Profile, click General Settings> DNP Custom Classes Map > DNP Level 2. You will see the DNP Custom Mapping screen. Click on the tabs at the top of the screen to move between the following Settings screens.

**DNP Custom Mapping**

Object 10 - Binary Output    Object 1 - Binary Input    Object 20 - Binary Counter

**Object 30 - Analog Input**    Global Values    DNP Settings

DNP Points	Map		Description	Deadband (%)	Class Assignments
	Line	Point			Object 32
0	34	0	One Second Updated: Voltage A-N	100.00	No Class
1	34	1	One Second Updated: Voltage B-N	100.00	No Class
2	34	2	One Second Updated: Voltage C-N	100.00	No Class
3	36	0	One Second Updated: Current A	100.00	No Class
4	36	1	One Second Updated: Current B	100.00	No Class
5	36	2	One Second Updated: Current C	100.00	No Class
6	45	0	One Second Updated: Watt Total	100.00	No Class
7	43	0	One Second Updated: Var Total	100.00	No Class
8					

Enter Line and Point assignments from the DNP Table or double click the Description Field for a list of Selections.

Enter a dead band % to be used in causing an associated Object 32 value. (See Manual for Description of base values used by the dead band %)

For Object 32 assign a class.

☐ Use Custom 16-Bit Scaling

OK    Cancel    Help    Clear    Clear All

- The Clear All Button clears all assigned items on all the tabs.
- The Clear Button clears only the items on the current tab view.

## 22.2: Binary Input (Object 1)

A Nexus® meter can use up to 64 Binary Input Points. Values available for Binary Input use can be found in the DNP Object Mapping. Only Class 0 is used when polling Binary Input (Object 1) Data. Class 1, 2 or 3 is used when polling Binary Input Change (Object 2) Data.

**DNP Custom Mapping**

Object 30 - Analog Input    Global Values    DNP Settings

Object 10 - Binary Output    **Object 1 - Binary Input**    Object 20 - Binary Counter

DNP Points	Map		Description	Class Assignments
	Line	Point		Object 2
0 - 7	233	0	Internal Inputs States: Inputs 1-8	Class 2
8 - 15	234	0	Digital Input States 1 - 8, Card 1: 1-8	Class 2
16 - 23				
24 - 31				
32 - 39				
40 - 47				
48 - 55				
56 - 63				

Enter Line and Point assignments from the DNP Table or double click the Description Field for a list of Selections.

DNP Points are assigned in Groups of 8. Entering an Point selects that point and the next 7 in succession. Each Object 1 assigned has an associated Object 2.

OK    Cancel    Help    Clear    Clear All

- Line, Point, Description setting:
  - Double-click on the box under Description to Add, Delete or Modify DNP Points to the screen above.
  - From the pull-down menu, choose a Type (of reading) and a Channel and click OK.
  - The corresponding numbers for the selected reading and channel will appear in the Line and Point columns.

- Numbers for a Binary Input value can also be found in the DNP Object Mapping (Chapter 7 of the DNP V3.00 Level 2 Protocol Assignments for Nexus® 1252, 1262, 1272, 1450, 1500, 1500+ Meters manual).
  - For example, 1 Cycle High Speed Input Delta and Current State has Line Number 16 and Point Number 0 in the DNP Object Mapping. Write those numbers into the Object 1 – Binary Input tab. When the Line and Point Numbers are written, the software fills in the description on the screen. Repeat for each desired Binary Input Point.
- Object 2 setting: any DNP Static Point can be configured to create a DNP Event Point. Class Assignments on the Object 2 screen are used to configure Binary Input Change Event Points. In order to create Event Data, Object 2 Points must be assigned to Class 1, 2 or 3. Each point can have a different Class Assignment.
- Click OK to return to the Device Profile screen; click Update Device to update the meter. The Nexus® meter will scan the programmed points every second.

## 22.3: Analog Input (Object 30)

A Nexus® meter can use up to 64 Analog Input points. Values available for Analog Input use can be found in the DNP Object Mapping. Only Class 0 is used when polling Analog Input (Object 30) Data. Class 1, 2 or 3 is used when polling Analog Change Event (Object 32) Data.

**DNP Custom Mapping**

Object 10 - Binary Output      Object 1 - Binary Input      Object 20 - Binary Counter

**Object 30 - Analog Input**      Global Values      DNP Settings

DNP Points	Map		Description	Deadband (%)	Class Assignments
	Line	Point			Object 32
0	34	0	One Second Updated: Voltage A-N	100.00	No Class
1	34	1	One Second Updated: Voltage B-N	100.00	No Class
2	34	2	One Second Updated: Voltage C-N	100.00	No Class
3	36	0	One Second Updated: Current A	100.00	No Class
4	36	1	One Second Updated: Current B	100.00	No Class
5	36	2	One Second Updated: Current C	100.00	No Class
6	45	0	One Second Updated: Watt Total	100.00	No Class
7	43	0	One Second Updated: Var Total	100.00	No Class
8					

Enter Line and Point assignments from the DNP Table or double click the Description Field for a list of Selections.

Enter a dead band % to be used in causing an associated Object 32 value. (See Manual for Description of base values used by the dead band %)

For Object 32 assign a class.

☐ Use Custom 16-Bit Scaling

OK      Cancel      Help      Clear      Clear All

- Line, Point, Description settings:
  - a. Double-click on the box under Description to Add, Delete or Modify DNP Points to the screen above.
  - b. From the pull-down menu, choose a Type (of reading) and a Channel and click OK.
  - c. The corresponding numbers for the selected reading and channel will appear in the Line and Point columns.



- Line and Point Numbers can also be found in the DNP Object Mapping (Chapter 7 of the DNP V3.00 Level 2 Protocol Assignments for Nexus® 1252, 1262, 1272, 1450, 1500, 1500+ Meters manual).
  - For example, One Second Phase A-N Voltage is EIG Line Number 34 and Point Number 0 in the DNP Object Mapping. Write these numbers into the Object 30 – Analog Input tab. When the Line and Point Numbers are written, the software will fill in the description. Repeat for each desired Analog Input Point.
- Deadband (), Object 32:
  - Any DNP Static Point can be configured to create DNP Event Points. Deadband and Class Assignments on the Object 32 screen are used to configure Analog Change Event Points. In order to create Event Data, Object 32 Points must be assigned to Class 1, 2 or 3. Each point can have a different Class assignment. Deadband () defines the boundary value for that point.
    - For example, suppose One Second Phase to Neutral Volts AN is programmed and the Voltage Full Scale is 120.00V for the meter. Entering 10 for Deadband will define the boundary value of 12V (10 of 120V). Every second, new Static Data is scanned for One Second Phase to Neutral Volts AN. If the new data is different from the previous standard value by the boundary value, an Analog Change Event will be created.

For example, if the previous standard value is 110 and new data is lower than 98V or higher than 122V, a new Analog Change Event Point will be created. The new value then becomes the previous standard value for future scans.
- Analog Input Points have various Full Scales values due to different data types (Volts, Amps, Watts, etc.). These Full Scale values are used for Exception Polling in DNP. Some Full Scale values are programmable by users and others have fixed numbers. See the chart of Full Scale Values on page 22-7.

- To use the custom-scaling feature, click the checkbox next to Use Custom 16-Bit Scaling. The Custom Scaling button will display - click this button to see the screen shown below.

**DNP Custom Mapping: Object 30 Custom 16-Bit Scaling**

DNP Value	+Maximum	Minimum	-Maximum
	+32767	0	-32768
I A, B, C, N	<input type="text" value="0.000"/>	0	
V AN, BN, CN	<input type="text" value="0.000"/>	0	
V AB, BC, CA	<input type="text" value="0.000"/>	0	
Power Phase	<input type="text" value="0.000"/>	0	0.000
Power Total	<input type="text" value="0.000"/>	0	0.000
Frequency	<input type="text" value="0.000"/>	0.000	<input type="text" value="0.000"/>

Note: Enter values in primary

OK Cancel

Use this screen to program the secondary scale that will be used to maximize the 16-bit resolution precisely around the parameters you choose:

- Enter values (in Primary) in the Maximum entry fields next to the readings you want to scale.
- Click OK to save your entry and return to the previous screen; click Cancel to close the screen without making any changes.

**NOTE:** Depending on the age of your meter, you may not have the custom-scaling option.

- Full Scale values are 4-byte integer numbers. The units are as follows:

Analog Input	Full Scale	Unit
I A, B, C, Nc	Programmable	1/65536 Amps
I Nm	Programmable	1/65536 Amps
V AN, BN, CN	Programmable	1/65536 Volts
V AB, BC, CA	Programmable	1/65536 Volts
V Aux	Programmable	1/65536 Volts
Power Phase	Programmable	1/65536 Watts
Power Total	Programmable	1/65536 Watts
Frequency	Programmable	1/65536 Hz
Power Factor	4000	0.001 PF
Angles	18000	0.001 PF
Percent	10000	0.01
K-Factor	500	0.01
TOU Ratio	N/A	N/A
Temperature	10000	0.01
Flicker	65536	0.0001
In Interval	1000	1000
Day of Week	6	1
Sequence	1	1
Status	100	1
Avg Select	100	1
Delay	100	1
Log Index	100	1
Countdown	100	1

- For example, in order to find out if there is new log data, use a Log Index Number. One of the Log Index Numbers (Last Index) will increase when a new log is created. In Object 30, Program Last Log Record Index:

Waveform Log (Line 499, Point 7). Input Deadband 1.00 and assign a Class.

The exception data will be created when the Index Number increases by one.

- Click OK to return to the Device Profile screen; click Update Device to update the meter. The Nexus® meter will scan the programmed points every second (except for Tenth Second Readings: Tenth Second Readings (Line 18 to 32) are scanned as soon as the meter detects a change (as often as every 50 milliseconds).

## 22.4: Binary Counter (Object 20)

A Nexus® meter can use up to 32 Binary Counter Points. Values available for Binary Counter use can be found in the DNP Object Mapping. Only Class 0 is used when polling Binary Counter (Object 20) Data and Frozen Counter (Object 21) Data. Class 1, 2 or 3 is used when polling Counter Event (Object 22) Data and Frozen Counter Event (Object 23) Data.

**DNP Custom Mapping**

Object 30 - Analog Input			Global Values		DNP Settings		
Object 10 - Binary Output			Object 1 - Binary Input		<b>Object 20 - Binary Counter</b>		
DNP Points	Map		Description	Scaling	Object 22		Object 23 Class
	Line	Point			Delta	Class	
0	537	0	Energy(Scaled):Quadrant 1+4 Wh	0	999999999	No Class	No Class
1	536	1	Energy(Scaled):Quadrant 1+2 VARh	0	0	No Class	Class 1
2							
3							
4							
5							
6							
7							
8							
9							

Enter Line and Point assignments from the DNP Table or double click the Description Field for a list of Selections. Enter a Digit Scaling Number(0 to 15) for the point where Number is represented by x in the  $10^x$  power scaling equation.

Each Object 20 assigned has an associated Object 22 and 23. For Object 22, enter a delta value to trigger the DNP event and assign a class. For Object 23 assign a class.

OK Cancel Help Clear Clear All

- Line, Point, Description settings:
  - Double-click on the box under Description to Add, Delete or Modify DNP Points to the screen above.
  - From the pull-down menu, choose a Type (of reading) and a Channel and click OK.

- c. The corresponding numbers for the selected reading and channel will appear in the Line and Point columns.
- Line and Point Numbers can also be found in the DNP Object Mapping (Chapter 7 of the *DNP V3.00 Level 2 Protocol Assignments User Manual for Nexus® 1252, 1262, 1272, 1450, 1500, 1500+ Meters*).
    - For example, VA hour has Line Number 133 and Point Number 0 in the DNP Object Mapping. Write those numbers into the Object 20- Binary Counter tab. When the Line and Point Numbers are written, the software fills in the description on the screen. Repeat for each desired Binary Counter Point.
  - Scaling:
    - A Nexus® meter can measure its Binary Counter value using up to a 16-digit number (0 to 9,999,999,999,999,999). DNP Binary Counter Points use up to 32 bits. That means that the range is 0 to 4,294,967,295 (0x0FFFFFFF). This maximum number is only a 10-digit number. In order to deal with a 16-digit number, Scaling is necessary.
    - Scaling is used to select a unit in powers of 10: 1 = x10, 2 = x100 and so on. The Scaling value can be 0 to 15.
      - For example, if the value inside the meter is 3,000,000 and a Scaling value of 2 (x100) is used, the Binary Counter value will be reported as 30000. The actual value is  $30000 \times 100 = 3,000,000$ .
  - Delta, Object 22:
    - Any DNP Static Point can be configured to create DNP Event Points. Delta and Class Assignments on the Object 22 screen are used to configure Counter Change Event Points. In order to create Event Data, Object 22 must be assigned to Class 1, 2 or 3. Each point can have a different Class Assignment. The Delta value defines the boundary value for that point.
      - For example, suppose VA hour is programmed and the Delta is 5. That represents 5 increments from the returned 32-bit Binary Counter value. Every second, new Static Data is scanned for VA hour. If new data is different from the previous standard value by the Delta value, the Counter Change Event Data will be created.

That means, if the previous standard polled value is 50000 VA hour and if the VA hour reading increases to 50005, it will create a Counter Change Event Point for VA hour and 50005 VA hour will become the previous standard value for the next Static Data.

- The Scaling setting for a point also applies to the Delta value. If Delta is 5 and Scaling is 2, this indicates a 500-count change in the internal representation.
- Object 23: Frozen Analog Event (Object 23) will be created if Object 23 is assigned to Class 1, 2 or 3.
- Click OK to return to the Device Profile screen; click Update Device to update the meter. The Nexus® meter will scan the programmed points every second.

## 22.5: Binary Output (Object 10)

Class 0 is used when polling Binary Output (Object 10) Data. External Relay Output Modules can be attached to the Nexus® 1252/1262/1272/1450/1500/1500+ meter. Up to 4 Relay Output Modules can be attached and each Relay Module has 4 Relay Outputs.

**DNP Custom Mapping**

Object 30 - Analog Input      Global Values      DNP Settings

**Object 10 - Binary Output**      Object 1 - Binary Input      Object 20 - Binary Counter

DNP Point	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Relay #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Enable	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

DNP Point	Actions	Enable
16	Log Reset	<input checked="" type="checkbox"/>
17	Maximum Reset	<input checked="" type="checkbox"/>
18	Minimum Reset	<input checked="" type="checkbox"/>
19	Energy Reset	<input checked="" type="checkbox"/>
20	Reset Time Of Use Current Season and Current Month	<input checked="" type="checkbox"/>
21	Manual Waveform Capture	<input checked="" type="checkbox"/>
22	Reset Internal Input Accumulations and Aggregations	<input checked="" type="checkbox"/>
23	Reset Unit to Boot Mode - Default Communication Settings	<input checked="" type="checkbox"/>

Check the box to enable the function to be able to be controlled by DNP.

Relay Status and Reset Status are polled using Object 10  
For Controlling relays and performing Resets, Object 12 is used.

OK      Cancel      Help      Clear      Clear All

- To enable control of a Relay by DNP, check its box. If unchecked, the relay will not be controlled by DNP.
- The Master in DNP protocol can control 16 relays. In order to do that, each relay box should be checked and the Nexus® meter should be updated with this profile.
- Check the box for the Reset Enable you want to control through DNP. The Master not only controls relays but also can do various resets.
- Relay Status and Reset Status can be polled using Object 10. For Controlling Relays and performing Resets, Object 12 is used. Each box should be checked in order for the Master to do the reset.

- Example 1 - The Master can control Relay 1 by sending this message (Meter Address 1, Master Address 10):

05 64

18 C4 01 00 0A 00 6C 1A

C0

C0 05

06

01 17 01

00 03 01 01 00 00 00 00 00 3B EF 00 00 00 FF FF

- Example 2 – The Master can control Relay 2 by sending this message:

05 64

18 C4 01 00

0A 00 6C 1A

C0

C1 05

0C

01 17 01

01 03 01 01 00 00 00 00 00 E2 5F 00 00 00 FF FF

- Example 3 – The Master can do a Log Reset by sending this message:

05 04

18 C4 01 00 0A 00 6C 1A

C0

C2 05

0C



01 17 01

10 03 01 01 00 00 00 00 00 C5 1B 00 00 00 FF FF

- Example 4 – The Master can do an Energy Reset by sending this message:

05 04

18 C4 01 00 0A 00 6C 1A

C0

C3 05

0C

01 17 01

13 03 01 01 00 00 00 00 00 E7 5B 00 00 00 FF FF

**NOTE:** The preceding examples use Function 5 (Direct Operate Relay) and Qualifier 0x17.

- The Point Numbers for Relays and Resets are as follows:

- Points Assignment

- 0 Relay 1

- 1 Relay 2

- 2 Relay 3

- 3 Relay 4

- 4 Relay 5

- 5 Relay 6

- 6 Relay 7

- 7 Relay 8

- 8 Relay 9

- 9 Relay 10
- 10 Relay 11
- 11 Relay 12
- 12 Relay 13
- 13 Relay 14
- 14 Relay 15
- 15 Relay 16
- 16 Log Reset
- 17 Reset of Maximum Thermal Average
- 18 Reset of Minimum Thermal Average
- 19 Energy Reset
- 20 Reset Time of Use Current Frozen Register and Current Month
- 21 Manual Waveform Capture
- 22 Reset Internal Input Accumulations and Aggregations
- 23 Reset Unit to Boot Mode – Default Communication Settings

**NOTE:** Point 23 is a temporary switch to Boot in Modbus Protocol. This switch times out.

## 22.6: Global Values

Each Object can be polled by Variation 0.

**DNP Custom Mapping**

Object 10 - Binary Output      Object 1 - Binary Input      Object 20 - Binary Counter  
 Object 30 - Analog Input      **Global Values**      DNP Settings

Object		Object
Name	Number	Variation
Binary Input	1	2, (With Status)
Binary Input Change	2	2, (With Time)
Binary Counter	20	6 (16-bit w/o Flag)
Frozen Counter	21	10, (16-bit w/o Flag)
Counter Change Event	22	6, (16-bit With Time)
Frozen Counter Event	23	6, (16-bit With Time)
Analog Input	30	4, (16-bit w/o Flag)
Analog Change Event	32	4, (16-bit With Time)

Click on the field for a list of the variants allowed for each object

OK    Cancel    Help    Clear    Clear All

- Using this tab, you can assign a default variation to be returned for each Object.
  - Click on the Object on the left side of the screen.
  - Click on a Variation on the right side of the screen.
- Click OK to return to the Device Profile screen; click Update Device to update the meter. The Nexus® meter will scan the programmed points every second.

## 22.7: DNP Settings

With this tab, you can enable DNP Time Synchronization.

The screenshot shows the 'DNP Custom Mapping' dialog box with the 'DNP Settings' tab selected. The dialog has a title bar 'DNP Custom Mapping' and a tabbed interface. The 'DNP Settings' tab is active, showing two main sections: 'DNP Time Synchronization' and 'DNP Auto Freeze Schedule'. The 'DNP Time Synchronization' section has an 'Enable' checkbox checked and a 'Sync Interval' dropdown set to '2 Minutes'. The 'DNP Auto Freeze Schedule' section has an 'Enable' checkbox checked, a 'Reference Date' section with 'Month' (12), 'Day' (31), and 'Year' (2014) dropdowns, a 'Reference Time' section with 'Hour' (23), 'Minute' (59), and 'Second' (59) dropdowns, and a 'Freeze Interval' section with 'Hour' (48) and 'Minute' (59) dropdowns. Below these sections is a 'Class 0 Poll Counter Object' dropdown set to 'Frozen Counter (Object 21)'. At the bottom of the dialog are buttons for 'OK', 'Cancel', 'Help', 'Clear', and 'Clear All'.

- The Time Interval is the amount of time the device waits before requesting Time Synchronization from the Master (using IINI-4). The Time Interval is configurable from 1 minute to 1 day in 1-minute intervals. The initial factory setting is Not Enabled.
- Class 0 Poll Counter Object allows you to select Binary Counter (Obj. 20) or Frozen Counter (Obj. 21) for a Class 0 Poll.
- DNP Auto Freeze Schedule enables and sets the interval for a Class 0 Poll.
- For the Nexus® 1500+ meter, there is an additional section of settings for the Unsolicited Response feature. See the example screen on the next page.

**DNP Custom Mapping**

Object 10 - Binary Output    Object 1 - Binary Input    Object 20 - Binary Counter  
Object 30 - Analog Input    Global Values    **DNP Settings**

**DNP Time Synchronization**  
☐ Enable

**DNP Auto Freeze Schedule**  
☐ Enable

**Class 0 Poll Counter Object**  
Frozen Counter (Object 21)

**DNP Unsolicited Response Settings (Serial Port Only)**  
☒ Enable

Disable on Startup: Yes    Destination Address: 2    Confirmation Timeout: 10 Seconds    Number of Retries: 16

Enable Unsolicited Responses For: ☒ Class 1    ☒ Class 2    ☒ Class 3

OK    Cancel    Help    Clear    Clear All

Unsolicited Response is a DNP feature in which the meter sends an unrequested message to the master device when certain specified events occur. This setting lets you enable and configure unsolicited response messages for the Nexus® 1500+ meter. Refer to the *DNP V3.00 Level 2 Protocol Assignments User Manual for Nexus® 1252, 1262, 1272, 1450, 1500, 1500+ Meters* for additional details on Unsolicited Response.

Note that unsolicited response can only take place through a serial port connection. The settings for unsolicited response are as follows:

- Enable - check the box to enable unsolicited response - un-check it to disable unsolicited response.
- Disable on startup - this setting disables (Yes) or enables (No) the sending of a null (empty) message to the master device, on meter startup.

- Destination Address - enter the destination address of the master device to which the unsolicited response will be sent. The allowable range is from 1 to 65519.
- Confirmation Timeout - enter the amount of time that the meter will wait for a confirmation back from the master device. This is also the amount of time between transmissions of unconfirmed unsolicited responses. The range of allowable values is from 1 second to 60 seconds.
- Number of Retries - enter the number of unsolicited retries that the meter will transmit in each unsolicited response series, if it does not receive confirmation back from the master device. The configured value includes identical and regenerated retry messages. The allowable values are from 1 to 16. Selecting 16 causes continual retries, until there is a response.
- Enable Unsolicited Response For - the meter can monitor all data points from 3 DNP3 Classes, which can then be included inside unsolicited response messages. Check the box next to Class 1, Class 2 and/or Class3 to include data from those classes; uncheck the boxes to not send data from those classes in unsolicited response messages.
- Click OK to return to the Device Profile screen; click Update Device to update the meter.

## 23: EN 50160 / IEC 61000-4-30 Power Quality Analysis

### 23.1: Overview

EN 50160 is the European Standard approved by CENELEC (European Committee for Electrotechnical Standardization). This standard and other standards, such as IEC 61000-4-30, define the properties of the power supply as delivered to the user in normal operating conditions. The properties are defined in terms of continuity of supply and characteristics of voltage (symmetry, frequency, magnitude, waveform, Flicker). These standards define the main characteristics of the voltage at the customer's supply terminals in public voltage electricity distribution systems. They do not describe the typical situation for a customer connected to a public supply network.

The term "Flicker," for example, is defined by EN50160/IEC61000-4-30 and refers to the human eye's perception of luminance differences in light sources. Flicker is discussed in the Rapid Voltage Changes section.

In recent years, power quality has become a very important issue. Competitive markets require constant attention to customer satisfaction. Increasing use of non-linear and pulsed loads can cause mains interference. And, many electronically controlled devices that we use to "run" our countries, businesses, and homes require quality supply voltage. For these reasons, it is important to collect reliable power quality data for electricity suppliers and customers alike.

Following are the Power Quality measurements that comprise analysis as per the EN 50160/IEC 61000-4-30 standards (depending on the meter model, the measurement label and/or available measurements may differ, as shown in the table below):

<b>Nexus® 12** Meters</b>	<b>Nexus® 1500 Meter</b>	<b>Nexus® 1500+ Meter</b>
Frequency Fluctuations	Power Frequency	Power Frequency
Low Speed Voltage Fluctuations	Supply Voltage Variations	Supply Voltage Variations
Fast Voltage Fluctuations	Rapid Voltage Changes	Rapid Voltage Changes
Flicker	Flicker PLT	Flicker PLT
		Flicker PST
Supply Voltage Unbalance	Supply Voltage Unbalance	Supply Voltage Unbalance
Harmonic Magnitude	Harmonic Voltage THD	Harmonic Voltage and THD
THD		
		Magnitude of Supply Voltage
Voltage Dip	Supply Voltage Dips	Supply Voltage Dips
		Voltage Swells
Short Interruption Supply Voltage	Short Interruption of Supply Voltage	Short Interruption of Supply Voltage
Long Interruption Supply Voltage	Long Interruption of Supply Voltage	Long Interruption of Supply Voltage
	Mains Signaling Voltage on the Supply Voltage	Mains Signaling Voltage on the Supply Voltage
	Temporary Power Frequency Overvoltage Between Live Conductors and Earth	Temporary Power Frequency Overvoltage Between Live Conductors and Earth



## **23.2: Issues Addressed by the Power Quality Compliance Standards**

The following sections describe the Power Quality standards for compliance.

### **23.2.1: Mains Interference**

The increased use of power electronics and other devices puts a strain on the network. Because of this, electricity suppliers need detailed data on the quality of their network. New, advanced measuring and testing systems are used to record voltage quality at various points, convert the data and add it to a central database. By correlating the applicable fluctuations and studying the time of events, the cause for a disturbance can be confined and ultimately eliminated.

For a number of reasons, power quality has become an important issue:

1. Mains interference feedback can be caused by increased use of non-linear and pulsed loads.
2. An ever-widening number of electronic devices are very sensitive to mains pollution. A certain quality of supply voltage is required for them to operate properly.

3. With deregulation a global reality, a good relationship between supplier and customer is essential. Permanent monitoring of voltage quality in networks is one key to maintaining quality control, which helps to sustain relationships.

### **23.2.2: Power Quality and Network Disturbances**

The quality of an electric power supply is determined by examining two aspects of Power Quality:

1. Reliability of the energy supply
2. Quality of the voltage (similarity of the waveform of the supplied voltage to an ideal sinusoidal voltage)

Divergences from the ideal come in many shapes and sizes. In the next sections, we will discuss Network disturbances in detail.

#### **23.2.2.1: Voltage Dips**

The Voltage Level determines the Voltage Quality. When the voltage drops to a low level, a voltage dip occurs. If the voltage drops to zero, a power failure occurs. The depth and duration of the dip determine the severity.

A dip is a sudden drop of the voltage to a level below 90 of the nominal voltage, followed by an increase to a level above 90 within a period of 10ms to 60s. Most dips in medium or high voltage networks have durations of less than 0.2s.

Short dips can cause serious problems, such as failure of equipment and machine control systems. Short dips can also cause sudden torque change in motors, which causes damage.

Faults in the insulation of medium and high voltage networks are the primary cause of most dips. Other possible causes of dips are branches of trees in contact with lines, ice, frost, snow and thunderstorms. During most dips, all customers in the network are affected to the same degree.

Customers themselves can cause many dips. The start-up of big machines or capacitor banks can cause voltage dips, and short circuits can cause losses when there is insufficient short-circuit capacity.

### 23.2.2.2: Flicker

The term Flicker, defined in IEC 61000-4-15, applies to luminescent variations of light sources as perceived by the human eye. Since each human eye is different, this perception varies with each person. Flicker is the sensation that is experienced by the human visual system when it is subjected to changes occurring in the illumination intensity of light sources. The primary effects of Flicker are headaches, irritability and sometimes epilepsy. Flicker can be caused by voltage variations which are caused by variable loads, such as arc furnaces, laser printers and microwave ovens.

IEC 61000-4-15, IEC61000-4-30 and former IEC 868 describe the methods used to determine Flicker severity. This phenomenon is strictly related to the sensitivity and the reaction of individuals. To determine the standard, Flicker measurement was performed through observation of groups of people, and statistical operations were applied to the observations.

Flicker is computed using the three phase-to-neutral voltages in WYE configurations and the three phase-to-phase voltages when in DELTA. Evaluation occurs in the following forms: Instantaneous, Short Term or Long Term.

The range of analysis is from 0.01 to 33Hz. Sensitivity of the human brain correlates with the frequency of the sensation. To make sure that most people do not perceive flickers, the Plt (Long Term Flicker) value must be below 1.00. This value is obtained with the following equation:

$$P_{lt} = \frac{\sqrt[3]{\sum_{i=1}^N P_{sti}^3}}{N}$$

Where  $P_{sti}$  ( $i = 1, 2, 3, \dots$ ) are consecutive readings of the short-term severity  $P_{st}$ .

### 23.2.2.3: Transients

A transient over-voltage is a short duration oscillatory or non-oscillatory over-voltage, usually highly damped and with a duration of a few milliseconds or less. Transients are generally incidental and are considered single short term events. Switching capacitor banks on, switching inductive loads off, and lightning that affects power lines are the primary causes of transients.

However, regular transients can occur when loads controlled by power electronics are switched on and off. Modern switching technology can be applied to minimize regular transients.

### 23.2.2.4: Harmonics

Harmonic voltage is defined as a sinusoidal voltage with a frequency equal to an integer multiple of the fundamental frequency of the supply voltage. Harmonic voltages can be evaluated:

- Individually by their relative amplitude ( $U_h$ ) related to the fundamental voltage ( $U_1$ ), where  $h$  is the order of the harmonic.
- Globally, for example by the total harmonic distortion factor (THD), which is the sum of all harmonics (all frequency contents), calculated using the following equation:

$$THD = \sqrt{\sum_{h=2}^{40} (u_h)^2}$$

Supply voltage harmonics are usually caused by customers' non-linear loads connected to all voltage levels of the supply system. Harmonic currents flowing through the system impedance create harmonic voltages.

In office and residential buildings, harmonics are usually caused by energy-efficient lamps, TVs and PCs. These devices in large numbers can produce high harmonic content in low voltage networks. Fast Fourier transformation is used to measure harmonics. This method generates a spectrum of a signal yielding a frequency-

domain representation. EN 50160 defines the values for harmonics and THD in percentages of the nominal voltage  $U_h$ .

### 23.2.2.5: Frequency

The supply voltage nominal frequency ( $U_{fn}$ ) is 50Hz or 60Hz. Under normal operating conditions, the 10-second average value of the fundamental frequency in a distributive mains must be in the following ranges:

$U_{fn} \pm 1$	For mains with connection to an interlinking mains* during 95 of one week.
$U_{fn} \pm 4 / -6$	For mains with connection to an interlinking mains* during 100 of one week.
$U_{fn} \pm 2$	For stand-alone mains** during 95 of one week.
$U_{fn} \pm 15$	For stand-alone mains** during 100 of one week.

In today's interconnected grids, frequency fluctuations are very small.

\* Interlinking mains are also known as synchronous. They are large, inter-connected power grids.

\*\* Stand-alone mains are also known as unsynchronous. They are independent power systems, unconnected to the main electrical grid.

## 23.3: Permanent Monitoring Provides Valuable Data

The types of data provided by permanent monitoring are listed below. This data is invaluable to the successful operation of electricity suppliers.

- Types and levels of disturbances in the network
- Overview and detailed analysis of voltage quality in the network
- Time-stamped recordings of disturbances

Through analysis of the data provided, causes of a disturbance can be determined, events clarified and associated problems or trends discovered. Preventive maintenance may also be facilitated by the data. Indicators may predict disturbances early enough to avoid the event altogether.

## 23.4: Power Quality Monitoring

EN 50160 has standardized the voltage quality of electricity supplied by public distribution systems since 1994. Amendments have been added to the standard to reflect changes in technology. Other standards, such as IEC 61000-3-6 and 61000-3-7, set the standard for distortions across medium and high voltage networks.

With this standard in hand, customers have new rights regarding the quality of supply. For example, if the voltage quality at the point of common coupling does not conform to the standard, according to EN 50160 the customer has the right to complain. As a result, there has been a shift towards partnership between the electricity supplier and customer. The quality of the electricity should be constantly monitored at the point of common coupling and throughout the network to the benefit of both partners. And, since disturbances caused by one customer can affect others indirectly linked to them in the network, the continuous monitoring will benefit all customers.

## 23.5: EN 50160/IEC 61000-4-30 Meter Setting and Report Viewing

You set up your meter for use with the Power Quality Compliance Standards through the meter's Device Profile - see section 11.3.6 (Nexus® 1500/1500+ meter), 12.3.4 (Nexus® 1262/1272 meter), and 13.3.4 (Nexus® 1252 Meter) for instructions.

- Through the Flicker Polling screen - see Section 5.4.3 for instructions
- Through the Flicker log - see Section 19.4.13 for instructions on viewing and graphing the Flicker data
- Through the EN50160 report - see Section 19.4.15 for instructions on viewing the data and printing an EN 50160 report. A sample copy of the report follows. Note that the example report is for Nexus® 1500+ meter - the EN 50160 report generated from a Nexus® 1252/1262/1272 meter or a Nexus® 1500 meter with earlier firmware, will look slightly different.

## EN50160 Individual Report Summary

 Power Frequency (x.1)	<b>Fail</b>
 Supply Voltage Variations (x.3.x)	<b>Fail</b>
 Rapid Voltage Changes (x.4.1)	<b>Fail</b>
 Flicker PLT (x.4.2)	<b>Fail</b>
 Flicker PST	<b>Fail</b>
 Supply Voltage Dips (x.5)	<b>Pass</b>
 Voltage Swells	<b>Pass</b>
 Short Interruption of Supply Voltage (x.6)	<b>Fail</b>
 Long Interruption of Supply Voltage (x.7)	<b>Fail</b>
 Temporary power frequency overvoltage (x.8)	<b>Pass</b>
 Supply Voltage Unbalance (x.10)	<b>Fail</b>
 Harmonic Voltage (x.11)	<b>Pass</b>
 Mains Signaling Voltage (x.13)	<b>Pass</b>

Meter Name 128Mb\_IP194  
 Serial 113599432  
 Nominal Frequency 60Hz  
 Nominal Voltage (Un) 120V

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Weekly report for  
 Mon, 06 Oct 2014 16:47:46 -0500 to Sat,  
 11 Oct 2014 23:59:59 -0500

EN50160 (2010) Report Details

Device Info	
Meter Type	Nexus 1500
Meter Name	128Mb_IP194
Serial Number	0000000113599432
Firmware	4.6027
Profile CRC	0x9E5B
Profile Date	2014-07-21 15:10:56
Hookup	Wye
Supply Type	Medium Voltage
Synchronous Connection	No
Nominal Voltage	120V
Nominal Frequency	60Hz

Report Info	
Report Version	S2010-1
Standard Version	EN50160 (2010)
Report Type	Weekly
First Day of Week	Sun
Time Range	10/6/2014 to 10/12/2014

Report Errors	
Date Range	Unknown date range type: Weekly

Meter Name 128Mb\_IP194  
 Serial 113599432  
 Nominal Frequency 60Hz  
 Nominal Voltage (Un) 120V

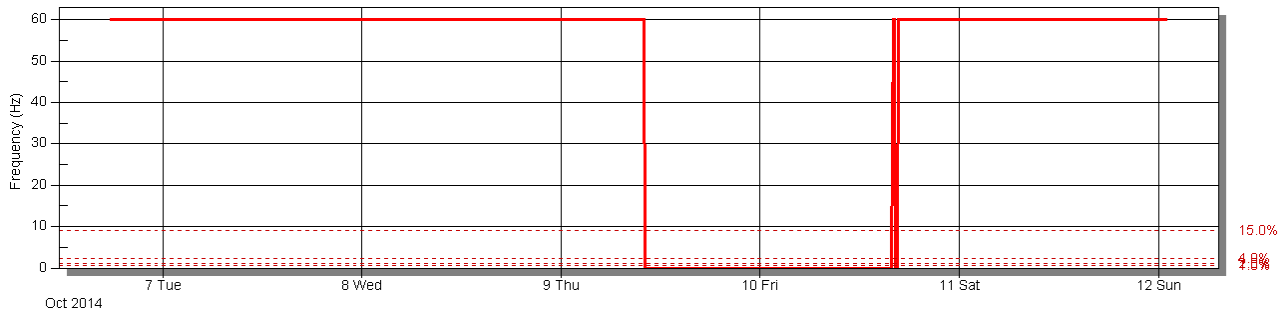
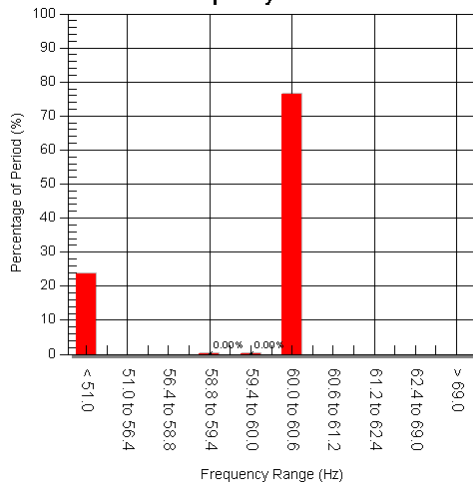
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Weekly report for  
 Mon, 06 Oct 2014 16:47:46 -0500 to Sat,  
 11 Oct 2014 23:59:59 -0500



**FREQ****Section x.1 Power Frequency (Not Synchronized)****Fail**

Under normal operating conditions for a non-synchronized system, the mean value of the fundamental frequency measured over 10 seconds shall be within  $\pm 1.0\%$  of the nominal frequency (60Hz) for 99.0% of the year, and within  $+4.0\%/-6.0\%$  for 100.0% of the year. This report gives the results over the course of the specified period.

**Frequency Trend****Frequency Bins****Results Summary**

Zone	Required	Actual	Result
$\pm 1.0\%$	99.0%	76.35%	Failed
$+4.0\%/-6.0\%$	100.0%	76.35%	Failed

Meter Name 128Mb\_IP194  
 Serial 113599432  
 Nominal Frequency 60Hz  
 Nominal Voltage (Un) 120V

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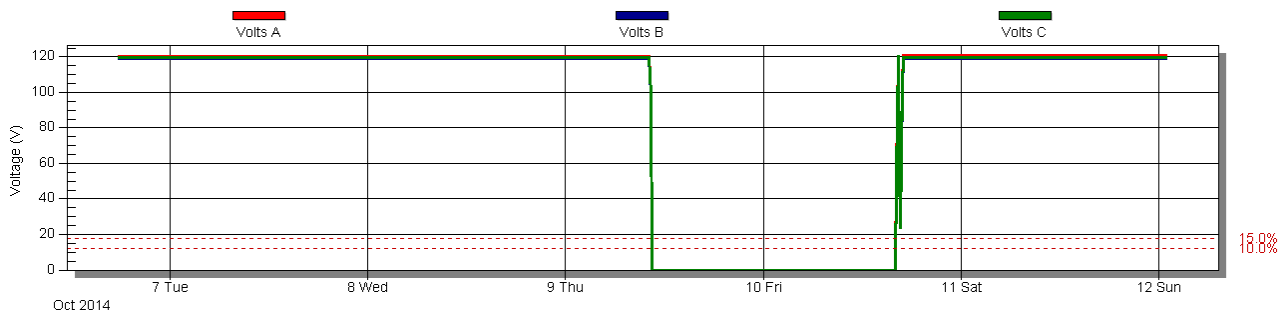
Weekly report for  
 Mon, 06 Oct 2014 16:47:46 -0500 to Sat,  
 11 Oct 2014 23:59:59 -0500

### Section x.3.x Supply Voltage Variations

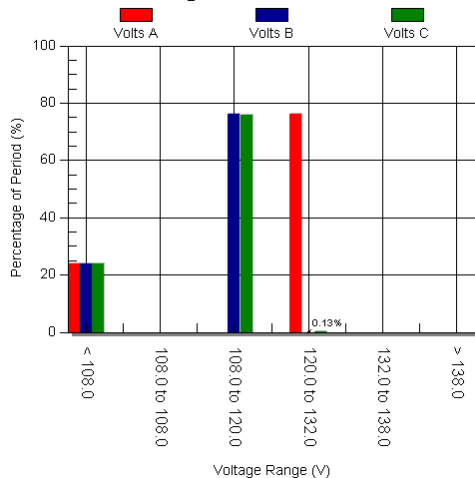
**Fail**

Supply voltage shall vary no more than  $\pm 10.0\%$  of  $U_n$  for 99.0% of the week. The voltage must be within  $+15.0\%/-10.0\%$  of  $U_n$  for 100.0% of the time. Situations like those arising from faults or voltage interruptions, the circumstances of which are beyond the reasonable control of the parties, are excluded.

10 Minute Avg Voltage RMS Trend



Voltage Variations Bins



Results Summary

Zone	Required	Volts A	Volts B	Volts C
$\pm 10.0\%$	99.0%	76.04%	76.04%	76.04%
$+15.0\%/-10.0\%$	100.0%	76.04%	76.04%	76.04%

Meter Name 128Mb\_IP194  
 Serial 113599432  
 Nominal Frequency 60Hz  
 Nominal Voltage ( $U_n$ ) 120V

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Weekly report for  
 Mon, 06 Oct 2014 16:47:46 -0500 to Sat,  
 11 Oct 2014 23:59:59 -0500

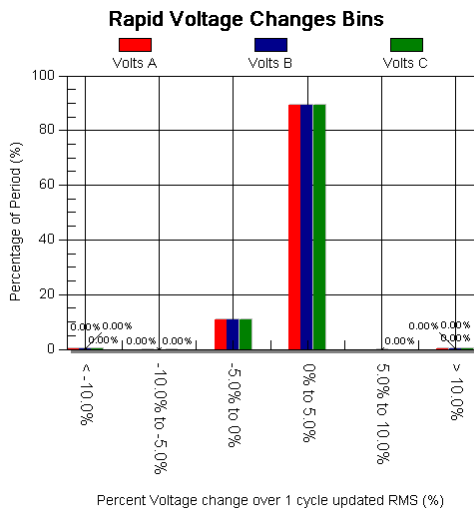


## Section x.4.1 Rapid Voltage Changes

**Fail**

A rapid voltage change of the supply voltage is mainly caused either by load changes in network users' installations, or by switching in the system. Under normal operating conditions, a rapid voltage change generally does not exceed  $\pm 5.0\%$  Un, but a change of up to  $\pm 10.0\%$  Un with a short duration might occur some times per day in some circumstances. Note: A negative voltage change resulting in a voltage less than  $85.0\%$  Un is considered a supply voltage dip.

Note: The results displayed for  $\pm 10.0\%$  Un are over the course of the week, and do not represent a single day.  $14 \pm 10.0\%$  changes are allowed in one week.



### Results Summary

Zone	Required	Volts A	Volts B	Volts C
$\pm 5.0\%$		100.00%	100.00%	100.00%
$\pm 10.0\%$	14	2	2	2
$> \pm 10.0\%$	0	79	36	44

Meter Name 128Mb\_IP194  
 Serial 113599432  
 Nominal Frequency 60Hz  
 Nominal Voltage (Un) 120V

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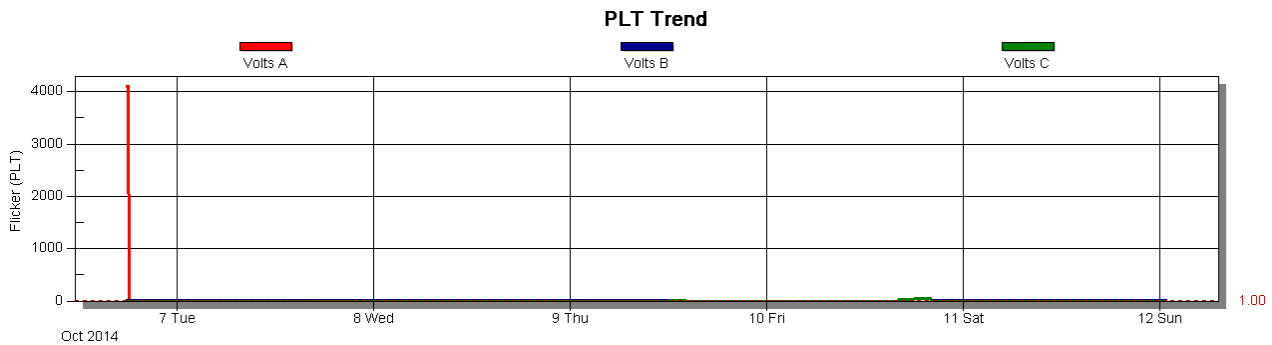
Weekly report for  
 Mon, 06 Oct 2014 16:47:46 -0500 to Sat,  
 11 Oct 2014 23:59:59 -0500



## Section x.4.2 Flicker

**Fail**

Flicker is the impression of unsteadiness of visual sensation induced by a light stimulus whose luminance or spectral distribution fluctuates with time. Under normal operating conditions, during a period of one week, the long term flicker (PLT) severity caused by voltage fluctuations should be  $\leq 1.00$  for 100.0% of the time.



### Results Summary

Zone	Required	Volts A	Volts B	Volts C
$\leq 1.00$	100.0%	95.31%	95.31%	95.31%
$> 1.00$		4.69%	4.69%	4.69%

Meter Name                      128Mb\_IP194  
 Serial                            113599432  
 Nominal Frequency            60Hz  
 Nominal Voltage (Un)        120V

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Weekly report for  
 Mon, 06 Oct 2014 16:47:46 -0500 to Sat,  
 11 Oct 2014 23:59:59 -0500



## Flicker PST

**Fail**

Flicker is the impression of unsteadiness of visual sensation induced by a light stimulus whose luminance or spectral distribution fluctuates with time. Under normal operating conditions, during a period of one week, the short term flicker (PST) severity caused by voltage fluctuations should be  $\leq 1.00$  for 100.0% of the time.

### Results Summary

Zone	Required	Volts A	Volts B	Volts C
$\leq 1.00$	100.0%	99.35%	99.35%	99.35%
$> 1.00$		0.65%	0.65%	0.65%

Meter Name 128Mb\_IP194  
 Serial 113599432  
 Nominal Frequency 60Hz  
 Nominal Voltage (Un) 120V

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Weekly report for  
 Mon, 06 Oct 2014 16:47:46 -0500 to Sat,  
 11 Oct 2014 23:59:59 -0500



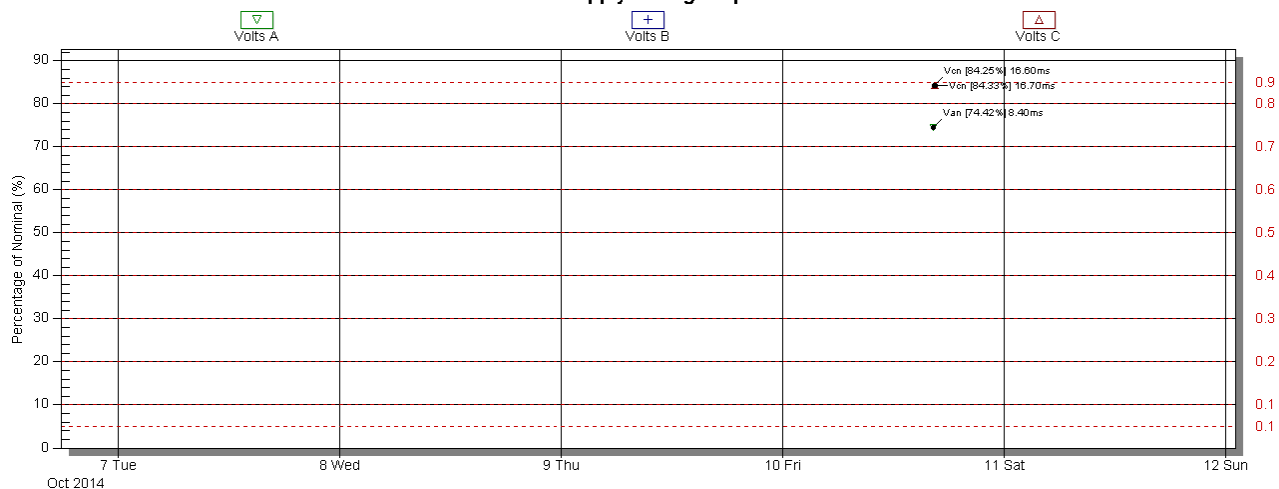
## Section x.5 Supply Voltage Dips

Pass

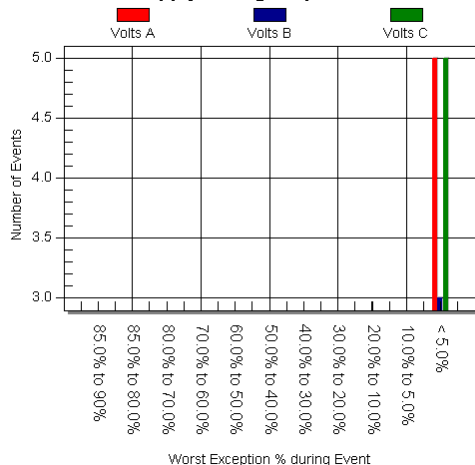
A Supply Voltage Dip is a sudden reduction of the supply voltage to a value between 90% and 1% of the declared voltage  $U_c$ , followed by a recovery after a short period of time.

Under normal operating conditions, the expected number of voltage dips in a year may be from a few tens up to one thousand. The majority of voltage dips have a duration less than 1s and a retained voltage greater than 70%. However, voltage dips with greater depth and duration can occur infrequently.

Supply Voltage Dips



Supply Voltage Dip Bins



Results Summary

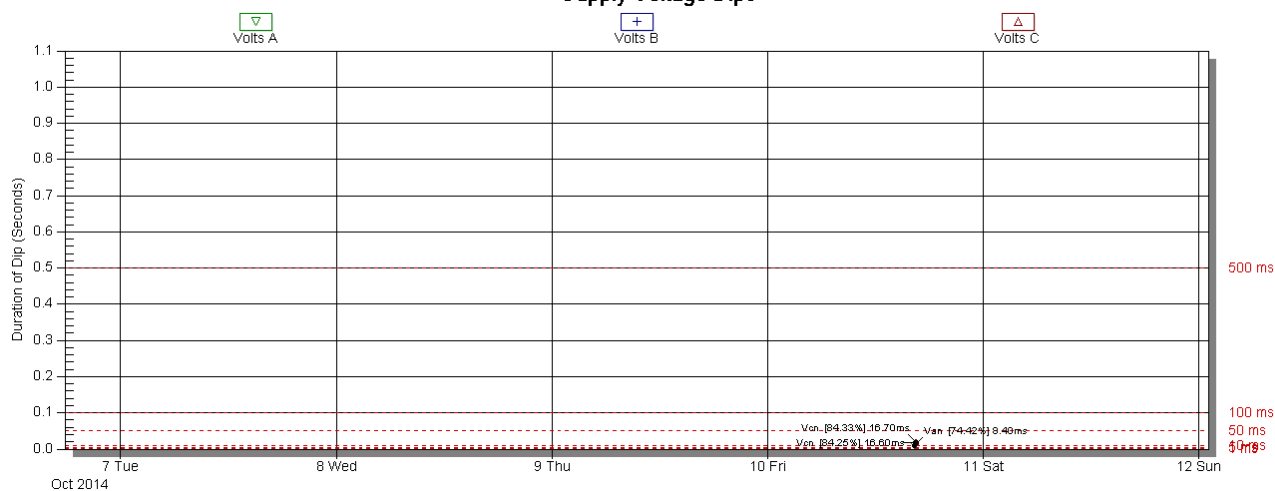
Zone	Required	Volts A	Volts B	Volts C
85.0% to 90%		0	0	0
85.0% to 80.0%		0	0	0
80.0% to 70.0%		0	0	0
70.0% to 60.0%		0	0	0
60.0% to 50.0%		0	0	0
50.0% to 40.0%		0	0	0
40.0% to 30.0%		0	0	0
30.0% to 20.0%		0	0	0
20.0% to 10.0%		0	0	0
10.0% to 5.0%		0	0	0
< 5.0%		5	3	5

Meter Name 128Mb\_IP194  
 Serial 113599432  
 Nominal Frequency 60Hz  
 Nominal Voltage (Un) 120V

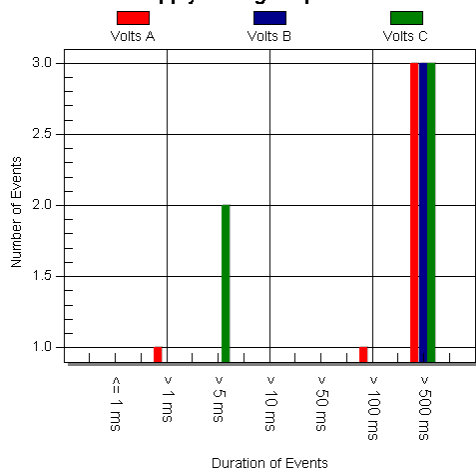
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Weekly report for  
 Mon, 06 Oct 2014 16:47:46 -0500 to Sat,  
 11 Oct 2014 23:59:59 -0500

## Supply Voltage Dips



## Supply Voltage Dip Bins



## Results Summary

Zone	Required	Volts A	Volts B	Volts C
<= 1 ms		0	0	0
> 1 ms		1	0	0
> 5 ms		0	0	2
> 10 ms		0	0	0
> 50 ms		0	0	0
> 100 ms		1	0	0
> 500 ms		3	3	3

Meter Name 128Mb\_IP194  
 Serial 113599432  
 Nominal Frequency 60Hz  
 Nominal Voltage (Un) 120V

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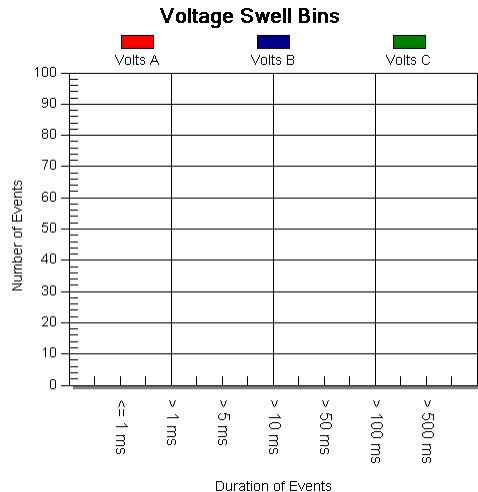
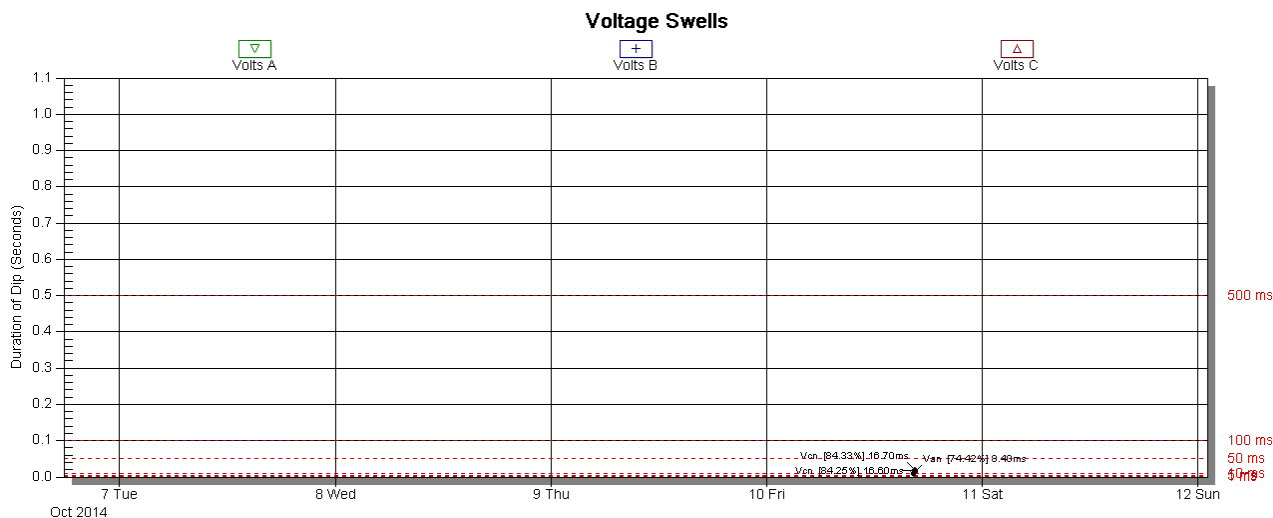
Weekly report for  
 Mon, 06 Oct 2014 16:47:46 -0500 to Sat,  
 11 Oct 2014 23:59:59 -0500



## Voltage Swells

Pass

A Voltage Swell is a increase of the supply voltage to a value above 115.0% of the declared voltage  $U_c$ , followed by a recovery after a period of time.



### Results Summary

Zone	Required	Volts A	Volts B	Volts C
≤ 1 ms		0	0	0
> 1 ms		0	0	0
> 5 ms		0	0	0
> 10 ms		0	0	0
> 50 ms		0	0	0
> 100 ms		0	0	0
> 500 ms		0	0	0

Meter Name 128Mb\_IP194  
 Serial 113599432  
 Nominal Frequency 60Hz  
 Nominal Voltage (Un) 120V

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 Mon, 06 Oct 2014 16:47:46 -0500 to Sat,  
 11 Oct 2014 23:59:59 -0500





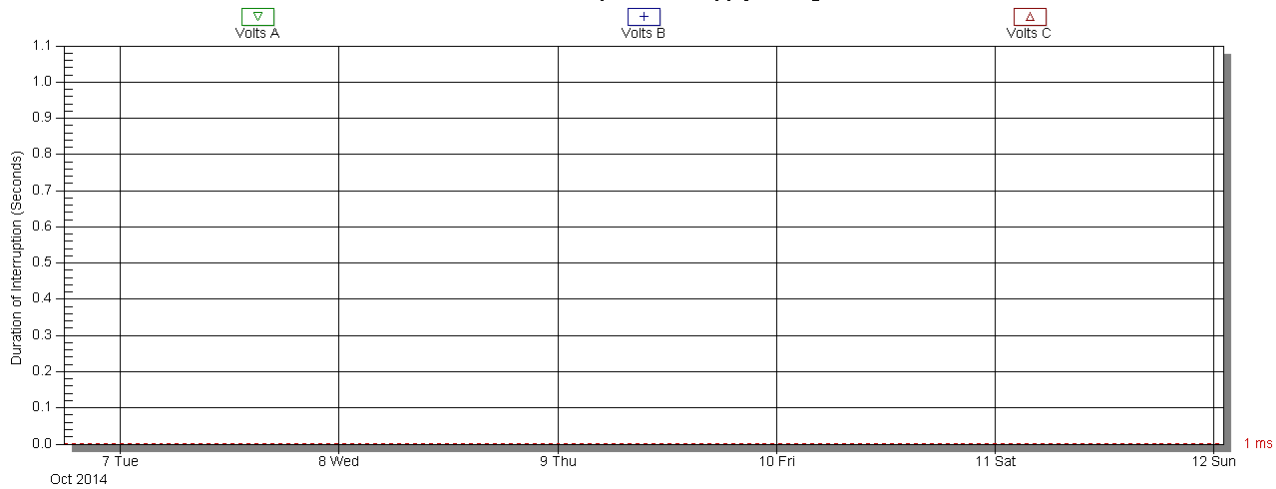
## Section x.6 Short Interruption of Supply Voltage

**Fail**

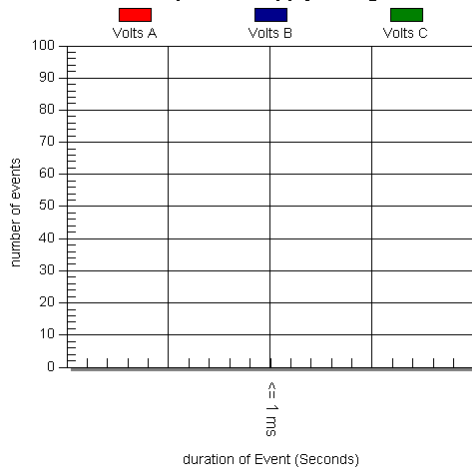
An Interruption of Supply Voltage is a condition in which the voltage at the the supply terminals is lower than 5.0% on Phase A, 5.0% on Phase B, and 5.0% on Phase C, of the declared voltage  $U_c$ . A Short Interruption is defined as an event which lasts for less than 1 milliseconds.

Under normal operating conditions, the annual occurrence of short interruptions ranges from a few tens to several hundreds. The duration of approximately 70% of the Short Interruptions may be less than one second.

**Short Interruptions of Supply Voltage**



**Short interruption of supply voltage bins**



**Results Summary**

Zone	Allowed	Volts A	Volts B	Volts C
<= 1 ms		0	0	0

Meter Name 128Mb\_IP194  
 Serial 113599432  
 Nominal Frequency 60Hz  
 Nominal Voltage (Un) 120V

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Weekly report for  
 Mon, 06 Oct 2014 16:47:46 -0500 to Sat,  
 11 Oct 2014 23:59:59 -0500



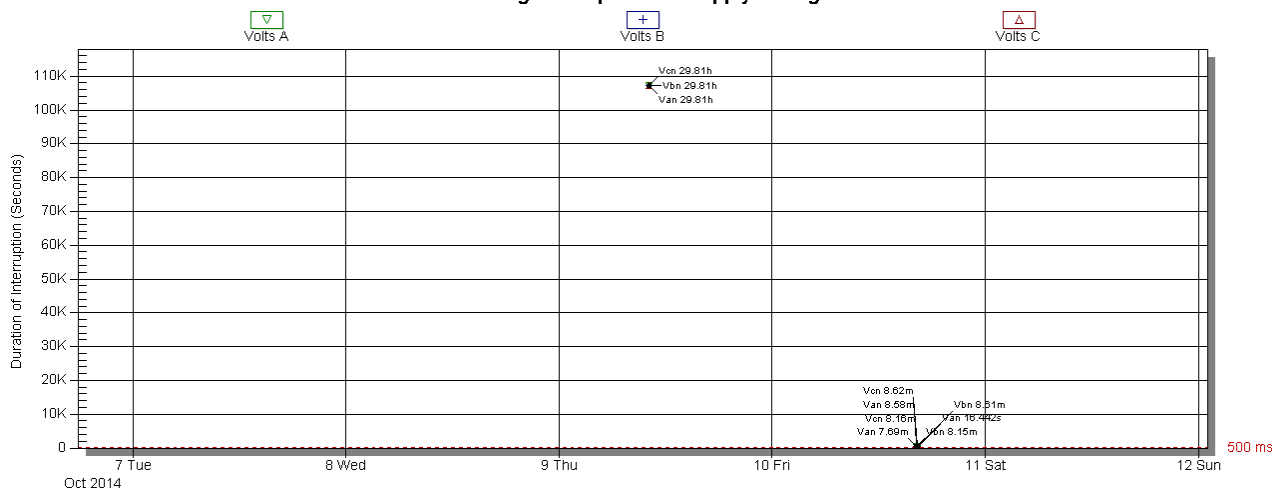
## Section x.7 Long Interruption of Supply Voltage

**Fail**

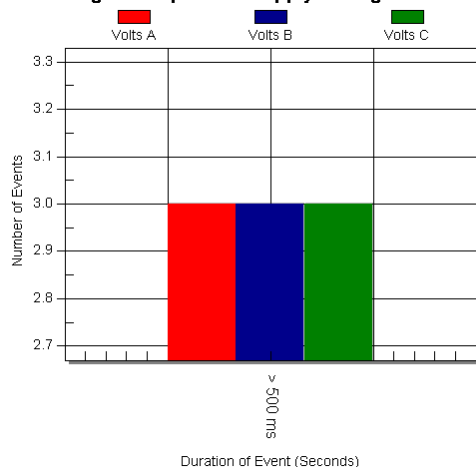
An Interruption of Supply Voltage is a condition in which the voltage at the supply terminals is lower than 5.0% on Phase A, 5.0% on Phase B, and 5.0% on Phase C, of the declared voltage  $U_c$ . A Long Interruption is defined as an event which lasts for more than 500 milliseconds.

Under normal operating conditions, the annual occurrence of long interruptions ranges from 10 to 50, depending on the area. This location is allowed up to 1 long interruptions per year.

**Long Interruptions of Supply Voltage**



**Long Interruption of Supply Voltage Bins**



**Results Summary**

Zone	Allowed	Volts A	Volts B	Volts C
<= 1 ms	1	3	3	3
> 500 ms				

Meter Name 128Mb\_IP194  
 Serial 113599432  
 Nominal Frequency 60Hz  
 Nominal Voltage (Un) 120V

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Weekly report for  
 Mon, 06 Oct 2014 16:47:46 -0500 to Sat,  
 11 Oct 2014 23:59:59 -0500



## Section x.8 Temporary Power Frequency Overvoltage

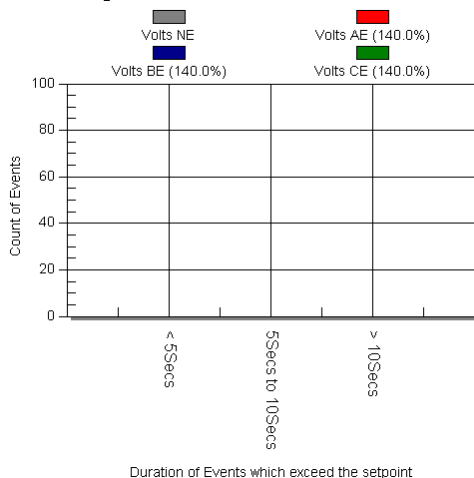
Pass

A temporary power frequency overvoltage generally appears during a fault in the public distribution network, or in a network user's installation, and disappears when the fault is cleared. Under these conditions, the overvoltage may reach the value of the phase-to-phase voltage, due to a shift of the neutral point of the three-phase voltage system, the actual value depending upon the degree of load unbalance, and the remaining impedance between the faulty conductor and earth.

The duration of the event is limited by the time taken for protection to clear the fault, typically no more than 10Secs.

The magnitude of the event may not exceed 140.0%  $U_c$  for  $V_{ae}$ , 140.0%  $U_c$  for  $V_{be}$ , or 140.0%  $U_c$  for  $V_{ce}$ .

Over Voltage Between Live Conductors and Earth Bins



Results Summary

Zone	Required	Vne	Vae (140.0%)	Vbe (140.0%)	Vce (140.0%)
< 5Secs		0	0	0	0
5Secs to 10Secs		0	0	0	0
> 10Secs	0%	0	0	0	0

Meter Name 128Mb\_IP194  
 Serial 113599432  
 Nominal Frequency 60Hz  
 Nominal Voltage (Un) 120V

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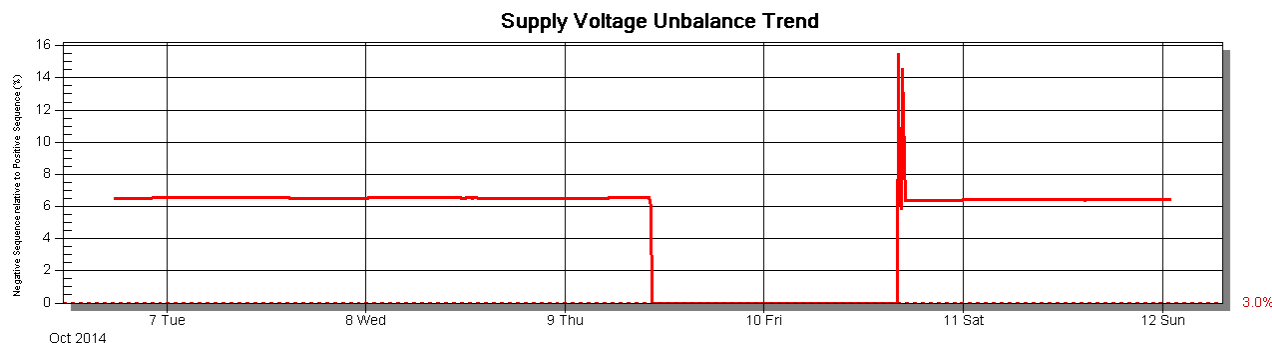
Weekly report for  
 Mon, 06 Oct 2014 16:47:46 -0500 to Sat,  
 11 Oct 2014 23:59:59 -0500



## Section x.10 Supply Voltage Unbalance

**Fail**

Under normal operating conditions, during each period of one week, 100.0% of the 10 Minutes mean RMS values of the negative phase sequence component (fundamental) of the supply voltage shall be within the range of 0% to 3.0% of the positive phase sequence component (fundamental).



### Results Summary

Zone	Required	Actual	Result
0% to 3.0%	100.0%	23.30%	Failed
> 3.0%		76.70%	Failed

Meter Name 128Mb\_IP194  
 Serial 113599432  
 Nominal Frequency 60Hz  
 Nominal Voltage (Un) 120V

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Weekly report for  
 Mon, 06 Oct 2014 16:47:46 -0500 to Sat,  
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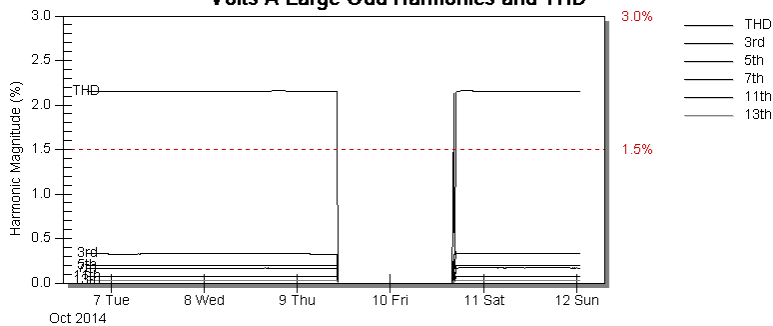


## Section x.11 Harmonic Voltage

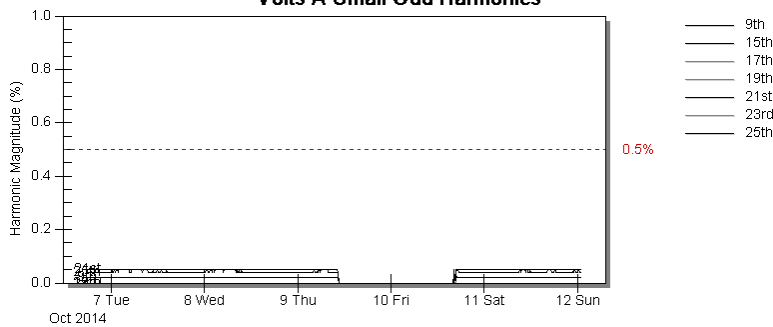
Pass

Under normal operating conditions, during each period of one week, a percentage of the 10 min mean RMS values of each individual harmonic voltage shall be less than or equal to the limit value given in the results table. Additionally, 5.0% the THD of the supply voltage (including all harmonics up to the 40th order) shall be less than or equal to 8.0%.

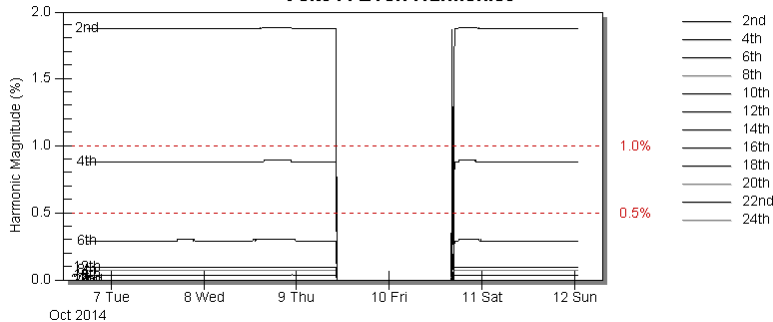
**Volts A Large Odd Harmonics and THD**



**Volts A Small Odd Harmonics**



**Volts A Even Harmonics**



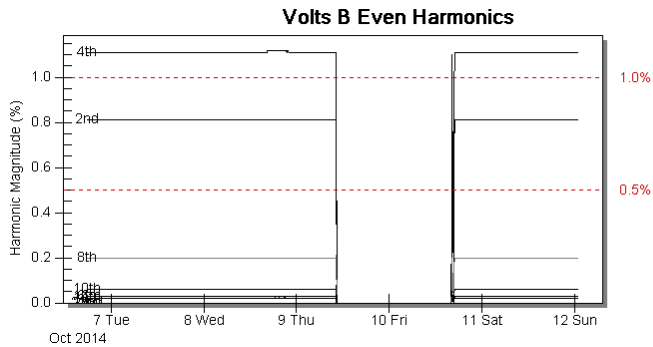
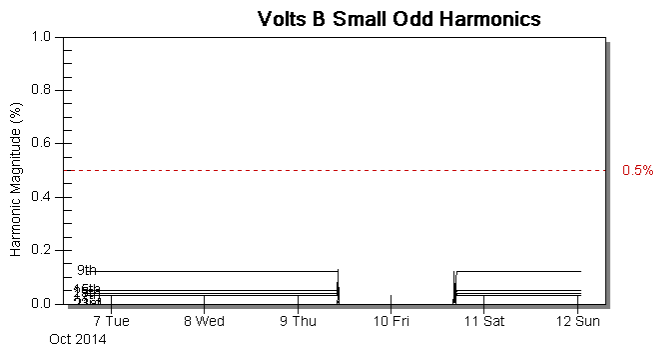
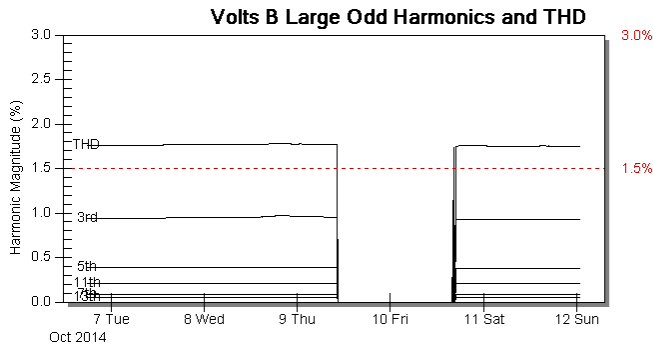
**Volts A Harmonic Summary**

Zone	Allowed	Limit	% Out
THD	95.0%	8.0%	0.00%
2nd	5.0%	2.0%	0.00%
3rd	5.0%	5.0%	0.00%
4th	5.0%	1.0%	0.00%
5th	5.0%	6.0%	0.00%
6th	5.0%	0.5%	0.00%
7th	5.0%	1.5%	0.00%
8th	5.0%	50.0%	0.00%
9th	5.0%	1.5%	0.00%
10th	5.0%	0.5%	0.00%
11th	5.0%	3.5%	0.00%
12th	5.0%	0.5%	0.00%
13th	5.0%	3.0%	0.00%
14th	5.0%	0.5%	0.00%
15th	5.0%	0.5%	0.00%
16th	5.0%	0.5%	0.00%
17th	5.0%	2.0%	0.00%
18th	5.0%	0.5%	0.00%
19th	5.0%	1.5%	0.00%
20th	5.0%	0.5%	0.00%
21st	5.0%	0.5%	0.00%
22nd	5.0%	0.5%	0.00%
23rd	5.0%	1.5%	0.00%
24th	5.0%	0.5%	0.00%
25th	5.0%	1.5%	0.00%

Meter Name 128Mb\_IP194  
 Serial 113599432  
 Nominal Frequency 60Hz  
 Nominal Voltage (Un) 120V

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Weekly report for  
 Mon, 06 Oct 2014 16:47:46 -0500 to Sat,  
 11 Oct 2014 23:59:59 -0500



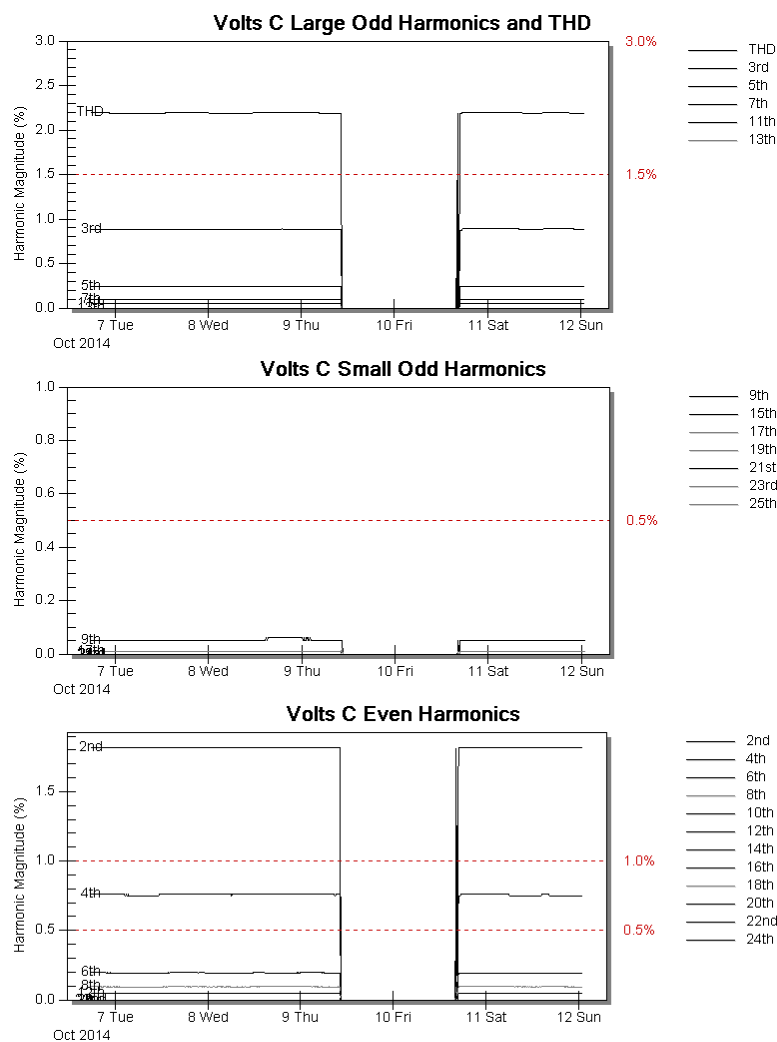
### Volts B Harmonic Summary

Zone	Allowed	Limit	% Out
THD	95.0%	8.0%	0.00%
2nd	5.0%	2.0%	0.00%
3rd	5.0%	5.0%	0.00%
4th	5.0%	1.0%	76.05%
5th	5.0%	6.0%	0.00%
6th	5.0%	0.5%	0.00%
7th	5.0%	1.5%	0.00%
8th	5.0%	50.0%	0.00%
9th	5.0%	1.5%	0.00%
10th	5.0%	0.5%	0.00%
11th	5.0%	3.5%	0.00%
12th	5.0%	0.5%	0.00%
13th	5.0%	3.0%	0.00%
14th	5.0%	0.5%	0.00%
15th	5.0%	0.5%	0.00%
16th	5.0%	0.5%	0.00%
17th	5.0%	2.0%	0.00%
18th	5.0%	0.5%	0.00%
19th	5.0%	1.5%	0.00%
20th	5.0%	0.5%	0.00%
21st	5.0%	0.5%	0.00%
22nd	5.0%	0.5%	0.00%
23rd	5.0%	1.5%	0.00%
24th	5.0%	0.5%	0.00%
25th	5.0%	1.5%	0.00%

Meter Name 128Mb\_IP194  
 Serial 113599432  
 Nominal Frequency 60Hz  
 Nominal Voltage (Un) 120V

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Weekly report for  
 Mon, 06 Oct 2014 16:47:46 -0500 to Sat,  
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**Volts C Harmonic Summary**

Zone	Allowed	Limit	% Out
THD	95.0%	8.0%	0.00%
2nd	5.0%	2.0%	0.00%
3rd	5.0%	5.0%	0.00%
4th	5.0%	1.0%	0.00%
5th	5.0%	6.0%	0.00%
6th	5.0%	0.5%	0.00%
7th	5.0%	1.5%	0.00%
8th	5.0%	50.0%	0.00%
9th	5.0%	1.5%	0.00%
10th	5.0%	0.5%	0.00%
11th	5.0%	3.5%	0.00%
12th	5.0%	0.5%	0.00%
13th	5.0%	3.0%	0.00%
14th	5.0%	0.5%	0.00%
15th	5.0%	0.5%	0.00%
16th	5.0%	0.5%	0.00%
17th	5.0%	2.0%	0.00%
18th	5.0%	0.5%	0.00%
19th	5.0%	1.5%	0.00%
20th	5.0%	0.5%	0.00%
21st	5.0%	0.5%	0.00%
22nd	5.0%	0.5%	0.00%
23rd	5.0%	1.5%	0.00%
24th	5.0%	0.5%	0.00%
25th	5.0%	1.5%	0.00%

Meter Name 128Mb\_IP194  
 Serial 113599432  
 Nominal Frequency 60Hz  
 Nominal Voltage (Un) 120V

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Weekly report for  
 Mon, 06 Oct 2014 16:47:46 -0500 to Sat,  
 11 Oct 2014 23:59:59 -0500



## Section x.13 Mains Signaling Voltage

**Pass**

In some countries the public distribution networks may be used by the public supplier for the transmission of signals. Over 100.0% of a day, the 3 second mean of the signal voltage shall be less than or equal to the mains signaling threshold.

The Mains Signaling Threshold is 120.0% of  $U_n$ , or 144V.

### Results Summary

Zone	Required	Vae	Vbe	Vce
$\leq 120.0\% U_n$	100.0%	100.00%	100.00%	100.00%
$> 120.0\% U_n$	$\leq 0.0\%$	0.00%	0.00%	0.00%

Meter Name 128Mb\_IP194  
Serial 113599432  
Nominal Frequency 60Hz  
Nominal Voltage ( $U_n$ ) 120V

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Weekly report for  
Mon, 06 Oct 2014 16:47:46 -0500 to Sat,  
11 Oct 2014 23:59:59 -0500



## 24: Configuring the Dial-In/Dial-Out Feature

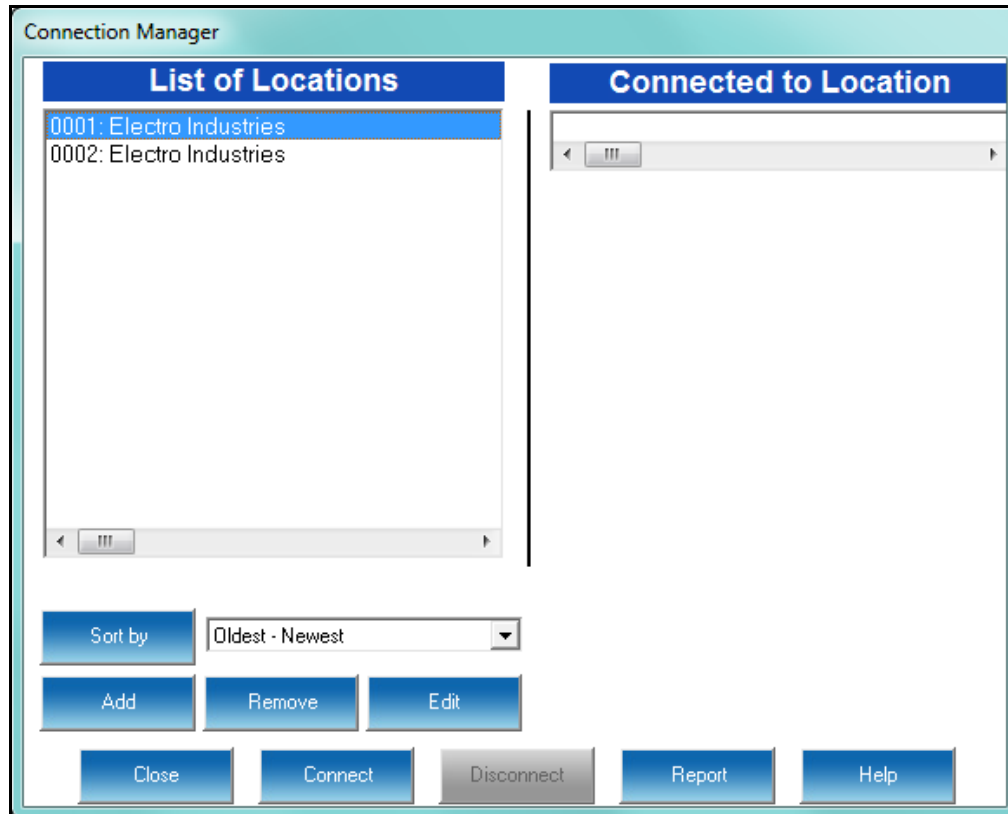
### 24.1: Overview

Older versions of the Nexus® 1262/1272 meters have an optional Internal Modem that has a Dial-In/Dial-Out feature (the Internal Modem was discontinued in February, 2020.). This chapter explains how to use CommunicatorPQA® software to configure the following settings for the Modem Dial-In/Dial-Out function:

- Modem Dial-Out Programming (24.4: Modem Dial-Out Programming, on page 24-7)
- Dial-In Programming (24.5: Dial-In Settings, on page 24-12)
- Disable Email / Page Generation (24.5: Dial-In Settings, on page 24-12)
- Modem Monitor (24.6: Modem Monitor, on page 24-16)
- Alarm Server (24.7: Nexus® Alarm Server, on page 24-17)

## 24.2: Setting the Dial-In Connection

1. Install the modem connected to the computer (the "originate modem"). See your meter's Installation and Operation Manual for details on hardware requirements.
2. From the CommunicatorPQA® application's Main screen, click the Connect Mgr icon or select Connection>Connection Manager. You will see the screen shown below.



3. Click the Add button to add a "New Location"; then click the Edit button. You will see the screen shown on the next page.

The screenshot shows the 'Connection Manager Location Editor' dialog box. At the top, there is a 'Location Name' field containing 'New Location'. Below this, there are two radio buttons: 'Serial Port' (selected) and 'Network'. Under 'Serial Port', there are several dropdown menus: 'Com Port' (set to 'COM1'), 'Baud Rate' (set to '9600'), 'Data Bits' (set to '8'), 'Flow Control' (set to 'None'), 'Parity' (set to 'None'), and 'Echo Mode' (set to 'No Echo'). There are also checkboxes for 'Use Modem' and 'Use Password', both of which are unchecked. Below these are three text input fields for 'Phone Number', 'Setup String', and 'Password'. To the right of the 'Serial Port' settings, there is a checkbox for 'Use Data Switch String(s)' which is unchecked. Below this checkbox are two text input fields labeled 'Connect' and 'Disconnect'. At the bottom of the dialog, there is a blue header bar labeled 'Devices At Location'. Below this bar are two buttons: 'Add Serial' and 'Add Net'. At the very bottom of the dialog are two buttons: 'Close' and 'Help'.

4. Configure the Location Editor screen as follows:

- a. Type in a Location Name.
- b. Select a Com Port Number.
- c. Set the Baud Rate to 38400.
- d. Enable Hardware Flow Control.
- e. Set Data Bits to 8.
- f. Set Parity to None.

- g. Click the Use Modem checkbox.
- h. Enter Phone Number or Setup String - whichever is applicable for your modem.
- i. If you want to control access, click Use Password and then enter a Password.
- j. In the Devices at Location section, click Add Serial, then select the new Device and click Edit. You will see the screen shown below.



The screenshot shows a window titled "Connection Manager Location Device Editor" with a sub-header "Device Properties". The form contains the following fields and controls:

Field	Value	Control
Address	1	Text input with a "Network" button
Name	Device 1	Text input
Description	Device 1	Text input
Protocol	Modbus RTU	Dropdown menu
Device Type	Nexus 1200 Series	Dropdown menu
Comm Port	1	Text input

At the bottom of the window are two buttons: "Close" and "Help".

5. Configure the Location Device Editor screen as follows:

- a. Address will be 1 for the Primary Device; something other than 1 if it is not the Primary Device.
- b. Type in Name.
- c. Type in Description.
- d. Select Modbus ASCII from the Protocol pull-down menu.
- e. Device Type is Nexus® 1200 Series.

- f. Enter the Com port you are using.
  - g. Click Close. You will return to the Location Editor screen.
6. Click once on the device you want to connect to your computer and then click Connect. The computer begins dialing. When the CommunicatorPQA® application locates the Nexus® meter at that location, the Device Status screen appears to confirm the connection.
7. The CommunicatorPQA® software will search for a Modem. If you do not get a "Modem Found" message, check your computer configuration and External Modem setup.

### **24.2.1: Troubleshooting the Connection**

If you have communication problems, check the following:

- Confirm that all cables are secure.
- Confirm that the RS232 cable is connected to the correct Com Port on the PC.
- Confirm that the PC and the meter's ports have the same Baud Rate and are both set to Modbus ASCII.

### 24.3: Setting the Dial-Out Connection

1. From the CommunicatorPQA® application's Main screen, click the Profile icon. The CommunicatorPQA® application retrieves the programmable settings for the currently selected, connected Nexus® meter. You will see a screen showing the retrieval progress.
2. Once the settings are retrieved, the Device Profile menu is displayed. Click on the (+/-) icon next to Communications, and then double-click on one of the displayed ports. You will see the screen shown below if you are connected to a Nexus® 1250/1252 meter:

**NOTE:** The screen for the Nexus® 1262/1272 meter shows only Ports 1 and 4.

Device Profile: Communications Settings

Port 1	Port 2	Port 3	Port 4(Ext Devices)
Address: 1	Address: 95	Address: 42	Address: 1
Baud Rate: 9600	Baud Rate: 115200	Baud Rate: 115200	Baud Rate: 57600
Data Bits: 8	Data Bits: 8	Data Bits: 8	Data Bits: 8
Parity: None	Parity: None	Parity: None	Parity: None
Stop Bits: 1	Stop Bits: 1	Stop Bits: 1	Stop Bits: 1
Tx Delay: 0ms	Tx Delay: 0ms	Tx Delay: 0ms	Tx Delay: 0ms
Protocol: Modbus RTU	Protocol: Modbus RTU	Protocol: Modbus RTU	Protocol: Modbus RTU
	If the Modem or Network option is installed, Port 2 settings here will not be used. See below.	Mode: Slave	Mode: Master (I/O Modules)

**Network Settings (MAC Address 00-01-58-00-18-7C)**

IP Address	172	20	169	96
Subnet Mask	255	255	248	0
Default Gateway	172	20	161	25

**Advanced Settings**

Ethernet Gateway (INP10X)

Baud Rate: 115200

Delay: 10 x 15 ms

**Internal Modem Settings (If Internal Modem Option was purchased)**

Answer Phone on: 3 Rings

Modem Gateway Baud Rate: 38400

Dial Out Profile

OK Cancel Help

3. Configure the Internal Modem Settings as follows:

- a. Answer the Phone on 2 Rings.
  - b. Modem Gateway Baud Rate set to 38400.
4. Click the Dial-Out Profile button to configure the Dial-Out feature of the Internal Modem - see section 24.4 for instructions for configuring the Dial-Out settings.
  5. When you have completed your modem settings, click OK to save your settings and return to the Device Profile menu.
  6. Click Update Device to send your settings to the meter.

## 24.4: Modem Dial-Out Programming

When you click Dial-Out Profile button from the Communications screen, you see the Modem Programming screen, shown below.

**Modem Programming**

**Primary phone number settings**

Number

Retry delay  Minutes

Retry limit  Attempts

Connection type

**Secondary phone number settings**

Number

Retry delay  Minutes

Retry limit  Attempts

Connection type

**Communications settings**

Inactivity timeout limit  Minutes

Call delay timer limit  Seconds

Callback type

Call failure reset limit  Hours

Share the phone line ☒

**Modem settings**

Rings to answer  Rings

Identification

Password

Enable password ☐

Violation limit  Attempts

Violation lockout time  Hours

**Dial out on the following conditions**

☐ Limits status change      ☐ CBEMA Power quality event      ☐ Cycling of control power

☐ High speed input change      ☐ Control output change      ☐ Modem password failure

☐ Waveform record captured      ☐ Filling of meter memory      ☐ Failure of communication with Device

Log full limit threshold (All Logs)  %

This screen helps you configure the Dial-Out Profile. It has five sections - each is detailed below:

- Primary Phone Number Settings
  - Number: The first phone number (up to 50 characters) called for automated callout.
  - Retry Delay: The number of minutes (1-1000) between retries.
  - Retry Limit: The user-set limit for retry attempts (0-1000).
  - Connection Type: Computer.
- Secondary Phone Number Settings
  - Number: The second phone number (up to 50 characters) for automated callout.
  - Retry Delay: The number of minutes (1-1000) between retries.
  - Retry Limit: The user-set limit for retry attempts (0-1000).
  - Connection Type: Computer.

The modem will retry the Primary Number according to the Retry Limit set. The modem will then dial the Secondary Number for the programmed number of retries set in the Retry Limit.

- Communication Settings
  - Activity Timeout Limit: User-set value that is the number of minutes of inactivity (no communication activity) that is allowed on an open modem connection before the modem terminates the connection (1-30 minutes).
  - Call Delay Timer Limit: User-set variable that defines the number of seconds the modem waits before processing a callback event (0-240 seconds). This setting applies to calls caused by Limit or Input Status conditions.
  - Callback Type: There are two types of callback:
    - Playback: The Modem waits 500ms after connection and plays back the Modem ID string displayed (if programmed) and the reason for the call.



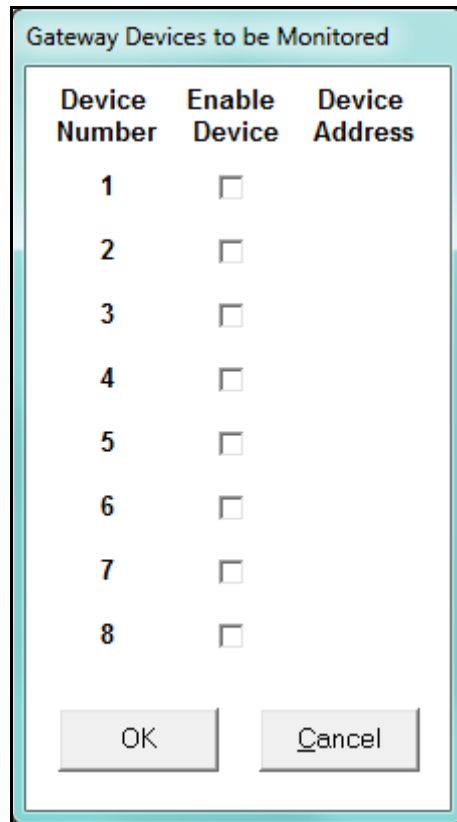
- **Standard:** When performing a callback, once connection is established the modem waits to be queried by the PC it has called.

**NOTE:** You can override Playback mode by turning Playback off. You will not be able to override the setting to Playback mode if the Modem ID string is blank ("-----").

- **Call Failure Reset Limit:** User-set value for the number of hours the modem locks out incoming calls if the Incoming Connection Failure Limit is reached (1-50 hours).
- **Share the Phone Line:** If checked, the modem monitors phone line voltage during all calls. If the phone line voltage drops by more than 30 during a call (indicating that someone else has taken another phone off the hook) the modem disconnects and returns to normal polling operation. If not checked, the modem does not watch for line voltage deviations.
- **Modem Settings**
  - **Rings to Answer:** User-set value for the number of Rings (1-9) before the modem goes off the hook and attempts to answer an incoming call. Zero = Never Answers. Ring is a Voltage Change.
  - **Identification:** Up to 32 Western Alphabet Characters (16 Asian Characters).
  - **Password:** Up to 10 alphanumeric characters (user-set) in addition to passwords that restrict access to certain levels of the Nexus® meter. If the password is not entered correctly, the modem asks the user to enter the password again (up to three times) and disconnects after the third incorrect attempt.
  - **Enable Password:** If checked, a Password must be entered.
  - **Violation Limit:** User-set value for number of times the modem allows unsuccessful connection attempts (unable to supply correct password in three attempts) before locking-up to incoming calls (1-10). The Modem disconnects from the incoming call and does not accept incoming calls for a period of time equal to the Violation Lockout Time.

- Violation Lockout Time: User-set time limit for the number of hours (1-32) the Modem will be inaccessible. The Violation Lockout provides a level of security against bad passwords.
- Dial-Out on the Following Conditions:
  - Limits Status Change
  - High Speed Input Change
  - Waveform Record Captured
  - CBEMA Power Quality Event
  - Control Output Change
  - Filling of Meter Memory
  - Cycling of Control Power
  - Modem Password Failure
  - Failure of Communication with the Nexus® meter
  - Log Full Limit Threshold (Covers All Logs): Percent that a log is full before a call is triggered.
- Edit Gateway Port Devices: the Edit Gateway Port Devices button at the bottom of the screen is used to enable up to 8 devices that are connected via the gateway

and are to be monitored. When you click the Edit Gateway Port Devices button, you will see the screen shown below.



Device Number	Enable Device	Device Address
1	<input type="checkbox"/>	
2	<input type="checkbox"/>	
3	<input type="checkbox"/>	
4	<input type="checkbox"/>	
5	<input type="checkbox"/>	
6	<input type="checkbox"/>	
7	<input type="checkbox"/>	
8	<input type="checkbox"/>	

OK Cancel

- Click the Enable Device box next to the Device to be monitored. A Device address will be displayed next to the Enabled Device.
- Change the Device Address, if needed, to any address except 1. Address number 1 is always reserved for the Primary Device.
- Click either:
  - OK to save changes and return to the Modem Programming screen
  - Cancel on either screen to cancel changes and return to the previous screen.

When your Dial-Out settings are complete, click OK to return to the main Device Profile menu. For these changes to take effect, you must click the Update Device button to send the new settings to the meter.

## 24.5: Dial-In Settings

The Nexus® meter's Dial-In Settings screen is divided into 9 possible event or problem sections. Any one event/problem or a combination of event/problems can trigger a call. The settings on this screen tell the PC what to do when the Modem calls with one or more problems:

- Who to call
- Where to call
- What message to send.

**NOTE:** You must have installed Dial-In Server software for the Dial-In screens to work.

1. From the CommunicatorPQA® application's Main screen, click Dial-In Settings. You will see the screen shown below.

**Dial In Settings**

<b>Limits status change</b> Retrieve: <input type="button" value="Limit log"/> <input type="button" value="v"/> <input type="checkbox"/> Reset all logs after retrieval <input checked="" type="checkbox"/> Generate email <input type="checkbox"/> Call pager	<b>High speed input change</b> Retrieve: <input type="button" value="Digital input log"/> <input type="button" value="v"/> <input type="checkbox"/> Reset all logs after retrieval <input checked="" type="checkbox"/> Generate email <input type="checkbox"/> Call pager	<b>Control output change</b> Retrieve: <input type="button" value="Digital output log"/> <input type="button" value="v"/> <input type="checkbox"/> Reset all logs after retrieval <input checked="" type="checkbox"/> Generate email <input type="checkbox"/> Call pager
<b>Waveform record capture</b> Retrieve: <input type="button" value="Waveform log"/> <input type="button" value="v"/> <input type="checkbox"/> Reset all logs after retrieval <input checked="" type="checkbox"/> Generate email <input type="checkbox"/> Call pager	<b>CBEMA Power quality event</b> Retrieve: <input type="button" value="PQ(CBEMA) log"/> <input type="button" value="v"/> <input type="checkbox"/> Reset all logs after retrieval <input checked="" type="checkbox"/> Generate email <input type="checkbox"/> Call pager	<b>Filling of log memory</b> Retrieve: <input type="button" value="Filled log"/> <input type="button" value="v"/> <input type="checkbox"/> Reset all logs after retrieval <input checked="" type="checkbox"/> Generate email <input type="checkbox"/> Call pager
<b>Cycling of control power</b> <input checked="" type="checkbox"/> Generate email <input type="checkbox"/> Call pager	<b>Modem password failure</b> <input checked="" type="checkbox"/> Generate email <input type="checkbox"/> Call pager	<b>Failure of communication with the Device</b> <input checked="" type="checkbox"/> Generate email <input type="checkbox"/> Call pager

**Email and pager settings**

Outgoing mail server:  Sender:  Pager ID #:

Reply address:  Port number:

**Recipients**

Name	Mail Address	Pager Number	Filter(Double Click to Edit)
Test	btech@gmail.com		511

**User defined message**

2. These are the settings in the screen:

- **Events/Problems**
  - **Limits Status Change:** The Nexus® meter contains up to 64 monitored limit conditions. One or more limit states had a change.
  - **High Speed Input Change:** One or more of the 8 High Speed Inputs had a change.
  - **Control Output Change:** When a control event occurs, an integer counter increments (range of 0-65,536).
  - **Waveform Record Capture:** A Waveform Record Capture was triggered in response to observed transient conditions. An integer counter increments each time a waveform record is captured (range of 0-65,536).
  - **CBEMA Power Quality Event:** The meter captures CBEMA event records in response to observed transient conditions. The counter has a range of 0-65,536.
  - **Filling of Log Memory:** When any one log reaches or exceeds the user-set download level, the modem calls to report a log fill condition and perform an automated download of all stored data.
  - **Modem Password Failure:** When the Password Limit is reached, the modem initiates a callback with no delay (because there is no opportunity for the condition to reset). If the phone line is available, the modem attempts a reporting call; if the phone line is unavailable, the modem continues polling.
  - **Failure of Communication with Nexus® meter:** If the meter fails to the modem within the allotted time, the modem initiates a callback with no delay (because there is no opportunity for the condition to reset). If the phone line is available, the modem attempts a reporting call; if the phone line is unavailable, the modem continues polling.
- **Event/Problem Settings**
  - **Retrieve:** For those events that trigger log retrieval, six of the screens have pull-down menus for you to select the logs to be retrieved.

- Reset All Logs after Retrieval: Check those sections that apply.

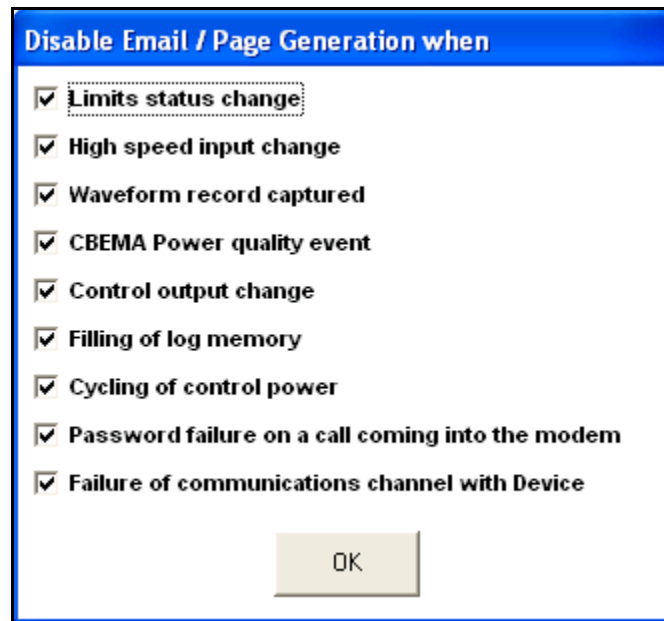
**NOTE:** In order to use the Reset function, you must select "All Logs" from the pull-down menu next to the word "Retrieve."

- Generate Email: Send an email message to the designated recipient.
- Call Pager: Call the designated recipient's pager number.

**NOTE:** Selecting "All Logs" from multiple events sections does not cause duplication in log retrieval.

- Email and Pager Settings
  - Outgoing Mail Server: Enter name of Valid Email Server that does not require password and user name to send mail (POP3 type).
  - Sender: The CommunicatorPQA® application.
  - Pager ID#: User-set numeric value used to identify this meter when a numeric page is issued (up to 5 digits, 00000 to 99999).
  - Reply Address: None or Email Address to let recipient know where to send replies.
  - Port Number: 25 is normal for email servers.
  - Test Email: Sends a Test Message to a recipient to test the email settings (uses email of the first recipient only).
  - Test Pager: Sends a Test Message to a recipient to test the paging (uses the number for first recipient only).
  - Recipients: List Name, Email Address and Pager Number.

- Filter: Double-click and the Edit screen will open.



- Click in front of message(s) you want to exclude from the highlighted recipient.
- Add: Click to Add a Recipient.
- Remove: Click to Remove a Recipient.
- User Defined Message: Type in a message for the highlighted recipient.

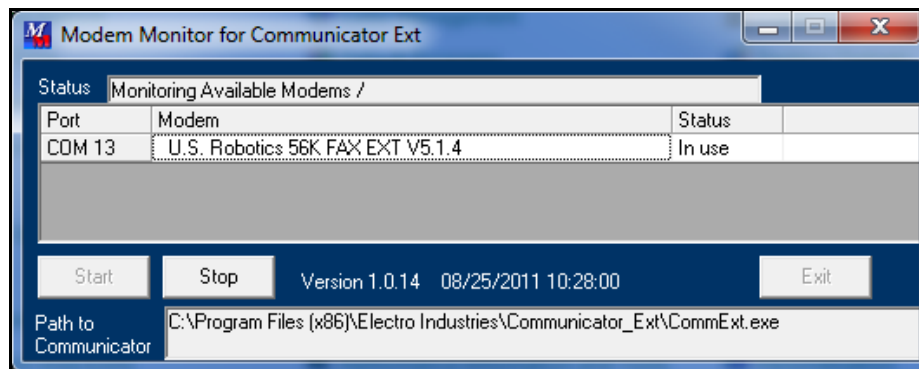
3. The screen buttons are used as follows:

- OK: click to Save Settings and return to the Main screen.
- Cancel: click to Exit the screen without saving the settings.
- Print: click to Print the screen.

## 24.6: Modem Monitor

The Modem Monitor, as the name implies, checks the PC for connected modems and monitors available modems for incoming calls. The Status line coaches you in setting up the modem and keeps you informed of the status of the available modems.

1. To start the Modem Monitor screen, click Start>Programs>Electro Industries>Modem Monitor icon.



2. After the screen appears, press Start to allow the Modem Monitor to monitor available modems. After a search for modems, the software will continue to locate the modems that were found for a "Call Back."
3. The main screen lists the available modems with the Ports to which they are connected and their Status. When an incoming call is detected, the Modem Monitor starts the CommunicatorPQA® application, which answers the call and processes it.

- Command Line Switches

/S: Autostart Modem Monitoring when program is started.

/M: Minimize program when started. Program will appear as icon in the system tray on your computer screen.

**NOTE:** When program is minimized, it appears as an icon in the system tray. Click on this icon to restore the program to a normal sized window.

- Example Command Line Switches

Nexusmonitor.exe /S:

Nexusmonitor.exe /M:



Nexusmonitor.exe /S: /M:

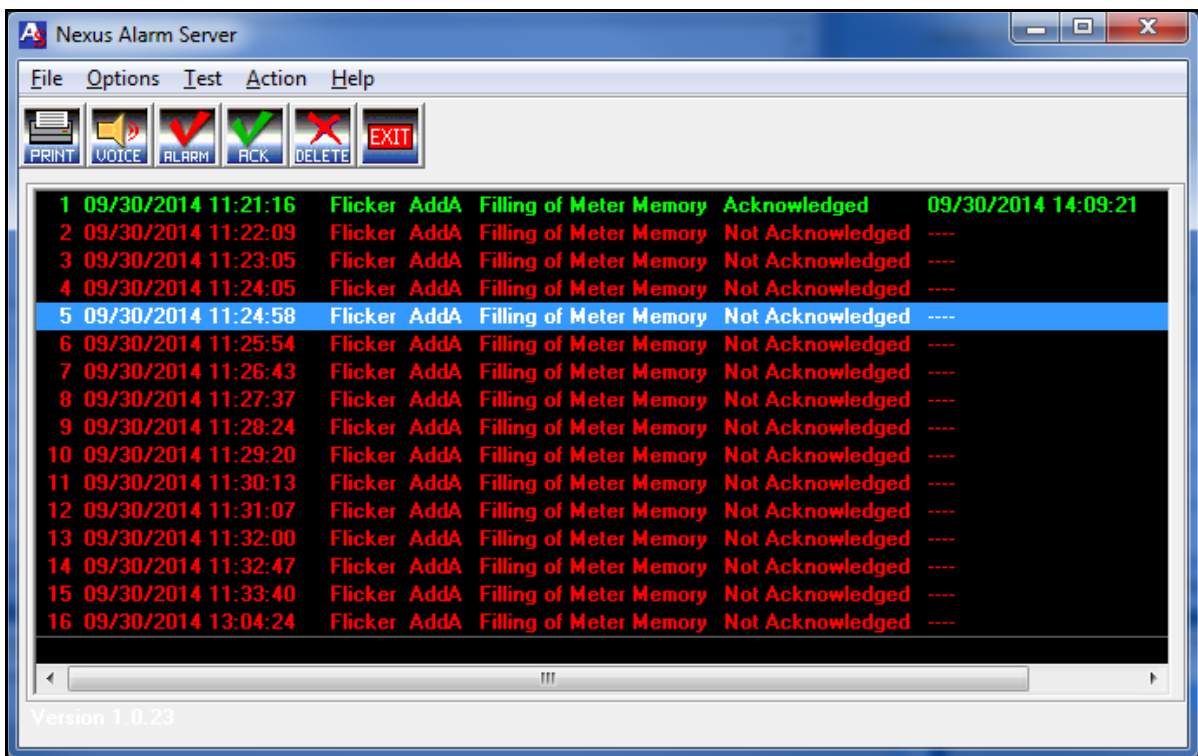
**NOTE:** Spaces are required between the components.

- Screen Buttons
  - Click Stop to disconnect the Modem Monitor.
  - Click Start to connect the Modem Monitor.

## 24.7: Nexus® Alarm Server

The Nexus® Alarm Server screen lists all Call Back Events that have occurred. Data included with each event entry is as follows: Number of the Alarm on the list, Date, Time of the Call Back Event, Name of Modem, Type of Event/Problem, whether that Event has been acknowledged and the Time of the Acknowledgement. Settings for this screen are located on the Modem Programming screen/Dial Out Profile in the Nexus® meter's Device Profile.

To start the Nexus Alarm Server screen, click Start>Programs>Electro Industries>Nexus® Alarm Server icon.



- The screen's Tool Bar has these options:

- File: Select one of the following
  - Export - Excel Compatible Values file
  - Print - Print the contents of the box of events
  - Exit - Exit the program
- Options:
  - Items
    - Insert to Top of the list of events.
    - Append to Bottom of the list of events.
  - Alarm - Enable or Disable Audio or Visual
    - Audio - Can replace with another 2 second sound file with the same name (alarm.wav in the directory where the CommunicatorPQA® software files are installed)
    - Visual - Text box display
  - Test - Generate a Test Message
  - Action
    - Silence Alarm - Turn Noisemaker and/or Alarm Message off (not mute)
    - Acknowledge Item - Red to Green color change
    - Acknowledge All - Red to Green color change
    - Remove All - Erase All Alarms
- The screen Icons are:
  - Print: lick to select Setup Options.
  - Voice: Microsoft Speech Properties.
  - Alarm Silencer: To stop audio and/or visual alarm until next entry arrives.
  - Acknowledge Event

- Delete Entry in Server Box
- Exit

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# 25: Firmware Updating

## 25.1: Overview

- You can update the following firmware components:
  - Nexus® Communication Processor ("Nexus® Comm"): This processing chip performs all tasks related to communication and storing data.
  - Nexus® Digital Signal Processor ("Nexus® DSP"): This processing chip performs all tasks related to data calculation.
  - LED Display: This processing chip is installed in the Nexus® External LED Display.
  - Internal Modem Card: This optional card is installed in the Nexus® meter and enables it to act as meter and modem in one device. This card must be updated in addition to updating the Nexus® Comm and DSP. (Refer to 25.2.2: Update the Internal Modem Card's Firmware, on page 25-4.)
  - Internal Network Option: This option allows a Nexus® meter to communicate with multiple PC's concurrently. This card must be updated in addition to updating the Nexus® Comm and DSP. (Refer to [25.2.1: Update the Internal Network Card's Firmware, on page 25-3.](#))
  - Network Option card: This option gives a Nexus® or Shark® 200/250/270 meter 100BaseT Ethernet capability. See the meter's User Manual for instructions on updating the card's firmware.
  - Cellular Modem Card: This option gives cellular modem wireless communication to a Shark® 270 meter. See [25.4.4: Firmware Update for the Shark® 270 Meter's Cell Modem Card, on page 25-13.](#)
- There are 3 ways to learn what firmware versions are currently installed in your meter:
  - Click the Device Stats icon (or select Tools>Retrieve Device Status or Tools>Device Status). The "Run-time" field shows the current Comm firmware version number; the "DSP Run-time" field shows the current DSP firmware version number.

- Click the Profile icon to retrieve the current Device Profile from the connected meter. Click Report. The Comm and DSP firmware are listed in the Runtime column.
- If you have a Nexus® External Display connected to the meter, see the User Manual for your meter for details on using it to access firmware version numbers.
- To update, you must have the most recent update file from Electro Industries.
- Updating erases the existing firmware and replaces it with the new version.

### **WARNINGS!**

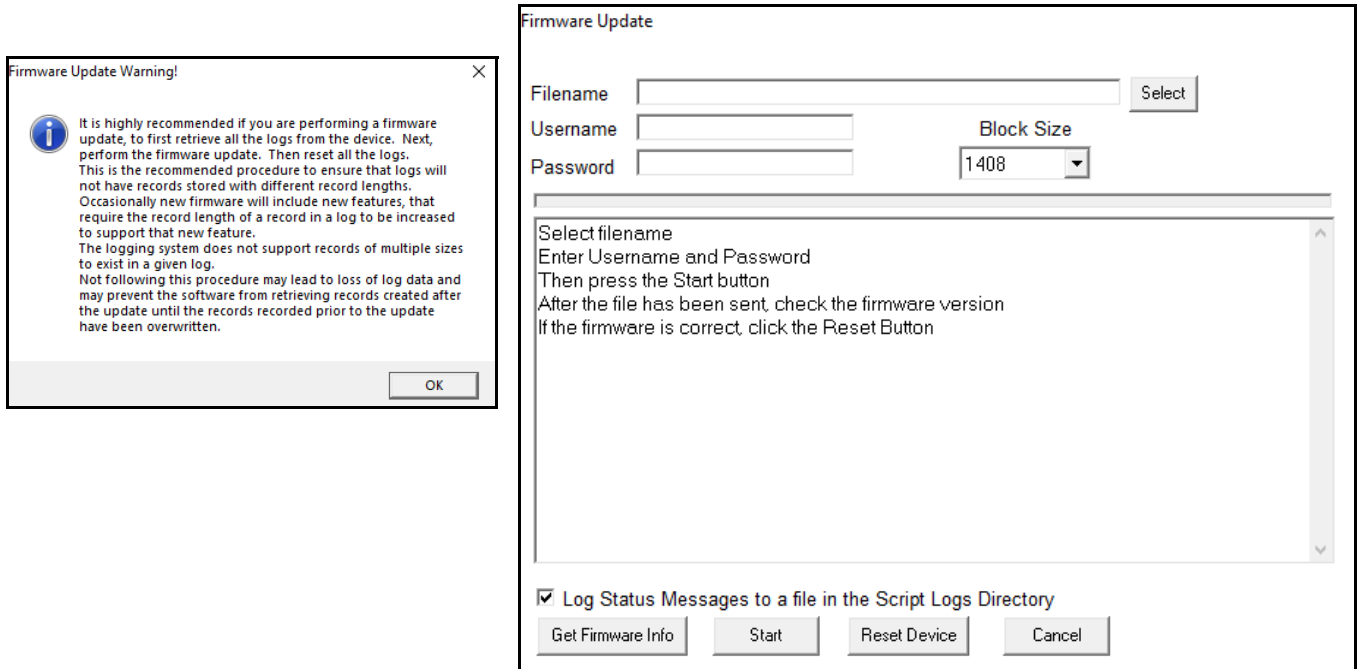
- Updating should only be done with the proper firmware. Otherwise, data may be lost.
- Perform Backup of your stored data prior to installing new firmware into your unit.

Detailed instructions for performing firmware updates for EIG meters and their network cards are linked on EIG's website:

<https://www.electroind.com/technical-support/product-firmware-release-dates/>

### 25.2.1: Update the Internal Network Card's Firmware

1. When you have selected Internal Network and clicked Next, you will see the screen shown below on the right with the warning message shown on the left in front of the screen. Read the warning and do as it says. Click OK to close the warning message window.



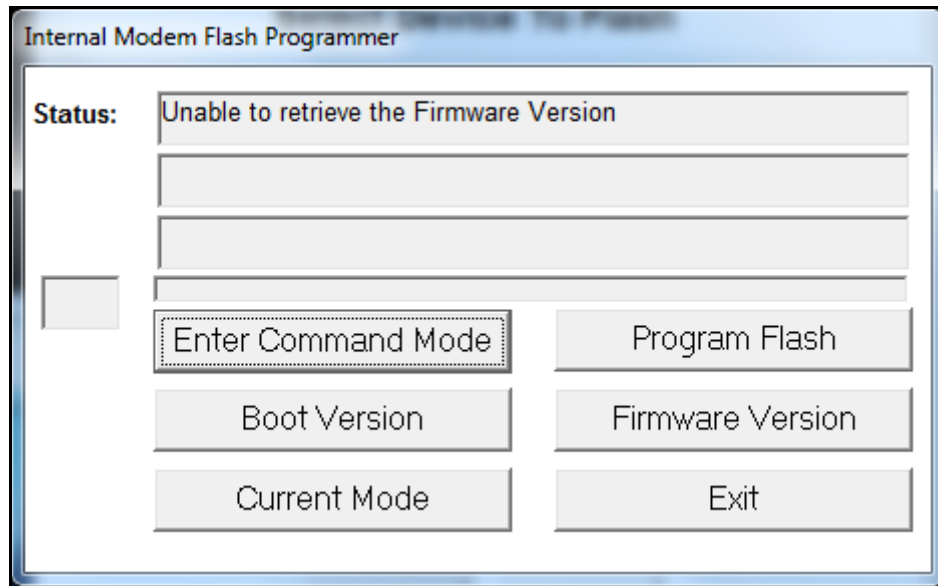
**NOTE:** The warning instructs you to retrieve logs before updating and reset logs after updating.

2. In the Firmware Update file, click Select to find the Firmware file on your PC.
3. If password protection is enabled, enter the Username and Password.
4. Click Start to begin the Firmware Update process. Updating the Internal Network card takes approximately 30 minutes. Note that you may see a warning message telling you to retrieve logs before the update and reset logs after the update.
5. The screen displays messages while the firmware is loading. When you see the message "Run-time firmware updated to flash successfully," click Reset Device.

**NOTE:** You can click Get Firmware Info to verify that you have the correct firmware before you reset the meter.

### 25.2.2: Update the Internal Modem Card's Firmware

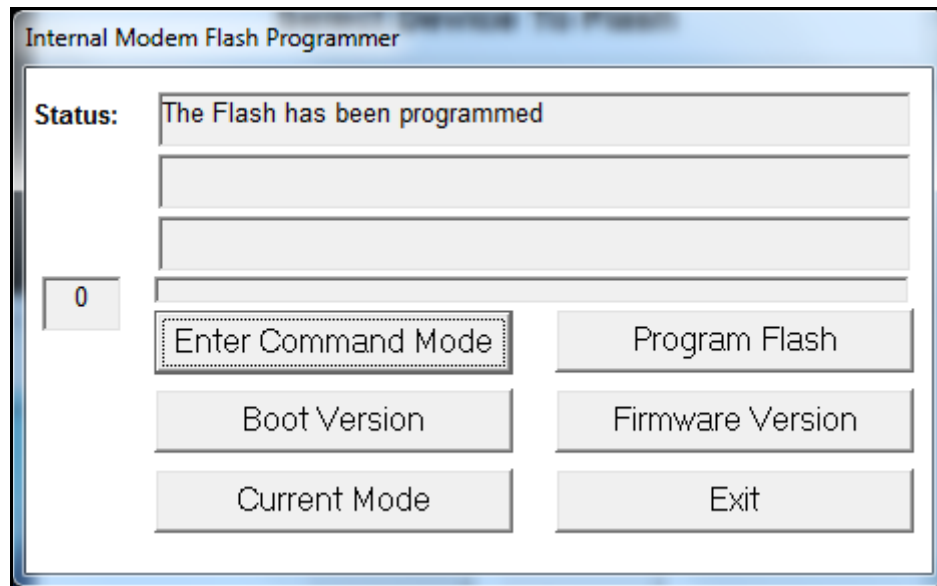
1. When you have selected Internal Modem and clicked Next, you will see the screen shown below. (If the Password Feature is Enabled, you will be prompted to enter your Level 2 Password - do so and click OK.) You will see the screen shown below.



- a. Click Enter Command Mode. In the Status fields, the words "Entering Command Mode," "Sending Escape Sequence," and then, "In Command Mode" will be displayed.
- b. Click Program Flash to open a window that lets you locate the firmware file on your computer. You will need only one file (\*.hex file) for the Internal Modem firmware update. Be sure to read the text file located in the same directory as the firmware file.
- c. Select the file and click Open. The program automatically uploads the data. Lines 1 and 2 of the Status fields display the progress of the update.



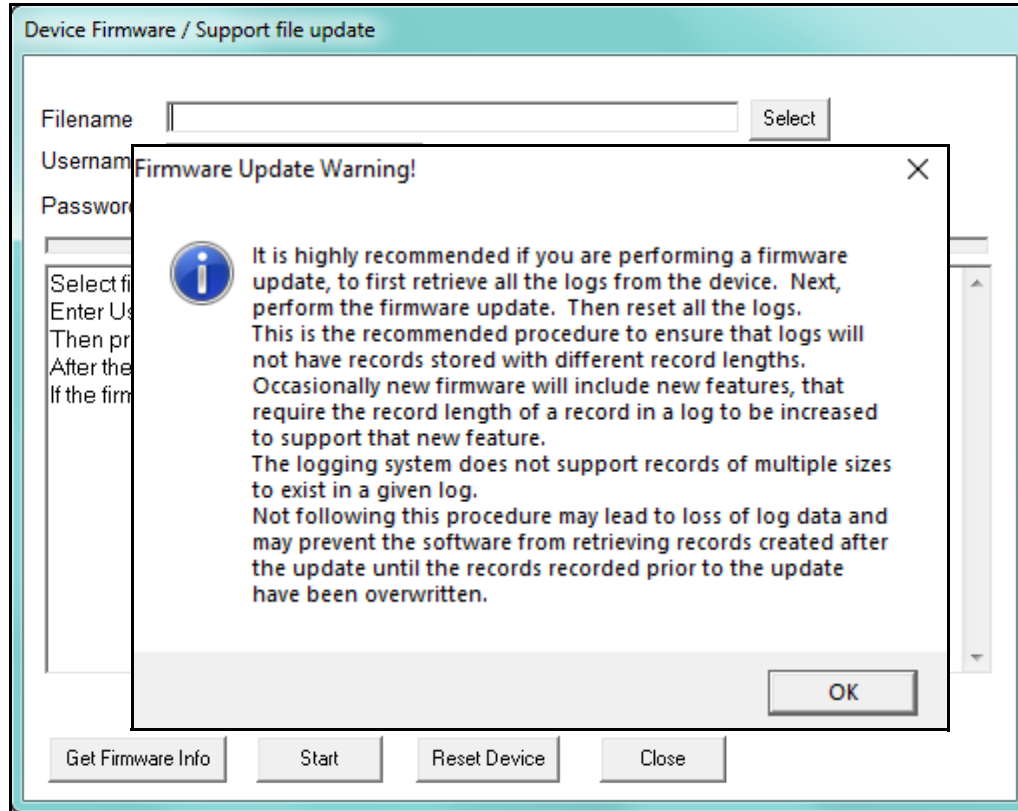
- d. When the firmware update is complete, the Status field will say "The Flash has been programmed."



2. Click Exit to return to the Main screen.

### 25.3: Update a Nexus® 1500/1500+ Meter's Firmware

1. From the Main screen, Click Tools>Firmware Update. You will see the screen shown below.

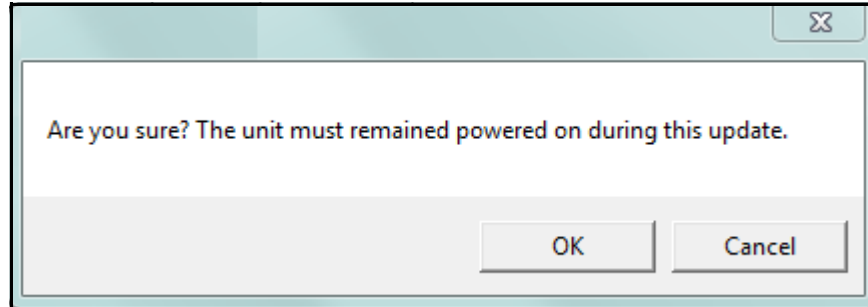


2. Read the warning and do as it says. Click OK to close the message window.  
**NOTE:** The warning instructs you to retrieve logs before updating and reset logs after updating.
3. Click Select to locate the firmware update file. You use this same screen to perform any firmware updates for the meter.

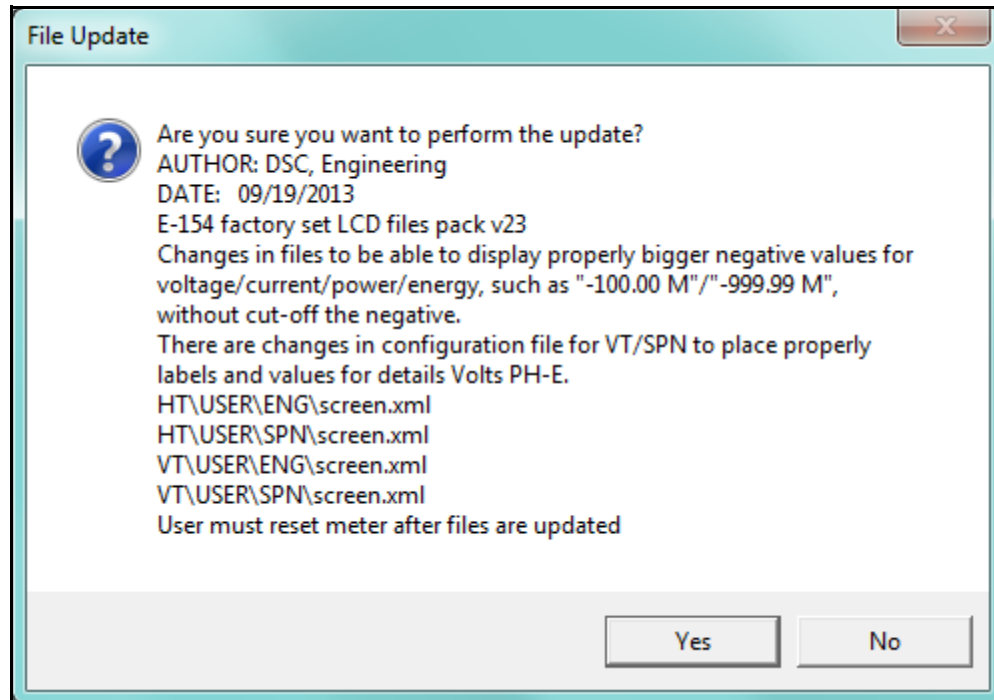
**IMPORTANT!** If you are updating a 1500+ with firmware version 15.2, first download the PQ log, and then reset it (see [16.2: Retrieving Log Data, on page 16-1](#) and [20.1.7: Reset Device Information, on page 20-7](#). for instructions).

**NOTE:** You can click Get Firmware Info to verify that you have the correct firmware before you reset the meter.

4. Enter Username and Password: if password protection is enabled enter the programmed information. If password protection is disabled, enter **anonymous** in both the User Name and Password fields.
5. Click Start. You will see the window shown below. Click OK to continue.



6. You will see the message window shown below. Click Yes to continue.



7. The progress bar will show the status of the update. When the update has completed successfully, a message to that effect displays in the message field.
8. Click Get Firmware Info to see and confirm the meter's firmware version information.
9. If the version is correct, click Reset Device. (If the version is not correct, click Select to choose another update file.)
10. Click Close to exit the screen.

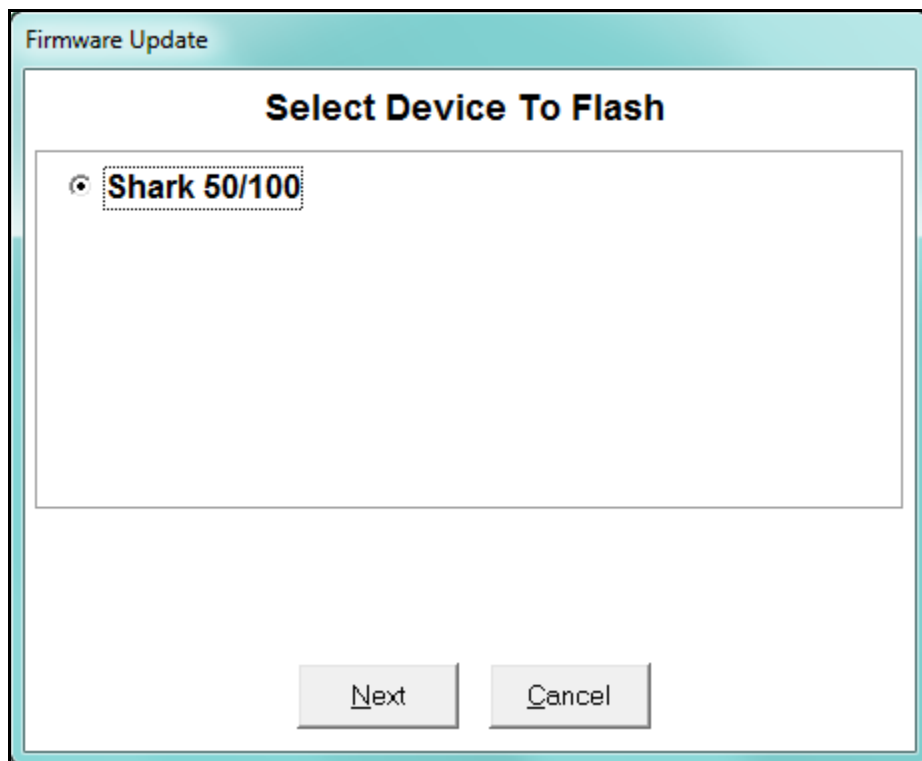
## 25.4: Update the Shark® Series Meters' Firmware

The next section tells how to perform a firmware update for the Shark® Gen1 50/100 meter. Section 25.4.2 explains how to perform a firmware update for the Shark® 200 meter, the ST40 meter, the Gen2 Shark® 50/100 meter, and the MP200™ metering system. Section 25.4.3 explains how to perform a firmware update for the Shark® 250 meter.

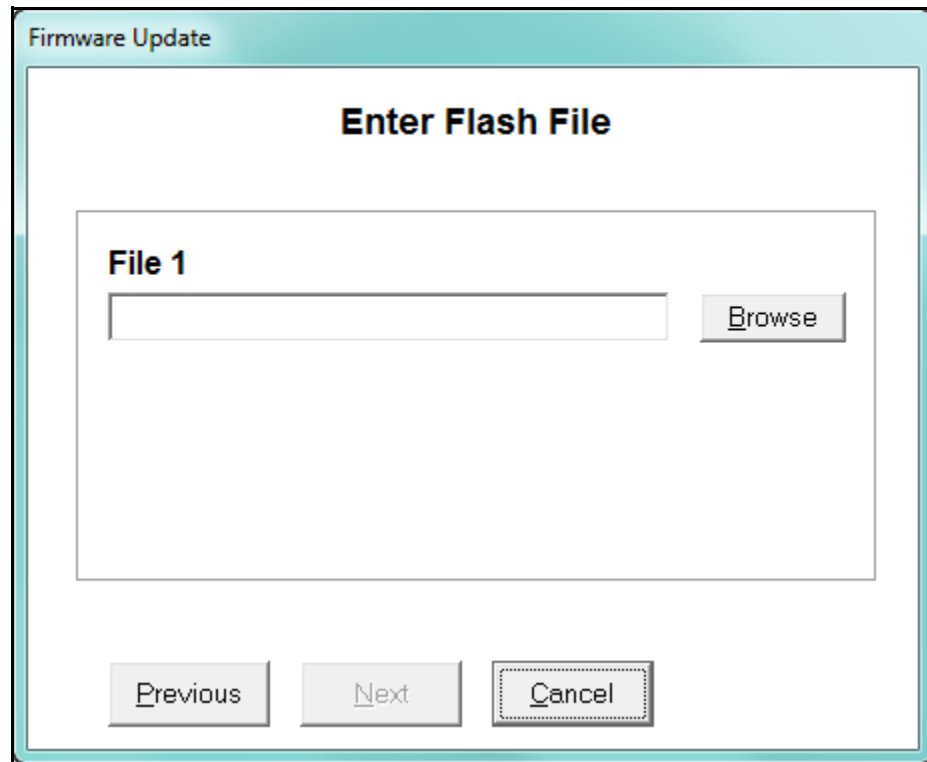
### 25.4.1: Firmware Update for Shark® Gen 1 50/100 Meter

**NOTE:** There are two versions of the Shark® 50/100 meters' DSP processor - Gen1 and Gen2. You can see the processor's firmware version in the Device Status screen for the meter: Gen1 firmware has a version number of 65 or lower and Gen2 firmware has a version number of 76 or higher. The procedure in this section is for the Gen1 processor. Follow the procedure in [25.4.2: Firmware Update for Shark 200/ST40 Meter, Gen2 Shark 100 Meter, and MP200 Metering System](#), on page 25-11 if your meter has the Gen2 processor.

1. From the Main screen, select Tools>Firmware Update. You will see the screen shown below.

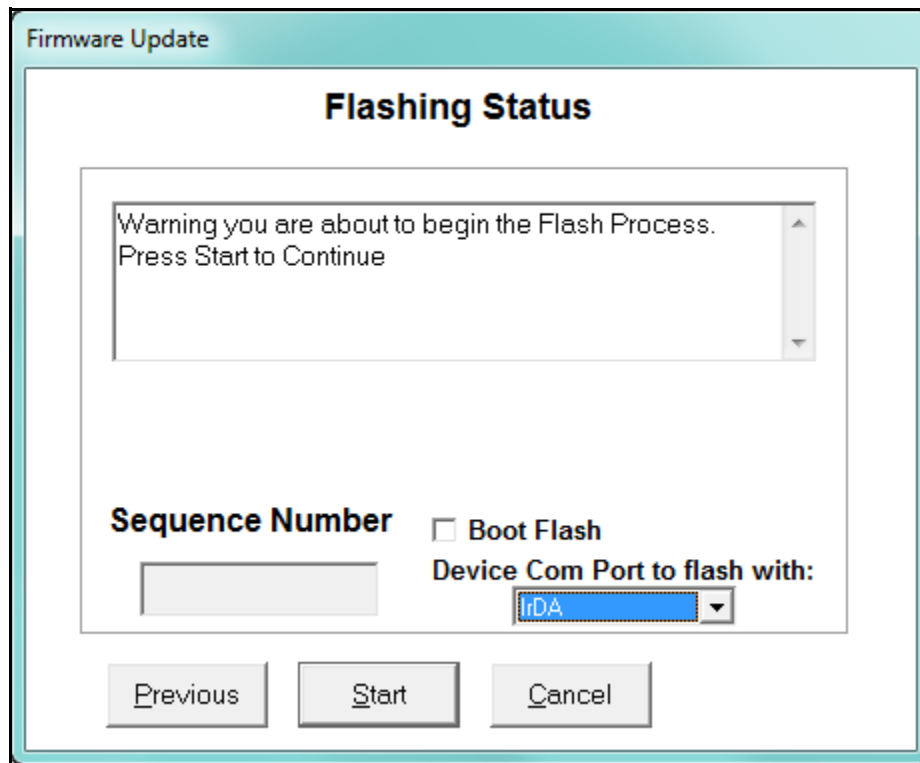


2. Click Next. You will see the screen shown on the next page.

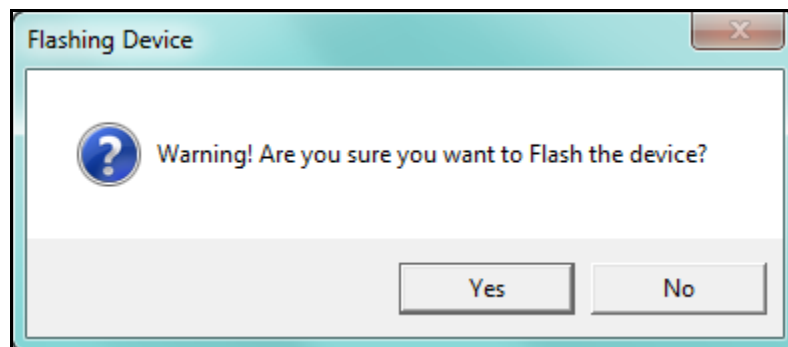


3. Click Browse to locate the firmware file and click Next.

4. You will see the screen shown below.



- a. Select the meter's Com port you want to use for the update: IrDA or RS485.
  - b. If the meter is in Boot Mode, click the Boot Flash checkbox.
3. Click Start to perform the firmware update. You will see the confirmation message window shown below. Click Yes to continue.



4. When the update is complete, the Cancel button changes to OK. Click OK to close the screen.

### 25.4.2: Firmware Update for Shark 200/ST40 Meter, Gen2 Shark 100 Meter, and MP200 Metering System

1. From the Main screen, select Tools>Firmware Update. You will see the screen shown below.



2. Click Browse to locate the firmware file.
3. Click Start to update the firmware with the new firmware file.
4. When updating is complete, click Exit to close the screen.

**NOTE:** If firmware updating fails, you will see a message to that effect. Check Device Status to see if your meter is in Boot Mode.

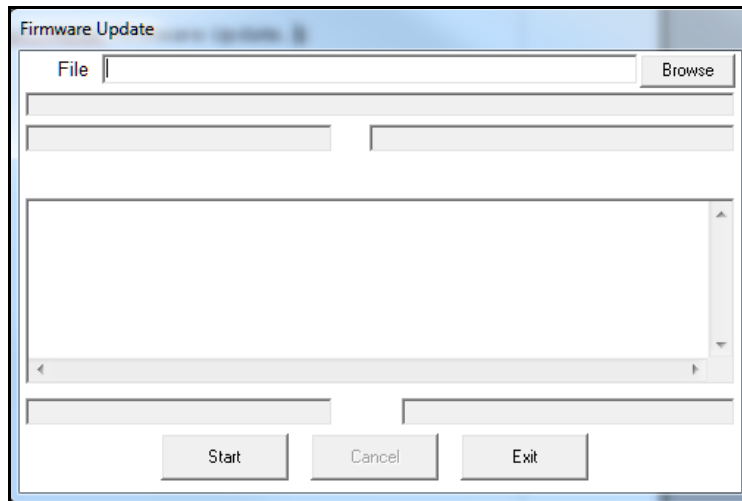
- If the meter is in Boot Mode, uncheck the Starting from Run Mode box in the Firmware Update screen and try updating the firmware again.
- If the meter's status is not displayed in the Device Status screen, the meter may be stuck in Boot Mode. If you are certain the communication settings are correct for the meter, try connecting to the meter using the following defaults:
  - For RS485 connection:
    - Address 001
    - Baud Rate 9600
    - Protocol Modbus RTU
  - For IrDA connection:
    - Address 001
    - Baud Rate 57600
    - Protocol Modbus ASCII

Once you connect to the meter, you can try updating again.

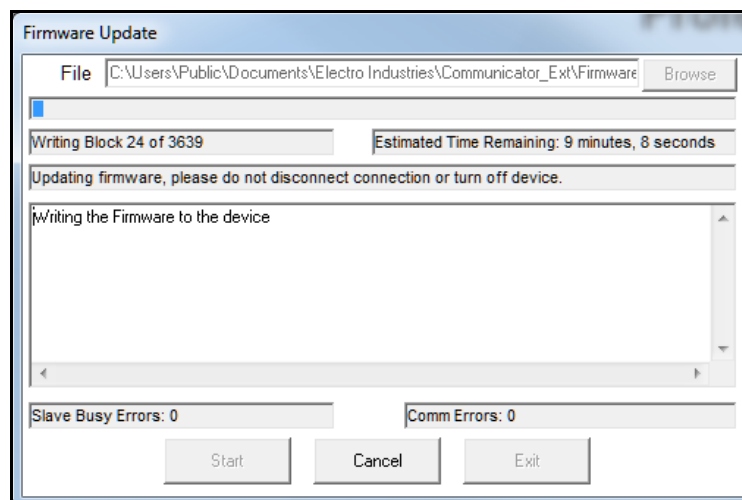
**NOTE:** The Shark® 200 meter's network card can only be updated via its webpage. See the *Shark® 200/200T Installation and Operation Manual* for details.

### 25.4.3: Firmware Update for the Shark® 250/270 Meter

1. From the Main screen, select Tools>Meter Firmware Update.



2. Click Browse. You will be prompted to select the firmware file.
3. Once the file is shown in the File field, click Start to begin firmware update. You will see messages as the update takes place. See the example screen, below.



4. The screen will show a message when the update is complete. Click Exit to close the screen.



### 25.4.4: Firmware Update for the Shark® 270 Meter's Cell Modem Card

The Shark® 270 meter offers the Verizon-certified 4GLTE cellular modem card. If your 4GLTE card has version 0001 firmware, EIG recommends that you upgrade to version 0002 firmware. You can get the firmware file from EIG's technical support (phone # 516-334-0870, 8a.m. - 8 p. m. Monday - Friday) - save the file on your PC. Note that you can see the 4GLTE card's current firmware version in the Device Status screen (see [Chapter 4: Viewing Device Status, on page 4-1](#) for instructions on viewing the Device Status screen).

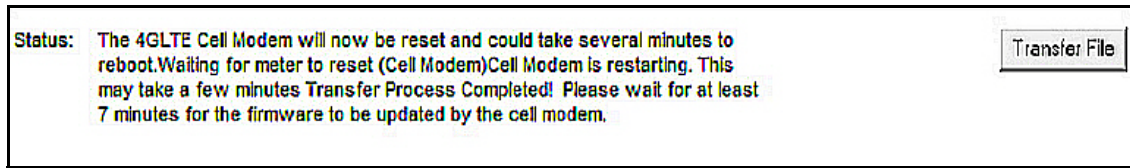
Follow this procedure to update the card's firmware:

1. Use CommunicatorPQA® software version 5.0.280 or higher to preset the APN number and optionally configure the Allow IP address(s) - these fields are new in firmware version 0002. The APN number is necessary in order to connect to a cell modem with the new firmware. You can use the cellular connection to connect to the meter.
2. Instructions for setting the APN and allowed addresses are in [26.5.8: Configuring a Verizon 4G Cell Modem Card \(4GLTE\), on page 26-120](#).
3. When you have updated the meter's Device Profile with the new settings, click Tools>4GLTE Card Firmware Update from the main screen's Title bar.
4. Select the update firmware file by clicking the Browse button to locate it on your PC.

5. Click Write File to Meter; File Type is 05-4G Cell Modem Firmware.

6. Click Transfer File. You will see a status update as the firmware is loading.

7. When the update has successfully completed, you will see the following message.



8. Wait about 10 minutes - the unit should connect via the cell modem.

## 25.5: Firmware Update for the Nexus® 1450 Meter

You can only update the firmware using an Ethernet (not serial) connection. You can find the meter's current firmware version in the App Archive version number, in either the Device Status screen or the WebView™ Energy Dashboard's Meter Hardware webpage.

Device Status Screen

Device	Device Type	Serial Number
1450_IP13	Nexus 1450	0000000168022827

Item	Value
DSP Run	0001.0009
FPGA	012B504300010007
App Archive	0002.0002
Web Archive	0002.0001
Modbus Map Ver	0002.0001
V-Switch	2
Comm State	Healthy
DSP State	Healthy

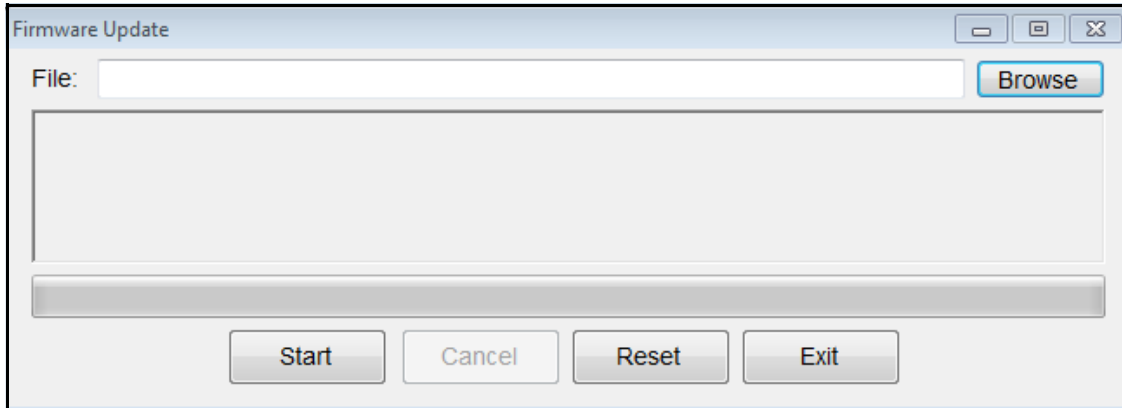
■ Polling 1450\_IP13

OK Copy

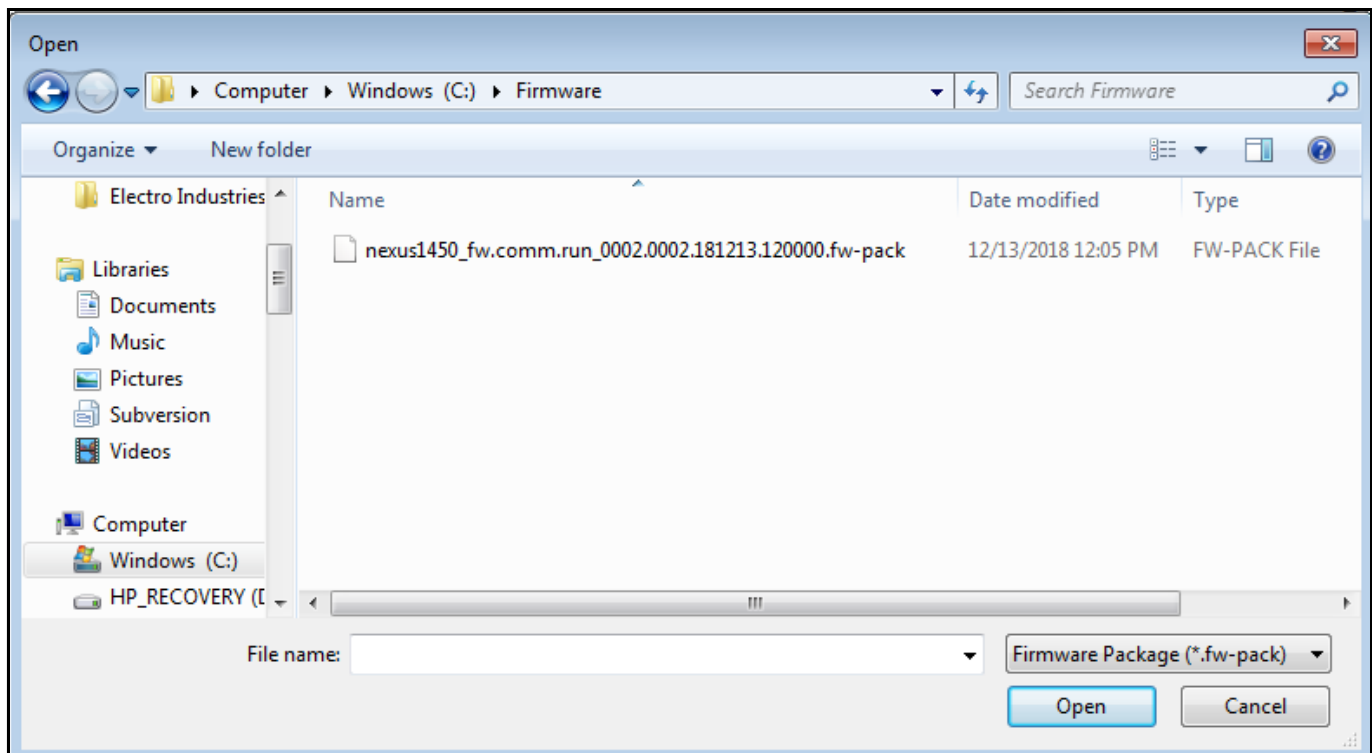
WebView™ Energy Dashboard's Meter Hardware Webpage

Meter Dashboard						Real-time	
Voltage / Current Power Energy Pulse Accumulation Phasor Flicker Harmonics Inputs PQ Data Waveform Data Historical Data Limits Data Digital Inputs Data System Event Data EN50160 Reports Meter	<b>Hardware</b>					<b>Firmware</b>	
	<b>Board 1</b>					<b>DSP Runtime</b>	
	name	serial_number	number	rev	status	test_date	<b>version_string</b>
	digital board	0000000180652527	SK171202	SK-3	passed	03/07/2016	E1719061 ver:0001.0000.010974, \$15.30@02/02/18 (release)
	<b>Board 2</b>					<b>UCC DSP</b>	
	name	serial_number	number	rev	status	test_date	<b>version</b>
	analog board	0000000123746225	SK171203	SK-2	passed	06/07/2016	0.01.0010
	<b>Board 3</b>					<b>Boot firmware</b>	
	name	serial_number	number	rev	status	test_date	<b>preboot_version</b>
	I/O COMM board	0000000099538338	SK171203	SK-2	maybe passed	06/07/2016	<b>preboot_buildtime</b>
<b>CF Card</b>					<b>uboot_copy1_version</b>		
model	serial_number	firmware_version	file_format	firmware_model	<b>uboot_copy2_version</b>		
ATP COMPACT FLASH	99007140429130200303	20130426	FAT32/EXT3	20130426ATP COMPACT FLASH	<b>uboot_version</b>		
<b>Processor</b>					<b>uboot_buildtime</b>		
cpu	clock	revision	platform	memory	<b>U-Boot 2010.06 (May 21 2017 - 12:27:02) MPC83XX</b>		
e300c3	265.420800MHz	2.0 (pvr 8085 0020)	E171	256 MB	<b>U-Boot 2010.06 (May 21 2017 - 12:27:02) MPC83XX</b>		
<b>Factory</b>					<b>FPGA</b>		
					<b>trace_id</b>		
					<b>hardware_firmware_id</b>		
					<b>Apps Archive</b>		
					<b>version</b>		
					<b>buildtime</b>		
					0002.0000.180205.103041		
					2018-02-05 10:41:45 (Release)		

1. From the Main screen, select Tools>Meter Firmware Update.



2. If you know the firmware file's path, enter it in the File field, or else click Browse to locate the file.



3. Click on the file you want to use and click Open.
4. Once the file is shown in the File field, click Start to begin the firmware update. You will see messages as the update takes place. Note that the firmware update may take longer than five minutes to complete. When the update is complete, click Reset to reboot the meter using the new firmware.

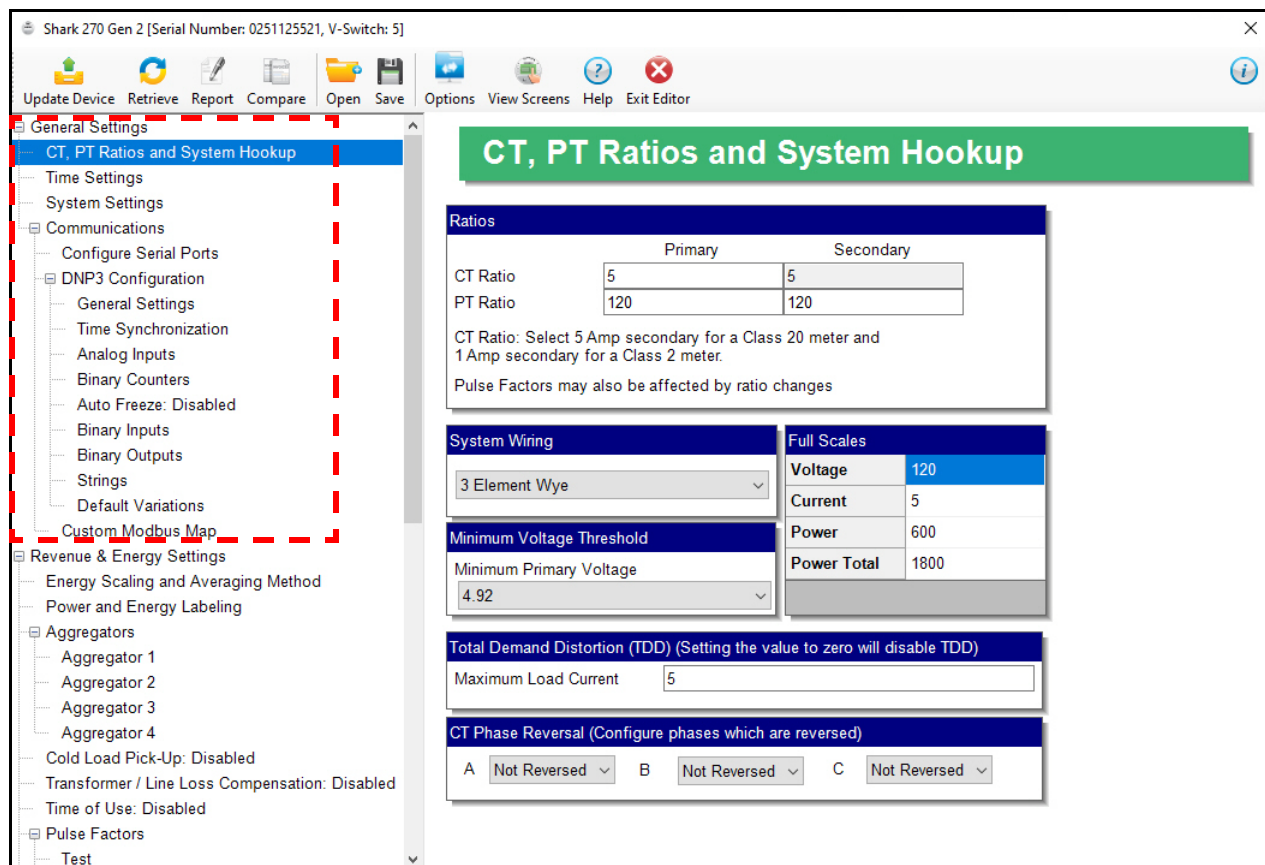
## 26: Shark® 270 Certified, ANSI C12.20 Accuracy Class Energy Meter

This chapter explains how to configure a Shark® 270 energy meter's programmable settings, which are stored in the unit's Device Profile. Chapter 7 contains detailed information on how to use the meter's Device Profile. See [6.11: Shark® 250/270 Meter's Security, on page 6-21](#), for details on programming restrictions when the Sealing Switch is enabled.

**NOTE:** Depending on the firmware in your meter, and whether it is Gen 1 or Gen 2, you may see slightly different options than shown in some screen captures.

### 26.1: Device Profile General Settings

1. From the Tree Menu on the left side of the Shark® 270 meter's Device Profile screen, double-click on the General Settings line or click on the + button next to it. All of the settings in the General Settings group are listed.



### 26.1.1: Configuring CT, PT Ratios and System Hookup

Use this setting to configure Current Transformer and Potential Transformer ratios and to select the System Hookup. The Full Scales values are display only.

#### Functional Overview of CT and PT Ratios:

Current and Potential Transformers are used mainly for the following reasons:

- To insulate, and as a result isolate, the meter from high-voltage circuits.
- To change the primary voltage and current to standard values and sizes that the meter can measure.

The CT and PT transformers deliver fractions of the primary voltage and current to the meter. With properly set ratios and multipliers, the readings of the meter can be used to determine the energy, voltage, current, or power of the system.

1. From the Tree Menu, click General Settings>CT, PT Ratio and System Hookup.

The screenshot shows the Shark 270 configuration software interface. The title bar reads 'Shark 270 [Serial Number: 0220922320, V-Switch: 5]'. The menu bar includes 'Update Device', 'Retrieve', 'Report', 'Compare', 'Open', 'Save', 'Options', 'View Screens', 'Help', and 'Exit Editor'. The left-hand tree menu is expanded to 'General Settings' > 'CT, PT Ratios and System Hookup'. The main window displays the following settings:

### CT, PT Ratios and System Hookup

	Primary	Secondary
CT Ratio	5	5
PT Ratio	120	120

CT Ratio: Select 5 Amp secondary for a Class 20 meter and 1 Amp secondary for a Class 2 meter.  
Pulse Factors may also be affected by ratio changes

**Changing settings may affect screens in the meter.**

System Wiring		Full Scales	
3 Element Wye		Voltage	120
		Current	5
		Power	600
		Power Total	1800

#### Minimum Voltage Threshold

Minimum Primary Voltage: 4.92

#### Total Demand Distortion (TDD) (Setting the value to zero will disable TDD)

Maximum Load Current: 5

#### CT Phase Reversal (Configure phases which are reversed)

A: Not Reversed    B: Not Reversed    C: Not Reversed

## 2. Make these settings:

## a. Ratios:

	Primary	Secondary
CT Ratio	5	5
PT Ratio	120	120

CT Ratio: Select 5 Amp secondary for a Class 20 meter and 1 Amp secondary for a Class 2 meter.

Pulse Factors may also be affected by ratio changes

- CT Ratio, enter:
  - Primary (CT Numerator): 1 - 65535
  - Secondary: this setting depends on the meter class. Enter 5 for a Class 20 meter, or 1 for a Class 2 meter.
- PT Ratio, enter:
  - Primary (PT Numerator): 1 - 99999999
  - Secondary (PT Denominator): 1 - 65535

## b. System Wiring:

System Wiring
3 Element Wye
3 Element Wye
2.5 Element Wye
2CT Delta

- From the pull-down menu, select your system's wiring:
  - 3 Element Wye
  - 2.5 Element Wye
  - 2 CT Delta

**IMPORTANT!** The power system type must be selected correctly for the meter to calculate readings correctly.

- c. Full Scales (display, only, not programmable):  
these fields display the primary values of the meter at full scale.

Full Scales	
Voltage	120
Current	5
Power	600
Power Total	1800

## d. Minimum Voltage Threshold:

- The minimum voltage threshold is a percentage of the voltage full scale. This setting adjusts the pick up threshold for the voltage, in order to configure the meter to start readings values above 0 voltage.
- Set a percentage of the PT primary (PT numerator), up to 12.7, in the entry field.

Minimum Voltage Threshold	
Minimum Primary Voltage	0

## e. Total

Demand  
Distortion  
(TDD):

Total Demand Distortion (TDD) (Setting the value to zero will disable TDD)	
Maximum Load Current	5

- The TDD is the current harmonic distortion in the system in relation to the demand, or load, of the system. Enter the maximum load current for your system (i.e., the system the meter is measuring) in the Current Reference field. This value will be used in the formula that calculates the TDD.

## f. CT Phase

Reversal: Use  
this setting to  
enable CT

CT Phase Reversal (Configure phases which are reversed)			
A	Not Reversed	B	Not Reversed
		C	Not Reversed

reversal for any phase. This feature is useful if a CT is wired the wrong way and you do not want to (or cannot) change the wiring. When CT reversal is enabled, the meter's firmware shifts the current phase by 180 degrees for that phase. This will reverse the power direction, and all computations such as power factor, phase angle etc., which are derived after that will be affected.

**NOTE:** This setting is only available for a three element WYE hookup. For any other hookup, this setting will be ignored.

- To implement phase reversal for a phase (A, B, or C), select Reversed next to that field.

3. To implement any changes, click the Update Device button to send the new profile to the meter.



## 26.1.2: Configuring Time Settings

Use this setting to enable or disable Daylight Savings Time for the meter, to set the beginning and ending times for Daylight Savings Time, and to set up Time Zone information and clock synchronization information.

1. From the Tree Menu, click General Settings>Time Settings.

Shark 270 Gen 2 [Serial Number: 0251125521, V-Switch: 5]

Update Device Retrieve Report Compare Open Save Options View Screens Help Exit Editor

**General Settings**

- CT, PT Ratios and System Hookup
- Time Settings**
- System Settings
- Communications
  - Configure Serial Ports
- DNP3 Configuration
  - General Settings
  - Time Synchronization
  - Analog Inputs
  - Binary Counters
  - Auto Freeze: Disabled
  - Binary Inputs
  - Binary Outputs
  - Strings
  - Default Variations
  - Custom Modbus Map
- Revenue & Energy Settings
  - Energy Scaling and Averaging Method
  - Power and Energy Labeling
- Aggregators
  - Aggregator 1
  - Aggregator 2
  - Aggregator 3
  - Aggregator 4
- Cold Load Pick-Up: Disabled
- Transformer / Line Loss Compensation: Disabled
- Time of Use: Disabled
- Pulse Factors
- Test

**Time Settings**

**Daylight Savings Information**

☐ Enable Daylight Savings Time in Meter

	Month	Week	Day of Week	Hour
Begin	March	Second	Sunday	2:00 AM
End	November	First	Sunday	2:00 AM

**Time Zone Descriptor**

(UTC -05:00)

**Clock Sync**

Method: IRIG-B

Schema: B003

**Date/Time Format**

	Format	Separator	Example
Date	MM/DD/YYYY	/	05/09/2023
Time	hh:mm:ss tt	:	11:22:37 AM

2. Make these settings:

- a. Check the box to Enable Daylight Savings time, or un-check it to Disable Daylight Savings Time.

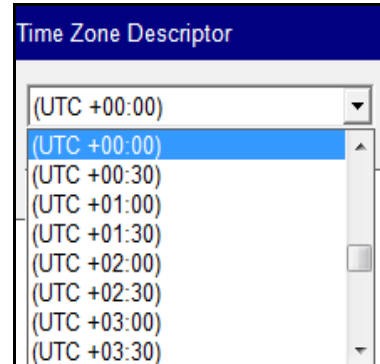
**Daylight Savings Information**

☒ Enable Daylight Savings Time in Meter

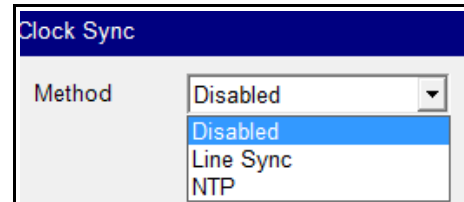
	Month	Week	Day of Week	Hour
Begin	March	Second	Sunday	2:00 AM
End	November	First	Sunday	2:00 AM

b. If you are enabling Daylight Savings Time, use the entry fields to set the start and end times for it. Select the values you want from the Month, Week, Day of the Week, and Hour fields. Note that the Hour field uses a 24-Hour clock.

c. Set the time zone by selecting the time zone from the pull-down menu. The time zones are described as UTC (Coordinated Universal Time) Plus or minus a period of time. If you do not enable the Time Zone, the meter defaults to UTC (+0.00), which is UTC time.



d. Select the clock synchronization (Clock Sync setting) method for the meter: Disabled, if don't want to synchronize the meter's clock with an external source\*; Line Sync to use the frequency zero crossings to provide a time reference for the meter (this is the most common method to synchronize a meter's clock)\*\*; NTP if you have a Network Option card and want to use a Network Time Protocol Server for time synchronization\*\*\*; and IRIG-B if you have a Gen 2 meter and an IRIG1 (IRIG-B and Pulse Outputs) card.



\*EIG recommends that you set up a clock sync method unless there is a specific reason to not do so. If the meter is not synchronized to either the line frequency or an NTP server, it will default to internal crystal. The Shark® 270 meter's internal clock has a low drift - between 6 and 15 seconds per month.

\*\*Make sure to match the frequency to the meter's frequency. If it is not the same, the line sync will not work. The default value is 50 Hz.

If line sync is enabled, the duration for logged events that last 100 ms or less will be timestamped as 100 ms.

\*\*\*You also need to set up the NTP server information for the Network card.

See [26.5.1: Configuring a Network Card \(INP100S\)](#), on page 26-90 for instructions.

Note that the time sync method in use is shown on the meter's front panel

display, in the Status bar, next to time: either C (clock sync); L (line sync); or N (NTP sync), as long as sync is active and working properly.

- e. Set up the format for date and time display: select the format and the separator from the date and time pull-down menus, e.g., Date: MM/

Format		
Format	Separator	Example
MM/DD/YYYY	/	07/19/2017
hh:mm:ss tt	:	11:05:18 AM

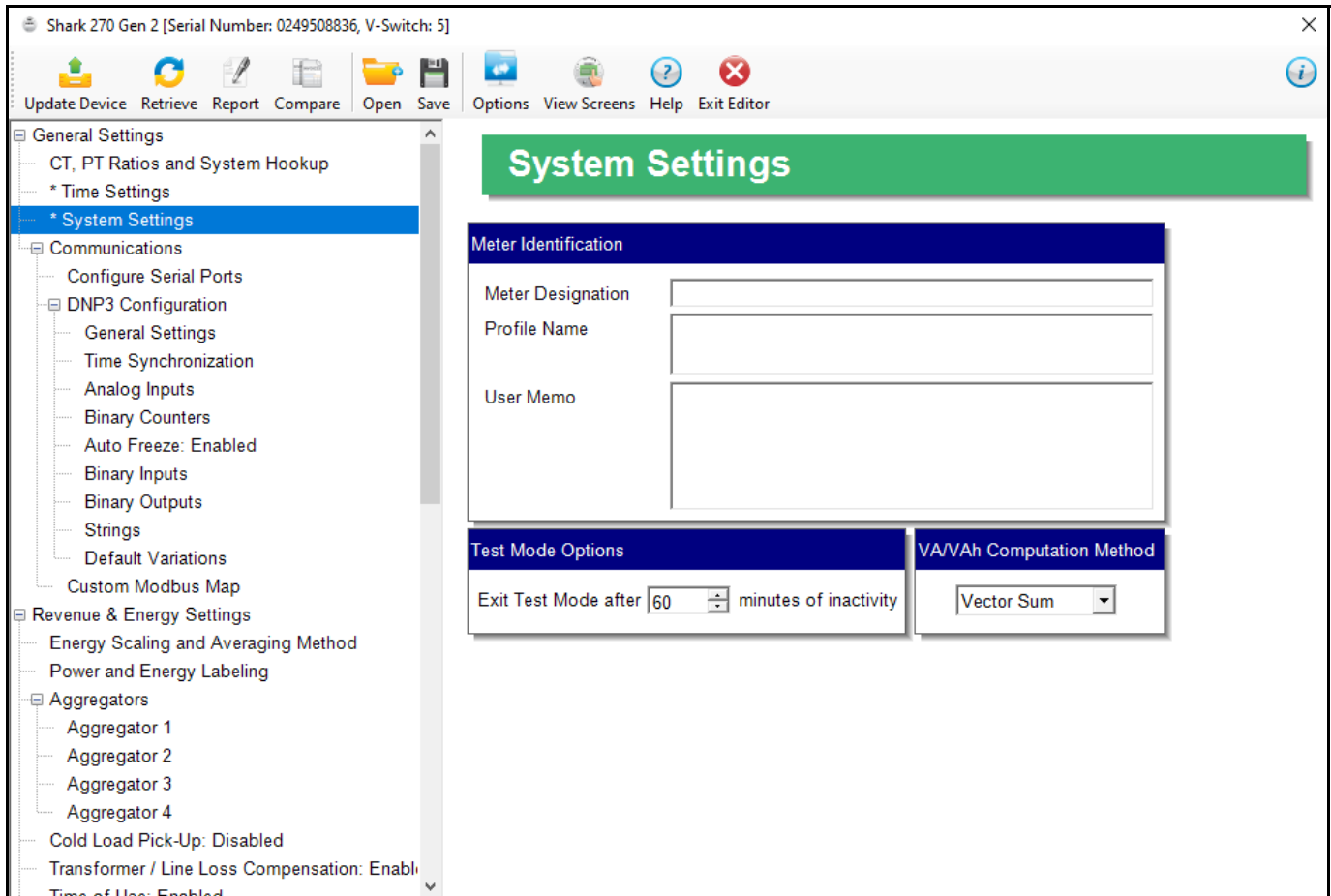
DD/YY format and - separator for 02-20-2016 and HH:MM:SS tt; with: separator for 12:28:29 PM. The Example field shows what your selections will look like, when implemented.

3. To implement any changes, click the Update Device button to send the new profile to the meter.

### 26.1.3: Configuring System Settings

Use the system settings to set up a meter ID, various system processing settings, and a Test Mode setting.

1. From the Tree Menu, click General Settings>System Settings.



2. Make these settings:

- a. Meter Identification:

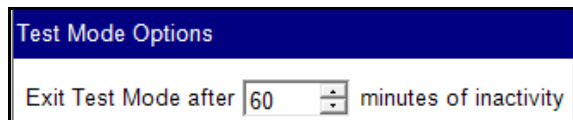
enter a name for the meter (Meter Designation setting). You can also use the Profile Name and User Memo

field to enter other relevant information. Any memo entry will be displayed in the Memo field in the Main screen's Status bar - see [2.2.2: Main Screen's Status Bar](#), on page 2-8.

Meter Identification	
Meter Designation	<input type="text"/>
Profile Name	<input type="text"/>
User Memo	<input type="text"/>

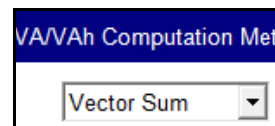
Note that it is important to name each meter individually, since the meter name is used to name the log databases when logs are downloaded.

- b. Using the up/down arrows, enter the amount of time in minutes that Test Mode should continue after the last



user action (Exit Test Mode After setting). After this amount of time, the meter will return to its normal processing mode.

- c. \*VA/VAR Computation Method: Select either Vector Sum or Arithmetic Sum from the pull-down menu.



**NOTE:** There are two optional methods of VA/VAR Computation:

**Arithmetic Sum** - the formula for this calculation is:

$$VA_T = VA_a + VA_b + VA_c$$

**Vector Sum** - the formula for this calculation is:

$$VA_T = \sqrt{W_T^2 + VAR_T^2}$$

Generally, the superior method for calculation is the Vectoral method; however, both methods are provided.

\* Note that this setting replaces the previous Power setting in the Energy Scaling and Averaging Method screen.

3. To implement any changes, click the Update Device button to send the new profile to the meter.

### 26.1.4: Configuring Communication Settings

Use this screen to enter communication settings for the meter's two on-board ports: the Optical Port (COM 1) and RS485 Port (COM 2).



**IMPORTANT!** The settings on this screen are the current settings for communication. Any changes you make may affect communication between the Shark® meter and your PC.

1. From the Tree Menu, click General Settings>Communications>Configure Serial Ports.

The screenshot shows the Shark270 software interface. The title bar indicates 'Shark270 [Serial Number: 0196665942, V-Switch: 5]'. The menu bar includes 'Update Device', 'Retrieve', 'Report', 'Compare', 'Open', 'Save', 'Options', 'View Screens', 'Help', and 'Exit Editor'. The left tree menu shows the following structure:

- General Settings
  - CT, PT Ratios and System Hookup
  - Time Settings
  - System Settings
- Communications
  - Configure Serial Ports** (selected)
  - DNP3 Configuration
    - General Settings
    - Time Synchronization
  - Analog Inputs
  - Binary Counters
  - Auto Freeze: Disabled
  - Binary Inputs
  - Binary Outputs
  - Strings
  - Default Variations
- Revenue & Energy Settings
  - Energy Scaling and Averaging Method
  - Power and Energy Labeling
- Aggregators
  - Aggregator 1
  - Aggregator 2
  - Aggregator 3
  - Aggregator 4
- Cold Load Pick-Up: Disabled
- Transformer / Line Loss Compensation: Disabled
- Time of Use: Enabled
- Pulse Factors
  - Test
- Internal Accumulators
- CT & PT Compensation: Disabled

The main area displays the 'Communications' settings for two ports:

#### COM1 (Optical)

Address	1
Protocol	Modbus ASCII
Baud Rate	57600
Response Delay	0 milliseconds
Parity	None
Optical Receive Mode	Inverted

#### COM2 (RS-485)

Address	1
Protocol	Modbus RTU
Baud Rate	57600
Response Delay	0 milliseconds
Parity	None

## 2. Make these settings:

- a. COM 1 (Optical): enter the settings for the meter's Optical port. The address defaults to 1, and can't be changed. The other settings default as shown in this screen capture, but they may be changed by selecting another value from the pull-down menu for the field.

COM1 (Optical)	
Address	1
Protocol	Modbus ASCII
Baud Rate	57600
Response Delay	0 milliseconds
Parity	None
Optical Receive Mode	Inverted

- Protocol: the default is Modbus ASCII. The options are Modbus RTU or Modbus ASCII.
- Baud Rate: Options are 1200, 2400, 4800, 9600, 19200, 38400, 57600.
- Response Delay: 0 - 750 (50 msec increments). Response Delay is the delay the meter should use before responding to queries. If your connecting device requires a delay before receiving information, use response delay to program the time to wait before the meter starts responding to queries.
- Parity: Odd, Even, or None.
- Optical Receive Mode: Inverted or Non-Inverted. Inverted Operation is used with the A9U and B10U optical readers. These readers can be purchased from EIG's online store: at [www.electroind.com/shop](http://www.electroind.com/shop).

- b. COM 2 (RS-485): enter the settings for the meter's standard RS485 port.

COM2 (RS-485)	
Address	1
Protocol	Modbus RTU
Baud Rate	57600
Response Delay	0 milliseconds
Parity	None

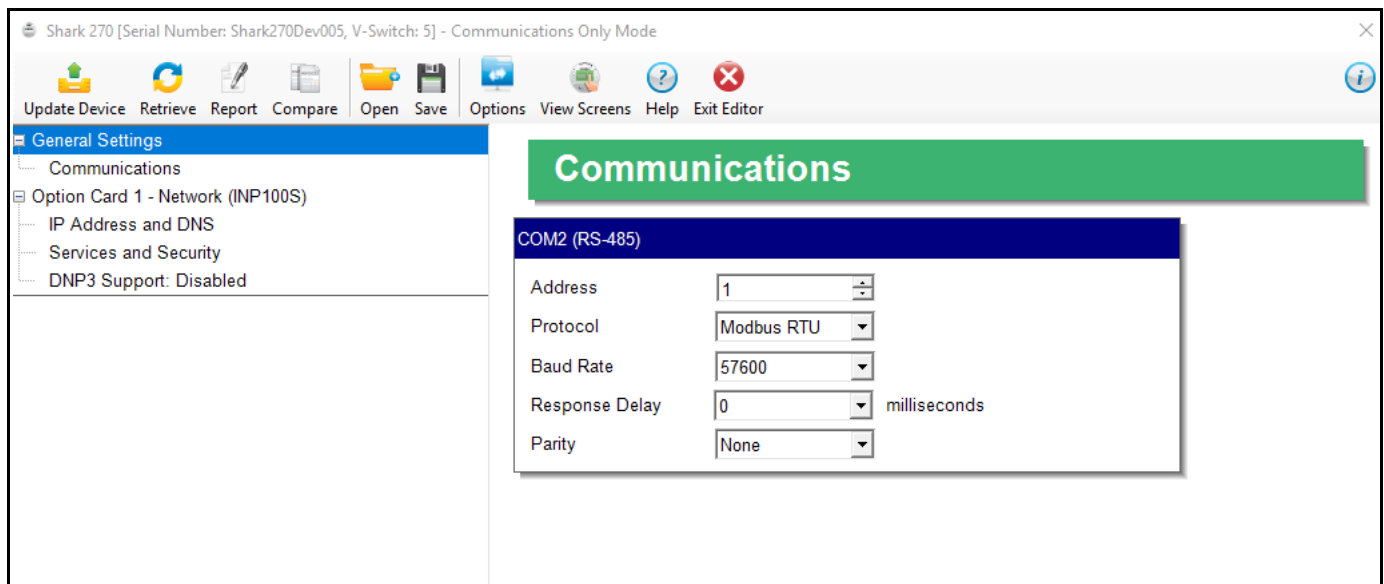
- Address: 1 - 247 (Modbus only; the address for DNP3 protocol is set during DNP Configuration - see [26.1.4.1.1: General Settings, on page 26-14](#))
- Protocol: Modbus RTU, Modbus ASCII or DNP3\*.

\* Only one serial port can be selected for DNP3 support, due to DNP3 restrictions. However, one Ethernet port can be set up for DNP3 in addition to the serial port.

- Baud Rate: 1200, 2400, 4800, 9600, 19200, 38400, 57600.
- Response Delay: 0 - 750 (50 msec increments)  
Response Delay is the delay the meter should use before responding to queries. If your connecting device requires a delay before receiving information, use response delay to program the time to wait before the meter starts responding to queries.
- Parity: Odd, Even, or None.

3. To implement any changes, click the Update Device button to send the new profile to the meter.

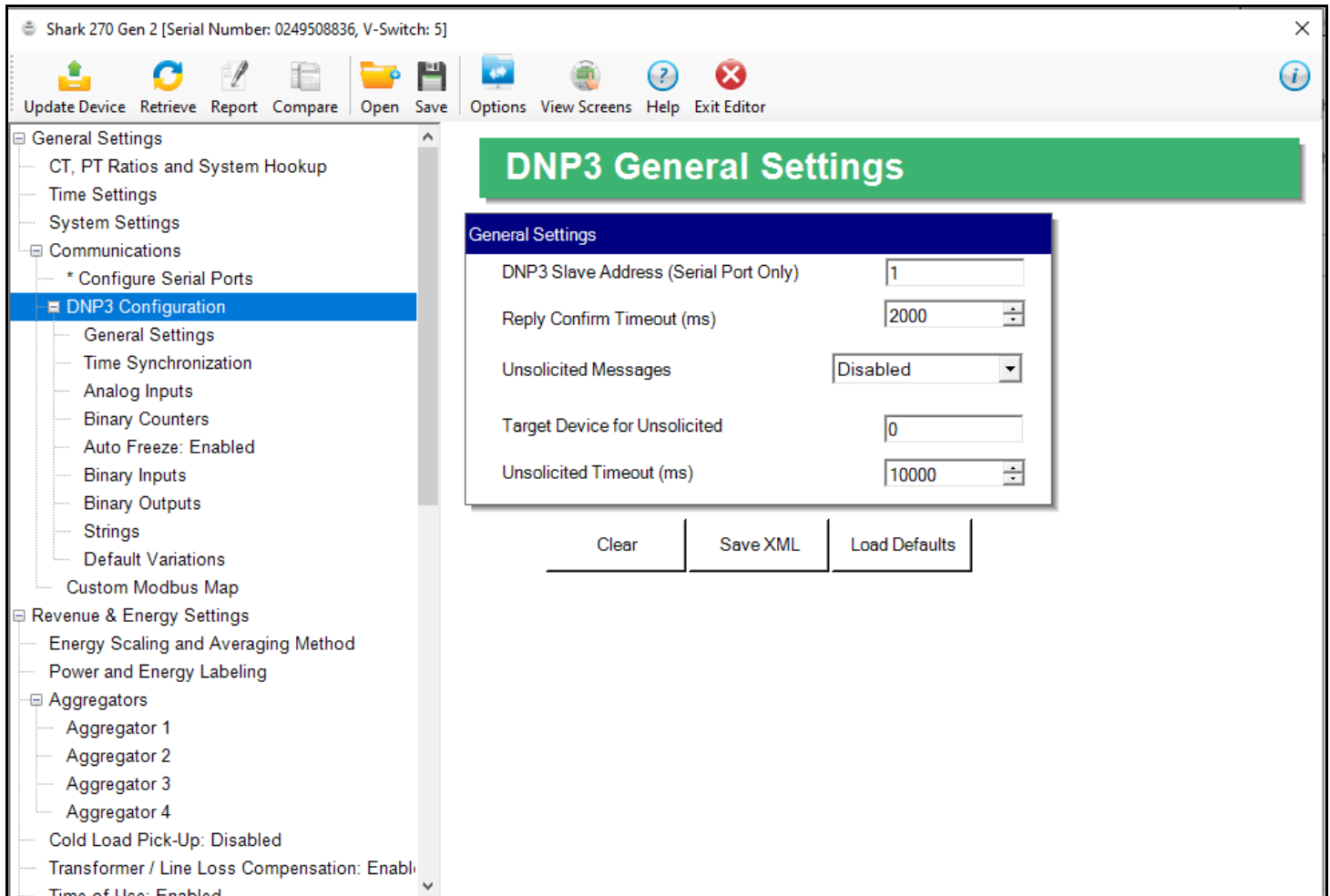
**NOTE:** If the meter's sealing switch is enabled, you will be able to edit COM 2 settings, only. the screen will look like the one shown below. See [6.11: Shark® 250/270 Meter's Security, on page 6-21](#), for details on programming restrictions when the Sealing Switch is enabled.





### 26.1.4.1: DNP3 Configuration

If your meter supports DNP3 communication (V3 and above), there are additional settings listed in the Communications tree. These settings let you customize DNP3 for your application needs. Note that the Modbus Map version must be 52 or above. In order for the DNP3 settings to be available, you must first enable DNP. You can enable DNP for either the RS485 port - see [26.1.4: Configuring Communication Settings, on page 26-10](#), or for an Ethernet Option card (INP100S) - see [26.5.1: Configuring a Network Card \(INP100S\), on page 26-90](#).



#### NOTES:

- See Appendix C in the [Shark® 270 Meter User Manual](#) for detailed information on settings, including the meter's default settings, and example use cases.
- Clicking the Save XML button in the DNP3 screens generates the DNP XML Profile. The DNP XML Profile is a file that contains the characteristics and configuration parameters set in the DNP3 screens, as well as data from the meter itself (serial numbers, channels, etc.). This file can be used to further configure other peers, e.g., the Master device, in the DNP3 Network. If you need a DNP XML Profile, EIG

recommends you click the Save button after making all of your DNP3 settings. Refer to official DNP3 documentation for DNP3 Network details.

- Formatting of energy and power values (number of digits, decimal point position, etc.) is used for display, only - DNP3 always uses the raw values from the Modbus register.

#### **26.1.4.1.1: General Settings**

The first setting is General Settings.

1. From the Tree menu, click DNP3 Configuration>General Settings. You will see the screen shown on the previous page.

2. You have the following options:

- You can click Load Defaults to load the settings from the meter.
- You can enter the settings manually.
- You can edit any edit any of the settings.
- You can clear the entries by clicking Clear.

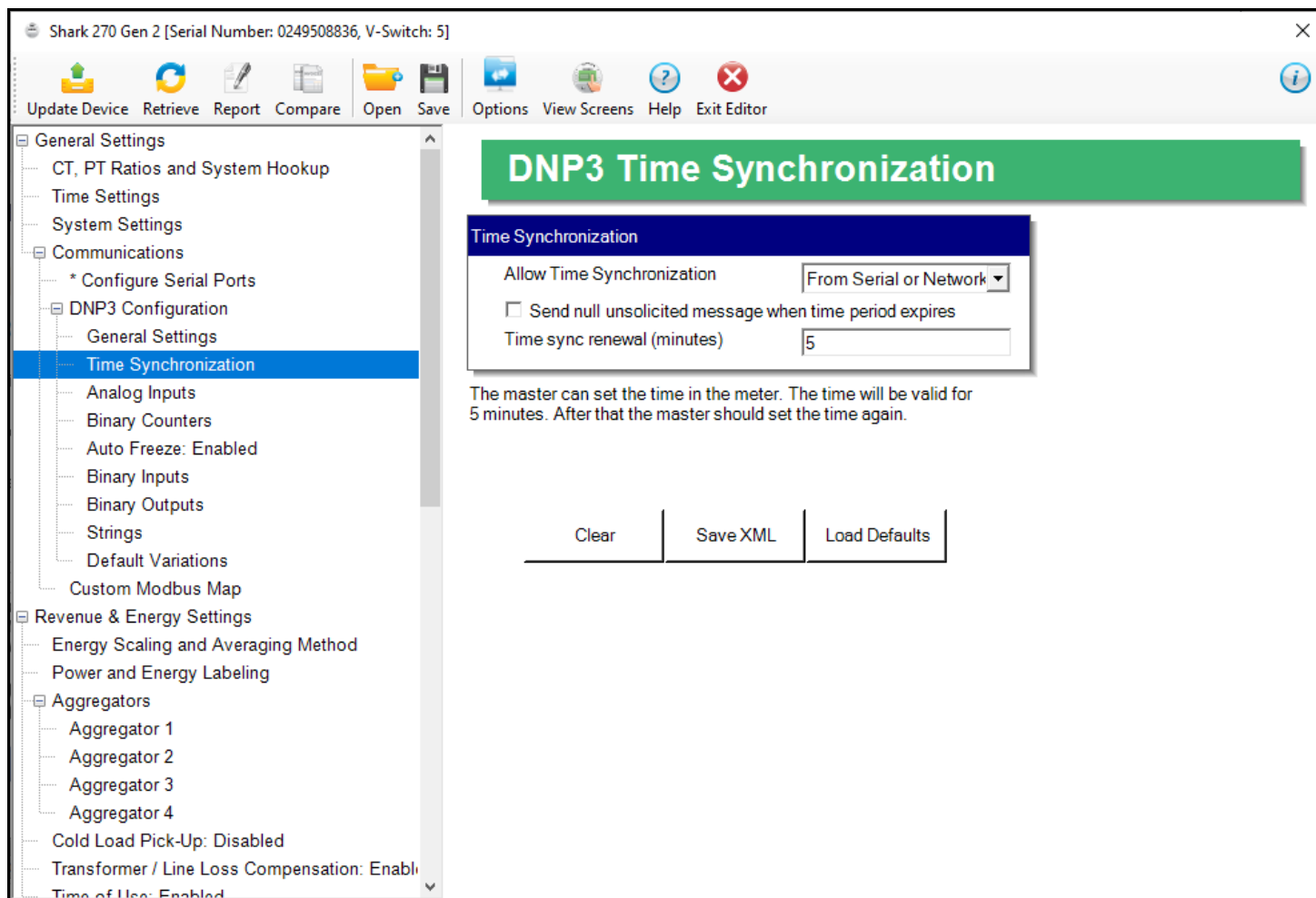
3. The settings on this screen are:

- DNP Slave Address: enter the DNP slave address for this meter. This is the address used with an RS485 serial link, only (not an Ethernet link).
- Reply Confirm Timeout (ms): enter the reply confirmation timeout in milliseconds.
- Unsolicited Messages: select Enabled to accept unsolicited messages. Note that the unsolicited messages are sent to the LAN only if the "Single Socket Enforced" option is enabled in the INP100S card's DNP3 Support setting (see [26.5.1: Configuring a Network Card \(INP100S\), on page 26-90](#)). If this option is not enabled, DNP3 cannot send the unsolicited messages since it won't know which meter socket to use.
- Target Device for Unsolicited: select the address for the target device for unsolicited messages.
- Unsolicited Timeout (ms): enter the unsolicited timeout in milliseconds.

### 26.1.4.1.2: Time Synchronization

The second setting for DNP is Time Synchronization. Note that EIG recommends you use only one method for meter time synchronization: if you enable the DNP Time Sync and you have a Network card, do not use the NTP feature for the Network card.

1. From the Tree menu, click DNP3 Configuration>Time Synchronization.



2. You have the following options:

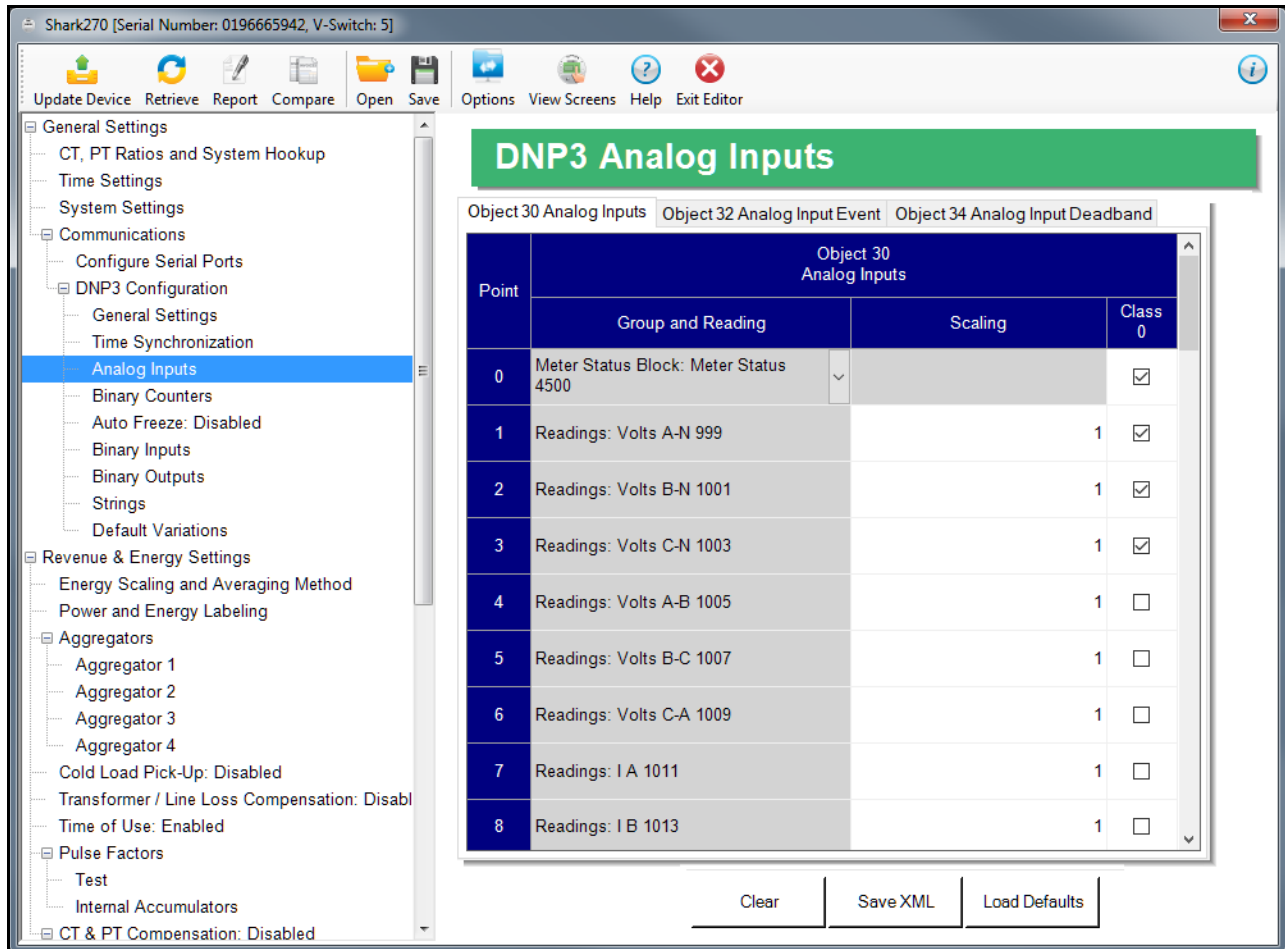
- You can load the default setting by clicking the Default button.
- You can clear the entry by clicking Clear.
- You can choose to allow time synchronization of the meter through DNP. When time synchronization is enabled, a Master must write the time into the meter. The time is updated frequently to reduce jitter and offsets. The options for time synchronization are:

- Disabled - no time sync through DNP is allowed.
  - From Serial - the time sync will be accepted from DNP only through the serial line (RS485 or other serial option).
  - From Serial or Network Card - the time sync will be accepted from DNP serial or DNP network communication.
3. The Sync Renewal Time is the period the time is considered valid after the Master has written it into the meter. After this time, the Meter will flag NEED\_TIME in its responses, to let other devices know that it needs a time update.
4. The Send Null unsolicited message checkbox allows the meter to send a null unsolicited message when the valid time expires, letting other devices know, immediately, about the need for time resynchronization. This is an additional feature which is not required by the DNP3 standard.

### 26.1.4.1.3: Analog Inputs

The third setting for DNP is Analog Inputs, which are non-accumulator readings.

1. From the Tree menu, click DNP3 Configuration>Analog Inputs.



2. You can make settings for Objects 30, 32, and 34 by clicking on the different tabs. The screen above shows the settings for Object 30. You have the following options:

- You can load the default settings by clicking the Default button.
- You can clear the entries by clicking Clear.
- You can enter the Analog Input settings manually:
  - Up to 64 points can be defined for DNP Analog Inputs. Select the reading you want to use from the pull-down menu, which lets you choose from groups of Measured Values, Demand, Harmonics, Angles and Basic setup parameters. For example, the reading Volt-A can be selected.

3. For the Object 30 tab:

- You can use the Scaling field to enter a multiplier value to change the magnitude of the reading for DNP. The scaling can be a positive fraction or integer; enter 1 for no scaling.
  - For example, you might want to scale the Volt-A reading, which has a full scale value of 600, to a higher range, e.g., 60000. To do that, you would set the Scaling value to 100. Scaling can also be used to scale down the value by using a fraction in the Scaling field. If no change is needed, the Scaling field must be left as 1.
- The Class 0 column allows you to include or not include the reading in a DNP Class-0 response. This gives you a practical way to poll several readings at a time, through grouping them into a class query.

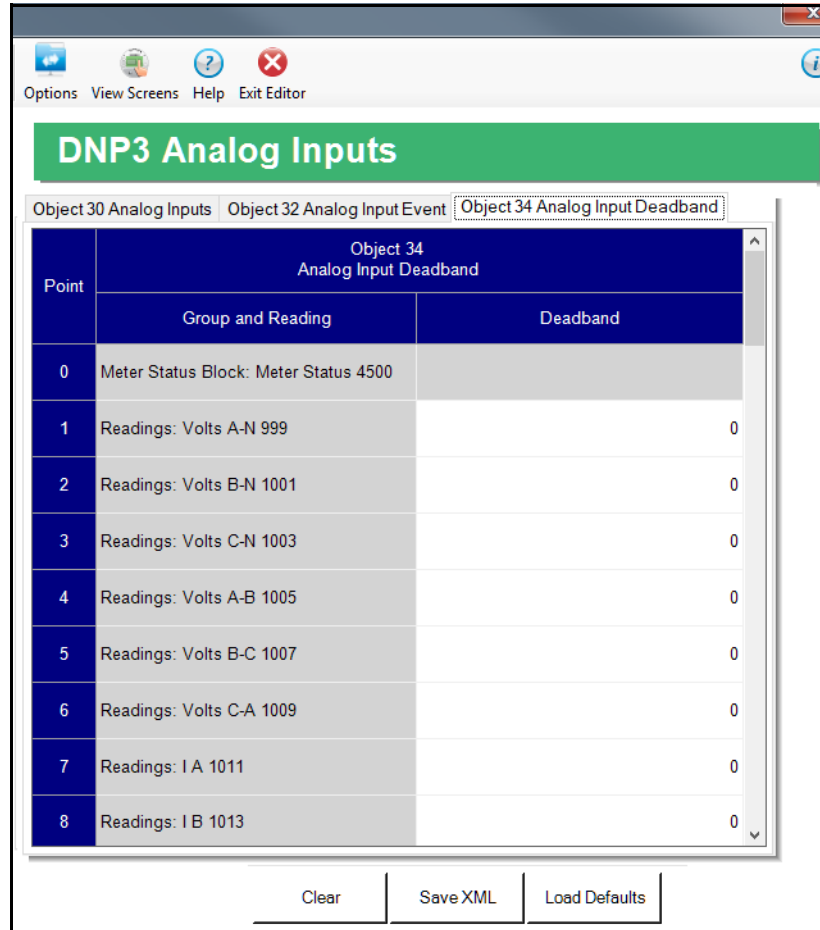
Point	Group and Reading	Object 32 Analog Input Event		
		Class 3	Class 2	Class 1
0	Meter Status Block: Meter Status 4500	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	Readings: Volts A-N 999	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Readings: Volts B-N 1001	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Readings: Volts C-N 1003	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Readings: Volts A-B 1005	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Readings: Volts B-C 1007	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Readings: Volts C-A 1009	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	Readings: I A 1011	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	Readings: I B 1013	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. For the Object 32 tab (shown above):

- The Analog Event Object 32 is used as a capture placeholder (data storage) for dead banding events. Dead banding events are used when you want to know if

an Analog Input varies by more than a specified amount. The amount of allowable variation is called a deadband. If the Analog Input varies in an amount less than the deadband, nothing happens, since it is considered within limits. Whenever the variation amount exceeds the deadband, a snapshot is taken of the Analog Input, i.e., the data is copied to the corresponding Object 32 and an event is flagged for that reading. This allows the user to later check on the Analog Input value at the time of the event.

- Object 32 can be also assigned to Class 1,2 or 3, allows creation of different groups for different events.



5. For the Object 34 tab (shown above):

- The deadband value is used for detecting the changes in the Analog Input. A value of 0 disables this feature. The deadband is always a positive number, but it checks for the absolute variation, either positive or negative. Note that if Scaling is used, the deadband will compare the Analog Input value after scaling has been applied.

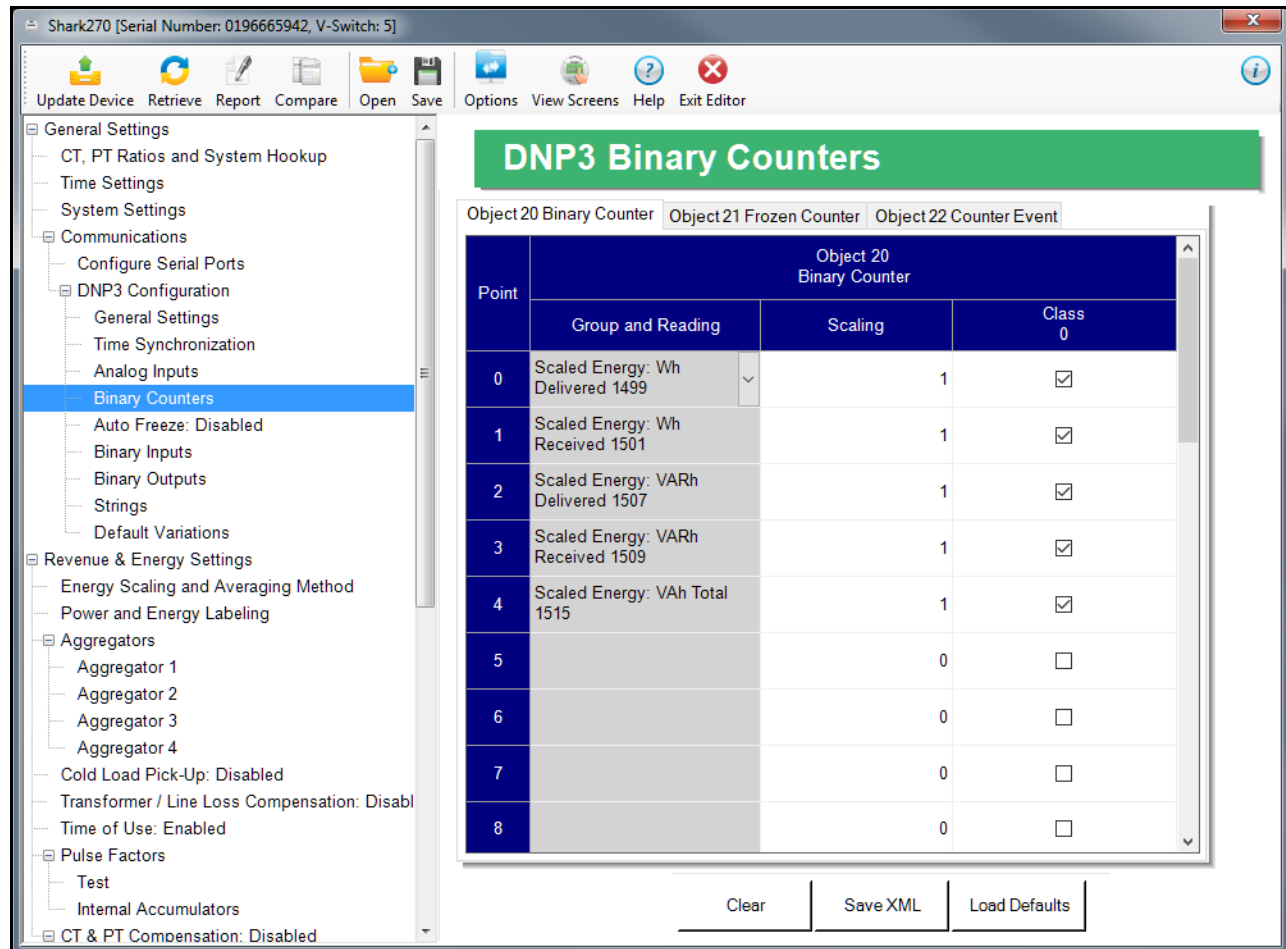
**NOTE:** EIG recommends you do not set the deadband value too small, to avoid filling up the DNP Event Buffer with very minor fluctuations, causing bigger fluctuations to be missed.



### 26.1.4.1.4: Binary Counters

The fourth setting for DNP is Binary Counters, which are accumulator readings.

1. From the Tree menu, click DNP3 Configuration>Binary Counters.



2. You can make settings for Objects 20, 21, and 22 by clicking on the different tabs. The screen above shows the settings for Object 20 Binary counter. You have the following options:

- You can load the default settings by clicking the Default button.
- You can clear the entries by clicking Clear.
- You can enter the settings manually, for the binary counters:
  - Select the reading you want to use from the Group and Reading pull-down menu, e.g., Group - Uncompensated, Reading - Wh.

3. For the Object 20 tab:

- You can use the Scaling field to enter a multiplier value to change the magnitude of the reading for DNP. The scaling can be a positive fraction or integer; enter 1 to keep the reading's scaling the same as in the meter.
- The Class 0 column allows you to include or not include the counter in a DNP Class-0 response.

Point	Object 20 Binary Counter Group and Reading	Object 21 Frozen Counter Class 0
0	Scaled Energy: Wh Delivered 1499	<input type="checkbox"/>
1	Scaled Energy: Wh Received 1501	<input type="checkbox"/>
2	Scaled Energy: VARh Delivered 1507	<input type="checkbox"/>
3	Scaled Energy: VARh Received 1509	<input type="checkbox"/>
4	Scaled Energy: VAh Total 1515	<input type="checkbox"/>
5		<input type="checkbox"/>
6		<input type="checkbox"/>
7		<input type="checkbox"/>
8		<input type="checkbox"/>

4. For the Object 21 tab (shown above):

- Frozen Binary Counter Object 21 is a placeholder used when the meter is instructed to freeze the respective counter. In other words, when the meter receives the instruction to freeze counters, it copies the Binary Counter (Object 20) into the Frozen Binary Counter (Object 21) placeholder, where it is kept available for the user to read. Only a new freeze will update the Frozen Binary Counter Object 21.

- The Frozen Binary Counter can be assigned to Class 0, only. (It does not have to be assigned to Class 0, though.)
- Clear After Freeze is not supported. To clear the binary counters, Binary Output Point #4 must be Pulsed-On/Latched-On via Object 12, V1 - Direct Operate. (See Appendix C in the *Shark® 270 Meter User Manual* for details). Note that because the meter does not support clearing individual counters, all the binary counters will be cleared.

Point	Object 20 Binary Counter Group and Reading	Object 22 Counter Event Change Delta	Object 22 Counter Event		
			Class 3	Class 2	Class 1
0	Scaled Energy: Wh Delivered 1499	1	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	Scaled Energy: Wh Received 1501	1	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	Scaled Energy: VARh Delivered 1507	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Scaled Energy: VARh Received 1509	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Scaled Energy: VAh Total 1515	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5		0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6		0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7		0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8		0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Clear    Save XML    Load Defaults

5. For the Object 22 tab (shown above):

- Use the Change Delta field to set up a value in the same raw unit as the reading, which is used to define a threshold value for the counter. This threshold value instructs when to create an event for Binary Counter Event Object 22. Every time the Binary Counter changes by the value of the Change Delta field, or by a greater value, an event for Object 22 is created. If the Change Delta value is 0, changes for this reading are not monitored.

- The Binary Counter Event Object 22 can be assigned to Class 1,2 or 3.

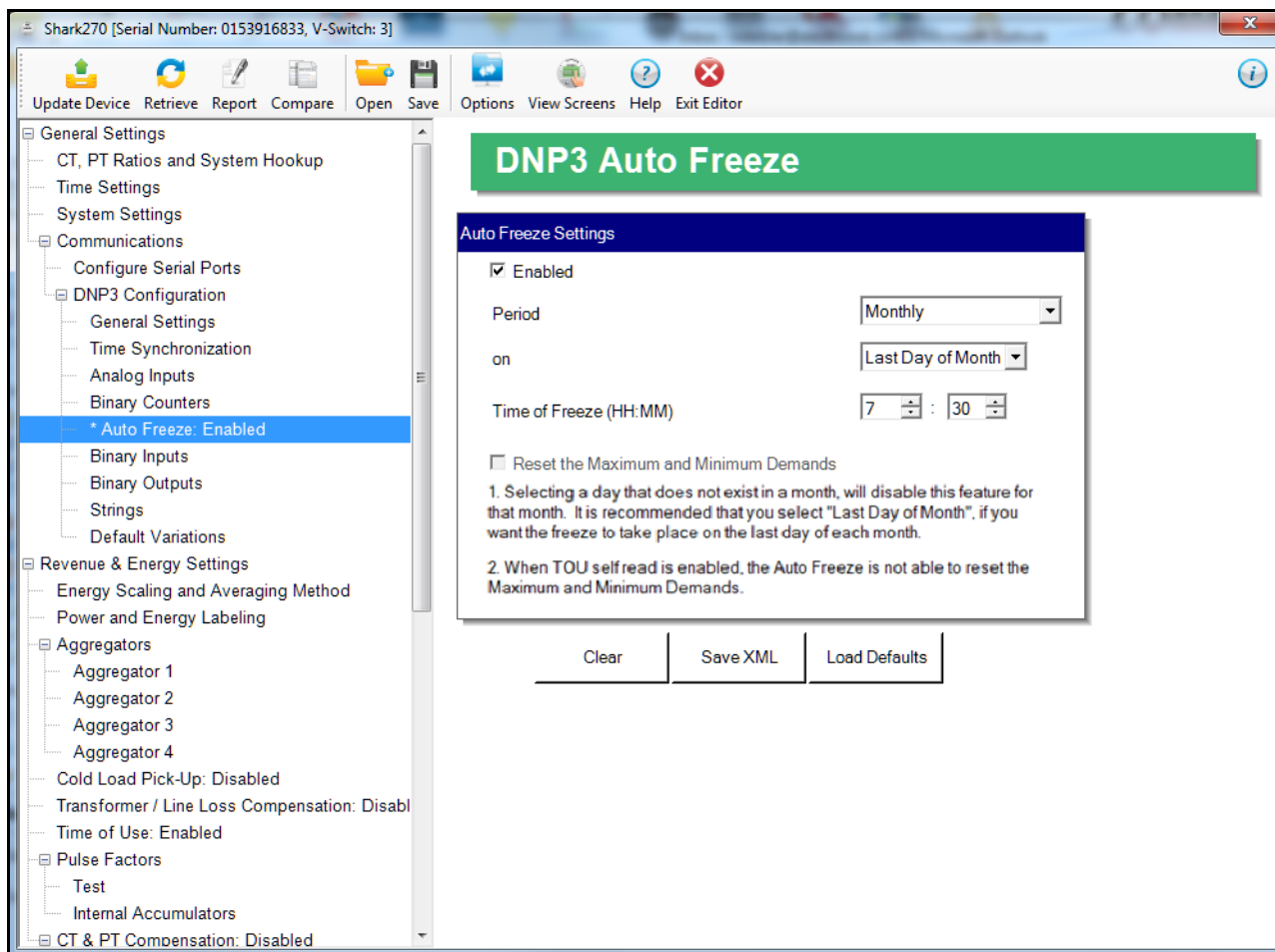
**NOTE:** EIG recommends you do not set the Change Delta value too small, to avoid filling up the DNP Event Buffer with very minor fluctuations, causing bigger fluctuations to be missed.

#### **26.1.4.1.5: DNP3 Auto-Freeze**

The meter's DNP implementation lets you freeze defined Object 20 and Object 30 points automatically, on a periodic schedule, without needing to send the Freeze command through DNP. This feature is set up through the fifth DNP setting, DNP3 Auto Freeze, which copies the original Object 20 and Object 30 data points into Object 21 and Object 31 data points, respectively, along with the time stamp of the copy process.

- The Object 21 and Object 31 data points are also referred to as "previous" values: they belong to the previous Auto Freeze period.
- If the meter loses power, the frozen points in Object 21 and Object 31 are preserved.
- Note that the frozen DNP points (Object 21 and Object 31) have the same scale and unit as their respective points in Object 20 and Object 30.
- For example, if point# 0 of Object 20 has been configured with Wh Total register and 0.001 scaling, reading point #0 of Object 20 will give us a KWh value. When the Auto Freeze period has elapsed, the value in reading point# 0 is copied into point #0 of Object 21. Further readings to point# 0 of Object 20 will show the current KWh value (increasing, if there is energy flow), but the point# 0 of Object 21 will stay frozen in its original value until the next Auto Freeze period has elapsed. At that point, the new KWh value will be written into the Object 21 point.

1. From the Tree menu, click DNP3 Configuration>Auto Freeze.



Note that if you haven't enabled DNP3 Auto Freeze, the menu option will say Auto Freeze: Disabled; and if Auto Freeze is already enabled, it will say Auto Freeze: Enabled.

2. To enable Auto Freeze, check the Enabled box.

3. To set up the Auto Freeze period, i.e., the time the current values of objects 21 and 31 are copied into the Frozen objects 21 and 31:

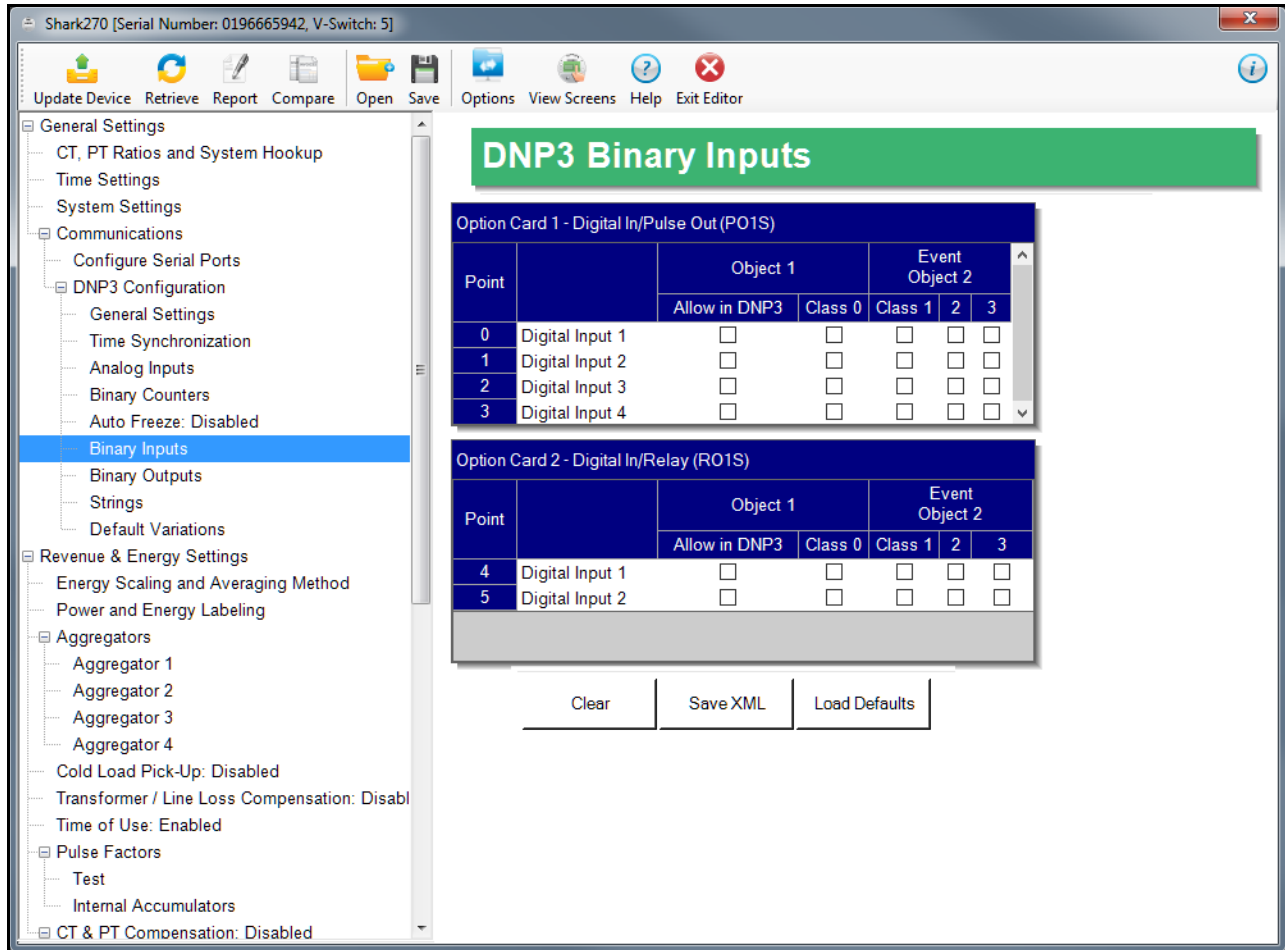
a. From the Period pull-down menu, select the Auto Freeze period, i.e., frequency: Monthly, Weekly, Daily, or Hourly.

- b. From the On pull-down menu, select the day of the month the Auto Freeze period starts: 1-31, or "Last Day of Month." Note that if you selected Monthly as your period, you shouldn't select a day that doesn't exist in all months, since that would cause that month's Auto Freeze to be disabled; e.g., if you select 30, February will be skipped. In that case, use the "Last Day of the Month" setting.
  - c. From the Time of Freeze pull-down menus, select the hour (0-23, using a 24-hour clock, where 0 is midnight and 23 is 11 P.M.), and minute (0, 15, 30, 45) the Auto Freeze period begins.
- 4. If you want the Maximum and Minimum Demand to be reset when Auto Freeze takes place, check the box. Note that this box will not be selectable if TOU is enabled.

### 26.1.4.1.6: Binary Inputs

The next setting for DNP is Binary Inputs, which is used for the digital inputs from the meter's ROIS (relay output/digital input) and/or POIS (pulse output/digital input) Option cards.

1. From the Tree menu, click DNP3 Configuration>Binary Inputs.



You will only see settable fields if an Option card with digital inputs is installed in the meter. Note that the ROIS has two digital inputs and the POIS has four digital inputs.

2. You have the following options:

- You can load the default settings by clicking the Default button.
- You can clear the entries by clicking Clear.

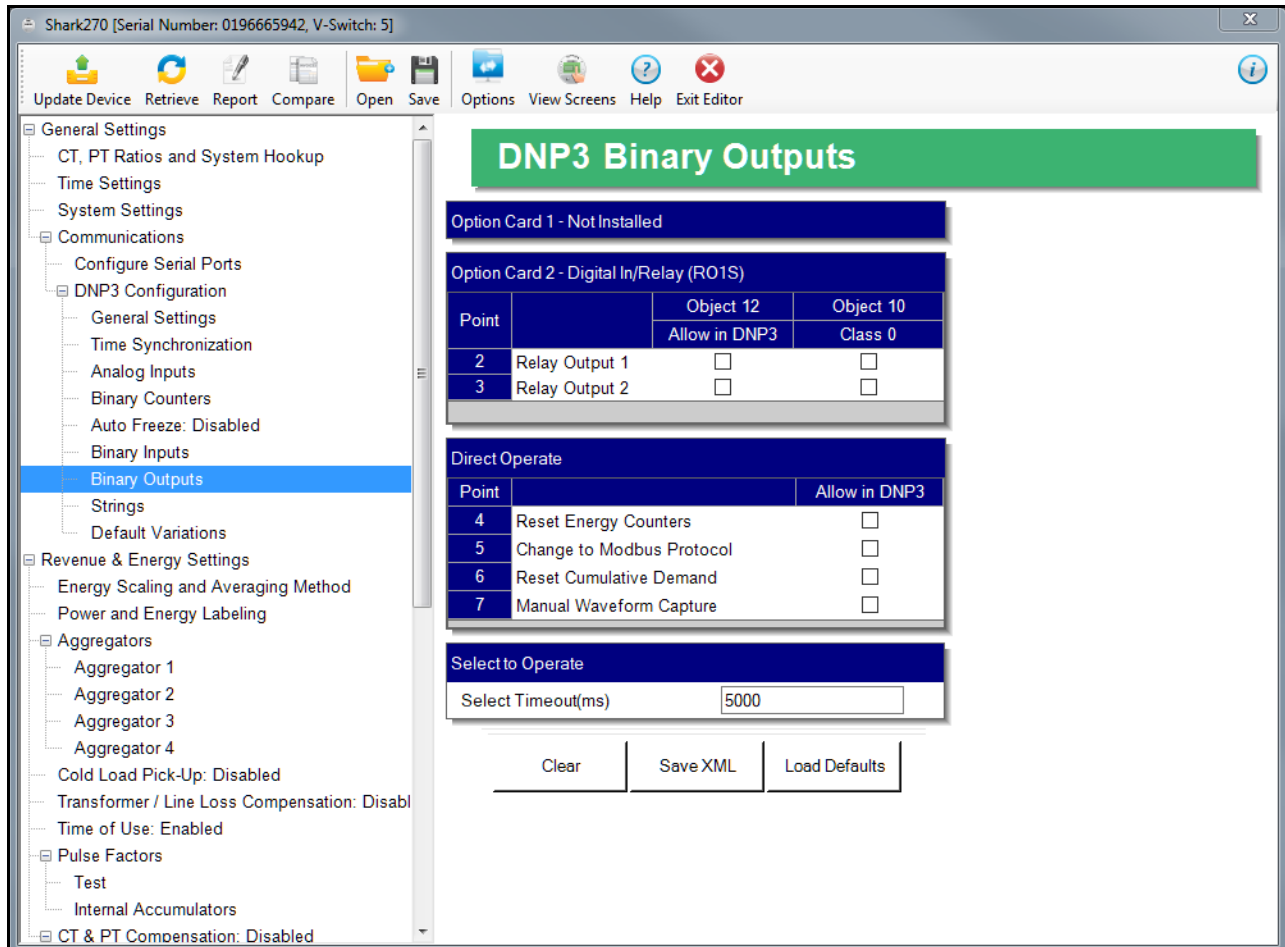
- You can enter the settings manually, for the Binary Inputs:
  - For the Event Object 2 fields, select the Class you want to use: Class 0, which corresponds to Object 1 (static binary inputs), or Class 1, 2, or 3, which all correspond to Object 2 (binary input events).
  - If Class 1,2 or 3 is assigned to the Binary Input Event Object 2, the Binary Input will be checked for changes. Every time the input changes state, an event will be created and the value put into the Binary Input Event Object 2. This allows the user to later check on the value at the time of the event.
  - Note that when you select a Class, the Allow in DNP3 box is checked automatically. If you uncheck the box, all selected classes will be unchecked.



### 26.1.4.1.7: Binary Outputs

The next setting for DNP is Binary Outputs, which is used for the relay outputs of the ROIS Option card.

1. From the Tree menu, click DNP3 Configuration>Binary Outputs.



**NOTE:** You will only see settable fields if at least one ROIS card is installed in the meter. You can have two ROIS cards installed in a meter.

2. You have the following options:

- You can load the default settings by clicking the Default button.
- You can clear the entries by clicking Clear.
- You can enter the settings manually, for the binary outputs:
  - Under Object 12 Allow in DNP, click the checkbox next to any relay output you want to be accessed through DNP.

- For the Object 12 Class 0 fields, Class 0 corresponds to Object 10 (static output state).
- The relay outputs require a Select before Operate procedure through DNP in order to change them. If instead you want the relay output to be pulsed directly, set up Direct Operate for the options listed: Reset Energy Counters, Change to Modbus Protocol, Reset Demand Counters, and Manual Waveform Capture.
- Select a timeout in milliseconds. The timeout is the maximum time allowed between the select command being issued and the relay being operated.

### NOTES on Binary Output Points

Relay Card	Physical Output	DNP Point	Actions	Action Mode	Notes
Slot #1	1	0	Latch On / Latch Off	Select Before Operate	Physical Relay
	2	1	Latch On / Latch Off	Select Before Operate	Physical Relay
Slot #2	1	2	Latch On / Latch Off	Select Before Operate	Physical Relay
	2	3	Latch On / Latch Off	Select Before Operate	Physical Relay
Reset Energy		4	Latch On / Pulse On	Direct Operate	Automatically cleared
Switch RS485 to Modbus RTU		5	Latch On / Pulse On	Direct Operate	Automatically cleared
Reset Demand Counters		6	Latch On / Pulse On	Direct Operate	Automatically cleared
Trigger Waveform Capture		7	Latch On / Pulse On	Direct Operate	Automatically cleared

**Possible Errors Using Select Before Operate command**

Error	If ...
Not Supported	Actions other than Latch-On or Latch-Off were issued (Trip, Close, Pulse, etc.)
Not Supported	Trying to select any DNP3 Output point out of range (0 to 3)
Not Supported	Trying to select a point between 0 and 3, but the corresponding Relay Card is not installed
Local	Trying to select an output point that is being used by ElectroLogic™ Relay Control (configured in Device profile)
Local	Trying to select an output point that has not been allowed in the DNP profile
Accepted	Point selected

**Possible Errors When Operating an Output Point Between 0 and 3**

Error	If ...
Not Supported	Actions other than Latch-On or Latch-Off were issued (Trip, Close, Pulse, etc.)
Not Supported	Trying to operate a point between 0 and 3, but the corresponding Relay Card is not installed.
Local	Trying to operate an output point that is being used by the ElectroLogic™ Relay Control (configured in Device profile)
Local	Trying to operate an output point that has not been allowed in the DNP profile
No Select	Trying to operate an output which has not been previously selected
Accepted	Point selected

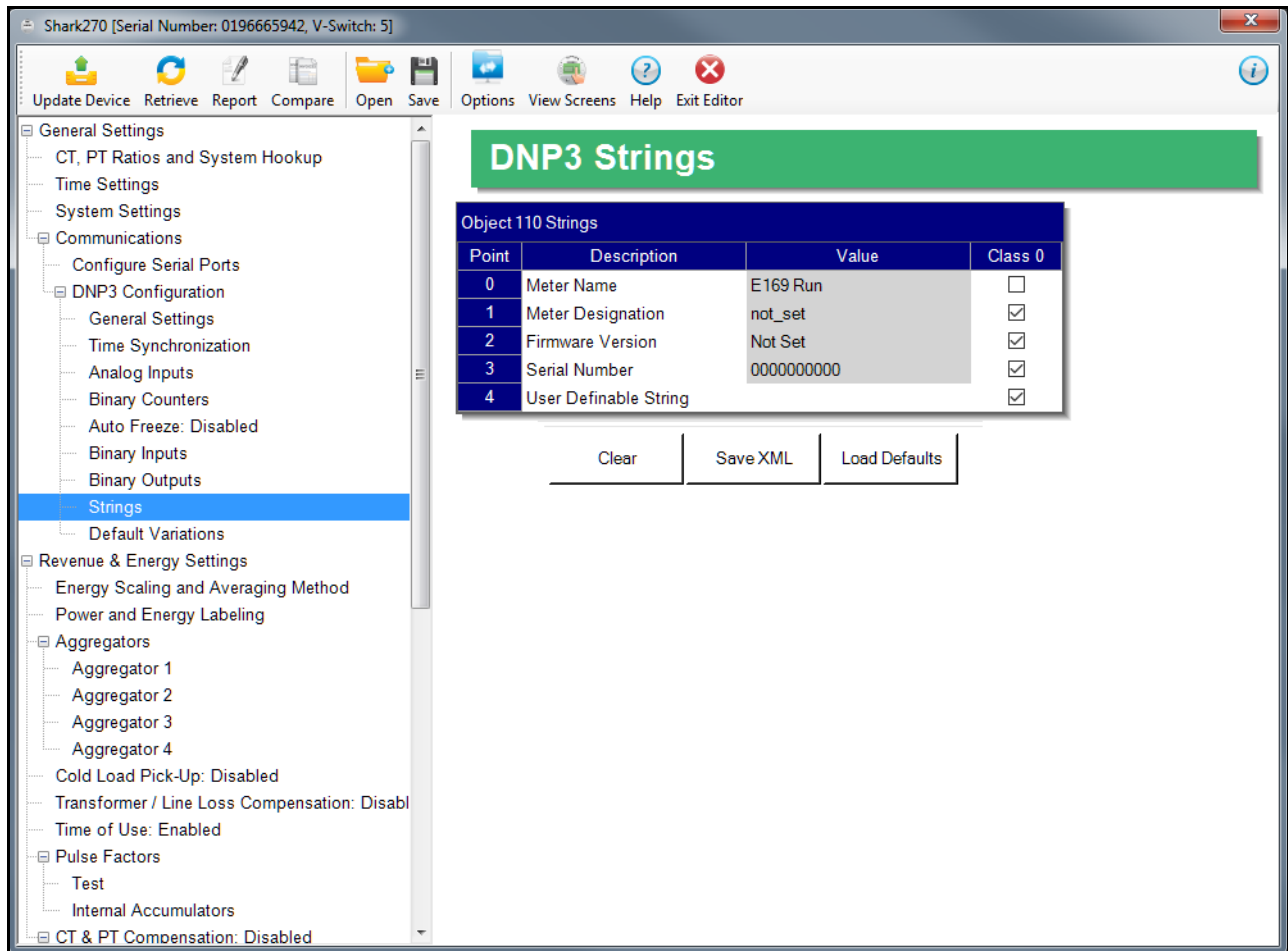
**Possible Errors When Operating an Output Point Between 4 and 7**

Error	If ...
Not Supported	Trying to select any DNP3 Output point out of range (8 or larger)
Not Supported	Actions other than Latch-On or Latch-Off were issued (Trip, Close, Pulse, etc.)
Not Supported	Trying to operate point 7 (waveform capture) but there is no log memory allocated for waveforms
Local	Trying to operate an output point that has not been allowed in the DNP profile
Timeout	Trying to operate point 4 (reset energy) when the meter has not warmed up yet
Timeout	Trying to operate point 7 (waveform capture) when there is a capture already in progress
Not Authorized	Other functionality is solely responsible for resetting energy (TOU, AutoFreeze, etc.) or Security settings do not allow it (Seal switch)

### 26.1.4.1.8: Strings

The next setting for DNP is Strings, which is used to set up reporting of static information, such as meter model.

1. From the Tree menu, click DNP3 Configuration>Strings.



2. You have the following options:

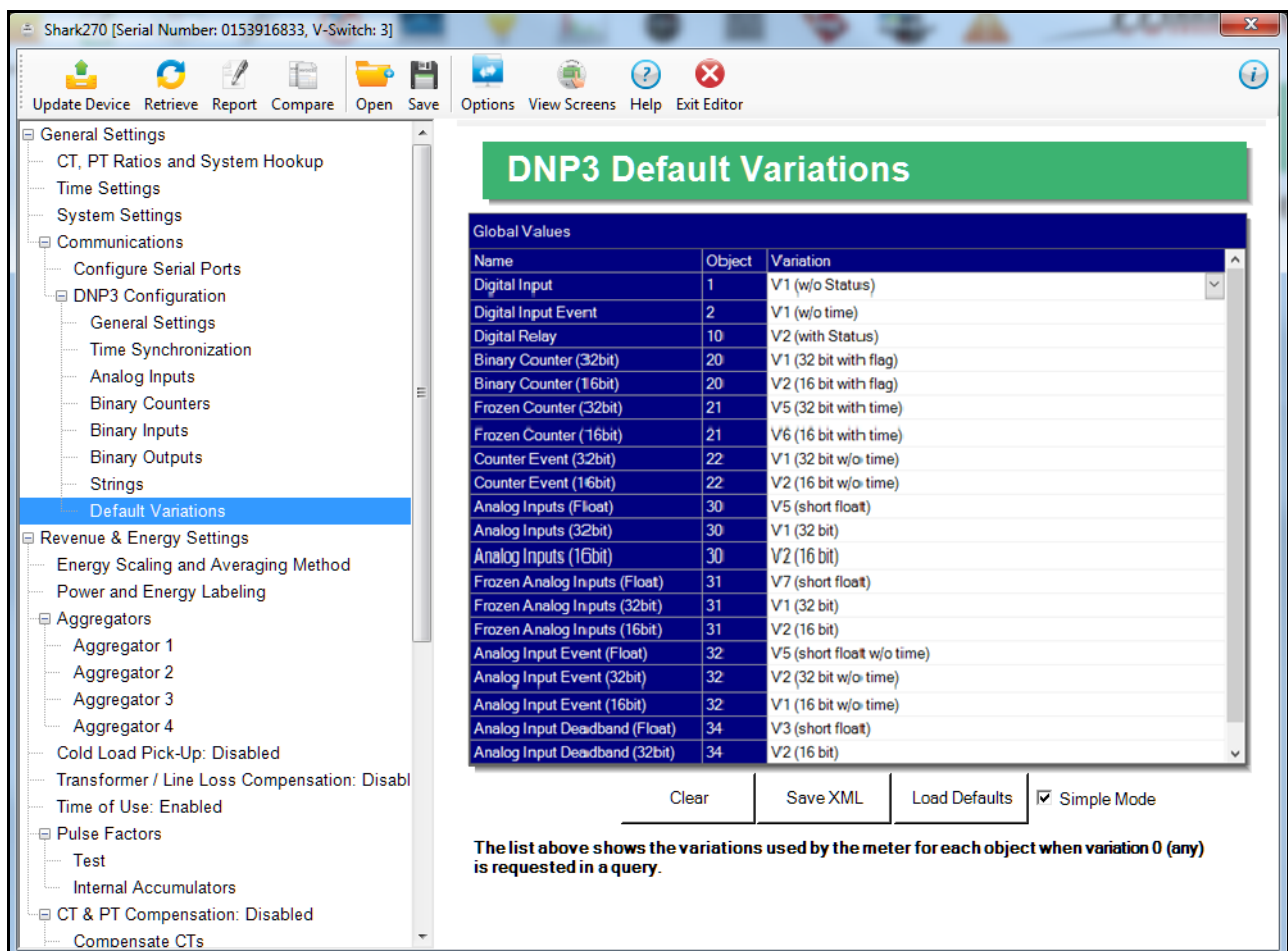
- You can load the default settings by clicking the Default button.
- You can clear the entries by clicking Clear.
- You can enter the settings manually, for the strings:
  - Points 0, 2 and 3 are hard-coded and fixed in the meter.
  - Point 1 can be configured in the meter's Device Profile. See [26.1.3: Configuring System Settings](#), on page 26-8.

- Point 4 is an editable string, which you can enter. The maximum number of characters you can use is 16.
- The only assignable class for the strings is Class 0. Click the checkbox to assign any of the strings to Class 0.

### 26.1.4.1.9: Default Variations

The last setting for DNP is Default Variations, which is used to configure the variations used by the meter for each object when Variation 0 is requested by a query. Note that there are default configurations already set up in the meter for Variation 0, but this setting lets you change them. Refer to Appendix C in the *Shark® 270 Meter Installation and Operation Manual* for details on this setting.

1. From the Tree menu, click DNP3 Configuration>Default Variations.



**DNP3 Default Variations**

Name	Object	Variation
Digital Input	1	V1 (w/o Status)
Digital Input Event	2	V1 (w/o time)
Digital Relay	10	V2 (with Status)
Binary Counter (32bit)	20	V1 (32 bit with flag)
Binary Counter (16bit)	20	V2 (16 bit with flag)
Frozen Counter (32bit)	21	V5 (32 bit with time)
Frozen Counter (16bit)	21	V6 (16 bit with time)
Counter Event (32bit)	22	V1 (32 bit w/o time)
Counter Event (16bit)	22	V2 (16 bit w/o time)
Analog Inputs (Float)	30	V5 (short float)
Analog Inputs (32bit)	30	V1 (32 bit)
Analog Inputs (16bit)	30	V2 (16 bit)
Frozen Analog Inputs (Float)	31	V7 (short float)
Frozen Analog Inputs (32bit)	31	V1 (32 bit)
Frozen Analog Inputs (16bit)	31	V2 (16 bit)
Analog Input Event (Float)	32	V5 (short float w/o time)
Analog Input Event (32bit)	32	V2 (32 bit w/o time)
Analog Input Event (16bit)	32	V1 (16 bit w/o time)
Analog Input Deadband (Float)	34	V3 (short float)
Analog Input Deadband (32bit)	34	V2 (16 bit)

Clear Save XML Load Defaults ☒ Simple Mode

The list above shows the variations used by the meter for each object when variation 0 (any) is requested in a query.

2. For each of the objects listed under Global Values, you can select the Variation number you want to use by clicking in the Variation line and choosing the variation.

- Some objects have more than one type (i.e., Float, 16-Bit, or 32-bit), depending on the reading being mapped. If you need to program a different variation for an object depending on its type, uncheck the Simple Mode box. Then you can assign a variation to each type, individually. See the example configuration for Object 30, Analog Inputs, below; each of the object's types has been programmed with a different default Variation.

Binary Counter (32bit)	20	V1 (32 bit with flag)
Binary Counter (16bit)	20	V2 (16 bit with flag)
Frozen Counter (32bit)	21	V5 (32 bit with time)
Frozen Counter (16bit)	21	V6 (16 bit with time)
Counter Event (32bit)	22	V1 (32 bit w/o time)
Counter Event (16bit)	22	V2 (16 bit w/o time)
Analog Inputs (Float)	30	V5 (short float)
Analog Inputs (32bit)	30	V1 (32 bit)
Analog Inputs (16bit)	30	V2 (16 bit)
Frozen Analog Input (32bit)	31	V1 (32 bit)
Frozen Analog Input (16bit)	31	V2 (16 bit)
Analog Input Event (Float)	32	V7 (short float with time)
Analog Input Event (32bit)	32	V7 (short float with time)
Analog Input Event (16bit)	32	V7 (short float with time)
Analog Input Deadband (Float)	34	V3 (short float)
Analog Input Deadband (32bit)	34	V2 (16 bit)
Analog Input Deadband (16bit)	34	V1 (32 bit)

- If you want to set the same variation for all of an object's types, check the Simple Mode box and select the variation for the object.

### 26.1.5: Custom Modbus Map (Shark® 270 Meter Gen 2 Only)

The Shark® 270 Gen 2 meter's Modbus map has a configurable section in which any available reading can be assigned a Modbus address. (See the *Shark® 270 Meter User Manual* for details about the Shark® 270 meter's Gen 2.)

- The customizable section starts at address 0x1700.
- Up to 256 data points can be configured for this section.
- The custom Modbus section can only be read using Modbus commands.
- See the *Shark® 270 Meter Modbus Protocol Application Guide* for complete information on the meter's Modbus map.

1. From the meter's device profile screen, click General Settings>Custom Modbus Map.

Shark 270 Gen 2 [Serial Number: 0249508836, V-Switch: 5]

Update Device Retrieve Report Compare Open Save Options View Screens Help Exit Editor

General Settings

- CT, PT Ratios and System Hookup
- Time Settings
- System Settings
- Communications
  - \* Configure Serial Ports
  - DNP3 Configuration
    - General Settings
    - Time Synchronization
  - \* Analog Inputs
  - Binary Counters
  - Auto Freeze: Enabled
  - Binary Inputs
  - Binary Outputs
  - Strings
  - Default Variations
  - \* Custom Modbus Map
- Revenue & Energy Settings
  - Energy Scaling and Averaging Method
  - Power and Energy Labeling
- Aggregators
  - Aggregator 1
  - Aggregator 2
  - Aggregator 3
  - Aggregator 4
- Cold Load Pick-Up: Disabled
- Transformer / Line Loss Compensation: Enabl

### Custom Modbus Map

Item	Number of Registers	Start Register (4x)	Channel	Format	Data Size	Unit	Primary/Secondary	Absolute Value
1	2	5889	Readings: Volts A-N	Unsigned Integer	4 bytes	1	Primary	No
2	2	5891	Readings: Volts B-N	Unsigned Integer	4 bytes	1	Primary	No
3	2	5893	Readings: Volts C-N	Unsigned Integer	4 bytes	1	Primary	No
4								
5								
6								
7								
8								
9								
10								
11								

Custom modbus items must be sequential. There cannot be gaps in between.

Clear Item Clear All

2. Any registers already created are shown.

- To clear a register item, click on the item and click Clear Item.



**IMPORTANT! Do not leave any blank rows between items.** If you delete an item, either enter another channel in that row, or move the channels up to fill the deleted item's row.

- To clear all of the register items, click the Clear All button.

3. To add a register, double-click in an empty row.



Custom Modbus Configuration

Group	Measured Values
Sub Group	Readings
Channel	Volts A-N
Format	Unsigned Integer
Data Size	4 bytes
Unit	1
Byte Order	MSW, MSB
Primary/Secondary	Primary
Absolute Value	No

OK Cancel

4. Use the screen above to select the measured reading you want to use for the register and the formatting for the register. Enter the following:

a. Group: Choose a reading group from the menu items.

<b>Group</b>	<div>Measured Values</div>
<b>Sub Group</b>	<div>Measured Values Energy Max/Min Demand Average Demand Harmonics/THD Meter Status Accumulators Aggregators</div>
<b>Channel</b>	<div>Volts A-N</div>

b. Sub Group: Choose a reading sub group from the menu items.

<b>Sub Group</b>	<div>Readings</div>
<b>Channel</b>	<div>Volts A-N</div>

c. Channel: Choose a reading from the menu items (use the scroll bar to see all of the readings).

<b>Channel</b>	<div>Volts A-N</div>
<b>Format</b>	<div>Volts A-N Volts B-N Volts C-N Volts A-B Volts B-C Volts C-A</div>
<b>Data Size</b>	<div>1 A 1 B</div>

d. Format: Choose a data format for the register.

<b>Format</b>	Unsigned Integer
<b>Data Size</b>	Unsigned Integer Signed Integer Float

Unsigned Integer = a whole number (not fraction) between 0 and 65535

Signed Integer = a whole number between -32768 and 32767

Float = a real number with decimal points

e. Data Size: Choose either 2 bytes or 4 bytes for the register's data size.

<b>Data Size</b>	4 bytes
	2 bytes 4 bytes

f. Unit: Choose the unit you want applied to the register. The unit is a multiplier that will change the value; e.g., if you select 10, this register value will be multiplied by 10.

<b>Unit</b>	1
<b>Byte Order</b>	1 10 100 1000 10000 100000 1000000 10000000
<b>Primary/Secondary</b>	

- g. Byte Order: Choose the order you want applied to the register bytes from the menu.

<b>Byte Order</b>	MSW, MSB
<b>Primary/Secondary</b>	MSW, MSB MSW, LSB LSW, MSB LSW, LSB

MSW = most significant word  
LSW = least significant word  
MSB = most significant byte  
LSB = least significant byte

- h. Primary/Secondary: Choose whether this energy value is in primary or secondary.

<b>Primary/Secondary</b>	Primary
	Primary Secondary

- i. Absolute Value: Choose Yes or No from the menu. If you choose Yes, a signed integer value is read as unsigned.

<b>Absolute Value</b>	No
	No Yes

5. Click OK to save the register and go back to the Custom Modbus map screen. You can continue adding registers.

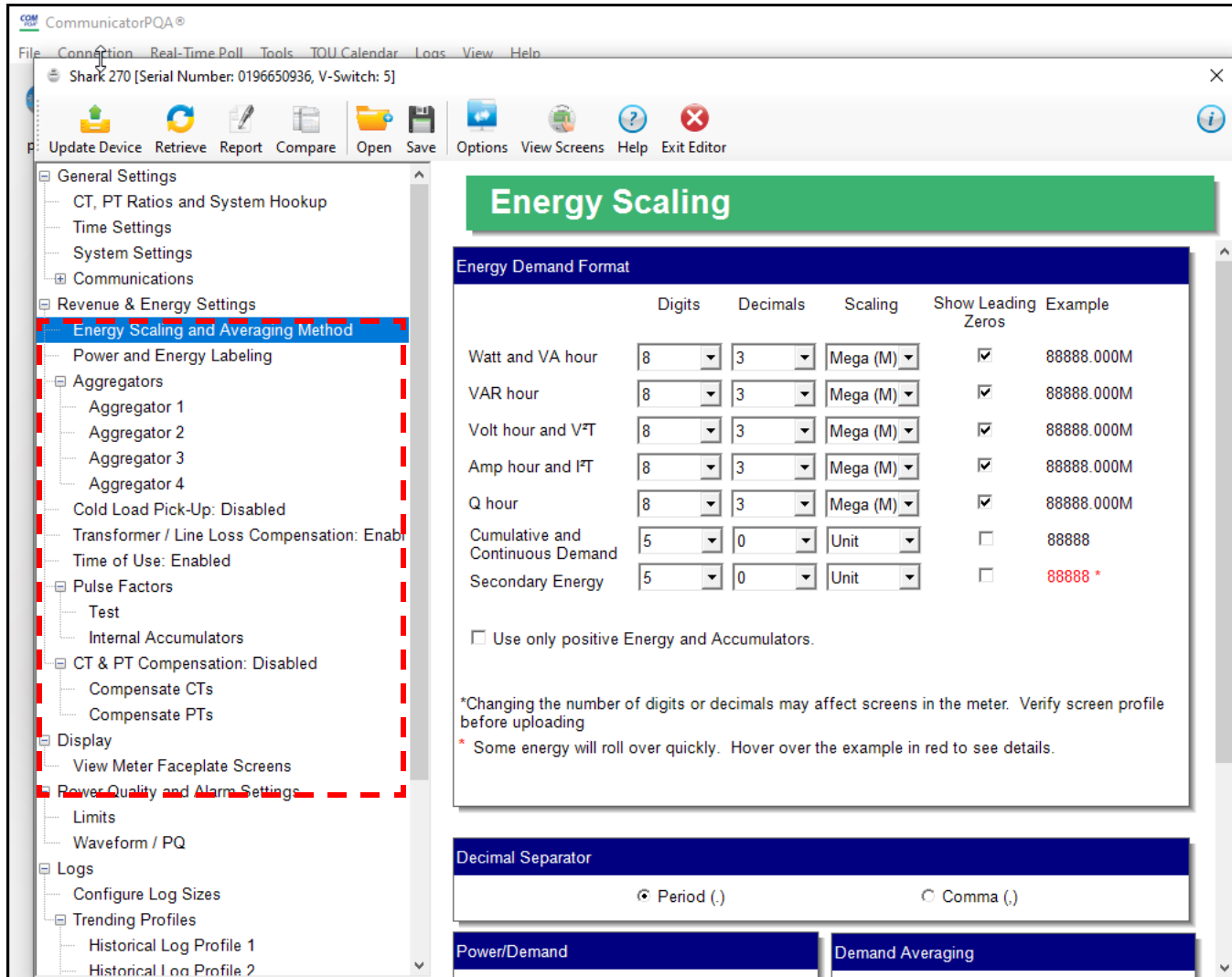


**IMPORTANT! Do not leave any blank rows between items.**

6. To implement any changes, click the Update Device button to send the new profile to the meter

## 26.2: Revenue and Energy Settings

From the Tree Menu on the left side of the Shark® 270 meter's Device Profile screen, double-click on the Revenue and Energy Settings line or click on the + button next to it. The settings in the Revenue and Energy Settings group are listed.



### 26.2.1: Configuring Energy, Power Scaling, and Averaging Method

- From the Tree Menu, click Revenue & Energy Settings> Energy Scaling and Averaging Method to display the screen shown above. Use this setting to configure:
  - The display and storage of energy and power registers in the meter.
  - The method of demand averaging and the interval over which average values are computed.

## Functional Overview of Energy Scaling, Power Scaling, and Averaging:

### • Energy Scaling

Energy scale setting includes:

Digits (the number of digits in the reading)

Decimals (the number of decimal places in the reading)

Scaling: the scale of the reading - unit; kilo (number times 1000); Mega (number times 1 million)

Energy settings allow you to balance the resolution (or accuracy) of the energy stored, with the interval over which energy rollover occurs. For example, the maximum resolution for a k scale reading is: 99999.999k.

To calculate the speed at which the energy will rollover, you must know the Power Full Scale, which is computed from the CT and PT Full Scale values (see [26.1.1: Configuring CT, PT Ratios and System Hookup, on page 26-2](#)). The formula for calculating Power Full Scale is:

Wye system:  $\text{CT Full Scale} \times \text{PT Full Scale} \times 3$

Delta system:  $\text{CT Full Scale} \times \text{PT Full Scale} \times 3 \times \sqrt{3}$

For example, for a CT Full Scale of 2000, PT Full Scale of 14400, Wye system:  
 $2000 \times 14400 \times 3 = 86400000$

In this example, the energy will increment at 86400000 Watts per hour, or 24000 Watts per second.

This value allows you to determine the number of digits, decimal places, and energy scale you want to configure for the Energy settings, when you take into account the rollover time.

To determine the number of hours before rollover, use this formula:

$[\text{Max Resolution}]/[\text{Full Scale}] = \text{\#Hours}$ , where Max Resolution = maximum digits and decimals for the Energy scale in use.

Using the previous example, with an energy scale of Mega, the formula would be:  
 $99999.999 \text{ M}/86.4 \text{ M} = 1157.4074 \text{ hours}$  or about 48 days until rollover.

**NOTE:** To increase the number of days until rollover, you can increase the number of digits (to 8), decrease the number of decimal places (to 0), or increase the Energy Scale (to M).

- **Power Scaling**

Power scale setting includes:

Decimals (the number of decimal places in the reading)

Scaling: the scale of the reading - unit; kilo (number times 1000); Mega (number times 1 million)

- **Demand Averaging**

Demand is the average rate of energy use over time. The Shark® 270 meter supports two types of demand averaging: Block demand and Rolling demand.

Block demand records the average demand for time intervals that you define (usually 5, 15 or 30 minutes).

Rolling demand functions like multiple, overlapping Block demands. You define the subintervals at which an average of demand is calculated. An example of Rolling demand would be a 15-minute Demand block using 5-minute subintervals, thus providing a new demand reading every 5 minutes, based on the last 15 minutes.

- Note that the Gen 2 and the original Shark® 270 meter have slightly different screens.

## Original Shark® 270 Meter's Energy Scaling

The screenshot shows the 'Energy Scaling' configuration window. At the top, there is a green header bar with the title 'Energy Scaling'. Below this, the 'Energy Demand Format' section contains a table with columns for 'Digits', 'Decimals', 'Scaling', 'Show Leading Zeros', and 'Example'. The table lists seven energy measurement types, each with corresponding dropdown menus for digits, decimals, and scaling, and a checkbox for 'Show Leading Zeros'. Below the table, a note states: 'Changing the number of digits or decimals may affect screens in the meter. Verify meter faceplate screens before uploading'. There is also a checkbox labeled 'Make all accumulators absolute value'.

The 'Decimal Separator' section has two radio buttons: 'Period (.)' (selected) and 'Comma (,)'.

The 'Power/Demand' section has a 'Decimals' dropdown set to '1', a text field showing '8888888.0k', and a 'Scaling' dropdown set to 'Kilo (k)'.

The 'Demand Averaging' section has a 'Type' dropdown set to 'Block' and an 'Interval (Minutes)' dropdown set to '15'.

	Digits	Decimals	Scaling	Show Leading Zeros	Example
Watt and VA hour	8	0	Kilo (k)	<input checked="" type="checkbox"/>	8888888k
VAR hour	8	0	Kilo (k)	<input checked="" type="checkbox"/>	8888888k
Volt hour and V <sup>2</sup> T	8	0	Kilo (k)	<input checked="" type="checkbox"/>	8888888k
Amp hour and I <sup>2</sup> T	8	0	Kilo (k)	<input checked="" type="checkbox"/>	8888888k
Q hour	8	0	Kilo (k)	<input checked="" type="checkbox"/>	8888888k
Cumulative and Continuous Demand	8	0	Kilo (k)	<input checked="" type="checkbox"/>	8888888k
Secondary Energy	8	0	Kilo (k)	<input checked="" type="checkbox"/>	8888888k

Changing the number of digits or decimals may affect screens in the meter. Verify meter faceplate screens before uploading

☐ Make all accumulators absolute value

**Decimal Separator**

☒ Period (.) ☐ Comma (,)

**Power/Demand**

Decimals: 1  
8888888.0k  
Scaling: Kilo (k)

**Demand Averaging**

Type: Block  
Interval (Minutes): 15



## Shark 270 Gen 2 Meter's Energy Scaling and Averaging

### Energy Scaling and Averaging Method

Energy Format

	Digits	Decimals	Scaling	Show Leading Zeros	Example
Watt and VA hour	<input type="text" value="8"/>	<input type="text" value="3"/>	<input type="text" value="Unit"/>	<input checked="" type="checkbox"/>	88888.000 *
VAR hour	<input type="text" value="8"/>	<input type="text" value="3"/>	<input type="text" value="Unit"/>	<input checked="" type="checkbox"/>	88888.000 *
Volt hour and VT	<input type="text" value="8"/>	<input type="text" value="3"/>	<input type="text" value="Unit"/>	<input checked="" type="checkbox"/>	88888.000
Amp hour and IT	<input type="text" value="8"/>	<input type="text" value="3"/>	<input type="text" value="Unit"/>	<input checked="" type="checkbox"/>	88888.000
Q hour	<input type="text" value="8"/>	<input type="text" value="3"/>	<input type="text" value="Unit"/>	<input checked="" type="checkbox"/>	88888.000 *
Cumulative and Continuous Demand	<input type="text" value="8"/>	<input type="text" value="1"/>	<input type="text" value="Unit"/>	<input checked="" type="checkbox"/>	8888888.0
Secondary Energy	<input type="text" value="8"/>	<input type="text" value="3"/>	<input type="text" value="Unit"/>	<input checked="" type="checkbox"/>	88888.000 *

Changing the number of digits or decimals may affect screens in the meter. Verify meter faceplate screens before uploading

\* Some energy will roll over quickly. Hover over the example in red to see details.

☒ Make all accumulators absolute value

☐ Use different display multipliers from meter energy scaling (Leave unchecked to sync energy scaling with display registers)

Decimal Separator

☒ Period (.)

☐ Comma (,)

Demand Averaging

Type

Interval (Minutes)

Power/Demand

Decimals

Data Dependant

Scaling

Custom Energy Interval

☐ Use custom interval for energy

Minutes

2. Make these settings:

Energy Scaling

Energy Demand Format

	Digits	Decimals	Scaling	Show Leading Zeros	Example
Watt and VA hour	8	0	Kilo (k)	<input checked="" type="checkbox"/>	88888888k
VAR hour	8	0	Kilo (k)	<input checked="" type="checkbox"/>	88888888k
Volt hour and V <sup>2</sup> T	8	0	Kilo (k)	<input checked="" type="checkbox"/>	88888888k
Amp hour and I <sup>2</sup> T	8	0	Kilo (k)	<input checked="" type="checkbox"/>	88888888k
Q hour	8	0	Kilo (k)	<input checked="" type="checkbox"/>	88888888k
Cumulative and Continuous Demand	8	0	Kilo (k)	<input checked="" type="checkbox"/>	88888888k
Secondary Energy	8	0	Kilo (k)	<input checked="" type="checkbox"/>	88888888k

Changing the number of digits or decimals may affect screens in the meter. Verify meter faceplate screens before uploading

☐ Make all accumulators absolute value

a. Energy Demand Format/Energy Format: for each of the values Watt Hour and VA Hour, VAR Hour, Volt Hour and V<sup>2</sup>T Hour, Amp Hour and I<sup>2</sup>T Hour, Q Hour, Cumulative and Continuous Demand, and Secondary Energy set the following, using the pull-down menus:

- Digits: 5; 6; 7; 8.
- Decimals: 0 - 6. Note that if the entry would cause the accumulator to roll over quickly, the Example will be shown in red and there will be this note:

\* Some energy will roll over quickly. Hover over the example in red to see details.

- Scaling: unit; kilo (K); Mega (M).

- Show Leading Zeros: check the box if you want leading zeros to show; e.g., if a value has five digits and zero decimals, and the reading is 400, if you select show leading zeros the reading would be 0400.
  - The Example field shows the result of your choices: e.g., a reading for Digits: 8; Decimals: 3; Scale: K would be formatted: 00123.456k.
- Check the box next to "Make all accumulators absolute value" if you need to log all energy values as positive energy.



**IMPORTANT!** If you select this option, you must reset energy after updating the meter, to clear previous energy readings.

- Gen 2 has an additional setting: "Use different display multipliers from meter energy scaling." Check this box if you need the display scaling to be different from what the meter uses (this is an uncommon situation). See [26.8: Custom Display Multipliers, on page 26-148](#) for instructions on setting up the display scaling.

#### NOTES:

- Your selection in the Energy Scaling fields determines the precision of energy stored for display and polling. Refer to the Functional Overview at the beginning of this section for more information.
- If you are changing the energy scaling settings, we recommend you first reset the energy accumulators, in order to prevent erroneous counts. See [20.1.7: Reset Device Information, on page 20-7](#), for instructions on resetting the Shark® 270 meter's energy accumulators.

- b. Decimal Separator: this is the symbol used between whole numbers and decimals. The default setting is a period (e.g., 24.3), but if your country uses a comma as a decimal separator (e.g., 24,3), click on the Comma radio button to select it. Note that this setting only affects the display, since the CommunicatorPQA® software uses the Operating System's internal settings.

Decimal Separator	
<input checked="" type="radio"/> Period (.)	<input type="radio"/> Comma (,)

c. Demand Averaging: select the demand averaging type you want from the from the pull-down menu:

Demand Averaging

Type: Block

Interval (Minutes): 15

- If you select Block, select the number of minutes in the block from the Interval (Minutes) pull-down menu.
- If you select Rolling, you will see the bottom screen on the right. Select the number of minutes in the sub-interval from the Sub-Interval (Minutes) pull-down menu (the choices are 3; 5; 15; 30; 60); and then select the number of sub-intervals you want from the # of Sub-Intervals pull-down menu (the choices are 1; 2; 3; 4; 5). The Interval Window field is display only. It is the product of the values entered in the Sub-Interval and # of Subintervals fields.

Demand Averaging

Type: Rolling

Sub-Interval (Minutes): 15

# of Sub Intervals: 1

Interval Window: 15 minutes

d. Power/Demand: select the number of Decimals (0. 1. 2. or 3) and Scaling (Unit, kilo, Mega, or Auto) that you want to use for power and demand readings.

e. Gen 2 has an additional setting - Custom Energy Interval. To set an energy interval that is different from the Demand interval, check the "Use custom interval for energy box" and then select 1, 3, 5, 15, 0, or 60 from the Minutes field.

Custom Energy Interval

☒ Use custom interval for energy

5 Minutes



**IMPORTANT!** When you check the box you will see the following warning message.

Custom Energy in Interval

?

This will create a different energy in the interval than the meters demand calculation. In most cases this should not be set.

Yes No Cancel

- If you are certain you want to proceed, click Yes and make your setting.
- If you do not want to continue, click No or Cancel.
- If you do not use this setting, the meter will use the interval set for Demand Averaging, which is displayed in the Interval field for Block Demand and the Interval Window field for Rolling Demand.

**NOTES:**

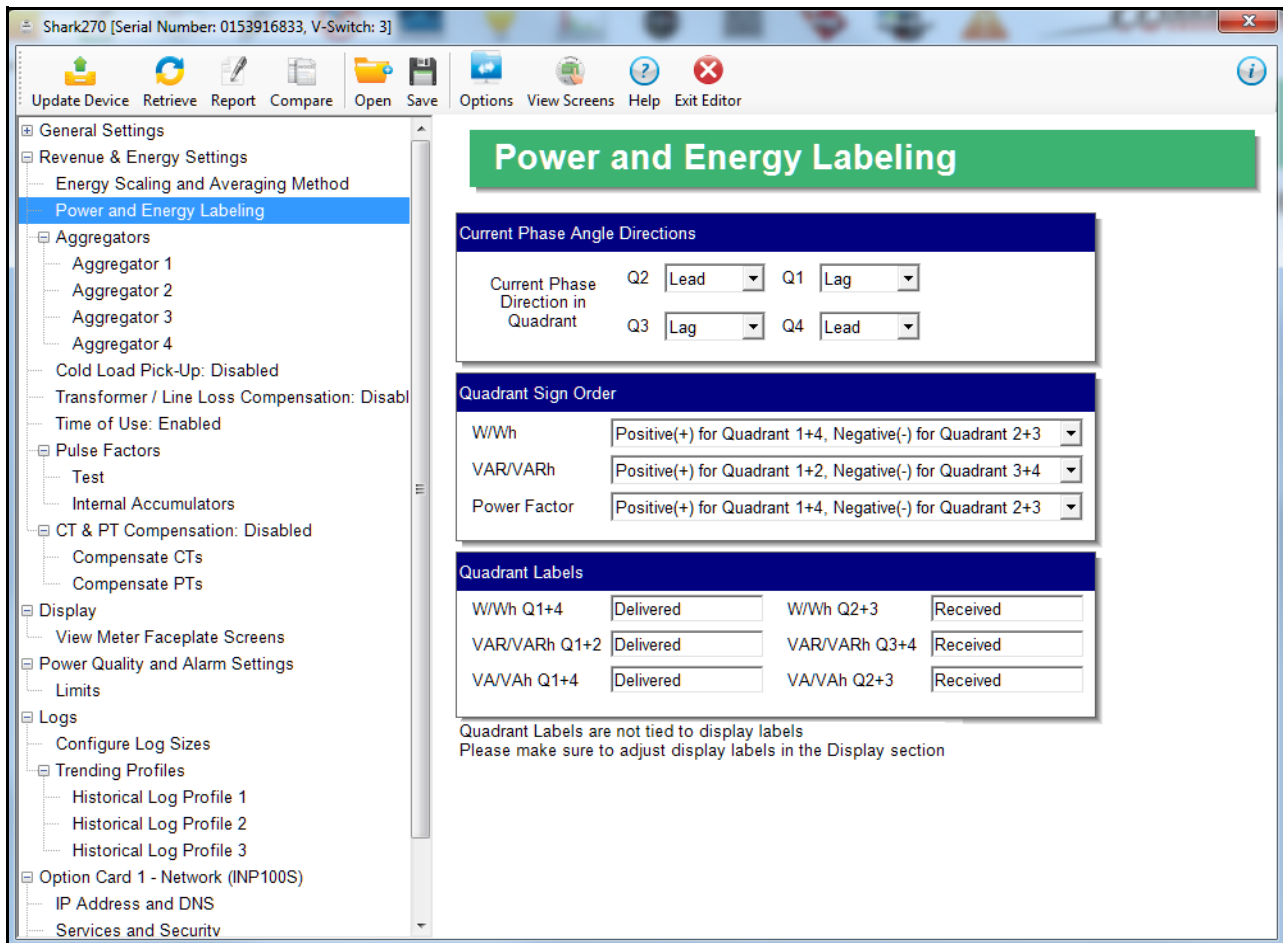
- Unless you selected the option in step e, the setting in the demand averaging/interval window is also used for the energy in the interval readings.
  - If you have set an Input to trigger EOI demand averaging (using either a Relay Output/Digital Input or Pulse Output/Digital Input Option card) any entry you make in the Demand Averaging field will be ignored. A message to that effect appears on the screen. See [26.5.3: Configuring a Digital Relay Card \(RO1S\)](#), on page 26-103 and [26.5.4: Configuring a Digital Input/Pulse Output Card \(PO1S\)](#), on page 26-109, for instructions on setting EOI pulse for demand averaging.
3. To implement any changes, click the Update Device button to send the new profile to the meter.

### **26.2.2: Power and Energy Labeling**

This setting matches the direction of power for the meter to that of the electrical system being measured. Use it to designate the system as an inductive (lagging) load, with current lagging voltage; or as a capacitive (leading) load with current leading voltage.

Power direction for the meter is determined by setting the power quadrants as lagging or leading; setting the sign order for power and energy readings, such as watt/watt-hour; and setting the quadrant labels as received or delivered. This setting insures that the meter's power measurements match the electrical system. There are examples of different power direction settings, after the instructions.

1. From the Tree Menu, click Revenue & Energy Settings> Power and Energy Labeling.



2. Make these settings:

- a. Current Phase Angle Directions: designate each of the 4 energy quadrants, Q1, Q2, Q3, Q4, as Lead(ing) or Lag(ging).

Current Phase Angle Directions				
Current Phase Direction in Quadrant	Q2	Lead	Q1	Lag
	Q3	Lag	Q4	Lead

- b. Quadrant Sign Order: designate the positive and negative power quadrants for W/Wh, VAR/VARh, and Power Factor.

Quadrant Sign Order	
W/Wh	Positive(+) for Quadrant 1+4, Negative(-) for Quadrant 2+3
VAR/VARh	Positive(+) for Quadrant 1+2, Negative(-) for Quadrant 3+4
Power Factor	Positive(+) for Quadrant 1+4, Negative(-) for Quadrant 2+3

- c. Quadrant Labels:  
designate the  
Power Quadrants  
as Delivered or  
Received.

Quadrant Labels			
W/Wh Q1+4	Delivered	W/Wh Q2+3	Received
VAR/VARh Q1+2	Delivered	VAR/VARh Q3+4	Received
VA/VAh Q1+4	Delivered	VA/VAh Q2+3	Received

- d. See the examples of different quadrant settings on the next two pages.
3. To implement any changes, click the Update Device button to send the new profile to the meter.

#### Example 1

Power and Energy Labeling

Current Phase Angle Directions				
Current Phase Direction in Quadrant	Q2	Lead	Q1	Lag
	Q3	Lag	Q4	Lead

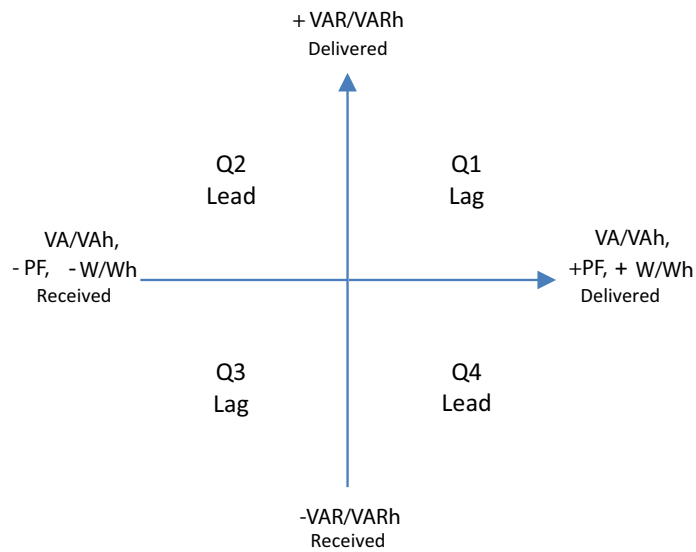
  

Quadrant Sign Order	
W/Wh	Positive(+) for Quadrant 1+4, Negative(-) for Quadrant 2+3
VAR/VARh	Positive(+) for Quadrant 1+2, Negative(-) for Quadrant 3+4
Power Factor	Positive(+) for Quadrant 1+4, Negative(-) for Quadrant 2+3

Quadrant Labels			
W/Wh Q14	Delivered	W/Wh Q23	Received
VAR/VARh Q12	Delivered	VAR/VARh Q34	Received
VA/VAh Q14	Delivered	VA/VAh Q23	Received

Example 1 settings are illustrated below.

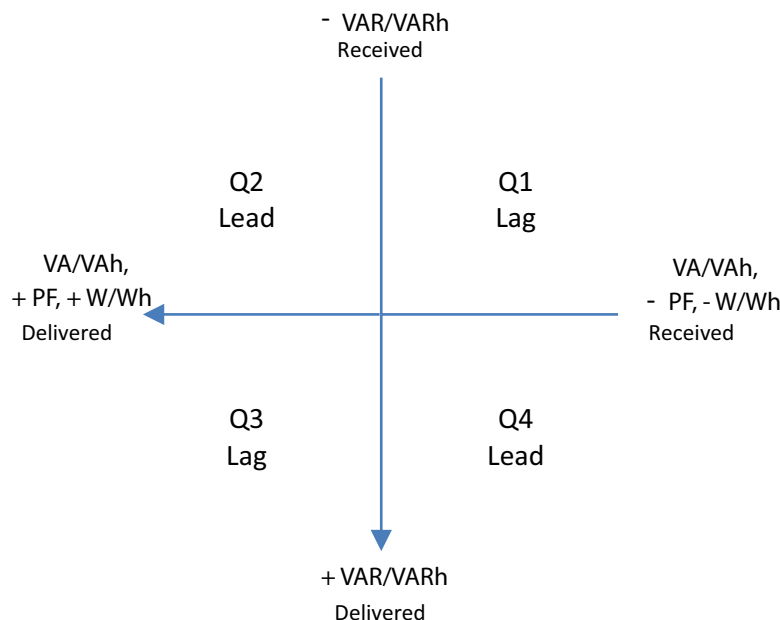


Example 2

Power and Energy Labeling				
<b>Current Phase Angle Directions</b>				
Current Phase Direction in Quadrant	Q2	Lead	Q1	Lag
	Q3	Lag	Q4	Lead
<b>Quadrant Sign Order</b>				
W/Wh	Negative(-) for Quadrant 1+4, Positive(+) for Quadrant 2+3			
VAR/VARh	Negative(-) for Quadrant 1+2, Positive(+) for Quadrant 3+4			
Power Factor	Negative(-) for Quadrant 1+4, Positive(+) for Quadrant 2+3			
<b>Quadrant Labels</b>				
W/Wh Q14	Received	W/Wh Q23	Delivered	
VAR/VARh Q12	Received	VAR/VARh Q34	Delivered	
VA/VAh Q14	Received	VA/VAh Q23	Deleivered	



Example 2 settings are illustrated below.



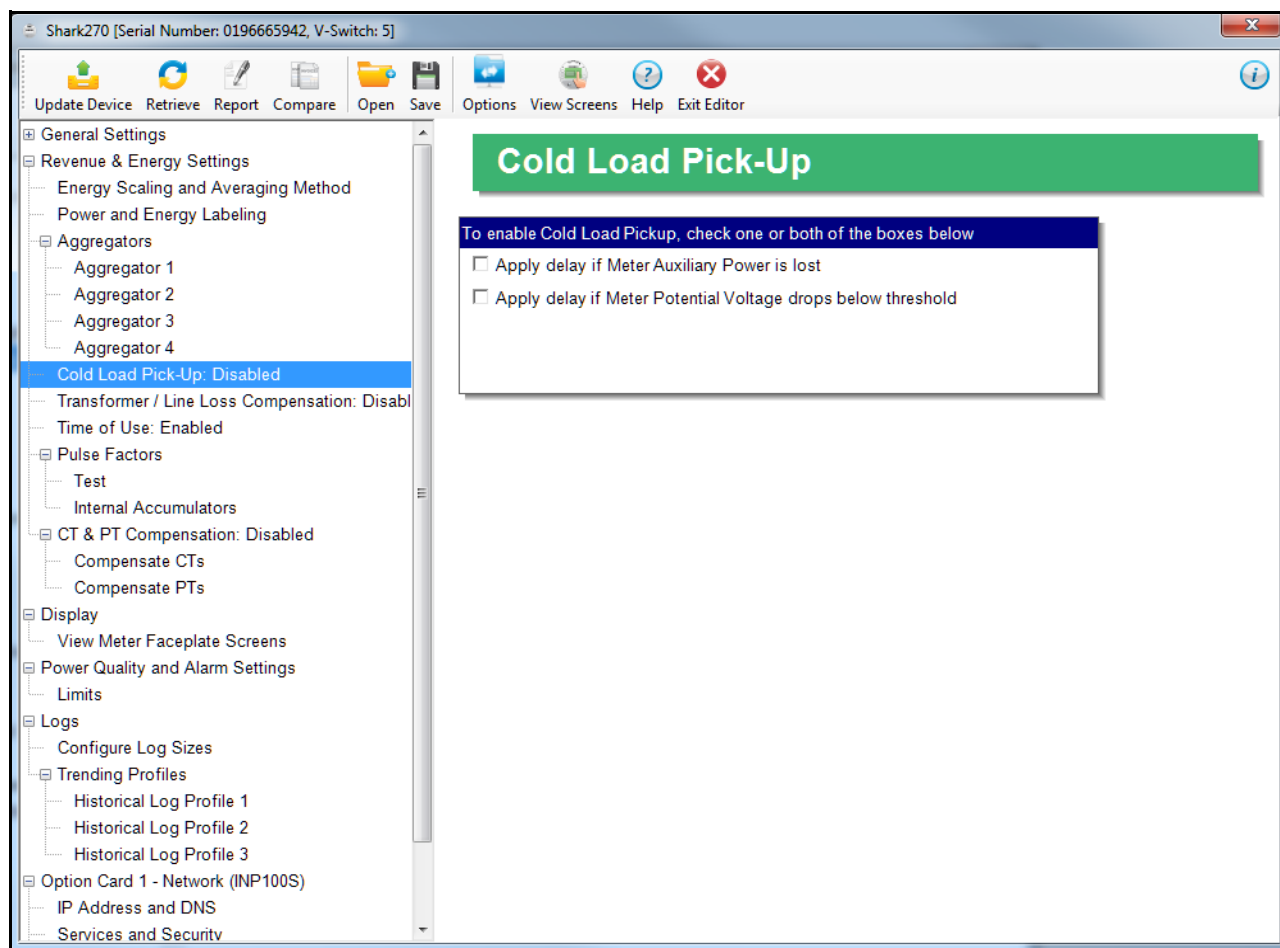
### 26.2.3: Cold Load Pickup (Demand Forgiveness)

The Shark® 270 meter offers Cold Load Pickup, so that in case a power system outage or excessive power system voltage drop occurs, when normal service is resumed, the customer will not be billed for the initial surge or in-rush of power to feed its “cold loads.” During the initial time period immediately following the return of normal electric service, the demand is not computed in the Demand Registers if the two threshold conditions described below are met, so the customer is not billed for possible excessive demand due to “cold load pickup.”

- A power system outage which drops the metering potential inputs to the meter (to below a programmed threshold) and also drops the meter’s power.
- A power system outage which drops the metering potential inputs to the Meter (to below a programmed threshold), but the meter’s external power remains supplied by an alternate source (e.g., station battery, station service, etc.), that is, the meter continues to operate.

Note that energy is always continuously measured and is also recorded in the Power Profile Logs, if so configured (see [26.4.2: Configuring Historical Logs](#), on page 26-82, for log setup procedures).

1. From the Tree Menu, click Revenue & Energy Settings> Power and Energy Labeling. Use this setting to enable and configure the meter's cold load pickup/demand forgiveness feature. When enabled, this feature lets you set the amount of time power is off to identify a power outage that is the responsibility of the utility (as opposed to a very short term loss of power that is not their responsibility) and the amount of time you want to wait before demand starts again. This time should correspond to the "grace" period the utility applies to avoid charging for motor startup, etc. after a power outage.



## 2. Make these settings:

- a. Click Apply delay if Meter's Auxiliary Power is Lost. The Intervals fields display on the screen.

**To enable Cold Load Pickup. Check one or both of the boxes below**

☒ Apply delay if Meter Auxiliary Power is lost

☐ Apply delay if Meter Potential Voltage drops below threshold

---

**Intervals**

Demand forgiveness interval	3600	Seconds
Minimum loss of service	300	Seconds
Maximum allowed service on-time	900	Seconds

- Demand Forgiveness Interval: use the up and down arrows to

- Minimum Loss of Service: use the up and down arrows to set a minimum time that service is lost before Cold Load is implemented.
- Maximum Allowed Service On-Time: use the up and down arrows to select the time.

- b. Click Apply Delay if Meter Potential Voltage Drops Below threshold. The Intervals and Thresholds (Secondary) fields display on the screen.

**To enable Cold Load Pickup. Check one or both of the boxes below**

☒ Apply delay if Meter Auxiliary Power is lost

☒ Apply delay if Meter Potential Voltage drops below threshold

☐ On all phases

☐ On any phase

---

**Intervals**

Demand forgiveness interval	3600	Seconds
Minimum loss of service	300	Seconds
Maximum allowed service on-time	900	Seconds

---

**Thresholds (Secondary)**

Voltage A-N	30.00
Voltage B-N	30.00
Voltage C-N	30.00

- You can select to apply the threshold to either all phases (click On All Phases radio button) or any of the phases (click On Any Phase radio button).

- Make the Intervals settings the same as in step a.
  - Set the thresholds: use the up and down arrows to enter the percentage drop for each phase A-N, B-N, C-N.
3. To implement any changes, click the Update Device button to send the new profile to the meter.

#### **26.2.4: Transformer/Line Loss Compensation**

Transformer losses are power used by the transformer while working. The more load on the transformer, the higher the transformer losses. There are two types of transformer losses:

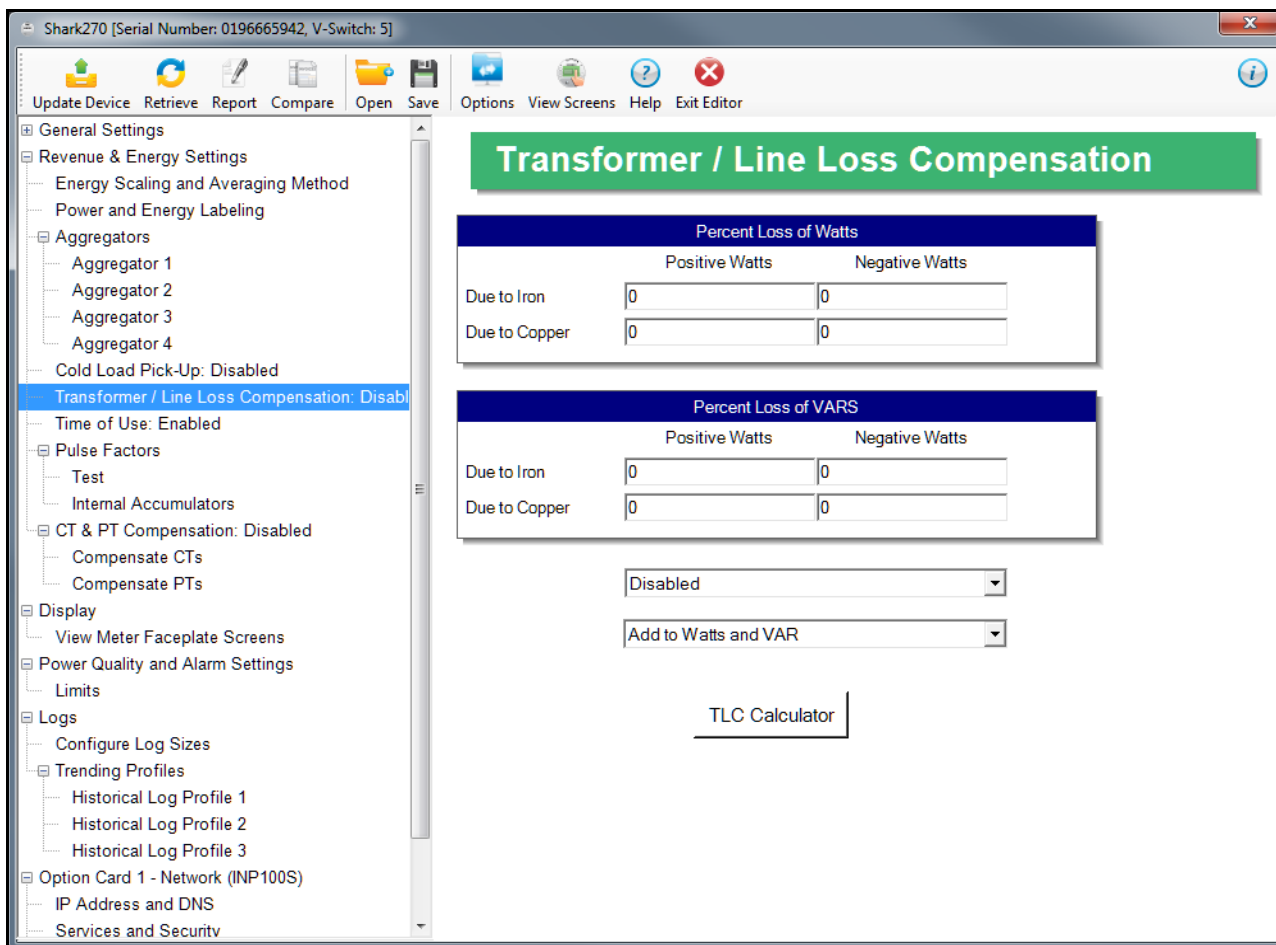
- No load losses - these are the fixed losses that keep the transformer up and running.
- Load losses - these vary with changes in the load.

When the meter is located on the secondary side of a customer's transformer, a utility will want to add the transformer losses into the energy usage calculation. However, this practice is regulated by local jurisdiction and regulations. The meter has the capability to add in or subtract out these transformer losses, depending on the user's specific needs.

Line losses are similar to transformer losses, except that they are used to compensate for loss incurred on wires, such as transmission lines.

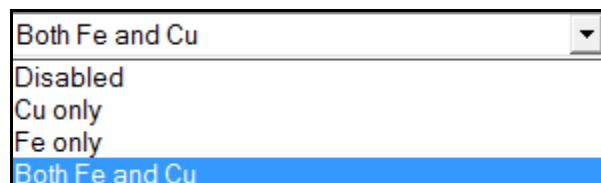
Transformer/Line Loss Compensation allows you to add or subtract transformer and/or line losses to meter registration.

1. From the Tree Menu, click Revenue & Energy Settings>Transformer/Line Loss Compensation.

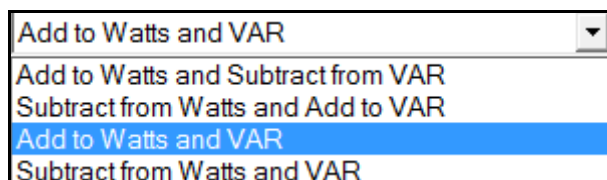


2. Make these settings:

- a. Use the first pull-down menu at the bottom of the screen to enable TLC for iron (Fe) and/or copper (Cu), or to disable TLC for the meter. Click the option you want.



- b. Use the second pull-down menu at the bottom of the screen to specify how the compensation should be made; e.g., Add to Watts and Subtract from VARs. Click the option you want.



- c. Click TLC Calculator to find the values to enter into the Percent Loss fields at the top of the screen. The TLC Calculator button launches the TLC Calculator that makes the calculations for you once you enter the required data.

**NOTE:** Appendix A contains screen captures of the Loss Calculator with example numbers, and an explanation of Loss Compensation considerations.

- d. Enter the percent Loss of Watts and VARS for copper and iron in the appropriate fields:

- Percent Loss of Watts:

enter the percentage of

positive or negative watts due to iron and/or copper losses.

Percent Loss of Watts		
	Positive Watts	Negative Watts
Due to Iron	0	0
Due to Copper	0	0

- Percent Loss of VARS: enter the percentage of posi-

tive or negative watts due to iron and/or copper losses.

Percent Loss of VARS		
	Positive Watts	Negative Watts
Due to Iron	0	0
Due to Copper	0	0

3. To implement any changes, click the Update Device button to send the new profile to the meter.

## 26.2.5: Pulse Factors

Pulse factors are the weight of a KYZ pulse for energy consumed. The meter uses pulses for energy accuracy testing, KYZ pulse outputs, and for load profiling of accumulated energy over demand intervals. The pulse weights are assigned in this Device Profile setting. There are two settings for Pulse Factors - Test, for setting the Test pulses; and Internal Accumulators, for setting the pulses for energy accumulators.

### 26.2.5.1: Test Pulse Factors

1. From the Tree Menu, click Revenue & Energy Settings>Pulse Factors>Test. Use this screen to set the Test pulse factors.

Shark 270 [Serial Number: 0187887342, V-Switch: 5]

Update Device Retrieve Report Compare Open Save Options View Screens Help Exit Editor

General Settings  
Revenue & Energy Settings  
Energy Scaling and Averaging Method  
Power and Energy Labeling  
Aggregators  
Aggregator 1  
Aggregator 2  
Aggregator 3  
Aggregator 4  
Cold Load Pick-Up: Disabled  
Transformer / Line Loss Compensation: Enabled  
Time of Use: Enabled  
Pulse Factors  
Test  
Internal Accumulators  
CT & PT Compensation: Disabled  
Compensate CTs  
Compensate PTs  
Display  
View Meter Faceplate Screens  
Power Quality and Alarm Settings  
Limits  
Waveform / PQ  
Logs  
Configure Log Sizes

## Test Pulse Factors

### Test Pulses

#### Test Pulse 1

IR Pulse 1 (P) 1.8 Wh per pulse

#### Test Pulse 2

IR Pulse 2 (Q) 1.8 Configure below  
Energy Wh (In the meter's Test Mode, the Energy measurement for Pulse 2(Q) is always VARh Total.)  
Phase Phase A

Note: Please enter a pulse weight value between 0.00001 and 9.99999 or a pulse weight value between 00.0000 and 99.9999  
\*KYZ Output on back of meter shares the (P) Pulse configuration

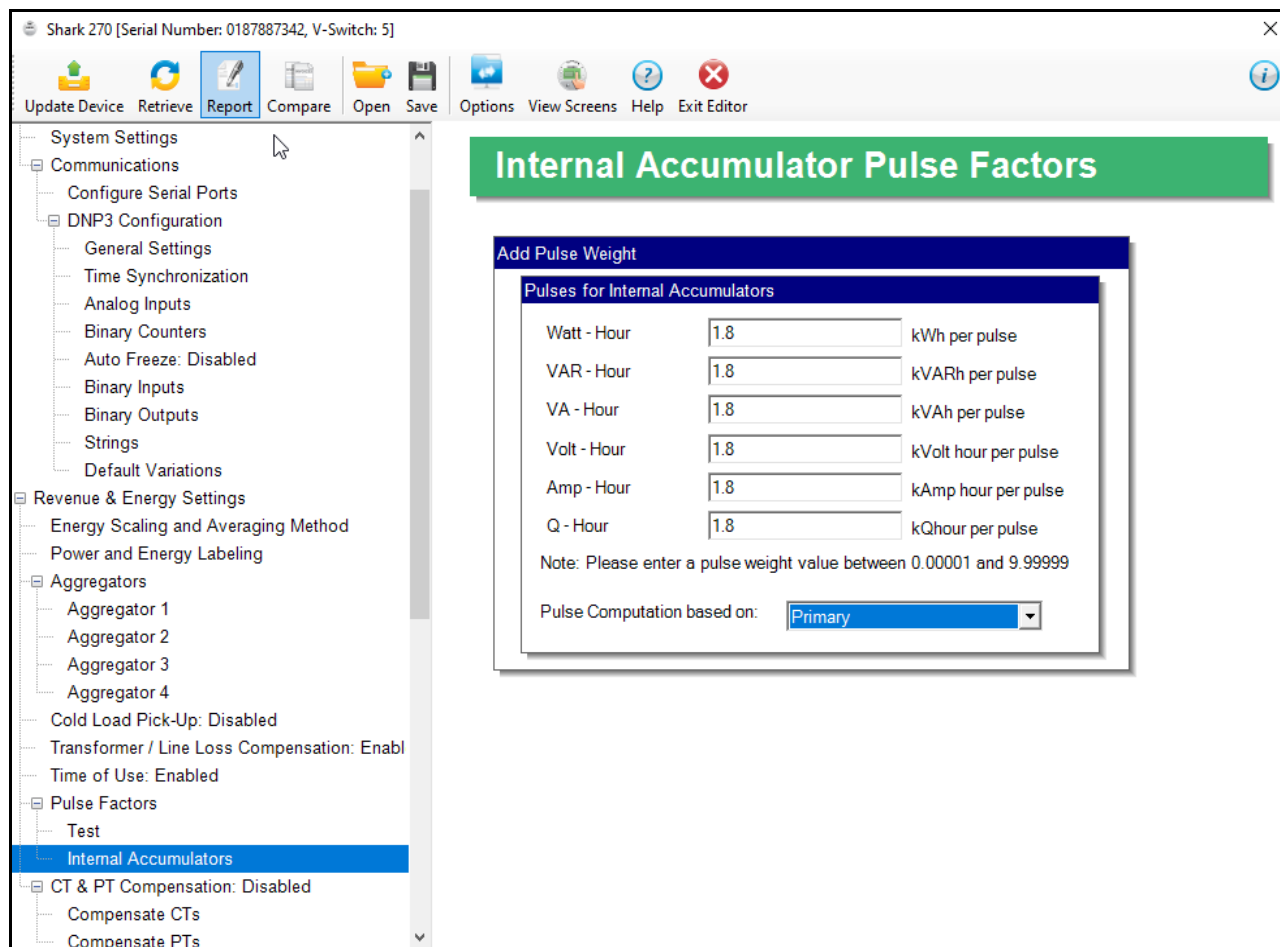
2. For each of the Test pulses, enter the pulse weight you want to assign to it. The pulse weight must be between 0.01000 and 9.99999.
3. For Test Pulse 2 you can also select the energy channel and phase or total value from the pull-down menu.

**NOTE:** In the meter's Test Mode the Energy measurement used for IR Pulse 2 (Q) is *always* total VARh, irrespective of the setting in this screen. Refer to Chapter 3 in the *Shark® 270 Meter Installation and Operation Manual* for more details and specific pulse configuration instructions.

4. To implement any changes, click the Update Device button to send the new profile to the meter.

### 26.2.5.2: Internal Accumulator Pulse Factors

1. From the Tree Menu, click Revenue & Energy Settings>Pulse Factors>Internal Accumulators.



2. For each of the energy reading accumulators, enter the pulse weight you want to assign to it. The pulse weight must be between 0.00001 and 9.99999.
3. From the pull-down menu, select pulse computation based on Primary or Secondary readings.
4. To implement any changes, click the Update Device button to send the new profile to the meter.

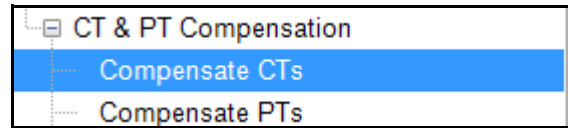


### 26.2.6: CT and PT Compensation

CT/PT compensation is used to correct for errors caused by the current transformers (CTs) (external to the meter) and Potential/Voltage transformers (PTs) connected to the meter.

From the Tree Menu, click Revenue and Energy Settings>CT & PT Compensation.

Two options open under CT & PT Compensation:



Two options open under CT & PT Compensation: Compensate CTs and Compensate PTs. Use these settings to enable and set compensation factors for the meter.

### 26.2.6.1: Compensate CTs

The first CT & PT Compensation setting option is Compensate CTs.

1. From the Tree menu, click CT & PT Compensation>Compensate CTs.

**CT Compensation**

☐ Enable CT PT Compensation in Meter

Frequency: 60.00 Hz    CT Ratio: 5 : 5

Phase A CT Compensation				
Point	Primary Current		Ratio Correction Factor (RCF) Range: 0.8500 to 1.1500	Phase Error (Arcminutes) Range: -60 to +60
	% of Rated Current	Value (A)		
1	0.00%	0.0000	1.0000	0
2	0.00%	0.0000	1.0000	0
3	0.00%	0.0000	1.0000	0
4	0.00%	0.0000	1.0000	0
5	0.00%	0.0000	1.0000	0
6	0.00%	0.0000	1.0000	0
7	0.00%	0.0000	1.0000	0
8	0.00%	0.0000	1.0000	0

<<Previous Phase    NextPhase>>    Enter 0% for Rated Value to disable that test point.

1. The Phase Error difference between any CT Point and any PT Point of a given phase (A, B, or C) must be between -60 and + 60 Arc Minutes.
2. The RCF difference between any CT Point and any PT Point of a given phase (A, B, or C) must be between the two values shown in the range column.

2. Make sure the Enable CT & PT Compensation in Meter box is checked. If it is not, any settings you enter won't be implemented. The top of the screen shows the system frequency and the CT ratio (see [26.1.1: Configuring CT, PT Ratios and System Hookup](#), on page 26-2). Make these settings:

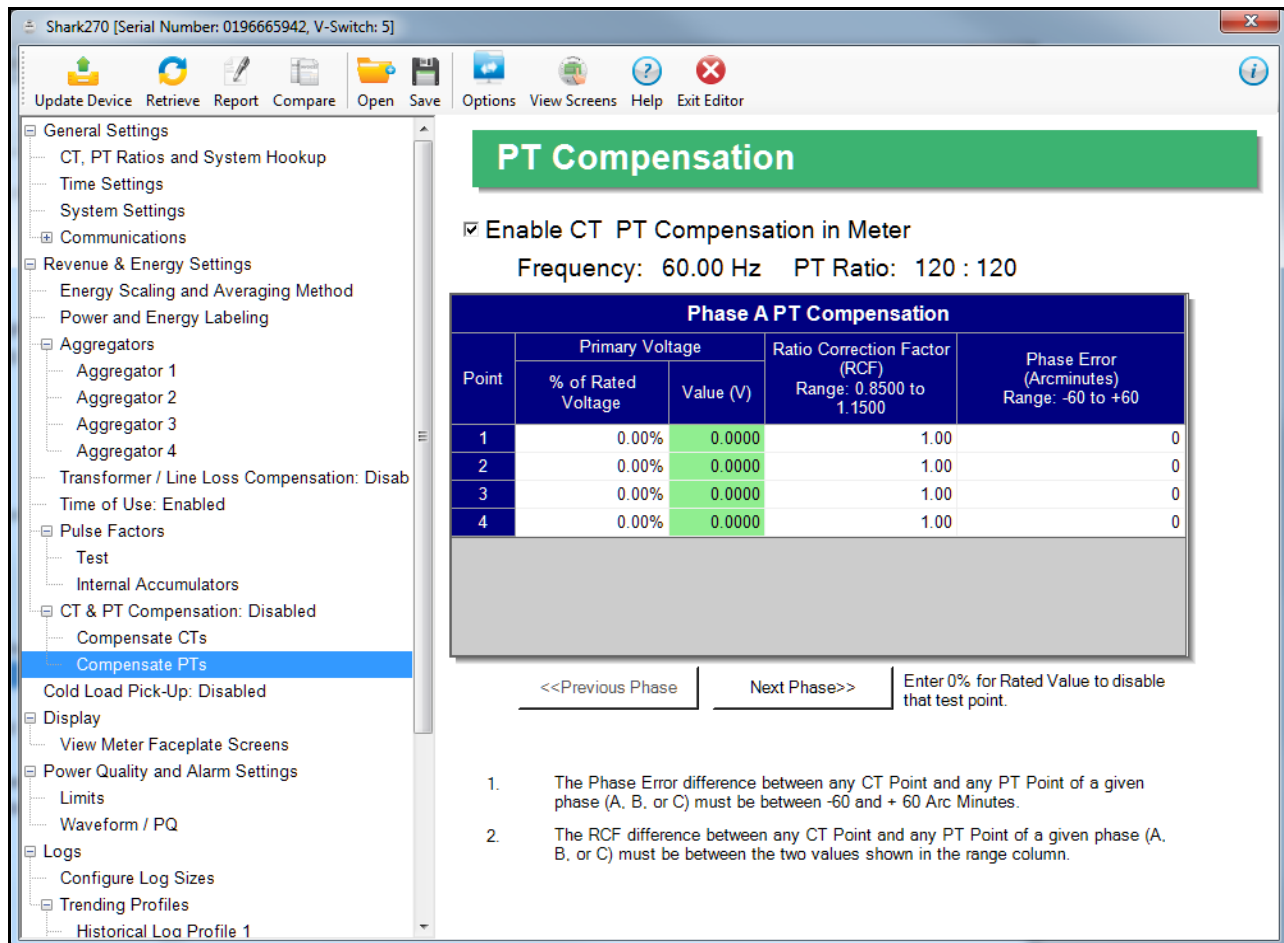
- a. The first screen you see displays the settings for Phase A CT compensation. Click the Next Phase button at the bottom of the screen to enter settings for phases B and C.

- b. For each of the phases, enter up to 8 points of % of rated current, ratio correction factor (.08500 to 1.1500), or phase error/arcminutes (-60 to +60). The Value (A) field displays the current value for the "% of rated current" setting you entered. For example, if the current Full Scale is 5 A, and you enter 0.01% in the "% of rated current field," the value will be 0.0005 A. Refer to your CT manufacturer's documentation for the values to enter on this screen.
- If you don't want to use a test point, enter 0% for the rated current.
- c. Continue to the next phase and repeat step 2b.
3. To implement any changes, click the Update Device button to send the new profile to the meter.

### 26.2.6.2: Compensate PTs

The second CT & PT Compensation setting option is Compensate PTs.

1. From the Tree menu, click CT & PT Compensation>Compensate PTs.



2. Make sure the Enable CT & PT Compensation in Meter box is checked. If it is not, any settings you enter won't be implemented. The top of the screen shows the system frequency and PT ratio (see [26.1.1: Configuring CT, PT Ratios and System Hookup](#), on page 26-2). Make these settings:

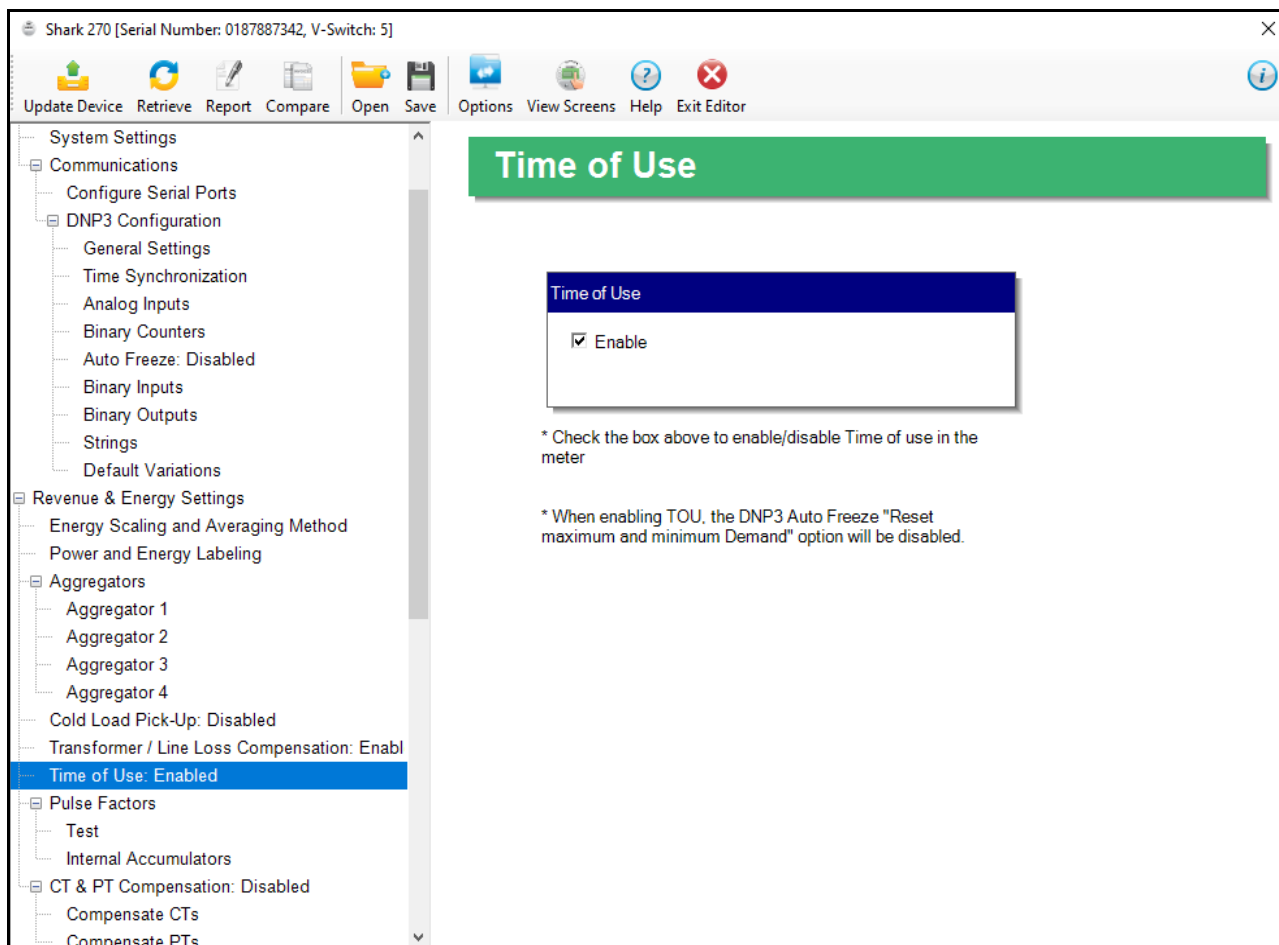
- a. The first screen you see displays the settings for Phase A PT compensation. Click the Next Phase button at the bottom of the screen to enter settings for phases B and C.

- b. For each of the phases, enter up to 4 test points of % of rated voltage, ratio correction factor (0.8500 to 1.1500), or phase error/arcminutes (-60 to +60). The Value (V) field displays the voltage value for the "% of rated voltage" setting you entered. For example, if you entered 0.01% of the rated voltage, the value will be 0.060 V if the PT Ratio is 600:600. Refer to your PT manufacturer's documentation for the values to enter on this screen.
- If you don't want to use a test point, enter 0% for the rated voltage.
- c. Continue to the next phase and repeat step 2b.
3. To implement any changes, click the Update Device button to send the new profile to the meter.

### 26.2.7: Time of Use Setting

The Shark® 270 meter offers Time of Use. See [Chapter 15: Time of Use, on page 15-1](#), for instructions. To enable or disable, Time of Use for the meter:

1. Click Revenue & Energy Settings>Time of Use.



2. Check the box to enable Time of Use; uncheck the box if you want to disable it.
3. To implement any changes, click the Update Device button to send the new profile to the meter.

## 26.2.8: Aggregators Setting

Aggregators are registers that hold the sum/difference of data from multiple sources, internal and external. An example use for an aggregator is to totalize pulses from different meters. The Shark® 270 meter offers four aggregators. The aggregators get data from two sources: 1. an input that is set up as an accumulator (see [26.5.3: Configuring a Digital Relay Card \(RO1S\)](#), on page 26-103 and [26.5.4: Configuring a Digital Input/Pulse Output Card \(PO1S\)](#), on page 26-109) and 2. one of the meter's energy registers. The value of the Input accumulator(s) and of the energy register can either be added to, or subtracted from, the aggregator.

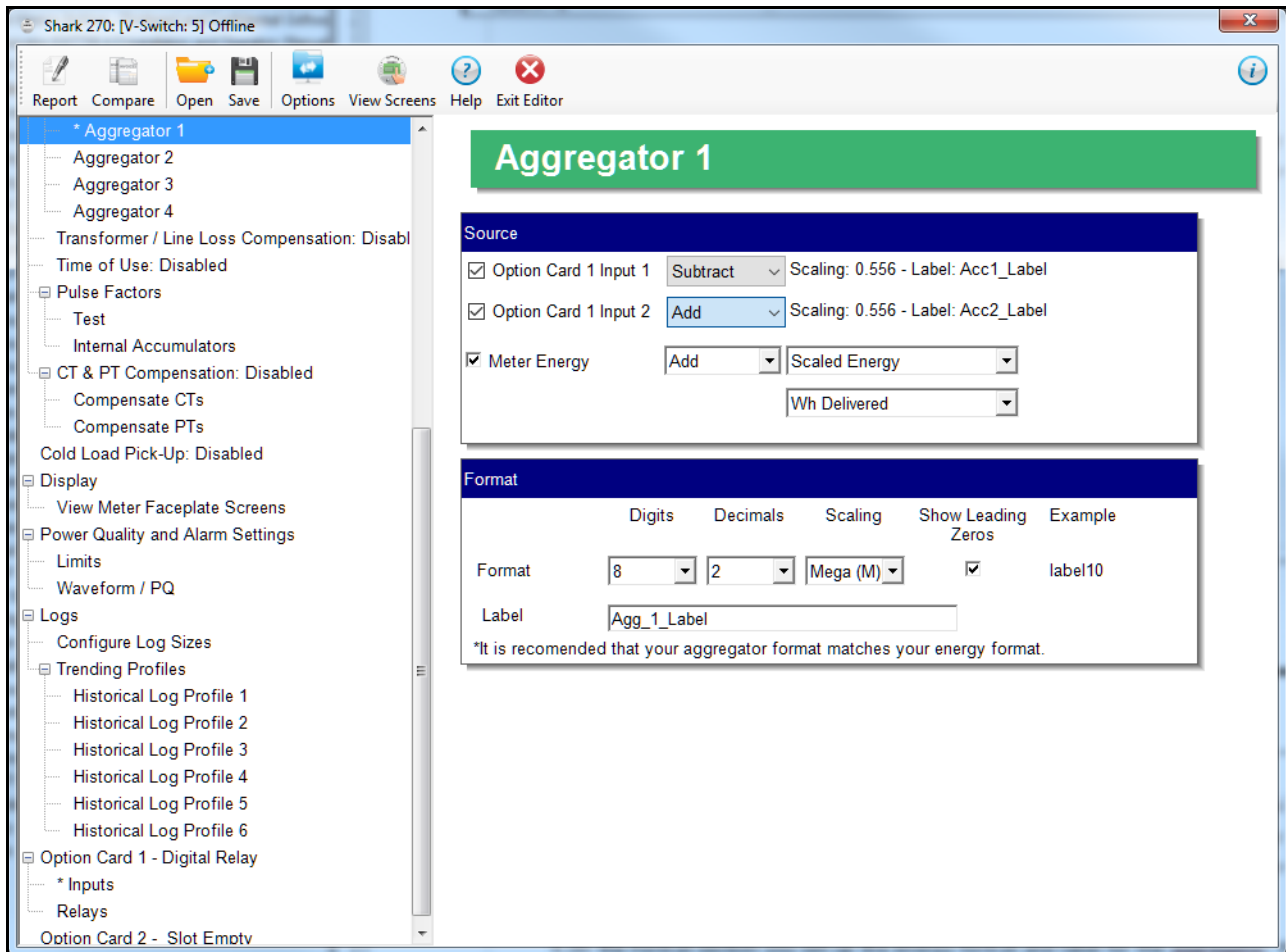
The Pulse Output/Digital Input card has four inputs and the Relay Output/Digital Input card has two inputs. Each aggregator can hold the addition/subtraction of one to eight of the digital inputs and 1 energy register listed in the table below and on the following page.

<b>Energy (Compensated &amp; Uncompensated)</b>
It, Phase A
It, Phase B
It, Phase C
Vt, Phase A-N
Vt, Phase B-N
Vt, Phase C-N
Vt, Phase A-B
Vt, Phase B-C
Vt, Phase C-A
Wh, (Q1+Q4)
Wh, (Q2+Q3)
VARh, (Q1+Q2)
VARh, (Q3+Q4)
VAh, Total
Quadrant 1 Wh, Total
Quadrant 1 VARh, Total
Quadrant 1 VAh, Total

Energy (Compensated & Uncompensated)
Quadrant 2 Wh, Total
Quadrant 2 VARh, Total
Quadrant 2 VAh, Total
Quadrant 3 Wh, Total
Quadrant 3 VARh, Total
Quadrant 3 VAh, Total
Quadrant 4 Wh, Total
Quadrant 4 VARh, Total
Quadrant 4 VAh, Total
VAh (Q1+Q4), Total
VAh (Q2+Q3), Total
+Qh, Total
-Qh, Total



1. To set up aggregators, click Revenue and Energy Settings>Aggregators>Aggregator (1-4). All four aggregators are set up the same way.



**NOTE:** The Shark® 270 meter Gen 2 has an extra setting for the display formatting. See step 4 on the next page.

2. In the Source section you set up the Input and the Energy register to use:
  - a. Depending on the Option card(s) installed in the meter, you will see between none and eight Option card Inputs listed. Click the checkbox to the left of any Inputs you want to use in the aggregator. The scaling and label for that accumulator is listed to the right of the Input's field.

**IMPORTANT!** The Input must be assigned as an accumulator. See [26.5.3: Configuring a Digital Relay Card \(RO1S\)](#), on page 26-103 and [26.5.4: Configuring a Digital Input/Pulse Output Card \(PO1S\)](#), on page 26-109, for instructions on setting up an Input as an accumulator.

- b. Select Add or Subtract from the pull-down menu next to each Input you are using. Add means that you want to add the Input accumulator value to the aggregator; subtract means you want to subtract the Input accumulator value from the aggregator.
  - c. Click the checkbox to the left of Meter Energy and select the energy register you want to use from the pull-down menu. The top menu lets you select the Energy type, e.g., Scaled Energy, and the bottom menu lets you select the energy register, e.g., Wh Delivered.
  - d. Select Add or Subtract from the pull-down menu next to the Meter Energy field. Add means that you want to add the Energy value to the aggregator; subtract means you want to subtract the Energy value from the aggregator.
3. In the Format section you set up the energy format and label for the aggregator:
  - a. Select the number of digits (5-8), decimals (0-6), and scaling (kilo or Mega), from the pull-down menus.
  - b. If you want to show leading zeros, click the checkbox.
  - c. The Example field shows what your formatting choices will look like.
  - d. Enter a label for the aggregator. The label can be up to 32 characters.
4. The Shark® 270 Gen 2 meter has another field that gives you the option of setting a separate scaling for the display than for the meter's readings (see the energy scaling explanation in [26.2.1: Configuring Energy, Power Scaling, and Averaging Method, on page 26-41](#)).

Display Format					
	Digits	Decimals	Scaling	Show Leading Zeros	Example
Format	5	0	Unit	<input type="checkbox"/>	88888

- a. To set the display scaling, enter the following:
  - Digits: 5; 6; 7; 8.

- Decimals: 0 - 6.
  - Scaling: unit; kilo (K); Mega (M).
- b. Show Leading Zeros: check the box if you want leading zeros to show; e.g., if a value has five digits and zero decimals, and the reading is 400, if you select show leading zeros the reading would be 0400.
- c. The Example field shows the result of your choices: e.g., a reading for Digits: 8; Decimals: 3; Scale: K would be formatted: 00123.456k.
5. To implement any changes, click the Update Device button to send the new profile to the meter.

## 26.3: Power Quality and Alarm Limit Settings

1. From the Tree Menu on the left side of the Shark® 270 meter's Device Profile screen, double-click on the Power Quality and Alarm Limit Settings line or click on the + button next to it. The settings in the Power Quality and Alarms Settings group are listed: Limits and Waveform/PQ. Note that you will only see the Waveform/PQ setting if your meter has V-Switch™ key 4 or above.

**Shark270 [Serial Number: 0196665942, V-Switch: 5]**

Update Device Retrieve Report Compare Open Save Options View Screens Help Exit Editor

**General Settings**

- CT, PT Ratios and System Hookup
- Time Settings
- System Settings
- \* Communications

**Revenue & Energy Settings**

- Energy Scaling and Averaging Method
- Power and Energy Labeling
- Cold Load Pick-Up: Disabled
- Transformer / Line Loss Compensation: Disabled

**Pulse Factors**

- Test
- Internal Accumulators

**CT & PT Compensation: Disabled**

- Compensate CTs
- Compensate PTs
- Time of Use: Enabled

**Display**

- View Meter Facplate Screens
- Power Quality and Alarm Settings**
  - Limits**
  - Waveform / PQ

**Logs**

- Configure Log Sizes
- Trending Profiles
  - Historical Log Profile 1
  - Historical Log Profile 2
  - Historical Log Profile 3
  - Historical Log Profile 4
  - Historical Log Profile 5
  - Historical Log Profile 6

**Limits**

Limit ID	Assigned Channel	Setting	Setpoint		Return Hysteresis	
			% of Fullscale	Primary	% of Fullscale	Primary
1	Primary Readings: Volts A-N	Above	120.0%	144.000	110.0%	132.000
		Below	80.0%	96.000	90.0%	108.000
2	Primary Readings: Volts B-N	Above	120.0%	144.000	110.0%	132.000
		Below	80.0%	96.000	90.0%	108.000
3	Primary Readings: Volts C-N	Above	120.0%	144.000	110.0%	132.000
		Below	80.0%	96.000	90.0%	108.000
4	Primary Readings: I A	Above	200.0%	2.000	190.0%	1.900
		Below	80.0%	0.800	90.0%	0.900
5	Primary Readings: I B	Above	200.0%	2.000	190.0%	1.900
		Below	80.0%	0.800	90.0%	0.900
6	Primary Readings: I C	Above	200.0%	2.000	190.0%	1.900
		Below	80.0%	0.800	90.0%	0.900
7	Primary Readings: Frequency	Above	102.0%	61.200	102.0%	61.200
		Below	98.0%	58.800	98.0%	58.800
8		Above				
		Below				
9		Above				
		Below				
10		Above				

**Full Scales**

Voltage	120
Current	1
Power	120
Power Total	360

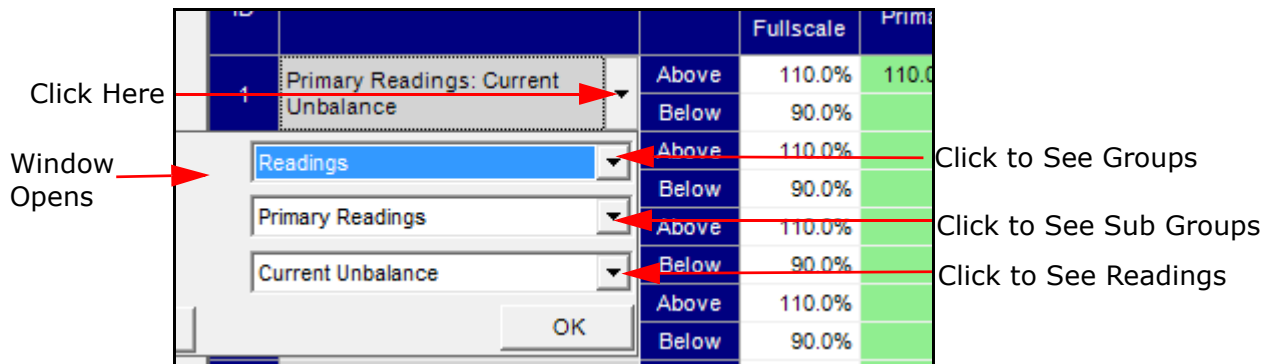
### 26.3.1: Configuring Limits

#### Functional Overview for Limits:

Limits are transition points used to divide acceptable and unacceptable measurements. When a value goes above or below the limit, an out-of-limit condition occurs. You can set and configure up to 16 Limits for the Shark® 270 meter.

Once they are configured, you can view the out-of-Limits (or Alarm) conditions in the Limits Log (see Chapter 19) or Limits Polling screen (see Chapter 5). You can also use Limits to trigger relays.

1. From the Tree Menu, click Power Quality and Alarm Settings>Limits. The current settings for Limits are shown in the screen (see screen on the previous page). Use this screen to assign Limits for the Shark® 270 meter.
2. To set up a limit:
  - a. Click the arrow in the Assigned Channel field to open a window that lets you select the channel you want to place a limit on, from Group, Sub Group and Item submenus.



- b. Click the arrow in the Group field to select the group the reading you want belongs to.
- c. Click the arrow in the Sub Group field to select the sub group your reading belongs to (note that the Average Demand group doesn't have any sub groups).
- d. Click the arrow in the Item field to select the reading you want to set a limit for.

e. Click OK. The channel you selected is now displayed in the Assigned channel field.

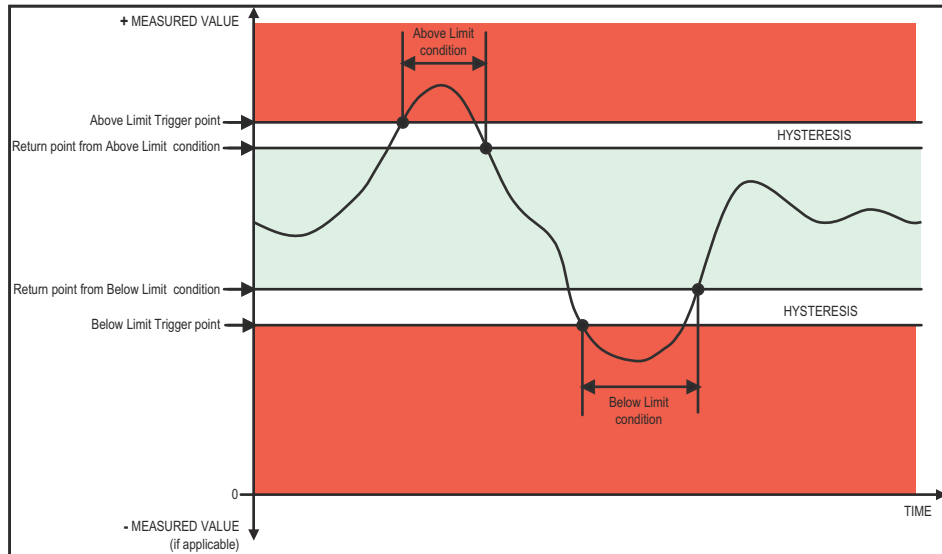
f. You set the limit as a percentage of the Full Scale value of the channel. (The Full Scale values are displayed at the bottom of the screen.)

Program the percentage of the Full Scale that will trigger the limit, for both the Above limit setpoint and the Below limit setpoint. The Primary field is display only, and shows the actual setpoint value.

As seen in the example screen below, the Voltage Full Scale is 600. For the first limit of A -N voltage, the above setpoint is 110% of full scale, which is 660 V. The below setpoint is 90% of full scale, which is 540 V. This means that: if an A-N reading is greater than 660 V or lower than 540 V, it will trigger this limit.

Limit ID	Assigned Channel	Setting	Setpoint		Return Hysteresis	
			% of Fullscale	Primary	% of Fullscale	Primary
1	Primary Readings: V A-N	Above	110.0%	660.0000	108.0%	648
		Below	90.0%	540	92.0%	552
2	Primary Readings: SymCompMag, 0 Seq	Above	110.0%	660	108.0%	648
		Below	90.0%	540	92.0%	552
3	Primary Readings: SymCompMag + Seq	Above	110.0%	660	108.0%	648
		Below	90.0%	540	92.0%	552
4	Primary Readings: SymCompMag - Seq	Above	110.0%	660	108.0%	648
		Below	90.0%	540	92.0%	552
5	Primary Readings: Unbalance zero Seq	Above	110.0%	0	108.0%	0
		Below	90.0%	0	92.0%	0
6	Primary Readings: Unbalance neg Seq	Above	110.0%	0	108.0%	0
		Below	90.0%	0	92.0%	0
7	Primary Readings: SymCompPhase 0 Seq	Above	110.0%	0	108.0%	0
		Below	90.0%	0	92.0%	0
8	Primary Readings: SymCompPhase + Seq	Above	110.0%	0	108.0%	0
		Below	90.0%	0	92.0%	0
9	Primary Readings:	Above	110.0%	0	108.0%	0
Full Scales						
Voltage		600				
Current		5				
Power		3000				
Power Total		9000				

- g. You also set the return hysteresis as a percentage of the Full Scale. The Primary field is display only, and shows what the hysteresis value actually is. Return Hysteresis is the value at which the limit's status changes from out of limit to within limit: see the following figure.



Program the percentage of the Full Scale that will be considered back within limit, for both the Above limit return hysteresis and the Below limit return hysteresis.

As seen in the previous example screen, the Voltage Full Scale is 600. For the first limit of A -N voltage, the above return hysteresis is 108% of full scale, which is 648 V. The below return hysteresis is 92% of full scale, which is 552 V. This means that: if an A-N reading was greater than the Above limit setpoint (660 V), it will be back within limit at 648 V; and if an A-N reading was lower than the Below limit setpoint (540 V), it will be back within limit at 552 V.

#### NOTES:

- If the Above Return Hysteresis is greater than the Above Set Point, the Above Limit is Disabled; if the Below Return Hysteresis is less than the Below Set Point, the Below Limit is Disabled. You may want to use this feature to disable either the Above Limit or Below Limit condition for a reading.

- If you are entering negative limits, be aware that the negative value affects the way the above and below limits function, since negative numbers are processed as signed values.
  - EIG recommends you do not make the set points and hysteresis values too close to the reading's Primary value, e.g., an Above Set Point of 101%, or a Hysteresis value of 99%. If these settings are too close to the Primary value you may flood the Limits log with very minor fluctuations, causing bigger fluctuations to be missed. The software highlights the Limit ID in red if the setting is considered outside of the recommended range.
8. To implement any changes, click the Update Device icon to send the new profile to the meter.

### 26.3.2: Configuring Waveform/PQ (with V4 and V5)

The Shark® 270 meter is V-Switch™ key upgradeable. If you have purchased V-Switch™ keys 4 or 5, the waveform recording feature will be available with your meter. The Waveform/PQ capability allows the meter to act as a high-speed waveform recorder to record any anomaly that occurs within a cycle of duration. This provides a user with advanced waveform analysis including pre- and post- waveform recording.

The meter has the capability to record both surges and sags of the measured signals. A voltage surge is any event that increases the RMS voltage for one cycle, calculated every half cycle. A voltage sag is a dip in the RMS of one cycle of voltage, calculated every half cycle. A current fault (or surge) is also calculated in the same manner. When the RMS value of any of these triggers exceeds the threshold settings, the meter will trigger a waveform capture.

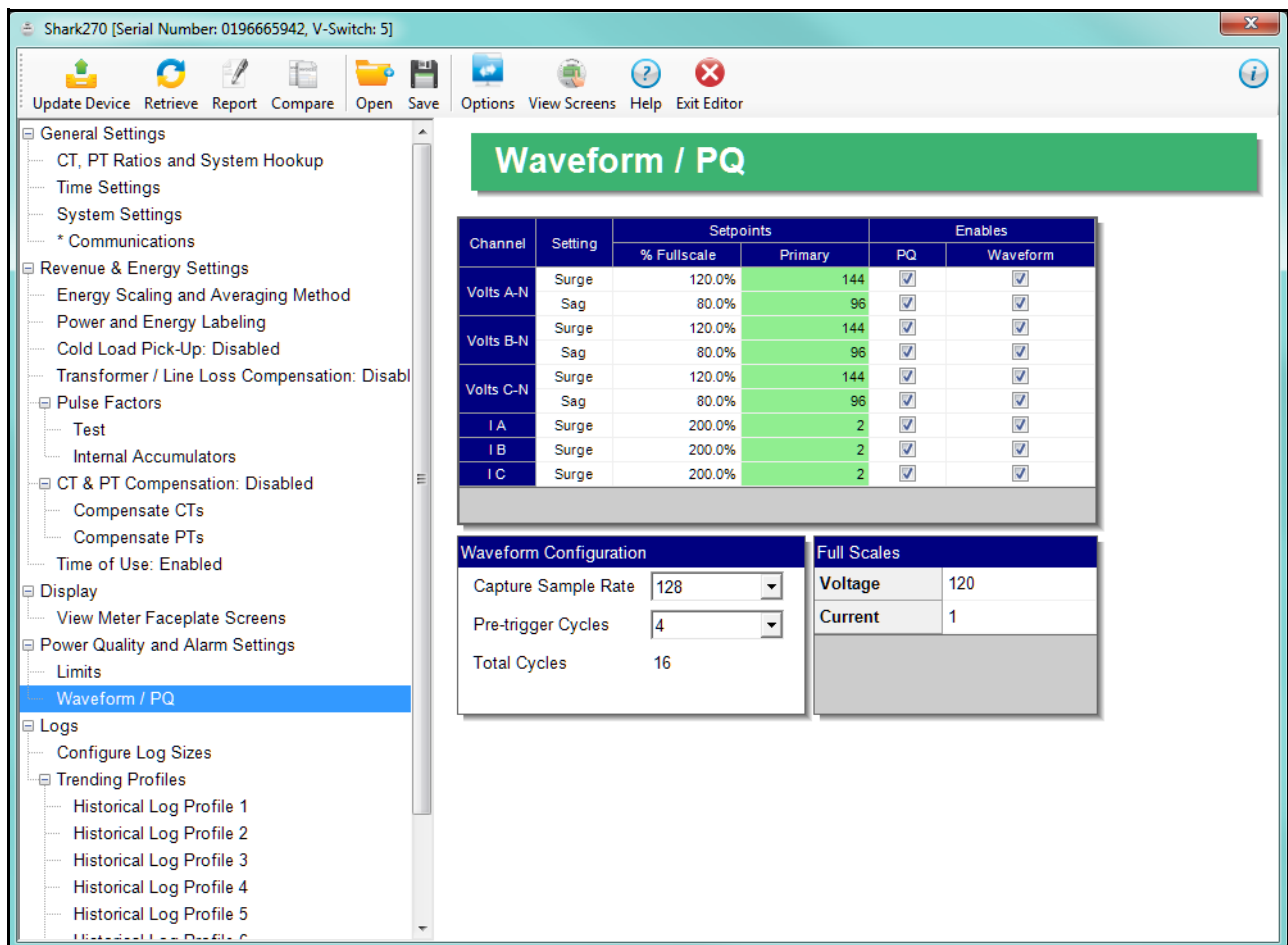
This setting determines at what point the meter executes a waveform capture and/or records a power quality event. See [19.3.5: Waveform Log, on page 19-20](#) and [19.3.4: Power Quality Log, on page 19-16](#), for instructions on viewing Waveform and PQ logs. See [26.4.1: Configuring Log Sizes, on page 26-80](#) for instructions on configuring the log sectors for the Shark® 270 meter.

**NOTE:** PQ and Waveform Thresholds are given as a percentage of the Full Scales (Full Scale fields). Full Scales are based on the CT and PT Ratios set in the CT, PT Ratios and System Hookup setting. Before programming the Waveform/PQ Thresholds, set



the CT and PT ratios. See [26.1.1: Configuring CT, PT Ratios and System Hookup](#), on page 26-2, for instructions.

1. From the Tree Menu, click Power Quality and Alarm Settings>Waveform/PQ. The current settings, if any, are shown in the screen.



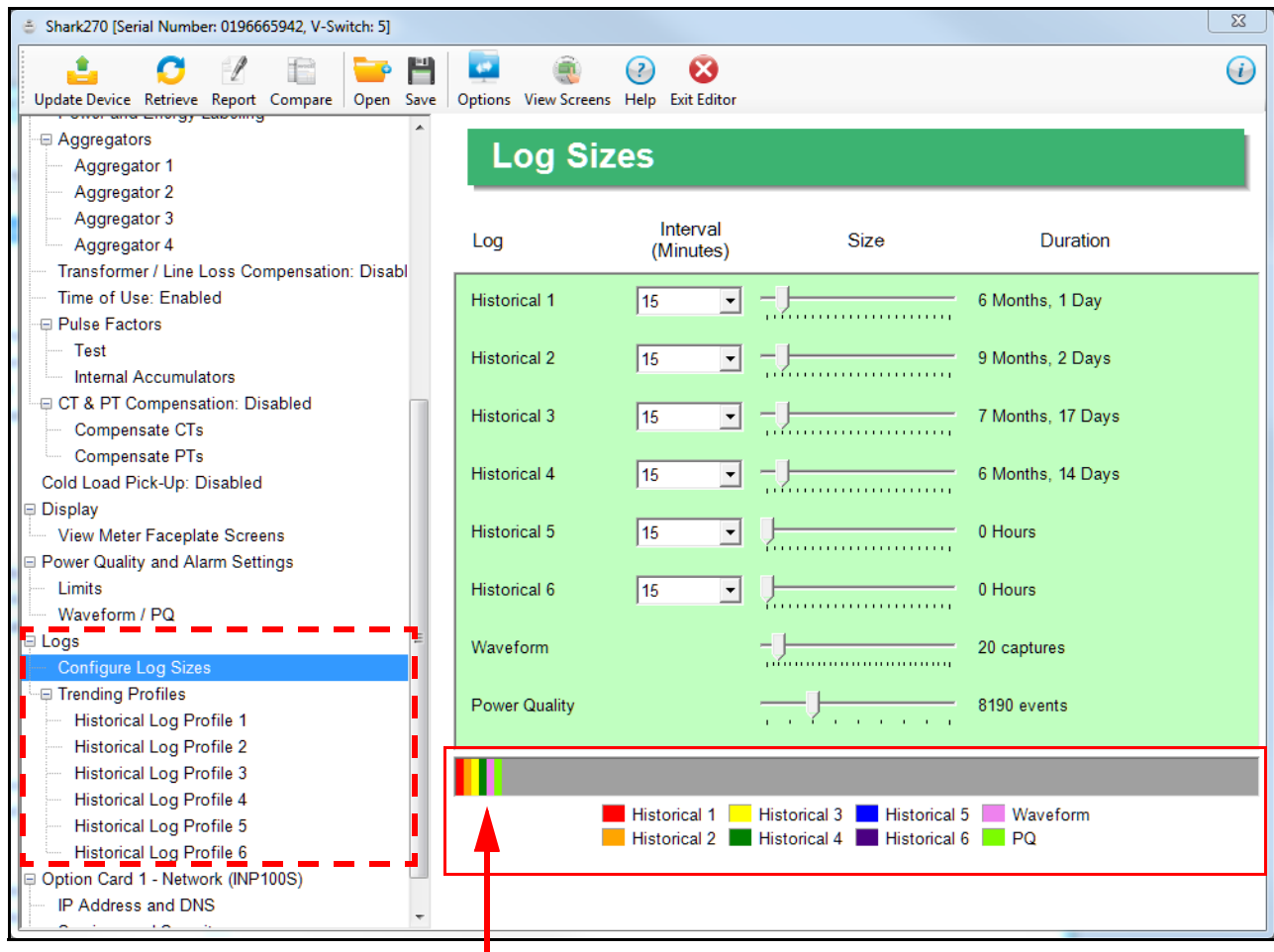
- Set the Surge and Sag Setpoints (in percentage of Full Scale), for Voltage, and the Surge Setpoint (in percentage of Full Scale) for Current. When you enter the percentage for a reading, the primary value is displayed in the Primary field. The bottom, right of the screen displays the Full Scales for Voltage and Current.

**NOTE:** EIG recommends you do not make the % Fullscale too close to the reading's Primary value, e.g., a Surge of 101%, or a Sag of 99%. If these settings are too close to the Primary value you may flood the PQ log with waveform recordings of very minor fluctuations, causing bigger fluctuations to be missed. The software highlights the Limit ID in red and displays a note on the screen if the setting is considered outside of the recommended range.

2. Click the checkbox under PQ to enable PQ recording when the programmed threshold is exceeded.
3. Click the checkbox under Waveform to enable Waveform recording when the programmed threshold is exceeded.
4. Select the sampling rate from the Capture Sample Rate pull-down menu. The options are 32 - 128, for V-Switch™ key 4, and 32 - 512 for V-Switch™ key 5.
5. From the Pre-trigger Cycles pull-down menu, select the number of cycles of waveform data prior to the triggering event, that you want to be included in the waveform capture. The options are 2 to 63.  
**NOTE:** Increasing the sample rate will decrease the number of available pre-trigger cycles. For example, if you select a sampling rate of 128, the maximum number of pre-trigger cycles is 15; if you select a sampling rate of 512, you can only set 2 or 3 pre-trigger cycles.
6. To implement any changes, click the Update Device icon to send the new profile to the meter.

## 26.4: Logs Setting

From the Tree Menu on the left side of the Shark® 270 meter's Device Profile screen, double-click on the Logs line or click on the + button next to it. All of the settings in the Logs group are listed.



This graph represents the logs and the amount of memory allocated to them

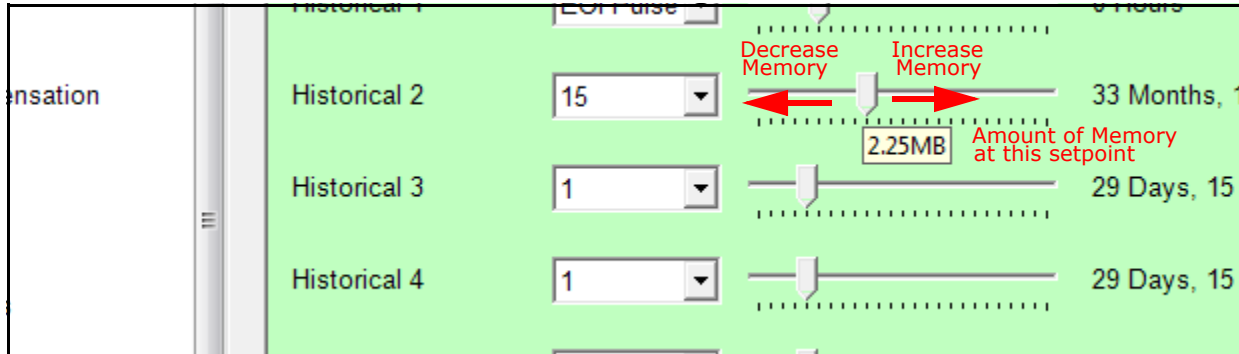
### 26.4.1: Configuring Log Sizes

This setting allows a user to allocate the amount of memory available for each log, based on the number of recording days desired. Once the log's memory fills, the log "rolls over" and the records are overwritten in a FIFO (first in, first out) sequence. Depending on the meter's V-Switch™ key, the user is able to memory allocation for up to 6 historical logs and the waveform and PQ logs, to optimize the number of records stored for each log.

- For V-Switch™ keys 2 and 3, use this setting to increase or decrease the amount of records that each of the Shark® 270 meter's three Historical logs can store.
- For V-Switch™ keys 4 and 5, use this setting to set the allocation for the Waveform(V4 and V5) and Power Quality (V5 only) logs, as well as for 6 Historical logs.

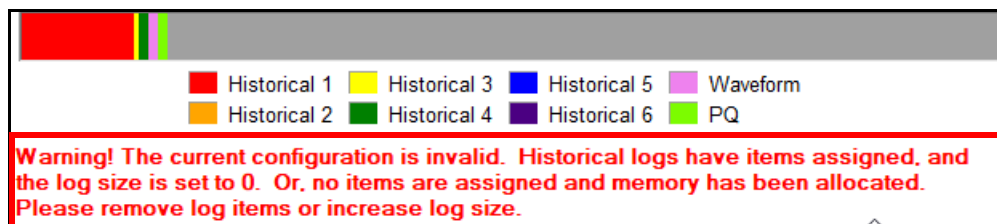
1. From the Tree Menu, click Logs>Configure Log Sizes. You will see the screen shown on the previous page. Note that the example screen is for a meter with V5 - the screen you see will look a bit different if your meter has a lower V-Switch™ key.
2. For each log, set both the logging interval and size. (Note that for the Waveform and PQ logs, you only set the size.) For the historical logs, the Duration field tells how many months and days of logging your setting will provide; for the Waveform log, it tells how many waveform captures it will provide; and for the Power Quality log, it tells how many PQ events, i.e., surges and sags, will be recorded.
  - a. Select the logging interval from the pull-down menu. The interval is in minutes. You can set between 1 and 60 minutes, or EOI pulse, for the historical logs.
  - b. Set the log size (the amount of memory allocated to it), by moving the bar in the size field to the right to increase the amount of memory, and to the left to decrease the amount of memory. When your cursor is on the bar, the

amount of memory for that setting point is displayed.



#### NOTES:

- The maximum allowable size for the historical logs is 6 MB, and for the Waveform log, is 8 MB. The V-Switch™ key level may limit this maximum number, e.g., a meter with V2 has 2 MB memory in total to assign to the available logs.
- When EOI Pulse is set as the Logging Interval for a Historical log (see [26.4.2: Configuring Historical Logs, on page 26-82](#)), the Interval field will display EOI Pulse, and the duration field will say “0 Hours.”
- Note that the more memory allocated to a log, the longer it takes to collect the data from the log. Only allocate as much memory as needed for the application. The unused memory that remains will be used for wear leveling of the flash chip.
- If either: a) one (or more) of the historical logs has been configured, but no memory has been assigned to it; or b) one (or more) of the historical logs has memory assigned to it, but no data items have been configured for it, the following message will be shown at the bottom of the screen.



See the following section for historical log configuration instructions.

3. To implement any changes, click the Update Device icon to send the new profile to the meter.

### 26.4.2: Configuring Historical Logs

Use this setting to select the parameters to be stored in each of the Shark® 270 meter's historical logs. For additional information on logs, including using the HHF Converter, see [Chapters 16: Databases and Log Data, on page 16-1](#) and [19: Viewing Logs, on page 19-1](#).

#### **Functional Overview of Historical Logs:**

Depending on the meter's V-Switch™ key, the Shark® 270 meter allows a user to set up to 6 separate historical profile logs that can log up to 64 parameters, each. Each of these logs can log at different time frames (intervals). For example, one log can be set for one minute intervals to record voltage; while another log can be set for 15 minute intervals for energy consumption logging.

Having multiple historical logs additionally affords you the flexibility of programming each log with unique parameters. For example, you might program Historical Log 1 to record Power Quality parameters (for example, THD), Log 2 to record Demand or average power parameters, and Log 3 to record Energy parameters, and so on.

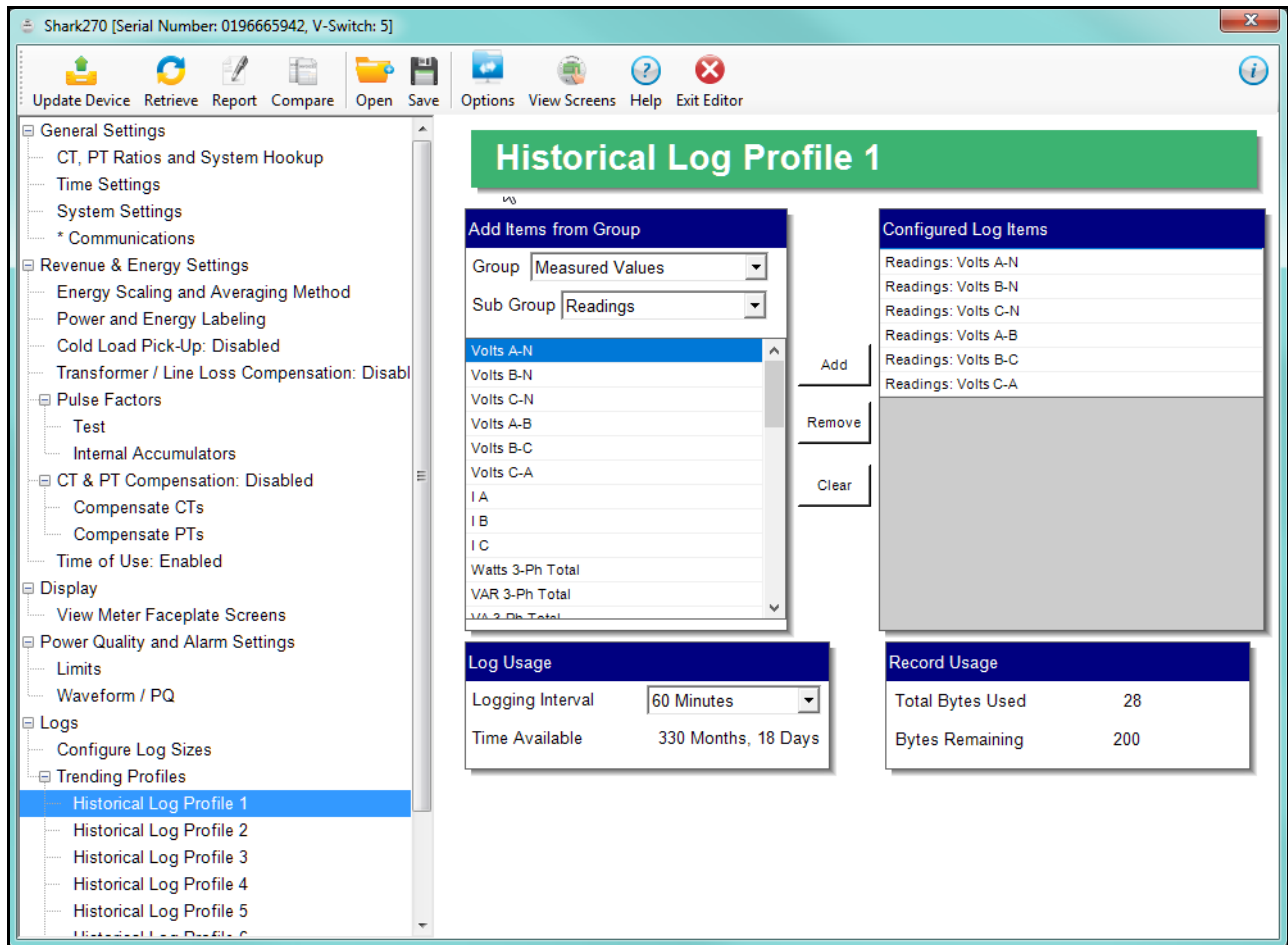
Historical Log parameters can be selected from these groups/subgroups:

- Measured Values/Readings (V L-L, V L-N, Ia, Ib, Ic, Current Neutral, Watts, VARs, VA, Frequency, PF, Symmetrical Components, Voltage Unbalance, Current Unbalance, Quadrant Indicator, Q Total, V P-N Average, V P-P Average, I Average).
- Measured Values/Uncompensated Readings (Total Watts/VAR/VA, PF Total, Watts A/B/C, VAR A/B/C, VA A/B/C, PF A/B/C, Q Total).
- Measured Values/Phase Angle (Phase A/B/C Current, Angle Volts A-B/B-C/C-A).
- Energy/Scaled Energy (Wh, VARh, VAh, Quadrants, Qh Total, I2T/V2T per Phase and Total).
- Energy/Scaled Energy in Interval (Wh, VARh, VAh, Quadrants, Qh).
- Energy/Scaled Energy in Interval (Pulses) (Wh, VARh, VAh, Quadrants, Qh).
- Energy/Uncompensated Energy (Wh, VARh, VAh, Quadrants, Qh Total, I2T/V2T per Phase and Total).

- Energy/Uncompensated Energy in the Interval (Wh, VARh, VAh, Quadrants, Qh).
- Energy/Uncompensated Energy in Interval (Pulses) (Wh, VARh, VAh, Quadrants, Qh).
- Energy/Secondary Energy (Wh, VARh, VAh, Qh, Scaled Wh, Scaled VARh, Scaled VAh).
- Energy/Secondary Energy in Interval (Wh, VARh, VAh, Qh, Scaled Wh, Scaled VARh, Scaled VAh).
- Energy/Secondary Uncomp. Energy (Wh, Varh, VAh).
- Max/Min Demand/Maximums (V L-L, V L-N, Ia, Ib, Ic, Current Neutral, Watts, VARs, VA, Frequency, PF, Avg. Demand, Aggregators, High-speed Inputs).
- Max/Min Demand/Minimums (V L-L, V L-N, Ia, Ib, Ic, Current Neutral, Watts, VARs, VA, Frequency, PF, Avg. Demand, Aggregators, High-speed Inputs).
- Max/Min Demand/Voltage Maximums in the Interval (V Short Term Max).
- Max/Min Demand/Voltage Minimums in the Interval (V Short Term Min).
- Max/Min Demand/Previous Demand Last Reset (Max Watt/VAR/VA).
- Average Demand/Demand ( Average I, Watts, VARs, VA, PF, Q, Aggregators, Option Cards).
- Average Demand/Cumulative Demand (Watts, Cont. Watts).
- Average Demand/Timestamp (Demand Last Reset Time).
- Harmonics/THD/THD (%THD, % K Factor).
- Harmonics/THD/Magnitudes (V and I magnitudes to 40th order).
- Harmonics/THD/Angles (V and I angles to 40th order).
- Meter Status (Meter On Time, Current Date and Time, Current Temperature, Max/Min Demand Reset Counter).
- Accumulators/Inputs Slot 2 (Input 1 and Input 2 Accumulators).

- Accumulators/Relays Slot 2 (Relay1 and Relay 2 Accumulators).
- Aggregators (Aggregators 1, 2, 3).

1. From the Tree Menu, click Logs>Historical Log Profile (1-6).



This screen allows you to select items to be stored in the historical log you selected. The Group field determines the items that are available for selection.

2. Click on the arrow in the Group field and select a readings group from the pull-down menu (the available groups are listed on the previous page). In the screen above the Energy Interval group is selected.

3. The available items are displayed under the Group field. Select the values you want in your log:

- Highlight the item(s) you want in the Selectable Items box.



- b. Click Add. The item(s) are added to the Selected Items box.
  - c. To remove item(s), highlight them in the Selected Items box and click Remove.
4. Set the Logging Interval (Minutes). The available choices are: 1, 3, 5, 10, 15, 30, 60, EOI (End of Interval) Pulse. The Logging Interval determines when the meter takes a snapshot.

**IMPORTANT!** If you are trending Energy in the Interval, the Logging interval must be the same as the Demand interval.

**NOTES:**

- Only **one** of the following can be set for the EOI pulse feature:
  - EITHER **1** Option card input can be set to receive an EOI pulse from another device
  - OR **1** Option card output can be set to trigger an EOI pulse
- When you choose EOI Pulse, the meter takes a snapshot when the pulse is either received or generated (depending on whether the EOI pulse is assigned to an input or output), rather than on a time interval.

**NOTE:** There are display fields at the bottom of the Historical Log Profile screen. They show Time Available (which is dependent on the number of values being logged and the logging interval), the Total Bytes Used (which is dependent on the number of values being logged), and the Bytes Remaining for this historical log. These fields are updated as you make selections on the screen. The total number of bytes available per log record is approximately 234.

5. To implement any changes, click the Update Device icon to send the new profile to the meter.

## 26.5: Configuring Option Cards

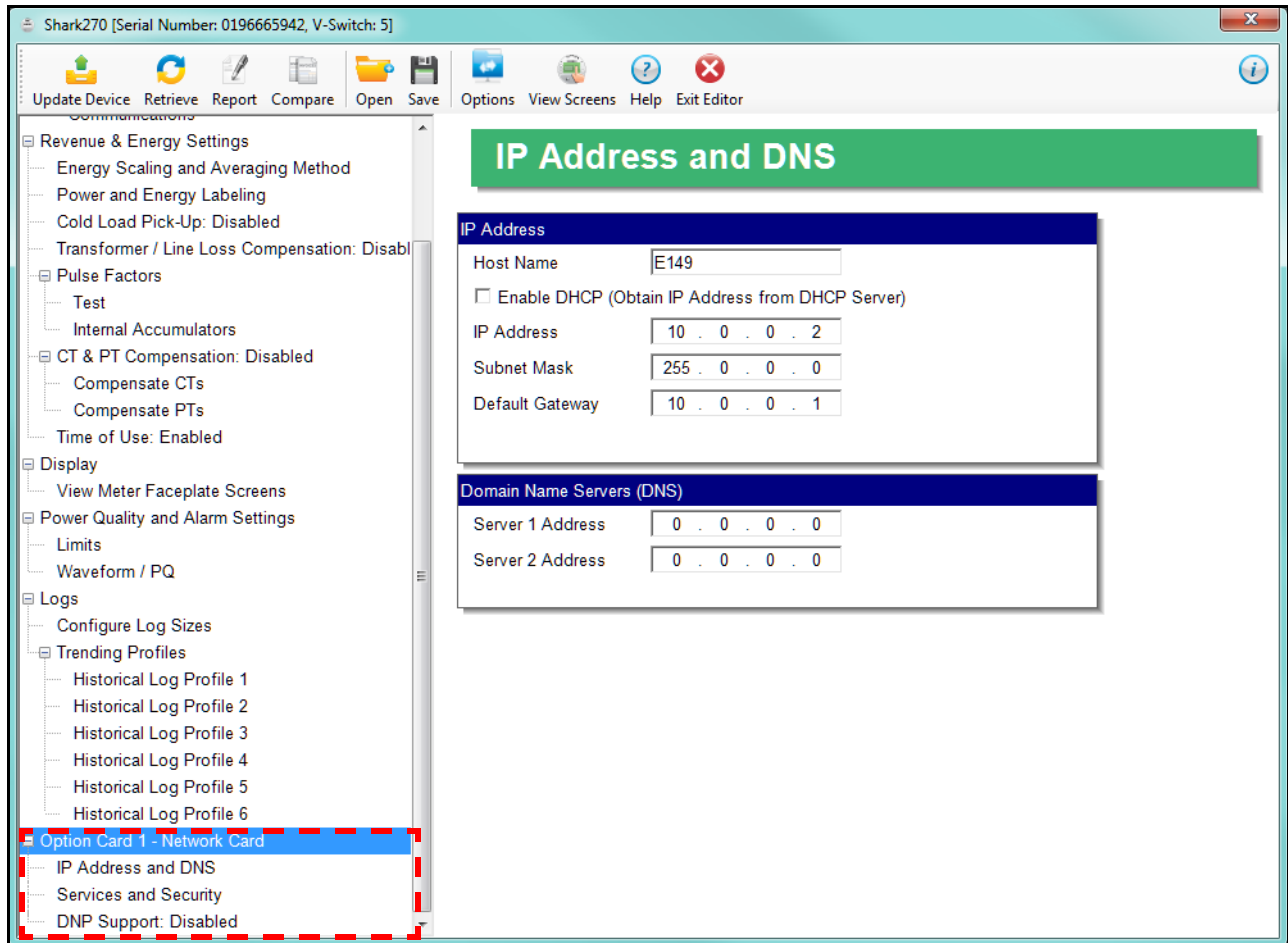
The Shark® 270 meter automatically detects the presence of any Option cards installed in it. You will see the installed card(s) listed in the Tree Menu (see the figure below). Up to two Option cards can be installed in the Shark® 270 meter. Refer to the meter's Installation and Operation Manual for additional information concerning Option cards, including installation procedures and firmware updates, if applicable.

You must configure an Option card before using it. The following sections give instructions for configuring each of the Option cards.

**NOTE:** You can configure settings for an Option card when you are not connected to a meter.

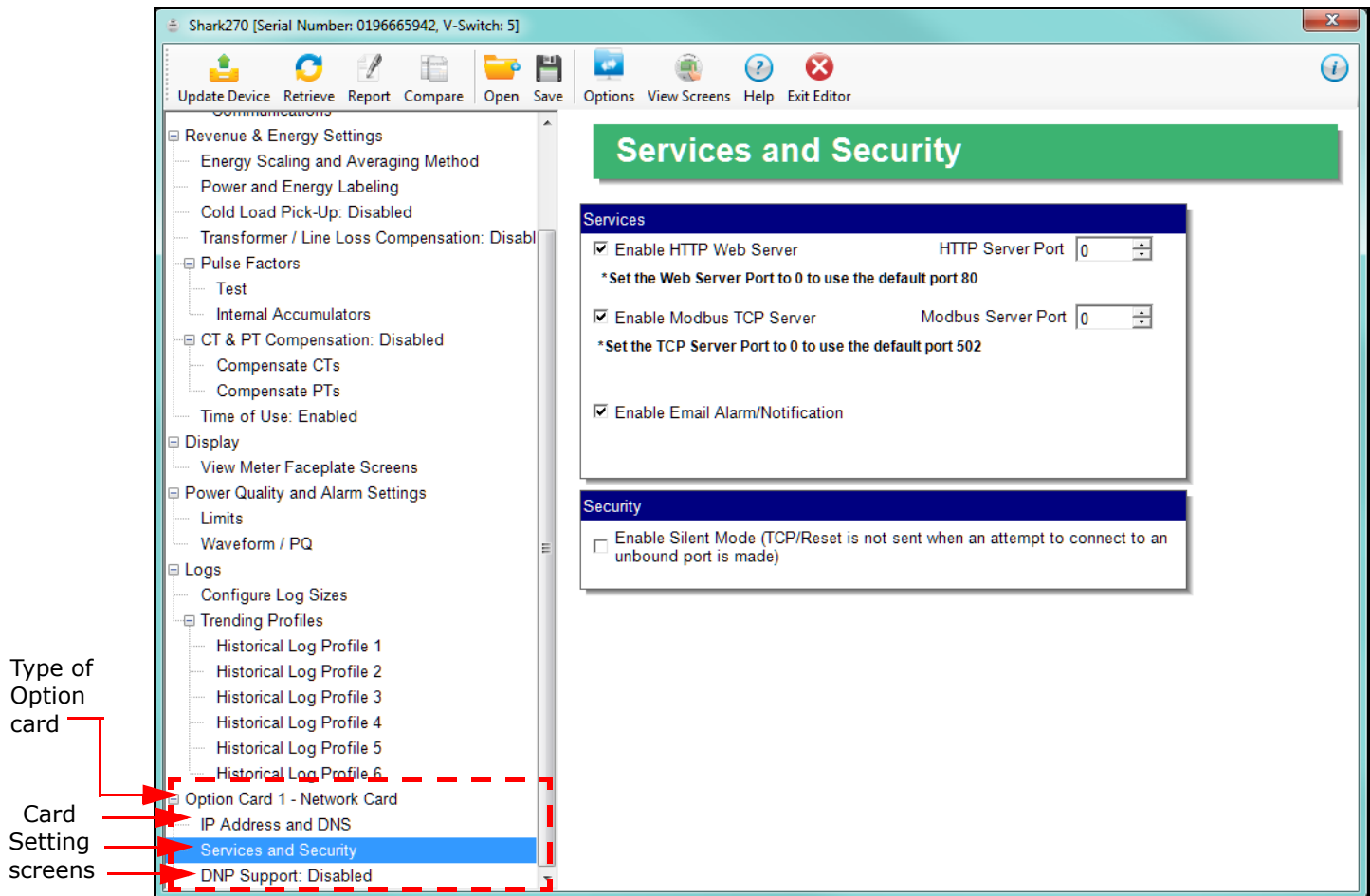
1. Click Option Card 1 or 2 from the Shark® 270 meter's Device Profile screen. The drop-down menu on the displayed screen allows you to select your Option card.
  - The available selections are: Network (INP100S), Network IEC 61850 (INP300S), Digital In/Relay (RO1S), Digital In/Pulse Out (PO1S), Analog Output (0-1 mA) (1mAOS), Analog Output (4-20 mA) (20mAOS), RS-232/485 (RS1S), 4G Cell Modem (4GLTE), or None; and for Gen 2 only, IRIG-B & Pulse Output (IRG1).  
**NOTE:** The 4GLTE is only available in the Option card 2 menu.
2. Click Apply. The Option card you chose is now listed in the menu. Refer to the instructions for configuring the card, located in the following sections.

From the Tree Menu on the left side of the Shark® 270 meter's Device Profile screen, double-click on the Option Card 1 or Option Card 2 line or click on the + button next to it. The settings for the option card(s) installed in your meter are shown.



## Option Card Screens:

The type of Option card installed in the meter determines the settings you need to configure. Click on the selectable lines under your Option card in the Tree menu. See the example below.



## NOTES:

- The Option card settings for your meter will only show the option cards currently installed in your meter.
- For firmware versions 0009 or above, when the meter's sealing switch is enabled, you will be able to configure the communication Option cards: INP100S, RS1S, and 4GLTE, if they are installed in the meter. Any other Option cards installed in the meter are not configurable, and will not be displayed in the Tree menu, while the sealing switch is enabled.

### 26.5.1: Configuring a Network Card (INP100S)

The INP100S enables 10/100BaseT Ethernet communications. It also acts as a Web server, allowing the meter's data to be viewed on a standard web browser. For technical specifications, hardware installation, and detailed information on the Web server, refer to the meter's User Manual.

Note that there are two versions of the INP100S card - a legacy version and the Gen 2 version. The Option Card screen will indicate which card is installed in your meter. See the example on the right.

Gen 2 INP100S

Option Card Status				
Option Card Information				
Card	Type	SubType	Card Name	Serial
1	Communication	Network Card	Network Card G2	
2	Communication	Network Card	Network Card	

Legacy INP100S

Gen 2 of the INP100S card has additional features not supported by the legacy card.

- One major feature is support for both IPv4 and IPv6. IPv6 offers many more IP addresses, avoiding the possibility of "running out" of IP addresses for IPv4. IPv6 does not need to use the network-address translation necessary in IPv4, though its larger packet size means that the processing speed of IPv4 and IPv6 is very similar. Since IPv6 is used by about a third of the Internet currently, it is a good idea to enable both IPv4 and IPV6 for your card.
- Gen 2 of the INP100S card offers enhanced security, including digital firmware signature that authenticates the network card firmware before an update is performed, SSL/TLS (secure socket layer/transport layer security) encryption, support for encrypted (SMTPS) and unencrypted (SMTP) alarm and notification emails, and access to the Gen 2 INP100S card's Web server using either HTTP or HTTPS protocols.

See Chapter 10 in the Shark 270 Meter User Manual for additional features and details on the Gen 2 INP100S card. This section of the manual will give instructions for both the legacy and Gen 2 INP100S card.

1. From either the Option Card 1 - Network Card or Option Card 2 - Network Card menu, click IP Address and DNS. This setting allows you to configure the IP Address and DNS for the card, and for Gen 2 to set up the Keep Alive feature.

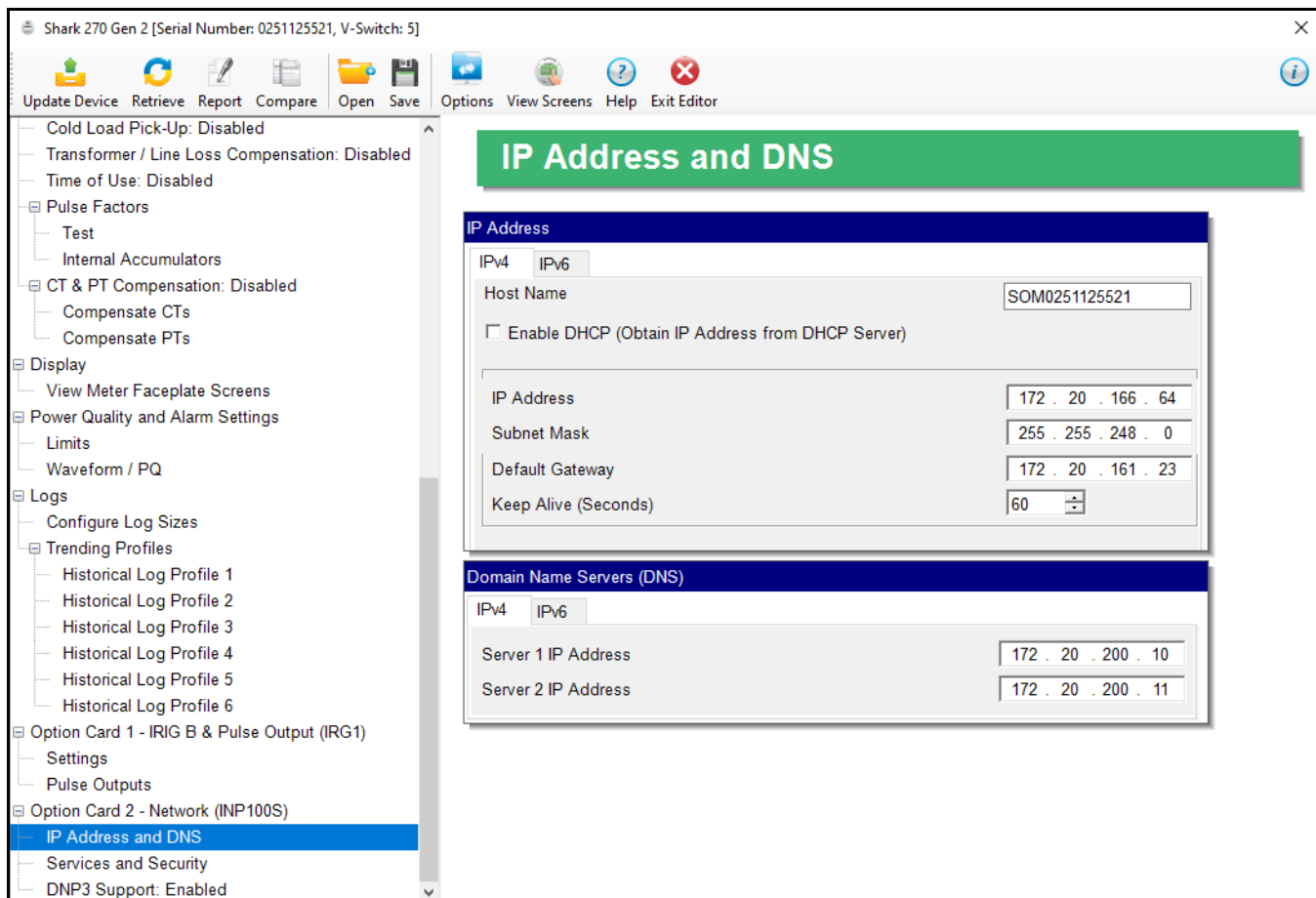
- You will see the screen shown below for the legacy INP100S.

The screenshot shows the Shark270 configuration software interface. The title bar indicates the device is 'Shark270 [Serial Number: 0196665942, V-Switch: 5]'. The menu bar includes 'Update Device', 'Retrieve', 'Report', 'Compare', 'Open', 'Save', 'Options', 'View Screens', 'Help', and 'Exit Editor'. The left sidebar shows a tree view of configuration categories, with 'Option Card 1 - Network Card' selected. The main area displays the 'IP Address and DNS' configuration screen. The 'IP Address' section includes fields for 'Host Name' (E149), 'IP Address' (10 . 0 . 0 . 2), 'Subnet Mask' (255 . 0 . 0 . 0), and 'Default Gateway' (10 . 0 . 0 . 1). There is a checkbox for 'Enable DHCP (Obtain IP Address from DHCP Server)'. The 'Domain Name Servers (DNS)' section includes fields for 'Server 1 Address' and 'Server 2 Address', both set to 0 . 0 . 0 . 0.

IP Address	
Host Name	E149
<input type="checkbox"/> Enable DHCP (Obtain IP Address from DHCP Server)	
IP Address	10 . 0 . 0 . 2
Subnet Mask	255 . 0 . 0 . 0
Default Gateway	10 . 0 . 0 . 1

Domain Name Servers (DNS)	
Server 1 Address	0 . 0 . 0 . 0
Server 2 Address	0 . 0 . 0 . 0

- You will see the screen below if you are connected to the Gen 2 INP100S.



Note that for Gen 2, the INP100S has both IPv4 and IPv6 settings. You can use the screen to make both IPv4 and IPv6 settings that will be used by the card.

- In the IP Address section, enter the following information for both the legacy and Gen 2 IPv4:

- Host Name: To enable a DHCP server to assign the IP address for your network card, click the DHCP box and enter the host name.
- If you are not using a DHCP server, enter the following for the network card:
  - IP Address.
  - Subnet Mask.
  - Default Gateway.

**NOTE:** If no mask is entered (blank) or 0.0.0.0 is used, the network



card will use an automatic mask based on the network address class, or will not apply a mask, according to the following table:

Network Class	Address range	Mask used
Class A	1.0.0.0-127.x.x.x	255.0.0.0
Class B	128.0.0.0-191.x.x.x	255.255.0.0
Class C	192.0.0.0-223.x.x.x	255.255.255.0
Other classes		No masking will be applied

- For the Gen 2 INP100S card, the Keep Alive setting specifies the number of seconds the meter will wait before sending a “keep alive” message if there is no communication. After the specified amount of time, the meter sends the keep alive message to the TCP socket to see if the connection is still up and running. If the connection has been lost, the TCP socket can then be freed for another connection.

b. In the IPv6 IP Address tab, enter the following:

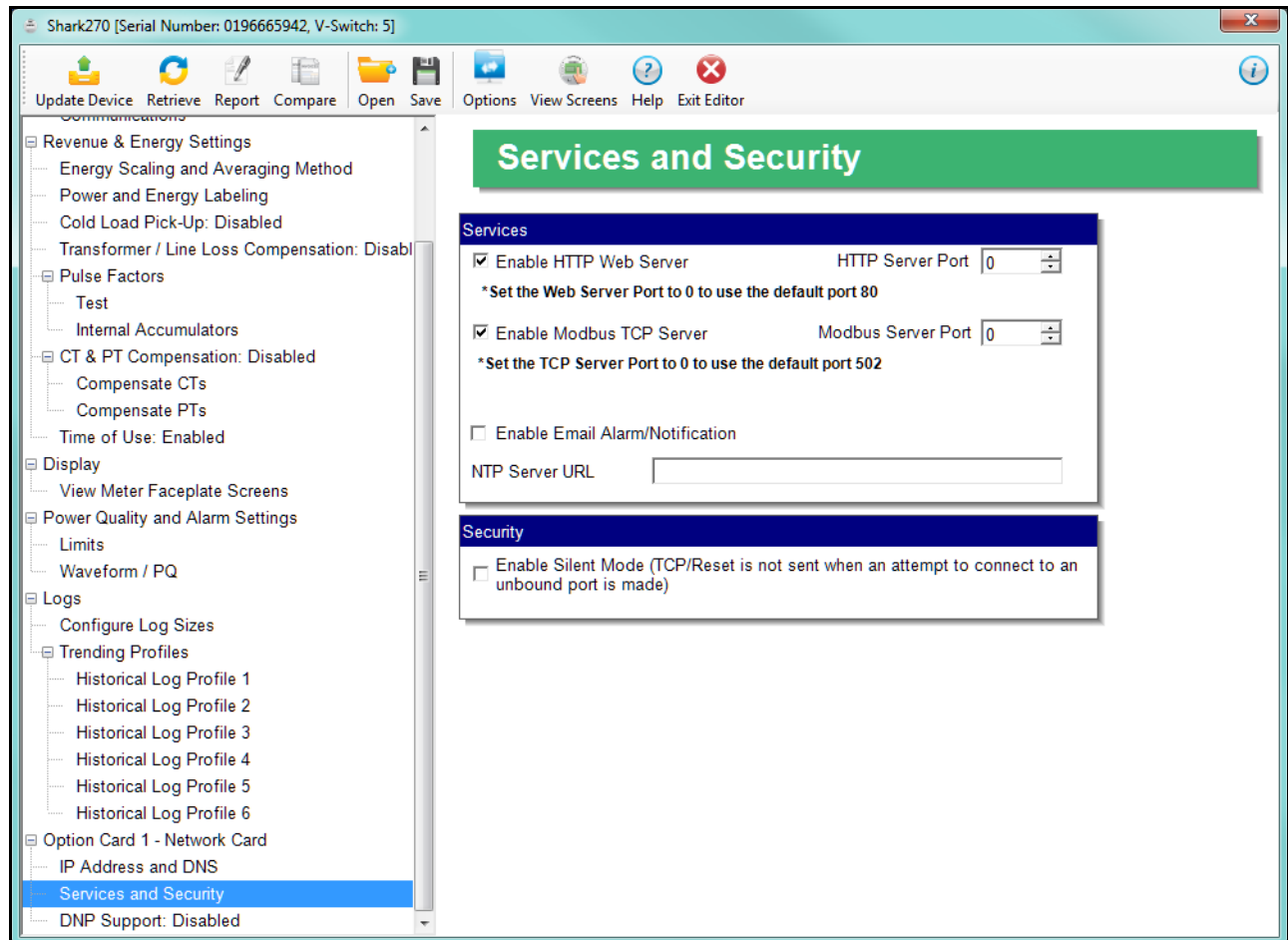
- Mode: select one of the following options -
  - Use Static Address and then enter the address in the IP address field.
  - Use Link Local Address.
  - Use DHCP.
- Prefix Length: this field is similar to the subnet mask in IPv4. You can enter a number between 1 and 128.
- Default Gateway: enter the address of the default gateway or leave the default of all zeros.

c. Domain Name Server Address(es) (for Gen 2, you can set up to two servers for IPv4 and IPv6, each).

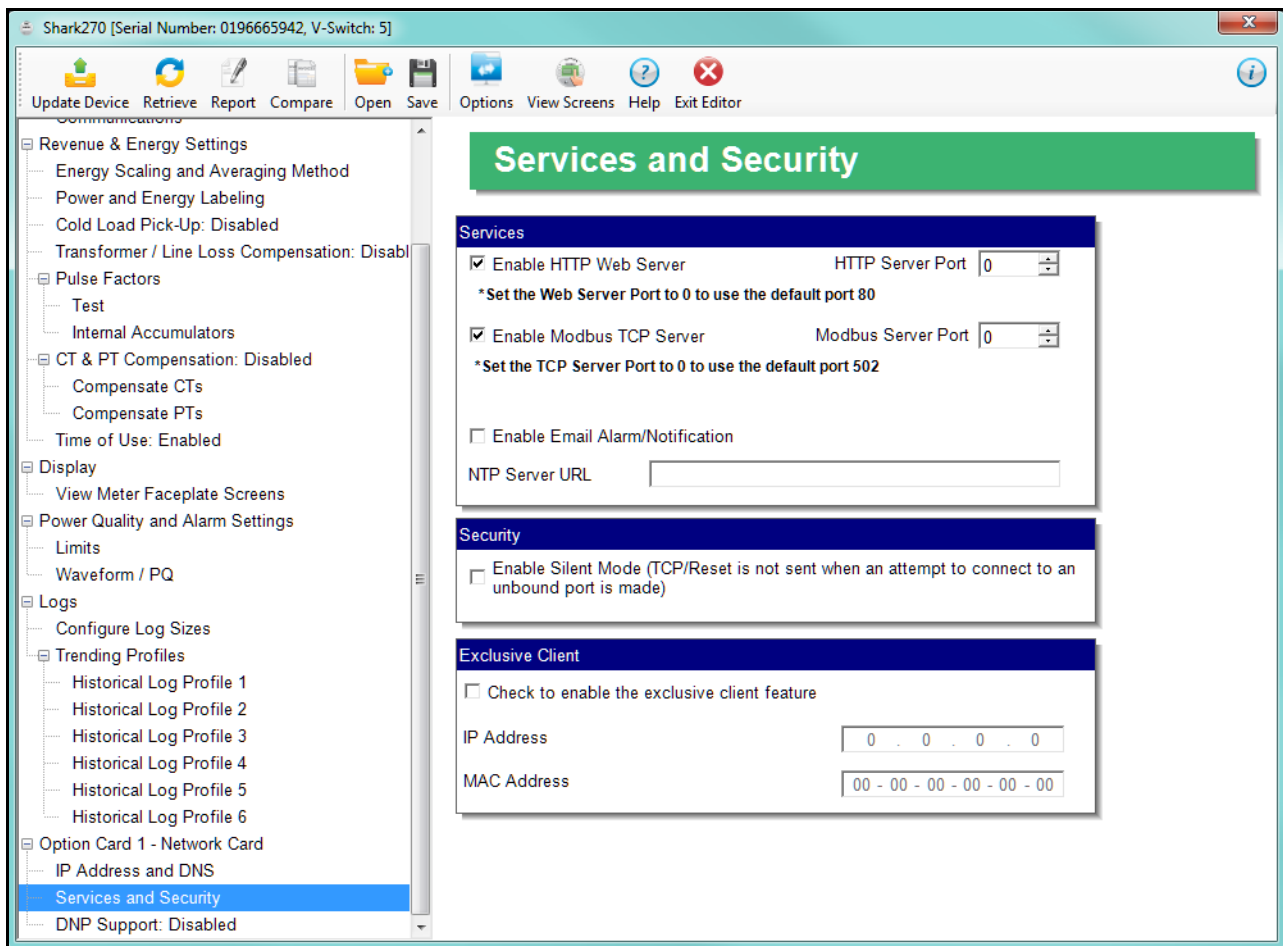
**NOTE:** If you don’t enter a DNS address, the field defaults to 0.0.0.0. In this case, you need to enter an IP address (e.g., 163.27.987.53) for the NTP server (if enabled) and email features. If you do specify a valid DNS address, however, you can use a URL address (e.g., pool.ntp-micro-soft.org) for the NTP and email features.

2. From the Option Card menu, click Services and Security. This screen allows you to disable certain features of the meter's Ethernet connection, for security purposes.

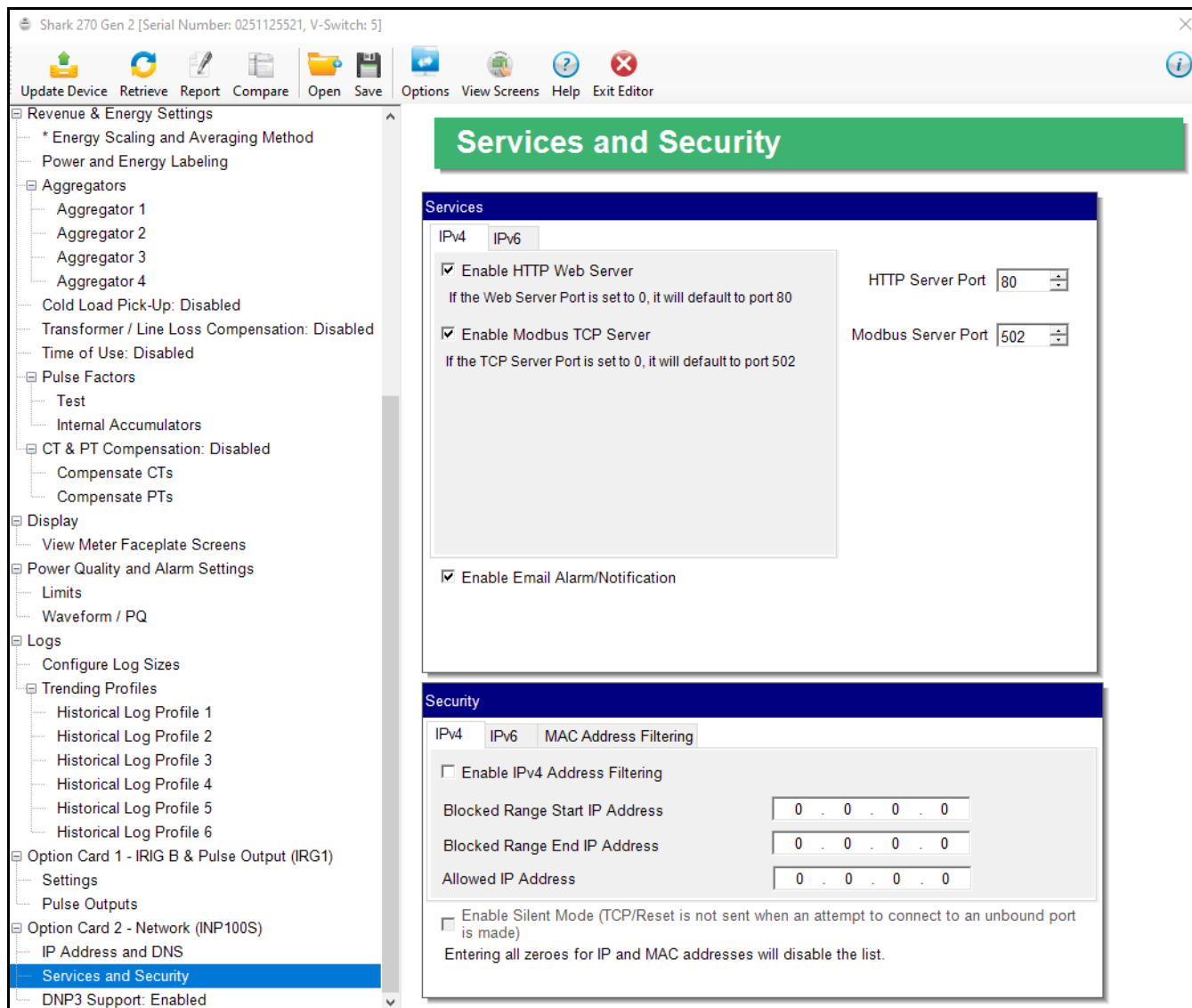
- You will see the screen shown below if your legacy Network card's Firmware version is 3.42 or lower.



- If your legacy Network card's Firmware version is 3.43 or higher, you will see the screen shown below:



- If you have a Gen 2 INP100S card, you will see the screen below. Again, you make settings for both IPv4 and IPv6.



a. In the Services tab, make these settings:

- The HTTP Web Server can be disabled, or its default port can be changed.
- The Modbus TCP server can be disabled, or its default port can be changed.
- If the port entered is less than "10," the standard port is used: 80 for Web Server and 502 for Modbus TCP Server.
- To disable one of the servers, uncheck the box next to it.

- Check the Enable Email Alarm/Notification box to use the alarm email and periodic notification feature of the Network card. Note that the Network card's firmware must support alarm and notification email for this feature to be available. The settings for the alarm/notification email feature are made using the card's Web server. See the *Shark® 270 Meter User Manual* for instructions. There is one setting for both IPv4 and IPv6.
- If you have selected NTP as the time synchronization source for the meter (see [26.1.2: Configuring Time Settings, on page 26-5](#)), you will see the settings below.

Enable NTP Client using	IPv6 ▼
SNTP Server Name/IP Address	<input type="text"/>

- Enable the NTP client for either IPv4 or IPv6.
- Enter the SNTP Server name or IP address of a Network Time Protocol server.

**NOTES:**

- The Network Time Protocol server is used for clock synchronization. It can be either a device with a real-time clock that is networked with your meter, or an NTP server on the Internet.
  - The legacy card's Network Firmware versions at or below 3.43 (INP100S) and 3.44 (INP300S), support NTP version 4.0; Network Firmware versions 3.45 and higher, support both NTP version 3.0 and 4.0.
  - NTP is supported in Query-Reply method, only.
  - NTP can only be enabled for one INP100S card.
- b. For the legacy INP100S card:
- When the Security feature "Silent Mode" is enabled, a TCP/Reset packet is not sent when an attempt to connect to an unbound port is made. When "Silent Mode" is disabled, the meter follows standard TCP/IP procedures for incoming connections to unused ports. This feature is useful in preventing hacking (attempted security intrusions).

- Network Firmware version 3.43 and higher and CommunicatorPQA® software version 4.0.249 and above support the Exclusive Client feature. This feature lets you allow an IP and/or MAC address. When that address is used to connect to the meter, all other network communication with the meter, though the same Network card, is suspended. This ensures that anything being done, e.g., updating programmable settings, while the allowed address is being used to communicate with the meter, is secure.
- Click the checkbox and enter the IP address or MAC address you want to establish as the Exclusive Client.

**NOTE:** To disable the exclusive Client feature, uncheck the checkbox - the IP and MAC addresses will be set to all zeros.

c. For the Gen 2 INP100S card, the Security section has these settings:

- IPv4 and IPv6 tabs let you set up firewall security:
  - i. Check the box to Enable IP(v4/v6) Address filtering. (Leave the box unchecked if you don't want to set firewall security).
  - ii. The Blocked Range Start and End IP Address fields are used to block a range of both IPv4 and IPv6 addresses.
  - iii. Use the Allowed IP Address to enter an IP address within the blocked IP address range that you give access to.
- There is also a MAC address tab, with an Enable checkbox and up to three Allowed MAC address fields.
- Check the box to enable Silent Mode for both IPv4 and IPv6. When Silent Mode is enabled, a TCP/Reset packet is not sent when an attempt to connect to an unbound port is made. When Silent Mode is disabled, the meter follows standard TCP/IP procedures for incoming connections to unused ports. This feature is useful in preventing hacking (attempted security intrusions).

**NOTES:**

- Contact your System Administrator for proper configuration.
  - See [Chapter 25: Firmware Updating, on page 25-1](#), for instructions on updating the legacy Network card's firmware. The Gen 2 INP100S card's firmware is updated via its webpage - see the *Shark® 270 Meter User Manual* for instructions.
3. From the Option Card menu, click DNP Support if you want to set up DNP over Ethernet for the Network Card. This screen lets you set up a DNP Server gateway for the Network Option card. This gateway enables DNP3 protocol communication over Ethernet, for the meter.
- You will see the screen shown below if you have the legacy INP100S

Shark270 [Serial Number: 0196665942, V-Switch: 5]

Update Device Retrieve Report Compare Open Save Options View Screens Help Exit Editor

Aggregator 1  
Aggregator 2  
Aggregator 3  
Aggregator 4  
Transformer / Line Loss Compensation: Disabled  
Time of Use: Enabled  
Pulse Factors  
Test  
Internal Accumulators  
CT & PT Compensation: Disabled  
Compensate CTs  
Compensate PTs  
Cold Load Pick-Up: Disabled  
Display  
View Meter Faceplate Screens  
Power Quality and Alarm Settings  
Limits  
Waveform / PQ  
Logs  
Configure Log Sizes  
Trending Profiles  
Historical Log Profile 1  
Historical Log Profile 2  
Historical Log Profile 3  
Historical Log Profile 4  
Historical Log Profile 5  
Historical Log Profile 6  
Option Card 1 - Network (INP100S)  
IP Address and DNS  
Services and Security  
**\* DNP3 Support: Enabled**

## DNP Support

### DNP3 Address

☒ Enable DNP3 Support

DNP3 Server Port: 20000

DNP3 Device Address: 1

☐ Single Socket Enforced

\*Check the box if unsolicited messages are supported by your DNP3 network. This setting permits only one socket for the Network Card, so there is a single path to send the unsolicited message.

### DNP3 Remote Address Range

IP Address Start: 0 . 0 . 0 . 0

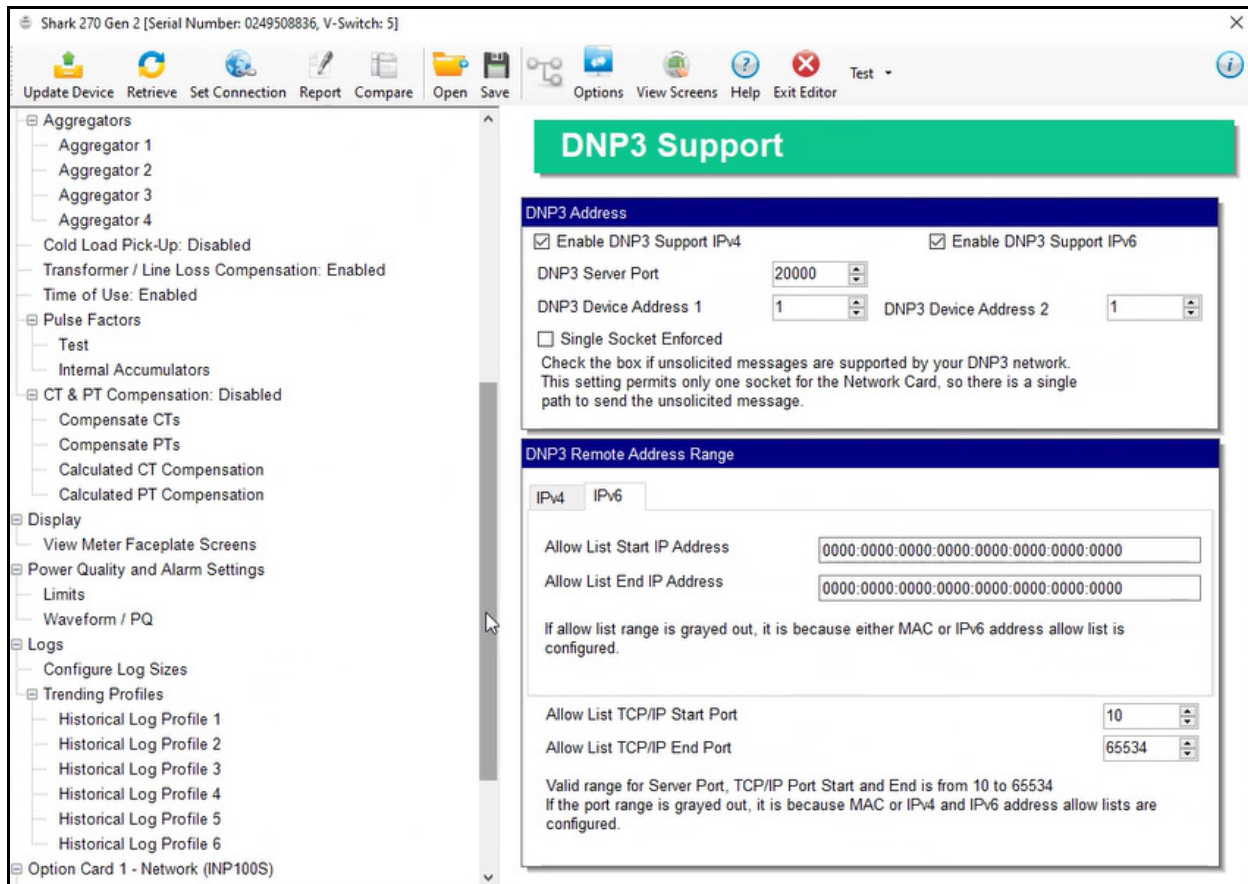
IP Address End: 0 . 0 . 0 . 0

TCP/IP Port Start: 10

TCP/IP Port End: 10

Note:  
1. Valid range for Server Port, TCP/IP Port Start and End is from 10 to 65534  
2. Valid range for IP addresses is from 0.0.0.0 to 255.255.255.255.  
3. IP Address Start must be lower or equal to the End.

- You will see the screen shown below if you have the Gen 2 INP100S card.



4. For both legacy and Gen 2 INP100S card's make these settings:

- Enable DNP Support: by default the DNP server support is disabled. Check the box to enable it. Once it is enabled, the other parameters can be entered.
- DNP Server Port: this is the TCP/IP port where the meter's Network card unit will be listening for incoming connections via the DNP protocol. Valid numbers are from 1 to 65535. We recommend that you set a value over 1024, because most of the lower numbers are reserved, or are already allocated to other popular services. If you set a port number of less than 10, the network card will set the port to its default, which is 20000.
- DNP Device Address: this is the meter's configured address (allowable setting is 1-65519).



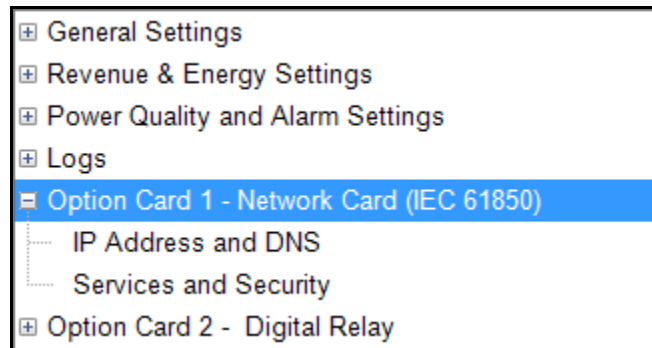
- d. Single Socket Enforced - check the box if unsolicited messages are supported by your DNP network. This setting permits only one socket for the Network card, so there is a single path to send the unsolicited message.
- e. DNP Remote Address Range: this setting implements Internet security by letting you specify a range of IP addresses that are authorized to connect to the DNP port. Any requester with an IP address outside of this range will be rejected.
  - For the legacy INP100S card, enter the range in the Remote Start Address and Remote End Address fields. To disable the IP range restriction, write 0.0.0.0 in the start field and 255.255.255.255 in the end field. An example of a range is 172.20.167.100 in the Remote Start Address field and 172.20.167.150 in the Remote End Address field. That would authorize connection to the DNP port for any IP address from 172.20.167.100 up to and including 172.20.167.150.
  - For the Gen 2 INP100S card, for IPv4 and IPv6, enter:
    - The Allow List Start and End IP Addresses if you want to set up a range of allowed IP addresses.
  - For the Gen 2 INP100S card, use the Allow List TCP/IP Start and End Ports to set an allowable range of communication ports. Communication using any ports outside of the Allowed range will be rejected. This setting is used by both IPv4 and IPv6.

**NOTE:** The DNP3 Allow List settings will not be available if IPv4, IPv6, or MAC allow lists have already been configured for the Gen 2 INP100S card.

- 5. To implement any changes to the Network card settings, click the Update Device icon to send the new profile to the meter.

### 26.5.2: Configuring an IEC 61850 Network Card (INP300S)

The IEC 61850 Network card INP300S gives the Shark® 270 meter Ethernet TCP/IP communication and an embedded IEC 61850 Protocol Server. The card's settings are the same as for the INP100S Network card described in [26.5.1: Configuring a Network Card \(INP100S\), on page 26-90](#), except that the Tree menu will say Option Card 1 - Network Card (IEC 61850) or Option Card 2 - Network Card (IEC 61850) (see example, below); there is no Enable Email Alarm/Notification option in the Service and Security settings screen, since alarm and notification email is not supported for the IEC 61850 Network card; and there is no DNP Support listed in the Tree menu, since the INP300S card does not support DNP3 protocol.



See the *Shark® 270 User Manual* for detailed instructions on the IEC 61850 protocol configuration for the INP300S card.

### 26.5.3: Configuring a Digital Relay Card (RO1S)

The RO1S card is a relay output/digital input card that can be used for a few purposes. The relay portion is used to send a control output when a limit is exceeded. The input portion can be used to either count KYZ pulse or detect the status of a circuit.

The Relay Output/Digital Input Option Card has:

- Two relay contact outputs for load switching
- Two wet/dry contact sensing digital inputs.

Accumulators in the CommunicatorPQA® software count the transitions of the Inputs and Outputs. For technical specifications and hardware installation, refer to the meter's Installation and Operation Manual. The Input accumulators can be used in aggregators - see [26.2.8: Aggregators Setting, on page 26-67](#).

**NOTE:** When installing a Relay Output/Digital Input card, we recommend you reset the accumulators for the card, in order to prevent erroneous counts. See [Chapter 20: Other Functions and Screens, on page 20-1](#). for instructions on using the Reset Shark® Information screen to reset card accumulators.

**Example:**

An example use of the optional Relay Card is in monitoring the status of circuit breakers or relays in your electrical system. The two status inputs could be used to monitor two circuit breakers, and the two relay outputs could be used to sound an alarm upon the occurrence of a programmed out of limit condition.

1. From the Option Card 1 - Digital Relay or Option Card 2 - Digital Relay menu, click Inputs. Use this screen to assign labels and functions to the Inputs.

**Digital Input**

Input ID	Assigned Channel	Trigger	Accumulator		
			Unit/Count	Compression	Label
1	Status Only	None	1.8000	1	Acc1_Label
2	Status Only	None	1.8000	1	Acc2_Label

Note: The Compression field is used to adjust how high an accumulator will go before rolling over. If the Compression is set to 1, each time a Pulse/State change occurs, the accumulator count will increment by 1. If the Compression is set to 10, each 10 Pulses/State changes occur, the accumulator count will increase by 1.

Note: High Speed Triggers can only be assigned to one Digital Input

**Input Labels**

Input	Label	Open Label	Closed Label
1	Input1	Input1_Open	Input1_Closed
2	Input2	Input2_Open	Input2_Closed

- b. For each of the two inputs, make a selection in the Assigned to field. The available selections are:

- Status Only - select this to use the digital inputs just to indicate if the state is open or closed.

- Accumulator - select this to use the digital input as a pulse counter. The accumulators can be used in an aggregator - see [26.2.8: Aggregators Setting, on page 26-67](#).
- Digital Input Log - select this to use the digital input to trigger an entry in the I/O change log.
- EOI Pulse - only one Input can be set to receive an EOI pulse.

**NOTES on End of Interval (EOI):**

- EOI is triggered in a device when the programmed condition is met. Only one Option Card input can be set to receive an EOI pulse. EOI is used for the following:
  - As a trigger for demand averaging: the received EOI pulse delineates an interval that results in demand averaging being performed. The minimum interval between received EOI Pulses used to trigger demand averaging should be 5 minutes. An EOI pulse allows the meter to be synchronized with an installed revenue meter, so that both meters are calculating Demand at the same time. When an Input is assigned to EOI, the demand interval is now the time between two received pulses.
  - For historical logging: when the EOI pulse is received, it causes any log that has been configured for EOI Pulse interval to capture a record. Refer to [26.4.2: Configuring Historical Logs, on page 26-82](#), for additional information on EOI Pulse and logging.



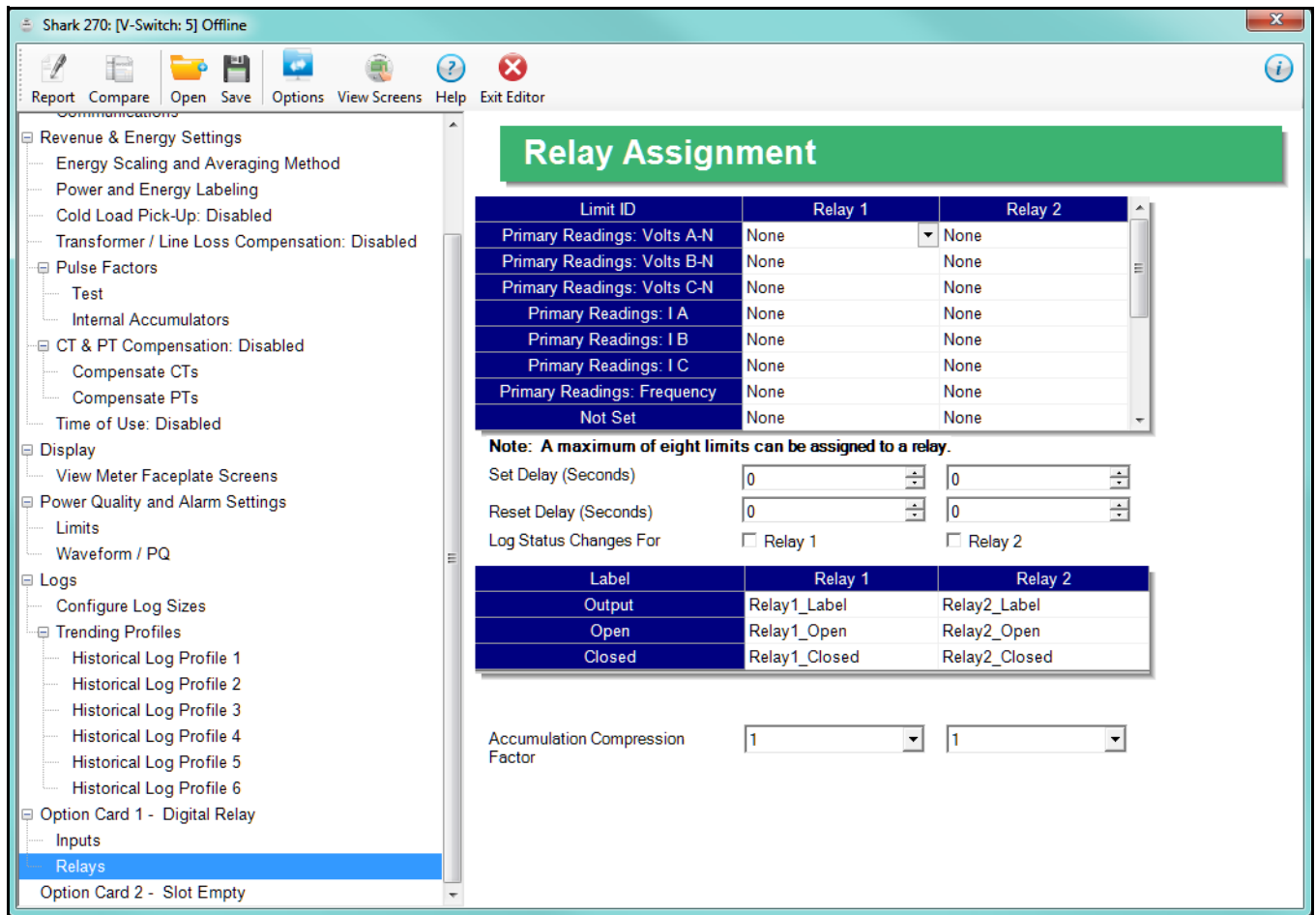
**IMPORTANT!** The EOI setting will affect Time of Use, if it is active for the meter. Instead of using the demand interval for TOU accumulations, TOU will perform automatic data usage accumulation and calendar actions (rate change, day type change, season/billing month self reads) based on the EOI input trigger. This can result in shorter or longer interval periods, depending on the EOI input timing, so the rate/day type/calendar actions may differ from what is expected.

c. Select Trigger from the pull-down menu. The Trigger you select depends on your Assigned to selection:

- For Status Only, select None.

- For Accumulator, select from Closing, Opening, High Speed Closing or High Speed Opening.  
**NOTE:** Only one accumulator can be assigned to a High Speed Trigger.
  - For Digital Input Log, select Change.
  - For EOI Pulse, select from Closing, Opening, or Change.
- d. Enter Units/Count. The Units/Count is the output ratio from the device that is being input into the Shark® 270 meter. For example, if you have a KYZ module that is outputting a pulse every 1.8 kWh, with the input set to Accumulator, Increment on Contact Opening, you would set the Units/Count to be the value of the KYZ; in this case either 1.8 or a ratio of that number.
- e. Enter Compression. The Compression Factor is used to adjust how high an accumulator will go before rolling over. For example, if you select a Compression Factor of 10, each time 10 Pulse/State changes occur, the accumulator count increments by 1. The available Compression Factors are: 1, 10, 100, 1000, 10000, and 100000. The default Compression Factor is 1.
- f. Enter a Label for the Accumulator.
- g. The current Input Labels are displayed in the screen. To change the Input Labels, click in the Labels field you want to change, and enter a new label. The fields that can be changed are:
- Input Label - Input ID
  - Open Label - Open state ID
  - Closed Label - Closed state ID

- From the Option Card - Digital Relays menu, click Relays to set the limits/alarm conditions and logging options for the card's Relay Outputs.



- Configure up to 8 output conditions for the two Relay Outputs. Note that the Limits used are configured in Power Quality and Alarm Settings>Limits (see [26.3.1: Configuring Limits, on page 26-73](#)).
- Set a Delay and Reset Delay for the Outputs.
- Choose to log Status Changes for each Relay Output.
- Assign each Output an Output Label, Open Label, and Closed Label, which are used when viewing the Relay Status Log.
- Assign an Accumulation Compression Factor for each output.



**IMPORTANT!** First use the Limits screen to set up the limits you want to assign to an Output. See [26.3.1: Configuring Limits, on page 26-73](#), for instructions.

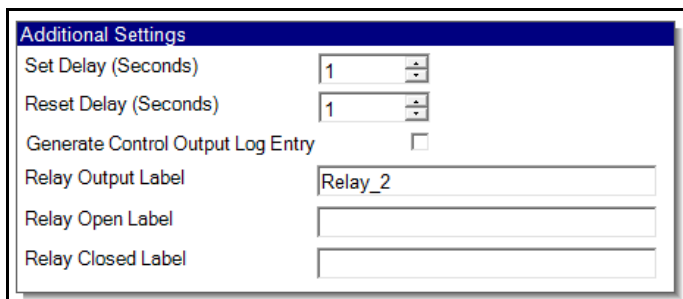
- a. The available limits appear in the Limit ID column. You can assign the limit to one or both (or neither) of the Relay Outputs.
  - Select the output condition from the pull-down menu next to the Limit ID. The options are: Above (the Output is triggered when the Above Limit condition occurs), Below (the Output is triggered when the Below Limit condition occurs), or None (no limit set condition set).

**NOTE:** A relay operates when any one assigned Limit is tripped, and stays in the Set condition as long as one Limit is in the Alarm state. To assign a limit to an Output relay:

- b. You can enter Set Delay and/or Reset Delay. These values are the delay before the Output is changed: Set is when the common is shorted to Normal Open (this is the Set Condition), Reset is when the Output is shorted (closed).
- c. Check the box next to Log Status Change if you want to log output status changes for either or both Relay. See [Chapter 19: Viewing Logs, on page 19-1](#), for information on the I/O Change Log.
- d. The current relay condition labels are displayed in the screen. These labels are used for logging. To change the labels, click in the Labels field you want to change, and enter a new label. The fields that can be changed are:
  - Output label for relays 1 and 2.
  - Open label for relays 1 and 2.
  - Closed label for relays 1 and 2.



- e. If you want, select Set Delay and Reset Delay from the pull-down menus in Additional Settings. You can choose between 0 and 255 seconds. Use these fields if you want to program a delay before the relay is set, or before it is reset



Additional Settings	
Set Delay (Seconds)	1
Reset Delay (Seconds)	1
Generate Control Output Log Entry	<input type="checkbox"/>
Relay Output Label	Relay_2
Relay Open Label	
Relay Closed Label	

- f. The Relay Output label is the default, but you can change it.
- g. You can enter a name for the Relay Open Label and Relay Closed Label.
3. To implement any changes to the Relay Output/Digital Input card settings, click the Update Device icon to send the new profile to the meter.

#### 26.5.4: Configuring a Digital Input/Pulse Output Card (PO1S)

The PO1S is a pulse output/digital input card that is similar to the Digital Relay card RO1S, except that the PO1S contains 4 KYZ pulse output contacts instead of relay control outputs. These solid state output contacts can be configured to have the meter pulse out for user-assigned energy values. The Pulse Output/Digital Input Option Card has:

- Four Pulse Outputs via solid state contacts
- Four wet/dry contact sensing digital inputs.

Accumulators in the CommunicatorPQA® software count the pulses of Inputs and Outputs. For technical specifications and hardware installation, refer to the meter's Installation and Operation Manual. The Input accumulators can be used in aggregators - see [26.2.8: Aggregators Setting, on page 26-67](#).

**NOTE:** When installing a Pulse Output/Digital Input card, we recommend you reset the accumulators for the card, in order to prevent erroneous counts. See [Chapter 20: Other Functions and Screens, on page 20-1](#), for instructions on using the Reset Shark® Information screen to reset card accumulators.

**Example:**

An example use of the Pulse Output/Digital Input Card is in a sub-metering application where a pulse output is needed. The Input Accumulator allows you to count the pulses from another device, for example, a KYZ module or another meter. The Output Accumulators allow you to count the pulses being output by the card.

1. From the Option Card 1 or Option Card 2 - Digital In/Pulse Out (PO1S), click Inputs. Use this screen to assign labels and functions to the Inputs.

**Digital Input**

Input ID	Assigned Channel	Trigger	Accumulator		
			Units/Pulse	Compression	Label
1	Status Only	None	1.8000	1	Accumulator 1
2	Status Only	None	1.8000	1	Accumulator 2
3	Status Only	None	1.8000	1	Accumulator 3
4	Status Only	None	1.8000	1	Accumulator 4

Note: The Compression field is used to adjust how high an accumulator will go before rolling over. If the Compression is set to 1, each time a Pulse/State change occurs, the accumulator count will increment by 1. If the Compression is set to 10, each 10 Pulses/State changes occur, the accumulator count will increase by 1.

Note: High Speed Triggers can only be assigned to one Digital Input

**Input Labels**

Input	Label	Open Label	Closed Label
1	Input 1	Input1_Low	Input1_High
2	Input 2	Input2_Low	Input2_High
3	Input 3	Input3_Low	Input3_High
4	Input 4	Input4_Low	Input4_High

2. Make a selection in the Assigned to field. The available selections are:

- Status Only - select this to use the digital inputs just to indicate if the state is open or closed.

- Accumulator - select this to use the digital input as a pulse counter. The accumulator can be used in an aggregator - see [26.2.8: Aggregators Setting, on page 26-67](#).
- Digital Input Log - select this to use the digital input to trigger an entry in the I/O change log.
- EOI Pulse - only one Input can be set to receive an EOI pulse.

**NOTES on End of Interval (EOI):**

- EOI is triggered in a device when the programmed condition is met. Only one Option Card input can be set to receive an EOI pulse. EOI is used for the following:
  - As a trigger for demand averaging: the received EOI pulse delineates an interval that results in demand averaging being performed. The minimum interval between received EOI Pulses used to trigger demand averaging should be 5 minutes. An EOI pulse allows the meter to be synchronized with an installed revenue meter, so that both meters are calculating Demand at the same time.
  - For historical logging: when the EOI pulse is received, it causes any log that has been configured for EOI Pulse interval to capture a record. Refer to [26.4.2: Configuring Historical Logs, on page 26-82](#), for additional information on EOI Pulse and logging.



**IMPORTANT!** The EOI setting will affect Time of Use, if it is active for the meter. Instead of using the demand interval for TOU accumulations, TOU will perform automatic data usage accumulation and calendar actions (rate change, day type change, season/billing month self reads) based on the EOI input trigger. This can result in shorter or longer interval periods, depending on the EOI input timing, so the rate/day type/calendar actions may differ from what is expected.

3. Select Trigger from the pull-down menu. The Trigger you select depends on your Assigned to selection:

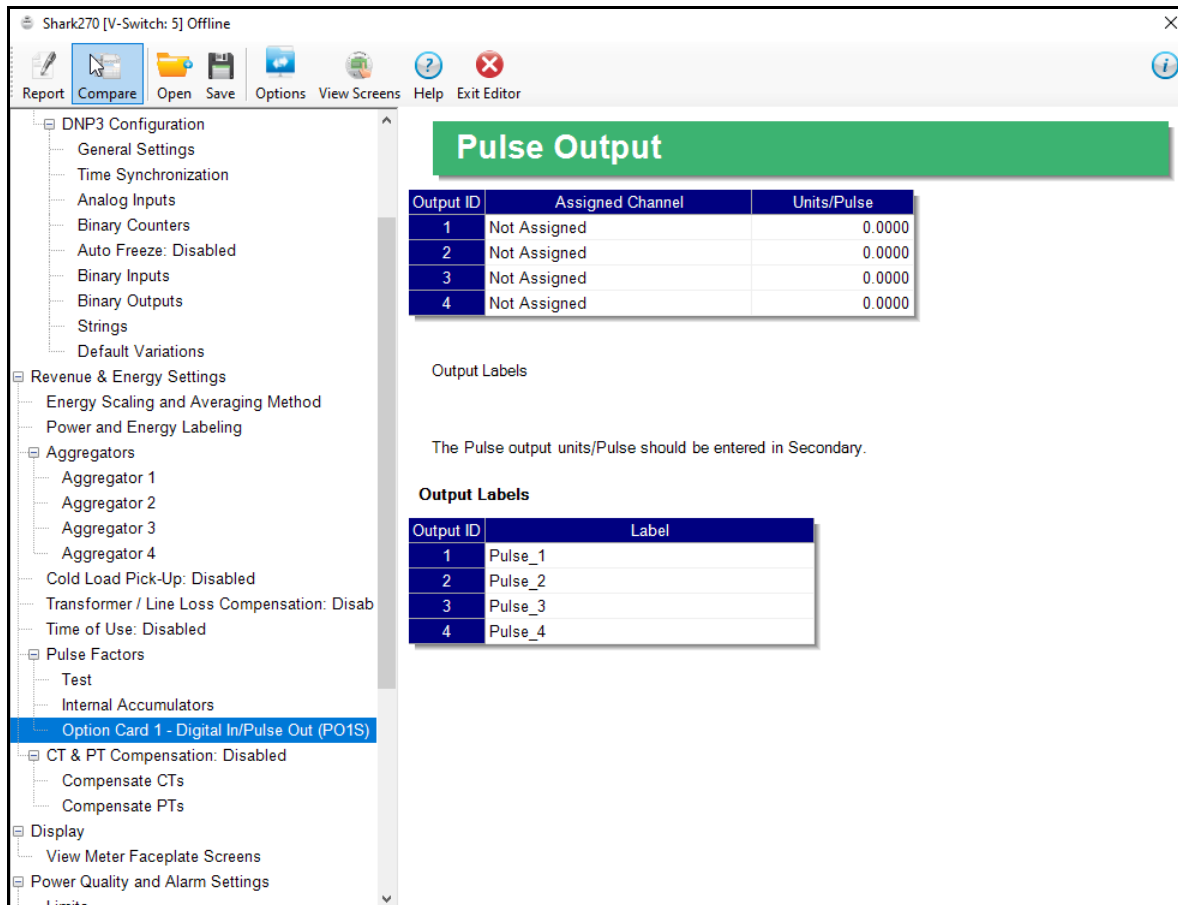
- For Status Only, select None.

- For Accumulator, select from Closing, Opening, High Speed Closing or High Speed Opening.

**NOTES:**

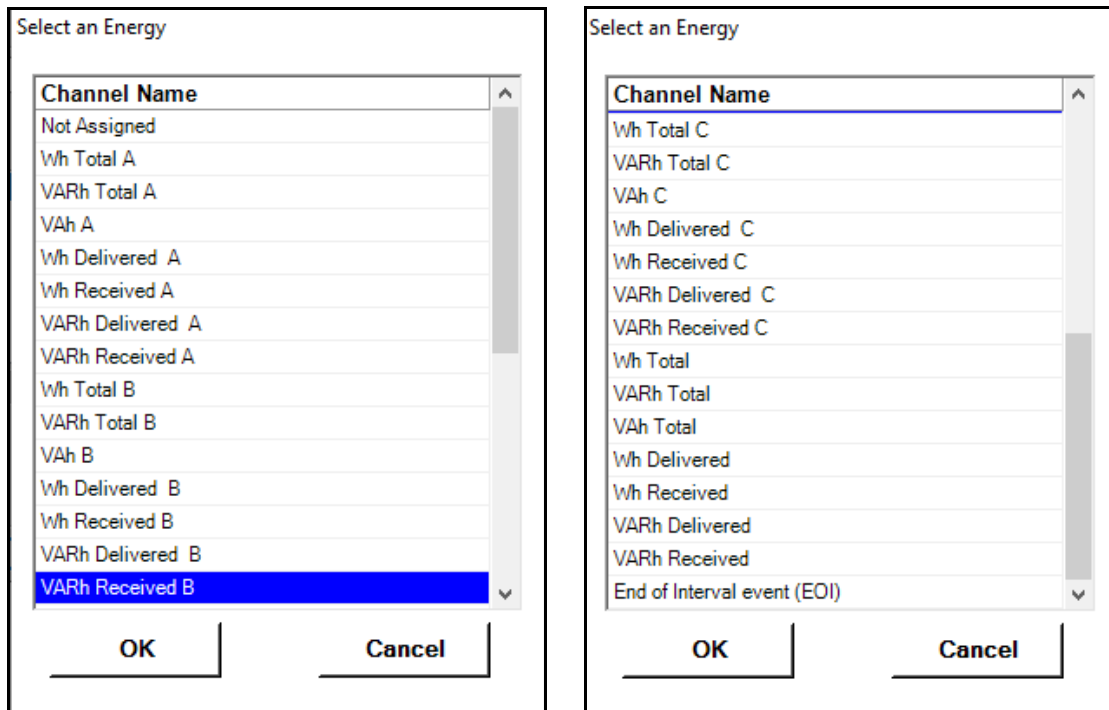
- Only one accumulator can be assigned to a High Speed Trigger.
  - High speed opening and closing would be used when monitoring pulses from water meters that can be pulsing very quickly.
- For Digital Input Log, select Change.
  - For EOI Pulse, select from Closing, Opening, or Change.
4. Enter Unit/Pulse. The Unit/Pulse is the output ratio from the device that is being input into the Shark® 270 meter. For example, if you have a KYZ module that is outputting a pulse every 1.8 kWh, with the input set to Accumulator, Increment on Contact Opening, you would set the Units/Count to be the value of the KYZ; in this case either 1.8 or a ratio of that number.
  5. Enter Compression. The Compression Factor is a divider used to adjust how high an accumulator will go before rolling over. For example, if you select a Compression Factor of 10, each time 10 Pulse/State changes occur, the accumulator count increments by 1. The available Compression Factors are: 1, 10, 100, 1000, 10000, and 100000. The default Compression Factor is 1.
  6. Enter a Label for the Accumulator.
  7. The current Input Labels are displayed in the screen. To change the Input Labels, click in the Labels field you want to change, and enter a new label. The fields that can be changed are:
    - Input Label - Input ID
    - Open Label - Open state ID
    - Closed Label - Closed state ID

8. You program the PO1S pulse outputs in the Revenue & Energy Settings>Pulse Factors>Option Card (1 or 2)- Digital In/Pulse Out (PO1S).



- You assign an energy channel, a units/pulse number, and a label for each of the four outputs.

9. Double-click an Assigned Channel field to open the Energy selection menu. Scroll to see all of the options.



10. Click on the energy value you want to use, "Not Assigned" if you are not using that output, or "End of Interval" if the output is being assigned to an EOI pulse.
11. Click OK. The channel you chose is displayed in the Assigned Channel field. For all energy channels, the default Units/Pulse value (1.8) is also displayed. You can edit this field by double-clicking in it.
- The units/pulse should be entered in secondary, i.e., the readings in the meter. E.g., for a three-phase meter with 600 W per element for a total of 1800 W the Units/Pulse field will be 1.8. Every 1.8 Wh, the count will accumulate by 1, and each count will represent 1.8 Wh. If you are using CTs with a ratio of 1000 to 1 the count will still increment every 1.8 Wh, but the count in that case will represent 1.8 Wh x 1000, or 1800 Wh.
12. The default output labels are displayed in the Labels field. To change an output label, click in the field and enter the new label.
13. To implement any changes to the Pulse Output/Digital Input card settings, click the Update Device icon to send the new profile to the meter.

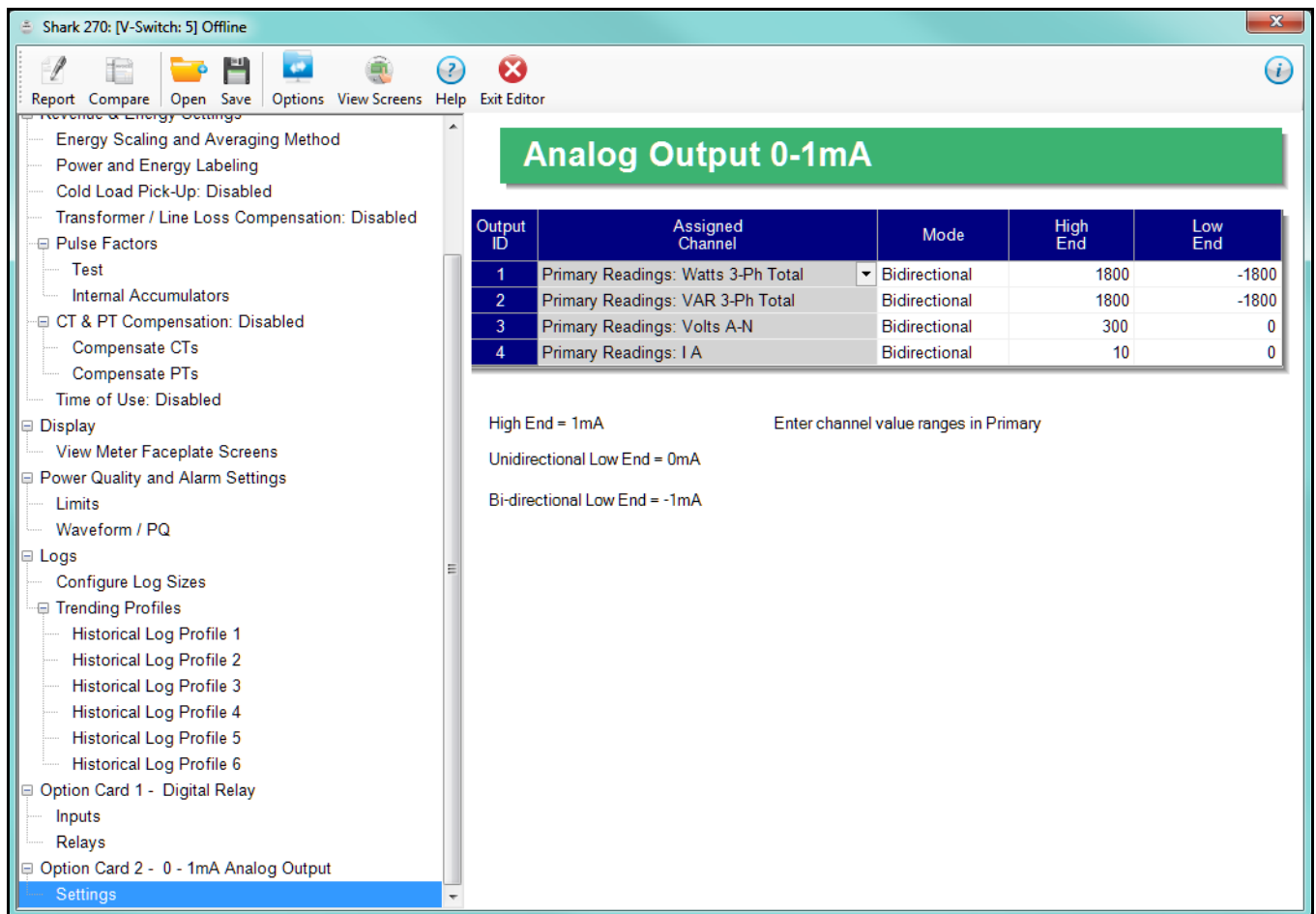
### 26.5.5: Configuring a 0-1 mA Output Card (1mAOS)

The 1mAOS is an analog output card, which transmits a standard, bidirectional 0-1 milliamp signal proportional to the value selected. This card mimics an analog transducer. With the Shark® design, the user can select any measured parameter to output on an analog transducer signal. For technical specifications and hardware installation, refer to the meter's Installation and Operation Manual.

#### Example:

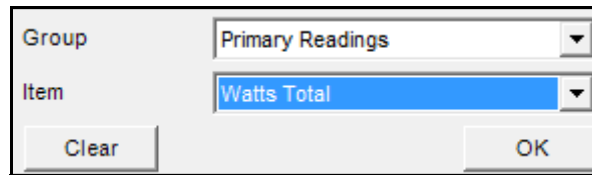
An example use of the optional 0-1 mA Output Card is in enabling the Shark® 270 meter to communicate with an RTU.

1. From the Option Card 1 - 0-1 mA Analog Output or the Option Card 2 - 0-1 mA Analog Output menu, click Settings.



You can set up to four Output IDs for your Output Card.

2. Double-click an Assigned Channel field to add or edit an Output ID. You will see the window shown below.



The screenshot shows a small dialog box with a light gray background. It contains two labels, 'Group' and 'Item', each followed by a dropdown menu. The 'Group' dropdown is currently showing 'Primary Readings'. The 'Item' dropdown is showing 'Watts Total' and has a blue highlight. At the bottom of the dialog, there are two buttons: 'Clear' on the left and 'OK' on the right.

3. Select Group for your Output Channel. The available selections are as follows:
  - Primary Readings
  - Secondary Readings
  - THD
  - Uncompensated Readings
  - Maximums
  - Minimums
4. Select Item for your Output Channel. The items are the available readings for the group you selected. For example, as shown in the window above, Watts Total is an item you can select when you have selected Primary Readings as the group.
5. Click OK. The Output Channel you selected is displayed in the Assigned Channel field.
6. Enter Low End and High End for the channel.

**NOTE:** For the Item selected for the Assigned Channel, the Output Card takes the value in the meter and outputs a DC current within its range. The Low End is the lowest value, and the High End is the highest value. For example, for VOLTS A-N and Bidirectional Mode, at Nominal of 120 V, the Low End is set to 115 V and the High End is set to 125 V. The Analog Output Card will output -1 mA when the reading is 115 V, 0 mA when the reading is 120 V, and 1 mA when the reading is 125 V. The analog card can output below -1 mA and above +1 mA, proportionally to VOLTS A-N. For limiting values refer to the meter's Installation and Operation Manual's applicable section.



7. You can select either Unidirectional or Bidirectional for Mode. Unidirectional mode is used for unsigned data, e.g., voltage; and bi-directional mode is used with signed data, e.g., Watts.
8. To implement any changes to the 0-1 mA Output card settings, click the Update Device icon to send the new profile to the meter.

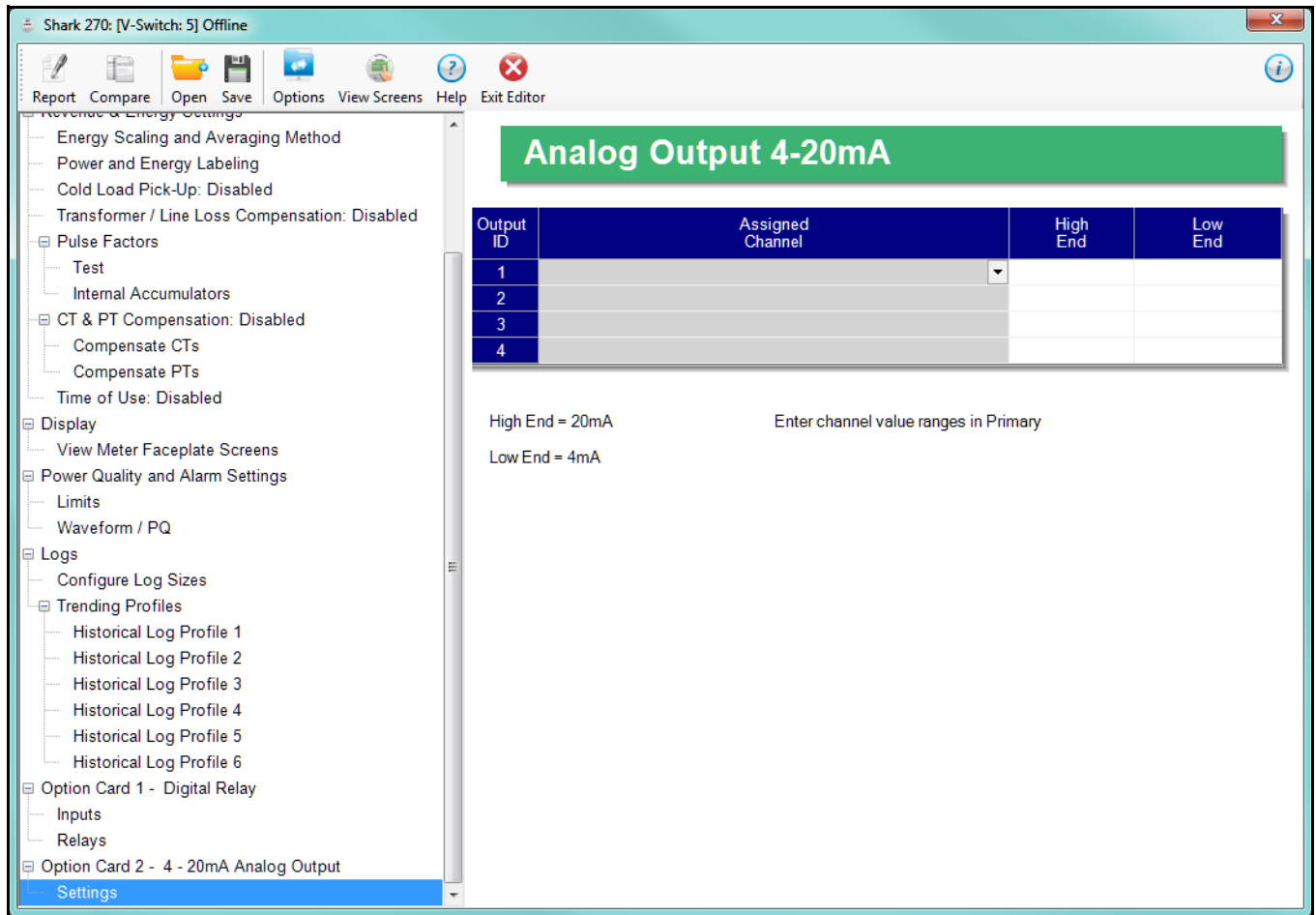
### 26.5.6: Configuring a 4-20 mA Output Card (20mAOS)

The 20mAOS is an analog communication card, which transmits a standard, unidirectional 4-20 milliamp signal. For technical specifications and hardware installation, refer to the meter's Installation and Operation Manual.

**Example:**

An example use of the optional 4-20 mA Output Card is in enabling the Shark® 270 meter to communicate with an RTU.

1. From the Option Card 1 - 4-20 mA Analog Output or the Option Card 2 - 4-20 mA Analog Output menu, click Settings.

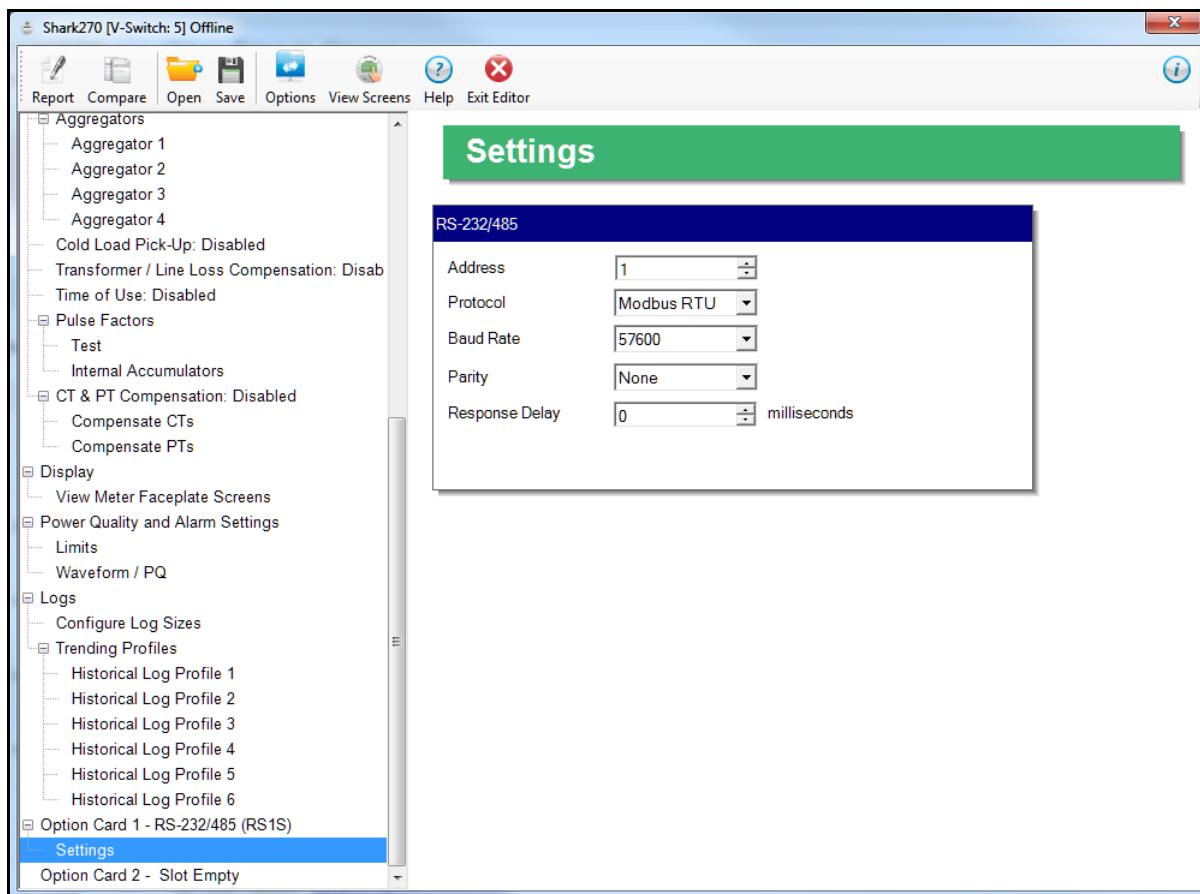


2. Follow the instructions for configuring the 0-1 mA Card. The configuration of a 4-20 mA Card is the same as a 0-1 mA Card, except that this card can only be unidirectional, so there is no Mode setting, and the High End and low end are 20 mA and 4 mA, respectively.

### 26.5.7: Configuring an RS232/RS485 Card (RS1S)

The RS1S card lets you add an RS232 or RS485 serial connection to the meter.

1. From the Option Card 1 - RS232/RS485 or the Option Card 2 - RS232/RS485 menu, click Settings.



2. Use this screen to make the following settings for the card:

- Address: 1 - 247 (Modbus); 1-65520 (DNP).
- Protocol: Modbus RTU; Modbus ASCII; DNP3.
- Baud Rate: 9600; 19200; 38400; 57600.
- Parity: None, Odd, Even.
- Response Delay (msec): the suggested delay is 50 msec, but you can increase the delay, if necessary.

3. To implement any changes, click the Update Device button to send the new profile to the meter.

### 26.5.8: Configuring a Verizon 4G Cell Modem Card (4GLTE)

The 4GLTE card lets you add a Verizon-certified 4G LTE<sup>1</sup> communication option to the meter. When this option is ordered, the card comes pre-installed in a Shark® 270 socket form meter. However, the card must be commissioned before use. Instructions for this are given in Chapter 14 of the *Shark® 270 Meter User Manual*, available on EIG's website: [www.electroind.com](http://www.electroind.com).

You can access the 4GLTE card's status, including SIM card and IMEI card numbers, by clicking Tools>4GLTE Cell Modem Status and you can update the card's firmware by clicking Tools>4GLTE Cell Modem Firmware Update. These actions are described in chapters 20 and 25, respectively.

1. Click Option Card 2 - 4G Cell Modem (4GLTE)>Settings.

2. On this screen, you can specify the Modbus server port (the default is 502).
3. Select the number of minutes you want for the Inactivity Reset Timer field, from the pull-down menu. This timer is used to prevent keeping the connection open unnecessarily, e.g, if there is a network communication error. After this amount of time with no data activity, the cell modem will close the connection and initiate a soft reset.

1. LTE is a trademark of ETSI.

4. Select the number of minutes you want for the Connection Inactivity Reset Timer, from the pull-down menu or enter the number in the field. The available setting is from 60 to 65535 minutes. This timer is used to reset the modem if there is a problem with its connection to the carrier's system. To use this setting, enter an amount of time that is greater than your usual connection time; e.g., if you connect every six hours, set this field to 6 1/2 or 7 hours (390 or 420 minutes); if you connect once a day, set it to 25 hours (1500 minutes). Then if you are not able to connect due to a problem with the cell modem's connection to the carrier's system, this timer will cause the modem to reset. Resetting the modem should restore its connection to the carrier's system and you will be able to connect to the modem.

5. APN: enter the APN number given to you by your provider.

**IMPORTANT!** Be careful when entering the APN, making sure to copy any characters, numbers, and/or punctuation symbols exactly. Failure to do so can lead to communication and connection problems.



6. Allowed List: you can enter an IP address or specify a range of addresses. These IP addresses will be able to connect to the 4GLTE card.

**NOTE:** It is important to set up this feature if you are not on a private network, to ensure there is no unwanted communication with the cell modem and meter.

To enter a range of addresses, use an asterisk as a wildcard. For example:

192.25.6.\*

All valid IP addresses beginning with 192.25.6 will be allowed access.

**IMPORTANT!** Make sure you enter the IP address correctly.



7. Click Update Device to save your settings.

**NOTE:** To connect to your meter using the 4GLTE, enter its IPV4 address in the Network Connect screen - see [3.2.2: Connect through a Network, on page 3-9](#). You can find the 4GLTE's IPV4 address either through the Cell Modem Status screen (from the CommunicatorPQA® application's Main screen, click Tools>4GLTE Cell Modem Status - see [20.1.20: 4GLTE Cell Modem Status \(Shark® 270 Meter\), on page 20-58](#)) or from the meter's display.

### 26.5.9: IRIG-B & Pulse Outputs Card (IRG1)

The IRG1 card enables IRIG-B communication for Gen 2 meters. You select IRIG-B as the time synchronization method in the Time Settings screen - see [26.1.2: Configuring Time Settings, on page 26-5](#).

The IRG1 card does not need any IRIG-B settings. The Pulse Outputs in the card have the identical settings as the Pulse Outputs in the PO1S card - see [26.5.4: Configuring a Digital Input/Pulse Output Card \(PO1S\), on page 26-109](#) for instructions on programming the pulse outputs. Access the IRG1 pulse output settings screen by clicking Option Card 1 or 2>Pulse Outputs.

#### NOTES:

- The card's IRIG-B implementation is compatible with all eight schemas for time synchronization, but control functions are not supported by the meter.
- The SBS field included in some schema is not used by the meter.

## 26.6: Display Setting

The Shark® 270 meter has an embedded LCD display that contains display screens in 3 Modes (a Mode consists of screens that will display in order). The meter comes programmed with pre-defined screens, but the Shark® 270 meter gives you the ability to edit the pre-defined screens and/or to create custom screens for the display, letting you match the display screens to any application needs you have. Through the Display setting in the Device Profile, you can:

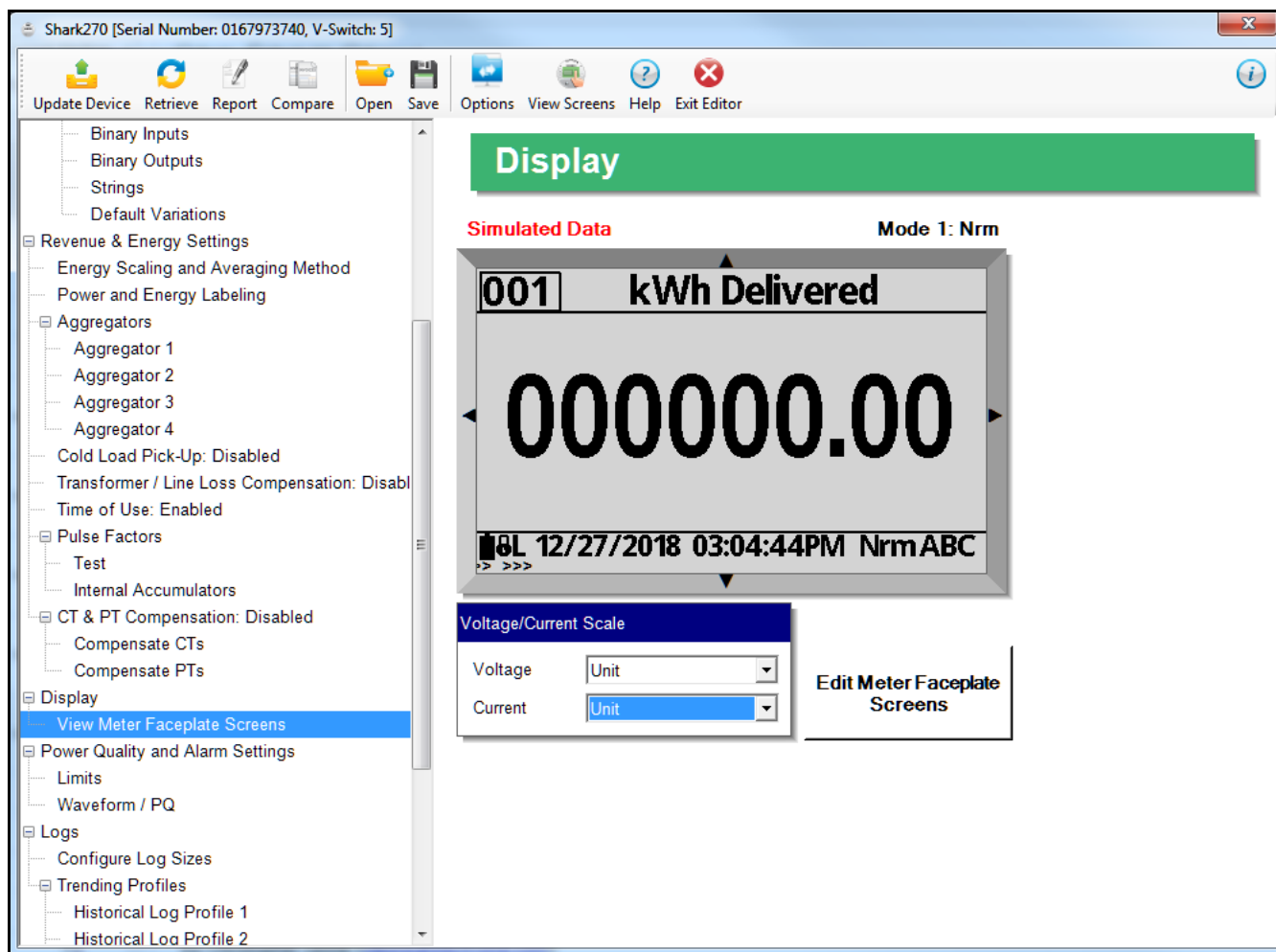
- Customize the meter's LCD screens to display any measured readings.
- Add the pre-defined and custom screens to one of the Modes, and arrange the order of display of the screens (see [26.6.2: Meter Screen Designer, on page 26-125](#), for instructions).
- Customize the LCD display for any application. Additional features are as follows:
  - You can add screen numbers and/or labels (titles).
  - You can create a customized “look” for the screens.
  - You can add text and lines.
  - You can use the screens to view data from pulse inputs, such as water, gas, steam, etc.

The Shark® 270 meter up to 12888 bytes of memory to be used by display screens.

**NOTE:** Gen 2 meters offer the option of setting custom display multipliers for energy readings. See [26.8: Custom Display Multipliers, on page 26-148](#) for instructions.

### 26.6.1: View Meter Faceplate Screens

1. From the Tree Menu, double-click Display. You will see the View Meter Faceplate Screens.

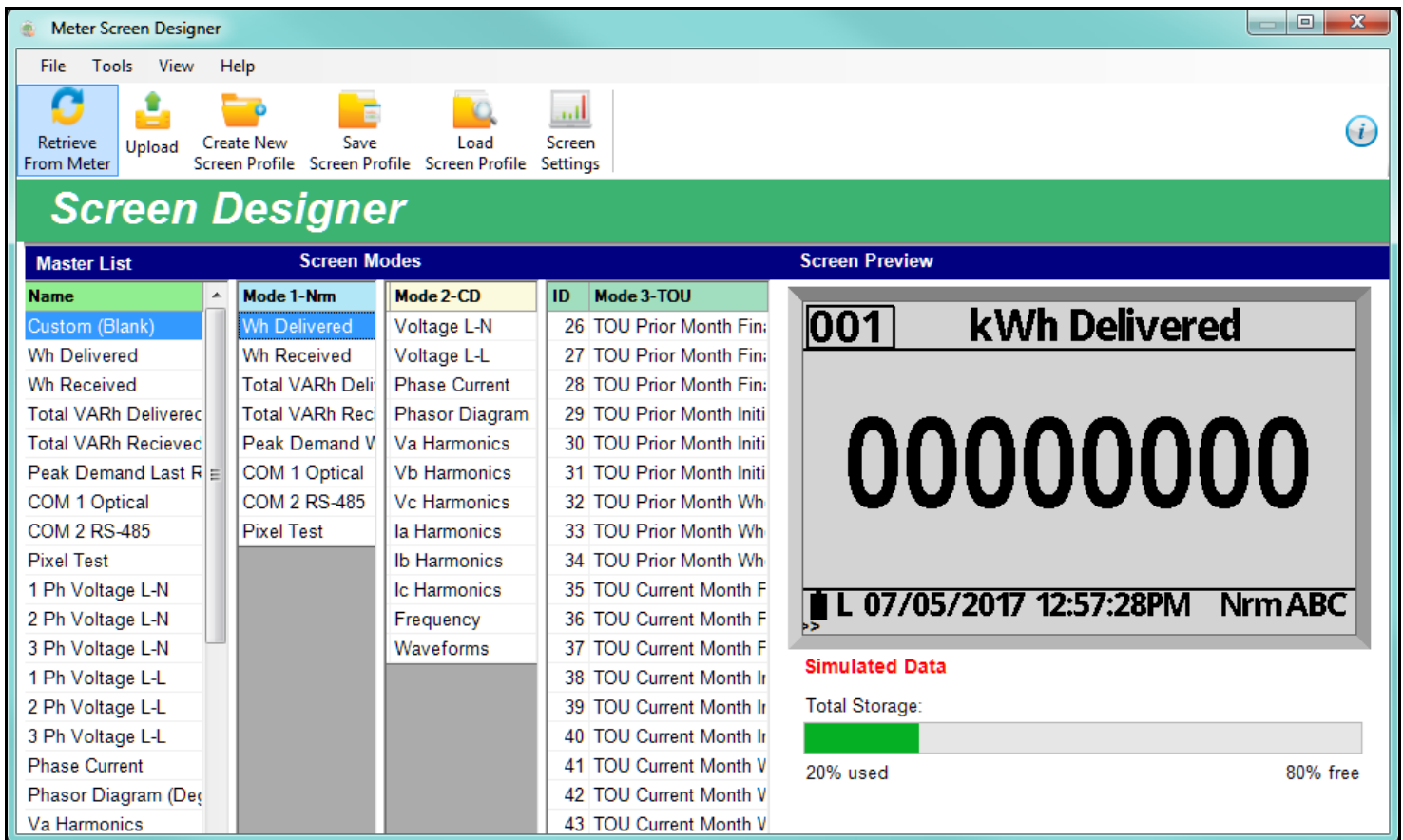


2. All of the screens can be viewed using the arrows. These screens have been loaded from the connected meter.
  - Use the right arrow to view screens for the next Mode, and the left arrow to view screens for the previous Mode.
  - Use the top arrow to view the next screen in the current Mode, and the bottom arrow to view the previous screen in the current Mode.
3. Click Edit Meter Faceplate Screens to launch the Screen Designer screens. Continue to the next section.



## 26.6.2: Meter Screen Designer

When you click Edit Meter Faceplate Screens you will open the Meter Screen Designer Main screen.

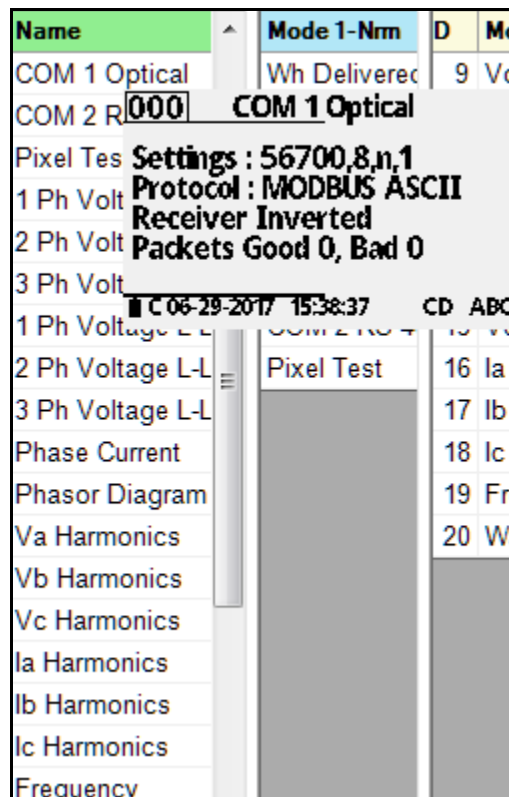


The screens listed here have been uploaded from the currently connected meter's Screen Profile. A Screen Profile consists of the display screens and their Mode assignments. From this screen you can create a new Screen Profile, edit or add to the screens in the current Screen Profile, or upload an existing Screen Profile and make changes to it. Once you are done, you can save the Screen Profile changes and upload them to the meter, if you wish. Note that you can save a Screen Profile and later upload it to a different meter or meters. Just connect to the meter and follow the instructions for uploading a Screen Profile (see [26.6.5: Additional Commands, on page 26-144](#)).

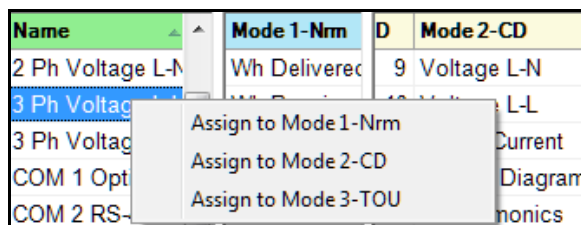
1. The Screen Designer Main lets you assign screens to the three Modes.

- All of the available screens, pre-defined and custom, are listed on the left side of the screen in the Master List column.

- The three Modes are listed in the remaining columns. Under each of the Modes are the screen assigned to that Mode. The three Modes are:
  - Mode 1: Nrm, Normal Mode.
  - Mode 2: CD, Circuit Diagnostic Mode.
  - Mode 3: TOU, TOU Mode.
- Use the scroll bars to display all of the items in the columns. You can also adjust the width of the Mode columns by clicking on the vertical lines between the Mode columns and moving to the right or left.
- The Preview screen shows the screen currently highlighted in one of the Modes (the Master List screens are not previewed). Note that the data in the screen is simulated, not actual data from the meter.
- The Total Storage bar tells you the percentage of storage memory used and the percentage still free.
- If you hover your cursor over one of the screen names, you will see a small image of that screen.



2. To move a screen from the Master List screen to one of the Modes, click on it and drag it to where you want it.
  - You can also drag screens from one Mode to another Mode, or to the Master List, which will remove the screen from its display Mode, i.e., it will not be displayed on the meter.
  - Note that if you drag the screen to an entry, it will be placed below that entry.
  - You can change the order of display of the screens in a mode, by clicking and “dropping” them where you want them.
  - The number that is shown next to the screen is its assigned number - either as a default screen or as a custom screen. There is a renumbering option - see [26.6.5: Additional Commands, on page 26-144](#), for instructions.
  - You can also right-click on a screen in the Master List and select the View Mode you want to assign it to.



3. For each of the Modes, you can edit the Mode Tag, Title Line 1, and Title Line 2 fields. You can also select the transition time between screens and timeouts for screens. To do so:

- a. Either click the Screen Settings icon at the top of the screen, or select Tools>Screen Settings from the Title menu.

**Settings**

Screen Transition Time  seconds

CD Timeout  minutes

TOU Timeout  minutes

Screen Freeze Time  seconds

Back Light On Time  seconds

**Mode Labels**

	Mode 1	Mode 2	Mode 3
Mode Tag	<input type="text" value="Nrm"/>	<input type="text" value="CD"/>	<input type="text" value="TOU"/>
Title Line 1	<input type="text" value="Normal Mode"/>	<input type="text" value="Curcuit Diag"/>	<input type="text" value="Time Of Use"/>
Title Line 2	<input type="text" value="Readings"/>	<input type="text" value="Unit Info"/>	<input type="text" value="Month-Season"/>

☐ Show Layout Configuration

- b. The values shown in the screen can be changed:

- Screen Transition Time: select the number of seconds each screen should remain before scrolling to the next screen in the Mode (1-300).
- CD (Mode 2) Timeout: select the number of minutes the display will stay in Mode 2 before going to Mode 3 (1-300).
- TOU (Mode 3) Timeout: select the number of minutes the display will stay in Mode 3 before returning to Mode 1 (1-300).
- Screen Freeze Time: select the number of seconds a screen should remain in hold (1-300). You can place a screen in hold by holding a magnet over the reed Mode switch (see the *Shark® 270 Meter's Installation and Operation Manual* for details).
- Back Light On Time: select the number of seconds the LCD backlight should stay on (1-300).
- Mode Labels: you can enter new names for the Modes, and their titles lines.

- **Show Layout Configuration:** check this box to set up preset alignments for the screens. Preset alignments are screen positions that are saved, so that you can use them multiple times. This makes it easy for you to create screens with the same format. By default, this box is unchecked. When you check it, the screen shows additional information, as shown below.

**Settings**

Screen Transition Time: 7 seconds  
 CD Timeout: 5 minutes  
 TOU Timeout: 5 minutes  
 Screen Freeze Time: 30 seconds  
 Back Light On Time: 30 seconds

**Mode Labels**

	Mode 1	Mode 2	Mode 3
Mode Tag	Nrm	CD	TOU
Title Line 1	Normal Mode	Circuit Diag	Time Of Use
Title Line 2	Readings	Unit Info	Month-Season

☒ Show Layout Configuration

**Preset Alignments**

	Label	Reading	Unit of Measure
1	8	80	340
2	4	88	338
3	40	100	290
4	0	0	0
5	0	0	0
6	0	0	0
7	0	0	0
8	0	0	0

\* The values in the grid will affect all screens in the meter which are using the preset alignments.

**Preview**

000 Example

Van 600.0V

C 06-29-2017 16:30:54 Nrm ABC

Label: Van Font Size: Small  
 Unit of Measure: V Reading: Voltage

Help Load Defaults Cancel Apply

- In the Preset Alignments box, you can set up to 8 screen positions (preset alignments 1 to 8). The default preset alignments are shown in the table. The Preview screen shows you the position of any preset alignment you click on.
- For each of the preset alignments, you enter a position for the Label, or Prefix, e.g., Van; the Reading, e.g., voltage; and for the Unit of Measure, e.g., V.

iii. You set the position of the Label, Reading, and Unit of Measure by clicking in the field and using the up and down arrows to enter an "x" position. (You can also type the number into the field.) You will see the fields in the preview screen move in response to your selections. See the example below.

Preset Alignments			
	Label	Reading	Unit of Measure
1	8	80	340
2	4	88	338
3	40	100	290
4	50	125	320
5	0	0	0
6	0	0	0
7	0	0	0
8	0	0	0

\* The values in the grid will affect all screens in the meter which are using the preset alignments.

Label   
Unit of Measure

Font Size   
Reading

000

Example

Van

0.000V

C 28/08/2017 03:58:48PM NrmABC

Note that the Preview screen will display the values in the Label, Font Size, Unit of Measure, and Reading fields located under it. However, these are just examples to help you set up the positions. What you are saving is the actual "x" position on the screen.

iv. To use one of the preset alignments in a custom screen, you will select it when you set the "x" coordinate. See [26.6.4: Display Screen Items, on page 26-136](#), for instructions.

- Click Apply to implement your changes, Cancel to close the window without changing any screen settings, Help to open instructions for the screen; or Load Defaults to set all of the fields to their initial, (default) values.

5. The top of the Meter Screen Designer Main screen has both an Icon Bar and a Menu Bar.

- The Icon Bar gives you the following options:



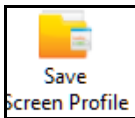
Retrieve the current Screen Profile, consisting of the display screens and the Modes, from the meter.



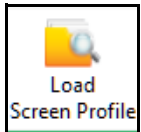
Upload the new Screen Profile to the meter.



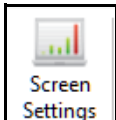
Create a new Screen Profile. This removes all of the screens from the Modes to let you set up a completely new Screen Profile.



Save the new or revised Screen Profile to a location on the PC.

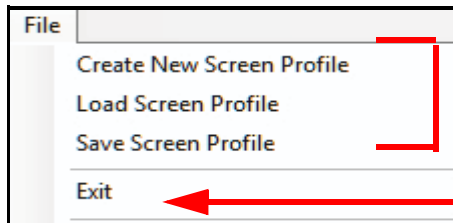


Load a saved Screen Profile to the meter.



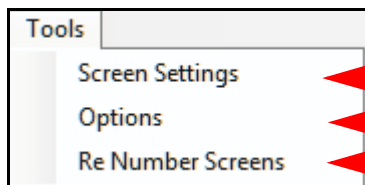
Open the Screen Settings screen explained in step 3-a.

- The Menu Bar gives you the following options:



Same as Icon Bar

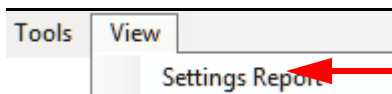
Click to exit Meter Screen Designer. You will be prompted to save your changes if you haven't done so already.



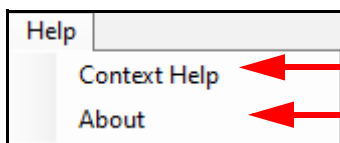
Click to open Screen Settings screen - see 3-a.

Click to open the Options screen - see 26.6.5.

Click to renumber screens - see 26.6.5.



Click to open the Settings Report - see 26.6.5.



Click to view instructions from the software manual.

Click to view version information for the Meter Screen Designer.\*

\* Clicking on the i in a circle on the extreme right of the meter also displays the version information.

6. The Meter Screen Designer Main screen lets you:

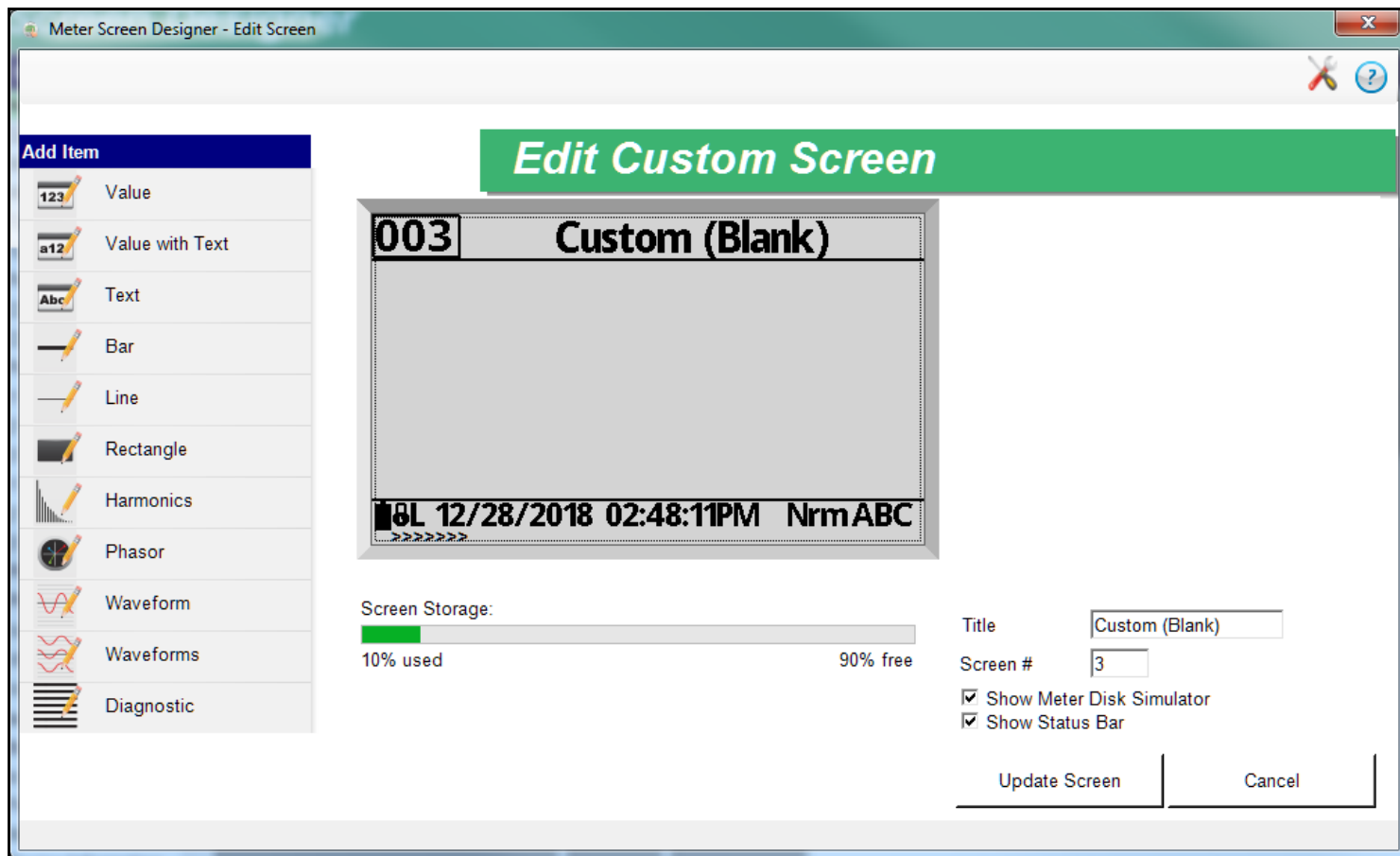
- Edit an existing screen: double-click on the screen in the Mode list to open the screen in the Edit Screen window.
- Create a new, custom screen: click on and drag the Custom(Blank) screen from the Master List to the Mode you want the new screen to be in. Then double-click on the Custom(Blank) screen.

7. Continue to the next section, [26.6.3: Create a Custom Screen/Edit a Screen, on page 26-133](#).



### 26.6.3: Create a Custom Screen/Edit a Screen

1. When you have double-clicked on a screen in the Modes list, you will see the Edit Screen window. Note that these instructions are for creating a new screen, but the actions are the same when editing an existing screen, except that there are already items in the screen, e.g., text or data values.

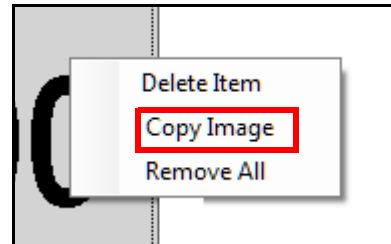


2. The left side of the screen lists items you use to build the screen, e.g., Line to place a line on the screen, Value to display a measured reading, or Waveform to display a waveform on the screen. See [26.6.4: Display Screen Items, on page 26-136](#), for a detailed explanation of all of the available screen items.

3. The center of the screen displays the preview screen, where any changes you make, e.g., drawing text or entering a value, are reflected. The Screen Storage bar lets you know how much memory the screen will use.

- The item you are currently editing is outlined in blue.
- When you make changes to the settings in a screen e.g., entering a new screen title, click once in the preview screen to see the change implemented.
- You can click and drag items in the preview screen to change their positions.
- The preview screen gives you copy/paste and delete options:

- You can copy the entire screen and then paste it into another document. To do so, right-click in the preview screen and select Copy Image. The image is copied into the Clipboard and can then be pasted into another application.



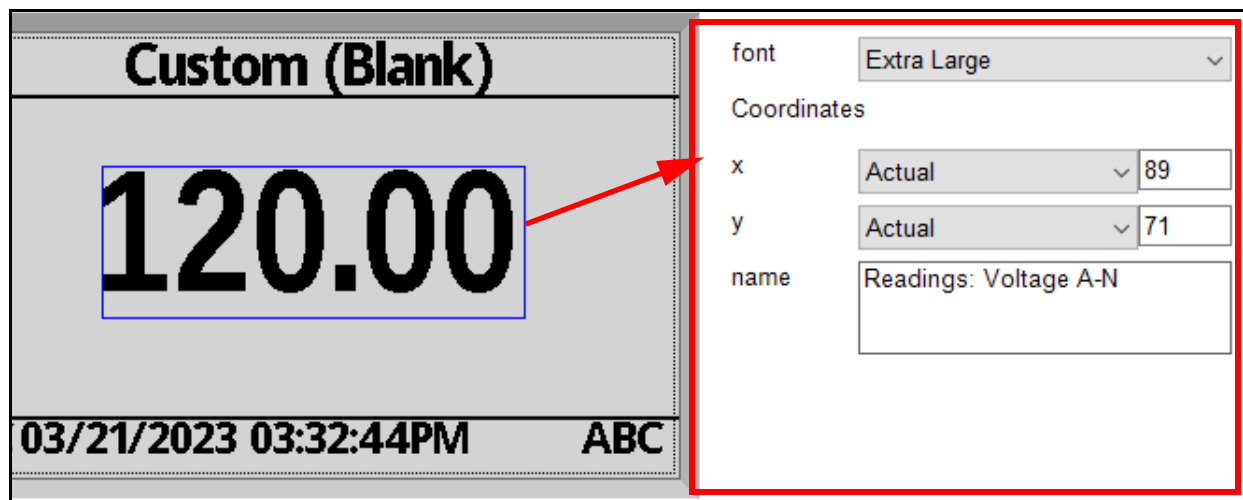
- To delete an item on the screen, select it, right-click and select Delete Item.
- To remove all the items in the screen, right-click and select Remove All.

4. The bottom right side of the screen contains the Title and screen number fields.

a. You can change the Title and Screen Number. When creating a new screen, give it a unique name and number.

- To change the title, enter a new title in the Title field.

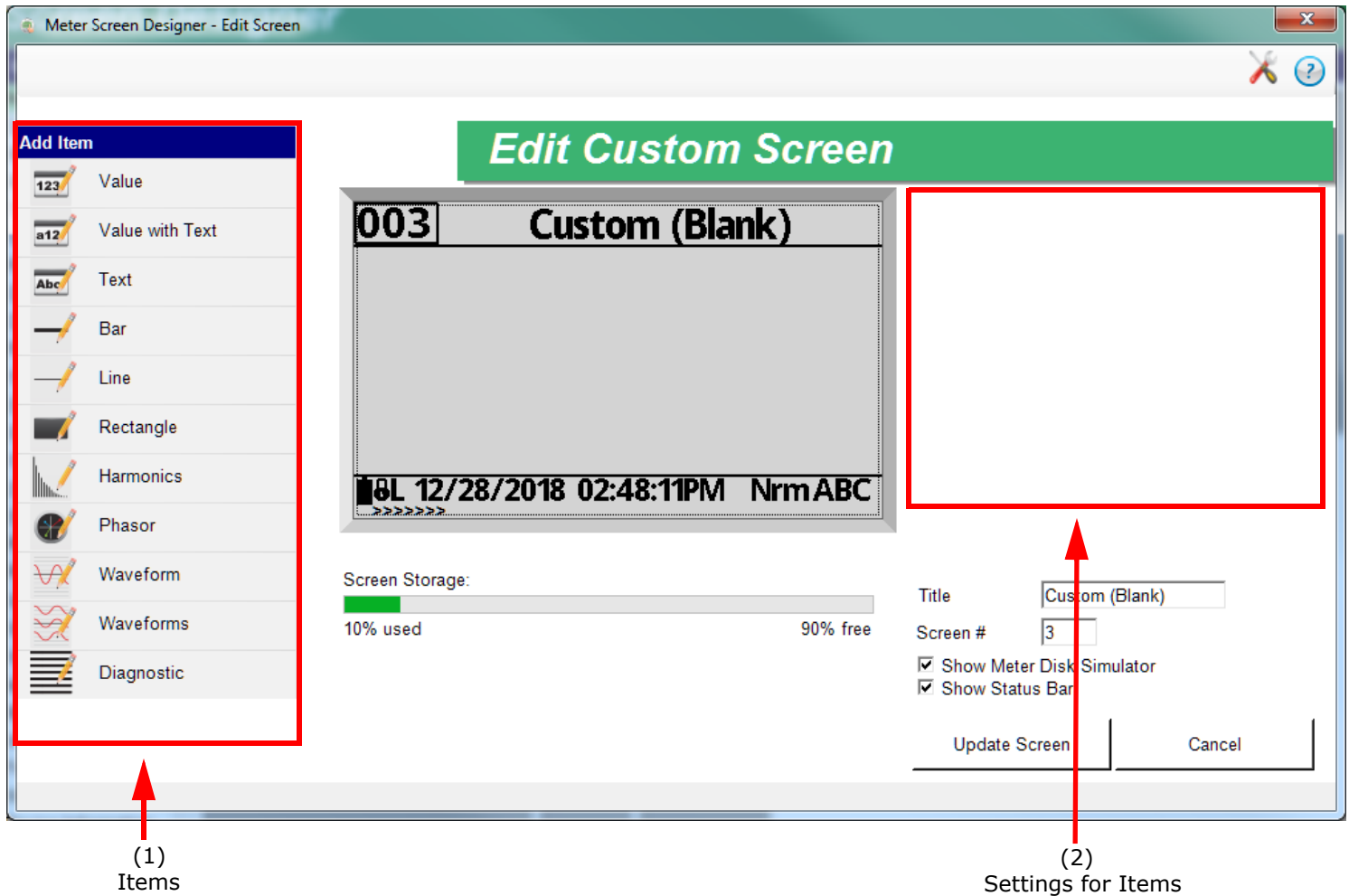
- To change the screen number, enter the new number in the Screen# field.
  - b. The Meter Disk Simulator is a scrolling bar at the bottom of the display screen. If you want it on the screen, check the The Show Meter Disk Simulator box. Note that you won't see anything change on the Preview screen.
  - c. The Status Bar is the text line at the bottom of the screen that contains the battery icon, date and time, and system status. This option is selected by default. If you do not want the Status Bar on your screen, uncheck its box.
5. The upper right side of the screen displays entry fields for the active item. In the example below, the Value field is selected.

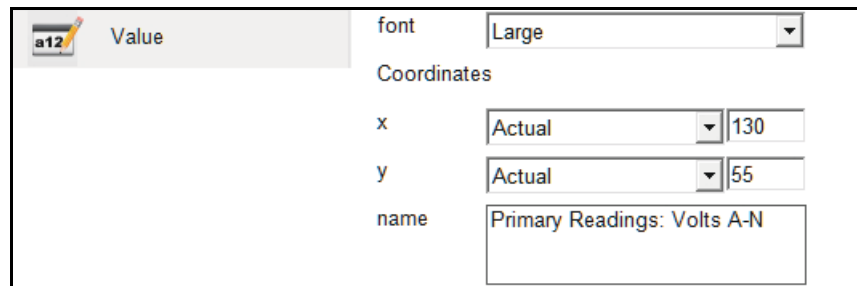



6. Edit or create a new screen by adding items you want in the screen. See the next section, [26.6.4: Display Screen Items, on page 26-136](#), for a list of all of the screen items and their settings.
7. When you have finished creating the screen, click Update Screen to save it. The Meter Screen Designer Main screen will be redisplayed, and the new screen will be listed in the Mode you assigned it to. (Note that if you do not want to save the screen, Cancel will bring you back to the Meter Screen Designer Main screen without saving any changes.)
8. When you have finished editing screens, close the Meter Screen Designer to return to the Device Profile screen. When you click Update Device, the new screens will be uploaded to the meter.

### 26.6.4: Display Screen Items

This section explains all of the items used to edit/customize screens and their settings.

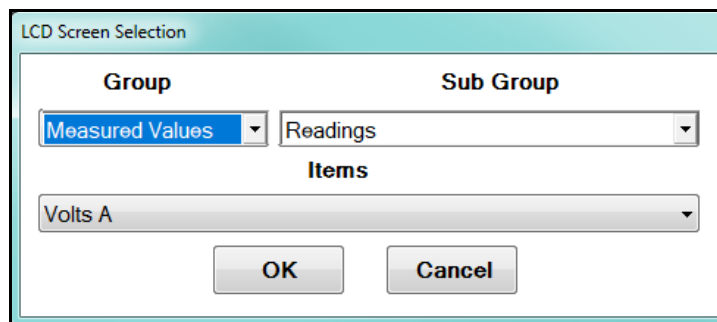


**Value:**


 Value	font	Large
	Coordinates	
	x	Actual 130
	y	Actual 55
	name	Primary Readings: Volts A-N

For the Value setting:

1. Select Small, Medium, Large, or Extra Large for the Font size. Note that only numbers 1-9 and characters ",", ";", "+", and "-" can use the Extra Large setting.
2. For Coordinates, select the x and y positions from the pull-down menus.
  - For the x position, the choices are Center Right, Center Left, Fixed Right, Fixed Left, and Preset Alignments (the Preset Alignment position is set up in the Screen Settings screen - see [26.6.2: Meter Screen Designer, on page 26-125](#)), or you can select Actual and enter the x position in the entry field.
  - For the y position, the choices are Center Up, Center Down, Fixed Top, and Fixed Bottom, or you can select Actual and enter the y position in the entry field.
3. The default for the Name field is Primary Readings: Volts A-N. Select another value as follows:
  - a. Click in the register field to display the window shown below.

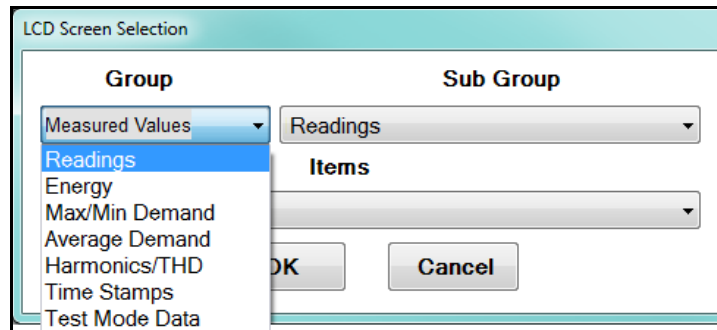


LCD Screen Selection

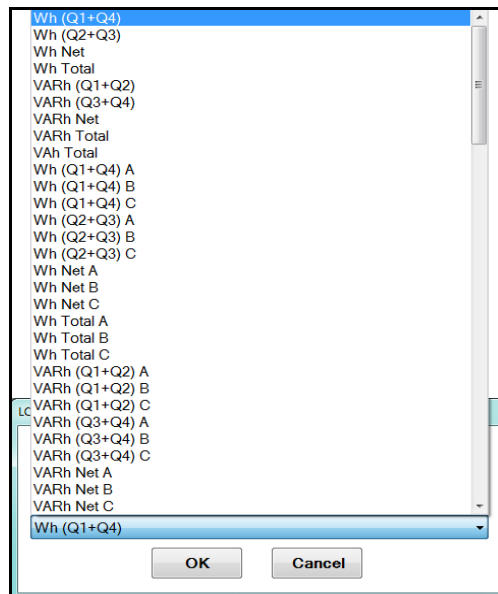
Group	Sub Group
Measured Values	Readings
Items	
Volts A	

OK Cancel

- b. Click the arrow in the Group field to select a readings group from the pull-down menu.



- c. Click the arrow in the Item field to select the value you want from the pull-down menu.

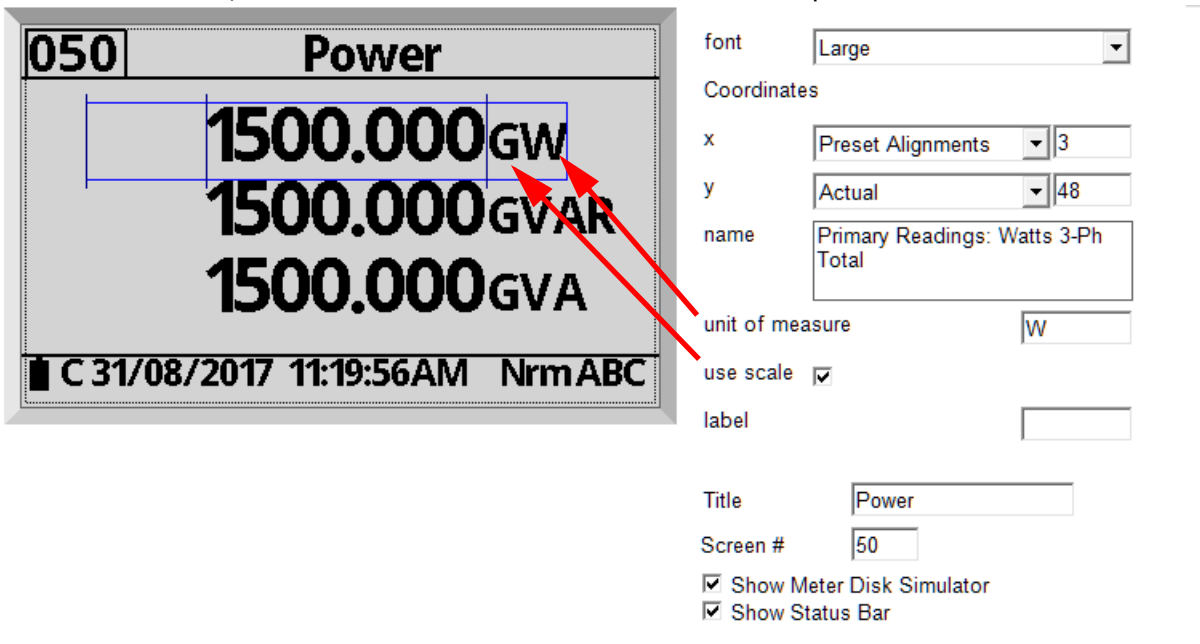


- d. The value you selected will now be displayed in the name field.

**Value with Text:**

The only difference between the Value and the Value with Text setting are the additional settings for scaling:

1. Follow steps 1-3 of the Value setting.
2. For Screen File versions below version 8, the Unit of Measure field can be changed, so that you can specify the scaling. The unit of measure will appear after the value; e.g., V.
3. You can enter a Label, which will be shown in front of the value; e.g., W.
4. If you want to use the scaling programmed in the meter for this value, click the Use Scale checkbox. If there is a scalar for the value, it will be placed after the value on the screen, before the unit of measure. See the example below:



The image shows the 'Value with Text' configuration window on the right and a preview of the screen display on the left. The preview shows a screen with the title 'Power' and a status bar at the bottom. Three lines of text are displayed: '1500.000GW', '1500.000GVAR', and '1500.000GVA'. A red box highlights the first line, and a red arrow points from the 'unit of measure' field in the configuration window to the 'W' in 'GW'.

**Value with Text Configuration:**


- font: Large
- Coordinates:
  - x: Actual, 209
  - y: Actual, 84
- name: Primary Readings: Volts A-N
- unit of measure:
- use scale: ☐
- label:

**Screen Display Configuration:**

- font: Large
- Coordinates:
  - x: Preset Alignments, 3
  - y: Actual, 48
- name: Primary Readings: Watts 3-Ph Total
- unit of measure: W
- use scale: ☒
- label:
- Title: Power
- Screen #: 50
- ☒ Show Meter Disk Simulator
- ☒ Show Status Bar

Note that for Screen File Version 8 and higher, scaling is always done automatically by the meter, so you won't see the Use Scale checkbox.


**Text:**

 Text	font	<input type="text" value="Large"/>
	Coordinates	
	x	<input type="text" value="Actual"/> <input type="text" value="30"/>
	y	<input type="text" value="Actual"/> <input type="text" value="48"/>
	text	<input type="text" value="DrawText"/>

For the Text setting:


1. Select Small, Medium, or Large Font size.
2. For Coordinates, select the x and y positions from the pull-down menus.
  - For the x position, the choices are Center Right, Center Left, Fixed Right, Fixed Left, and Preset Alignments (the Preset Alignment position is set up in the Screen Settings screen - see [26.6.2: Meter Screen Designer, on page 26-125](#)), or you can select Actual and enter the x position in the entry field.
  - For the y position, the choices are Center Up, Center Down, Fixed Top, and Fixed Bottom, or you can select Actual and enter the y position in the entry field.
3. Enter the text you want displayed in the Text box.

**Bar:**

 Bar	Coordinates
	y <input type="text" value="164"/>

For the Bar setting, you set the y position for the bar.

**Line:**

 Line	Coordinates
	x1 <input type="text" value="194"/>
	y1 <input type="text" value="60"/>
	x2 <input type="text" value="244"/>
	y2 <input type="text" value="60"/>

For the Line setting, you enter the x1 and y2 settings, and x2 and y2 settings, to place the line where you want it in the screen.



**Rectangle:**

Rectangle	
Coordinates	
x1	<input type="text" value="281"/> (The left most location)
y1	<input type="text" value="47"/> (The top most location)
x2	<input type="text" value="331"/> (The right most location)
y2	<input type="text" value="97"/> (The bottom most location)

For the Rectangle setting, you enter the x1 and y2 settings, and x2 and y2 settings, to place the rectangle where you want it in the screen.

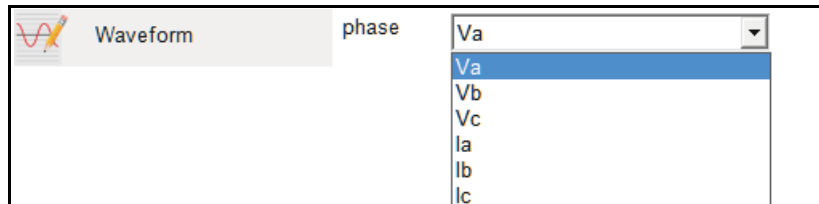
**Harmonics:**

Harmonics	
phase	<div>Va Va Vb Vc Ia Ib Ic</div>

For the Harmonics setting, you select the phase you want to display harmonics for, from the pull-down menu.

**Phasor:**

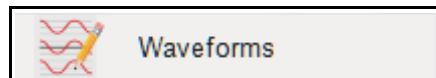
For the Phasor item, you do not need to set anything. This command places a phasor diagram on the screen.

**Waveform:**

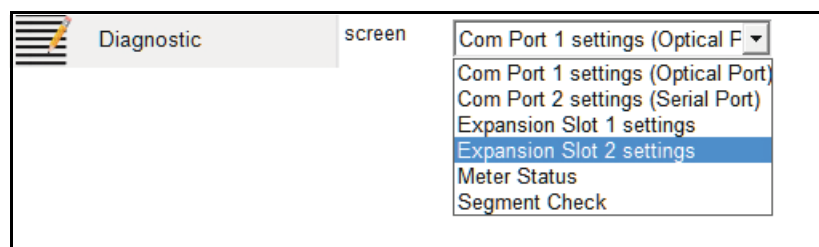
For the Waveform setting, select the current or voltage phase for the waveform from the Phase pull-down menu.

**Waveforms:**

For the Waveforms setting, you do not need to change anything. This command places waveforms for all voltage and current phases on the screen.

**Diagnostic:**

The Diagnostic setting lets you choose information to display on the screen.



Select from the following:

- Com Port 1 settings (Optical Port): displays this port's communication settings on the screen.

**Settings : 56700,8,n,1  
Protocol : MODBUS ASCII  
Receiver Inverted  
Packets Good 0, Bad 0**

- Com Port 2 settings (Serial Port): displays this port's communication settings on the screen.

**Settings : 56700,8,n,1**  
**Protocol : MODBUS RTU**  
**Packets Good 0, Bad 0**

- Expansion Slot 1 settings: displays the details for an I/O card installed in the first slot. The example on the right is for an INP100S Ethernet card.

**Ethernet Card**  
**IP : 192.11.111.111**  
**MAC : 00-00-00-00-00-00**

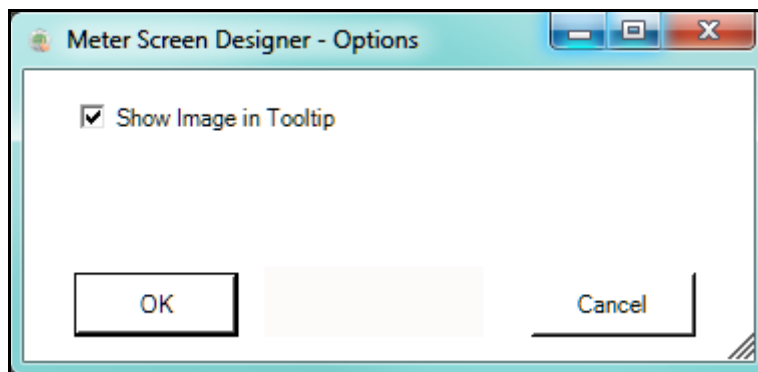
- Expansion Slot 2 settings: displays the details for an I/O card installed in the second slot (see the example for Expansion Slot 1 settings).
- Meter Status: displays details about the meter.
- Segment check: this item creates a black screen. It is used to confirm that all pixels are working. (If any parts of the screen are not black when the screen is displayed, it indicates those pixels are not working.)

**Shark270**  
**Run Version 0002**  
**Boot Version 0005**  
**Serial # 0167963638**  
**V-Switch 5**

### 26.6.5: Additional Commands

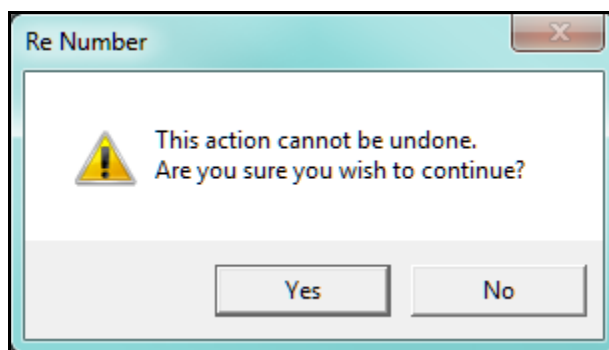
This section explains some additional commands mentioned in the description of the Menu Bar in [26.6.2: Meter Screen Designer](#), on page 26-125.

- Tools>Options: when you click Tools>Options, you see this screen.



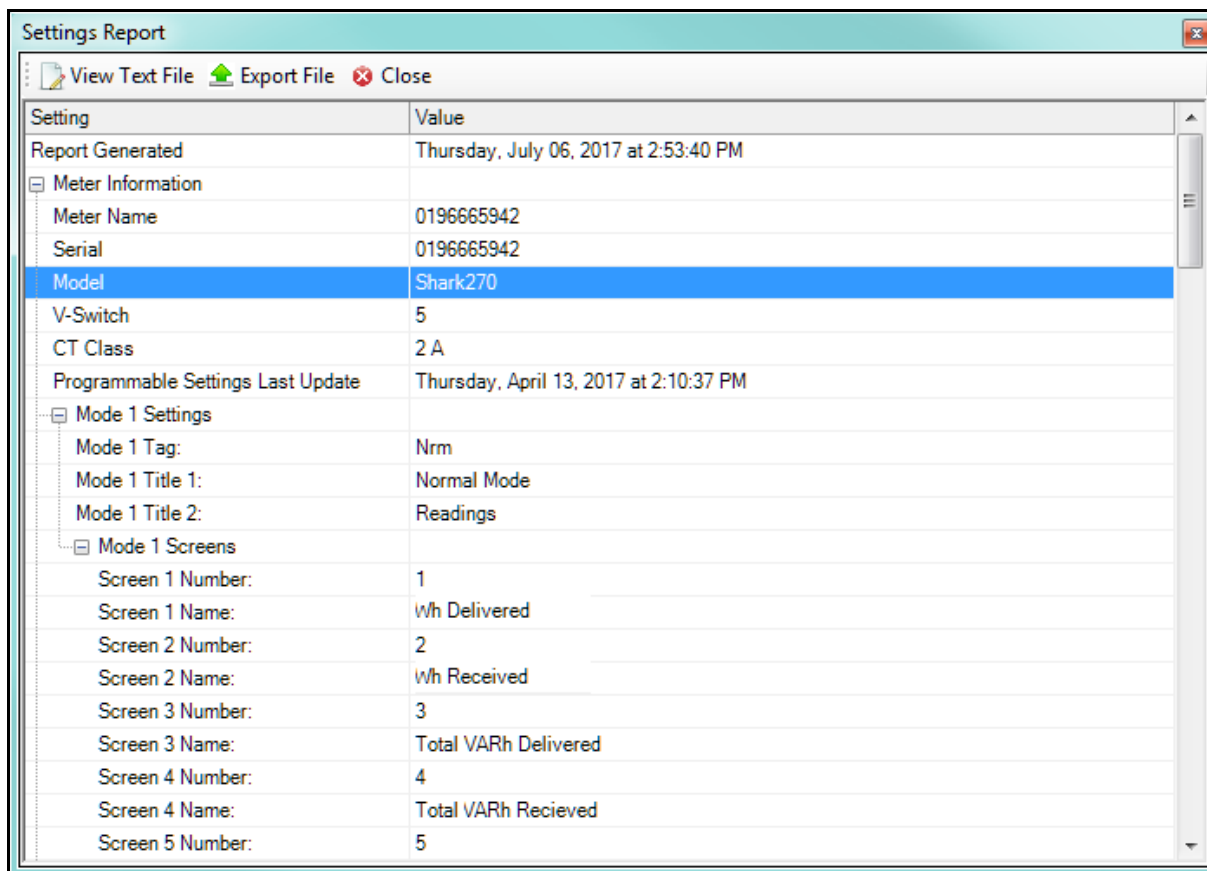
It controls the display of small screen images when you hover over a screen in the Meter Screen Designer screen. By default, this option is enabled. If you don't want to see the small screens, uncheck the box and click OK.

- Tools>Renumber Screens: when you click Tools>Renumber Screens you see this warning screen, since the renumbering can't be undone.



If you click Yes, the screens are renumbered in order starting at Mode 1's first screen and continuing through Mode 3's last screen.

- View>Settings Report: when you click View>Settings Report, you will see the following screen.



Setting	Value
Report Generated	Thursday, July 06, 2017 at 2:53:40 PM
<input checked="" type="checkbox"/> Meter Information	
Meter Name	0196665942
Serial	0196665942
Model	Shark270
V-Switch	5
CT Class	2 A
Programmable Settings Last Update	Thursday, April 13, 2017 at 2:10:37 PM
<input checked="" type="checkbox"/> Mode 1 Settings	
Mode 1 Tag:	Nrm
Mode 1 Title 1:	Normal Mode
Mode 1 Title 2:	Readings
<input checked="" type="checkbox"/> Mode 1 Screens	
Screen 1 Number:	1
Screen 1 Name:	Wh Delivered
Screen 2 Number:	2
Screen 2 Name:	Wh Received
Screen 3 Number:	3
Screen 3 Name:	Total VARh Delivered
Screen 4 Number:	4
Screen 4 Name:	Total VARh Recieved
Screen 5 Number:	5

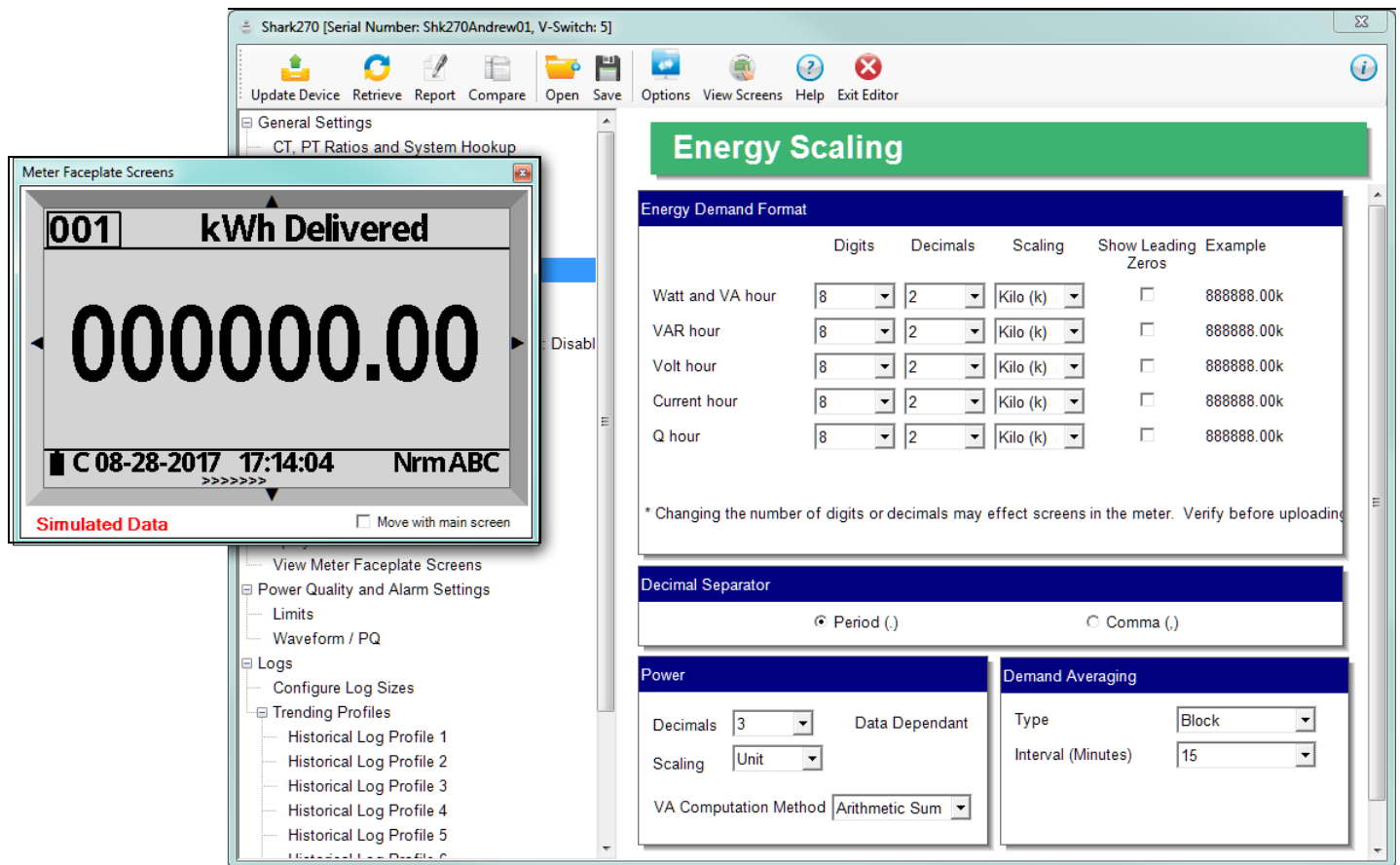
This screen contains the details of the current Screen Profile file that is open in Meter Screen Designer. The File menu at the top of the screen lets you:

- Open this file as a text file (View Text File).
- Export this file as a Microsoft® Excel file (Export file).
- Close this screen (Close).

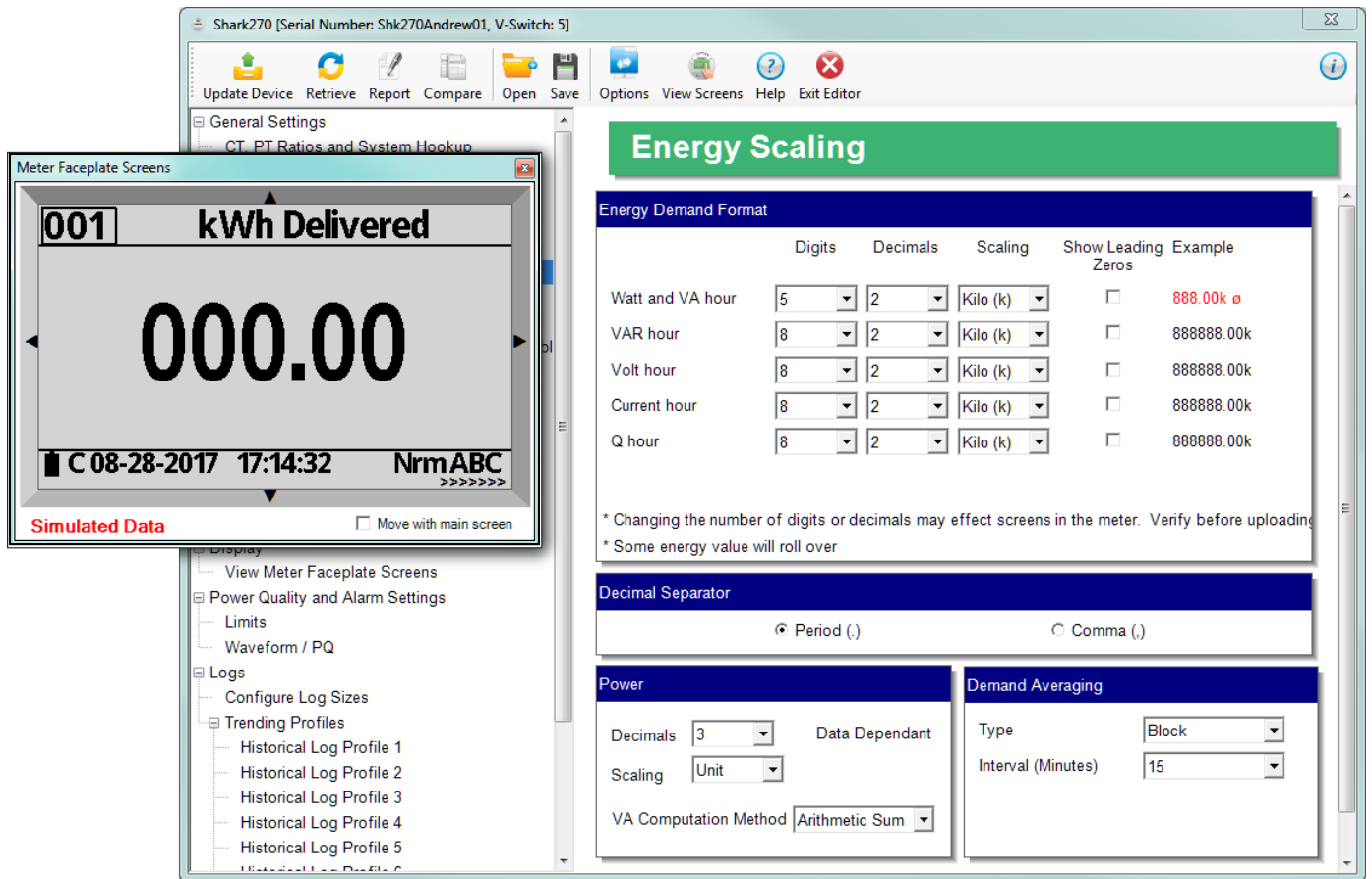
## 26.7: View Screens

The meter's Device Profile screen gives you the ability to see how settings changes will affect the meter's display screens.

1. From the Device Profile's Icon Bar, click View Screens. A small screen called Meter Faceplate Screens opens next to the Device Profile screen. See the example below.



2. You can check the box Move with Main Screen if you want to move the Meter Faceplate Screens and Device Profile screens together, rather than separately.
3. When you make changes to a setting that affects a display screen, you will see the changes reflected in the smaller screen. For example, in the screens above, the Watt and VA hour scaling is 8 digits, with 2 decimal places, as shown in the smaller screen. In the next screen, the setting has been changed to 5 digits, still with 2 decimal places. The next screen capture shows how that change affects the smaller screen.



4. When you have finished using Meter Faceplate Screens, click the X in the top right corner to close it.

## 26.8: Custom Display Multipliers

Gen 2 of the meter allows you to use different scaling for energy values on the meter's display than for the energy readings in the meter. You set up scaling for the energy readings in the meter in the Energy Scaling and Averaging Method screen (see [26.2.1: Configuring Energy, Power Scaling, and Averaging Method, on page 26-41.](#))

One of the settings on that screen is a checkbox that allows different multipliers for the display. Once you check that box, you will see the Custom Display Multipliers setting listed under View Meter Faceplate Screens, in the Device Profile screen's tree menu. Note that most meter installations use need to use this setting.

1. Click Display>Custom Display Multipliers from the tree menu.

Shark 270 Gen 2 [Serial Number: 0249508836, V-Switch: 5]

Update Device Retrieve Report Compare Open Save Options View Screens Help Exit Editor

**Custom Display Multipliers**

Primary energy format settings are located in Energy scaling and averaging section

Use only to custom scale display different than primary energy format settings

	Digits	Decimals	Scaling	Show Leading Zeros	Example
Watt and VA hour	8	3	Unit	<input checked="" type="checkbox"/>	88888.000 *
VAR hour	8	3	Unit	<input checked="" type="checkbox"/>	88888.000 *
Volt hour and V <sup>2</sup> T	8	3	Unit	<input checked="" type="checkbox"/>	88888.000
Amp hour and I <sup>2</sup> T	8	3	Unit	<input checked="" type="checkbox"/>	88888.000
Q hour	8	3	Unit	<input checked="" type="checkbox"/>	88888.000 *
Cumulative and Continuous Demand	8	1	Unit	<input checked="" type="checkbox"/>	8888888.0
Secondary Energy	8	3	Unit	<input checked="" type="checkbox"/>	88888.000 *

Changing the number of digits or decimals may affect screens in the meter. Verify meter faceplate screens before uploading

\* Some energy will roll over quickly. Hover over the example in red to see details.

2. For each of the values Watt Hour and VA Hour, VAR Hour, Volt Hour and V<sup>2</sup>T Hour, Amp Hour and I<sup>2</sup>T Hour, Q Hour, Cumulative and Continuous Demand, and Secondary Energy set the following, using the pull-down menus:

- Digits: 5; 6; 7; 8.



- Decimals: 0 - 6. Note that if the entry would cause the accumulator to roll over quickly, the Example will be shown in red and there will be this note:

\* Some energy will roll over quickly. Hover over the example in red to see details.

- Scaling: unit; kilo (K); Mega (M).
- Show Leading Zeros: check the box if you want leading zeros to show; e.g., if a value has five digits and zero decimals, and the reading is 400, if you select show leading zeros the reading would be 0400.
  - The Example field shows the result of your choices: e.g., a reading for Digits: 8; Decimals: 3; Scale: K would be formatted: 00123.456k.

**IMPORTANT!** Since you are changing display screen fields which have a limited amount of space, it is recommended that you verify the meter faceplate screens before uploading the new profile to the meter (see [26.6.1: View Meter Faceplate Screens, on page 26-124](#)). In general, if the primary energy fields are in a smaller unit than the display energy there should not be a problem; for example, if the primary energy is in kW, but you want the display energy to be in MW to make it simpler for the operator to view usage, that should be fine. However, using MW for primary energy and KW for the display will result in frequent rollovers and is NOT recommended.

3. Before exiting the Device Profile screen, click Update Device to upload any new settings to the meter.

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## 27: Nexus® 1450 Meter

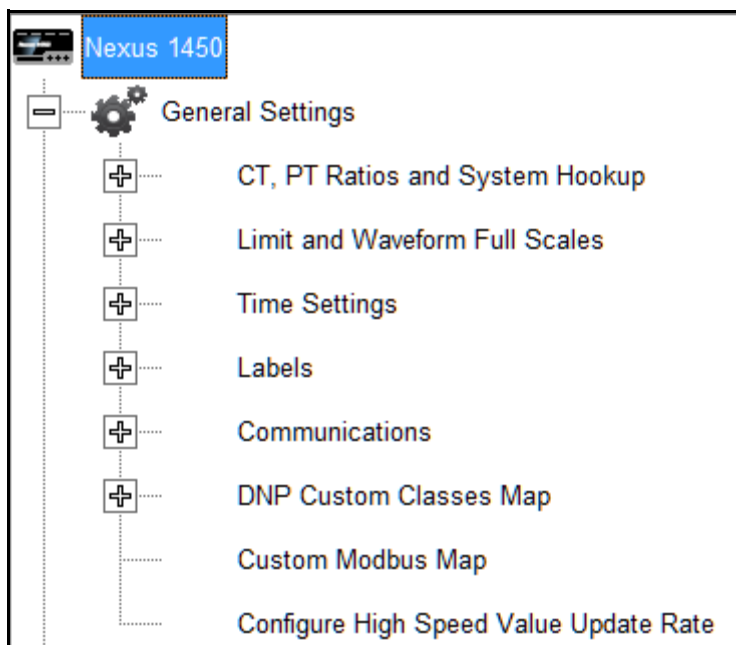
This chapter explains how to configure a Nexus® 1450 meter's programmable settings, which are stored in the unit's Device Profile. Chapter 7 contains detailed information on the Device Profile.

### NOTES:

- When the Device Profile of a Nexus® 1450 meter is updated, the meter reboots. If security was enabled when the meter rebooted, users may need to login again by disconnecting from the meter, reconnecting to it, and logging in again. This is true both for the user that updated the Device Profile and for any other users connected to the meter when it is updated.
- If any of the meter settings are not valid, meter update will fail and you will see an error message.

### 27.1: Device Profile General Settings

1. From the Device Profile screen, double-click on the General Settings line or click on the + button next to it. All of the settings in the General Settings group are listed.



2. Click on the programmable setting you want to modify. The following sections explain the settings in the General Settings menu.

### 27.1.1: CT and PT Ratios and System Hookup

#### Functional Overview of CT and PT Ratios:

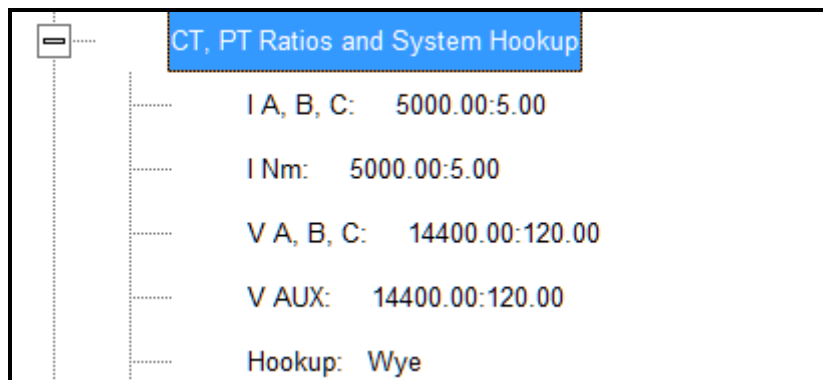
Current and Potential Transformers are used mainly for the following reasons:

- To insulate, and as a result isolate, the meter from high-voltage circuits.
- To change the primary voltage and current to standard values and sizes that the meter can measure.

The CT and PT transformers deliver fractions of the primary voltage and current to the meter. With properly set ratios and multipliers, the readings of the meter can be used to determine the energy, voltage, current, or power of the system.

This screen is also where you specify 50/60 Hz or Wide Band Auto frequency (for low and high Hz applications). Note that when the meter is operating in Wide Band Auto frequency mode, some of the Device Profile settings are not available: Line Frequency synchronization (Time Settings), and IEC 61000-4-30 Class A Edition 3/EN 50160. In addition, there are restricted Harmonics ranges and Waveform settings. These are explained in the relevant sections of this chapter.

1. From the General Settings menu, click the + button next to CT, PT Ratios and System Hookup. You will see the submenu shown below.



This submenu displays the current Device Profile's settings for CT, PT ratios and connection type.

2. Double-click on any of the settings. You will see the CT and PT Ratios screen.

Device Profile: CT and PT Ratios

CT Ratio			PT Ratio (Line to Neutral)		
	Primary Current	Secondary Current		Primary Voltage	Secondary Voltage
I A, B, C	5.00	5.00	V A, B, C	120.00	120.00
I N	5.00	5.00	V AUX	120.00	120.00

Hookup	Total VA/VAh Computation Method
Wye	Arithmetic Sum

Frequency Range
50/60Hz
50/60Hz
Wide Band Auto

3. Make changes to this screen according to your application requirements.

When you change a PT or CT Ratio, CommunicatorPQA® software updates the corresponding Full Scale value entered in the Limit and Waveform Full Scales setting. When you click OK on this screen, CommunicatorPQA® software opens the Limit & Waveform Full Scales screen so that you can verify the settings (see 27.1.2: Limit and Waveform Full Scales, on page 27-5).

- Enter Primary and Secondary Current and Voltage.
- Using the pull-down menu, choose the Hookup mode that matches the connection you have to the Nexus®1450 meter. Choose from the following:
  - Wye
  - Delta 3 CTs
  - Delta 2 CTs

- 2.5 Element Wye

- 4 Wire Delta

This value must be set properly for the meter to calculate readings correctly.

See the *Nexus® 1450 Meter Installation and Operation Manual* for connection diagrams.

- Total VA/VAh Computation Method (not displayed if Hookup is Delta): choose the VA/VAh computation you want used: Arithmetic Sum or Vector Sum, from the pull-down menu.

**Arithmetic Sum** - the formula for this calculation is:

$$VA_T = VA_a + VA_b + VA_c$$

**Vector Sum** - the formula for this calculation is:

$$VA_T = \sqrt{W_T^2 + VAR_T^2}$$

Generally, the superior method for calculation is the Vectoral method; however, both methods are available.

- Frequency Range: select 50/60 Hz or Wide Band Auto from the pull-down menu. Wide Band Auto is used for applications with frequencies other than 50/60 Hz. The meter can support applications with frequencies as low as 25 Hz and as high as 400 Hz. When you select Wide Band Auto, the meter will adjust automatically to the frequency used by your application. Your meter must have firmware version 3 or higher to support the Wide Band Auto feature.
4. Click OK. If changes have been made, a message window opens asking you to verify that the Limit Full Scales are correct.
  5. Click OK. The Limit and Waveform Full Scales screen opens (see Section 27.1.2: Limit and Waveform Full Scales, on page 27-5).
  6. To implement any changes, click the Update Device button to send the new profile to the meter.

You will see a warning message that logs will be reset, and you will be given the opportunity to retrieve the logs before they are cleared. Resetting the logs

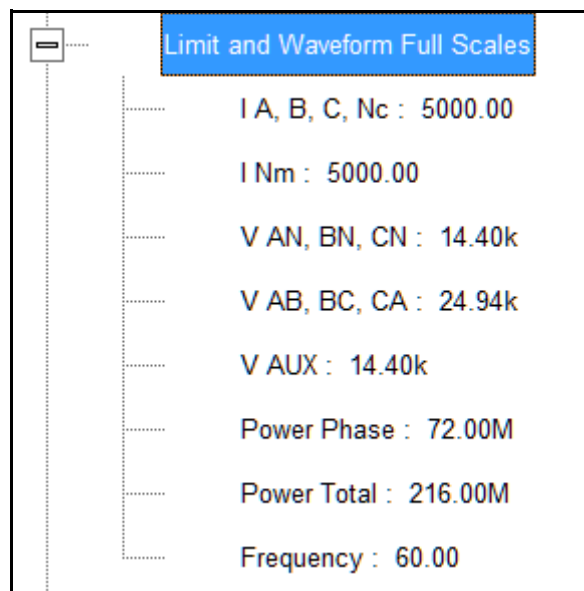
prepares the meter for placement in a new installation or change of the meter Transformers.

### 27.1.2: Limit and Waveform Full Scales

All Limit and Waveform settings (see Sections 27.1.1 and 27.3.5, respectively) are based on a percentage of the Full Scale. Full Scales are based on the CT and PT ratios (see Section 27.1.1: CT and PT Ratios and System Hookup, on page 27-2). The % of Full Scale is defaulted based on the CT and PT ratio. If the user wants, the Full Scales can be adjusted to the actual power system condition, to optimize the triggering conditions.

Set the CT and PT ratios first; CommunicatorPQA® software automatically recalculates the Full Scales every time the CT and PT ratios change and presents them for your verification.

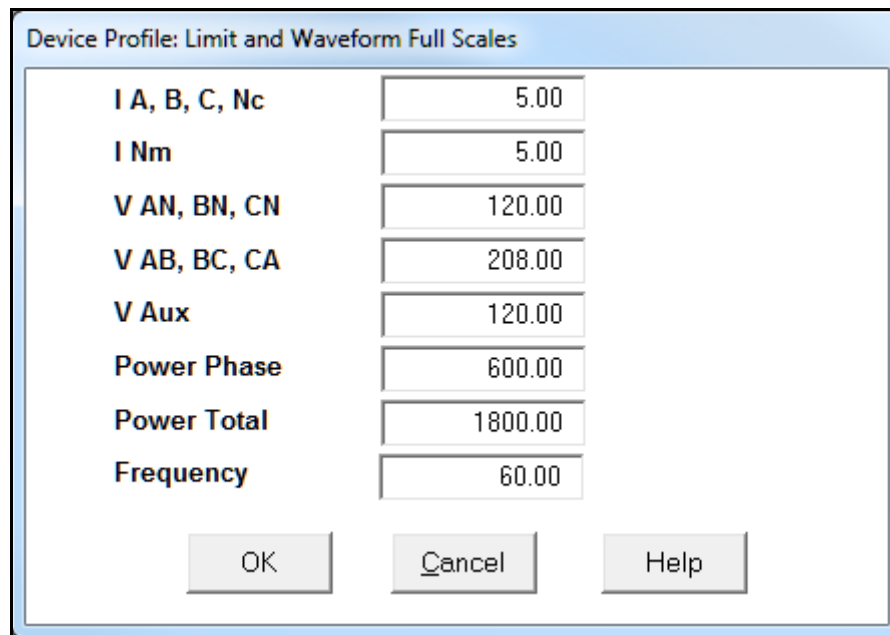
1. From the General Settings menu, click on the + button beside Limit and Waveform Full Scales or double-click on the Limit and Waveform Full Scales line. You will see the submenu shown below.



This submenu displays the current Device Profile's settings for the Limit and Waveform Full Scales. The values shown here are the default meter settings.

Frequency and Voltage values are nominal values. The Power Phase is computed using nominal Voltage and rated maximum current. In most cases the software automatically computes the proper value - you will not need to change it.

2. Double-click any of the settings. You will see the Limit and Waveform Full Scales screen.



Device Profile: Limit and Waveform Full Scales	
I A, B, C, Nc	5.00
I Nm	5.00
V AN, BN, CN	120.00
V AB, BC, CA	208.00
V Aux	120.00
Power Phase	600.00
Power Total	1800.00
Frequency	60.00

OK Cancel Help

3. Enter the Full Scale for each parameter.

#### NOTES:

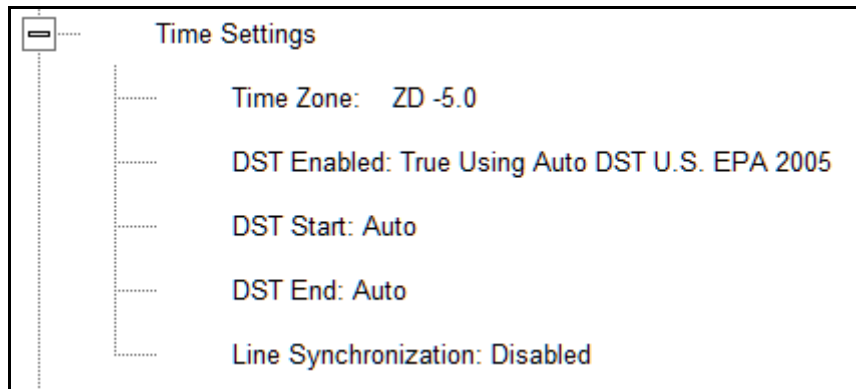
- The Limits and Waveform settings (see 27.3.1: Limits, on page 27-42 and 27.3.3: PQ Thresholds (Waveform Recording), on page 27-56, respectively) are based on a percentage of the Full Scales entered here.
  - CommunicatorPQA® software automatically recalculates the Full Scale Voltages, currents and power every time the CT and PT ratios change.
  - Power Phase is the amount of power per each phase; Power Total is the power of all phases combined.
4. When all changes are entered, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.



### 27.1.3: Time Settings

To edit a Device Profile's Time settings:

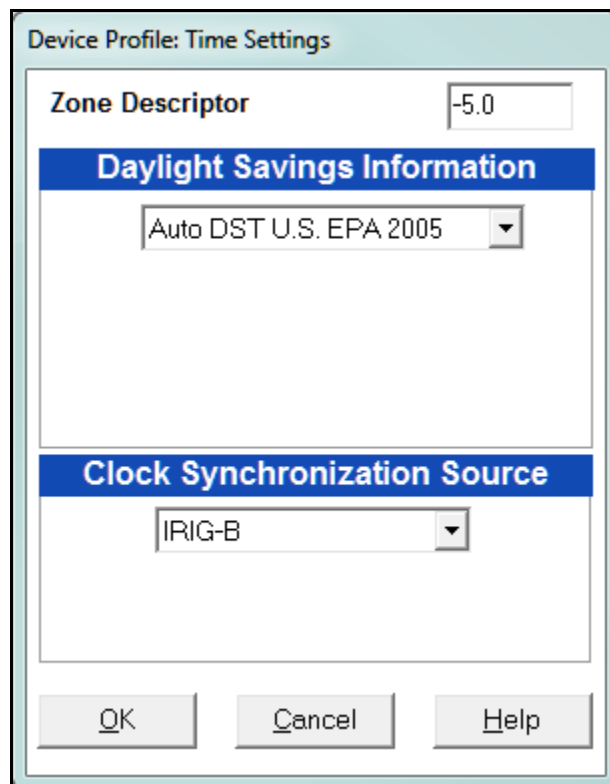
1. From the General Settings menu, double-click on the Time Settings line. You will see the submenu shown below.



The screenshot shows a submenu titled "Time Settings". On the left is a vertical list of five "E" icons. To the right of these icons are the following settings:

- Time Zone: ZD -5.0
- DST Enabled: True Using Auto DST U.S. EPA 2005
- DST Start: Auto
- DST End: Auto
- Line Synchronization: Disabled

- DST stands for Daylight Savings Time.
2. Double-click on any of the programmable settings; you will see the Time Settings screen.



The screenshot shows a dialog box titled "Device Profile: Time Settings". It contains the following fields and sections:

- Zone Descriptor:** A text field containing "-5.0".
- Daylight Savings Information:** A section header with a dropdown menu below it containing "Auto DST U.S. EPA 2005".
- Clock Synchronization Source:** A section header with a dropdown menu below it containing "IRIG-B".
- Buttons:** At the bottom are three buttons: "OK", "Cancel", and "Help".

3. Make changes to this screen according to your application requirements.

- Zone Descriptor: A Zone Descriptor sets the time zone for the meter. 0 = Greenwich Mean Time. Consult the chart below to find the Zone Descriptor for your time zone.

<b>GMT Greenwich Mean Time Table (Dublin, London)</b>	
-1.00 Azores	+1.00 Brussels, Paris, Warsaw
-2.00 Mid-Atlantic	+2.00 Athens, Cairo, Helsinki
-3.00 Buenos Aires, Georgetown	+3.00 Baghdad, Kuwait, Moscow, Tehran
-4.00 Atlantic Time (Canada), Santiago	+4.00 Kabul, Baku
-5.00 Eastern Time (USA and Canada), Lima	+5.00 Karachi
-6.00 Central Time (USA and Canada), Mexico City	+6.00 Dhaka
-7.00 Mountain Time (USA and Canada)	+7.00 Bangkok, Hanoi, Jakarta
-8.00 Pacific Time (USA and Canada), Tijuana	+8.00 Beijing, Hong Kong, Singapore
-9.00 Alaska	+9.00 Osaka, Sapporo, Seoul
-10.00 Hawaii	+10.00 Brisbane, Melbourne, Guam, Hobart
-11.00 Midway Island	+11.00 Magadan, Solomon Islands
-12.00 Niwetok	+12.00 Auckland, Fiji

- Daylight Savings Information:
  - Disabled: Disables an automatic adjustment for Daylight Savings Time.
  - Auto DST U.S. EPA 2005: Sets Daylight Savings Time automatically to the 2007 standard for the United States: the time changes automatically occur at 2:00 AM (your local time), on the second Sunday in March and the first Sunday in November.
  - User Defined: Allows you to set the Daylight Savings Time start and end times manually. Fields open that let you set the beginning and ending dates for Daylight Savings Time.

- Clock Synchronization Source: select the type of meter clock synchronization to use from the pull-down menu:
  - Disabled: No Time Synchronization will take place, unless IRIG-B is applied.
  - IRIG-B: IRIG-B is a standard time code format that synchronizes event time-stamping to within 1 millisecond. An IRIG-B signal-generating device connected to the GPS satellite system synchronizes Nexus® 1450 meters located at different geographic locations. Nexus® meters use an unmodulated signal from a satellite-controlled clock (such as Arbiter 1093B). For details on installation, refer to the *Nexus® 1450 Meter Installation and Operation Manual* and the User's Manual for the satellite-controlled clock in use.

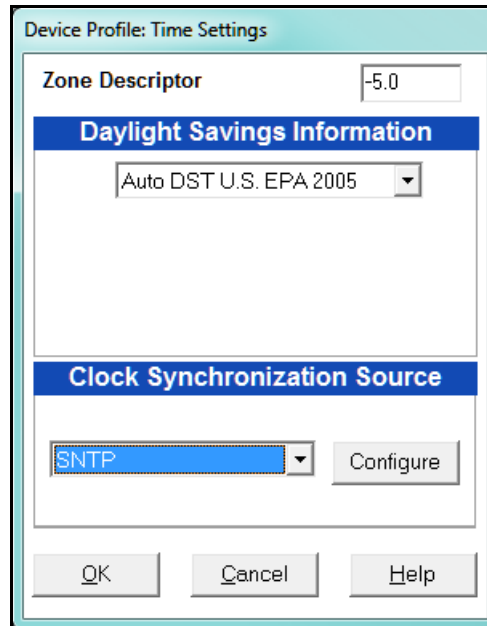
**NOTE:** When IRIG-B is applied, it takes precedence over any of the other Time Synchronization settings - it is not even necessary to select IRIG-B from the menu if it is applied.
  - Line Synchronization: uses the frequency zero crossings to provide a time reference for the meter. The basic function of Line Frequency Clock Synchronization is to adjust the real time clock to track the time based on the power line frequency. For this purpose, Phase A voltage only is used. When you select this option, a Frequency pull-down menu is displayed, letting you select between 60 Hz and 50 Hz. The selection should be based on the nominal frequency in the jurisdiction where the meter is located.

**NOTE:** This option is not available if the meter's frequency is set to Wide Band Auto (see 27.1.1: CT and PT Ratios and System Hookup, on page 27-2).

- **How Time is Adjusted**

After the clock is synced to the line, the meter periodically checks the cumulative difference between the real time clock in seconds and the line cycle count. If the absolute difference between the two accumulations is more than 1 second or 60 (50) cycles, the clock is adjusted + / - 1 second accordingly.

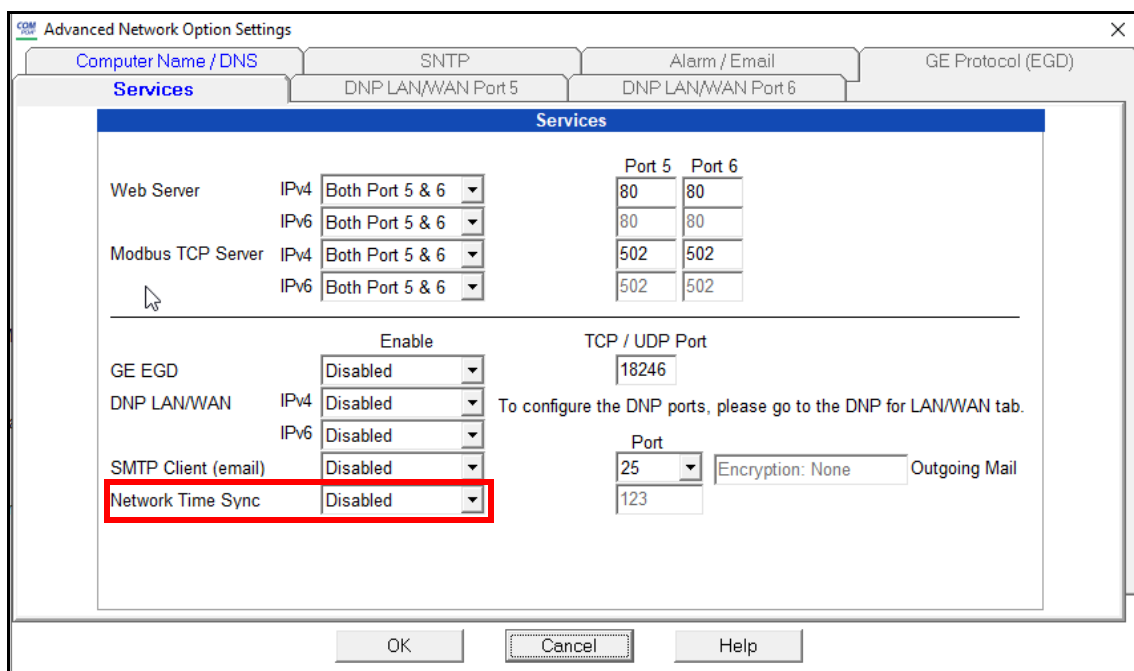
- SNTP (Simple Network time Protocol): with SNTP you access a Network Time Protocol (NTP) Server for time synchronization. The NTP server can be either a device with a real-time clock that is networked with your meter, or an NTP server on the Internet. To use SNTP, select it from the pull-down menu.



The dialog box is titled "Device Profile: Time Settings". It contains the following elements:

- Zone Descriptor:** A text field containing "-5.0".
- Daylight Savings Information:** A section header with a dropdown menu below it showing "Auto DST U.S. EPA 2005".
- Clock Synchronization Source:** A section header with a dropdown menu below it showing "SNTP" and a "Configure" button to its right.
- Buttons:** "OK", "Cancel", and "Help" buttons at the bottom.

- a. The screen changes to include a Configure button: click it to set up SNTP.



The dialog box is titled "Advanced Network Option Settings". It has several tabs: "Computer Name / DNS", "SNTP", "Alarm / Email", and "GE Protocol (EGD)". The "SNTP" tab is selected. Below the tabs are two sub-tabs: "DNP LAN/WAN Port 5" and "DNP LAN/WAN Port 6". The main area is titled "Services" and contains the following settings:

Service	Protocol	Port 5	Port 6
Web Server	IPv4	Both Port 5 & 6	80
	IPv6	Both Port 5 & 6	80
Modbus TCP Server	IPv4	Both Port 5 & 6	502
	IPv6	Both Port 5 & 6	502

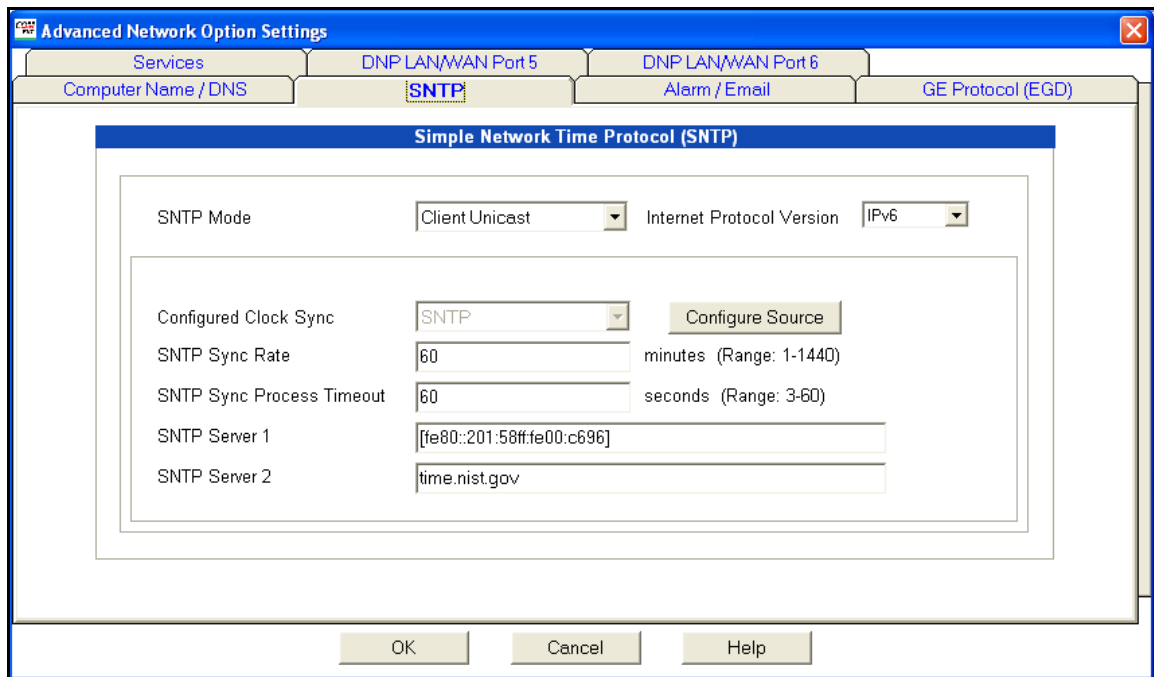
Below the table, there are several "Enable" dropdown menus:

- GE EGD: Disabled
- DNP LAN/WAN IPv4: Disabled
- DNP LAN/WAN IPv6: Disabled
- SMTP Client (email): Disabled
- Network Time Sync: Disabled** (highlighted with a red box)

To the right of these settings, there is a "TCP / UDP Port" field set to "18246". Below this, there is a "Port" dropdown set to "25" and an "Encryption: None" field. A note states: "To configure the DNP ports, please go to the DNP for LAN/WAN tab." At the bottom, there are "OK", "Cancel", and "Help" buttons.

b. The Advanced Network Options screen opens, showing the Services tab, since you need to enable SNTP before you can configure it. From the pull-down menu next to Network Time Sync, click SNTP Auto (SNTP enabled for any available port), SNTP Port 5 (SNTP enabled for only port 5), or SNTP Port 6 (SNTP enabled for only port 6).

c. Click the SNTP tab.



d. Enter:

- SNTP Mode: select Client Unicast or Client Broadcast:
  - In Client Unicast mode, the meter connects to the specified SNTP server using the configured SNTP IP address(es). First, the meter synchronizes with the SNTP server. After that, the meter periodically sends time requests to the SNTP server.
  - In Client Broadcast mode, the meter listens for broadcast messages sent by the SNTP server. After receiving the first broadcast message, the meter synchronizes its clock using the unicast mode, and afterwards does not send any packets to the SNTP server. Instead, it uses received broadcast messages from the SNTP server to adjust its clock.

- Select Internet Protocol Version (IPv4 or IPv6).
- If Configured Clock Sync is not SNTP, click the Configure Source button to display the Time Settings screen, and choose SNTP for time synchronization. This situation can occur if you previously selected a different time sync method and are now setting up SNTP directly through the Advanced Network Settings screen (Chapter 21 explains the options in the Advanced Network Settings screen).

Note that if SNTP is already displayed in the Configured Clock Sync field, you do not need to click the Configure Source button.

- The SNTP Sync Rate in minutes: this is how often the meter checks the SNTP server for time updates. EIG recommends that the sync rate be set to other than the logging interval, if possible; for example, if the logging interval is every 15 minutes, set the sync rate to every seven minutes. This is done to prevent erroneous time stamps in the log.
- The SNTP Sync Process Timeout in seconds: this is how long to wait for the server to respond. Typical timeout should be set for 30 seconds.

**NOTE:** Make sure to set SNTP Sync Rate and SNTP Sync Process Timeout as non-zero values; e.g., 1440 minutes, 60 seconds.

- At least one SNTP server: set NTP server 1 to time.nist.gov (you can enter a second SNTP server address if you want, if you are using Client Unicast mode.)

e. Click OK.

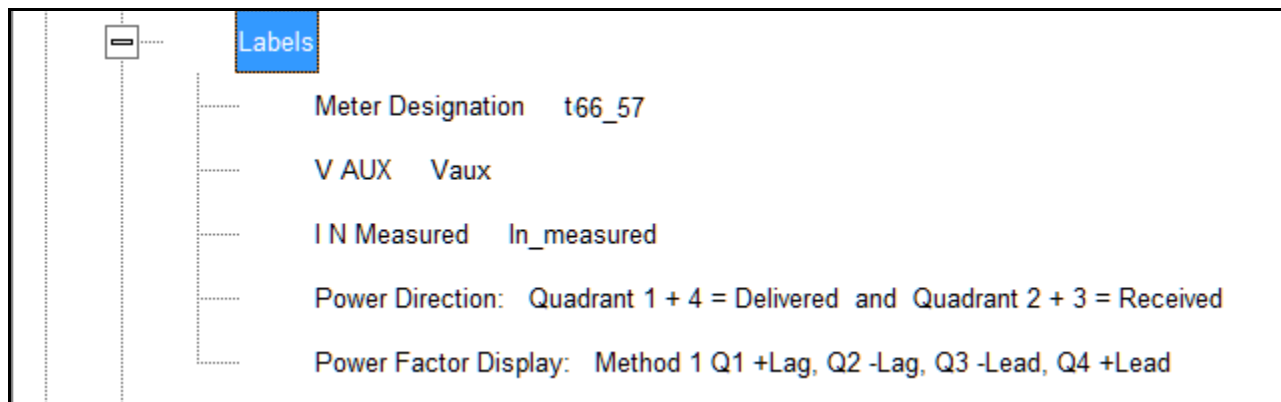
4. To set the meter's on-board clock, use Set Device Time from the Tools Menu (see 20.1.4: Set Device Time, on page 20-5).
5. When all changes are entered, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 27.1.4: Labels

Labels are user-defined names for the Nexus® 1450 meter and the I N Measured terminal. You also use the Labels screen to select the power direction, and the power factor display.

It is important to label the meter (under "Meter Designation") with a unique name because that label becomes the file name of any logs retrieved from that meter. Duplicate meter designations interfere with retrieved log databases. See Chapters 16 and 19 for more details on logs.

1. From the General Settings menu, double-click on the Labels line. You will see the submenu shown below.



2. Double-click on any of the parameters; you will see the Labels screen.

3. Enter labels in the appropriate fields.

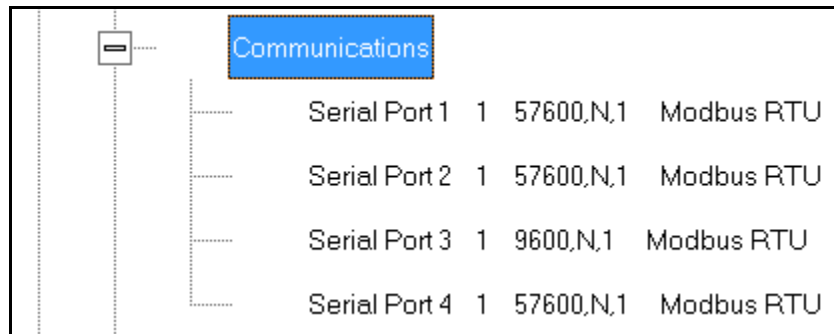
- Meter Designation must be set for partial log retrieval. You can use any character allowed by the Windows® operating system.
  - In English versions the following characters don't work:  
 $\backslash / : * ? " < > |$
  - For meters used internationally by multilingual users, we recommend you use only alphanumeric characters allowed by your operating system.
- Your selection in Power Direction determines which quadrants of Watt-hours are considered Received and Delivered.
- Your selection in Power Factor Display determines the display of Quadrants in the Power Factor screen.
- The Memo field is used to enter notes about the meter, such as the location, or other relevant details.



- The Phase Angle representation determines how the voltage phase angles are represented. 90% of users will use the default, which is the first radio button: "Positive angle for events after the reference and negative angle for events prior to the reference"; however, you can choose the opposite display by selecting the second radio button, if you wish.
4. When all changes are entered, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

## 27.1.5: Communications

1. From the General Settings menu, double-click on the Communications line. You will see the submenu shown below.



2. Double-click on any of the settings (e.g., "Serial Port 1"): you will see the Communications Settings screen.

Device Profile: Communications Settings

Serial Port 1	Serial Port 2	Serial Port 3	Serial Port 4
Address: 1	Address: 1	Address: 1	Address: 1
Baud Rate: 9600	Baud Rate: 9600	Baud Rate: 9600	Baud Rate: 9600
Data Bits: 8	Data Bits: 8	Data Bits: 8	Data Bits: 8
Parity: None	Parity: None	Parity: None	Parity: None
Stop Bits: 1	Stop Bits: 1	Stop Bits: 1	Stop Bits: 1
Tx Delay: 20ms	Tx Delay: 20ms	Tx Delay: 20ms	Tx Delay: 20ms
Protocol: Modbus RTU	Protocol: Modbus RTU	Protocol: Modbus RTU	Protocol: Modbus RTU
		Mode: Slave	Mode: Slave

**Port 5 RJ45**

☐ Obtain an IPv4 address automatically  
☒ Use the following IPv4 address

IP Address: 10 0 0 1  
 Subnet Mask: 255 255 255 0  
 Default Gateway: 10 0 0 0

☐ Obtain an IPv6 address automatically  
☒ Use Modified EUI-64 IPv6 address

Warning: Misconfiguration of these settings could cause issues communicating with the meter.

**Port 6 Fiber**

☐ Obtain an IPv4 address automatically  
☒ Use the following IPv4 address

IP Address: 10 0 1 1  
 Subnet Mask: 255 255 255 0  
 Default Gateway: 10 0 1 0

Warning: Misconfiguration of these settings could cause issues communicating with the meter.

Advanced Network Settings

OK Cancel Help

The current Device Profile settings for the Nexus®1450 meter's 4 Communications ports are shown: address, baud rate, data bits, parity, stop bits, Tx (Transmit) delay, (communication) protocol, and mode. You may use the one of the Nexus® External Displays to learn the current baud rate, address and communication protocol of each meter port. *See the Nexus® 1450 Meter Installation and Operation Manual* for details.

3. Make changes to this screen according to your application requirements by clicking on the box or pull-down menu of any of the following settings:

- Address: assign an address to each port to communicate with other devices. Multiple Nexus® meters on an RS485 bus must each have a unique address set for the port that is connected to the bus.
- Baud Rate: from the pull-down menu, select 1200, 2400, 4800, 9600, 19200, 38400, 57600, or 115200. The baud rate entered in this field must match the baud rate of the device connected to the Nexus® 1450 meter at this port. Use 9600 for modem connections.
- Data Bits: this field is display only.
- Parity: None, Even, or Odd.
- Stop Bits: 1 or 2.
- TxDelay (Transmit Delay): use the pull-down menu to select from: 0ms, 10ms, 20ms, 30ms, 40ms, 50ms, 60ms, or 70ms. Leave the Tx delay at 0ms unless you are using equipment that requires a delay in the response time, such as a radio modem.
- Protocol: use the pull-down menu to select from Modbus RTU and Modbus ASCII. Direct connections made through CommunicatorPQA™ software must use either Modbus RTU or Modbus ASCII protocol (we recommend Modbus RTU).
- Mode: Select the serial port mode from the pull-down menu:
  - Serial ports 1 and 2 are Slave ports, which is the only option. Serial ports 3 and 4 can optionally be set as Slave ports.

- Serial ports 3 and/or 4 can be used for Output modules. To do so, set the port to Master (I/O modules) mode, and set the port's Baud Rate to 57600, which is the default Baud Rate for the I/O modules.
- Serial port 4 can be used as an RTU Master. To do so, select RTU Master from the Mode menu. This feature lets the meter poll up to 128 Modbus registers, for example, one Modbus register from 128 Modbus devices; or 128 Modbus registers from one Modbus device; 32 Modbus registers each from 4 Modbus devices.
- Network Card Settings: Port 5 is an RJ45 Ethernet port and Port 6 is a Fiber Optic Ethernet port. You may want to check with your Network Administrator for the correct settings to enter into these fields, since settings vary from network to network. The settings for these ports' cards are:
- IP Address: for the RJ45 Ethernet port - port 5, you have the following choices:
  - Enter the IPv4 address of the card.
  - Click "Obtain an IPv4 address automatically" to use DHCP to assign the IPv4 address to the card.
  - Click "Obtain an IPv6 address automatically" to use DHCP to assign an IPv6 address prefix to the card; the firmware will then generate a unique IPv6 address for the card.
  - Click "Use Modified EUI-64 IPv6 address" to use the EUI-64 method to assign an IPv6 address to the card.

**NOTES:**

- If you use DHCP for a Network card port, you cannot configure the card as an IEC 61850 Protocol server.
- You will see the DHCP options if your meter has Firmware version 4 or higher. See [21.5.1: DHCP, on page 21-4](#), for an explanation of DHCP.
- Port 6, the Fiber Optic port, does not support DHCP. Enter the meter's IP address.
  - Subnet Mask: enter the subnet mask.
  - Default Gateway: enter the Ethernet gateway's IP address.
- Advanced Settings button: click it to open a screen that lets you set Network card features for the Ethernet ports (ports 5 and 6); see Chapter 21: Total Web Solutions and the WebView™ Energy Dashboard, on page 21-1, for details.

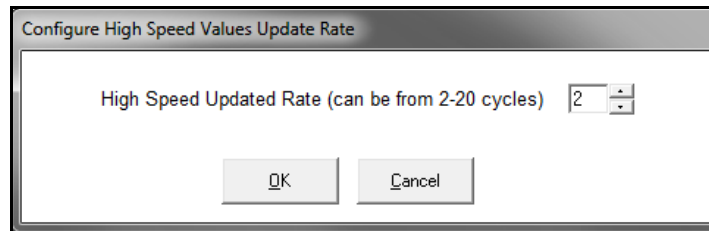
4. When all changes are entered, click OK to return to the main Device Profile screen. For these changes to take effect, you must click the Update Device button. This sends the new profile to the meter.

**IMPORTANT!** In order to prevent communications problems, be careful when making changes in the Communications Settings screen. For example, if you change the baud rate of the port connected to a computer, be sure to make the same change to the computer port's baud rate. If you change a port's address, be sure to update the address settings of any device that communicates with the port.

### 27.1.6: Configure High Speed Value Update Rate

The Configure High Speed Value Update Rate setting lets you configure the update rate for the meter's High Speed Inputs. You can set a number from two to 20 cycles. This number determines how often any values assigned to the High Speed Inputs are updated.

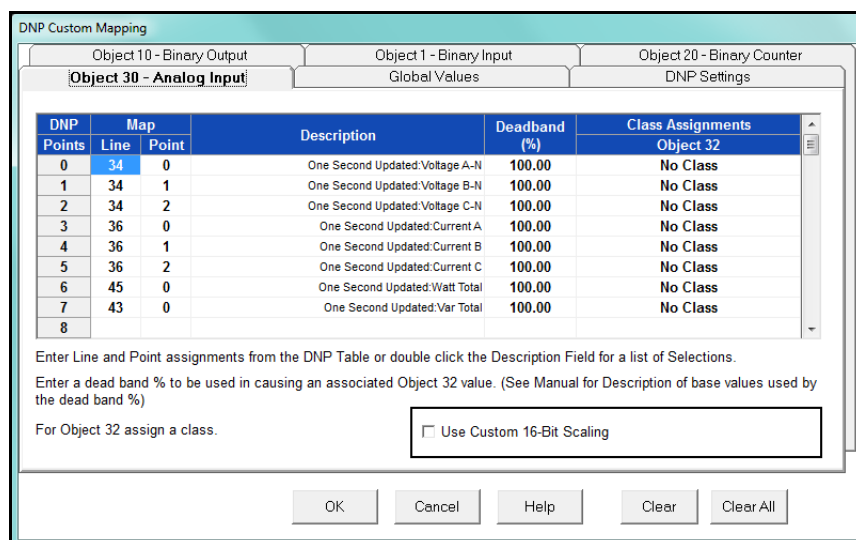
1. From the General Settings menu, double-click on the Configure High Speed Value Update Rate line. You will see the screen shown below.



2. Enter the number of cycles you want before an update is performed: enter a number from 2 to 20.
3. Click OK to save your changes and exit the screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 27.1.7: DNP Custom Classes Map

The DNP Custom Classes Map setting lets you set up DNP communication for the meter. From the General Settings menu, double-click on the DNP Custom Classes Map line and on the DNP Level 2 line. You will see the screen shown below. For details on programming the DNP Level 2 settings, see Chapter 22.



## 27.1.8: Custom Modbus Map

This setting lets you customize the meter's Modbus map to meet your application needs. You can select up to 256 meter data points in a block of 2048 registers (4096 bytes) and customize the order and format of the data points.

1. From the General Settings menu, double-click on the Custom Modbus Map line. You will see a screen like the one shown below, though most of the fields will be blank if you haven't yet set up this screen.

Custom Modbus Map

Item	Modbus Map Line	Point	Number of Registers	Start Register	Group	Channel	Format	Data Size	Unit	Primary / Secondary	Absolute Value	Byte Order	Display/Modulo/Offset
1	34	0	2	12289	One Second Phase to Neutral Volts	Volts AN	4 Byte IEEE Float	4 Byte	.001 Primary	No	MSR, MSB	N/A	
2	34	0	2	12291	One Second Phase to Neutral Volts	Volts AN	Unsigned Integer	4 Byte	.001 Primary	No	MSR, MSB	N/A	
3	34	0	2	12293	One Second Phase to Neutral Volts	Volts AN	Signed Integer	4 Byte	.001 Primary	No	MSR, MSB	N/A	
4	34	0	2	12295	One Second Phase to Neutral Volts	Volts AN	4 Byte IEEE Float	4 Byte	.001 Secondary	No	MSR, MSB	N/A	
5	34	0	2	12297	One Second Phase to Neutral Volts	Volts AN	Unsigned Integer	4 Byte	.001 Secondary	No	MSR, MSB	N/A	
6	34	0	2	12299	One Second Phase to Neutral Volts	Volts AN	Signed Integer	4 Byte	.001 Secondary	No	MSR, MSB	N/A	
7	34	0	2	12301	One Second Phase to Neutral Volts	Volts AN	4 Byte IEEE Float	4 Byte	.001 Primary	No	MSR, MSB	N/A	
8	34	0	2	12303	One Second Phase to Neutral Volts	Volts AN	Unsigned Integer	4 Byte	.001 Primary	No	MSR, MSB	N/A	
9	34	0	2	12305	One Second Phase to Neutral Volts	Volts AN	Signed Integer	4 Byte	.001 Primary	No	MSR, MSB	N/A	
10	34	0	2	12307	One Second Phase to Neutral Volts	Volts AN	4 Byte IEEE Float	4 Byte	.001 Secondary	No	MSR, MSB	N/A	
11	34	0	2	12309	One Second Phase to Neutral Volts	Volts AN	Unsigned Integer	4 Byte	.001 Secondary	No	MSR, MSB	N/A	
12	34	0	2	12311	One Second Phase to Neutral Volts	Volts AN	Signed Integer	4 Byte	.001 Secondary	No	MSR, MSB	N/A	
13	34	0	2	12313	One Second Phase to Neutral Volts	Volts AN	Unsigned Integer	4 Byte	.001 Secondary	No	MSR, MSB	N/A	
14	34	0	2	12315	One Second Phase to Neutral Volts	Volts AN	Unsigned Integer	4 Byte	.001 Secondary	No	MSR, LSB	N/A	
15	34	0	2	12317	One Second Phase to Neutral Volts	Volts AN	Unsigned Integer	4 Byte	.001 Secondary	No	LSR, MSB	N/A	
16	34	0	2	12319	One Second Phase to Neutral Volts	Volts AN	Unsigned Integer	4 Byte	.001 Secondary	No	LSR, LSB	N/A	
17	34	0	2	12321	One Second Phase to Neutral Volts	Volts AN	Unsigned Integer	4 Byte	1 Secondary	No	MSR, MSB	N/A	
18	34	0	2	12323	One Second Phase to Neutral Volts	Volts AN	Unsigned Integer	4 Byte	1 Secondary	No	MSR, MSB	N/A	

OK

Clear

Clear all

Cancel

Help

Registers

36 of 256

1. Data entry is straightforward. Each entry field is described below. Note that not all selections appear on the screen at the same time. Use the scroll buttons to view additional data/entry fields on the screen. Certain entries (such as Format, Data Size, etc.) have different allowable selections depending on the data point used. The pull-down menu adjusts to provide the appropriate selections for each data point.

- Data Point Selection: there are two different ways to select a data point:
  - a. Refer to the Nexus® 1450 meter's Modbus map and find the associated line and point for the value you want. When you enter those values into the screen table, the software displays the associated group and channel.
  - The Nexus® 1450 meter's Modbus Protocol Application Guide can be downloaded from the EIG website: [https://electroind.com/products/Nexus\\_1450/pdf/Nexus-1450-Meter-Modbus-Manual\\_E171707.pdf](https://electroind.com/products/Nexus_1450/pdf/Nexus-1450-Meter-Modbus-Manual_E171707.pdf).
  - b. Double-click the Group field. From the pull-down menus, select a group and its associated channel value. The software displays the map and line values.

- Number of Registers: this field is display only. The software computes the number in this field based on the data size selected in the Data Size column.
- Start Register: this field is display only. The software assigns and adjusts Start register numbers to take into account previous entries and data sizes. The Start register is the number of the first register used in polling. The Start registers are shown as 4x to describe them as holding registers, for SCADA applications.
- Format: from the pull-down menu, select a format type for a value, such as Signed Integer, Unsigned Integer, and 4 Byte IEEE Float.
- Data Size: from the pull-down menu, select the number of bytes you want to represent the data point: 2 Byte or 4 Byte.
- Unit: if the polled value is viewed as an integer, the Unit field tells the software where to place the decimal point.

**Examples**

- If you select .01, a polling value 1,800.92883 is interpreted as 180,092.883.
- If you select 100, a polling value 1234 is interpreted as 123400.
- Primary/Secondary: the meter normally computes values in secondary units. Where applicable, you may select primary or secondary. If Primary is selected, the value is multiplied by the appropriate CT and/or PT values.
- Absolute Value: where appropriate, you may have the option of having the data point computed as a signed or absolute value. Select either:
  - No: to have the data point computed as a signed value.
  - Yes: to have the data point computed as an absolute value.

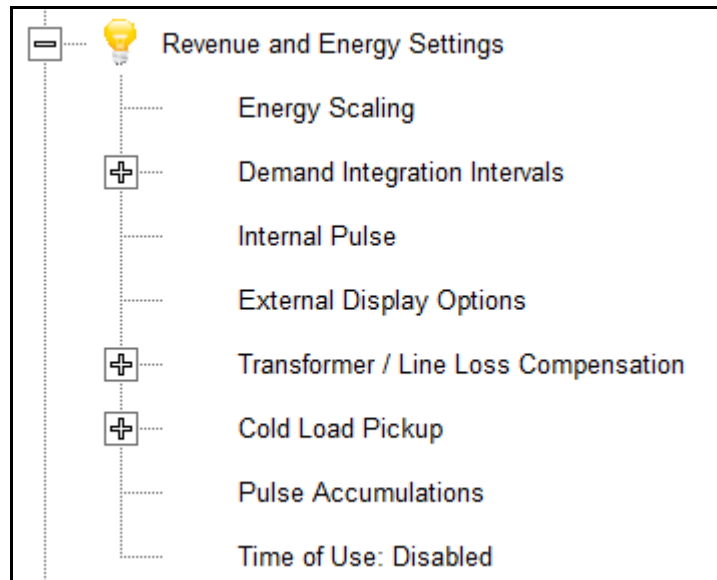


- **Byte Order:** for most of the data points, you can select the polling order of the registers/bytes to match what the SCADA system needs. The choices are: MSR, MSB (most significant register, most significant byte); MSR, LSB (most significant register, least significant byte); LSR, MSB (least significant register, most significant byte); and LSR, LSB (least significant register, least significant byte). EIG meters store data as MSR, MSB, whereas most SCADA systems use LSR, LSB. You can either select an alternate order here, for example, LSR, LSB, or you can leave the data as is and then have your SCADA system change the order after the data is polled.
  - **Display/Modulo/Offset:** depending on the data point, select one or more additional options with appropriate sub-selections.
    - **Display:** for certain data points, interpretation and display options are offered.  
**Example:** For "AN Angle" values, you can represent and display as 0 to 360 degrees or -180 to +180 degrees, etc. Selections appear in a pull-down menu for the associated point. You may want to select -180 to +180 degrees if you want to know if a phase angle is positive or negative in relation to the reference.
    - **Modulo:** Certain values are cumulative and can roll over and start recounting from zero. For those values, where required, you can enter a point at which the rollover will occur.
    - **Offset:** Where allowed, you can enter a value (offset) that will be added to the data point when it is computed.
3. Click OK to save your changes and exit the screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

## 27.2: Revenue and Energy Settings

Revenue and Energy Settings are the second group of settings in the Device Profile.

1. From the Device Profile screen, click on the + button next to Revenue and Energy Settings or double-click on the Revenue and Energy Settings line. All of the settings in the Revenue and Energy Settings group are listed.



2. Click on the programmable setting you want to modify. The following sections explain the settings in the Revenue and Energy Settings menu.

## 27.2.1: Energy Scaling

1. From the Revenue and Energy Settings menu, double-click on the Energy Scaling line. You will see the Energy Scale Settings screen.

To configure scaling for a reading, enter:  
 1. Number of Digits, 2. Number of Decimal Places,  
 3. Unit of Measurement; 4. Example of the resultant scaling is shown here

The screenshot shows the 'Energy Scale Settings' window. It contains a table with four columns: 'Item', 'Digits', 'Decimal Plac', 'Units', and 'Example'. Red arrows labeled 1, 2, 3, and 4 point to these columns respectively. The table lists various energy and power items with their corresponding settings. At the bottom are 'Apply' and 'Cancel' buttons.

Item	Digits	Decimal Plac	Units	Example
Quadrant 1+4 Wh	8	2		999999.99
Quadrant 1 Wh				
Quadrant 4 Wh				
Net Wh				
Quadrant 2+3 Wh	8	2		999999.99
Quadrant 2 Wh				
Quadrant 3 Wh				
Quadrant 1+2 VARh	8	2		999999.99
Quadrant 1 VARh				
Quadrant 2 VARh				
Quadrant 3+4 VARh	8	2		999999.99
Quadrant 3 VARh				
Quadrant 4 VARh				
Quadrant 1+2+3+4 VAh	8	2		999999.99
Quadrant 1 VAh				
Quadrant 2 VAh				
Quadrant 3 VAh				
Quadrant 4 VAh				
Internal Input Accumulators	8	2		999999.99
Internal Input Aggregators	8	2		999999.99
I Squared T	8	2		999999.99
V Squared T	8	2		999999.99
Qh	8	2		999999.99

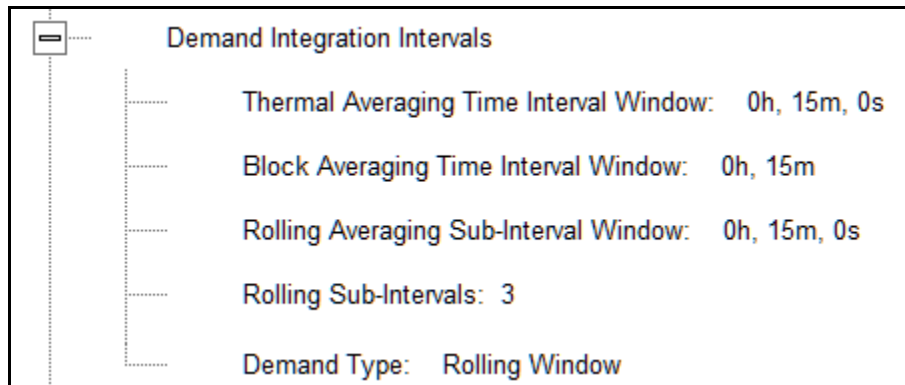
Apply Cancel

- Using the Energy Scale Settings screen you can select the number of digits, decimal point placement and Energy unit for displayed readings.
  - The Example field shows you the scaling choices you made applied to an example reading.
2. When you are done, click OK to return to the main Device Profile screen. For these changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 27.2.2: Demand Integration Intervals

See the *Nexus® 1450 Meter Installation and Operation Manual* for details on Demand intervals.

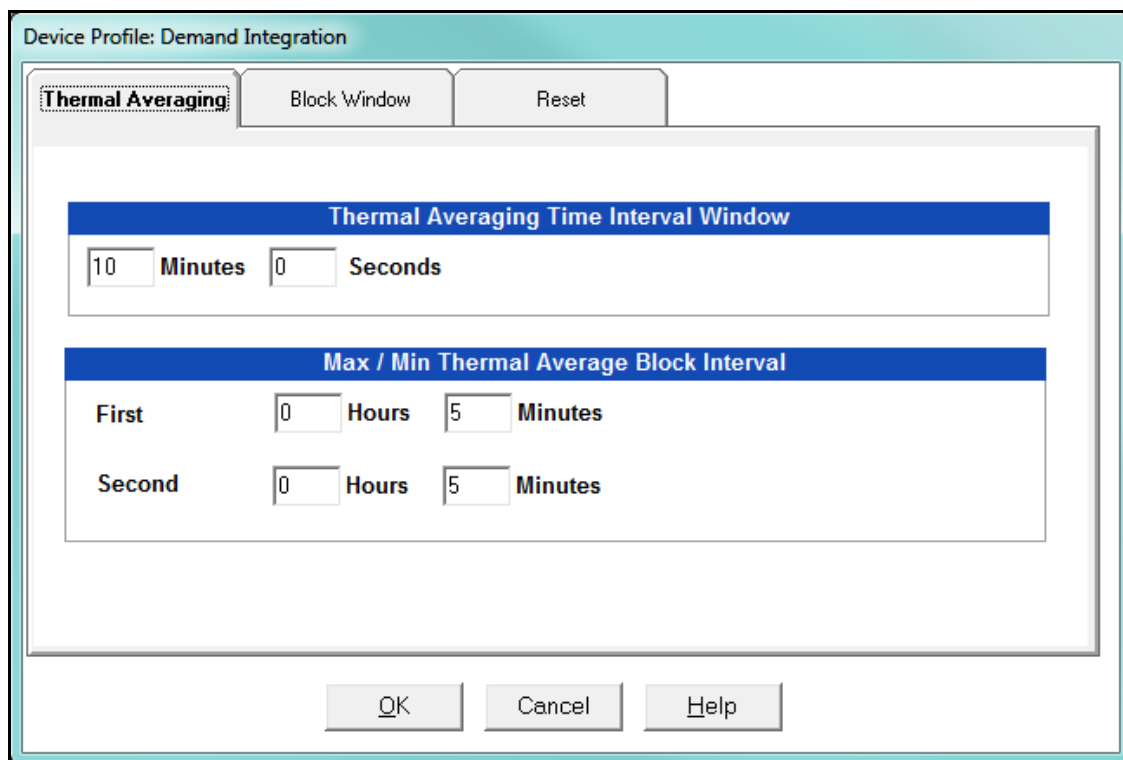
1. From the Revenue and Energy Settings menu, click on the + button next to Demand Integration Intervals or double-click on the Demand Integration Intervals line. You will see the submenu shown below.



The screenshot shows a submenu titled "Demand Integration Intervals". On the left is a vertical list of five items, each preceded by a small square icon. To the right of this list are the corresponding settings:

- Thermal Averaging Time Interval Window: 0h, 15m, 0s
- Block Averaging Time Interval Window: 0h, 15m
- Rolling Averaging Sub-Interval Window: 0h, 15m, 0s
- Rolling Sub-Intervals: 3
- Demand Type: Rolling Window

2. Double-click on any of the settings. You will see the screen shown below.



The screenshot shows a dialog box titled "Device Profile: Demand Integration". It has three tabs: "Thermal Averaging" (selected), "Block Window", and "Reset".

Under the "Thermal Averaging" tab, there are two main sections:

- Thermal Averaging Time Interval Window**: Contains two input fields. The first is labeled "10 Minutes" and the second is labeled "0 Seconds".
- Max / Min Thermal Average Block Interval**: Contains two rows of input fields. The first row is labeled "First" and the second row is labeled "Second". Each row has two input fields: "0 Hours" and "5 Minutes".

At the bottom of the dialog box are three buttons: "OK", "Cancel", and "Help".

3. Click on the tabs at the top of the screen to navigate from one setting to another. Make changes to the settings according to your application requirements. Following is a brief description of each setting and its function:

- Thermal Averaging (tab shown on previous page): use to set hours, minutes and seconds for a precise thermal window of demand data.  
Thermal Averaging (tab shown on previous page): use to set hours, minutes and seconds for a precise thermal window of demand data.
  - Traditional analog Watt-hour meters use heat-sensitive elements to measure temperature rises produced by an increase in current flowing through the meter. A pointer moves in proportion to the temperature change, providing a record of demand. The pointer remains at peak level until a subsequent increase in demand moves it again, or until it is manually reset.

The Nexus® 1450 meter mimics traditional meters to provide Thermal Demand readings. Electronic thermal demand emulation is the logarithmic average of the power used, with a more recent load being weighted more heavily than a less recent load, (approximated exponentially). Each second, as a new power level is computed, a recurrence relation formula is applied. This formula recomputes the thermal demand by averaging a small portion of the new power value with a large portion of the previous thermal demand value. The occurrence of the proportioning of new to previous is programmable, set by the averaging interval. The averaging interval represents a 90 change in thermal demand to a step change in power. So, for example, with a 15 minute set interval, the meter will record 90 of a change in load in 15 minutes, 99 in 30 minutes, and 99.9 in 45 minutes.

Because thermal demand emulation is the logarithmic average, the demand is not set to zero on a demand reset. On a demand reset, present demand becomes the new maximum demand.

- The Max/Min Thermal Average Block Interval fields are used if you want to track the maximum and minimum Demand in more than one interval, e.g., the Max and Min Demand in a 10 minute (First Interval) and a 15 minute interval (Second Interval).

- Block Window/Rolling Window: select the type of Demand Averaging to use - Block or Rolling - from the Demand Type pull-down menu:
  - Block Window settings: to set the length of the block interval used for Demand calculations and other interval-based functions; also used to set End of Interval pulse. Block averaging is also known as fixed window averaging. A window is the user set time range, e.g., 15 minutes. Computation is performed on that 15 minute interval, and after that, a new set of computations will be started. For example, Window 1 will be from 0 to 15 minutes, Window 2 will be from 16 to 30 minutes, and so on.

Device Profile: Demand Integration

Thermal Averaging    **Block Window**    Reset

Demand Type: Block Window

**Block Averaging Time Interval Window**

5 Minutes

**Block Window Sync**

High Speed Input Sync Disabled

☐ Generate End of Interval Pulse

Pulse Output # Test Pulse 1 (Enabled)    Pulse Width 530 milliseconds

OK    Cancel    Help

- Use the Hours, Minutes, and Seconds fields to set the length of the Block Interval.
- If you want to generate a pulse at the end of the set interval, check the box next to the Generate End of Interval Pulse field and select the pulse you want to use (choices are: Test Pulse 1, Test Pulse 2, Pulse Output 1, Pulse Output 2) and the pulse width (600 - 635 milliseconds).

**NOTE:** The Block Window Sync field indicates whether the meter is being synchronized with pulses from a High Speed input. This option is set in the Input Type field of the High Speed Inputs screen (see 27.3.5: IEC 61000-4-30 Harmonic & Interharmonic Thresholds, on page 27-69).

- **Rolling Window:** also known as a sliding window, functions like multiple, overlapping Block averages. You define the subintervals at which an average of Demand is calculated. A window duration is the user set time, such as 15 minutes, but it moves, so that, for example, Window 1 is 0 to 15, Window 2 is 1 to 16, Window 3 is 2 to 17, and so on.

Device Profile: Demand Integration

Thermal Averaging   **Rolling Window**   Reset

Demand Type: **Rolling Window**

**Rolling Averaging Sub-Interval Window**

3 Minutes

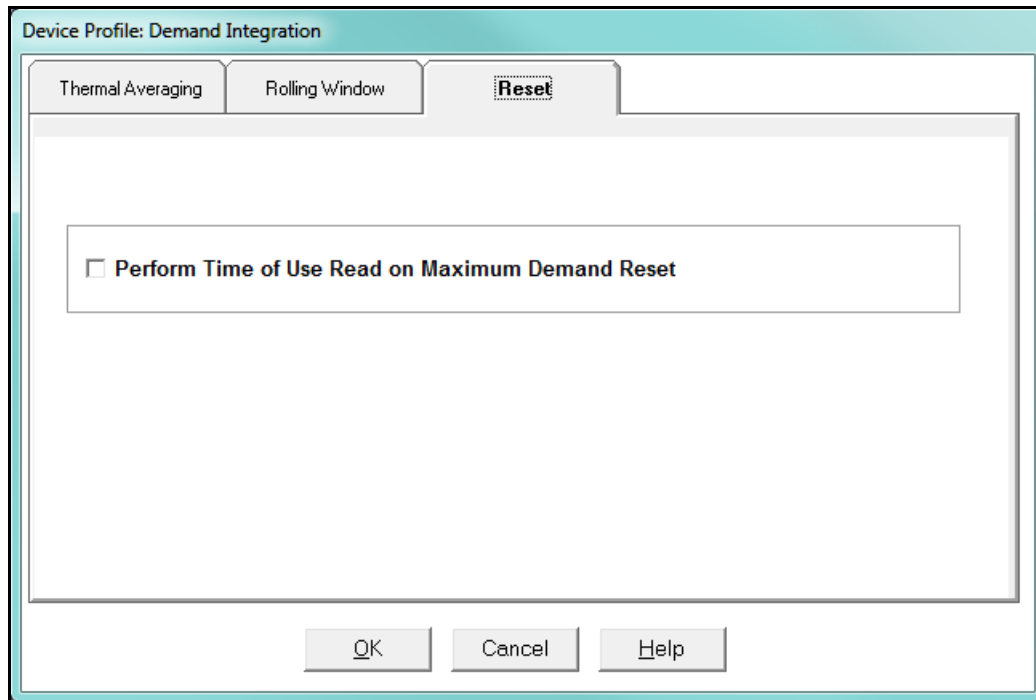
**Rolling Sub-Intervals**

2 Rolling Average Interval Window: 6.00 Minutes

OK   Cancel   Help

- Set the Hours and Minutes fields under Rolling Averaging Sub-Interval Window.
- Rolling Sub-Intervals: set the number of rolling windows you want to "string together." The display field shows the amount of time in the Rolling Average Interval Window (in the example screen above, 15 minute sub-intervals x 3 rolling sub-intervals = 45 minute rolling average interval window).

- **Reset:** Allows you to specify a Time of Use read whenever Maximum Demand is reset.



- Check the box to perform the TOU read. By selecting this, the meter will place all of the TOU values in the previous month's registers. Otherwise, the meter will default to self read based on a date set in the meter.
  - Leave the box unchecked if you don't want to perform a TOU read.
4. When all changes are entered, click OK to return to the main Device Profile screen. For these changes to take effect, you must click the Update Device button to send the new profile to the meter.



### 27.2.3: Internal Pulse

The Internal Pulse setting lets you assign channels to the meter's pulse outputs and to the test LEDs. The channel selection sets the type of pulse that will be generated. For example, the Test Pulse 1 LED can generate Energy Pulses for conventional testing or Reactive (VARh) Pulses for complex testing and approvals. This setting also allows you to determine the frequency and duration of the pulse for each output and LED.

1. From the Revenue and Energy Settings menu, click on the + button next to Internal Pulse or double-click on the Internal Pulse line. You will see the screen shown below.

Pulse Output	Assigned Channel	Watt Hour Per Pulse	Pulse Width(ms)	Mode	Form
Test Pulse 1 LED	Quad (1 + 4) Watthour	1.8000000	30	Disable	Pulse (Form A)
Test Pulse 2 LED	Quad (1+2+3+4) VAhour	1.0000000	50	Disable	Pulse (Form A)
Pulse Output 1	Quad (2 + 3) Watthour	1.8000000	150	Disable	Pulse (Form A)
Pulse Output 2	Quad (1+2+3+4) VAhour	0.0100000	50	Enable	Pulse (Form A)

Note: To configure a Relay to generate End of Internal Pulse, go to the Demand Integration Intervals settings.

OK Cancel Help

2. To make selections on this screen:
  - a. Select the assigned channel for the pulse/output. This is the demand that will be output as a pulse.
  - b. Enter Watt hour per pulse, pulse width, mode and form for each pulse/output.

#### NOTES:

- Form A = Pulse; Form C = Transition
- No more than one Pulse Output can be assigned as an Operation Status Output.

3. When all changes are entered, click OK to return to the main Device Profile screen.  
For these changes to take effect, you must click the Update Device button to send the new profile to the meter.

### **Considerations on Setting KYZ Outputs**

KYZ Pulses are produced at a rate proportional to the rate of energy accumulation, a feature that makes them useful for accuracy testing. Decreasing the value of the Watt Hour per Pulse field increases the pulse rate, improving the moment-to-moment precision of the output. The increased pulse rate means that the pulses are of shorter duration. Most equipment for detecting and counting pulses has a minimum detection time, so pulses that occur too rapidly might not be detected and counted.

The value in the Pulse Width field is used to force the meter to generate minimum width pulses in situations where proportional width pulses would occur too quickly to be measured. A pulse width setting that does not match appropriately with the input level and Watt hour per pulse setting will result in output that, in the short term, will not verify correctly.

For proper operation of this feature, the pulse width should be set to a value that is longer than the detection time required by the monitoring equipment, and shorter than the pulse period that the inputs and Watt hour per pulse setting would produce. The formula for the second quantity is:

$$\frac{3600 \times \text{Watt-hr per pulse}}{\text{Total Power}}$$

Some example cases are shown in the table below. For proper operation the pulse width should be set to a value that is less than the computed value of seconds per pulse.

Voltage Phase to Neutral/Phase		Current		Total Power Wh/Pulse	Pulses/Hour	Seconds/Pulse
Volts	Volts	Amps	Watts	Wh	Pulses	Seconds
69.28	120.00	1	207.85	1.8000000	115.47	31.18
69.28	120.00	1	207.85	0.2078461	1000.00	3.60
69.28	120.00	5	1039.23	1.8000000	577.35	6.24
69.28	120.00	5	1039.23	1.0392305	1000.00	3.60
120.00	207.85	1	360.00	1.8000000	200.00	18.00
120.00	207.85	1	360.00	0.3600000	1000.00	3.60
120.00	207.85	5	1800.00	1.8000000	1000.00	3.60
277.13	480.00	1	831.38	1.8000000	461.88	7.79
277.13	480.00	1	831.38	0.8313844	1000.00	3.60
277.13	480.00	5	4156.92	1.8000000	2309.40	1.56
277.13	480.00	5	4156.92	4.15629219	1000.00	3.60

### 27.2.4:Transformer / Line Loss Compensation

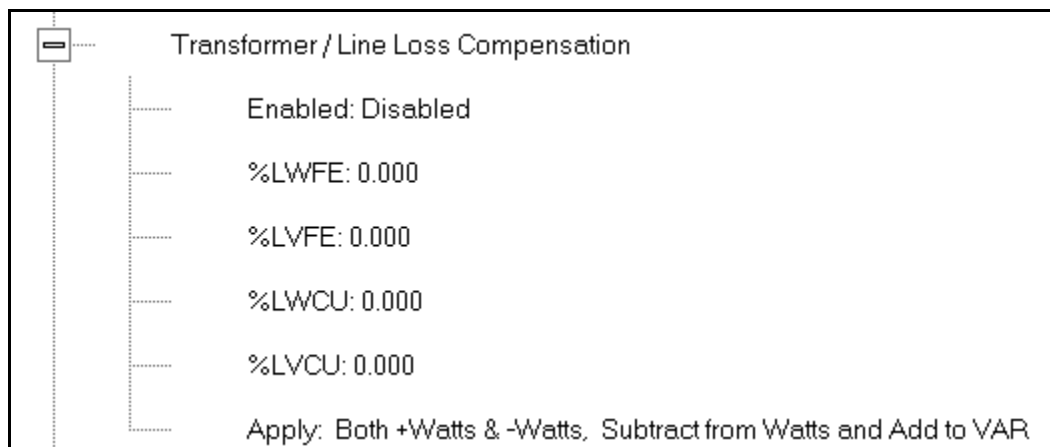
Transformer losses are power used by the transformer while working. The more load on the transformer, the higher the transformer losses. There are two types of transformer losses:

- No load losses - these are the fixed losses that keep the transformer up and running.
- Load losses - these vary with changes in the load.

When the meter is located on the secondary side of a customer's transformer, a utility will want to add the transformer losses into the energy usage calculation. However, this practice is regulated by local jurisdiction and regulations. The meter has the capability to add in or subtract out these transformer losses, depending on the user's specific needs.

Line losses are similar to transformer losses, except that they are used to compensate for loss incurred on wires, such as transmission lines.

1. From the Revenue and Energy Settings menu, click on the + button next to Transformer/Line Loss Compensation or double-click on the Transformer/Line Loss Compensation line. You will see the submenu shown below.



2. The menu displays the current values for the meter's Transformer Loss Compensation.

- LWFE = percent loss of Watts due to iron
- LVFE = percent loss of Vars due to iron

- LWCU = percent loss of Watts due to copper
  - LVCU = percent loss of Vars due to copper
3. Double-click on any of the loss values. You will see the screen shown below.

Device Profile: Transformer and Line Loss Compensation

**Percent Loss of Watts**

Due to Iron 0.000

Due to Copper 0.000

**Percent Loss of VARS**

Due to Iron 0.000

Due to Copper 0.000

Disabled

Subtract from Watts and Add to VAR

**Transformer and Line Loss Applies to**

Both +Watts and -Watts

☐ Disable When Current is Zero

OK TLC Calculator Cancel Help

4. Click on **TLC Calculator** to find the values to enter into the Percent Loss fields. The TLC Calculator button launches the TLC Calculator that performs the calculations for you once the required data is entered.

**NOTE:** Appendix A contains screen captures of the TLC Calculator with example numbers, and an explanation of Loss Compensation considerations.




5. Enter the percent loss of Watts and VARS for copper and iron in the appropriate fields.
6. Enable or Disable Transformer Loss Compensation with the first pull-down menu at the bottom of the screen. The optional selections are:
- Disabled
  - Iron (Fe) Only
  - Copper (Cu) Only

- Both Iron and Copper (Fe and Cu)
7. With the second pull-down menu, select from the following options:
- Add to Watts and Subtract from VAR
  - Subtract from Watts and Add to VAR
  - Add to Watts and VAR
  - Subtract from Watts and VAR
8. With the third pull-down menu, apply the loss based on the power flow direction by selecting one of the following options:
- Both +Watts and -Watts
  - -Watts only
  - +Watts only
3. When all settings are complete, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

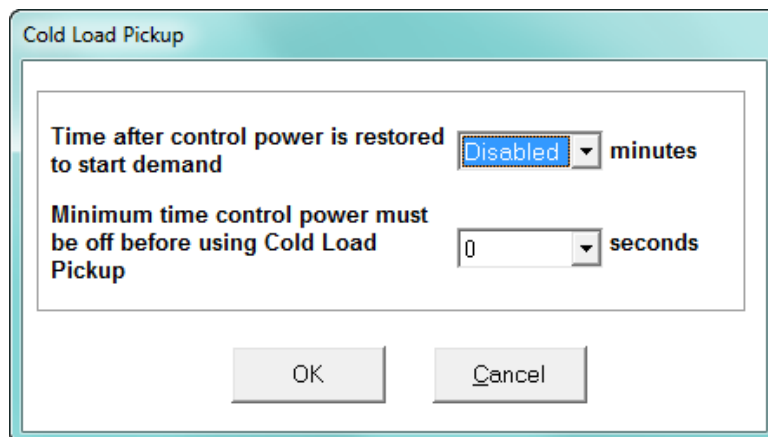
### 27.2.5: Cold Load Pickup

Cold Load Pickup is used to manage Demand in the event of a power outage. You set the amount of time (in seconds) power is off to identify a power outage that is the responsibility of the utility (as opposed to a very short term loss of power that is not their responsibility); then you set the amount of time (in minutes) you want to wait before Demand starts again. This time should correspond to the “grace” period the utility applies to avoid charging for motor startup, etc. after a power outage.

1. From the Revenue and Energy menu, click on the + button next to Cold Load Pickup or double-click on the Cold Load Pickup line. You will see the submenu shown below.

	Cold Load Pickup
	Time after control power is restored to start demand: Disabled
	Minimum time control power must be off before using Cold Load Pickup: 0 Second(s)

2. Double-click on one of the parameters to open the screen shown below.



The image shows a dialog box titled "Cold Load Pickup". It contains two settings: "Time after control power is restored to start demand" with a dropdown menu set to "Disabled" and the unit "minutes", and "Minimum time control power must be off before using Cold Load Pickup" with a dropdown menu set to "0" and the unit "seconds". At the bottom are "OK" and "Cancel" buttons.

3. Make the following selections in accordance with your application needs:

- Time after control power is restored to start demand - can be 1 to 60 minutes, or Disabled.
- Minimum time control power must be off before using Cold Load Pickup - can be from 0 to 255 seconds.

4. When all changes are entered, click OK to return to the main Device Profile screen. For these changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 27.2.6: Pulse Accumulations

Pulse accumulators are used to count and/or aggregate pulse information from external devices, using the High Speed inputs. These devices may be gas, water, or electricity meters; energy management systems; SCADA devices; or any pulse-generating device.

This section of the Device Profile displays a series of eight running totals available on the Nexus® 1450 meter. Each total can be added to (or subtracted from) other totals. This allows you to set the High Speed inputs located directly on the meter to accumulate pulses.

**NOTE:** If you use these inputs for pulse accumulations, do not set them to record waveforms - if you do, you will record endless waveforms.

1. From the Revenue and Energy Settings menu, click on the + button next to Pulse Accumulations or double-click on the Pulse Accumulations line. You will see the screen shown below.

Device Profile: Internal Input Pulse Accumulators Setup

Source	Units/Count	Aggregator	User Assigned Label	Mode	Average Full Scale
1	1	None	Accumulator1	Pulse (Form A)	1000000000000000
2	1	None	Accumulator2	Pulse (Form A)	1000000000000000
3	1	None	Accumulator3	Pulse (Form A)	1000000000000000
4	1	None	Accumulator4	Pulse (Form A)	1000000000000000
5	1	None	Accumulator5	Pulse (Form A)	1000000000000000
6	1	None	Accumulator6	Pulse (Form A)	1000000000000000
7	1	None	Accumulator7	Pulse (Form A)	1000000000000000
8	1	None	Accumulator8	Pulse (Form A)	1000000000000000

Source	Hour Reading	Aggregator
Device	Quadrant(1 + 4) Watt Hour	None

Aggregator	User Assigned Label	Average Full Scale
1	Aggregator 1	1000000000000000
2	Aggregator 2	1000000000000000
3	Aggregator 3	1000000000000000
4	Aggregator 4	1000000000000000

OK Cancel Help

2. High Speed inputs 1-8 are listed in order under Source. Enter the following information or use the pull-down menus to select:

- Units/Count - this is the scale factor that normalizes the pulses so that they can be aggregated. Pulses are stored in primary values.
- Aggregator - this allows you to place the pulse register into a separate accumulation register that can aggregate (add) or net (subtract) values.
- User Assigned Label - this window allows you to enter a label designation for the source.
- Mode - you can set Pulse or Transition. A transition means from open to shorted/closed or from shorted/closed to open; a pulse contains 2 transitions, open to shorted/closed, followed by shorted/closed to open.

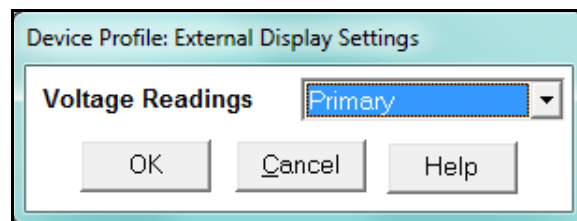


- Average Full Scale - for Nexus® meters, in order to set a limit on a reading it needs a Full Scale value as the 100 reference. You can set a limit on the average number of pulses per interval.
  - Device Hour Reading and Aggregator - source device is the meter you are connected to. The Hour reading is either Quadrant 1 and 4 Watt-hour or Quadrant 2 and 3 Watt-hour. The Aggregators indicate whether the count should be added to, or subtracted from, Aggregators 1-4. You can choose None if you don't want the count to affect any of the Aggregators.
  - Aggregators: The "buckets," or Totalizer fields where pulse counts from the High Speed inputs and from the Watt-Hour counters can be totaled. The user can assign a label to each of the Aggregators. See the Average Full Scale description above for an explanation of this field - it has the same use here, except for the Aggregators.
3. When all data has been entered, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 27.2.7: External Display Options

Many utility companies want to read secondary volts and primary power readings. This setting configures a P40N+ external display to read either primary or secondary Volts. All other readings will be in the primary, regardless of this setting.

1. From the Revenue and Energy Settings menu, double-click on the External Display Options line. You will see the screen below.

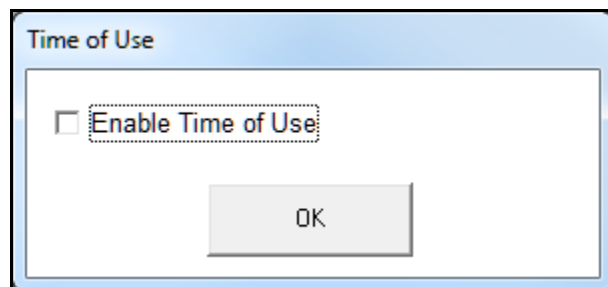


2. Use the pull-down menu to select either primary or secondary units for Voltage.
3. Click OK to return to the main Device Profile screen. For these changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 27.2.8: Time of Use

Use this setting to enable or disable the meter's Time of Use (TOU). Instructions for configuring the meter's TOU are in Chapter 15.

1. From the Revenue and Energy Settings menu, double-click on the Time of Use line.  
You will see the screen below.

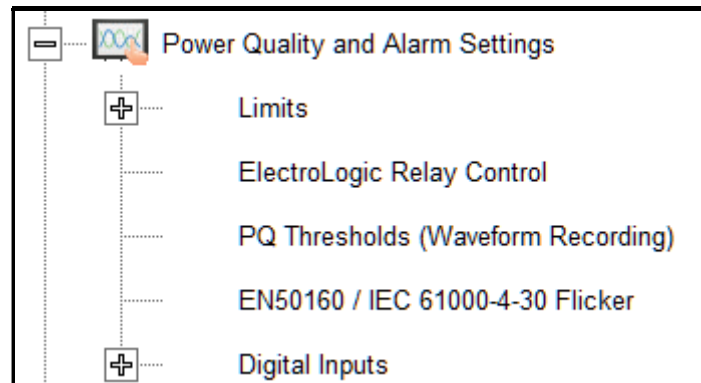


2. Check the box to enable TOU (uncheck the box to disable TOU).
3. Click OK to return to the main Device Profile screen. For changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 27.3: Power Quality and Alarm Settings

Power Quality and Alarm Settings are the third group of settings in the Device Profile.

1. From the Device Profile screen, click on the + button next to Power Quality and Alarm Settings or double-click on the Power Quality and Alarm Settings line. All of the settings in this group are listed.



2. Click on the programmable setting you want to modify. The following sections explain the settings in the order in which they appear in the Power Quality and Alarm Settings menu.

### 27.3.1: Limits

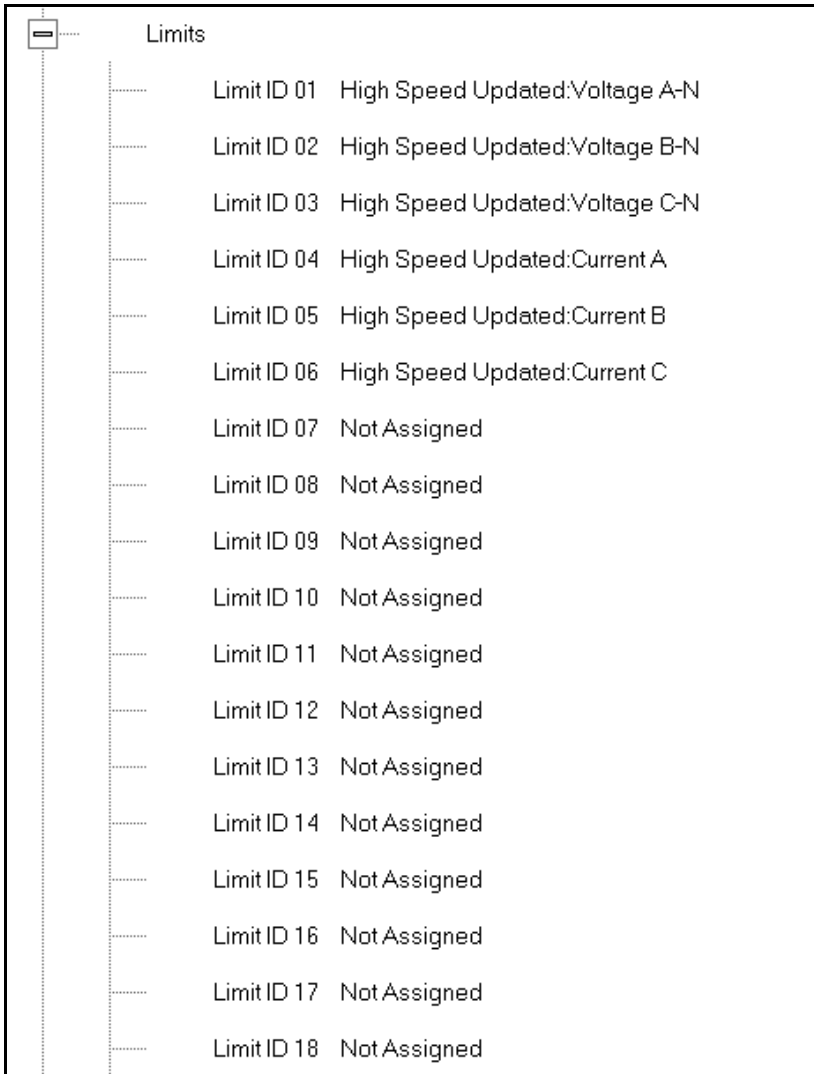
Limits are threshold settings that can be set by a user to trigger a record in a log when an alarm condition is met. Utilizing the limits, the user can then control a relay or send a warning email on that alarm.

Limit settings are based on a percentage of the Full Scale (% of FS), which is set in the Limit and Waveform Full Scales setting (see 27.1.2: Limit and Waveform Full Scales, on page 27-5). Full Scale is based on CT and PT ratios set in the CT, PT Ratios and System Hookup setting (see 27.1.1: CT and PT Ratios and System Hookup, on page 27-2). Limits are based on a percent of Full Scale settings so that the same settings can be used no matter what the CT and PT Ratio needed.

Before programming limits, set the CT and PT ratios. Then, set the Limit and Waveform Full Scales if you want to change to automatic configuration. In most cases the software will configure the Full Scale optimally.

**NOTE:** The software automatically updates the Full Scale; however, you can set it separately from the CT and PT Ratios.

1. From the Power Quality and Alarm Settings menu, click on the + button next to Limits or double-click on the Limits line. You will see the submenu shown below.



Limits	
Limit ID 01	High Speed Updated:Voltage A-N
Limit ID 02	High Speed Updated:Voltage B-N
Limit ID 03	High Speed Updated:Voltage C-N
Limit ID 04	High Speed Updated:Current A
Limit ID 05	High Speed Updated:Current B
Limit ID 06	High Speed Updated:Current C
Limit ID 07	Not Assigned
Limit ID 08	Not Assigned
Limit ID 09	Not Assigned
Limit ID 10	Not Assigned
Limit ID 11	Not Assigned
Limit ID 12	Not Assigned
Limit ID 13	Not Assigned
Limit ID 14	Not Assigned
Limit ID 15	Not Assigned
Limit ID 16	Not Assigned
Limit ID 17	Not Assigned
Limit ID 18	Not Assigned

This submenu displays the current Device Profile Limit settings. Not all limits are shown in the figure above: there are 32 Limit ID fields.

- Double-click on any of the settings (Limit ID 01, for example). You will see the Limits screen, shown below.

Device Profile: Limits

Limit ID	Assigned Item	Setting	Limit 1		Setting	Limit 2		Combination Limit 3
			% of FS	Primary		% of FS	Primary	
1	High Speed Updated:Voltage A-N	Above	120.00	17.28K	Below	80.00	11.52K	AND
2	High Speed Updated:Voltage B-N	Above	120.00	17.28K	Below	80.00	11.52K	AND
3	High Speed Updated:Voltage C-N	Above	120.00	17.28K	Below	80.00	11.52K	AND
4	High Speed Updated:Current A	Above	120.00	6000.00	Below	80.00	4000.00	AND
5	High Speed Updated:Current B	Above	120.00	6000.00	Below	80.00	4000.00	AND
6	High Speed Updated:Current C	Above	120.00	6000.00	Below	80.00	4000.00	AND
7	Not Assigned	Below	0.00	0.00	Below	0.00	0.00	AND
8	Not Assigned	Below	0.00	0.00	Below	0.00	0.00	AND
9	Not Assigned	Below	0.00	0.00	Below	0.00	0.00	AND
10	Not Assigned	Below	0.00	0.00	Below	0.00	0.00	AND
11	Not Assigned	Below	0.00	0.00	Below	0.00	0.00	AND
12	Not Assigned	Below	0.00	0.00	Below	0.00	0.00	AND

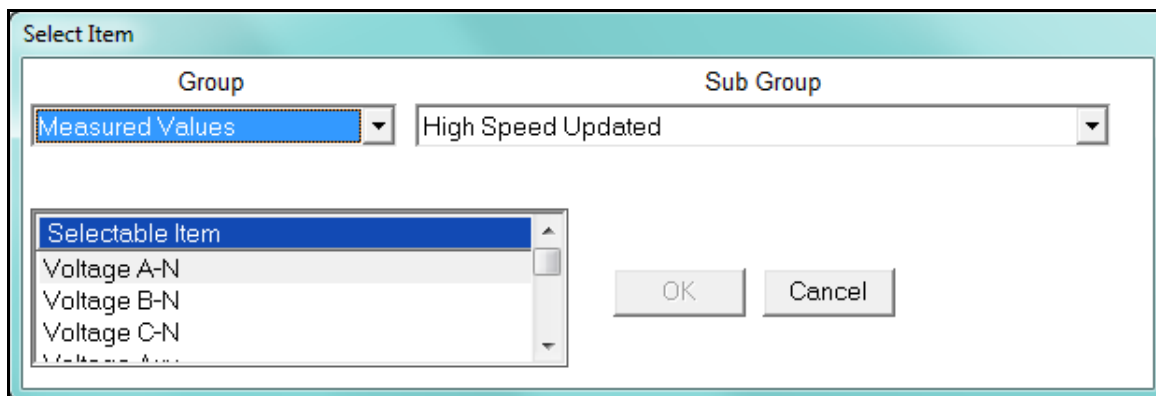
  

Channels	Primary Values at 100%
I A, B, C, Nc	5000.00
I Nm	5000.00
V Phase to Neutral	14.40k
V Aux	14.40k
V Phase to Phase	24.94k
Power Phase	72.00M
Power Total	216.00M
Frequency	60.00

OK Cancel Help

- This screen can be expanded to show all of the limits. Click on the top or bottom of the screen to display sizing arrows you can click on and drag to expand the screen.
  - Percentage of Full Scale settings (% of FS): The limits are set in % of Full Scale so that when you create a profile, you can keep your settings. This is true, even though the CT and PT ratios change when the meter (or a new meter) is placed in a different location. Changing the CT and PT ratios does not affect the % of Full Scale limits previously set. This is useful when you are using large numbers of meters because one profile can be used with a common set of limit settings no matter what the CT and PT ratio. Full Scale reference information is available in the lower left box.
- Make changes to this screen according to your application requirements.
    - To set the type of limit and the channel assigned to it:

- a. Double-click in either the Limit ID or Assigned Item column. You will see the screen shown below.



- b. From the pop-up menus, choose the desired settings and click OK. Following is a list of the available Groups, Sub Groups, and Items.

Group: Measured Values

Sub Group: High Speed Updated

Item: Voltage A-N

Voltage B-N

Voltage C-N

Voltage Aux

Current A

Current B

Current C

Current N Measured

Voltage A-B

Voltage B-C

Voltage C-A

VA A

VA B

VA C

VA Total

VAR A

VAR B

VAR C

VAR Total

Watt A

Watt B  
Watt C  
Watt Total  
Frequency  
Power Factor A  
Power Factor B  
Power Factor C  
Power Factor Total  
Volts A-Aux Phase Angle  
Sub Group: One second updated  
Item: Voltage A-N  
Voltage B-N  
Voltage C-N  
Voltage Aux  
Current A  
Current B  
Current C  
Current N Measured  
Current N Calculated  
Voltage A-B  
Voltage B-C  
Voltage C-A  
VA A  
VA B  
VA C  
VA Total  
VAR A  
VAR B  
VAR C  
VAR Total  
Watt A  
Watt B  
Watt C  
Watt Total  
Frequency  
Power Factor A



Power Factor B  
Power Factor C  
Power Factor Total  
Voltage Imbalance  
Current Imbalance  
Uncompensated VA A  
Uncompensated VA B  
Uncompensated VA C  
Uncompensated VA Total  
Uncompensated VAR A  
Uncompensated VAR B  
Uncompensated VAR C  
Uncompensated VAR Total  
Uncompensated Watt A  
Uncompensated Watt B  
Uncompensated Watt C  
Uncompensated Watt Total  
THD Volts A  
THD Volts B  
THD Volts C  
THD Current A  
THD Current B  
THD Current C  
K Factor Current A  
K Factor Current B  
K Factor Current C  
Internal Temperature

Sub Group: Harmonic Values

Item: 0 - 127th Harmonic on selectable Harmonic Magnitude  
(Voltage Phases A, B, and C; Current Phases A, B, and C)

Sub Group: Internal Inputs, States

Item: Internal Inputs 1-8

Sub Group: Phase Angles

Item: Phase A-N Voltage  
Phase B-N Voltage  
Phase C-N Voltage

Phase A Current  
Phase B Current  
Phase C Current  
Phase A-B Voltage  
Phase B-C Voltage  
Phase C-A Voltage  
Volts A-Aux Phase Angle  
Voltage Phase Sequence

Sub Group: Flicker

Item: Flicker: PInst Volts A

Flicker: PInst Volts B  
Flicker: PInst Volts C  
Flicker: PST Volts A  
Flicker: PST Volts B  
Flicker: PST Volts C  
Flicker: PLT Volts A  
Flicker: PLT Volts B  
Flicker: PLT Volts C

Group: Averages

Sub Group: Thermal Average

Item: Voltage A-N

Voltage B-N  
Voltage C-N  
Voltage Aux  
Current A  
Current B  
Current C  
Current N Measured  
Current N Calculated  
Voltage A-B  
Voltage B-C  
Voltage C-A  
VA A  
VA B  
VA C  
VA Total

VAR A

VAR B

VAR C

VAR Total

Watt A

Watt B

Watt C

Watt Total

Frequency

Power Factor A

Power Factor B

Power Factor C

Power Factor Total

Voltage Imbalance

Current Imbalance

Sub Group: Block Window Average

Item: VA

VAR

Watt

Sub Group: Pulse Accumulation/Aggregation Block Window Average

Item: Internal Inputs #1 - #8

Aggregators #1 - #4

Sub Group: Rolling Window Average

Item: Predictive VA

Predictive VAR

Predictive Watt

VA

VAR

Watt

Sub Group: Voltage and Current Means

Item: Volts PN

Current P

Volts PP

Group: External I/O Devices

Sub Group: Analog Input Modules

Item: Module 1: Analog Input 1 - Analog Input 8

Module 2: Analog Input 1 - Analog Input 8

Module 3: Analog Input 1 - Analog Input 8

Module 4: Analog Input 1 - Analog Input 8

- To designate the limit as either above or below a percentage of the Full Scale, click once in each Settings column and select the desired setting from the pull-down menu.
- To set the percentage of the Full Scale that will trip the limit, enter the value in the % of FS column. CommunicatorPQA™ software automatically calculates the Primary value.
- Combination Limit 3 is the logical combination of Limit 1's state and Limit 2's state.

### **Example 1**

#### Limit I D

Type: 1 Second Readings

Channel: Volts AN

Limit 1 Setting: Limit exceeded if Volts AN is below 120 F.S.

Limit 2 Setting: Limit exceeded if Volts AN is above 80 F.S.

Combination Limit 3 Setting: AND

If Limit 1 AND Limit 2 are tripped (e.g., the reading is 100F.S.), then Limit 3 is tripped.

### **Example 2**

#### Limit I D

Type: 1 Second Readings

Channel: Volts AN

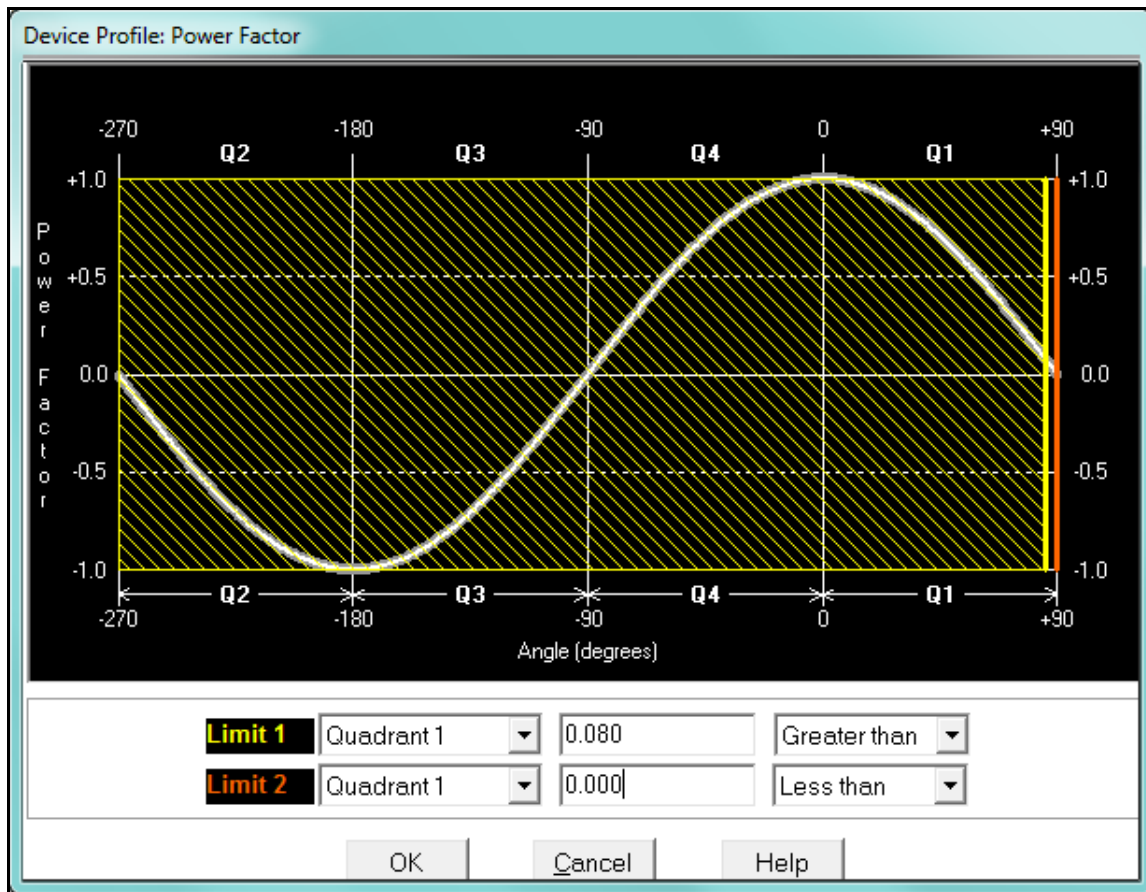
Limit 1 Setting: Limit exceeded if Volts AN is above 120 F.S.

Limit 2 Setting: Limit exceeded if Volts AN is below 80 F.S.

Combination Limit 3 Setting: OR

If either Limit 1 OR Limit 2 is tripped (e.g., the reading is 75), then Limit 3 is tripped.

- Full Scales settings are shown in the lower left of the screen. These values are set in the Limits and Waveform Full Scales section of the Device Profile (see 27.1.2: Limit and Waveform Full Scales, on page 27-5).
3. Power Factor is broken into four quadrants. Selecting the Full Scale value brings up a screen that lets you set a limit in two of the four quadrants.
- To set the power factor limits, double click on any of the power factor settings in the Limit 1 or Limit 2 columns. You will see the Power Factor screen.



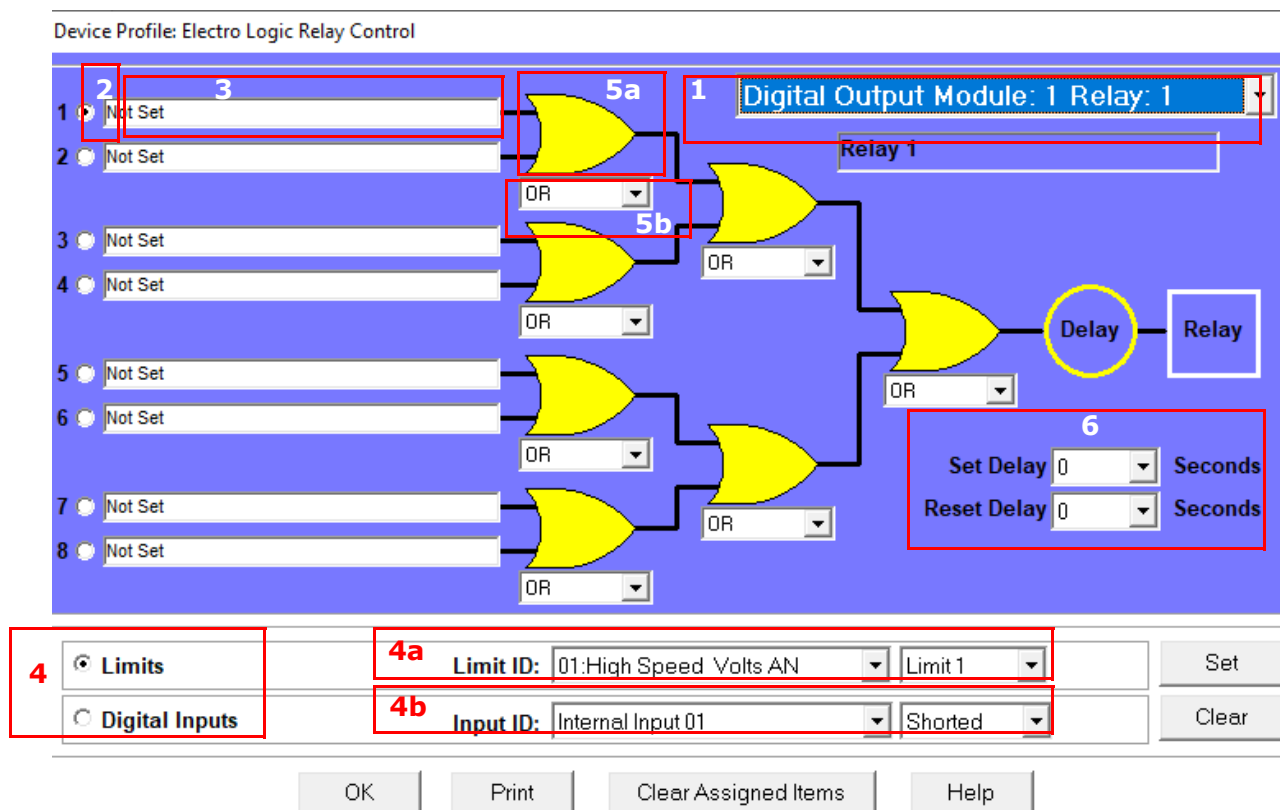
- To set a limit: from the pull-down menus, select a quadrant and Less Than or Greater Than (Full Scales). Enter the power factor number. The graph will illustrate your selections by shading the out of limit bands. The area of the graph not covered by shading is within normal operational range.
- NOTE:** Whether you see method 1 Quadrants (Q1 +Lag, Q2 -Lag, Q3 -Lead, Q4 +Lead) or method 2 Quadrants (Q1 +Lag, Q2 -Lead, Q3 +Lag, Q4 -Lead) depends on the setting in the Power Factor Display field of the Labels setting (see 27.1.4: Labels, on page 27-13).

**NOTE:** The Nexus® 1450 device is a four-quadrant meter. Therefore, limits can be set for capacitive and inductive PF when generating or consuming power.

3. When all settings are complete, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 27.3.2: Electrollogic Relay Control

1. From the Power Quality and Alarm Settings menu, double-click on the Electro-Logic™ Relay Control line. You will see the screen shown below.



ElectroLogic™ Relay Control lets you set up a logic tree to control the meter's optional relays. Each relay can be programmed individually. The end result of the logic tree is to set, or not set, a relay, with an optional programmed Set Delay and/or Reset Delay. The initial inputs to the logic tree are chosen from among the 32 Limits and 40 Digital Inputs (both internal and external inputs). The gates, in several stages, perform logical combinations (AND, OR, etc) on pairs of inputs (either initial inputs or the outputs of earlier gates), and in combination produce an ultimate "true" or "false" state to drive the relay open or closed.

For example, one of the gates is AND. For data to pass an AND gate, both pieces of data must be "true." For a Limit to be true, the data must be in the Out-of-Limit condition on either Limit 1, Limit 2, or both (you decide which). For a Digital Input to be true, it must be in the condition you specify - either Open or Shorted.

The gates used in ElectroLogic™ Relay Control are used as follows:

OR: If either or both of the two conditions are true, the gate is passed

AND: If both of the conditions are true, the gate is passed

Hysteresis: For Limits only, the if the Limit is within the programmed hysteresis value, the gate is passed

XOR: If either of the two conditions are true, but not both, the gate is passed

NOR: If either of the two conditions are true, the gate is not passed

NAND: If both of the two conditions are true, the gate is not passed

NHysteresis: For limits only, if the Limit is within the programmed hysteresis value, the gate is not passed

NXOR: If either of the two conditions are true, but not both, the gate is not passed

**NOTE: See Example settings on page 27-53.**

2. To assign an item to the Relay Logic tree:

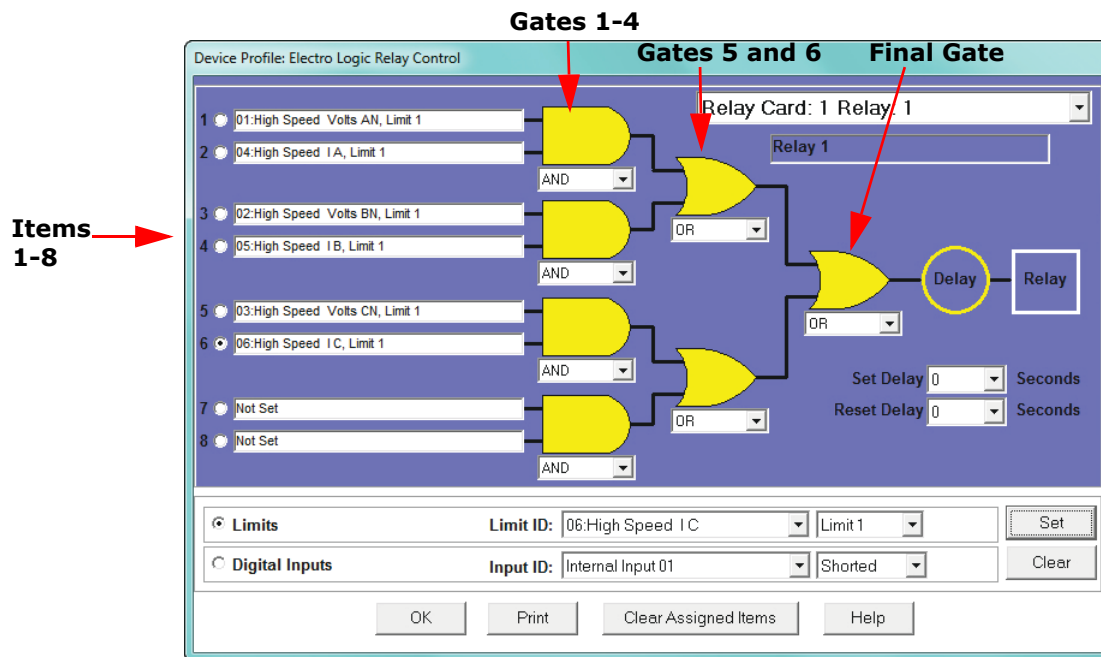
- a. Select the relay card/module from the pull-down menu - see number 1 in the screen on the previous page.
- b. Select an input for the tree by clicking on a radio button next to numbers 1 through 8 - see number 2 in the screen on the previous page.
- c. Choose Limits or Digital Inputs by clicking on the radio button in front of the word - see number 3 in the screen on the previous page.
- d. From the pull-down menus, select the limit (Limit ID) or input (Input ID) you want to assign to this Relay Logic tree input (step b) - see number 4 in the screen on the previous page.
  - For a limit, use the second pull-down menu to select Limit 1, Limit 2, or Combination - see number 4a in the screen on the previous page.
  - For an input, use the second pull-down menu to select Shorted or Open - see number 4b in the screen on the previous page.

- e. Press Set to confirm your selection. The software places the selection in the appropriate field in the screen.
3. After you assign all the Relay Logic inputs, select the gates that will be used to combine the logic to trigger the relay. To select a gate type, either:
  - Click on the gate (yellow fields) - see number 5a in the screen on page 11-50.
  - Choose a gate type from the pull-down menu below the gate - see number 5b in the screen on page 11-50.
4. If you want, select Set Delay and Reset Delay from the pull-down menus. You can choose between 0 and 255 seconds. Use these fields if you want to program a delay before the relay is set, or before it is reset - see number 6 in the screen on page 11-50.
5. To change items on the Relay Logic tree, follow the previous steps.
  - To clear an item from the Relay tree, click on that item and click the Clear button.
  - To clear all items from the Relay Tree, click the Clear Assigned Items button.
6. When all settings are complete, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

**NOTE:** In order to use this screen, you must have purchased at least one Relay Option card or one External Relay Output module. For more details on external Output modules, see Chapter 14.



### Example of an ElectroLogic™ Relay Logic Tree:



Inputs 1 through 8 are set to High Speed Volts AN Limit 1, High Speed Amps A Limit 1, High Speed Volts BN Limit 1, High Speed Amps B Limit 1, High Speed Volts CN Limit 1, High Speed Amps C Limit 1, Not Set and Not Set. The four first gates are AND gates, and the remaining three gates are OR gates.

Each first level gate looks at the state of the two limits, and the result is "true" if and only if both the inputs (Voltage Limit and Current Limit) are "true" (Out-of-Limit Condition). The second and third level gates look at the state of the earlier gates, and their results are "true" if either one (or both) of the previous gates are "true". The end result is a relay that is energized if one or more of the three phases (A, B, and/or C) is currently Out-of-Limit on both its voltage and current Limit 1 tests.

### 27.3.3: PQ Thresholds (Waveform Recording)

The PQ Thresholds/Waveform Recording capability allows the meter to act as a high-speed waveform recorder to record any anomaly that occurs within a cycle of duration. This provides a user with advanced waveform analysis including pre- and post-waveform recording.

The meter has the capability to record both surges and sags of the measured signals. A voltage surge is any event that increases the RMS voltage for one cycle, calculated every half cycle. A voltage sag is a dip in the RMS of one cycle of voltage, calculated every half cycle. A current fault (or surge) is also calculated in the same manner. When the RMS value of any of these triggers exceeds the threshold settings, the meter will trigger a waveform capture.

The Power Quality (PQ) and Waveform Thresholds setting determines at what point the Nexus® 1450 meter executes a waveform capture and/or records a power quality event.

See Chapter 19 for instructions on viewing Waveform and PQ logs.

**NOTE:** The 1450 meter also supports Manual Waveform capture. See 20.1.13: Manual Waveform Capture, on page 20-20.

PQ and Waveform Thresholds are given as a percentage of the Full Scales (% of FS). Set the Full Scales in the Limits and Waveform Full Scales setting of the Device Profile (see 27.1.2: Limit and Waveform Full Scales, on page 27-5). Full Scales are based on the CT and PT ratios set in the CT, PT Ratios and System Hookup setting of the Device Profile (see 27.1.1: CT and PT Ratios and System Hookup, on page 27-2).

Before programming the PQ and Waveform Thresholds, set the CT and PT ratios and the Limits and Waveform Full Scales.

**Note on Sampling Rate:** A higher sampling rate allows for transients to be monitored. Generally, the meter is set to take 1024 samples per cycle for this purpose. Lower sampling rates have advantages, however, because they allow you to record more cycles of information per event. Therefore, low sampling rates are better for long duration events, like motor starts or distribution faults. The meter enables you to tailor its recording for both these applications. For more information on sampling rate, see the table on page 27-62.

**Note for Wide Band Auto Frequency Setting:** If your meter is set to Wide Band Auto for frequency and your intended working frequency is either 200 Hz or 400 Hz, we recommend you set a waveform capture sample rate higher than 64 samples per cycle at 60 Hz, to avoid getting misleading results.

1. From the Power Quality and Alarm Settings menu, double-click on the PQ Thresholds (Waveform Recording) line. You will see the screen shown below

Waveform and Voltage Interruption Settings

**Voltage RMS Triggers**

**Current RMS Triggers**

Voltage RMS Triggers (Fixed)											
Voltage Channel		Above Setpoints				Below Setpoints				Waveform Enable	PQ Enable
		Value(%)	Primary	Return Hysteresis Value(%)	Primary	Value(%)	Primary	Return Hysteresis Value(%)	Primary		
1	AN	110.00	15.84k	108.00	15.55k	90.00	12.96k	92.00	13.25k	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2	BN	110.00	15.84k	108.00	15.55k	90.00	12.96k	92.00	13.25k	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3	CN	110.00	15.84k	108.00	15.55k	90.00	12.96k	92.00	13.25k	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
7	Aux	110.00	15.84k	108.00	15.55k	90.00	12.96k	92.00	13.25k	<input type="checkbox"/>	<input type="checkbox"/>

Limits are based on: ☒ Fixed RMS ☐ U<sub>SR</sub>

Group	Full scale
Volt AN, BN, CN	14.40k
Volt AB, BC, CA	24.94k
Volt Aux	14.40k
IA, B, C	5000.00
IN	5000.00

Enabled High Speed Input Triggers								
Input #	1	2	3	4	5	6	7	8
Enabled	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Sampling Rate: 128 Samples per cycle @ 60Hz

Pre Trigger Cycles: 24

Post Trigger Cycles: 36

Total Waveform Capture Windows per event: 1

OK Cancel Help

2. This screen allows you to set the voltage RMS triggers, the current RMS triggers, and the voltage transients triggers for waveform recording. It also allows you to set the voltage interruption settings for IEC61000-4-30 Class A recording. Use the tabs at the top of the screen to navigate between the voltage, current, and voltage transient and settings.

**NOTES:**

- The Waveform clipping threshold for the Nexus® 1450 meter is 66.7A RMS and 1140V RMS on the secondary side of all channels.
  - The High Speed Inputs field allows you to see which High Speed Digital input is enabled for Waveform recording. You assign the High Speed input to its trigger in the Digital Inputs screen. (Flicker is discussed in detail in Chapter 23.)
  - Voltage and current Full Scale values are shown in the lower left corner of the screen.
3. The Voltage setpoints are used to record voltage type events, such as voltage surges and sags. To set the Voltage RMS triggers for a PQ event and waveform capture (Voltage RMS Triggers tab):
- a. Select either Fixed RMS or  $U_{SR}$  (radio buttons).

**NOTE on  $U_{SR}$  Setting:** The  $U_{SR}$  setting lets you configure waveform capture thresholds based on sliding reference voltage rather than Full Scale (see instructions on the next page). This is useful if you know your line voltage will be varying and you want the voltage reference to be adjusted accordingly.

The formula used is as follows:

$$U_{SR}n = 0.9967 \times U_{SR(n-1)} + 0.0033 \times U_{(10/12)rms}$$

where

$U_{SR}n$  is the present value of the sliding reference voltage;

$U_{SR(n-1)}$  is the previous value of the sliding reference voltage; and

$U_{(10/12)rms}$  is the most recent 10/12-cycle RMS value.

When the measurement is started, the initial value of the sliding reference voltage is set to the programmed input voltage. The sliding reference voltage is computed every 10/12-cycles. If a 10/12-cycle is flagged as being out-of-limits, that voltage is not used - the previous sliding reference voltage is used instead.

b. If you select Fixed RMS:

- i. Enter the desired percentage of Full Scale in the Value() column of the Above setpoints and Below setpoints sections. After you make an entry, the Primary field (display only) adjusts accordingly. When the RMS value crosses the setpoint, a capture is taken.
- ii. Enter the desired percentage for Return Hysteresis for the Above and Below setpoints. After you make an entry, the Primary field (display only) adjusts accordingly. Hysteresis is the value that must be met for the out of limit condition to be considered ended. Hysteresis is useful in preventing excessive out of limit conditions when the readings are hovering around a setpoint, since it dictates that the readings must recover to a certain level before dropping again in order for them to be considered out of limit.
- iii. Click the box(es) to enable Waveform Recording (Waveform Enable box) and/or PQ Recording (PQ Enable box).

- c. If you have a load with slowly changing voltage, you probably do not want to use Full Scale as your reference point. In that case, you can use the  $U_{SR}$  function to set up a sliding reference voltage rather than a Full Scale voltage reference. Follow these instructions:

- i. Click the  $U_{SR}$  button. The top of the screen changes as seen in the example below.

Waveform and Voltage Interruption Settings

**Voltage RMS Triggers**      **Current RMS Triggers**

Voltage RMS Triggers (Usr)					
Voltage Channel		Above Setpoints	Below Setpoints	Waveform Enable	PQ Enable
ID		Value(%)	Value(%)		
1	AN	110.00	90.00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2	BN	110.00	90.00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3	CN	110.00	90.00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
7	Aux	110.00	90.00	<input type="checkbox"/>	<input type="checkbox"/>

Limits are based on: ☐ Fixed RMS      ☒  $U_{SR}$

Group	Full scale
Volt AN, BN, CN	120.00
Volt AB, BC, CA	208.00
Volt Aux	120.00
IA, B, C	5.00
IN	5.00

Enabled High Speed Input Triggers								
Input #	1	2	3	4	5	6	7	8
Enabled	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Sampling Rate: 128      Samples per cycle @ 60Hz

Pre Trigger Cycles: 10

Post Trigger Cycles: 170

Total Waveform Capture Windows per event: 1

OK      Cancel      Help

- ii. Enter the desired percentage of the sliding reference voltage in the Value(%) column of the Above setpoints and Below setpoints sections.
- iii. Click the box(es) to enable Waveform Recording (Waveform Enable box) and/or PQ Recording (PQ Enable box) when the setpoints are exceeded.

3. To set the current RMS triggers for a PQ event and waveform capture (Current RMS Triggers tab - see the example screen below):

Waveform and Voltage Interruption Settings

Voltage RMS Triggers **Current RMS Triggers**

		Current RMS Triggers						PQ Trigger Waveform Enable	PQ Enable
		Above Setpoints		Return Hysteresis					
Current Channel ID		Value(%)	Primary	Value(%)	Primary				
1	A	110.00	55.00	108.00	54.00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
2	B	110.00	55.00	108.00	54.00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
3	C	110.00	55.00	108.00	54.00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
4	N	110.00	5.50	108.00	5.40	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		

Group	Full scale
Volt AN, BN, CN	120.00
Volt AB, BC, CA	208.00
Volt Aux	120.00
I A, B, C	50.00
I N	5.00

Digital Input Triggers								
Input #	1	2	3	4	5	6	7	8
Enabled	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Sampling Rate: 512 Samples per cycle @ 60Hz

Pre Trigger Cycles: 10

Post Trigger Cycles: 50

Total Waveform Recording Windows per event: 1

OK Cancel Help

- Enter the desired percentage of Full Scale in the Value(%) column of the Above setpoints section. After you make an entry, the Primary field (display only) adjusts accordingly.
- Enter the desired percentage for Return Hysteresis for the Above setpoints. After you make an entry, the Primary field (display only) adjusts accordingly. Hysteresis is the value that must be met for the out of limit condition to be considered ended. Hysteresis is useful in preventing excessive out of limit conditions when the readings are hovering around a setpoint, since it dictates that the readings must recover to a certain level before dropping again in order for them to be considered out of limit.

- c. Click the box(es) to enable Waveform Recording (Enable box) and/or PQ Recording (PQ Enable box).

**NOTE:** The current setpoints are used to record faults on the line or in-rush currents from devices such as motors. Typically, to catch these events, set the limit to above 200% of Full Scale. As a general rule you do not want to set either any below current thresholds because that will trigger waveforms when the current drops, since this setting will constantly trigger waveforms.

5. Select the number of samples per cycle to be recorded from the Sampling Rate field's pull-down menu. Choose from 16, 32, 64, 128, 256, 512 or 1024 samples per cycle. The number of samples per cycle you choose above 128 samples per cycle affects the number of cycles per capture.
- The following table shows the effects of sampling rate on the number of cycles captured. Increasing the sampling rate increases waveform resolution; but for higher sampling rates, reduces the length of the observed window. The approximate length of the observed window is shown in the last column.



**NOTES:**

- The table shows sampling data for 60 Hz systems.
- The table shows values for one waveform capture window. If you have more than one waveform capture window, the maximum time per capture increases.

<b>Nexus® 1450 Sampling Rate Chart (at 60Hz)</b>					
<b>Samples per Cycle</b>	<b>Channels</b>		<b>Samples per Channel</b>	<b>Cycles per Channel per Window*</b>	<b>Time (approx.)</b>
	<b>Analog pts</b>	<b>Digital Inputs</b>			
16	6	8	2880	180	3 sec
32	6	8	5760	180	3 sec
64	6	8	11520	180	3 sec
128	6	8	23040	180	3 sec
256	6	8	30720	120	2 sec
512	6	8	30720	60	1 sec
1024	6	8	40960	40	0.6 sec

6. You can select Frequency - either 60Hz or 50Hz - from the pull-down menu next to "Samples per cycle @". This is only to help you decide what options to select - it does not affect the meter.
7. From the Pre-Trigger Cycles and Post-Trigger Cycles fields' pull-down menus, select the number of cycles you want to record before and/or after the triggered recording. See the table above for the maximum cycles per capture for each sampling rate.

8. The Total Waveform Recording Windows per event is fixed at 1, and cannot be changed.

**Note on CBEMA (PQ Recording):** CBEMA plotting is a power quality standard known worldwide for recording the amount of damage Voltage transient conditions have done to the equipment being monitored. The meter automatically records this information. For CBEMA purposes, program internal set points for Voltage below 90 and above 110 of Full Scale (+/- 10 from the nominal Voltage). These set points are defined by the ITI (CBEMA) specification. The ITI (CBEMA) Curve is published by Information Technology Industry Council (ITI) and is available online. You can set a recording with tighter Voltage limits to trigger a waveform recording. However, CBEMA plotting is based only on the limits internally set.

9. When all changes are entered, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 27.3.4: EN 50160/IEC 61000-4-30 Flicker

The Nexus® 1450 meter can record power quality reporting values in two independent logs. When EN 50160/IEC 61000-4-30 reporting is enabled, entries are made into the logs when the associated values occur. All values can be downloaded to the Log Viewer where they are available for graphing or export to another program, such as a spreadsheet. Refer to Chapter 19 for additional information on viewing logs.

The Nexus® 1450 meter offers customization of EN 50160/IEC 61000-4-30 reporting so that the user can meet specific jurisdictional or regional requirements. Note that you should program the CT/PT Ratio and System Hookup settings for the Nexus® 1500+ meter **before** programming the EN 50160 reporting - see 27.1.1: CT and PT Ratios and System Hookup, on page 27-2, for instructions.

**NOTE:** The meter is calculating its Flicker based upon the EN 61000-4-15 standard which is referenced in the EN 61000-4-30 standard. The accuracy requirements for this instrument are within the Class A standards for Flicker measurements. Refer to Chapter 23 for additional information on Flicker standards.

**IMPORTANT!** Since the EN 50160/IEC 61000-4-30 reporting has specific requirements for programming, EIG recommends that you refer to the IEC 61000-4-30 2008 standard before making changes to the default settings of the meter.

The meter's Runtime Firmware version and above support Edition 3 of IEC 61000-4-30 standard.

**NOTE:** This setting is not available if the meter's frequency is set to Wide Band Auto (see 27.1.1: CT and PT Ratios and System Hookup, on page 27-2).

1. From the Device Profile screen double-click on the EN50160/IEC61000-4-30 Flicker line. You will see the following screen, which has two tabs.

EN 50160 / IEC 61000 Settings

IEC 61000-4-30      **EN 50160**

Allowed Rapid Voltage changes per day: 1

Synchronous Connection: No

Allowed long interruptions in a year: 0

Rapid voltage change data source. RMS updated every: 10/12 Cycles

Supply voltage unbalance upper limit: Less than or equal to 2%

Voltage dip concern threshold: Greater than or equal to 10%

First day of week: Sunday

Mains Signalling Threshold: 5.00 %

Mains Signalling Interharmonics Frequency: 317.5 Hz

Mains Signalling Recording Interval (seconds): 120

OK      Cancel

2. The initial tab is the EN 50160 tab. Some of the fields are display only and cannot be changed. You can select the following settings from their pull-down menus:
  - Allowed Rapid Voltage changes per day: this field determines how many rapid voltage variations are allowed before they are considered a fault condition, and reported - select between 1 and 50.
  - Synchronous Connection: this field specifies whether the system has a synchronous connection to another system - select Yes or No.
  - Allowed long interruptions in a year: this field determines how many long voltage interruptions per year are allowed, before they are considered a fault, and reported - select between 1 and 100.
  - First day of the week: for the report, select Sunday or Monday as the first day of the week.

3. Enter the Mains Signaling Threshold: this setting and the next one (Mains Signaling Interharmonics Threshold Frequency) are for the Mains Signaling voltage, which is a burst of signals (often at a non-harmonic frequency) that remotely control industrial equipment, energy meters, and other devices. In this setting, enter the pass thresholds for the Mains signaling voltage (this is a percentage); e.g., if you set the threshold at 99.00, 99% or better will be considered a pass and anything less than 99% will be considered a fail.
4. Enter the Mains Signaling Interharmonics Frequency (in Hz): enter the interharmonic frequency for the test. When this interharmonic exceeds the detection threshold, reporting is made. See the IEC 61000-4-30 standard's Section 5.10.1 for more details on this setting.
5. Mains signal Recording Interval (seconds): if your meter supports IEC 61000-4-30 Edition 3 (Runtime Firmware version or higher), you can select an interval (from 1 to 120 seconds) for recording.
6. Click the IEC-61000-4-30 tab.

EN 50160 / IEC 61000 Settings

IEC 61000-4-30      EN 50160

**Nominal Settings**

Voltage: 120.00 Volts

Frequency: 60 Hz

**Flicker**

Short term test time (PST): 10 Minutes

Long term test time (PLT): 120 Minutes

**IEC 61000-4-30 Rapid Voltage Changes Additional Settings**

Phase	Threshold	Return Hysteresis
AN/AB	5.00	2.50
BN/BC	5.00	2.50
CN/CA	5.00	2.50

OK      Cancel

7. Enter:

- Voltage: enter the Nominal voltage.
- Frequency (50 or 60Hz) - this field is used to calculate the harmonics and interharmonics associated with the set fundamental frequency. Select the frequency from the pull-down menu.

8. Short Term Test Time and Long Term Test Time are display only and cannot be changed.

9. IEC 61000-4-30 Rapid Voltage Change Additional Settings: for meters that support Edition 3 (Runtime Firmware versions and higher), you can set a Threshold (the % of the voltage Full Scale for each channel) and Return Hysteresis (the % of the voltage Full Scale for each channel) per phase AN/AB, BN/BC, and CN/CA.

**NOTES:**

- The default for the Threshold value is 3% and the default for the Hysteresis Value is 1.5%.
  - Make sure that the Threshold setting does not exceed the Dip/Swell threshold settings; and that the Hysteresis does not exceed the Threshold settings.
10. When all changes have been entered, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

**NOTE:** Flicker is discussed in detail in Chapter 23.

### 27.3.5: IEC 61000-4-30 Harmonic & Interharmonic Thresholds

Use this setting to set the group and subgroup harmonic and interharmonic thresholds that will be applied to the IEC 61000-4-30 reporting for the meter.

**NOTE:** This setting is not available if the meter's frequency is set to Wide Band Auto (see 27.1.1: CT and PT Ratios and System Hookup, on page 27-2).

1. From the Power Quality and Alarm Settings menu, double-click on the IEC 61000-4-30 Harmonic & Interharmonic line. You will see the screen shown below.

Harmonic		Interharmonic	
Subgroup	Threshold	Subgroup	Threshold
0	5.00	0	5.00
1	5.00	1	5.00
2	5.00	2	5.00
3	5.00	3	5.00
4	5.00	4	5.00
5	5.00	5	5.00
6	5.00	6	5.00
7	5.00	7	5.00
8	5.00	8	5.00
9	5.00	9	5.00
10	5.00	10	5.00
11	5.00	11	5.00
12	5.00	12	5.00
13	5.00	13	5.00
14	5.00	14	5.00

OK Cancel

2. For each of the Harmonic and Interharmonic subgroup levels 0-51, you can enter a threshold percentage value. Use the scroll bars to view all of the levels.
3. When all changes are entered, click OK to return to the Main Device Profile screen.
4. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 27.3.6: Digital Inputs

The Nexus® 1450 meter's built-in digital inputs can be used in two ways:

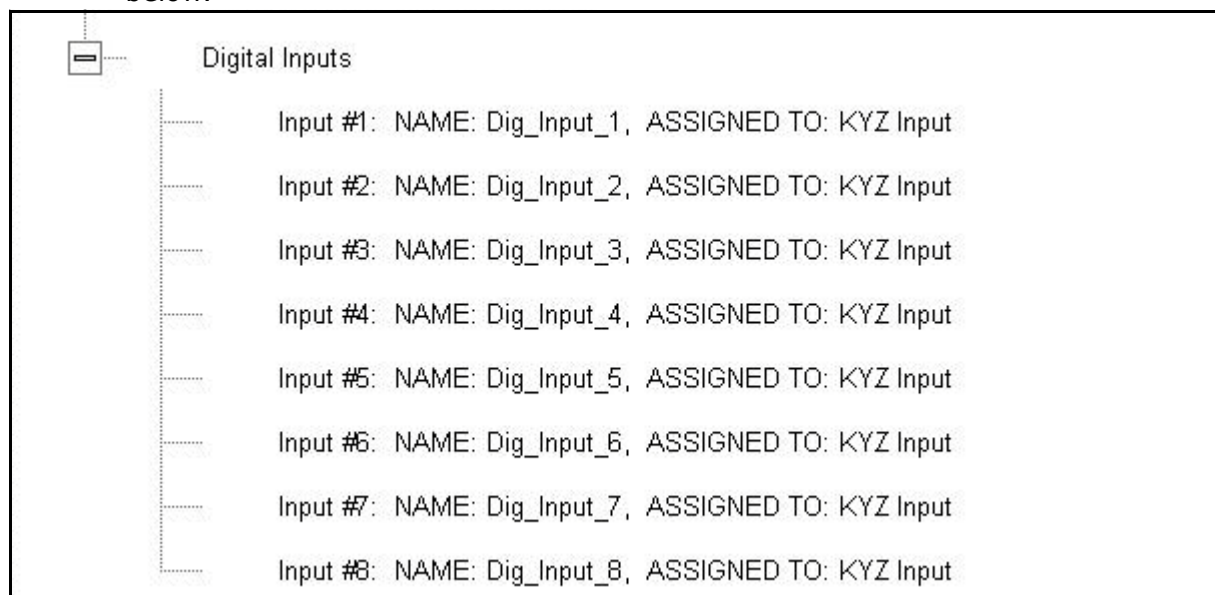
- Attaching status contacts from relays, breakers or other devices for status or waveform initiation
- Attaching the KYZ pulse outputs from other meters for pulse counting and totalizing

Even though these inputs are capable of being used as high speed digital fault recording inputs, they serve a dual purpose as KYZ counters and totalizers. The function in use is programmable in this setting of the Device Profile, which lets you label the eight digital inputs and to specify their status.

- Labeling the inputs allows you to determine the source of status change when data is later analyzed.
- This feature lets you set the digital inputs' status as a KYZ input, a trigger for waveform capture or PQ recording, a trigger for logging, or a means of synchronizing the meter.
- In the Pulse Accumulations setting (see 27.2.6: Pulse Accumulations, on page 27-37), you can assign the digital inputs' counts to be accumulated in one of four internal Aggregators of the meter.
- You can use Historical Log 2 for logging digital input transitions. This is accomplished by setting up a digital input channel



1. From the Power Quality and Alarm Settings menu, double-click on the Digital Inputs line or click on the + button next to it. You will see the submenu shown below.



2. Double-click any of the Input lines. You will see the screen below.

Input ID	Name	Open Label	Shorted Label	Normal Condition	Input Type
1	Dig_Input_1	open	shorted	Open	KYZ Input
2	Dig_Input_2	open	shorted	Open	KYZ Input
3	Dig_Input_3	open	shorted	Open	KYZ Input
4	Dig_Input_4	open	shorted	Open	KYZ Input
5	Dig_Input_5	open	shorted	Open	KYZ Input
6	Dig_Input_6	open	shorted	Open	KYZ Input
7	Dig_Input_7	open	shorted	Open	KYZ Input
8	Dig_Input_8	open	shorted	Open	KYZ Input

At the bottom of the window are three buttons: **OK**, **Cancel**, and **Help**.

3. Double-click a field to enter the following:

- Name
- Open Label
- Shorted Label

- Normal Condition: Open or Shorted
4. Click on the Input Type field to select an option from the pull-down menu. The available selections are:
- KYZ Input - select this option to designate the input as a pulse (KYZ) input.
  - Waveform/PQ Trigger - select this option if you want the input to trigger a waveform/PQ recording (see 27.3.3: PQ Thresholds (Waveform Recording), on page 27-56).
  - Block Window Sync Pulse - select this option if you want to synchronize the meter with pulses from the input (see Section 27.2.3: Internal Pulse, on page 27-31).
  - Event Triggered Log - select this option if you want the input to trigger logging. Logging occurs when the input's state changes from Open to Closed. Only one digital input at a time can be set for Event Triggered logging. You must also set the length of logging and the parameters to be logged (see 27.4.1: Programming the Trending Log Time Intervals, on page 27-73 and 27.4.2: Programming the Trending Setup, on page 27-76).
5. When you have finished making your selections, click OK to exit the screen and return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

## 27.4: Trending Profile Settings

This section of the Device Profile enables you to configure parameters for the Nexus® 1450 meter's eight historical logs.

1. From the Device Profile screen, click on the + button next to Trending Profile Settings or double-click on the Trending Profile Settings line. You will see the menu shown below.



2. Double-click on one of the Trending lines to access the programming screens.

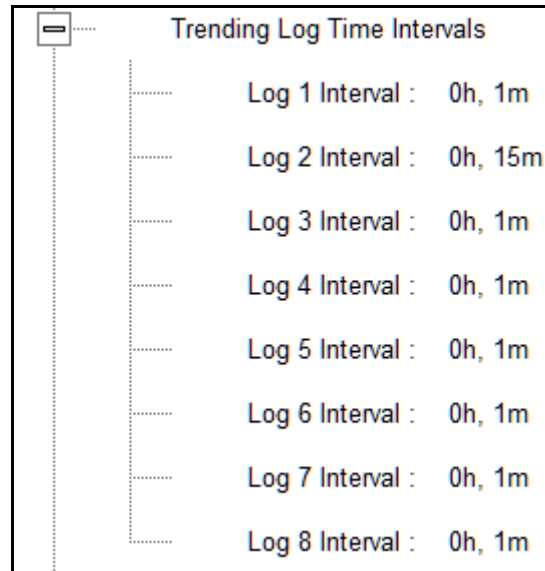
**NOTE on Load Profile Recording:** Load Profile recording is a subset of the Nexus® meter's more general logging and trending capability. The same screens are used for setup, but Load Profile recording only deals with accumulated values; Energy (Wh), reactive Energy (VARh) and apparent power (VAh).

Historically, Load Profile recording referred to recording of quadrant 1 Energy (Wh) because electromechanical meters only measured energy and were designed to prevent reverse rotation outside of quadrant 1.

### 27.4.1: Programming the Trending Log Time Intervals

The Trending Log Time Intervals setting determines the interval at which the Historical logs take a "snapshot" of data. To set the parameters for the logs, see 27.4.2: Programming the Trending Setup, on page 27-76. See Chapter 16 for information on retrieving logs and Chapter 19 for information on viewing logs.

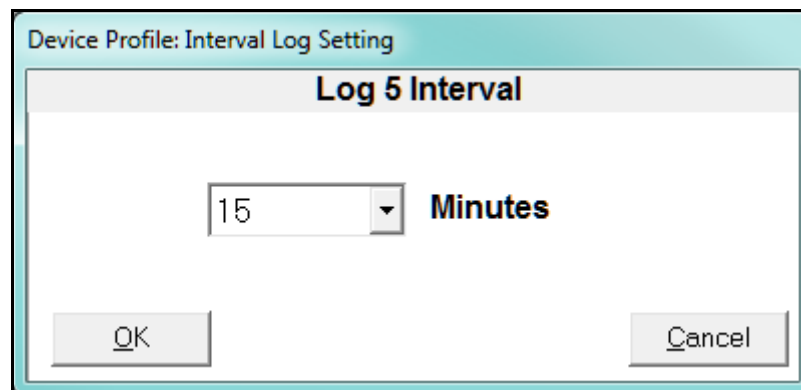
1. From the Trending Profile Settings menu, double-click Trending Log Time Intervals or click the + button next to it. You will see the submenu shown below. The submenu shows the interval set for the Historical logs. If one of the High Speed inputs has been assigned to the Event Triggered log, the event Triggered Log will be shown after Log 8 in the submenu.



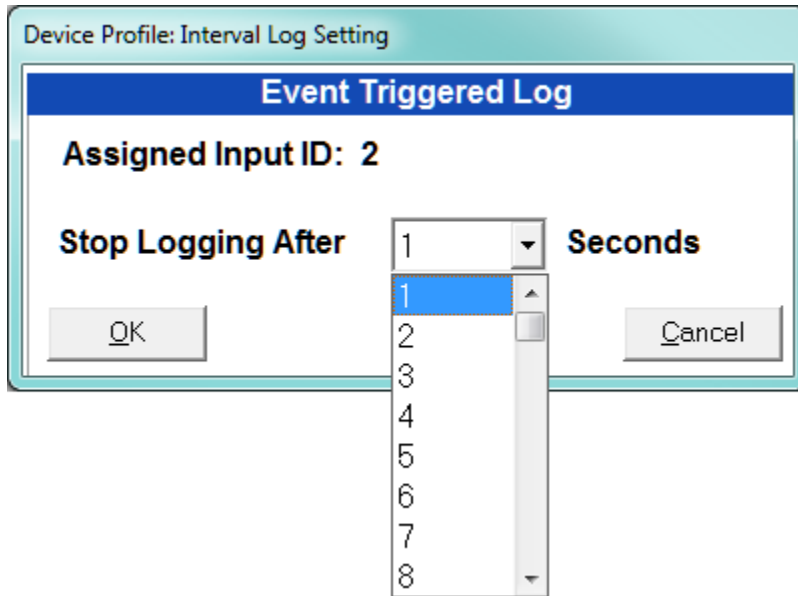
2. To change the interval for a Historical log, double-click on one of the logs.

**NOTE:** You can also access the Interval setting screens from the Trending Setup screens (see 27.4.2: Programming the Trending Setup, on page 27-76).

3. You will see the screen shown below.



4. Select the interval you want for the log from the pull-down menu: 1, 3, 5, 10, 15, 30 or 60 minutes.
5. If one of the High Speed Inputs has been set up as a trigger for logging, you will see the setting screen shown below.



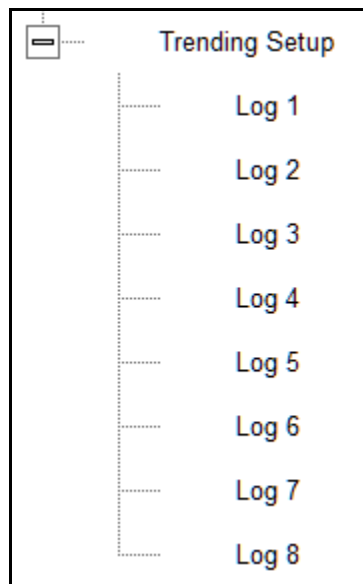
Select the number of seconds the log should record when a High Speed Input transition triggers recording, e.g., if you select 10 seconds, a transition will trigger recording of the log's parameters for ten seconds, and then stop until the next transition triggers recording for another 10 seconds. You can choose between 1 and 60 seconds.

6. Click OK to save your changes. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

### 27.4.2: Programming the Trending Setup

The Trending Setup controls the channel assignments for the Historical logs. See Chapter 16 for instructions on retrieving logs.

1. From the Trending Profile Settings menu, click on the + button next to Trending Setup or double-click on the Trending Setup line. You will see the submenu shown below. If one of the High Speed inputs has been assigned to the Event Triggered log, the event Triggered Log will be shown after Log 8 in the submenu.



2. Double-click on the log whose settings you want to configure. You will see the Trending Log Profile screen for the log you selected. An example screen is shown below.

Trending Log Profile Log 2

Trending Log Profile Log 2: 1 MB

Group: Accumulators Sub Group: Energy

Stored in log as: Scaled Primary

Selectable Item(s)		Selected Item(s)
Quadrant 1+4 Wh	Add >>	Energy(Scaled):Quadrant 1+4 Wh
Quadrant 2+3 Wh	<< Remove	Energy(Scaled):Quadrant 2+3 Wh
Quadrant 1+2 VARh	Remove All	Energy(Scaled):Quadrant 1+2 VARh
Quadrant 3+4 VARh		Energy(Scaled):Quadrant 3+4 VARh
Quadrant 1+2+3+4 VAh		
Quadrant 1 Wh		
Quadrant 2 Wh		
Quadrant 3 Wh		
Quadrant 4 Wh		
Quadrant 1 VARh		
Quadrant 2 VARh		
Quadrant 3 VARh		
Quadrant 4 VARh		
Quadrant 1 VAh		
Quadrant 2 VAh		
Quadrant 3 VAh		
Quadrant 4 VAh		
+Qh		
-Qh		

Total bytes used 24 \*Estimate for Backwards  
Bytes remaining 232 Compatibility

Estimated Log Timespan 341Day(s) 8Hour(s) 0Minute(s)  
Total Records 32768

OK Cancel Log Interval: 15 Minutes Help

3. Make changes to this screen according to your application requirements.
- a. Group: Using the pull-down menu, select the type of snapshot. The options are: Measured Values, Averages, Accumulators, Interval Accumulators, External Output Devices, TOU Cumulative Dmd.

- b. Sub-Group: Using the pull-down menu, select a channel for the snapshot. The options are: Fifty Millisecond Updated; One Second Updated; Harmonic Values; Internal Inputs, States; Phase Angles; Flicker.
- c. Sub-Group 2: With some selections, a second sub-group field will be shown underneath the first one. Select a value for this field from the pull-down menu.
- d. Highlight items in the Selectable Items(s) box and click Add to include the selections in the Log. The items will be copied to the Selected Item(s) box. To remove an item from the log, highlight the item in the Selected Item(s) box and click Remove or double-click the item. The item will be removed from the Selected Item(s) box.

**NOTES:**

- To select multiple items, hold Control while highlighting the items.
  - To select a range of items, click the first item, hold Shift, and click the last item.
  - Move the cursor to the lower left corner of an item, or group of items, to view its size in bytes.
- e. Click Check HHF if you want to check if current settings are compatible with the HHF Converter.

**NOTE:** You will not see the HHF options unless you have enabled the HHF converter using the Options menu. See Chapter 20 for instructions, and see Chapter 16 for HHF information.

- f. The Total bytes used and Bytes remaining fields display the amount of memory used for each record of the log. The meter assumes 256 bytes of memory for each record. Total memory is determined at time of purchase.
- g. The Estimated Log Timespan field displays the length of the time between the first and last records in the log when it is full.
- h. The Total Records field displays the total number of records that will be in the log when it is full.



- i. You can set the log interval by selecting it from the pull-down menu next to Log Interval: you can select 1, 5, 10, 15, 30 or 60 minutes.
4. When all changes have been entered, click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

## 27.5: External I/O Modules

The Nexus® 1450 meter offers expanded I/O through external I/O modules. These modules add both analog and digital inputs and outputs to the meter to greatly expand the capability of the instrument.

This setting of the Device Profile lets you set up the meter's optional external Input/Output modules (see Chapter 14 for more information on the I/O modules) and RTU Master settings. I/O modules work as Modbus slave devices. The meter polls these modules to get the data from them. I/O modules generally have default RS485 Modbus addresses, so, they don't have to be configured. Once you set up which module you want, put in the default address and start with the basic configuration of readings you want to gather.

### 27.5.1: Configuring the Input/Output Modules

1. From the Device Profile screen, double-click on the External I/O Modules icon. You will see the screen shown below.

Device Profile: I/O Modules

Module Number	Type	Assigned Address	Nexus Settings	Module Settings	Log / Limit ID
1	20mAON8: Analog Out 4 - 20mA 8 ch	132	Edit	Edit	AO Module 1
2	4PO1: KYZ Output	160	Edit	Edit	KYZ Module 1
3	4RO1: Digital Output	156	Edit	Edit	DO Module 4
4	8AI1: Analog In 0 - 1mA 8 ch	136	Edit	Edit	AI Module 1
5	No Device Assigned				
6	No Device Assigned				
7	No Device Assigned				
8	No Device Assigned				
9	No Device Assigned				
10	No Device Assigned				
11	No Device Assigned				
12	No Device Assigned				
13	No Device Assigned				
14	No Device Assigned				
15	No Device Assigned				
16	No Device Assigned				

OK Cancel Help

2. Click in the Type column and use the pull-down menu to select the specific module you want to add. The Assigned Address, Nexus® settings, and Module settings you can make depend on the module you are configuring. The modules and settings are as follows:

Module	Assigned Address*	Nexus® Setting**	Module Setting
4PO1 - KYZ Output	160*	Click to Edit Relay Accumulations	Click to enter Transmit Delay and configure KYZ outputs' Watt/pulse, rollover and minimum pulse width.
20mAON4 - Analog Transducer Signal Outputs, 4 channels, 4-20 mA	132*	Click to Assign Items to and configure the Analog Outputs	Click to enter Transmit Delay and configure Channel settings
20mAON8- Analog Transducer Signal Outputs, 8 channels, 4-20 mA	132*	Click to Assign Items to and configure the Analog Outputs	Click to enter Transmit Delay and configure Channel settings
1mAON4 - Analog Transducer Signal Outputs, 4 channels, 0-1 mA	128*	Click to Assign Items to and configure the Analog Outputs	Click to enter Transmit Delay and configure Channel settings
1mAON8 - Analog Transducer Signal Outputs, 8 channels, 0-1 mA	128*	Click to Assign Items to and configure the Analog Outputs	Click to enter Transmit Delay and configure Channel settings
4RO1 - Digital Output	156*	Click to configure Relays	Click to enter Transmit Delay
8AI1 - Analog Input Module, 0-1 mA	247*	Click to configure Analog Outputs	Click to enter Transmit Delay and configure Channel settings
8AI2- Analog Input Module, 0-20 mA	247*	Click to configure Analog Outputs	Click to enter Transmit Delay and configure Channel settings
8AI3 - Analog Input Module, 0-5 VDC	247*	Click to configure Analog Outputs	Click to enter Transmit Delay and configure Channel settings
8AI4 - Analog Input Module, 0-10 VDC	247*	Click to configure Analog Outputs	Click to enter Transmit Delay and configure Channel settings
8DI1 - Digital Status Input Module	164*	Click to configure Digital Inputs	Click to enter Transmit Delay and configure Channel settings

\* The Assigned address on this screen is the address the meter uses to identify the I/O module. The default is the factory set address, which you can change by clicking in the field and choosing a new address from the pull-down menu. This address is not the actual I/O module address. You set that from the I/O Devices menu; see Chapter 14 for instructions.

\*\*When you click in this field you see an Edit button. Click the button to open a screen that lets you edit that module. See the following example screens.

#### 4PO1 Screen - Pulse Output module

Relay	Accumulation
1	Quad (1 + 4) Watthour
2	Quad (2 + 3) Watthour
3	Quad (1 + 2) VARhour
4	Quad (3 + 4) VARhour

OK Cancel

This screen allows you to assign a KYZ output to an accumulator. Click on the pull-down menu to select accumulation configuration for each of the 4 relays. The options are:

- Disabled
- Quad (1+4) Watthr
- Quad (2+3) Watthr
- Quad (1+2) VARhr
- Quad (3+4) VARhr
- Quad (1+2+3+4) VAhr
- Quad 1 Watthr
- Quad 2 Watthr
- Quad 3 Watthr
- Quad4 Watthr
- Quad 1 VARhr
- Quad 2 VARhr
- Quad 3 VARhr
- Quad 4 VARhr

- Quad 1 VAhr
- Quad 2 VAhr
- Quad 3 VAhr
- Quad 4 VAhr
- +Qh Total
- -Qh Total
- Internal Input (#1-8) Totals
- Accumulation (#1-4) Totals
- External Digital Input Modules (1-4) Inputs (#1-8)
- I Squared T (A, B, C)
- V Squared T (A,B,C)

20mAON4 Screen: 4 channel Analog Output module, 4-20 mA

Device Profile: Analog Output

Output	Assigned Item (Click Item to Change)
1	High Speed Updated:Voltage A-B
2	High Speed Updated:Voltage B-C
3	High Speed Updated:Voltage C-A
4	Thermal Average:Current N Calculated

Channel Update

For Pulse Accumulators and Aggregator Block Window Average (8 Byte data) only, please choose 4 of the 8 bytes you want to map to the Analog outputs

Bytes 7, 6, 5, 4

OK Cancel Help

Click in Output channels 1-4 to assign them to a parameter. The other Analog Output Modules - 20mAON8, 1mAON4, and 1mAON8 have similar setting screens, except for the number of channels you can program.

- The analog outputs are used to send a variable current dependent on the programmed reading. This screen lets you select the readings to output.

## 4RO1 Screen- Relay Output module

Device Profile: Digital Output

Relay	Label	Common Shorted to N.C.	Common Shorted to N.O.	Lock to Manual Control
1	Relay 1	Closed1	Open1	<input checked="" type="checkbox"/>
2	Relay2	Closed2	Open2	<input checked="" type="checkbox"/>
3	Relay3	Closed3	Open3	<input checked="" type="checkbox"/>
4	Relay4	Closed4	Open4	<input type="checkbox"/>

OK Cancel Help

Click in the Relay fields 1-4 to enter relay label, common shorted to N.C., common shorted to N.O., and check the box to lock the relay to manual control. When a relay is locked to manual control, it cannot be used in ElectroLogic Relay Control (see 27.3.2: Electrologic Relay Control, on page 27-52, for detailed information).

## 8AI2- Analog Input Module, 4-20 mA

Device Profile: Analog Input

Input	Channel Label	High Value (20mA)	Low Value (4mA)
1	Temperature	100.0000	0.0000
2	Humidity	100.0000	0.0000
3		0.0000	0.0000
4		0.0000	0.0000
5		0.0000	0.0000
6		0.0000	0.0000
7		0.0000	0.0000
8		0.0000	0.0000

OK Cancel Help

Click in Input Channels 1-8 to assign a label and a High and Low Value for each of the analog inputs.

- The two analog input module's settings are the same, except for the Inputs' high and low range.

- The High and Low Value fields let you map the inputs' high and low range to values that are appropriate for the parameters you are measuring. For example, in the screen above, the first input is measuring temperature. The high value for the input is set to 100, and the low value is set to 0. An input reading of 12mA will translate to 50 for the temperature.

The Analog Input modules can be trended in the historical logs, and the data can be viewed and graphed in Log Viewer (see Chapter 19 for details). The readings shown in the logs and graphs will use the setting range programmed in the screen above, i.e., the results will be reported as 0 through 100.

#### 8DI1 - Digital Status Input module

Device Profile: Digital Input

Input	Channel Label	Open Label	Closed Label	Normal State
1	Ext Dig In 1	Open 1	Closed 1	Open ▾
2	Ext Dig In 2	Open 2	Closed 2	Open ▾
3	Ext Dig In 3	Open 3	Closed 3	Open ▾
4	Ext Dig In 4	Open 4	Closed 4	Open ▾
5	Ext Dig In 5	Open 5	Closed 5	Open ▾
6	Ext Dig In 6	Open 6	Closed 6	Open ▾
7	Ext Dig In 7	Open 7	Closed 7	Open ▾
8	Ext Dig In 8	Open 8	Closed 8	Open ▾

OK Cancel Help

Click in Channel Label's 1-8 to assign a Channel label, Open and Closed label, and Normal State (Open or Shorted) for each of the digital inputs.

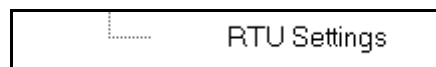
**NOTE:** Log/Limit ID is a display only field. It shows the ID that Communicator-PQA™ software generates to identify this module in the Log Viewer and Limits functions.

- Click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

## 27.5.2: RTU Settings

The Nexus® 1450 meter provides a feature that allows it to act as a simple Remote Terminal Unit (RTU). It can poll Modbus registers from downstream devices and bring that data into its memory for logging. This is very useful when trying to integrate data from existing, simpler, legacy Modbus devices. This section of the Device Profile enables you to configure RTU Master settings. This feature is used when you want to have the meter act as an RTU, polling data from other Modbus-based devices, such as lower end meters.

1. From the Device Profile screen, click on the + button next to the External I/O Modules line. You will see the menu option shown below.



2. Double-click on RTU Settings. You will see the screen shown below.

#	Description	Device Address	Starting Register	Number of Registers
1	Grp#1	2	12	5
2	Grp#2	3	20	1

Remaining Registers: 122

Use this screen to configure the settings when Port 2 is set as an RTU Master (see 27.1.5: Communications, on page 27-16).



3. The first view you see is the Group Main tab (shown on the previous page). This screen lets you set up the RTU Master groups, i.e. the devices the Nexus® 1450 meter is polling. You can enter up to 16 groups. You have the following options:

- Click Add to add a Master group. Fill in the Description, Device Address, Starting Register, and Number of Registers; click Save to save your entries.
- Click on a group and click Edit to change data for the group; click Save to save your changes.
- Click on a group and click Remove to delete the group.
- Click on a group and click Up or Down to change the position of the group.

4. Click the Group Details tab to set up the readings for the devices. See the example screen shown below.

The screenshot shows the 'Modbus RTU Group Settings' window with the 'Group - Details' tab selected. The window title is 'Modbus RTU Group Settings'. A message at the top right states 'This feature has not been assigned to a port'. The 'Selected Group' is 'Grp#1' and 'Remaining Bytes' is '8'. Below this is a table with columns: #, Description, Data Type, Size (Bytes), Byte Order, Multiplier (Base, Power), Master Starting Register, and Slave Starting Register. The table contains one row: 1, Readings, Integer, 2, MSB, None, 0, 14337, 12. To the right of the table are 'Up' and 'Down' buttons. At the bottom are 'Add', 'Edit', 'Remove', 'OK', and 'Cancel' buttons.

#	Description	Data Type	Size (Bytes)	Byte Order	Multiplier		Master Starting Register	Slave Starting Register
					Base	Power		
1	Readings	Integer	2	MSB	None	0	14337	12

You have the following options:

- Click Add to add a reading to the group. Fill in the Data Type, Size in Bytes, Byte Order, Multiplier Information, and Slave Starting Register (the Master Starting Register is read-only); click Save to save your entries.

**NOTE:** The readings in the group must have consecutive register numbers. If necessary you can break the readings into two or more groups.

- Click on a reading and click Edit to change data for the reading; click Save to save your changes.
  - Click on a reading and click Remove to delete the reading from the group.
  - Click on the Selected Group pull-down menu to select and display details for another group.
5. Click OK to return to the main Device Profile screen. For any changes to take effect, you must click the Update Device button to send the new profile to the meter.

**NOTE:** For more details on I/O Modules, see Chapter 14.

You can then use the polled data in the following ways:

- Access the data using Modbus protocol: Modbus registers, starting at #define MB\_REG\_NEXUS\_MASTER\_DATABASE 0x03800;  
#define MB\_REG\_NEXUS\_MASTER\_DATABASE\_LEN 0x00080.

You can see the Nexus® 1450 meter's full Modbus map in the Nexus® 1450 Meter Modbus User Manual.

- Log the data by selecting Master RTU Items for the group in the Trending Profiles screen: see the example screen, below.

Trending Log Profile Log 2

Group	Sub Group
RTU Master Items	Grp#2

Selectable Item(s)		Selected Item(s)
Rdgs2	Add >>	Grp#2:Rdgs2
	<< Remove	

Total bytes used	10	Estimated Log Timespan	648days 12hour 45min 0sec
Bytes remaining	246	Total Records	62259

OK Cancel Set Interval Help

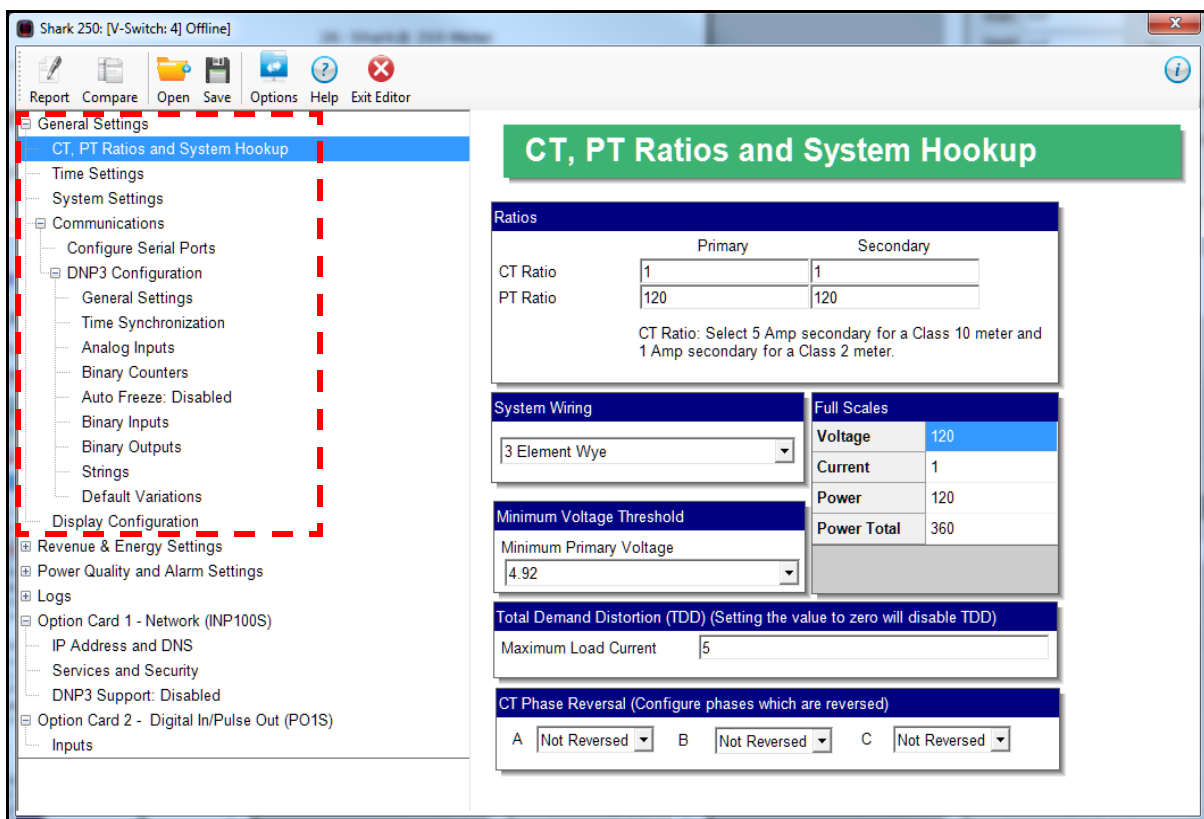
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## 28: Shark® 250 Meter

This chapter explains how to configure a Shark® 250 meter's programmable settings, which are stored in the unit's Device Profile. Chapter 7 contains detailed information on how to use the Device Profile.

### 28.1: Device Profile General Settings

1. From the Tree Menu on the left side of the Shark® 250 meter's Device Profile screen, double-click on the General Settings line or click on the + button next to it. All of the settings in the General Settings group are listed.



### 28.1.1: Configuring CT, PT Ratios and System Hookup

Use this setting to configure Current Transformer and Potential Transformer ratios and to select the System Hookup. The Full Scales values are display only.

#### Functional Overview of CT and PT Ratios:

Current and Potential Transformers are used mainly for the following reasons:

- To insulate, and as a result isolate, the meter from high-voltage circuits.
- To change the primary voltage and current to standard values and sizes that the meter can measure.

The CT and PT transformers deliver fractions of the primary voltage and current to the meter. With properly set ratios and multipliers, the readings of the meter can be used to determine the energy, voltage, current, or power of the system.

1. From the Tree Menu, click General Settings>CT, PT Ratio and System Hookup.

**Shark 250: [V-Switch: 4] Offline**

Report Compare Open Save Options Help Exit Editor

**General Settings**

- CT, PT Ratios and System Hookup**
- Time Settings
- System Settings
- Communications
  - Configure Serial Ports
- DNP3 Configuration
  - General Settings
  - Time Synchronization
  - Analog Inputs
  - Binary Counters
  - Auto Freeze: Disabled
  - Binary Inputs
  - Binary Outputs
  - Strings
  - Default Variations
- Display Configuration
- Revenue & Energy Settings
- Power Quality and Alarm Settings
- Logs
- Option Card 1 - Network (INP100S)
  - IP Address and DNS
  - Services and Security
  - DNP3 Support: Disabled
- Option Card 2 - Digital In/Pulse Out (PO1S)
  - Inputs

**CT, PT Ratios and System Hookup**

**Ratios**

	Primary	Secondary
CT Ratio	1	1
PT Ratio	120	120

CT Ratio: Select 5 Amp secondary for a Class 10 meter and 1 Amp secondary for a Class 2 meter.

**System Wiring**

3 Element Wye

**Full Scales**

Voltage	120
Current	1
Power	120
Power Total	360

**Minimum Voltage Threshold**

Minimum Primary Voltage: 4.92

**Total Demand Distortion (TDD) (Setting the value to zero will disable TDD)**

Maximum Load Current: 5

**CT Phase Reversal (Configure phases which are reversed)**

A: Not Reversed B: Not Reversed C: Not Reversed

2. Make these settings:

- CT Ratio, enter:
  - Primary (CT Numerator): 1 - 65535
  - Secondary (CT Denominator): this setting depends on the meter class - 5 for a Class 20 meter or 1 for a Class 2 meter.
- PT Ratio, enter:
  - Primary (PT Numerator): 1 - 99999999
  - Secondary (PT Denominator): 1 - 65535
- System Wiring, select from pull-down menu:
  - 3 Element Wye; 2.5 Element Wye; 2 CT Delta

This value must be set properly for the meter to calculate readings correctly.

Example Settings:

For a CT of 2000/5 A, set the following CT Ratios in the entry fields:

CT Numerator (Primary)        2000

CT Denominator (Secondary)   5

The Current Full Scale field will read 2000.

For a system that has 14400 V primary with a 120 V secondary line to neutral (PT Ratio of 120:1), set the following PT Ratios in the entry fields:

PT Numerator (Primary) 1440

PT Denominator (Secondary) 120

The Voltage Full Scale field will read 14.4k.

- Use the Minimum Voltage Threshold box to enter the minimum voltage threshold, which is a percentage of the voltage full scale. This setting adjusts the pick up threshold for the voltage. You set a percentage of the PT primary (PT numerator X PT multiplier) up to 12.7 in the entry field, to configure when the meter will start reading values above 0 voltage.
- Total Demand Distortion (TDD Setting): This setting of the Device Profile allows you to set the maximum value for current, which is used for the TDD (Total Demand Distortion) calculation. TDD is an index used to measure harmonics.

TDD is defined in the IEEE 519 Standard, "Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems" as "the total root-sum-square harmonic current distortion in percent of the maximum load current." It gives a better indication of the impact of distortion on Demand than THD (Total Harmonic Distortion), which analyzes the harmonic distortion relative to the fundamental, without consideration of load. In this field enter the maximum load current for TDD. To disable TDD, enter 0 in the field.

- **CT Reversal Phase Enables:** Use this setting to enable CT reversal for any phase. This feature is useful if a CT is wired the wrong way and you do not want to (or cannot) change the wiring. When CT reversal is enabled, the meter's firmware shifts the current phase by 180 degrees for that phase. This will reverse the power direction, and all computations such as power factor, phase angle etc., which are derived after that will be affected

**NOTE:** This setting is only available for a three element WYE hookup. For any other hookup, this setting will be ignored.

To implement phase reversal for a phase (A, B, or C), select Reversed next to that field.

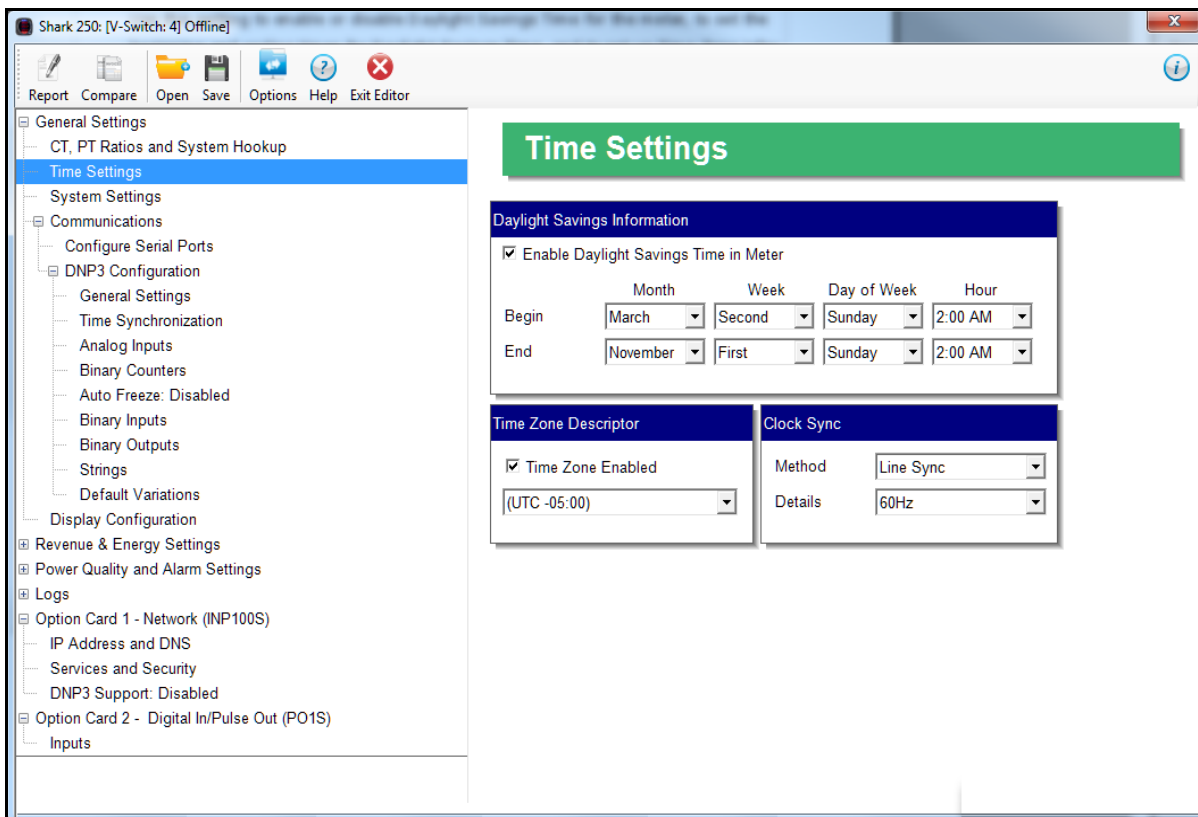
3. To implement any changes, click the Update Device button to send the new profile to the meter.



## 28.1.2: Configuring Time Settings

Use this setting to enable or disable Daylight Savings Time for the meter, to set the beginning and ending times for Daylight Savings Time, and to set up Time Zone information and clock synchronization information.

1. From the Tree Menu, click General Settings>Time Settings.



2. Check the box to Enable Daylight Savings time, or un-check it to Disable Daylight Savings Time.
3. Use the entry fields to set the beginning and ending times for the Daylight Savings Time feature, if enabled. Select the values you want from the Month, Week, Day of the Week, and Hour fields.

**NOTE:** The Hour field uses a 24-Hour clock.

4. You can choose clock synchronization for the meter. If your meter has a Network Option card, you can use it to access a Network Time Protocol (NTP) Server\*\*

for time synchronization. You can also select Line Sync for clock synchronization. Use these fields to set up clock synchronization:

- Time Zone: Zone Descriptor - Select the hour and minute of your time zone in relation to Greenwich Mean Time. For example, if your time zone is Eastern Standard time, you would select -5 from the pull-down Hour menu and leave the Minutes field at 0.
- Clock Sync - To enable clock synchronization, select:
  - Line (line synchronization) or NTP\*\* from the Method pull-down menu
  - For line synchronization, select 50Hz or 60Hz from the Line Frequency pull-down menu; for NTP select either Option Card in Slot 1 or Option Card in Slot 2 from the Interface pull-down menu.

Line synchronization uses the frequency zero crossings to provide a time reference for the meter. This is the most common method to synchronize a meter's clock. EIG recommends that you always select this method unless there is a specific reason not to select it. If the meter is not synchronized to line frequency or NTP, it will default to internal crystal. Different meters differ in terms of drift, but typically meters with 20 ppm crystals will drift 30 seconds per month when set to internal crystal.

- If you do not want to use Line or NTP clock synchronization, click Disabled.

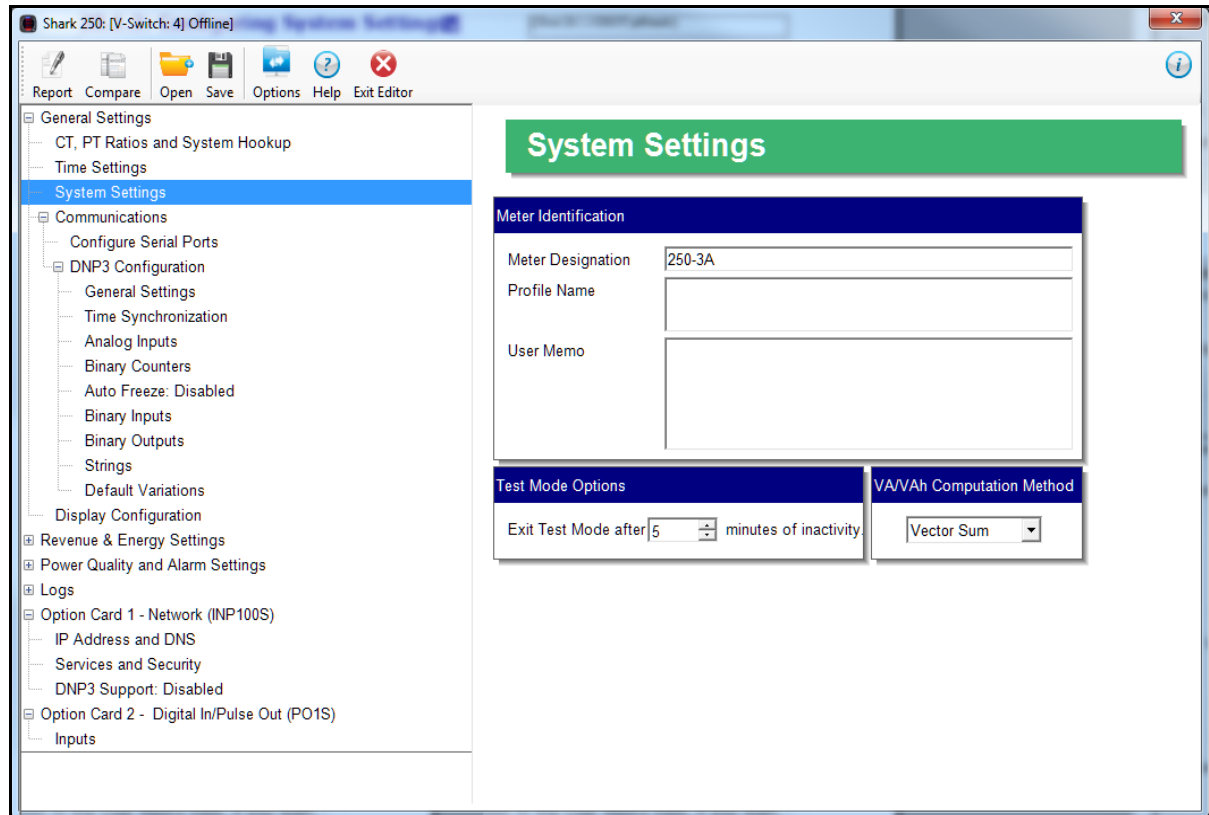
**\*\*IMPORTANT!** You also need to set up the NTP server information for the Network card. See [28.5.6: Configuring a Network Card, on page 28-91](#) for instructions.

5. To implement any changes, click the Update Device button to send the new profile to the meter.

### 28.1.3: Configuring System Settings

Use the system settings to set up a meter ID and a time out setting for Test Mode.

1. From the Tree Menu, click General Settings>System Settings.



2. From this screen, you can do the following:

- Change the Device Designation: input a new meter designation into this field.  
Note that it is important to name each meter individually, since the meter name is used to name the log databases when logs are downloaded.
- You can enter additional relevant information in the User Memo field, if you wish.  
It will be displayed in the Memo field in the Main screen's Status bar - see [2.2.2: Main Screen's Status Bar, on page 2-8](#).
- Test Mode Options: set the number of minutes without activity that will cause the meter to exit Test Mode. See [20.1.15.4: Test Mode and Energy Preset for the Shark® 250 Meter, on page 20-48](#) for more information on Test Mode.
- \*VA/VAh Computation Method: Select either Vector Sum or Arithmetic Sum from the pull-down menu.

**NOTE:** There are two optional methods of VA/VAh Computation:

- Arithmetic Sum - the formula for this calculation is:

$$VA_T = VA_a + VA_b + VA_c$$

- Vector Sum - the formula for this calculation is:

$$VA_T = \sqrt{W_T^2 + VAR_T^2}$$

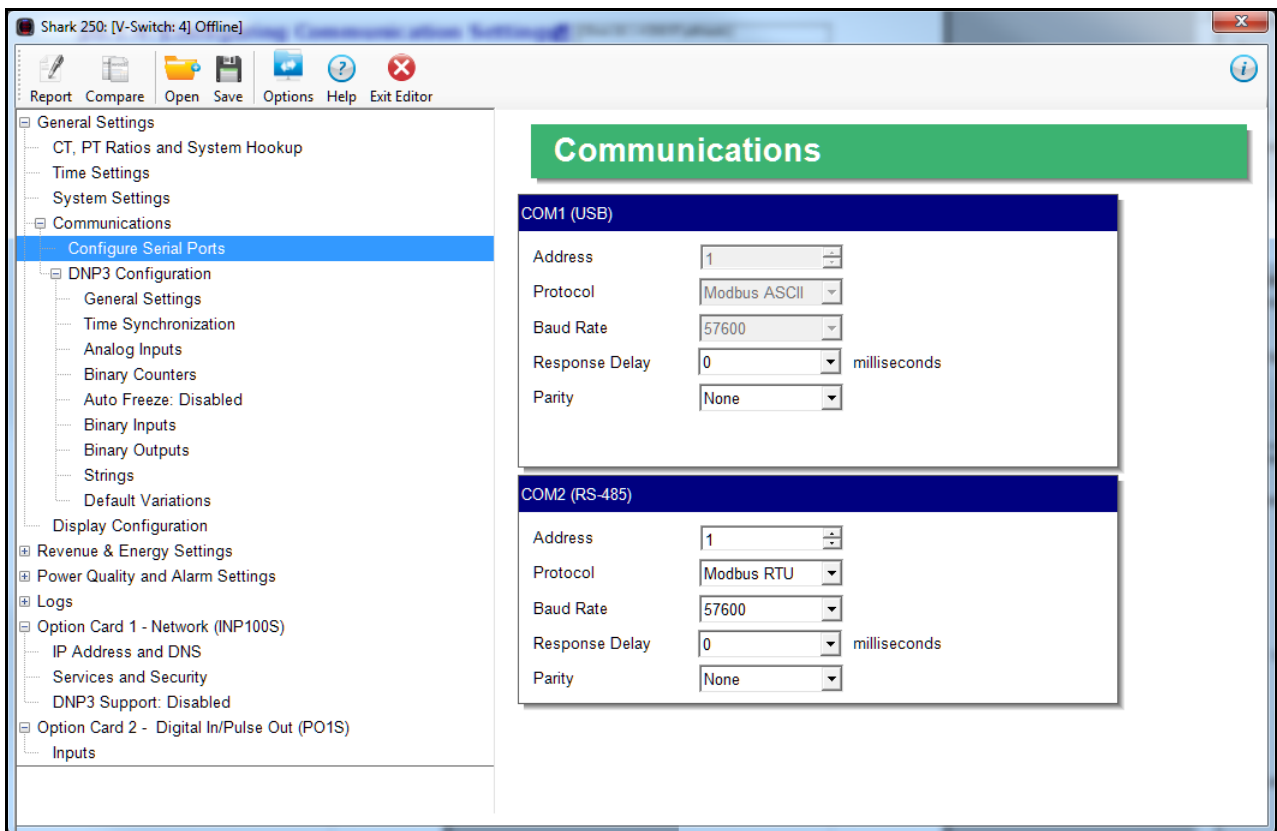
Generally, the superior method for calculation is the Vectoral method; however, both methods are provided.

- \* Note that this setting replaces the previous Power setting in the Energy Scaling and Averaging Method screen.
3. To implement any changes, click the Update Device button to send the new profile to the meter.

### 28.1.4: Configuring Communication Settings

Communications settings have two parts: communication settings for the meter's two on-board ports: the USB Port (COM 1) and RS485 Port (COM 2), and DNP 3.0 configuration.

1. From the Tree Menu, click General Settings>Communications>Configure Serial Ports.



**IMPORTANT!** The settings on this screen are the current settings for communication. Any changes you make may affect communication between the Shark® meter and your PC.

2. The screen fields and acceptable entries are as follows:

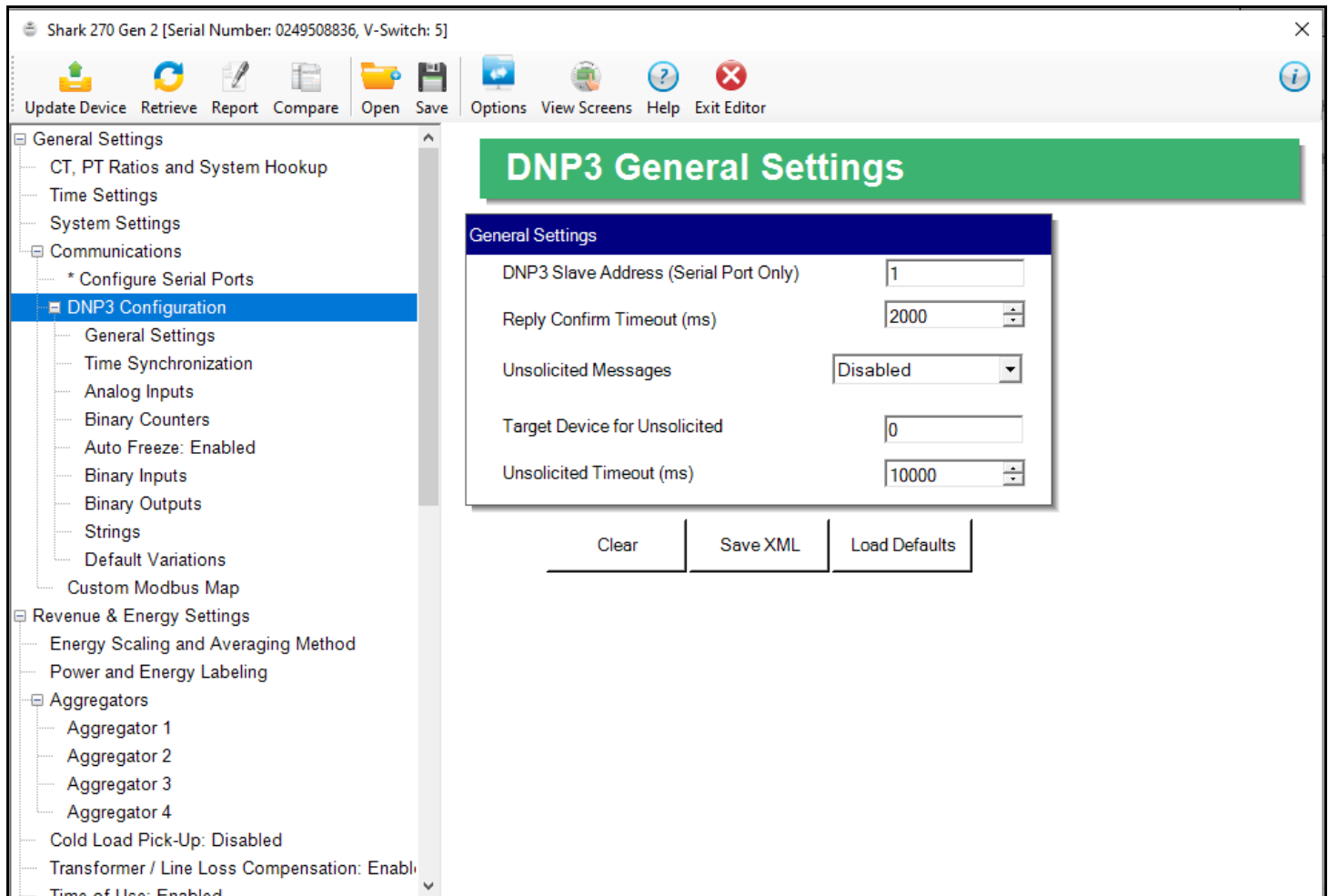
- COM 1 (USB)
  - Response Delay: 0 - 750 (50msec increments)

**NOTE:** You will not see the USB setting if you are connected to a Shark 250T transducer.

- COM 2 (RS-485)
  - Address: 1 - 247 (Modbus); 1-65520 (DNP)
  - Protocol: Modbus RTU, Modbus ASCII or DNP 3.0. If you select DNP 3.0 communication, see [28.1.4.1: DNP3 Configuration, on page 28-11](#), for configuration settings.
  - Baud Rate: 1200, 2400, 4800, 9600, 19200, 38400, 57600
  - Response Delay: 0 - 750 (50 msec increments)  
Response Delay is the delay the meter should use before responding to queries. If your connecting device requires a delay before receiving information, use response delay to program the time to wait before the meter starts responding to queries.
  - Parity: Odd, Even, or None
- 3. To implement any changes, click the Update Device button to send the new profile to the meter.

### 28.1.4.1: DNP3 Configuration

DNP3 Configuration consists of multiple settings that let you customize DNP3 for your application needs. Note that DNP protocol must be selected for either COM2 (the RS485 port) or an Ethernet Option card in order to use these settings screens (see [28.1.4: Configuring Communication Settings, on page 28-9](#) and [28.5.6: Configuring a Network Card, on page 28-91](#)). To access the DNP configuration screens, from the Tree menu, click Communications>DNP3 Configuration.



#### NOTES:

- See Appendix C in the [Shark® 250 Meter User Manual](#) for detailed information on settings, including the meter's default settings, and example use cases.
- Clicking the Save XML button in the DNP3 screens generates the DNP XML Profile. The DNP XML Profile is a file that contains the characteristics and configuration parameters set in the DNP3 screens, as well as data from the meter itself (serial numbers, channels, etc.). This file can be used to further configure other peers,

e.g., the Master device, in the DNP3 Network. If you need a DNP XML Profile, EIG recommends you click the Save button after making all of your DNP3 settings. Refer to official DNP3 documentation for DNP3 Network details.

- Formatting of energy and power values (number of digits, decimal point position, etc.) is used for display, only - DNP3 always uses the raw values from the Modbus register.

#### **28.1.4.1.1: General Settings**

The first setting is General Settings.

1. From the Tree menu, click DNP3 Configuration>General Settings. You will see the screen shown on the previous page.

2. You have the following options:

- You can click Load Defaults to load the settings from the meter.
- You can enter the settings manually.
- You can edit any of the settings.
- You can clear the entries by clicking Clear.

3. The settings on this screen are:

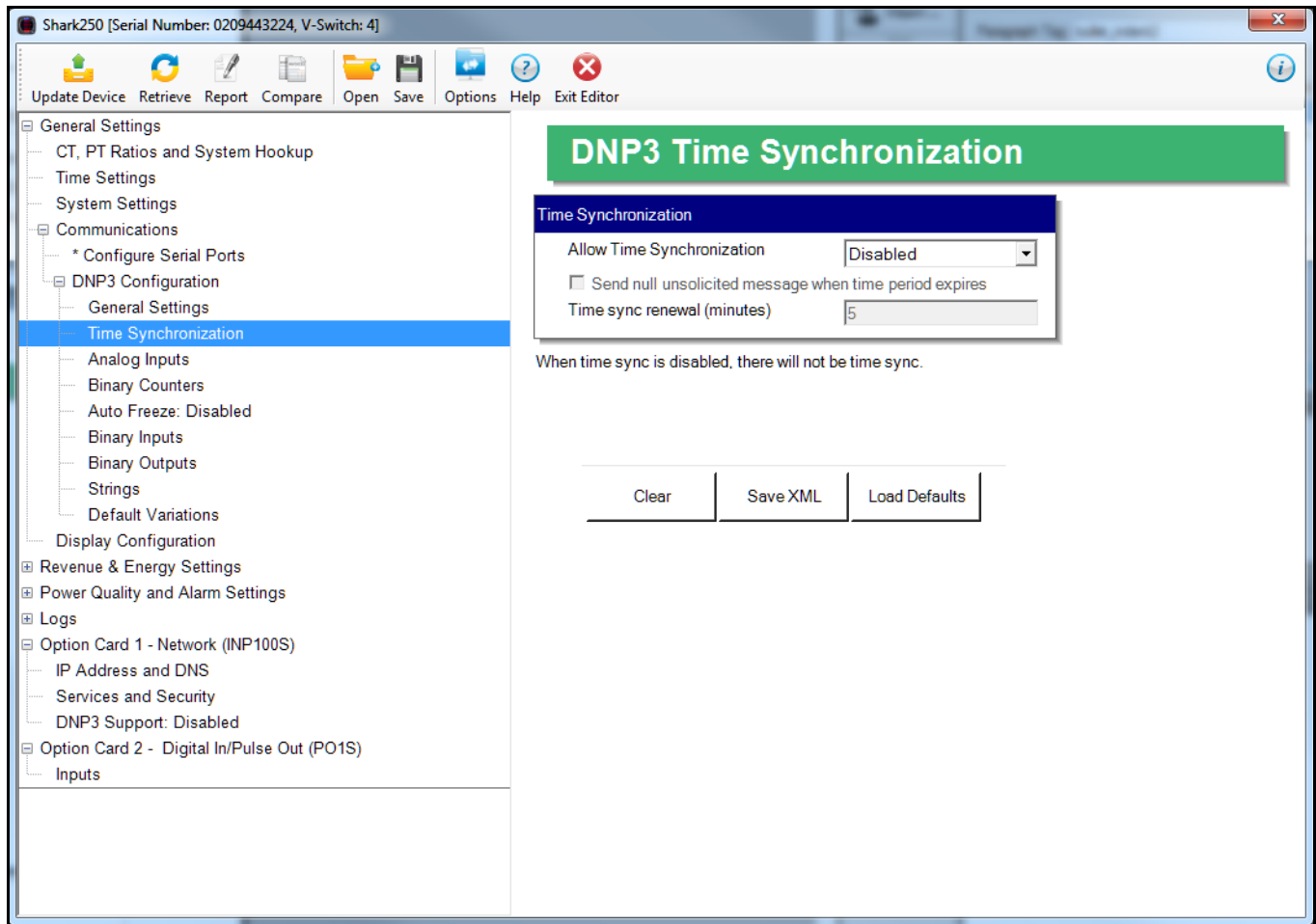
- DNP Slave Address: enter the DNP slave address for this meter. This is the address used with an RS485 serial link, only (not an Ethernet link).
- Reply Confirm Timeout (ms): enter the reply confirmation timeout in milliseconds.
- Unsolicited Messages: Select Disabled or Class 1, Class 2, or Class 3 from the pull-down menu. Note that the unsolicited messages are sent to the LAN only if the "Single Socket Enforced" option is enabled in the INP100S card's DNP3 Support setting (see [28.5.6: Configuring a Network Card, on page 28-91](#)). If this option is not enabled, DNP3 cannot send the unsolicited messages since it won't know which meter socket to use.
- Target Device for Unsolicited: enter the address for the target device for unsolicited messages.
- Unsolicited Timeout (ms): enter the unsolicited timeout in milliseconds.



### 28.1.4.1.2: Time Synchronization

The second setting for DNP is Time Synchronization. Note that EIG recommends you use only one method for meter time synchronization: if you enable the DNP Time Sync and you have a Network card, do not use the NTP feature for the Network card.

1. From the Tree menu, click DNP3 Configuration>Time Synchronization.



2. You have the following options:

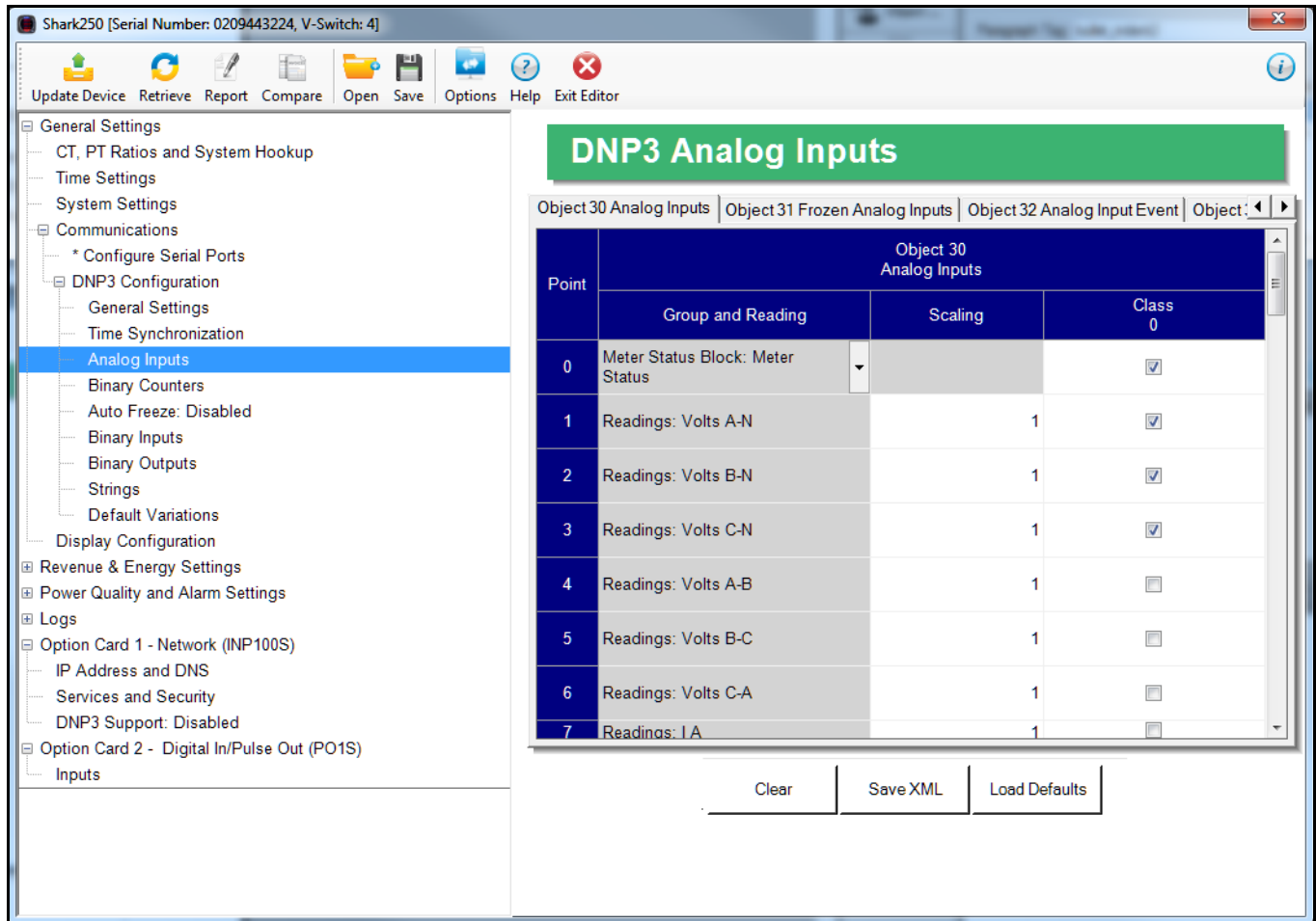
- You can load the default setting by clicking the Default button.
- You can clear the entry by clicking Clear.
- You can choose the allow time synchronization of the meter through DNP. When time synchronization is enabled, a Master must write the time into the meter. The time is updated frequently to reduce jitter and offsets. The options for time synchronization are:

- Disabled - no time sync through DNP is allowed.
  - From Serial - the time sync will be accepted from DNP only through the serial line (RS485 or other serial option).
  - From Serial or Network Card - the time sync will be accepted from DNP serial or DNP network communication.
3. The Sync Renewal Time is the period the time is considered valid after the Master has written it into the meter. After this time, the Meter will flag NEED\_TIME in its responses, to let other devices know that it needs a time update.
4. The Send Null unsolicited message checkbox allows the meter to send a null unsolicited message when the valid time expires, letting other devices know, immediately, about the need for time resynchronization. This is an additional feature which is not required by the DNP3 standard.

### 28.1.4.1.3: Analog Inputs

The third setting for DNP is Analog Inputs, which are non-accumulator readings.

1. From the Tree menu, click DNP3 Configuration>Analog Inputs.



2. You can make settings for Objects 30, 32, and 34 by clicking on the different tabs. The screen above shows the settings for Object 30. You have the following options:

- You can load the default settings by clicking the Default button.
- You can clear the entries by clicking Clear.
- You can enter the Analog Input settings manually:
  - Up to 64 points can be defined for DNP Analog Inputs. Select the reading you want to use from the pull-down menu, which lets you choose from groups of Measured Values, Demand, Harmonics, Meter Status, Basic Setups, and TOU parameters. For example, the reading Volt-A can be selected.

## 3. For the Object 30 tab:

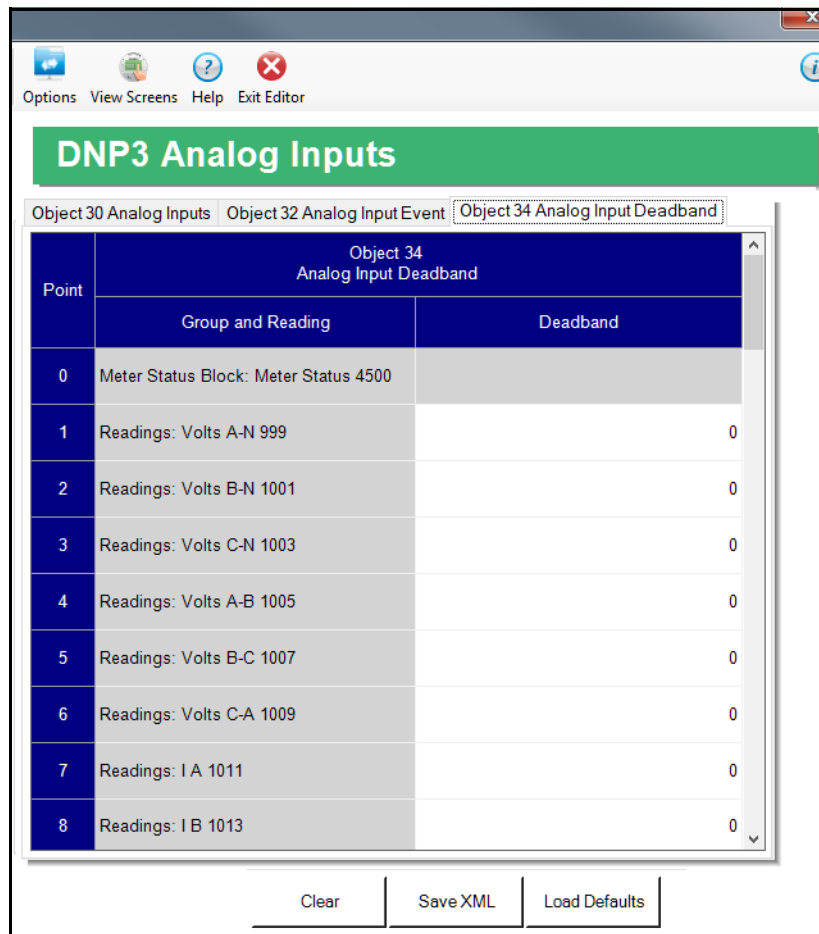
- You can use the Scaling field to enter a multiplier value to change the magnitude of the reading for DNP. The scaling can be a positive fraction or integer; enter 1 for no scaling.
  - For example, you might want to scale the Volt-A reading, which has a full scale value of 600, to a higher range, e.g., 60000. To do that, you would set the Scaling value to 100. Scaling can also be used to scale down the value by using a fraction in the Scaling field. If no change is needed, the Scaling field must be left as 1.
- The Class 0 column allows you to include or not include the reading in a DNP Class-0 response. This gives you a practical way to poll several readings at a time, through grouping them into a class query.

Point	Group and Reading	Object 32 Analog Input Event		
		Class 3	Class 2	Class 1
0	Meter Status Block: Meter Status 4500	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	Readings: Volts A-N 999	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Readings: Volts B-N 1001	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Readings: Volts C-N 1003	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Readings: Volts A-B 1005	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Readings: Volts B-C 1007	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Readings: Volts C-A 1009	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	Readings: I A 1011	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	Readings: I B 1013	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Clear Save XML Load Defaults

## 4. For the Object 32 tab (shown above):

- The Analog Event Object 32 is used as a capture placeholder (data storage) for dead banding events. Dead banding events are used when you want to know if an Analog Input varies by more than a specified amount. The amount of allowable variation is called a deadband. If the Analog Input varies in an amount less than the deadband, nothing happens, since it is considered within limits. Whenever the variation amount exceeds the deadband, a snapshot is taken of the Analog Input, i.e., the data is copied to the corresponding Object 32 and an event is flagged for that reading. This allows the user to later check on the Analog Input value at the time of the event.
- Object 32 can be also assigned to Class 1,2 or 3, allows creation of different groups for different events.



**DNP3 Analog Inputs**

Object 30 Analog Inputs | Object 32 Analog Input Event | **Object 34 Analog Input Deadband**

Point	Group and Reading	Deadband
0	Meter Status Block: Meter Status 4500	
1	Readings: Volts A-N 999	0
2	Readings: Volts B-N 1001	0
3	Readings: Volts C-N 1003	0
4	Readings: Volts A-B 1005	0
5	Readings: Volts B-C 1007	0
6	Readings: Volts C-A 1009	0
7	Readings: I A 1011	0
8	Readings: I B 1013	0

Clear | Save XML | Load Defaults

5. For the Object 34 tab (shown above):

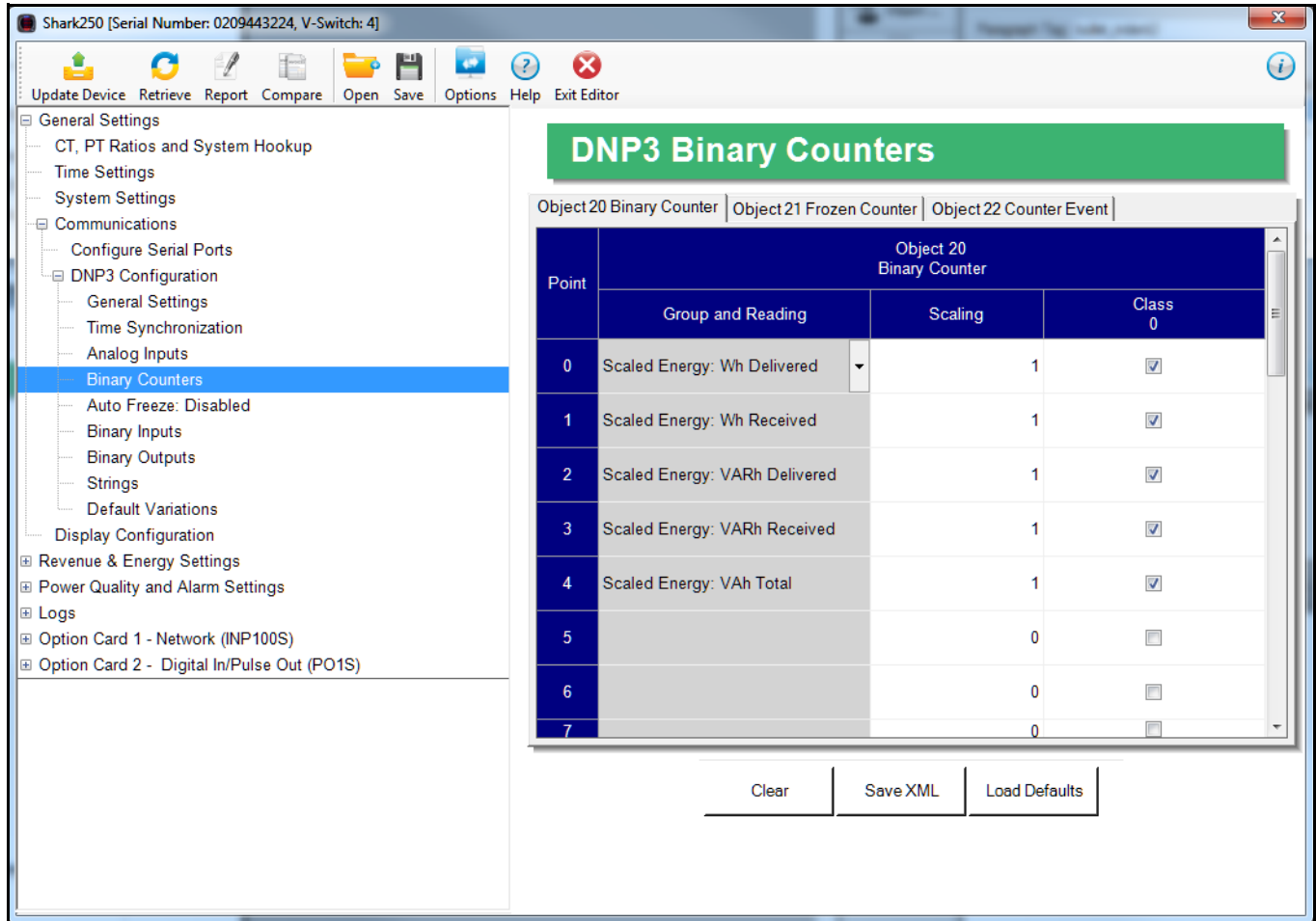
- The deadband value is used for detecting the changes in the Analog Input. A value of 0 disables this feature. The deadband is always a positive number, but it checks for the absolute variation, either positive or negative. Note that if Scaling is used, the deadband will compare the Analog Input value after scaling has been applied.

**NOTE:** EIG recommends you do not set the deadband value too small, to avoid filling up the DNP Event Buffer with very minor fluctuations, causing bigger fluctuations to be missed.

### 28.1.4.1.4: Binary Counters

The fourth setting for DNP is Binary Counters, which are accumulator readings.

1. From the Tree menu, click DNP3 Configuration>Binary Counters.



2. You can make settings for Objects 20, 21, and 22 by clicking on the different tabs. The screen above shows the settings for Object 20 Binary counter. You have the following options:

- You can load the default settings by clicking the Default button.
- You can clear the entries by clicking Clear.
- You can enter the settings manually, for the binary counters:
  - Select the reading you want to use from the Group and Reading pull-down menu, e.g., Group - Uncompensated, Reading - Wh.

3. For the Object 20 tab:

- You can use the Scaling field to enter a multiplier value to change the magnitude of the reading for DNP. The scaling can be a positive fraction or integer; enter 1 to keep the reading's scaling the same as in the meter.
- The Class 0 column allows you to include or not include the counter in a DNP Class-0 response.

Point	Object 20 Binary Counter Group and Reading	Object 21 Frozen Counter Class 0
0	Scaled Energy: Wh Delivered 1499	<input type="checkbox"/>
1	Scaled Energy: Wh Received 1501	<input type="checkbox"/>
2	Scaled Energy: VARh Delivered 1507	<input type="checkbox"/>
3	Scaled Energy: VARh Received 1509	<input type="checkbox"/>
4	Scaled Energy: VAh Total 1515	<input type="checkbox"/>
5		<input type="checkbox"/>
6		<input type="checkbox"/>
7		<input type="checkbox"/>
8		<input type="checkbox"/>

4. For the Object 21 tab (shown above):

- Frozen Binary Counter Object 21 is a placeholder used when the meter is instructed to freeze the respective counter. In other words, when the meter receives the instruction to freeze counters, it copies the Binary Counter (Object 20) into the Frozen Binary Counter (Object 21) placeholder, where it is kept available for the user to read. Only a new freeze will update the Frozen Binary Counter Object 21.



- The Frozen Binary Counter can be assigned to Class 0, only. (It does not have to be assigned to Class 0, though.)

Point	Object 20 Binary Counter Group and Reading	Object 22 Counter Event Change Delta	Object 22 Counter Event		
			Class 3	Class 2	Class 1
0	Scaled Energy: Wh Delivered 1499	1	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	Scaled Energy: Wh Received 1501	1	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	Scaled Energy: VARh Delivered 1507	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Scaled Energy: VARh Received 1509	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Scaled Energy: VAh Total 1515	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5		0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6		0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7		0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8		0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. For the Object 22 tab (shown above):

- Use the Change Delta field to set up a value in the same raw unit as the reading, which is used to define a threshold value for the counter. This threshold value instructs when to create an event for Binary Counter Event Object 22. Every time the Binary Counter changes by the value of the Change Delta field, or by a greater value, an event for Object 22 is created. If the Change Delta value is 0, changes for this reading are not monitored.
- The Binary Counter Event Object 22 can be assigned to Class 1, 2 or 3.
- Clear After Freeze is not supported. To clear the binary counters, Binary Output Point #4 must be Pulsed-On/Latched-On via Object 12, V1 - Direct Operate. (See Appendix C in the *Shark® 250 Meter User Manual* for details). Note that

because the meter does not support clearing individual counters, all the binary counters will be cleared

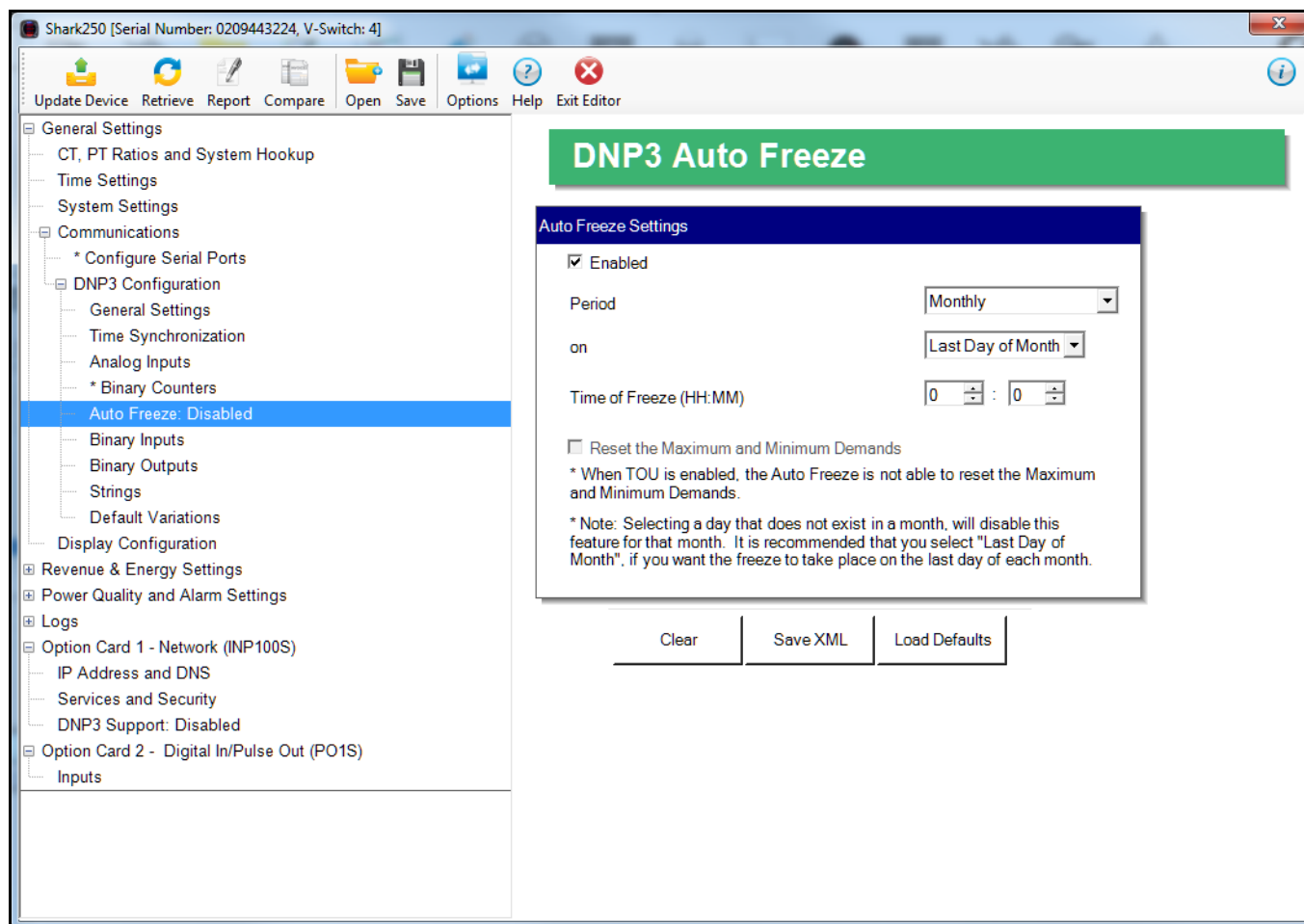
**NOTE:** EIG recommends you do not set the Change Delta value too small, to avoid filling up the DNP Event Buffer with very minor fluctuations, causing bigger fluctuations to be missed.

#### **28.1.4.1.5: DNP3 Auto-Freeze**

The meter's DNP implementation lets you freeze defined Object 20 and Object 30 points automatically, on a periodic schedule, without needing to send the Freeze command through DNP. This feature is set up through the fifth DNP setting, DNP3 Auto Freeze, which copies the original Object 20 and Object 30 data points into Object 21 and Object 31 data points, respectively, along with the time stamp of the copy process.

- The Object 21 and Object 31 data points are also referred to as "previous" values: they belong to the previous Auto Freeze period.
- If the meter loses power, the frozen points in Object 21 and Object 31 are preserved.
- Note that the frozen DNP points (Object 21 and Object 31) have the same scale and unit as their respective points in Object 20 and Object 30.
- For example, if point# 0 of Object 20 has been configured with Wh Total register and 0.001 scaling, reading point #0 of Object 20 will give us a KWh value. When the Auto Freeze period has elapsed, the value in reading point# 0 is copied into point #0 of Object 21. Further readings to point# 0 of Object 20 will show the current KWh value (increasing, if there is energy flow), but the point# 0 of Object 21 will stay frozen in its original value until the next Auto Freeze period has elapsed. At that point, the new KWh value will be written into the Object 21 point.

1. From the Tree menu, click DNP3 Configuration>Auto Freeze.



Note that if you haven't enabled DNP3 Auto Freeze, the menu option will say Auto Freeze: Disabled; and if Auto Freeze is already enabled, it will say Auto Freeze: Enabled.

2. To enable Auto Freeze, check the Enabled box.

3. To set up the Auto Freeze period, i.e., the time the current values of objects 21 and 31 are copied into the Frozen objects 21 and 31:

a. From the Period pull-down menu, select the Auto Freeze period, i.e., frequency: Monthly, Weekly, Daily, or Hourly.

- b. From the On pull-down menu, select the day of the month the Auto Freeze period starts: 1-31, or "Last Day of Month." Note that if you selected Monthly as your period, you shouldn't select a day that doesn't exist in all months, since that would cause that month's Auto Freeze to be disabled; e.g., if you select 30, February will be skipped. In that case, use the "Last Day of the Month" setting.
  - c. From the Time of Freeze pull-down menus, select the hour (0-23, using a 24-hour clock, where 0 is midnight and 23 is 11 P.M.), and minute (0, 15, 30, 45) the Auto Freeze period begins.
4. If you want the Maximum and Minimum Demand to be reset when Auto Freeze takes place, check the box. Note that this box will not be selectable if TOU is enabled.

### 28.1.4.1.6: Binary Inputs

The next setting for DNP is Binary Inputs, which is used for the digital inputs from the meter's RO1S (relay output/digital input) and/or PO1S (pulse output/digital input) Option cards.

1. From the Tree menu, click DNP3 Configuration>Binary Inputs.

**DNP3 Binary Inputs**

Option Card 1 - Digital In/Pulse Out (PO1S)

Point		Object 1		Event Object 2		
		Allow in DNP3	Class 0	Class 1	2	3
0	Digital Input 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	Digital Input 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Digital Input 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Digital Input 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Option Card 2 - Digital In/Relay (RO1S)

Point		Object 1		Event Object 2		
		Allow in DNP3	Class 0	Class 1	2	3
4	Digital Input 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Digital Input 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Clear Save XML Load Defaults

You will only see settable fields if an Option card is installed in the meter. Note that the RO1S has two digital inputs and the PO1S has four digital inputs.

2. You have the following options:

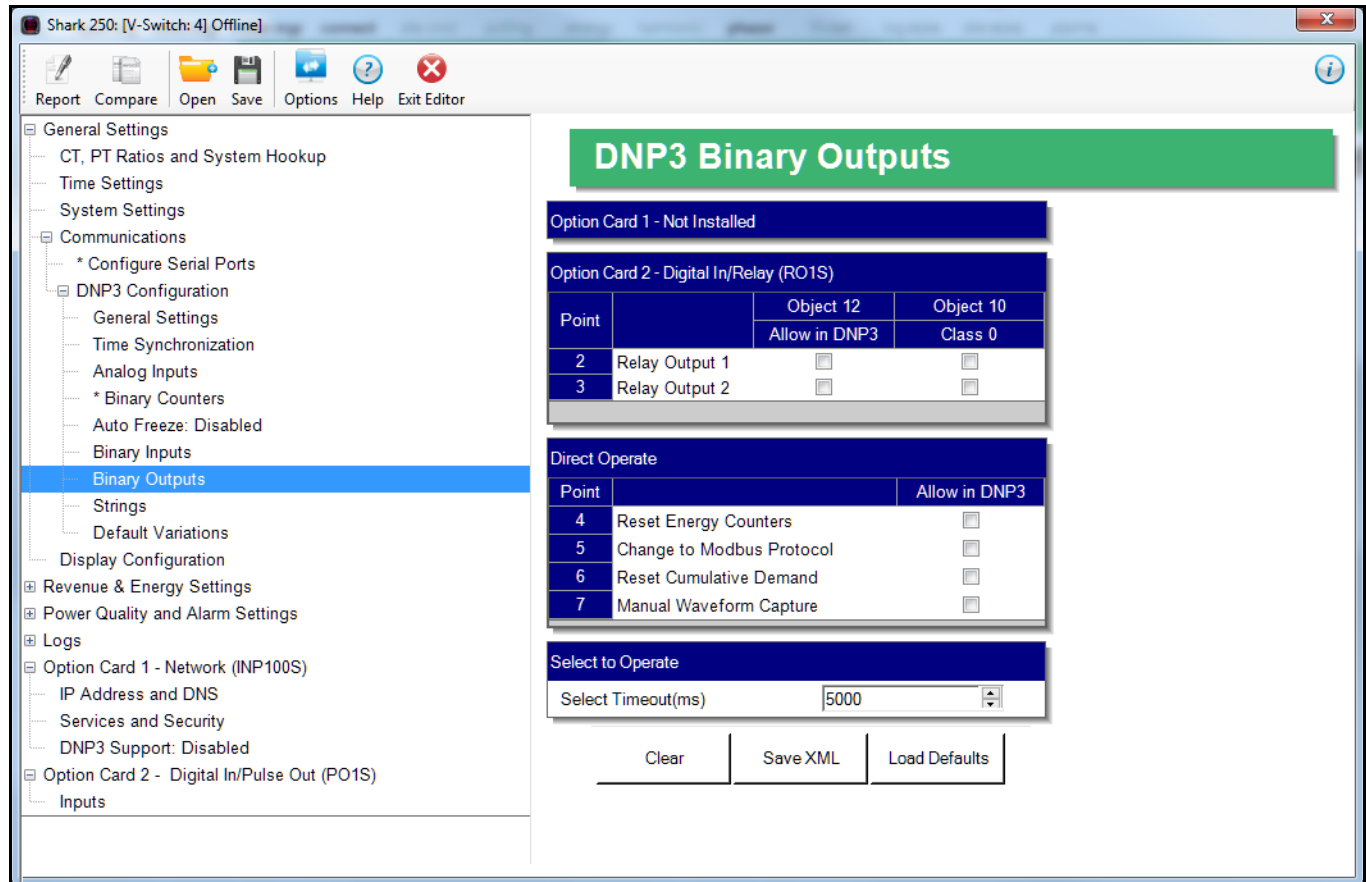
- You can load the default settings by clicking the Default button.
- You can clear the entries by clicking Clear.

- You can enter the settings manually, for the Binary Inputs:
  - For the Event Object 2 fields, select the Class you want to use: Class 0, which corresponds to Object 1 (static binary inputs), or Class 1, 2, or 3, which all correspond to Object 2 (binary input events).
  - If Class 1,2 or 3 is assigned to the Binary Input Event Object 2, the Binary Input will be checked for changes. Every time the input changes state, an event will be created and the value put into the Binary Input Event Object 2. This allows the user to later check on the value at the time of the event.
  - Note that when you select a Class, the Allow in DNP3 box is checked automatically. If you uncheck the box, all selected classes will be unchecked.

### 28.1.4.1.7: Binary Outputs

The next setting for DNP is Binary Outputs, which is used for the relay outputs of the RO1S Option card.

1. From the Tree menu, click DNP3 Configuration>Binary Outputs.



You will only see settable fields if at least one RO1S card is installed in the meter.

You can have two RO1S cards installed in a meter.

2. You have the following options:

- You can load the default settings by clicking the Default button.
- You can clear the entries by clicking Clear.
- You can enter the settings manually, for the binary outputs:
  - Under Object 12 Allow in DNP, click the checkbox next to any relay output you want to be accessed through DNP.

- For the Object 12 Class 0 fields, Class 0 corresponds to Object 10 (static output state).
- The relay outputs require a Select before Operate procedure through DNP in order to change them. If instead you want the relay output to be pulsed directly, set up Direct Operate for the options listed: Reset Energy Counters, Change to Modbus Protocol, Reset Demand Counters, and Manual Waveform Capture.
- Select a timeout in milliseconds. The timeout is the maximum time allowed between the select command being issued and the relay being operated.

### NOTES on Binary Output Points

Relay Card	Physical Output	DNP Point	Actions	Action Mode	Notes
Slot #1	1	0	Latch On / Latch Off	Select Before Operate	Physical Relay
	2	1	Latch On / Latch Off	Select Before Operate	Physical Relay
Slot #2	1	2	Latch On / Latch Off	Select Before Operate	Physical Relay
	2	3	Latch On / Latch Off	Select Before Operate	Physical Relay
Reset Energy		4	Latch On / Pulse On	Direct Operate	Automatically cleared
Switch RS485 to Modbus RTU		5	Latch On / Pulse On	Direct Operate	Automatically cleared
Reset Demand Counters		6	Latch On / Pulse On	Direct Operate	Automatically cleared
Trigger Waveform Capture		7	Latch On / Pulse On	Direct Operate	Automatically cleared



**Possible Errors Using Select Before Operate command**

Error	If ...
Not Supported	Actions other than Latch-On or Latch-Off were issued (Trip, Close, Pulse, etc.)
Not Supported	Trying to select any DNP3 Output point out of range (0 to 3)
Not Supported	Trying to select a point between 0 and 3, but the corresponding Relay Card is not installed
Local	Trying to select an output point that is being used by ElectroLogic™ Relay Control (configured in Device profile)
Local	Trying to select an output point that has not been allowed in the DNP profile
Accepted	Point selected

**Possible Errors When Operating an Output Point Between 0 and 3**

Error	If ...
Not Supported	Actions other than Latch-On or Latch-Off were issued (Trip, Close, Pulse, etc.)
Not Supported	Trying to operate a point between 0 and 3, but the corresponding Relay Card is not installed.
Local	Trying to operate an output point that is being used by the ElectroLogic™ Relay Control (configured in Device profile)
Local	Trying to operate an output point that has not been allowed in the DNP profile
No Select	Trying to operate an output which has not been previously selected
Accepted	Point selected

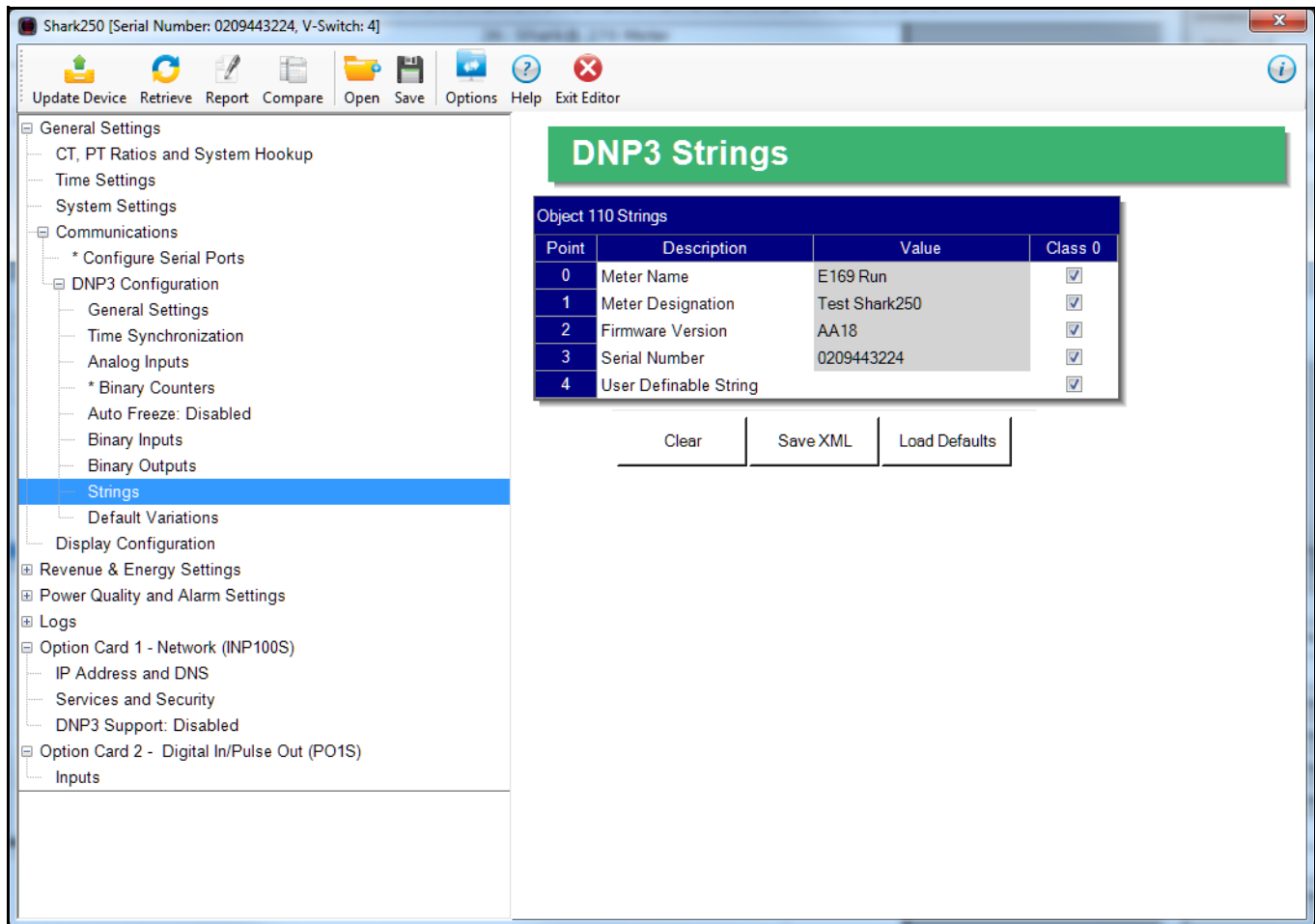
**Possible Errors When Operating an Output Point Between 4 and 7**

Error	If ...
Not Supported	Trying to select any DNP3 Output point out of range (8 or larger)
Not Supported	Actions other than Latch-On or Latch-Off were issued (Trip, Close, Pulse, etc.)
Not Supported	Trying to operate point 7 (waveform capture) but there is no log memory allocated for waveforms
Local	Trying to operate an output point that has not been allowed in the DNP profile
Timeout	Trying to operate point 4 (reset energy) when the meter has not warmed up yet
Timeout	Trying to operate point 7 (waveform capture) when there is a capture already in progress
Not Authorized	Other functionality is solely responsible for resetting energy (TOU, AutoFreeze, etc.) or Security settings do not allow it (Seal switch)

### 28.1.4.1.8: Strings

The next setting for DNP is Strings, which is used to set up reporting of static information, such as meter model.

1. From the Tree menu, click DNP3 Configuration>Strings.



2. You have the following options:

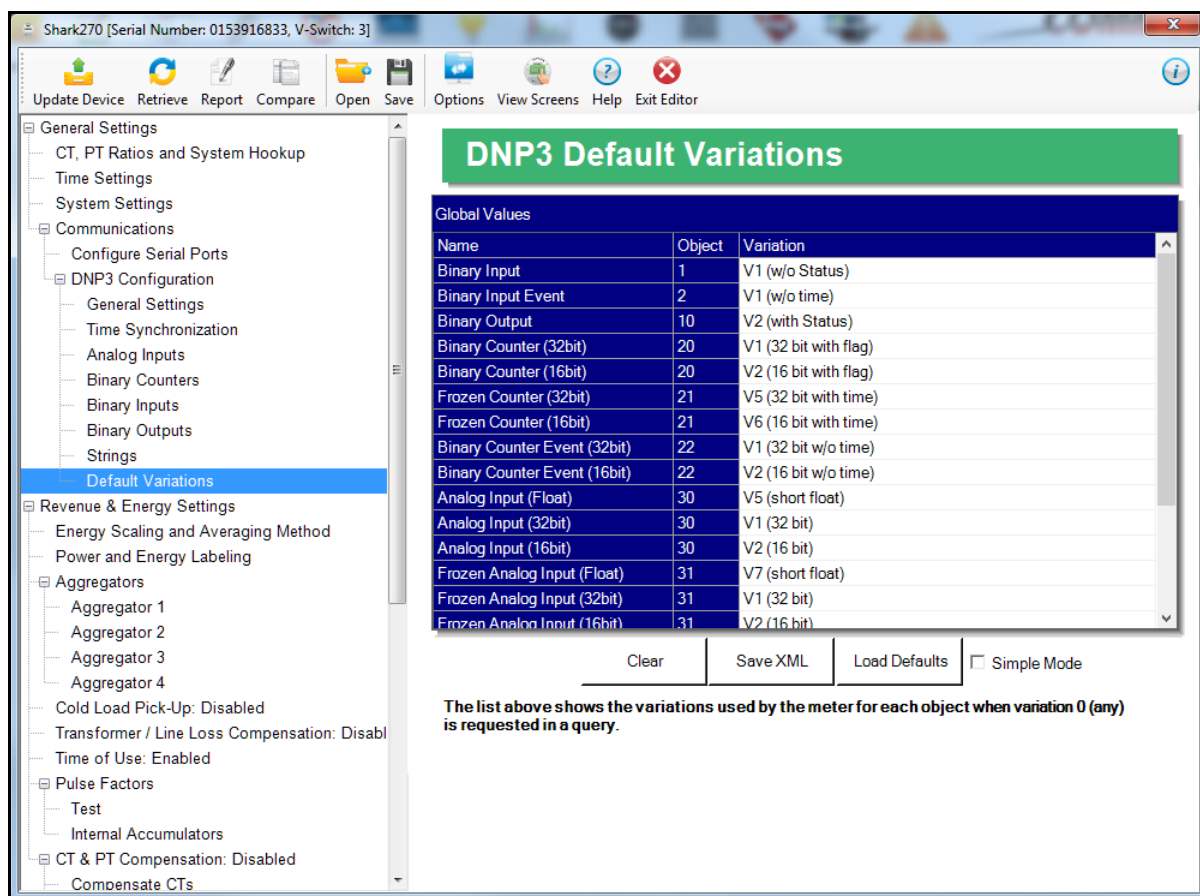
- You can load the default settings by clicking the Default button.
- You can clear the entries by clicking Clear.
- You can enter the settings manually, for the strings:
  - Points 0, 2 and 3 are hard-coded and fixed in the meter.
  - Point 1 can be configured in the meter's Device Profile. See [28.1.3: Configuring System Settings](#), on page 28-7.

- Point 4 is an editable string, which you can enter. The maximum number of characters you can use is 16.
  - The only assignable class for the strings is Class 0. Click the checkbox to assign any of the strings to Class 0.
3. To implement any changes, click the Update Device button to send the new profile to the meter.

### 28.1.4.1.9: Default Variations

The last setting for DNP is Default Variations, which is used to configure the variations used by the meter for each object when Variation 0 is requested by a query. Note that there are default configurations already set up in the meter for Variation 0, but this setting lets you change them. Refer to Appendix C in the *Shark® 270 Meter Installation and Operation Manual* for details on this setting.

1. From the Tree menu, click DNP3 Configuration>Default Variations.



2. For each of the objects listed under Global Values, you can select the variation number you want to use by clicking in the Variation line and then choosing the variation from the pull-down menu.

- Some objects have more than one type (i.e., Float, 16-Bit, or 32-bit), depending on the reading being mapped. If you need to program a different variation for an object depending on its type, uncheck the Simple Mode box. Then you can assign a variation to each type, individually. See the example configuration for Object 30, Analog Inputs, below; each of the object's types has been programmed with a different default Variation.

Binary Counter (32bit)	20	V1 (32 bit with flag)
Binary Counter (16bit)	20	V2 (16 bit with flag)
Frozen Counter (32bit)	21	V5 (32 bit with time)
Frozen Counter (16bit)	21	V6 (16 bit with time)
Counter Event (32bit)	22	V1 (32 bit w/o time)
Counter Event (16bit)	22	V2 (16 bit w/o time)
Analog Inputs (Float)	30	V5 (short float)
Analog Inputs (32bit)	30	V1 (32 bit)
Analog Inputs (16bit)	30	V2 (16 bit)
Frozen Analog Input (32bit)	31	V1 (32 bit)
Frozen Analog Input (16bit)	31	V2 (16 bit)
Analog Input Event (Float)	32	V7 (short float with time)
Analog Input Event (32bit)	32	V7 (short float with time)
Analog Input Event (16bit)	32	V7 (short float with time)
Analog Input Deadband (Float)	34	V3 (short float)
Analog Input Deadband (32bit)	34	V2 (16 bit)
Analog Input Deadband (16bit)	34	V1 (32 bit)

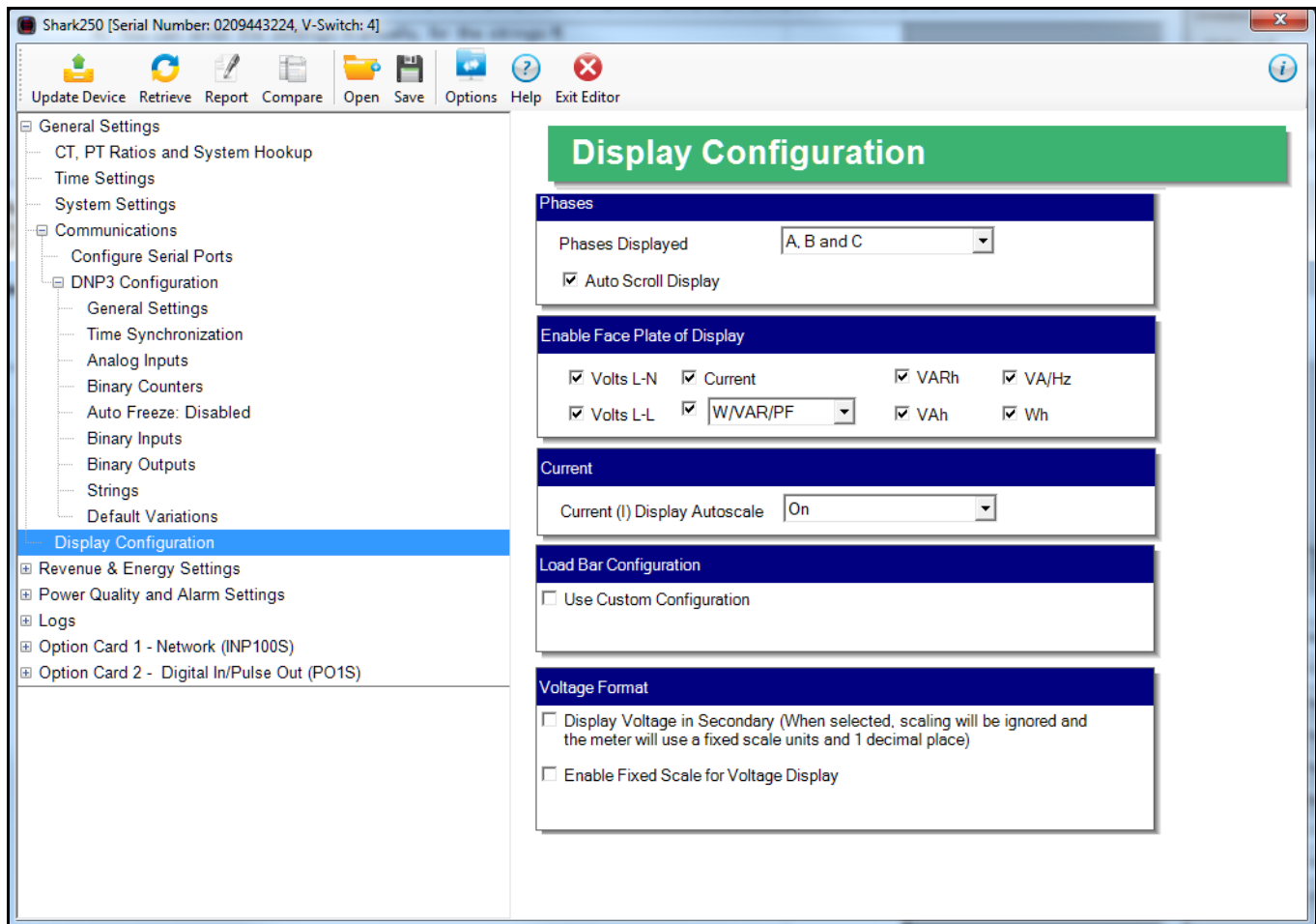
☐ Simple Mode

- If you want to set the same variation for all of an object's types, check the Simple Mode box and select the variation for the object.

### 28.1.5: Setting Display Configuration

Some users may want to lock the meter to a particular faceplate display or series of displays. For example, if you would like the meter to act only as a Volt meter, or only as an ammeter, the meter can be configured to display only the relevant screen. Use this setting to lock the display of the Shark® 250 meter's faceplate to the specific combination you want. Refer to the meter's Installation and Operation Manual for additional information on the faceplate. Note that you will not see this setting if you are connected to a Shark® 250T transducer.

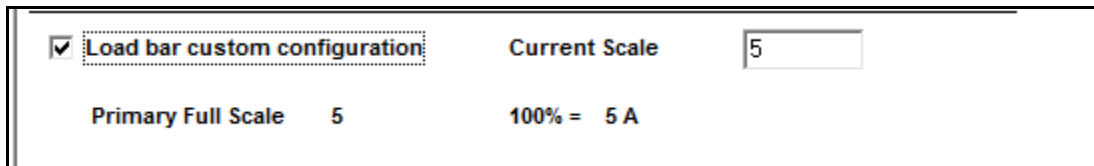
1. From the Tree Menu, click General Settings>Display Configuration.



2. The screen fields and acceptable entries are as follows:

- Phases Displayed: A; A and B; A, B, and C. This field determines which phases display on the faceplate. For example, if you select A and B, only those two phases will be displayed on the faceplate.

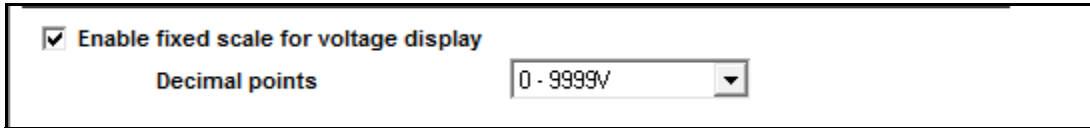
- **Auto Scroll Display:** Click to enable, leave unchecked to disable. This field enables/disables the scrolling of selected readings on the faceplate. If enabled, the readings scroll every 5 seconds.
- **Enable on Face Plate of Display:** Check the boxes of the Readings you want displayed on the faceplate of the meter. If you make no selection, Amps are displayed by default.
- **Current (I) Display Autoscale:** On to apply scaling to the current display or Off (No decimal places).
- **Load Bar Custom Configuration:** This allows the meter to display load with an analog representation. This way the user can get a visual presentation of the loading of the circuit. To enter scaling for the Load Bar:
  - a. Click the Use Custom Configuration checkbox. Fields display on the screen that allow you to enter a Scaling factor for the display. See the figure below



<input checked="" type="checkbox"/> <b>Load bar custom configuration</b>	<b>Current Scale</b>	<input type="text" value="5"/>
<b>Primary Full Scale</b>	<b>5</b>	<b>100% = 5 A</b>

- b. Enter the scaling factor you want in the Current Scale field. This field is multiplied by the CT Multiplier set in the CT, PT Ratios, and System Hookup screen (see [28.1.1: Configuring CT, PT Ratios and System Hookup, on page 28-2](#)) to arrive at the Primary Full Scale. Make sure you set the CT multiplier correctly.
- **Display Voltage in Secondary:** Click to enable or uncheck to disable. This setting overrides the next setting, i.e., if it is selected, the fixed scale setting is ignored.
  - **Enable Fixed Scale for Voltage Display:** To enter a scaling factor for the Voltage display (note that this setting is ignored if you select to display voltage in secondary in the previous setting):

- a. Click the checkbox next to Enable Fixed Scale for Voltage Display. The screen changes - see the figure below.

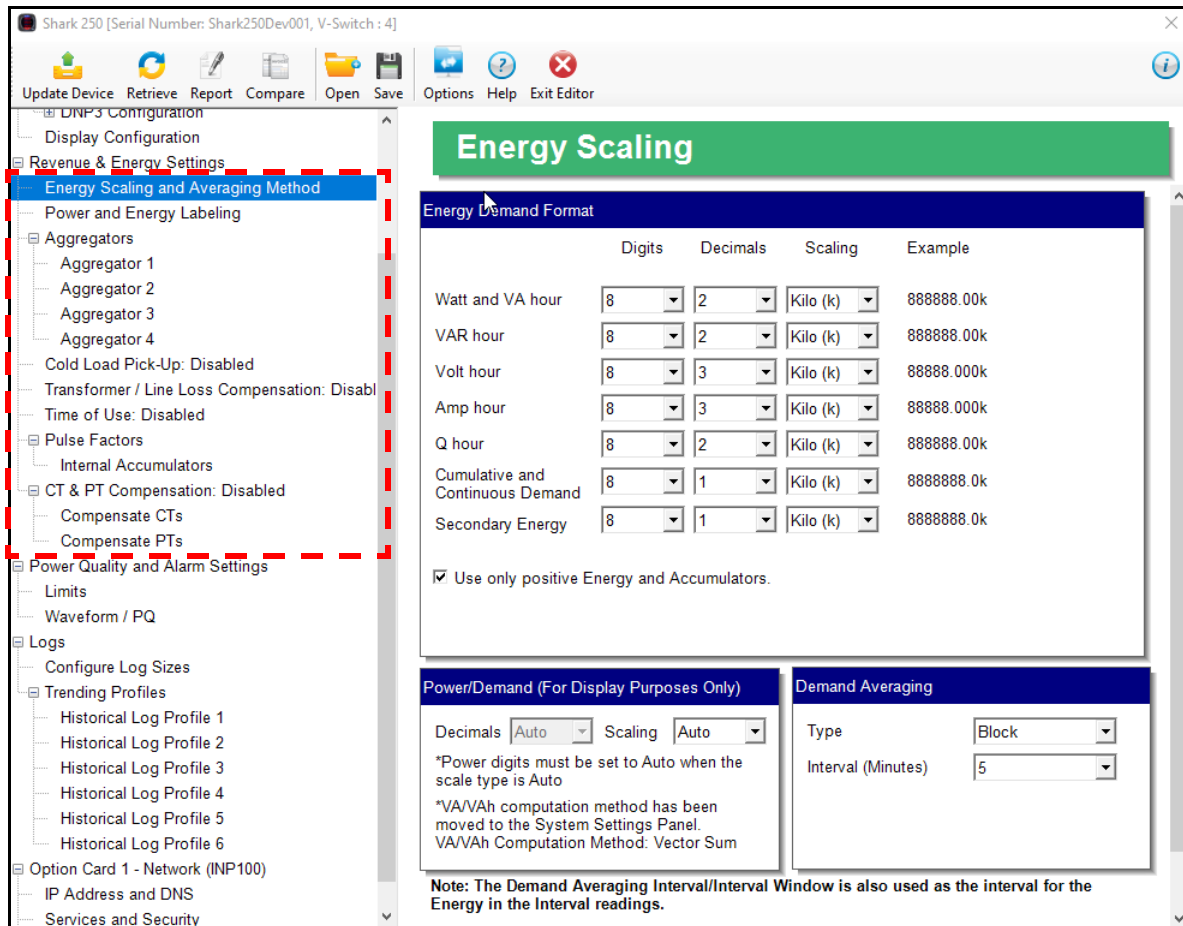


The screenshot shows a rectangular box containing two controls. At the top, there is a checked checkbox followed by the text "Enable fixed scale for voltage display". Below this, on the left, is the label "Decimal points" in blue. To the right of the label is a pull-down menu with a white background and a small downward-pointing arrow on the right side. The text inside the menu is "0 - 9999V".

- b. Select the scaling you want to use from the pull-down menu. The options are: 0-9999V, 100.0kV-999.9kV, 10.00kV-99.99kV, or 0kV-9.999kV.
3. To implement any changes, click the Update Device button to send the new profile to the meter.

## 28.2: Revenue and Energy Settings

From the Tree Menu on the left side of the Shark 250 meter's Device Profile screen, double-click on the Revenue and Energy Settings line or click on the + button next to it. The settings in the Revenue and Energy Settings group are listed.



### 28.2.1: Configuring Energy, Power Scaling, and Averaging

From the Tree Menu, click Revenue & Energy Settings> Energy, Power Scaling, and Averaging (see the screen above). Use this setting to configure:

- The display and storage of Energy registers in the meter
- The display of Power data in the meter
- The interval over which Average values are computed, as well as the Interval Energy



## Functional Overview of Energy Settings, VA Computation, and Averaging:

- **Energy Scaling**

Energy Setting includes:

Digits (the number of digits in the reading)

Decimals (the number of decimal places in the reading)

Energy Scale: the scale of the reading - unit; kilo (number times 1000); Mega (number times 1 million)

Energy settings allow you to balance the resolution (or accuracy) of the energy stored, with the interval over which energy rollover occurs. For example, the maximum resolution for a k scale reading is: 99999.999k.

To calculate the speed at which the energy will rollover, you must know the Power Full Scale, which is computed from the CT and PT Full Scale values (see [28.1.1: Configuring CT, PT Ratios and System Hookup, on page 28-2](#)). The formula for calculating Power Full Scale is:

Wye system:  $\text{CT Full Scale} \times \text{PT Full Scale} \times 3$

Delta system:  $\text{CT Full Scale} \times \text{PT Full Scale} \times 3 \times \sqrt{3}$

For example, for a CT Full Scale of 2000, PT Full Scale of 14400, Wye system:  
 $2000 \times 14400 \times 3 = 86400000$

In this example, the energy will increment at 86400000 Watts per hour, or 24000 Watts per second.

This value allows you to determine the number of digits, decimal places, and energy scale you want to configure for the Energy settings, when you take into account the rollover time.

To determine the number of hours before rollover, use this formula:

$[\text{Max Resolution}]/[\text{Full Scale}] = \text{\#Hours}$ , where Max Resolution = maximum digits and decimals for the Energy scale in use.

Using the example from above, with an energy scale of Mega, the formula would be:

$99999.999 \text{ M}/86.4 \text{ M} = 1157.4074 \text{ hours}$  or about 48 days until rollover.

**NOTE:** To increase the number of days until rollover, you can increase the number

of digits (to 8), decrease the number of decimal places (to 0), or increase the Energy Scale (to M).

- **Demand Averaging**

Demand is the average rate of energy use over time. The Shark® 250 meter supports two types of demand averaging: Block demand and Rolling demand.

Block demand records the average demand for time intervals that you define (usually 5, 15 or 30 minutes).

Rolling demand functions like multiple, overlapping Block demands. You define the subintervals at which an average of demand is calculated. An example of Rolling demand would be a 15-minute Demand block using 5-minute subintervals, thus providing a new demand reading every 5 minutes, based on the last 15 minutes.

1. The screen fields and acceptable entries are as follows:

- **Energy Demand Format:** for each of the readings, enter:

- Digits (number of digits): 5; 6; 7; 8
- Decimals (number of decimals): 0 - 6
- Scaling: unit; kilo (k); mega (M)

Example: shows the result of your choices, i.e., reading for Digits: 8; Decimals: 3; Scale: k, show leading zeros, would be formatted as:  
00123.456k

- Check the box to use only positive energy and accumulators.

**NOTES:**

- Your selection in the Energy Demand Format fields determines the precision of energy stored for display and polling. Refer to the Functional Overview at the beginning of this section for more information.
- If you are changing the energy settings, we recommend you first reset the Energy Accumulators, in order to prevent erroneous counts. See [20.1.7: Reset Device Information, on page 20-7](#), for instructions on resetting the Shark® 250 meter's Energy Accumulators.

- Power Settings
  - Decimals (number of digits): 0-3
  - Scaling: Auto; unit; kilo (k); mega (M)
- Demand Averaging
  - Type: Block or Rolling
  - Interval (Block demand) or Sub-Interval (Rolling demand): 3; 5; 15; 30; 60
  - Number of Subintervals: 1; 2; 3; 4; 5
  - Interval Window: This field is display only. It is the product of the values entered in the Sub-Interval and Number of Subintervals fields.

**NOTES:**

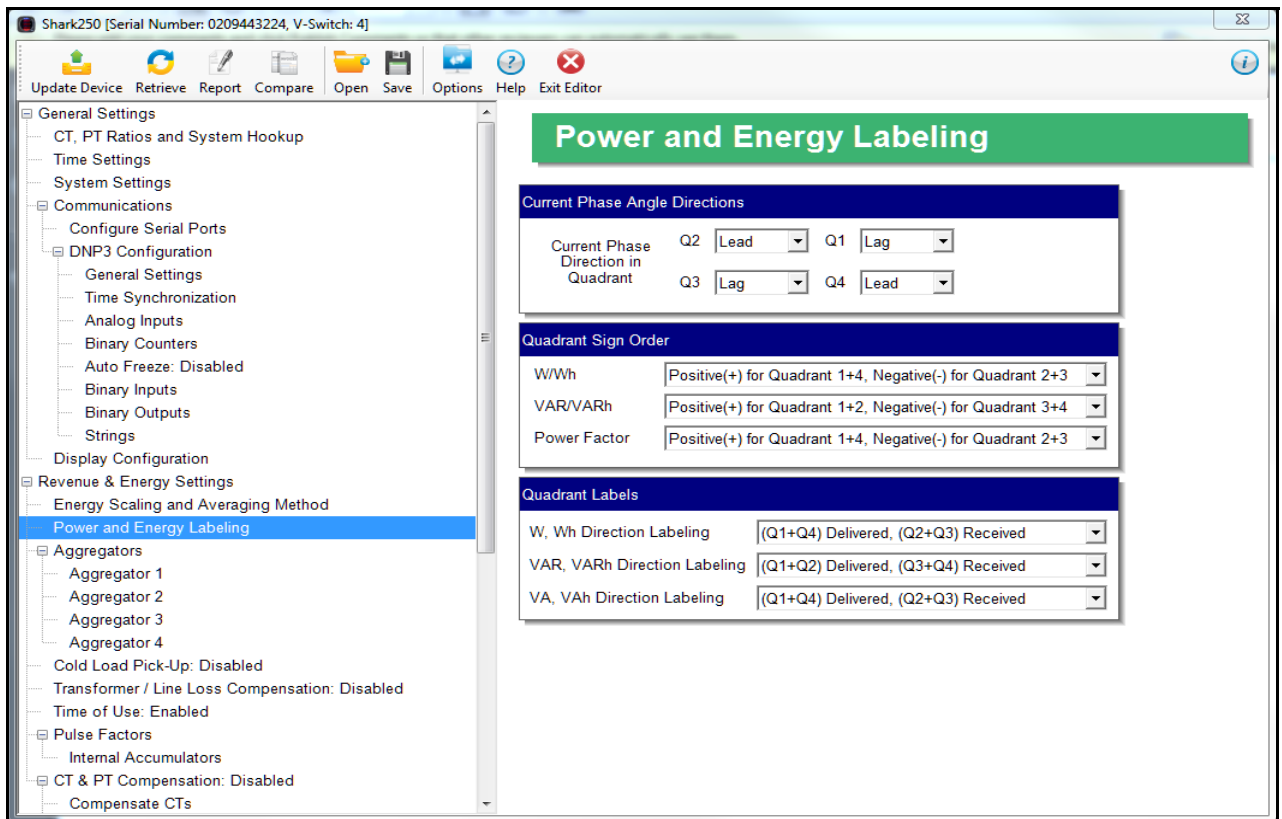
- You will only see the Number of Subintervals and Interval Window fields if you select Rolling demand.
  - If you have set an Input to trigger EOI demand averaging (using either a Relay Output/Digital Input or Pulse Output/Digital Input Option card) any entry you make in the Demand Averaging field will be ignored. A message to that effect appears on the screen. See [28.5.2: Configuring a Relay Output/Digital Input Card, on page 28-75](#) and [28.5.3: Configuring a Pulse Output/Digital Input Card, on page 28-81](#), for instructions on setting EOI pulse for demand averaging. Note that this affects Time of Use as well, since the TOU accumulations will occur at the EOI trigger point, rather than on the programmed interval, which can result in TOU periods of longer or shorter length than expected.
2. To implement any changes, click the Update Device button to send the new profile to the meter.

## 28.2.2: Power and Energy Labeling

This setting matches the direction of power for the meter to that of the electrical system being measured. Use it to designate the system as an inductive (lagging) load, with current lagging voltage; or as a capacitive (leading) load with current leading voltage.

Power direction for the meter is determined by setting the power quadrants as lagging or leading; setting the sign order for power and energy readings, such as watt/watt-hour; and setting the quadrant labels as received or delivered. This setting insures that the meter's power measurements match the electrical system. There are examples of different power direction settings, after the instructions.

1. From the Tree Menu, click Revenue & Energy Settings> Power and Energy Labeling.



## 2. Make these settings:

- a. Current Phase Angle Directions: designate each of the 4 energy quadrants, Q1, Q2, Q3, Q4, as Lead(ing) or Lag(ging).

Current Phase Angle Directions				
Current Phase Direction in Quadrant	Q2	Lead	Q1	Lag
	Q3	Lag	Q4	Lead

- b. Quadrant Sign Order:  
designate the positive and negative power quadrants for W/Wh, VAR/VARh, and Power Factor.

Quadrant Sign Order	
W/Wh	Positive(+) for Quadrant 1+4, Negative(-) for Quadrant 2+3
VAR/VARh	Positive(+) for Quadrant 1+2, Negative(-) for Quadrant 3+4
Power Factor	Positive(+) for Quadrant 1+4, Negative(-) for Quadrant 2+3

- c. Quadrant Labels: select the labels from the pull-down menus..

Quadrant Labels	
W, Wh Direction Labeling	(Q1+Q4) Delivered, (Q2+Q3) Received
VAR, VARh Direction Labeling	(Q1+Q2) Delivered, (Q3+Q4) Received
VA, VAh Direction Labeling	(Q1+Q4) Delivered, (Q2+Q3) Received

- d. See the examples of different quadrant settings on the next two pages.
3. To implement any changes, click the Update Device button to send the new profile to the meter.

## Example 1

Current Phase Angle Directions				
Current Phase Direction in Quadrant	Q2	Lead	Q1	Lag
	Q3	Lag	Q4	Lead

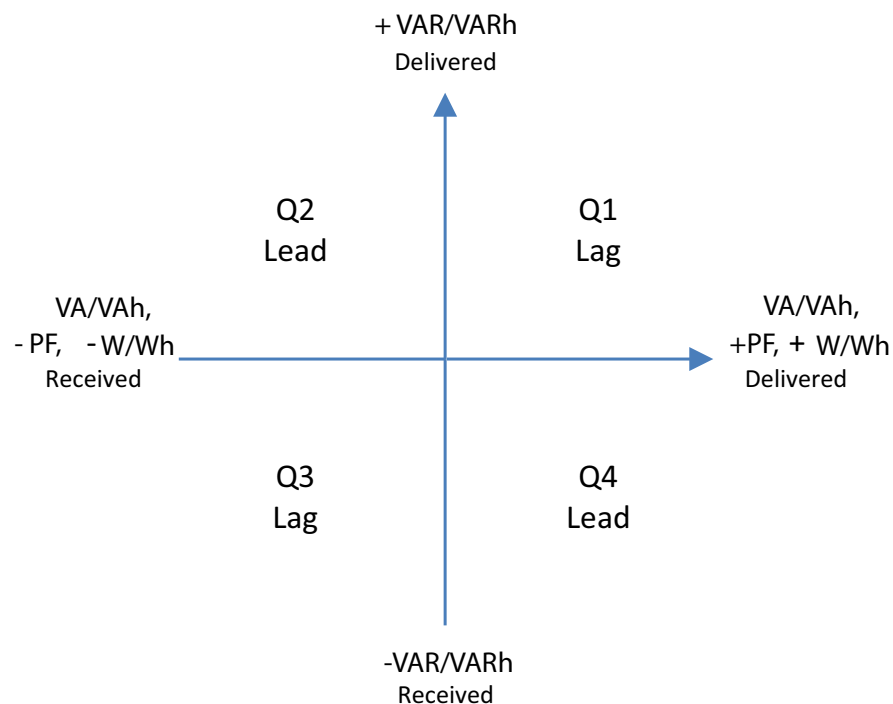
  

Quadrant Sign Order	
W/Wh	Positive(+) for Quadrant 1+4, Negative(-) for Quadrant 2+3
VAR/VARh	Positive(+) for Quadrant 1+2, Negative(-) for Quadrant 3+4
Power Factor	Positive(+) for Quadrant 1+4, Negative(-) for Quadrant 2+3

Quadrant Labels	
W, Wh Direction Labeling	(Q1+Q4) Delivered, (Q2+Q3) Received
VAR, VARh Direction Labeling	(Q1+Q2) Delivered, (Q3+Q4) Received
VA, VAh Direction Labeling	(Q1+Q4) Delivered, (Q2+Q3) Received

These settings are illustrated below (they are the factory default settings).



## Example 2

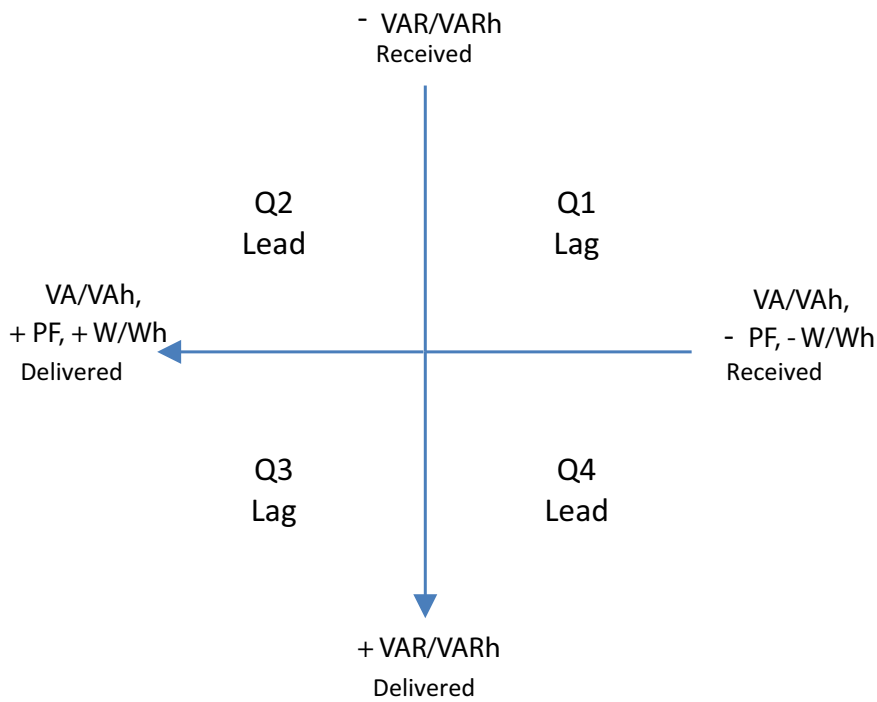
Current Phase Angle Directions				
Current Phase Direction in Quadrant	Q2	Lead	Q1	Lag
	Q3	Lag	Q4	Lead

Quadrant Sign Order	
W/Wh	Negative(-) for Quadrant 1+4, Positive(+) for Quadrant 2+3
VAR/VARh	Negative(-) for Quadrant 1+2, Positive(+) for Quadrant 3+4
Power Factor	Negative(-) for Quadrant 1+4, Positive(+) for Quadrant 2+3

Quadrant Labels	
W, Wh Direction Labeling	(Q1+Q4) Received, (Q2+Q3) Delivered
VAR, VARh Direction Labeling	(Q1+Q2) Received, (Q3+Q4) Delivered
VA, VAh Direction Labeling	(Q1+Q4) Received, (Q2+Q3) Delivered



### 28.2.3: Aggregators Setting

Aggregators are registers that hold the sum/difference of data from multiple sources, internal and external. An example use for an aggregator is to totalize pulses from different meters. The Shark® 250 meter offers four aggregators. The aggregators get data from two sources: 1. an input that is set up as an accumulator (see [28.5.2: Configuring a Relay Output/Digital Input Card, on page 28-75](#) and [28.5.3: Configuring a Pulse Output/Digital Input Card, on page 28-81](#)) and 2. one of the meter's energy registers. The value of the Input accumulator(s) and of the energy register can either be added to, or subtracted from, the aggregator.

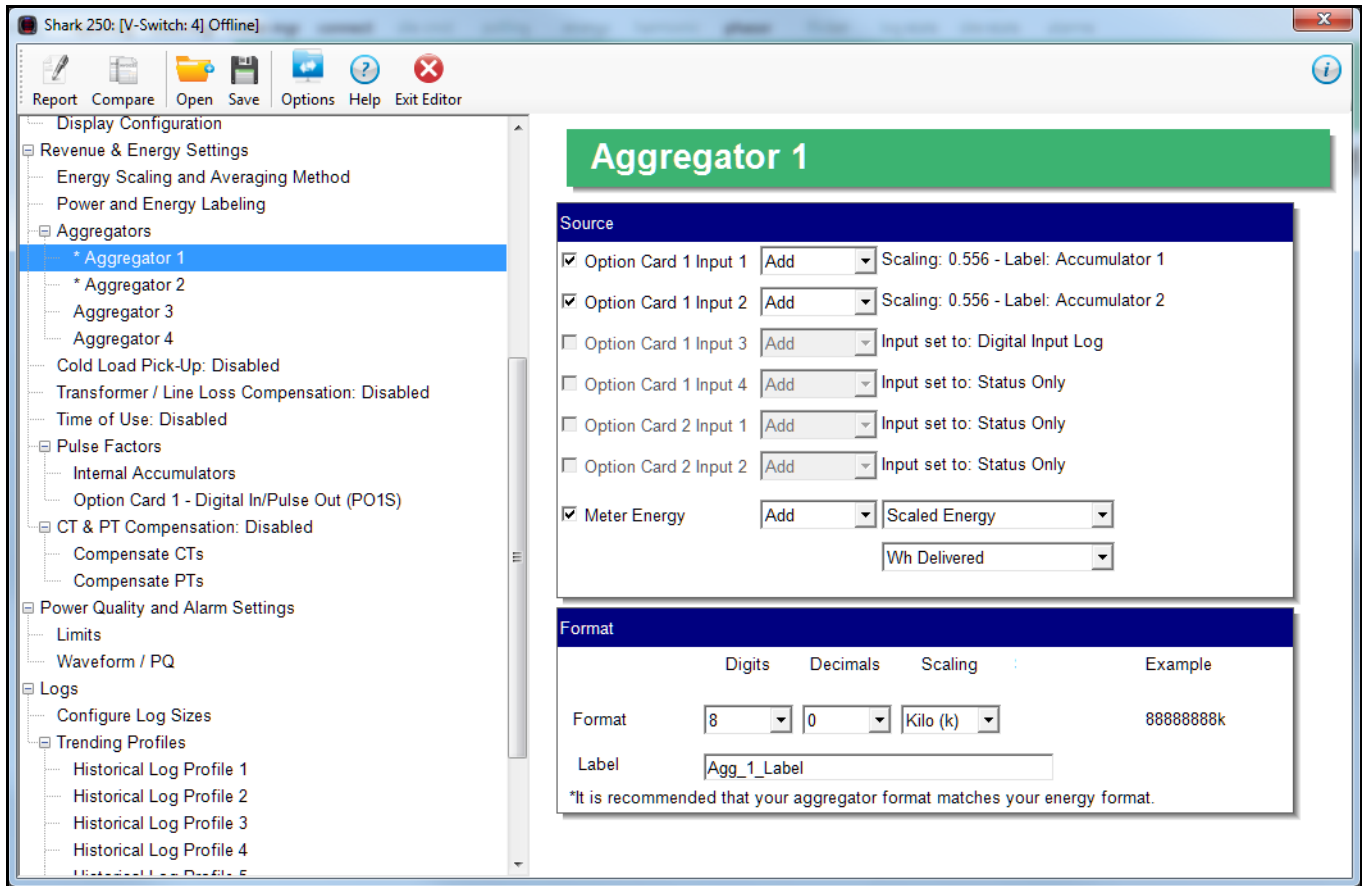
The Pulse Output/Digital Input card has four inputs and the Relay Output/Digital Input card has two inputs. Each aggregator can hold the addition/subtraction of one to eight of the digital inputs and 1 energy register listed in the table below and on the following page.

<b>Energy (Compensated &amp; Uncompensated)</b>
It, Phase A
It, Phase B
It, Phase C
Vt, Phase A-N
Vt, Phase B-N
Vt, Phase C-N
Vt, Phase A-B
Vt, Phase B-C
Vt, Phase C-A
Wh, (Q1+Q4)
Wh, (Q2+Q3)
VARh, (Q1+Q2)
VARh, (Q3+Q4)
VAh, Total
Quadrant 1 Wh, Total
Quadrant 1 VARh, Total
Quadrant 1 VAh, Total



Energy (Compensated & Uncompensated)
Quadrant 2 Wh, Total
Quadrant 2 VARh, Total
Quadrant 2 VAh, Total
Quadrant 3 Wh, Total
Quadrant 3 VARh, Total
Quadrant 3 VAh, Total
Quadrant 4 Wh, Total
Quadrant 4 VARh, Total
Quadrant 4 VAh, Total
VAh (Q1+Q4), Total
VAh (Q2+Q3), Total
+Qh, Total
-Qh, Total

1. To set up aggregators, click Revenue and Energy Settings>Aggregators>Aggregator (1-4). All four aggregators are set up the same way.



2. In the Source section you set up the Input and the Energy register to use:

- a. Depending on the Option card(s) installed in the meter, you will see between none and eight Option card Inputs listed. Click the checkbox to the left of any Inputs you want to use in the aggregator. The scaling and label for that accumulator is listed to the right of the Input's field.

**IMPORTANT!** The Input must be assigned as an accumulator. See [28.5.2: Configuring a Relay Output/Digital Input Card, on page 28-75](#) and [28.5.3: Configuring a Pulse Output/Digital Input Card, on page 28-81](#), for instructions on setting up an Input as an accumulator.

- b. Select Add or Subtract from the pull-down menu next to each Input you are using. Add means that you want to add the Input accumulator value to the aggregator; subtract means you want to subtract the Input accumulator value from the aggregator.
  - c. Click the checkbox to the left of Meter Energy and select the energy register you want to use from the pull-down menu. The top menu lets you select the Energy type, e.g., Scaled Energy, and the bottom menu lets you select the energy register, e.g., Wh Delivered.
  - d. Select Add or Subtract from the pull-down menu next to the Meter Energy field. Add means that you want to add the Energy value to the aggregator; subtract means you want to subtract the Energy value from the aggregator.
- 3. In the Format section you set up the energy format and label for the aggregator:
  - a. Select the number of digits (5-8), decimals (0-6), and scaling (kilo or Mega), from the pull-down menus.
  - b. The Example field shows what your formatting choices will look like.
  - c. Enter a label for the aggregator. The label can be up to 32 characters.
- 4. To implement any changes, click the Update Device button to send the new profile to the meter.

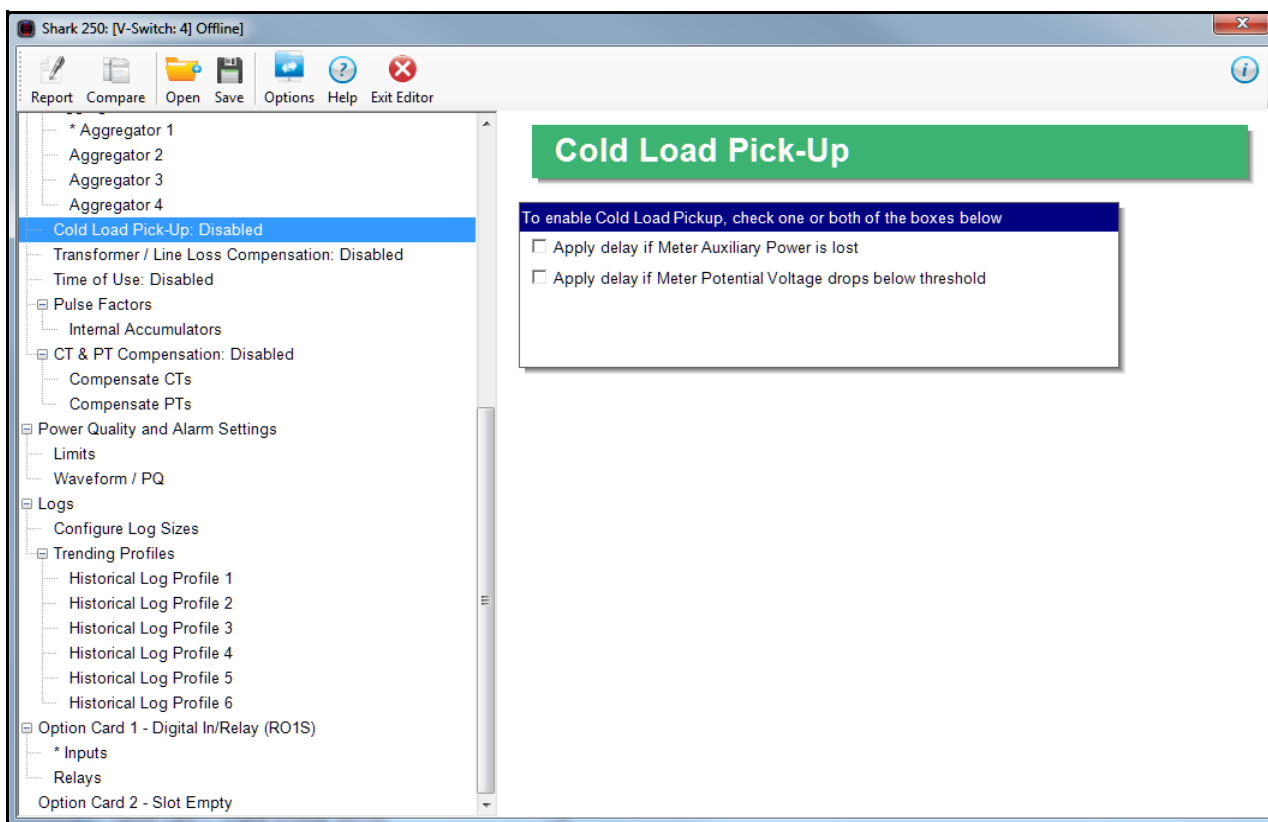
### 28.2.4: Cold Load Pickup (Demand Forgiveness)

The Shark® 250 meter offers Cold Load Pickup, so that in case a power system outage or excessive power system voltage drop occurs, when normal service is resumed, the customer will not be billed for the initial surge or in-rush of power to feed its “cold loads.” During the initial time period immediately following the return of normal electric service, the demand is not computed in the Demand Registers if the two threshold conditions described below are met, so the customer is not billed for possible excessive demand due to “cold load pickup.”

- A power system outage which drops the metering potential inputs to the meter (to below a programmed threshold) and also drops the meter’s power.
- A power system outage which drops the metering potential inputs to the Meter (to below a programmed threshold), but the meter’s external power remains supplied by an alternate source (e.g., station battery, station service, etc.), that is, the meter continues to operate.

Note that energy is always continuously measured and is also recorded in the Power Profile Logs, if so configured (see [28.4.2: Trending Profiles - Configuring Historical Logs](#), on page 28-68, for log setup procedures).

1. From the Tree Menu, click Revenue & Energy Settings> Power and Energy Labeling. Use this setting to enable and configure the meter's cold load pickup/demand forgiveness feature. When enabled, this feature lets you set the amount of time power is off to identify a power outage that is the responsibility of the utility (as opposed to a very short term loss of power that is not their responsibility) and the amount of time you want to wait before demand starts again. This time should correspond to the "grace" period the utility applies to avoid charging for motor startup, etc. after a power outage.



## 2. Make these settings:

- a. Click Apply delay if Meter's Auxiliary Power is Lost. The Intervals fields display on the screen.

To enable Cold Load Pickup. Check one or both of the boxes below

☒ Apply delay if Meter Auxiliary Power is lost

☐ Apply delay if Meter Potential Voltage drops below threshold

---

**Intervals**

Demand forgiveness interval	3600	Seconds
Minimum loss of service	300	Seconds
Maximum allowed service on-time	900	Seconds

- Demand Forgiveness Interval: use the up and down arrows to set the amount of time (in seconds) that Demand is not accumulated when a cold load condition occurs.
- Minimum Loss of Service: use the up and down arrows to set the minimum amount of time that power needs to be off before a cold load condition occurs.
- Maximum Allowed Service On-Time: use the up and down arrows to set the maximum time that Demand is not accumulated when a cold load condition occurs.

- b. Click Apply Delay if Meter Potential Voltage Drops Below threshold. The Intervals and Thresholds (Secondary) fields display on the screen.

To enable Cold Load Pickup. Check one or both of the boxes below

☒ Apply delay if Meter Auxiliary Power is lost

☒ Apply delay if Meter Potential Voltage drops below threshold

☐ On all phases

☐ On any phase

---

**Intervals**

Demand forgiveness interval	3600	Seconds
Minimum loss of service	300	Seconds
Maximum allowed service on-time	900	Seconds

---

**Thresholds (Secondary)**

Voltage A-N	30.00
Voltage B-N	30.00
Voltage C-N	30.00

- You can select to apply the threshold to either all phases (click On All Phases radio button) or any of the phases (click On Any Phase radio button).

- Make the Intervals settings the same as in step a.
  - Set the thresholds: use the up and down arrows to enter the percentage drop for each phase A-N, B-N, C-N.
3. To implement any changes, click the Update Device button to send the new profile to the meter.

### **28.2.5: Transformer/Line Loss Compensation**

Transformer losses are power used by the transformer while working. The more load on the transformer, the higher the transformer losses. There are two types of transformer losses:

- No load losses - these are the fixed losses that keep the transformer up and running.
- Load losses - these vary with changes in the load.

When the meter is located on the secondary side of a customer's transformer, a utility will want to add the transformer losses into the energy usage calculation. However, this practice is regulated by local jurisdiction and regulations. The meter has the capability to add in or subtract out these transformer losses, depending on the user's specific needs.

Line losses are similar to transformer losses, except that they are used to compensate for loss incurred on wires, such as transmission lines.

Transformer/Line Loss Compensation allows you to add or subtract transformer and/or line losses to meter registration.

1. From the Tree Menu, click Revenue & Energy Settings>Transformer/Line Loss Compensation.

Shark250 [Serial Number: ANDREW001, V-Switch: 4]

Update Device Retrieve Report Compare Open Save Options Exit Help

General Settings  
 CT, PT Ratios and System Hookup  
 Time Settings  
 \* System Settings  
 Communications  
 Display Configuration  
 Revenue & Energy Settings  
 Energy Scaling and Averaging Method  
 Power and Energy Labeling  
 Cold Load Pick-Up: Disabled  
**Transformer / Line Loss Compensation: Disabled**  
 Pulse Factors  
 Internal Accumulators  
 CT & PT Compensation: Disabled  
 Compensate CTs  
 Compensate PTs  
 Time of Use: Disabled  
 Power Quality and Alarm Settings  
 Limits  
 Waveform / PQ  
 Logs  
 Configure Log Sizes  
 Trending Profiles  
 Historical Log Profile 1  
 Historical Log Profile 2  
 Historical Log Profile 3  
 Historical Log Profile 4  
 Historical Log Profile 5

## Transformer / Line Loss Compensation

Percent Loss of Watts		
	Positive Watts	Negative Watts
Due to Iron	0	0
Due to Copper	0	0

Percent Loss of VARS		
	Positive Watts	Negative Watts
Due to Iron	0	0
Due to Copper	0	0

Disabled

Add to Watts and VAR

TLC Calculator

2. This screen displays the current values for the meter's Transformer Loss Compensation. The screen fields and acceptable entries are as follows
  - Percent Loss of Watts due to Iron and Copper/Positive Watts and Negative Watts
  - Percent Loss of VARS due to Iron and Copper/Positive and Negative Watts
  - Drop-down menu #1. Choose from: Disabled, Fe Only, Cu Only, Both Fe and Cu.
  - Drop-down menu #2. Choose from: Add to Watts and VAR; Add to Watts and Subtract from VAR; Subtract from Watts and Add to VAR; Subtract from Watts and VAR.
3. Click TLC Calculator to find the values to enter into the Percent Loss fields. The TLC Calculator button launches the TLC Calculator that makes the calculations for you once you enter the required data.

**NOTE:** Appendix A contains screen captures of the Loss Calculator with example numbers, and an explanation of Loss Compensation considerations.

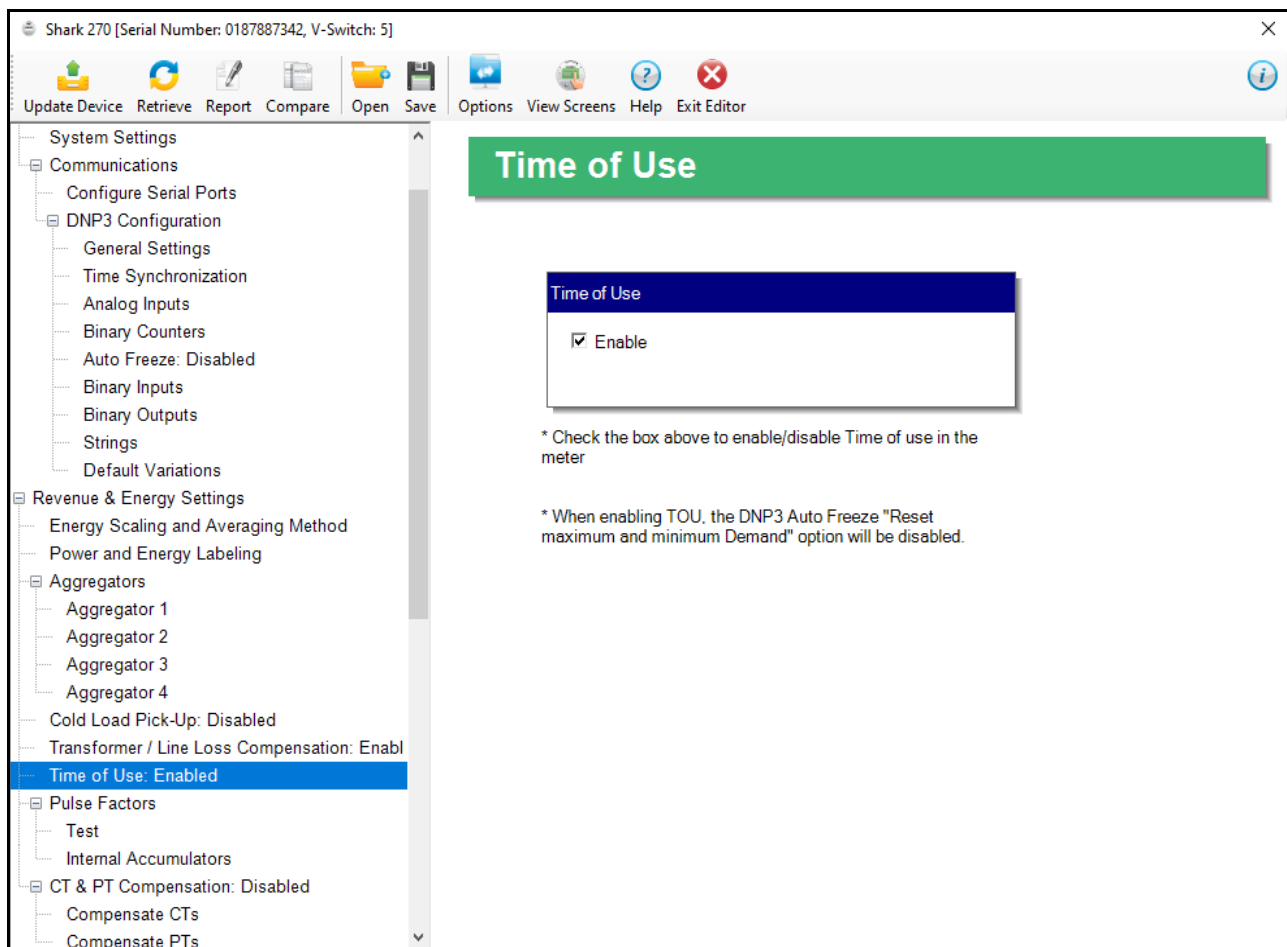


4. Enter the percent Loss of Watts and VARS for copper and iron in the appropriate fields.
5. To implement any changes, click the Update Device button to send the new profile to the meter.

### 28.2.6: Time of Use Setting

The Shark® 250 meter offers Time of Use. See [Chapter 15: Time of Use, on page 15-1](#), for instructions. To enable or disable, Time of Use for the meter:

1. Click Revenue & Energy Settings>Time of Use.

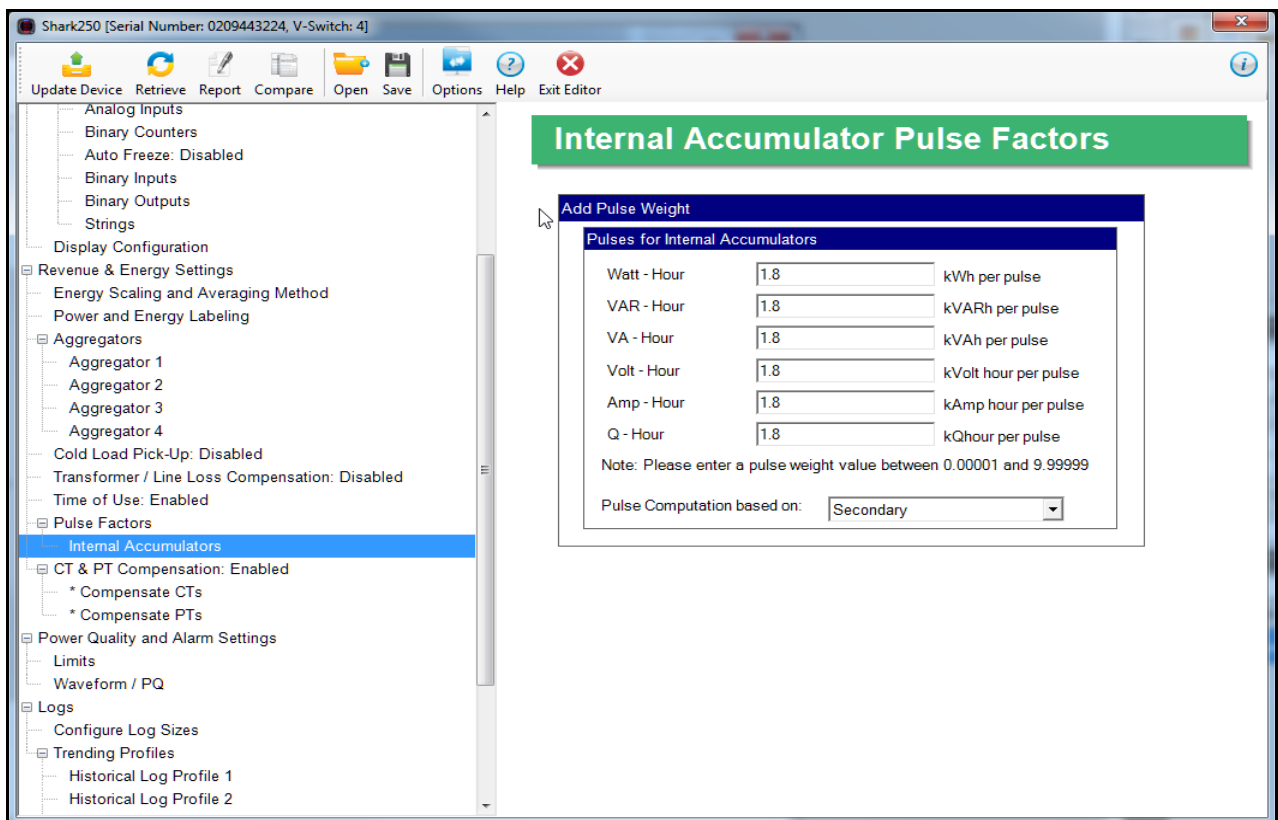


2. Check the box to enable Time of Use; uncheck the box if you want to disable it.
3. To implement any changes, click the Update Device button to send the new profile to the meter.

### 28.2.7: Internal Accumulators for Pulse Factors

Pulse factors are the weight of a KYZ pulse for energy consumed. The meter uses pulses for load profiling of accumulated energy over demand intervals. The pulse weights are assigned in this Device Profile setting.

1. From the meter's Programmable Settings screen in the CommunicatorPQA® application, click Revenue and Energy Settings>Pulse Factors>Internal Accumulators.

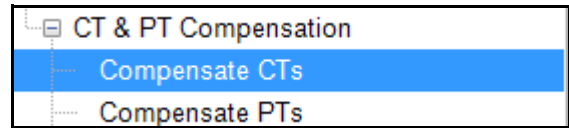


2. For each of the energy reading accumulators, enter the pulse weight you want to assign to it. The pulse weight must be between 0.01000 and 9.99999.
3. For the Pulse computation based on setting select either Primary to use primary energy or Secondary to use secondary energy.
4. To implement any changes, click the Update Device button to send the new profile to the meter.

### 28.2.8: CT and PT Compensation

CT/PT compensation is used to correct for errors caused by the current transformers (CTs) (external to the meter) and Potential/Voltage transformers (PTs) connected to the meter.

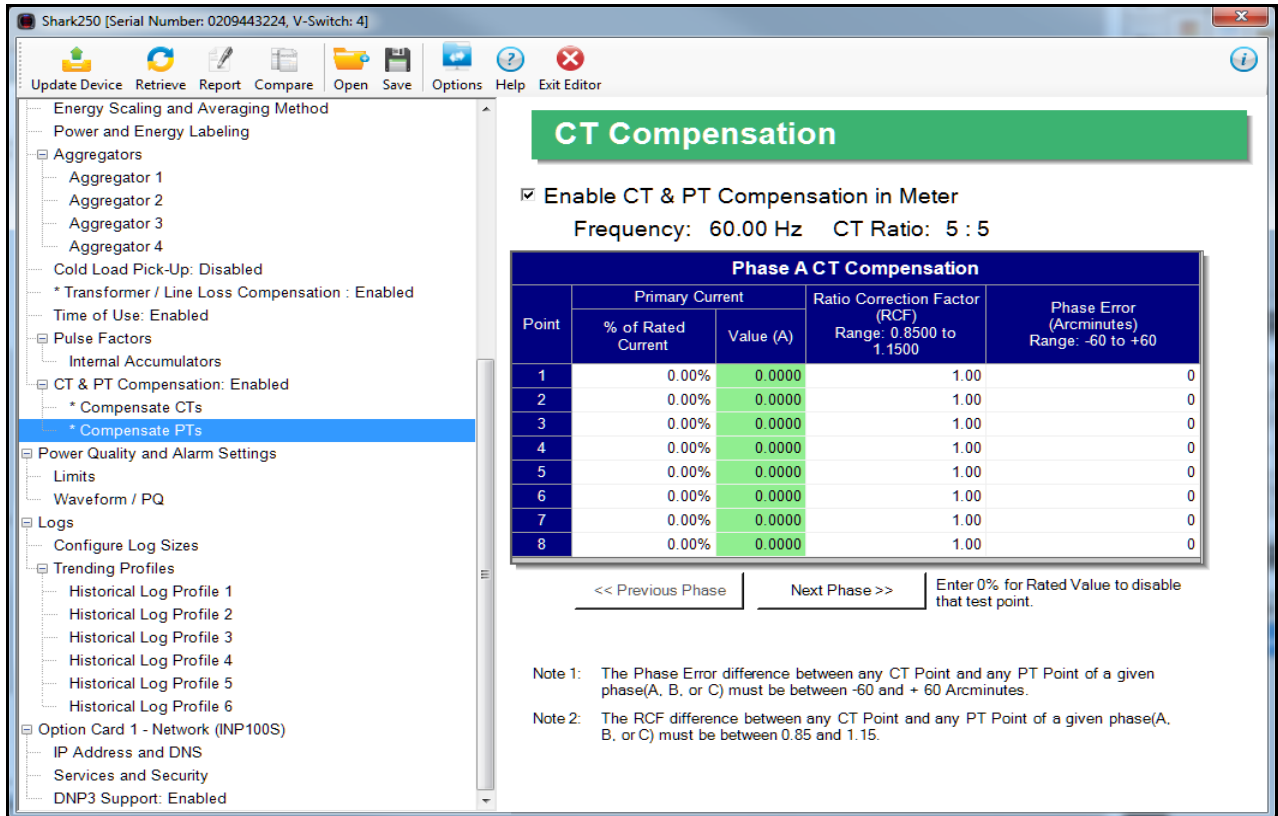
From the Tree Menu, click Revenue and Energy Settings>CT & PT Compensation. Two options open under CT & PT Compensation: Compensate CTs and Compensate PTs. Use these settings to enable and set compensation factors for the meter.



### 28.2.8.1: Compensate CTs

The first CT & PT Compensation setting option is Compensate CTs.

1. From the Tree menu, click CT & PT Compensation>Compensate CTs.



2. Make sure the Enable CT & PT Compensation in Meter box is checked. If it is not, any settings you enter won't be implemented. The top of the screen shows the system frequency and the CT ratio (see [28.1.1: Configuring CT, PT Ratios and System Hookup](#), on page 28-2). Make these settings:
  - a. The first screen you see displays the settings for Phase A CT compensation. Click the Next Phase button at the bottom of the screen to enter settings for phases B and C.

b. For each of the phases, enter up to 8 points of % of rated current, ratio correction factor (0.08500 to 1.1500), or phase error/arcminutes (-60 to +60). The Value (A) field displays the current value for the "% of rated current" setting you entered. For example, if the current Full Scale is 5 A, and you enter 0.01% in the "% of rated current field," the value will be 0.0005 A. Refer to your CT manufacturer's documentation for the values to enter on this screen.

- If you don't want to use a test point, enter 0% for the rated current.

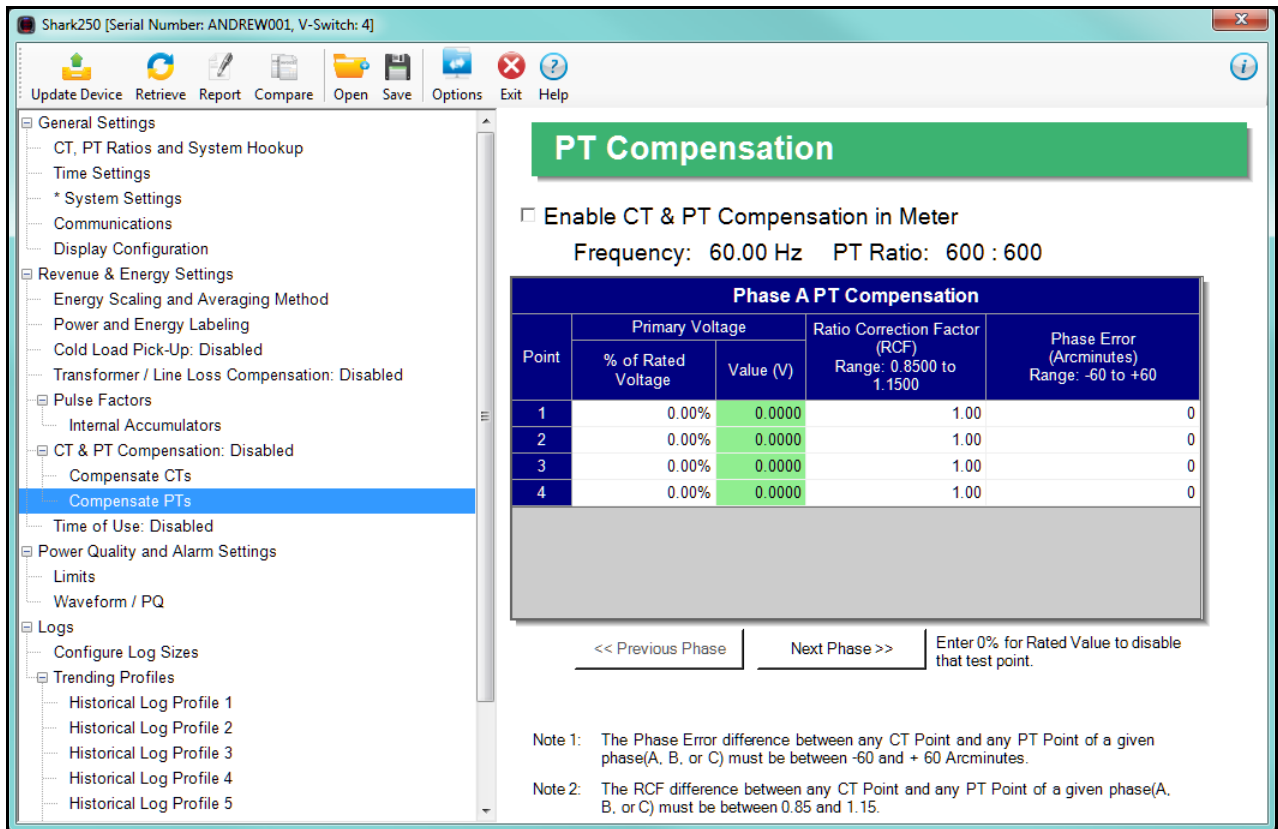
c. Continue to the next phase and repeat step 2b.

3. To implement any changes, click the Update Device button to send the new profile to the meter.

### 28.2.8.2: Compensate PTs

The second CT & PT Compensation setting option is Compensate PTs.

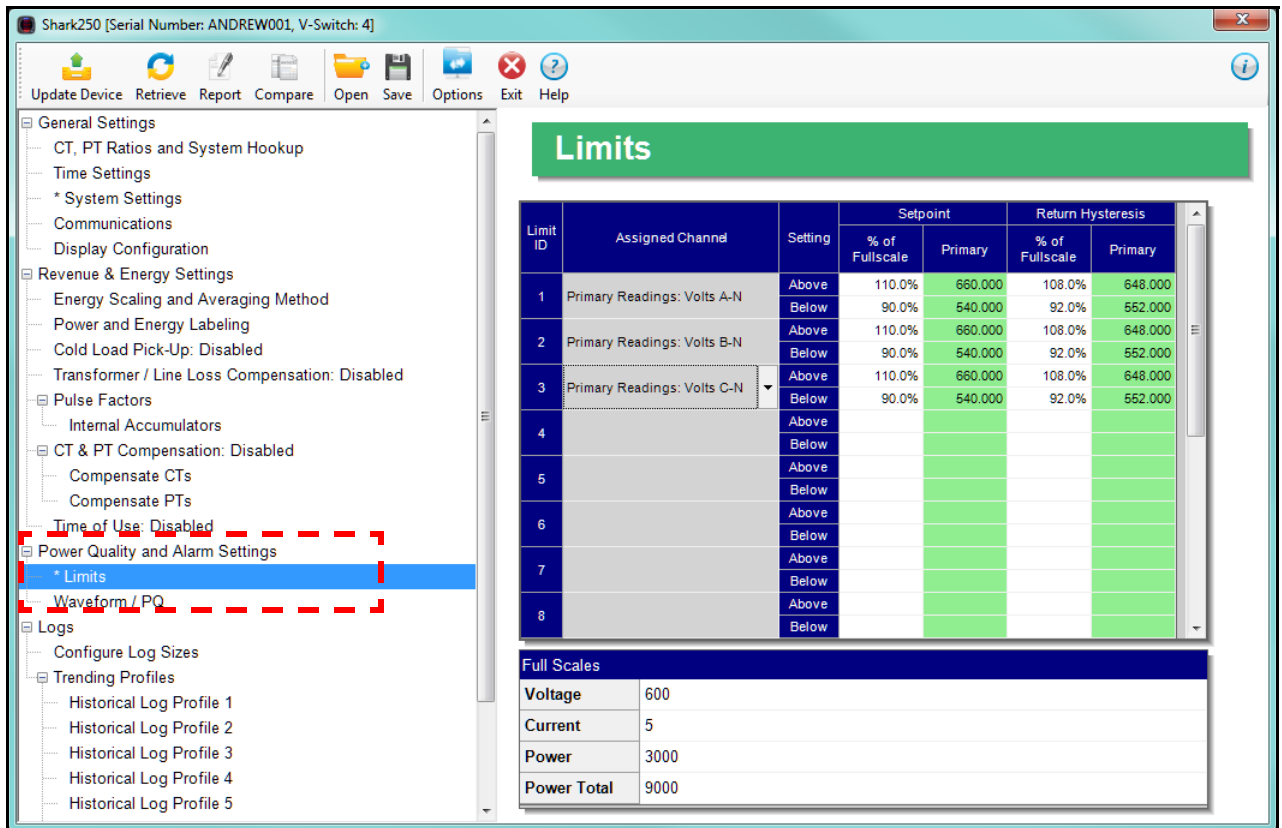
1. From the Tree menu, click CT & PT Compensation>Compensate PTs.



2. Make sure the Enable CT & PT Compensation in Meter box is checked. If it is not, any settings you enter won't be implemented. The top of the screen shows the system frequency and PT ratio (see [28.1.1: Configuring CT, PT Ratios and System Hookup](#), on page 28-2). Make these settings:
  - a. The first screen you see displays the settings for Phase A PT compensation. Click the Next Phase button at the bottom of the screen to enter settings for phases B and C.

## 28.3: Power Quality and Alarms Settings

From the Tree Menu on the left side of the Shark® 250 meter's Device Profile screen, double-click on the Power Quality and Alarms Settings line or click on the + button next to it. All of the settings in the Power Quality and Alarms Settings group are listed.



**Shark250 [Serial Number: ANDREW001, V-Switch: 4]**

Update Device Retrieve Report Compare Open Save Options Exit Help

**General Settings**

- CT, PT Ratios and System Hookup
- Time Settings
- \* System Settings
- Communications
- Display Configuration

**Revenue & Energy Settings**

- Energy Scaling and Averaging Method
- Power and Energy Labeling
- Cold Load Pick-Up: Disabled
- Transformer / Line Loss Compensation: Disabled

**Pulse Factors**

- Internal Accumulators

**CT & PT Compensation: Disabled**

- Compensate CTs
- Compensate PTs

**Time of Use: Disabled**

**Power Quality and Alarm Settings**

- \* Limits
- Waveform / PQ

**Logs**

- Configure Log Sizes
- Trending Profiles
  - Historical Log Profile 1
  - Historical Log Profile 2
  - Historical Log Profile 3
  - Historical Log Profile 4
  - Historical Log Profile 5

**Limits**

Limit ID	Assigned Channel	Setting	Setpoint		Return Hysteresis	
			% of Fullscale	Primary	% of Fullscale	Primary
1	Primary Readings: Volts A-N	Above	110.0%	660.000	108.0%	648.000
		Below	90.0%	540.000	92.0%	552.000
2	Primary Readings: Volts B-N	Above	110.0%	660.000	108.0%	648.000
		Below	90.0%	540.000	92.0%	552.000
3	Primary Readings: Volts C-N	Above	110.0%	660.000	108.0%	648.000
		Below	90.0%	540.000	92.0%	552.000
4		Above				
		Below				
5		Above				
		Below				
6		Above				
		Below				
7		Above				
		Below				
8		Above				
		Below				

**Full Scales**

Voltage	600
Current	5
Power	3000
Power Total	9000

### 28.3.1: Configuring Limits

1. From the Tree Menu, click Power Quality and Alarm Settings>Limits (see the screen on the previous page). The current settings for Limits are shown in the screen. Use this screen to assign Limits for the Shark® 250 meter.

#### **Functional Overview for Limits:**

Limits are transition points used to divide acceptable and unacceptable measurements. When a value goes above or below the limit, an out-of-limit condition occurs. You can set and configure up to 16 Limits for the Shark® 250 meter.

Once they are configured, you can view the out-of-Limits (or Alarm) conditions in the Limits Log (see Chapter 19) or Limits Polling screen (see Chapter 5). You can also use Limits to trigger relays.

You can assign the eight limits to readings from the following groups and sub-groups:

- Measured Values
  - Subgroups: Readings and Uncompensated Readings
- Max/Min Demand
  - Subgroups: Maximum, Minimum, Voltage Maximums in the Interval, and Voltage Minimums in the Interval
- Average Demand
- Harmonics/THD
  - Subgroups: THD and Magnitudes

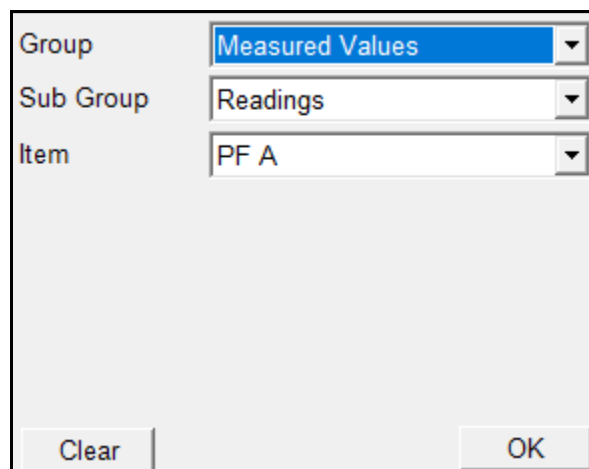
2. The bottom of the screen shows the Full Scale values for:

- Voltage
- Current
- Power
- Power Total



3. To set or change a Limit:

- a. Select a limit by double-clicking on the Assigned Channel field.
- b. You will see the screen shown below.



The screenshot shows a dialog box with three dropdown menus. The first dropdown, labeled 'Group', has 'Measured Values' selected. The second dropdown, labeled 'Sub Group', has 'Readings' selected. The third dropdown, labeled 'Item', has 'PF A' selected. At the bottom of the dialog box are two buttons: 'Clear' on the left and 'OK' on the right.

- c. Select a Group, Subgroup if applicable, and an Item for the Limit.
  - d. Click OK. The Limit you selected will now appear in the Limits screen.
3. To configure a Limit, double-click on the following fields to set their values:
- Above and Below Set Point: of Full Scale (the point at which the reading goes out of limit: see figure on the next page)  
For example:  
100% of 120V Full Scale = 120V  
90% of 120V Full Scale = 108V

- Above and Below Return Hysteresis (the point at which the limit's status changes from out of limit to within limit: see figure below)

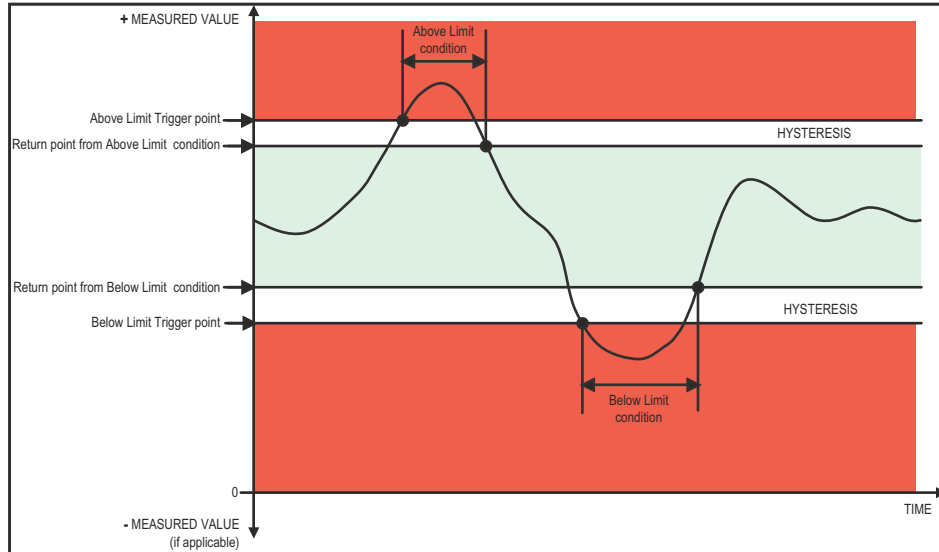
For example:

Above Set Point = 110% Below Set Point = 90%

(Out of Limit above 132V)(Out of Limit below 108V)

Above Return Hysteresis = 105% Below Return Hysteresis = 95%

(Stay Out of Limit until below 126V) (Stay Out of Limit until above 114V)



#### NOTES:

- The Primary fields are display only. They show what the set point and return Hysteresis value are for each limit.
  - If the Above Return Hysteresis is greater than the Above Set Point, the Above Limit is Disabled; if the Below Return Hysteresis is less than the Below Set Point, the Below Limit is Disabled. You may want to use this feature to disable either the Above Limit or Below Limit condition for a reading.
  - If you are entering negative limits, be aware that the negative value affects the way the above and below limits function, since negative numbers are processed as signed values.
4. To implement any changes, click the Update Device button to send the new profile to the meter.

### 28.3.2: Configuring Waveform/PQ (With V-Switch™ Key 3 and Higher)

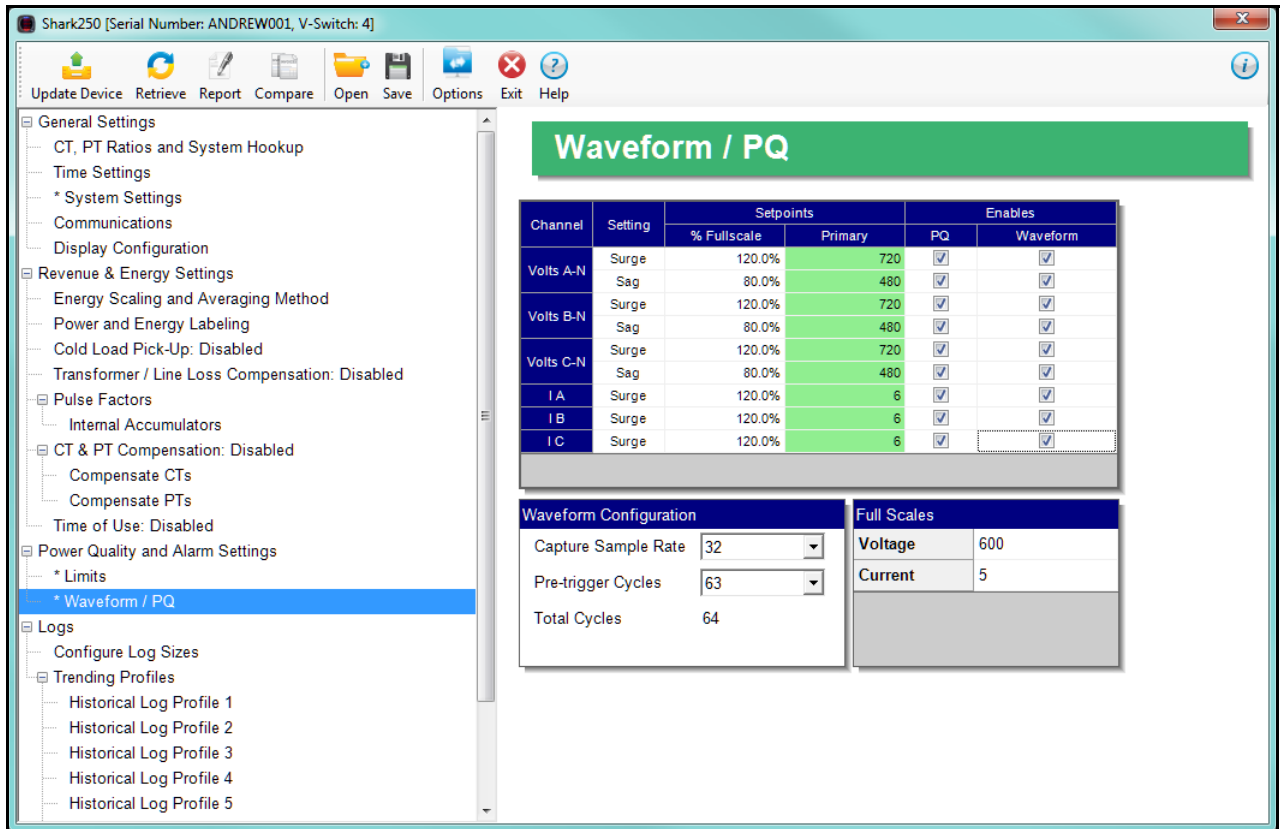
The Shark® 250 meter is V-Switch™ key upgradeable. If you have purchased V-Switch™ keys 3 or 4, the waveform recording feature will be available with your meter. The Waveform/PQ capability allows the meter to act as a high-speed waveform recorder to record any anomaly that occurs within a cycle of duration. This provides a user with advanced waveform analysis including pre- and post- waveform recording.

The meter has the capability to record both surges and sags of the measured signals. A voltage surge is any event that increases the RMS voltage for one cycle, calculated every half cycle. A voltage sag is a dip in the RMS of one cycle of voltage, calculated every half cycle. A current fault (or surge) is also calculated in the same manner. When the RMS value of any of these triggers exceeds the threshold settings, the meter will trigger a waveform capture.

This setting determines at what point the meter executes a waveform capture and/or records a power quality event. See Chapter 19 for instructions on viewing Waveform and PQ logs. See [28.4.2: Trending Profiles - Configuring Historical Logs, on page 28-68](#) for instructions on configuring the log sectors for the Shark® 250 meter.

**NOTE:** PQ and Waveform Thresholds are given as a percentage of the Full Scales ( Full Scale fields). Full Scales are based on the CT and PT Ratios set in the CT, PT Ratios and System Hookup setting. Before programming the Waveform/PQ Thresholds, set the CT and PT ratios. See [28.1.1: Configuring CT, PT Ratios and System Hookup, on page 28-2](#), for instructions.

1. From the Tree Menu, click Power Quality and Alarm Settings>Waveform/PQ. The current settings, if any, are shown in the screen.



2. Set the Surge and Sag Setpoints (in percent of Full Scale), for Voltage, and the Surge Setpoint for Current. When you enter the percentage for a reading, the primary value is displayed in the Primary field. The bottom of the screen displays the Full Scales for Voltage and Current.
3. Click the checkbox under PQ to enable PQ recording when the programmed threshold is exceeded.
4. Click the checkbox under Waveform to enable Waveform recording when the programmed threshold is exceeded.

5. Select the sampling rate from the Capture Sample Rate pull-down menu. The options are:

- For V-Switch™ key 3: 32, 64, 128
- For V-Switch™ key 6: 32, 64, 128, 256, 512.

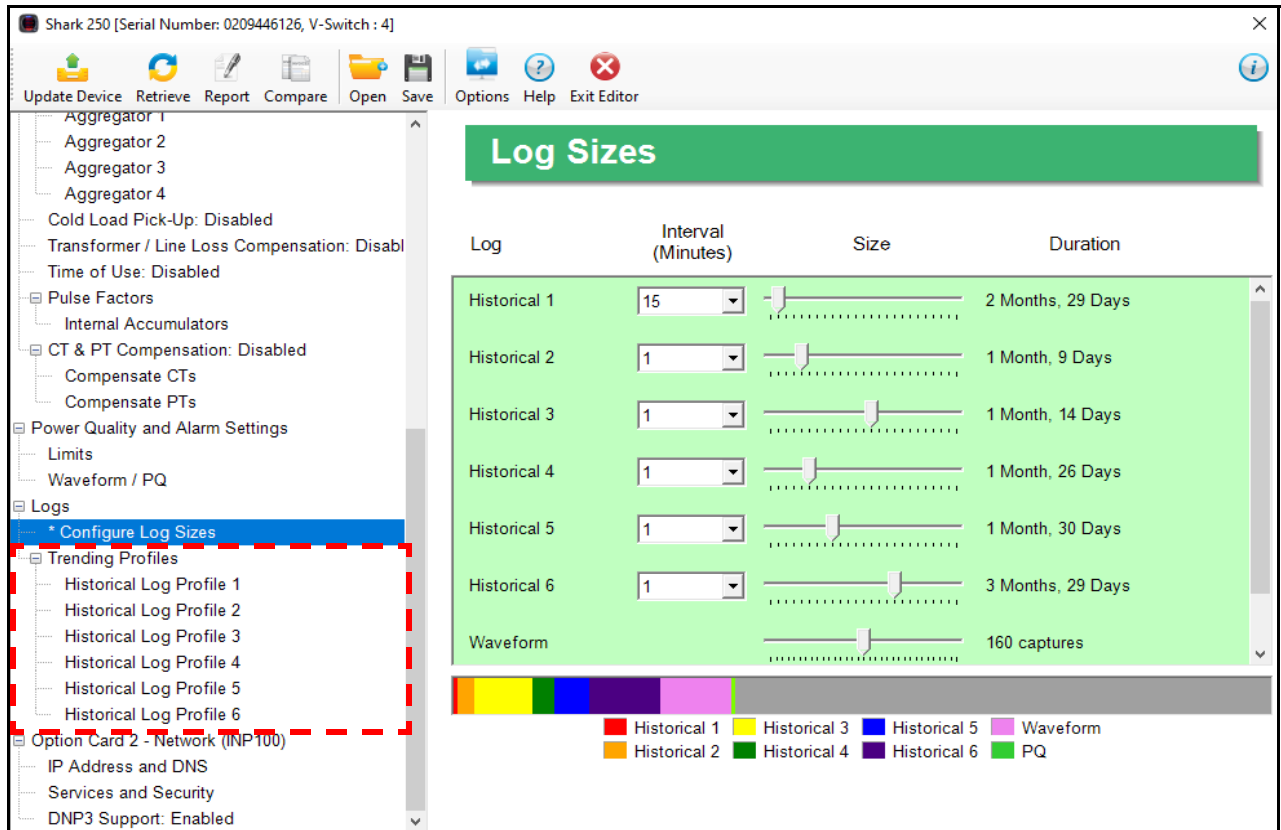
6. From the Pre-trigger pull-down menu, select the number of cycles of waveform data prior to the triggering event, that you want to be included in the waveform capture. The options are 2 to 63.

**NOTE:** Increasing the number of pre-cycles will decrease the number of cycles of data recorded after the event.

7. To implement any changes, click the Update Device button to send the new profile to the meter.

## 28.4: Logs

From the Tree Menu on the left side of the Shark® 250 meter's Device Profile screen, double-click on the Logs line or click on the + button next to it. All of the settings in the Logs group are listed: log size settings and configuration screens for the meter's six historical logs..

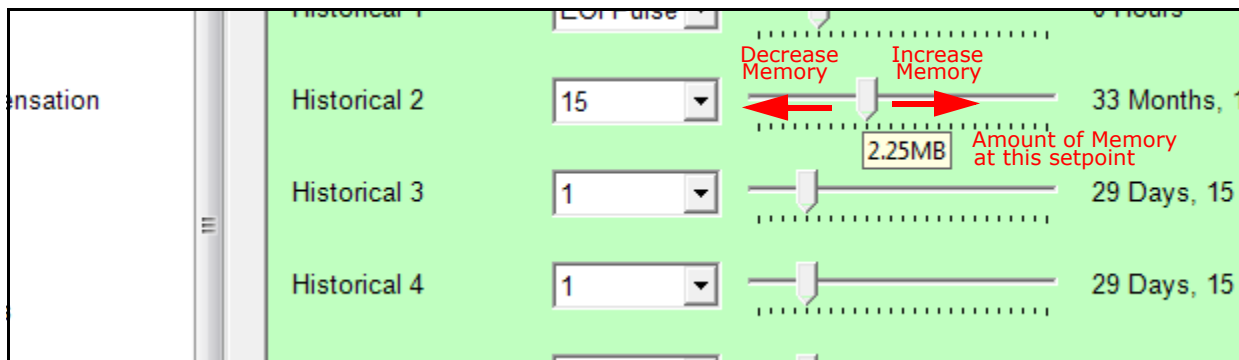


### 28.4.1: Configure Log Sizes

This setting allows a user to allocate the amount of memory available for each log, based on the number of recording days desired. Once the log's memory fills, the log "rolls over" and the records are overwritten in a FIFO (first in, first out) sequence. Depending on the meter's V-Switch™ key, the user is able to memory allocation for up to 6 historical logs and the waveform and PQ logs, to optimize the number of records stored for each log.

- For V-Switch™ keys 2 and higher, use this setting to increase or decrease the amount of records that each of the Shark® 250 meter's three Historical logs can store.

- For V-Switch™ keys 3 and 4, use this setting to set the allocation for the Waveform(V3 and V4) and Power Quality (V4 only) logs, as well as for 6 Historical logs.
1. From the Tree Menu, click Logs>Configure Log Sizes. You will see the screen shown on the previous page. Note that the example screen is for a meter with V4 - the screen you see will look a bit different if your meter has a lower V-Switch™ key.
  2. For each log, set both the logging interval and size. (Note that for the Waveform and PQ logs, you only set the size.) For the historical logs, the Duration field tells how many months and days of logging your setting will provide; for the Waveform log, it tells how many waveform captures it will provide; and for the Power Quality log, it tells how many PQ events, i.e., surges and sags, will be recorded.
    - a. Select the logging interval from the pull-down menu. The interval is in minutes. You can set between 1 and 60 minutes, or EOI pulse, for the historical logs.
    - b. Set the log size (the amount of memory allocated to it), by moving the bar in the size field to the right to increase the amount of memory, and to the left to decrease the amount of memory. When your cursor is on the bar, the amount of memory for that setting point is displayed.



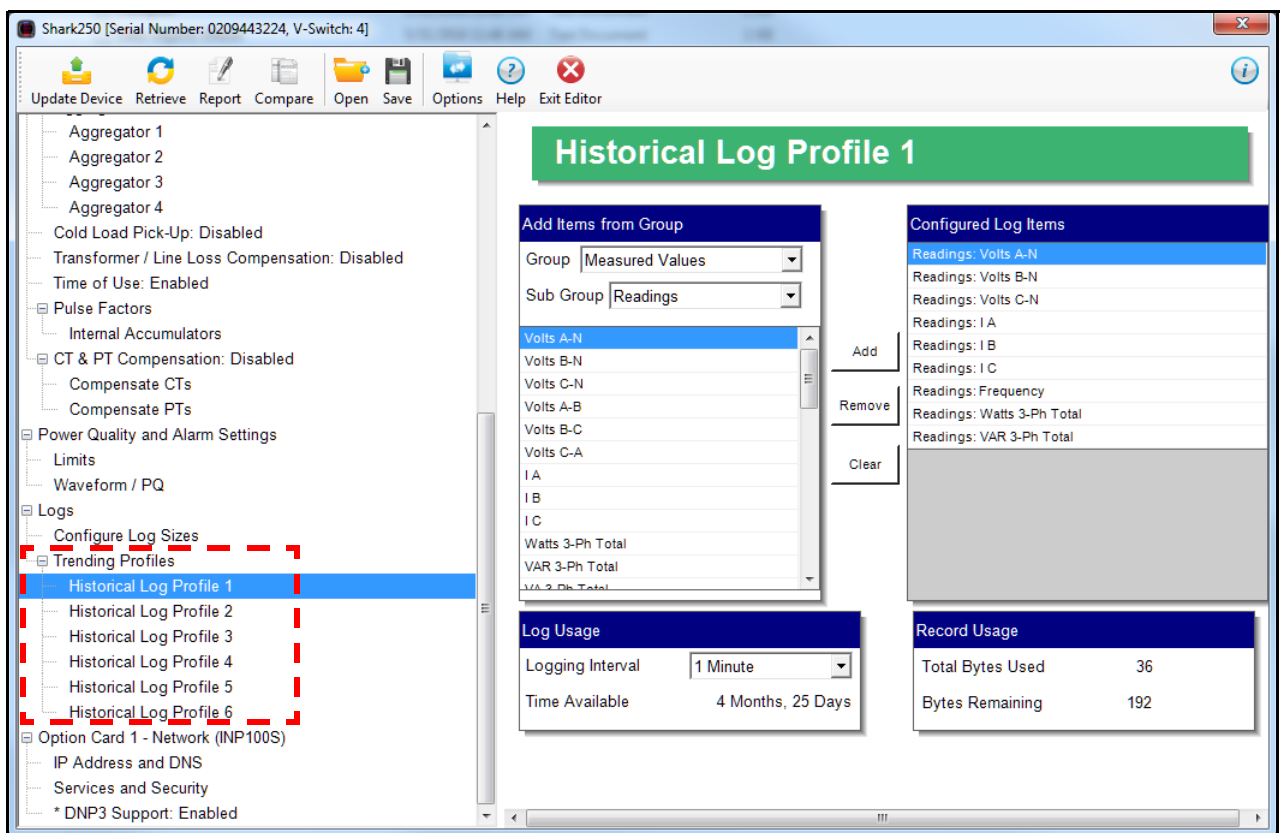
#### NOTES:

- The maximum allowable size for the historical logs is 6 MB, and for the Waveform log, is 8 MB. The V-Switch™ key level may limit this maximum number, e.g., a meter with V2 has 2 MB memory in total to assign to the available logs.

- When EOI Pulse is set as the Logging Interval for a Historical log (see [28.4.2: Trending Profiles - Configuring Historical Logs](#), on page 28-68), the Interval field will display EOI Pulse, and the duration field will say "0 Hours."
3. To implement any changes, click the Update Device icon to send the new profile to the meter.

### 28.4.2: Trending Profiles - Configuring Historical Logs

From the Tree Menu on the left side of the Shark® 250 meter's Device Profile screen, double-click on the Trending Profiles Settings line or click on the + button next to it. All of the settings in the Trending Profiles Settings group are listed.



Use this setting to select the parameters to be stored in each of the Shark® 250 meter's Historical Logs. For additional information on logs, including using the HHF Converter, see chapters 16 and 19.

#### Functional Overview of Historical Logs:

The Shark® 250 meter allows a user to set up 3 (for V2) or 6 (V3 and higher) separate historical profile logs that can log up to 64 parameters. Each of these logs can log



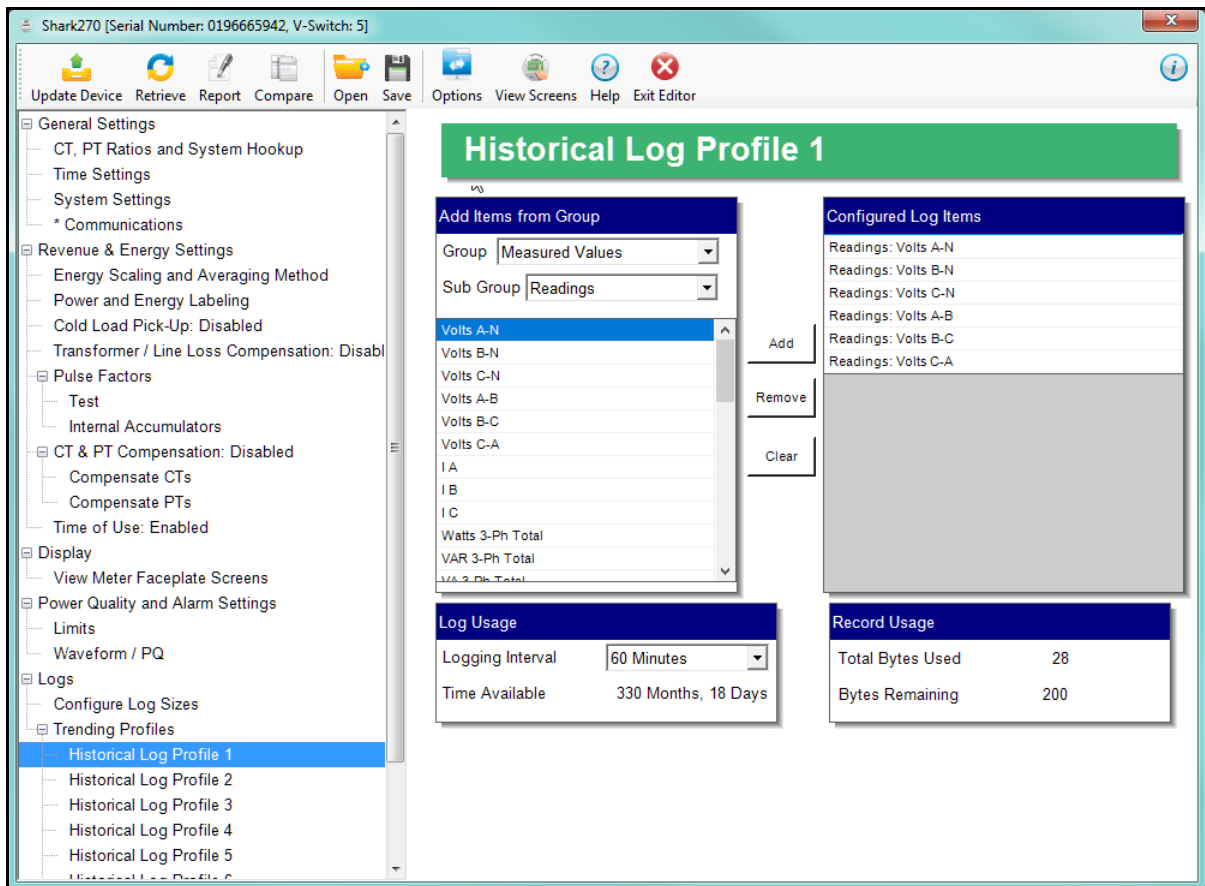
at different time frames. For example, one log can be set for one minute intervals to record voltage; while another log can be set for 15 minute intervals for energy consumption logging.

Having multiple historical logs additionally affords you the flexibility of programming each log with unique parameters. For example, you might program Historical Log 1 to record Power Quality parameters (for example, THD), Log 2 to record Demand parameters, and Log 3 to record Energy parameters.

Historical Log parameters can be selected from seven groups:

- Measured Values (choose parameters from readings, uncompensated readings, or phase angles sub groups).
- Energy (choose parameters from scaled energy, scaled energy in the interval, scaled energy in the interval (pulses), uncompensated energy, uncompensated energy in the interval, uncompensated energy in the interval (pulses), secondary energy, secondary energy in the interval, or secondary uncompensated energy sub groups).
- Max/Min Demand (choose parameters from maximums, minimums, voltage maximums in the interval, voltage minimums in the interval, or value prior to demand reset sub groups).
- Average Demand (choose parameters from demand, cumulative demand or time-stamp sub groups).
- Harmonics/THD (choose parameters from THD, magnitudes, or angles sub groups).
- Meter Status.
- Aggregators.

1. From the Tree Menu, click Trending Profiles>Historical Log Profile (1-3).



This screen allows you to select items to be stored in the historical log you selected. The Group field determines the items that are available for selection.

2. Select a Group. The possible selections are: Measured Values, Energy, M<sub>AX</sub>.Min Demand, Average Demand, Harmonics/THD, Meter Status, and Aggregators. (See [28.5.2: Configuring a Relay Output/Digital Input Card, on page 28-75](#) and [28.5.3: Configuring a Pulse Output/Digital Input Card, on page 28-81](#), for information on setting up Aggregators).

3. Select items for your log:

- Highlight the item(s) you want in the Selectable Items box.
- Click Add. The item(s) are added to the Selected Items box.
- To remove item(s), highlight them in the Selected Items box and click Remove.

4. Set the Logging Interval (Minutes). The available choices are: 1, 3, 5, 10, 15, 30, 60, EOI (End of Interval) Pulse. The Logging Interval determines when the meter takes a snapshot.

**IMPORTANT!** If you are trending Energy in the Interval, the Logging interval must be the same as the Demand interval.

**NOTES:**

- Only **one** of the following can be set for the EOI pulse feature:
  - EITHER **1** Option card input can be set to receive an EOI pulse from another device
  - OR **1** Option card output can be set to trigger an EOI pulse
- The maximum rate for EOI Pulse used to trigger a log is once per minute.
- When you choose EOI Pulse, the meter takes a snapshot when the pulse is either received or generated (depending on whether the EOI pulse is assigned to an input or output), rather than on a time interval.

**NOTE:** There are two display fields at the bottom of the Historical Log Profile screen. They show the Total Bytes Used and the Bytes Remaining for this historical log. These fields are updated as you make selections on the screen. The total number of bytes available per log record is approximately 228.

5. To implement any changes, click the Update Device button to send the new profile to the meter.

## 28.5: Configuring Option Cards

The Shark® 250 meter automatically detects the presence of any Option cards installed in it. You will see the installed card(s) listed in the Tree Menu (see the figure on the next page). Up to two Option cards can be installed in the Shark® 250 meter. Refer to the meter's Installation and Operation Manual for additional information concerning Option cards, including installation procedures.

You must configure an Option card before using it. The following sections give instructions for configuring each of the Option cards.

**NOTE:** You can configure settings for an Option card when you are not connected to a meter. Click Option Card 1 or 2 from the Shark® 250 meter's Device Profile screen. The drop-down menu on the displayed screen allows you to select your Option card. The available selections are: Fiber Optic, Network, Digital Relay, Pulse Output, Analog Output (0-1mA), Analog Output (4-20mA), None. Click Apply. The Option card you chose is now listed in the menu. Refer to the instructions for configuring the card.

From the Tree Menu on the left side of the Shark 250 meter's Device Profile screen, double-click on the Option Card 1 or Option Card 2 line or click on the + button next to it. The settings for the option card(s) installed in your meter are shown.

## Option Card Screens:

The type of Option card installed in the meter determines the settings you need to configure, and so, the screens you see. Click on the selectable lines under your Option card in the Shark® meter's Device Profile menu. See the example below.

The screenshot shows the Shark250 software interface. The title bar indicates 'Shark250 [Serial Number: ANDREW001, V-Switch: 4]'. The menu bar includes 'Update Device', 'Retrieve', 'Report', 'Compare', 'Open', 'Save', 'Options', 'Exit', and 'Help'. The left sidebar lists configuration categories: 'Display Configuration', 'Revenue & Energy Settings', 'Pulse Factors', 'CT & PT Compensation: Disabled', 'Power Quality and Alarm Settings', 'Logs', and 'Trending Profiles'. Under 'Option Card 1 - Network Card', the 'IP Address and DNS' option is selected and highlighted in blue. Red dashed boxes and arrows point to 'Option Card 1 - Network Card' and 'IP Address and DNS', with labels 'Type of Option card' and 'Card Setting screens' respectively.

The main window displays the 'IP Address and DNS' settings. It includes a green header 'IP Address and DNS' and two sections: 'IP Address' and 'Domain Name Servers (DNS)'. The 'IP Address' section contains fields for 'Host Name' (E169), 'Enable DHCP' (unchecked), 'IP Address' (172 . 20 . 166 . 129), 'Subnet Mask' (255 . 255 . 248 . 0), and 'Default Gateway' (172 . 20 . 161 . 23). The 'Domain Name Servers (DNS)' section contains fields for 'Server 1 Address' (0 . 0 . 0 . 0) and 'Server 2 Address' (0 . 0 . 0 . 0).

**NOTE:** The Option card settings for your meter will only show the option cards currently installed in your meter.

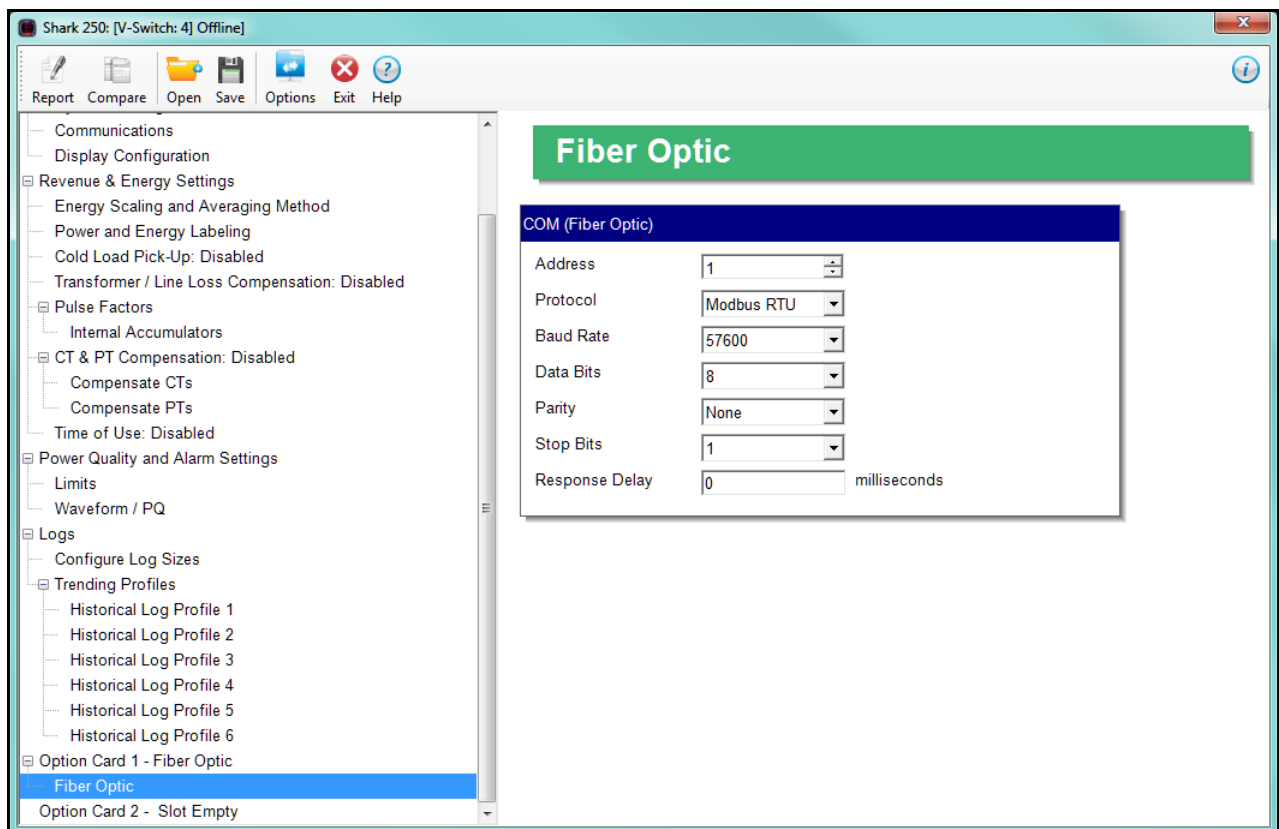
### 28.5.1: Configuring a Fiber Optic Card

The Fiber Optic Option Card is a Communication card that provides a standard, serial communication port over a fiber optic application. For technical specifications and hardware installation, refer to the meter's Installation and Operation Manual.

#### Example:

An example use of the optional Fiber Optic card is in a daisy chain topology, using the Echo switch on the Fiber Optic Card to allow messages to bypass the unit.

1. Click Option Card 1/2 - Fiber Optic>Fiber Optic.



2. The screen fields and acceptable entries are as follows:

- Address: 1 - 247 (Modbus); 1-65520 (DNP)
- Protocol: Modbus RTU; Modbus ASCII; DNP subset 2; DNP subset 3
- Baud Rate: 9600; 19200; 38400; 57600
- Data Bits: 5; 6; 7; 8

- Parity: None, Odd, Even
  - Stop Bits: 1 or 2
  - Response Delay (msec): the suggested delay is 50 msec, but you can increase the delay, if necessary.
3. To implement any changes, click the Update Device button to send the new profile to the meter.

### 28.5.2: Configuring a Relay Output/Digital Input Card

The Relay Output/Digital Input card is used for a few purposes. The relay portion is used to send a control output when a limit is exceeded. The input portion can be used to either count KYZ pulse or detect the status of a circuit.

The Relay Output/Digital Input Option Card has:

- Two relay contact outputs for load switching
- Two wet/dry contact sensing digital inputs.

Accumulators in the CommunicatorPQA® software count the transitions of the Inputs and Outputs. For technical specifications and hardware installation, refer to the meter's Installation and Operation Manual.

**NOTE:** When installing a Relay Output/Digital Input card, we recommend you reset the accumulators for the card, in order to prevent erroneous counts. See [20.1.7: Reset Device Information, on page 20-7](#), for instructions on using the Reset Shark® Information screen to reset card accumulators.

An example use of the optional Relay Card is in monitoring the status of circuit breakers or relays in your electrical system. The two status inputs could be used to monitor two circuit breakers, and the two relay outputs could be used to sound an alarm upon the occurrence of a programmed out of limit condition.

- 
- Shark 250 [V-Switch: 4] Offline
- Report Compare Open Save Options Exit Help
- Revenue & Energy Settings
    - Energy Scaling and Averaging Method
    - Power and Energy Labeling
    - Cold Load Pick-Up: Disabled
    - Transformer / Line Loss Compensation: Disabled
  - Pulse Factors
    - Internal Accumulators
  - CT & PT Compensation: Disabled
    - Compensate CTs
    - Compensate PTs
  - Time of Use: Disabled
  - Power Quality and Alarm Settings
    - Limits
    - Waveform / PQ
  - Logs
    - Configure Log Sizes
    - Trending Profiles
      - Historical Log Profile 1
      - Historical Log Profile 2
      - Historical Log Profile 3
      - Historical Log Profile 4
      - Historical Log Profile 5
      - Historical Log Profile 6
  - Option Card 1 - Fiber Optic
    - Fiber Optic
  - Option Card 2 - Digital Relay
    - Inputs
  - Relays
- ## Relay Assignment
- | Limit ID | Relay 1 | Relay 2 |
|----------|---------|---------|
| Not Set  | None    | None    |
| Not Set  | None    | None    |
| Not Set  | None    | None    |
| Not Set  | None    | None    |
| Not Set  | None    | None    |
| Not Set  | None    | None    |
| Not Set  | None    | None    |
| Not Set  | None    | None    |
| Not Set  | None    | None    |
- Note: A maximum of eight limits can be assigned to a relay.**
- Set Delay (Seconds)
- Reset Delay (Seconds)
- Log Status Changes For ☐ Relay 1 ☐ Relay 2
- | Label  | Relay 1       | Relay 2       |
|--------|---------------|---------------|
| Output | Relay1_Label  | Relay2_Label  |
| Open   | Relay1_Open   | Relay2_Open   |
| Closed | Relay1_Closed | Relay2_Closed |
- Accumulation Compression Factor

2. From the Relay Assignment screen, you can:
  - Configure up to 8 output conditions for each of the two Relay Outputs. Note that the Limits used are configured in Power Quality and Alarm Settings>Limits (see [28.3.1: Configuring Limits, on page 28-60](#)).
  - Set a Delay and Reset Delay for the Outputs.
  - Choose to log Status Changes for each Relay Output.



- Assign each Output an Output Label, Open Label, and Closed Label, which are used when viewing the Relay Status Log.
- Assign an Accumulation Compression Factor for each output.

**IMPORTANT!** First use the Limits screen to set up the limits you want to assign to an Output. See [28.3.1: Configuring Limits, on page 28-60](#) for instructions.

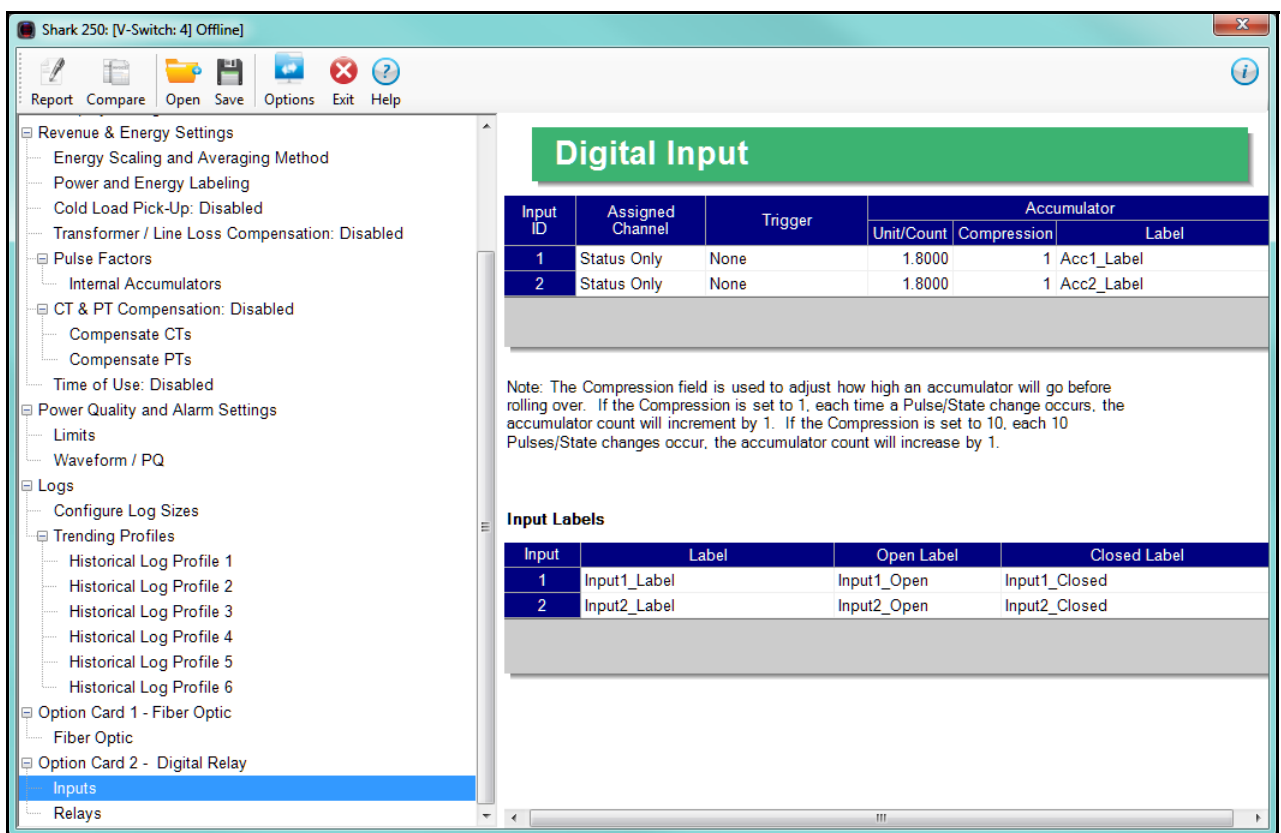
3. The available Limits appear in the Limit ID column. To assign a limit to an Output relay:
  - a. Select the output condition from the pull-down menu next to the Limit ID. The options are: Above Limit (the Output is triggered when the Above Limit condition occurs) and Below Limit (the Output is triggered when the Below Limit condition occurs).
  - b. You can assign the limit to one or both (or neither) of the Relay Outputs.

**NOTE:** A Relay operates when any one assigned Limit is tripped, and stays in the Set condition as long as one Limit is in the Alarm state.
4. You can enter Set Delay and/or Reset Delay. These values are the delay before the Output is changed: Set is when the common is shorted to Normal Open (this is the Set Condition), Reset is when the Output is shorted (closed).
5. Check the box next to Log Status Change for if you want to log output status changes for either or both Relay. See Chapter 19 for information on the I/O Change Log.
6. The current Output Labels are displayed in the screen. These labels are used for Logging. To change the Output labels, click in the Labels field you want to change, and enter a new label. The fields that can be changed are:
  - Output Label - Label ID
  - Open Label - Open state ID
  - Closed Label - Closed state ID

7. You can specify an Accumulation Compression Factor. The Compression Factor is used to adjust how high an accumulator will go before rolling over. Because of this, it is useful in delaying rollover. For example, if you select a Compression Factor of 10, each time 10 Pulse/State changes occur, the accumulator count increments by 1. The available Compression Factors are: 1, 10, 100, 1000, 10000, and 100000. The default Compression Factor is 1.

8. To configure the Digital Inputs:

a. Click Option Card 1/2 - Digital Relay>Inputs. Use this screen to assign labels and functions to the Inputs.



b. Make a selection in the Assigned to field. The available selections are:

- Status Only - select this to use the digital inputs just to indicate if the state is open or closed.
- Accumulator - select this to use the digital input as a pulse counter.

- Digital Input Log - select this to use the digital input to trigger an entry in the I/O change log.
- EOI Pulse - only one Input can be set to receive an EOI pulse.

**NOTES on End of Interval (EOI):**

- EOI is triggered in a device when the programmed condition is met. Only one Option Card input can be set to receive an EOI pulse. EOI is used for the following:
  - As a trigger for demand averaging: the received EOI pulse delineates an interval that results in demand averaging being performed. The minimum interval between received EOI Pulses used to trigger demand averaging should be 5 minutes. An EOI pulse allows the meter to be synchronized with an installed revenue meter, so that both meters are calculating Demand at the same time. When an Input is assigned to EOI, the demand interval is now the time between two received pulses.
- For historical logging: when the EOI pulse is received, it causes any log that has been configured for EOI Pulse interval to capture a record. Refer to 28.4.2: Trending Profiles - Configuring Historical Logs, on page 28-68, for additional information on EOI Pulse and logging.

**IMPORTANT!** The EOI setting will affect Time of Use, if it is active for the meter. Instead of using the demand interval for TOU accumulations, TOU will perform automatic data usage accumulation and calendar actions (rate change, day type change, season/billing month self reads) based on the EOI input trigger. This can result in shorter or longer interval periods, depending on the EOI input timing, so the rate/day type/calendar actions may differ from what is expected.

- c. Select Trigger from the pull-down menu. The Trigger you select depends on your Assigned to selection:
  - For Status Only, select None.

- For Accumulator, select from Closing, Opening, High Speed Closing or High Speed Opening.  
**NOTE:** Only one accumulator can be assigned to a High Speed Trigger.
  - For Digital Input Log, select Change.
  - For EOI Pulse, select from Closing, Opening, or Change.
- d. Enter Units/Count. The Units/Count is the output ratio from the device that is being input into the Shark® 250 meter. For example, if you have a KYZ module that is outputting a pulse every 1.8 kWh, with the input set to Accumulator, Increment on Contact Opening, you would set the Units/Count to be the value of the KYZ; in this case either 1.8 or a ratio of that number.
- e. Enter Compression. The Compression Factor is used to adjust how high an accumulator will go before rolling over. For example, if you select a Compression Factor of 10, each time 10 Pulse/State changes occur, the accumulator count increments by 1. The available Compression Factors are: 1, 10, 100, 1000, 10000, 100000, and 1000000. The default Compression Factor is 1.
- f. Enter a Label for the Accumulator.
- g. The current Input Labels are displayed in the screen. To change the Input Labels, click in the Labels field you want to change, and enter a new label. The fields that can be changed are:
- Input Label - Input ID
  - Open Label - Open state ID
  - Closed Label - Closed state ID
9. To implement any changes to the Relay Output/Digital Input card settings, click the Update Device button to send the new profile to the meter.

### 28.5.3: Configuring a Pulse Output/Digital Input Card

The Pulse Output/Digital Input card is similar to the Relay Output/Digital Input card except that the card contains 4 pulse output contacts (Form A, closing) instead of relay control outputs. These solid state output contacts can be configured to have the meter pulse out for user-assigned energy values. The Pulse Output/Digital Input Option Card has:

- Four Pulse Outputs via solid state contacts
- Four wet/dry contact sensing digital inputs.

Accumulators in the CommunicatorPQA® software count the pulses of Inputs and Outputs. For technical specifications and hardware installation, refer to the meter's Installation and Operation Manual.

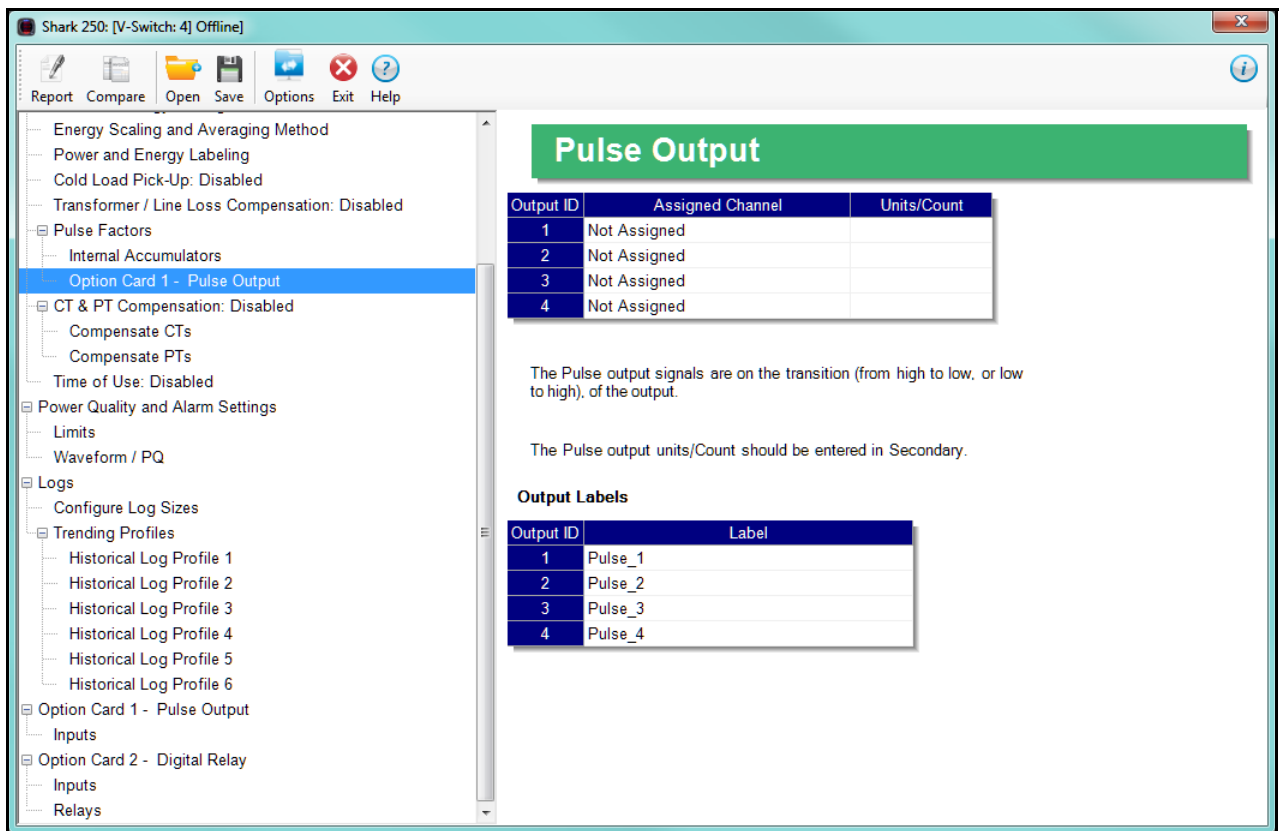
**NOTE:** When installing a Pulse Output/Digital Input card, we recommend you reset the accumulators for the card, in order to prevent erroneous counts. See [20.1.7: Reset Device Information, on page 20-7](#), for instructions on using the Reset Shark Information screen to reset card accumulators.

#### **Example:**

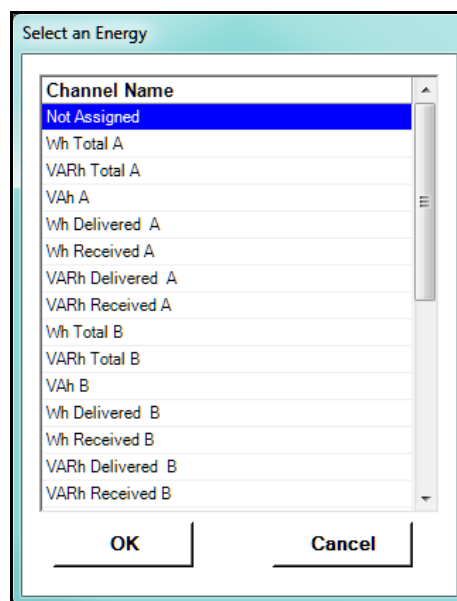
An example use of the Pulse Output/Digital Input Card is in a sub-metering application where a pulse output is needed. The Input Accumulator allows you to count the pulses from another device, for example, a KYZ module or another meter. The Output Accumulators allow you to count the pulses being output by the card.

The Pulse Output and Digital Input Card has two screens for configuration: the Pulse Output Settings screen and the Digital Input Settings screen.

1. To set the pulse outputs, click Pulse Factors>Option Card 1/2 - Pulse Outputs.



2. You can set up to four Output IDs for your Card. Each Output has a Label, an Assigned Channel, and a Unit/Count. Double-click an Assigned Channel field to add or edit an the assigned channel. You will see the window shown below.



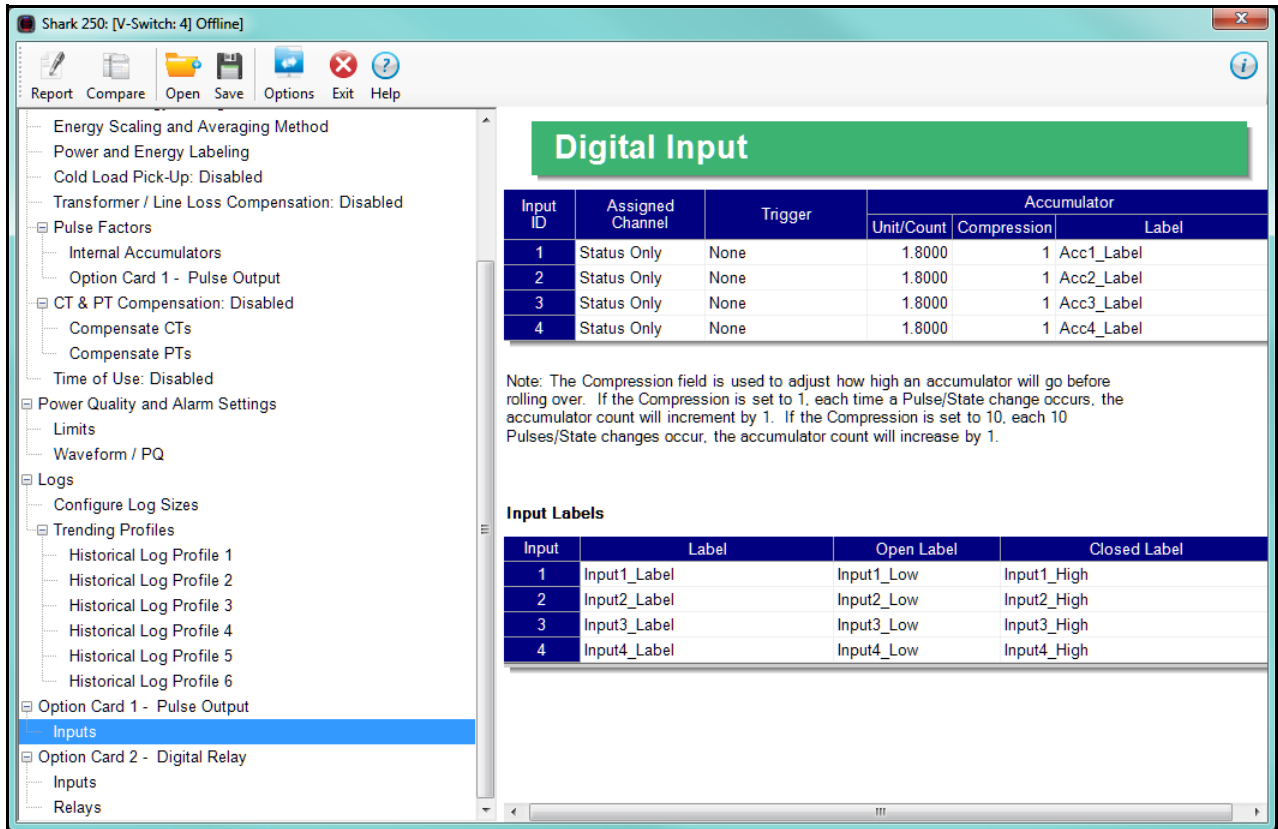
3. Select the Energy channel to use for the output. Click OK. The energy channel you selected displays in the Assigned Channel field.
4. When you select the Assigned Channel, a value is entered for it in the Units/Count field. You can edit this field by double-clicking in it. The Units/Count is determined by the Secondary (the readings in the meter). For example, if you have a three-phase meter with 600 Watts per element, for a total of 1800 Watts, the Units/Count field will be 1.8. That means that every 1.8 Watt-hours, the count will accumulate by 1, and each count will represent 1.8 Watt-hours. If you are using CTs that have a ratio of 1000 to 1, for example, the count will still increment every 1.8 Watt-hours, but the count in that case will represent 1.8 Watt-hours times 1000, or 1800 Watt-hours.



**IMPORTANT!** The values are based on one toggle instance, when the output changes from open to closed or from closed to open state.

5. The current Output Labels are displayed on the screen. To change the Output labels, click in the Labels field you want to change, and enter a new label.

6. Click Option Card 1/2 - Pulse Output>Inputs. Use this screen to assign labels and functions to the Inputs.



7. Make a selection in the Assigned to field. The available selections are:

- Status Only - select this to use the digital inputs just to indicate if the state is open or closed.
- Accumulator - select this to use the digital input as a pulse counter.
- Digital Input Log - select this to use the digital input to trigger an entry in the I/O change log.
- EOI Pulse - only one Input can be set to receive an EOI pulse.

**NOTES on End of Interval (EOI):**

- EOI is triggered in a device when the programmed condition is met. Only one Option Card input can be set to receive an EOI pulse. EOI is used for the following:



- As a trigger for demand averaging: the received EOI pulse delineates an interval that results in demand averaging being performed. The minimum interval between received EOI Pulses used to trigger demand averaging should be 5 minutes. An EOI pulse allows the meter to be synchronized with an installed revenue meter, so that both meters are calculating Demand at the same time.
- For historical logging: when the EOI pulse is received, it causes any log that has been configured for EOI Pulse interval to capture a record. Refer to 28.4.2: Trending Profiles - Configuring Historical Logs, on page 28-68, for additional information on EOI Pulse and logging.

**IMPORTANT!** The EOI setting will affect Time of Use, if it is active for the meter. Instead of using the demand interval for TOU accumulations, TOU will perform automatic data usage accumulation and calendar actions (rate change, day type change, season/billing month self reads) based on the EOI input trigger. This can result in shorter or longer interval periods, depending on the EOI input timing, so the rate/day type/calendar actions may differ from what is expected.

8. Select Trigger from the pull-down menu. The Trigger you select depends on your Assigned to selection:

- For Status Only, select None.
- For Accumulator, select from Closing, Opening, High Speed Closing or High Speed Opening.

**NOTES:**

- Only one accumulator can be assigned to a High Speed Trigger.
- High speed opening and closing would be used when monitoring pulses from water meters that can be pulsing very quickly.
- For Digital Input Log, select Change.
- For EOI Pulse, select from Closing, Opening, or Change.

9. Enter Units/Count. The Units/Count is the output ratio from the device that is being input into the Shark® 250 meter. For example, if you have a KYZ

module that is outputting a pulse every 1.8 kWh, with the input set to Accumulator, Increment on Contact Opening, you would set the Units/Count to be the value of the KYZ; in this case either 1.8 or a ratio of that number.

10. Enter Compression. The Compression Factor is a divider used to adjust how high an accumulator will go before rolling over. For example, if you select a Compression Factor of 10, each time 10 Pulse/State changes occur, the accumulator count increments by 1. The available Compression Factors are: 1, 10, 100, 1000, 10000, 100000, and 1000000. The default Compression Factor is 1.
11. Enter a Label for the Accumulator.
12. The current Input Labels are displayed in the screen. To change the Input Labels, click in the Labels field you want to change, and enter a new label. The fields that can be changed are:
  - Input Label - Input ID
  - Open Label - Open state ID
  - Closed Label - Closed state ID
13. To implement any changes to the Pulse Output/Digital Input card settings, click the Update Device button to send the new profile to the meter.

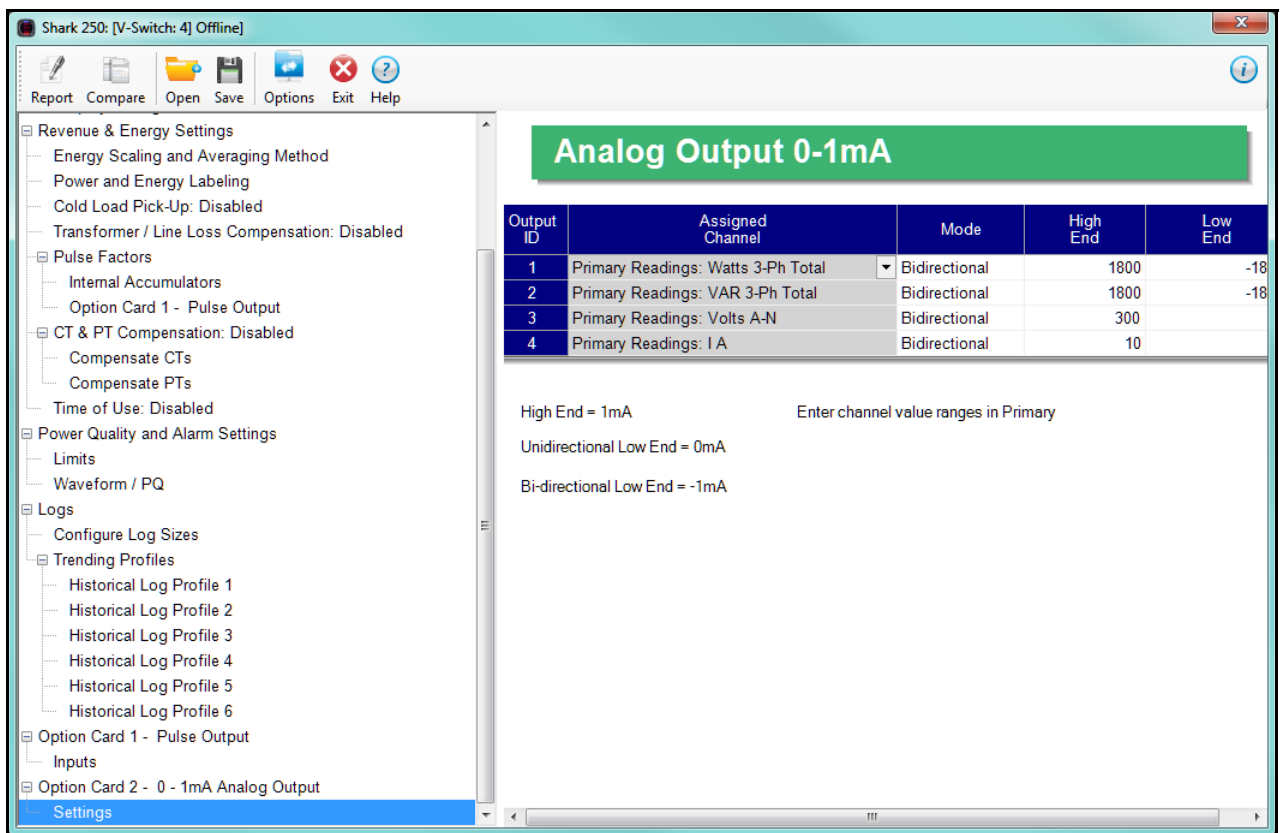
### 28.5.4: Configuring a 0-1 mA Output Card

The 0-1mA Output Option Card is an analog output card, which transmits a standard, bidirectional 0-1 milliamp signal proportional to the value selected. This card mimics an analog transducer. With the Shark® design, the user can select any measured parameter to output on an analog transducer signal. For technical specifications and hardware installation, refer to the meter's Installation and Operation Manual.

#### Example:

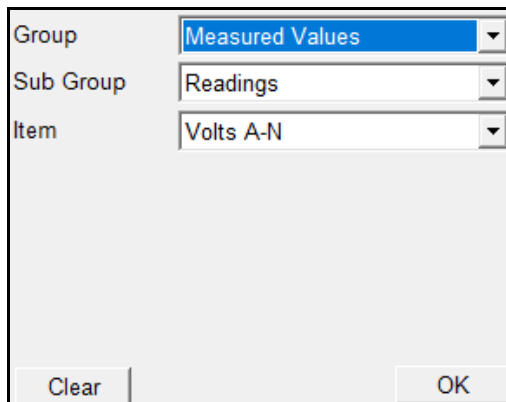
An example use of the optional 0-1mA Output Card is in enabling the Shark® 250 meter to communicate with an RTU.

1. Click Option Card 1/2 - 0-1 mA Output>Settings.



You can set up to four Output IDs for your Output Card.

2. Double-click an Assigned Channel field to add or edit an Output ID. You will see the window shown below.



Group	Measured Values
Sub Group	Readings
Item	Volts A-N

Clear OK

3. Select Group for your Output Channel. The available selections are as follows:
  - Measured Values
  - Max/Min Demand
  - Average Demand
  - Harmonics/THD
4. Select the Sub Group for your Output Channel. The sub group values are dependent on the group selection.
5. Select Item for your Output Channel. The items are the available readings for the group and subgroup you selected. For example, as shown in the window above, Volts A-N is an item you can select when you have selected Readings as the group, and Primary Readings as the sub group.
6. Click OK. The Output Channel you selected is displayed in the Assigned Channel field.
7. Enter Low End and High End for the channel.

**NOTE:** For the Item selected for the Assigned Channel, the Output Card takes the value in the meter and outputs a DC current within its range. The Low End is the lowest value, and the High End is the highest value. For example, for VOLTS A-N and Bidirectional Mode, at Nominal of 120V, the Low End is set to 115V and the High End is set to 125V. The Analog Output Card will output -1 mA when the reading is 115V, 0 mA when the reading is 120V, and 1 mA when the reading is 125V. The analog card can output below -1mA and above +1mA, proportionally

to VOLTS A-N. For limiting values refer to the meter's Installation and Operation Manual's applicable section.

8. You can select either Unidirectional or Bidirectional for Mode. Unidirectional mode is used for unsigned data, e.g., voltage; and bi-directional mode is used with signed data, e.g., Watts.
9. To implement any changes to the 0-1mA Output card settings, click the Update Device button to send the new profile to the meter.

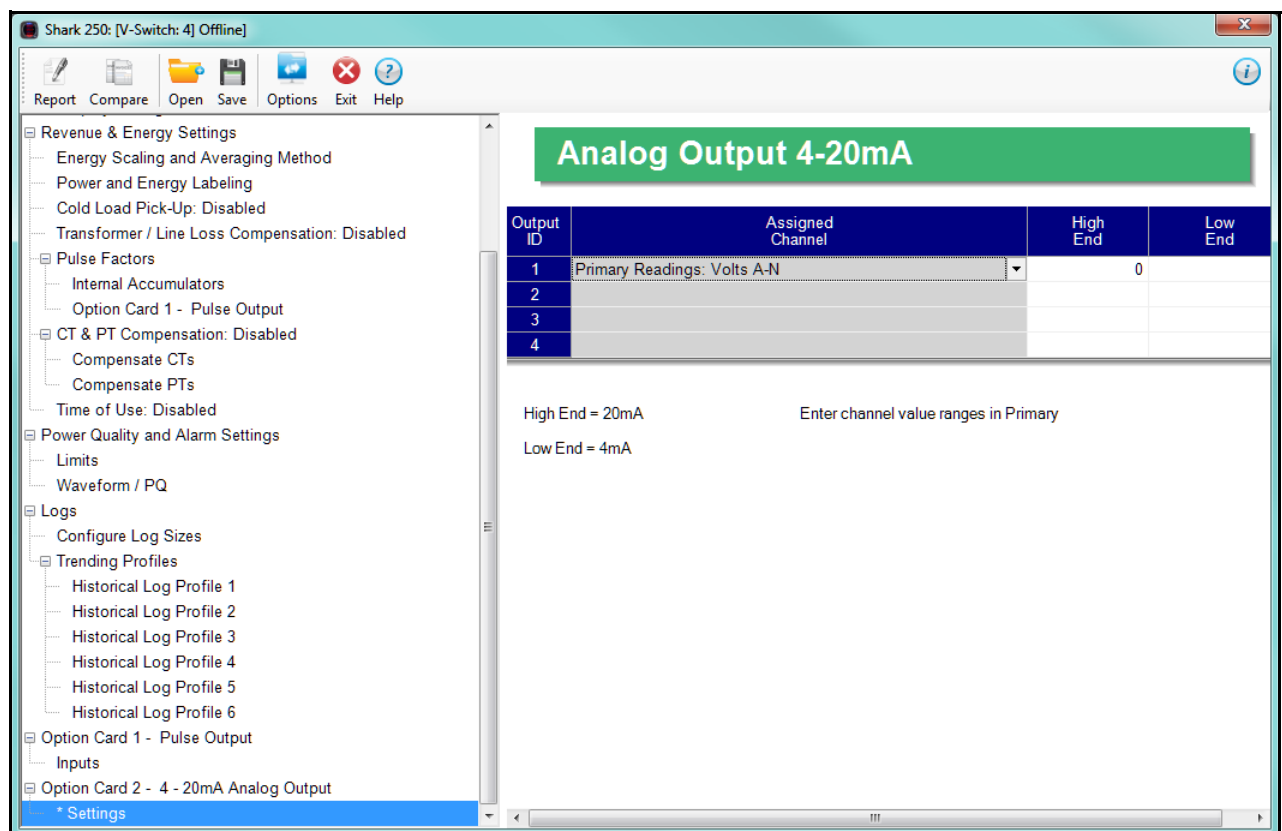
### 28.5.5: Configuring a 4-20 mA Output Card

The 4-20mA Output Option Card is an analog communication card, which transmits a standard, unidirectional 4-20 milliamp signal. For technical specifications and hardware installation, refer to the meter's Installation and Operation Manual.

#### Example:

An example use of the optional 4-20mA Output Card is in enabling the Shark® 250 meter to communicate with an RTU.

1. Click Option Card 1/2 - 4-20 mA Output>Settings.



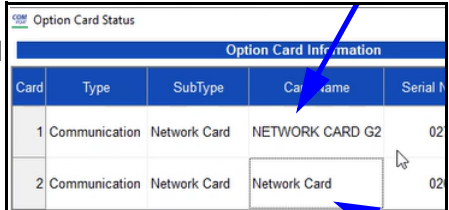
2. Follow the instructions for configuring the 0-1 mA Card. The configuration of a 4-20 mA Card is the same as a 0-1 mA Card, except that this card can only be uni-directional, so there is no Mode setting.

### 28.5.6: Configuring a Network Card

The optional Network Card enables 10/100BaseT Ethernet communications. It also acts as a Web server, allowing the meter's data to be viewed on a standard web browser. For technical specifications, hardware installation, and additional information on the Web server, refer to the meter's Installation and Operation Manual.

Note that there are two versions of the INP100S card - a legacy version and the Gen 2 version. The Option Card screen will indicate which card is installed in your meter. See the example on the right.

Gen 2 INP100S



Option Card Information				
Card	Type	SubType	Card Name	Serial N
1	Communication	Network Card	NETWORK CARD G2	02
2	Communication	Network Card	Network Card	02

Legacy  
INP100S

Gen 2 of the INP100S card has additional features not supported by the legacy card.

- One major feature is support for both IPv4 and IPv6. IPv6 offers many more IP addresses, avoiding the possibility of "running out" of IP addresses for IPv4. IPv6 does not need to use the network-address translation necessary in IPv4, though its larger packet size means that the processing speed of IPv4 and IPv6 is very similar. Since IPv6 is used by about a third of the Internet currently, it is a good idea to enable both IPv4 and IPV6 for your card.
- Gen 2 of the INP100S card offers enhanced security, including digital firmware signature that authenticates the network card firmware before an update is performed, SSL/TLS (secure socket layer/transport layer security) encryption, support for encrypted (SMTPS) and unencrypted (SMTP) alarm and notification emails, and access to the Gen 2 INP100S card's Web server using either HTTP or HTTPS protocols.

See Chapter 7 in the *Shark® 250 Meter User Manual* for additional features and details on the Gen 2 INP100S card. This section of the manual will give instructions for both the legacy and Gen 2 INP100S card.

1. Click Option Card 1/2 - Network Card>IP Address and DNS. You will see the screen shown below. It allows you to configure the IP Address, DNS, and Network Time Protocol Server for the card.

- You will see the screen shown below for the legacy INP100S.

The screenshot shows the Shark250 configuration software interface. The title bar reads "Shark250 [Serial Number: ANDREW001, V-Switch: 4]". The menu bar includes "Update Device", "Retrieve", "Report", "Compare", "Open", "Save", "Options", "Exit", and "Help". The left sidebar contains a tree view with the following items: "Display Configuration", "Revenue & Energy Settings" (with sub-items: "Energy Scaling and Averaging Method", "Power and Energy Labeling", "Cold Load Pick-Up: Disabled", "Transformer / Line Loss Compensation: Disabled"), "Pulse Factors" (with sub-item: "Internal Accumulators"), "CT & PT Compensation: Disabled" (with sub-items: "Compensate CTs", "Compensate PTs", "Time of Use: Disabled"), "Power Quality and Alarm Settings" (with sub-items: "\* Limits", "\* Waveform / PQ"), "Logs" (with sub-item: "Configure Log Sizes"), "Trending Profiles" (with sub-items: "Historical Log Profile 1" through "Historical Log Profile 6"), "Option Card 1 - Network Card" (which is expanded to show "IP Address and DNS", "Services and Security", and "DNP Support: Disabled"). The "IP Address and DNS" option is selected and highlighted in blue. The main panel on the right has a green header "IP Address and DNS". Below this header are two sections: "IP Address" and "Domain Name Servers (DNS)". The "IP Address" section contains a "Host Name" field with the value "E169", an unchecked checkbox for "Enable DHCP (Obtain IP Address from DHCP Server)", and three input fields for "IP Address" (172 . 20 . 166 . 129), "Subnet Mask" (255 . 255 . 248 . 0), and "Default Gateway" (172 . 20 . 161 . 23). The "Domain Name Servers (DNS)" section contains two input fields for "Server 1 Address" and "Server 2 Address", both showing the value 0 . 0 . 0 . 0.



- You will see the screen below if you are connected to the Gen 2 INP100S.

The screenshot shows the Shark 250 software interface. The title bar reads "Shark 250 [Serial Number: 0277149434, V-Switch : 4]". The menu bar includes "Update Device", "Retrieve", "Report", "Compare", "Open", "Save", "Options", "Help", and "Exit Editor". The left sidebar shows a tree view with categories like "Pulse Factors", "CT & PT Compensation: Disabled", "Power Quality and Alarm Settings", "Logs", "Trending Profiles", "Option Card 1 - Fiber Optic (FOTS)", and "Option Card 2 - Network (INP100S)". The "Option Card 2 - Network (INP100S)" category is expanded, showing "IP Address and DNS", "Services and Security", and "DNP3 Support: Disabled". The main window displays the "IP Address and DNS" configuration screen. It has a green header "IP Address and DNS". Below it, there are two sections: "IP Address" and "Domain Name Servers (DNS)". The "IP Address" section has tabs for "IPv4" and "IPv6". The "IPv4" tab is selected. It contains fields for "Host Name" (250-0272050925), "IP Address" (172 . 20 . 166 . 200), "Subnet Mask" (255 . 255 . 248 . 0), "Default Gateway" (172 . 20 . 161 . 23), and "Keep Alive (Seconds)" (60). There is a checkbox for "Enable DHCP (Obtain IP Address from DHCP Server)". The "Domain Name Servers (DNS)" section also has tabs for "IPv4" and "IPv6". The "IPv4" tab is selected. It contains fields for "Server 1 IP Address" (172 . 20 . 200 . 10) and "Server 2 IP Address" (172 . 20 . 200 . 11).

Note that for Gen 2, the INP100S has both IPv4 and IPv6 settings. You can use the screen to make both IPv4 and IPv6 settings that will be used by the card.

- In the IP Address section, enter the following information for both the legacy and Gen 2 IPv4:
  - Host Name: To enable a DHCP server to assign the IP address for your network card, click the DHCP box and enter the host name.
  - If you are not using a DHCP server, enter the following for the network card:
    - IP Address.
    - Subnet Mask.
    - Default Gateway.

**NOTE:** If no mask is entered (blank) or 0.0.0.0 is used, the network

card will use an automatic mask based on the network address class, or will not apply a mask, according to the following table:

Network Class	Address range	Mask used
Class A	1.0.0.0-127.x.x.x	255.0.0.0
Class B	128.0.0.0-191.x.x.x	255.255.0.0
Class C	192.0.0.0-223.x.x.x	255.255.255.0
Other classes		No masking will be applied

- For the Gen 2 INP100S card, the Keep Alive setting specifies the number of seconds the meter will wait before sending a “keep alive” message if there is no communication. After the specified amount of time, the meter sends the keep alive message to the TCP socket to see if the connection is still up and running. If the connection has been lost, the TCP socket can then be freed for another connection.

b. In the IPv6 IP Address tab, enter the following:

- Mode: select one of the following options -
  - Use Static Address and then enter the address in the IP address field.
  - Use Link Local Address.
  - Use DHCP.
- Prefix Length: this field is similar to the subnet mask in IPv4. You can enter a number between 1 and 128.
- Default Gateway: enter the address of the default gateway or leave the default of all zeros.

c. Domain Name Server Address(es) (for Gen 2, you can set up to two servers for IPv4 and IPv6, each).

#### NOTES:

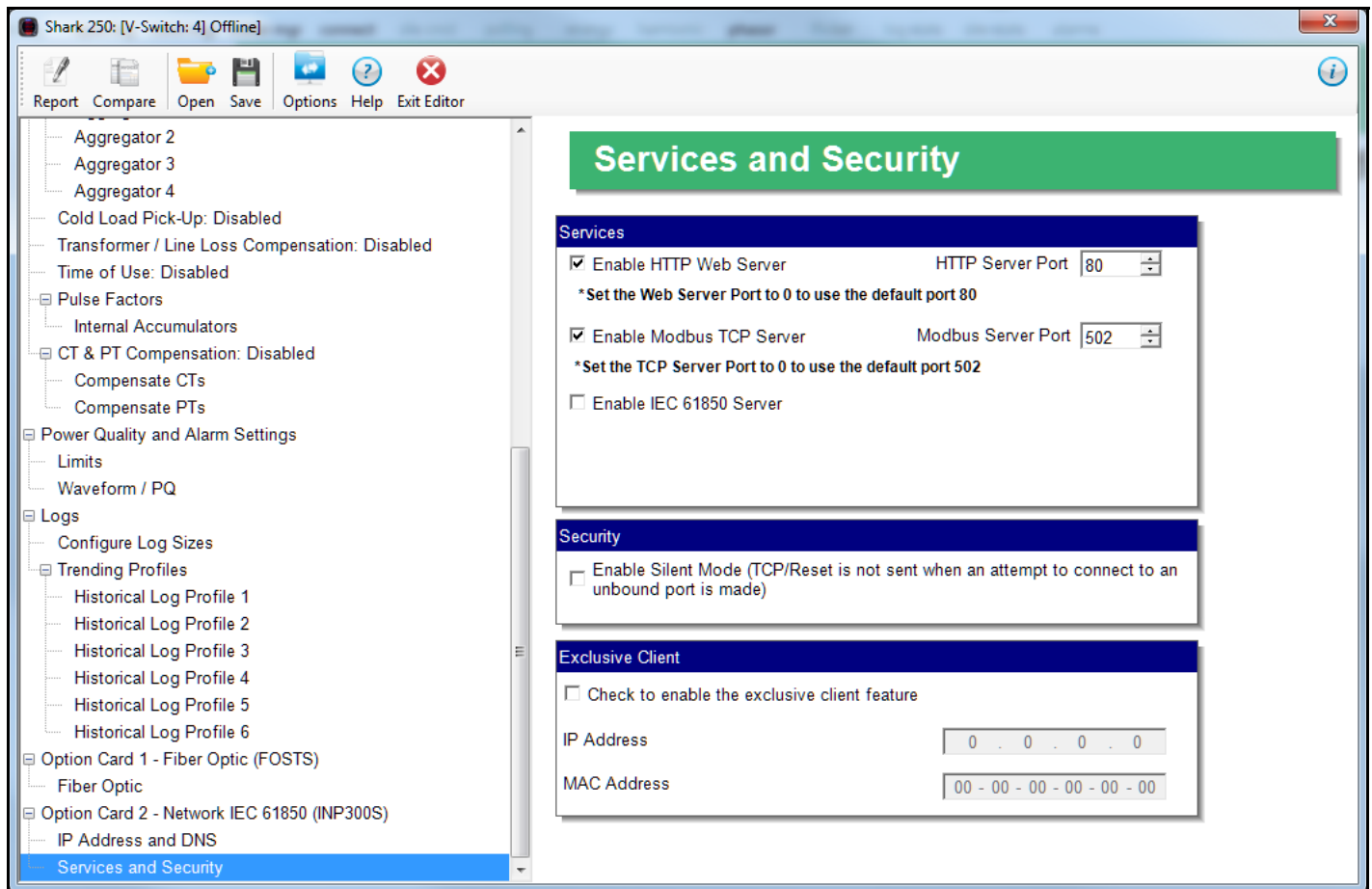
- If you don't enter a DNS address, the field defaults to 0.0.0.0. In this case, you need to enter an IP address (e.g., 163.27.987.53) for the NTP server (if enabled) and email features. If you do specify a valid DNS address, however, you can use a URL address (e.g., pool.ntp-micro-soft.org) for the NTP and email features.

- The Network Time Protocol server is used for clock synchronization. It can be either a device with a real-time clock that is networked with your meter, or an NTP server on the Internet.

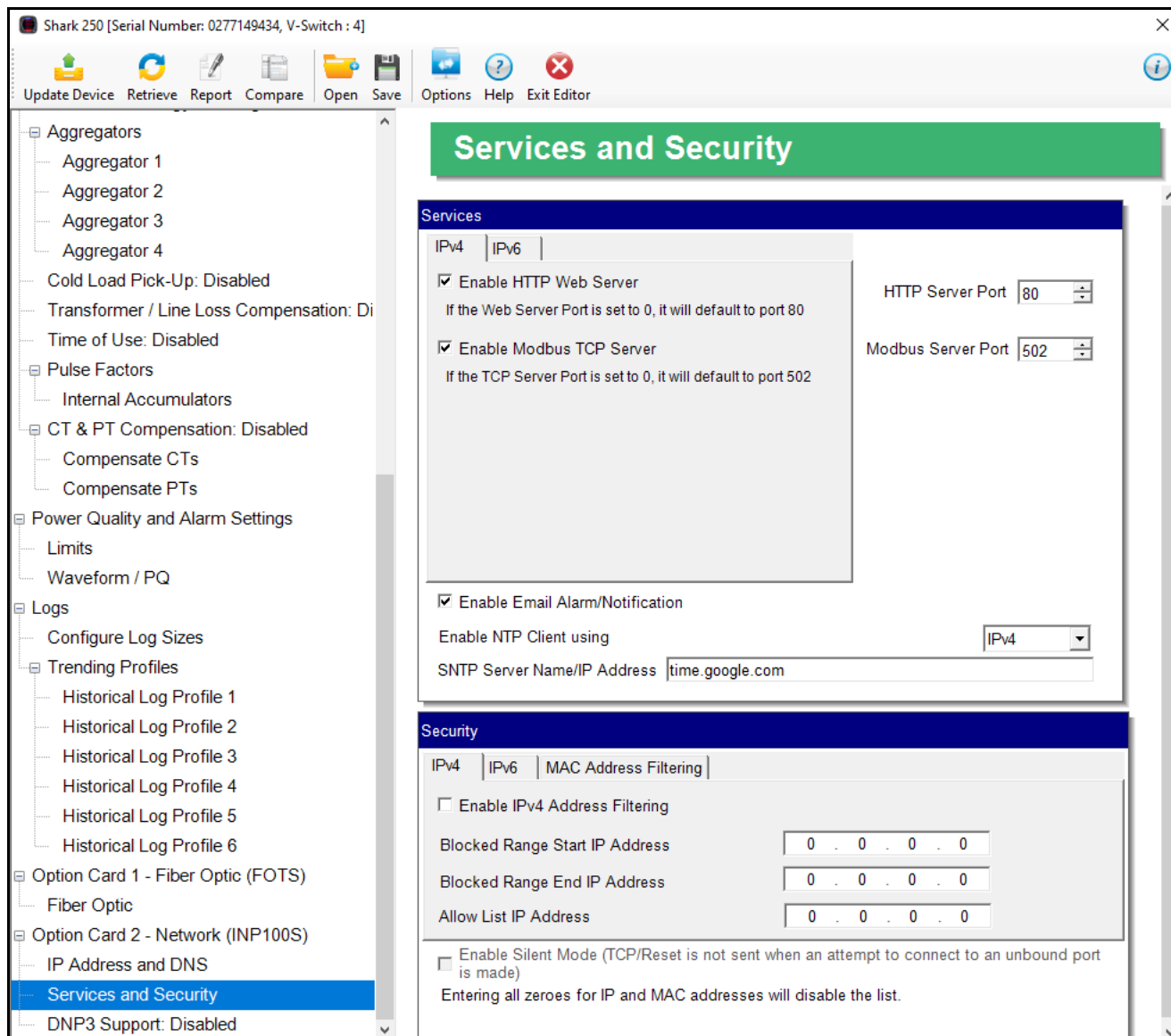
**IMPORTANT!** You must also enable Clock Synchronization in the Time Settings screen (see [28.1.2: Configuring Time Settings, on page 28-5](#)).

2. From the Option Card menu, click Services and Security. This screen allows you to disable certain features of the meter's Ethernet connection, for security purposes.

- You will see the screen below if you have the legacy INP100S card.



- If you have a Gen 2 INP100S card, you will see the screen below. Again, you make settings for both IPv4 and IPv6.



a. In the Services tab, make these settings:

- The HTTP Web Server can be disabled, or its default port can be changed.
- The Modbus TCP server can be disabled, or its default port can be changed.
- If the port entered is less than "10," the standard port is used: 80 for Web Server and 502 for Modbus TCP Server.

- To disable one of the servers, uncheck the box next to it.
- Check the Enable Email Alarm/Notification box to use the alarm email and periodic notification feature of the Network card. Note that the Network card's firmware must support alarm and notification email for this feature to be available. The settings for the alarm/notification email feature are made using the card's Web server. See the *Shark® 250 Meter User Manual* for instructions. There is one setting for both IPv4 and IPv6.
- If you have selected NTP as the time synchronization source for the meter (see [28.1.2: Configuring Time Settings, on page 28-5](#)), you will see the settings below.

Enable NTP Client using	IPv6 ▼
SNTP Server Name/IP Address	<input type="text"/>

- Enable the NTP client for either IPv4 or IPv6.
- Enter the NTP Server name or IP address of a Network Time Protocol server.

**NOTES:**

- The Network Time Protocol server is used for clock synchronization. It can be either a device with a real-time clock that is networked with your meter, or an NTP server on the Internet.
  - NTP is supported in Query-Reply method, only.
  - NTP can only be enabled for one INP100S card.
- b. For the legacy INP100S card:
- When the Security feature "Silent Mode" is enabled, a TCP/Reset packet is not sent when an attempt to connect to an unbound port is made. When "Silent Mode" is disabled, the meter follows standard TCP/IP procedures for incoming connections to unused ports. This feature is useful in preventing hacking (attempted security intrusions).
  - Network Firmware version 3.43 and higher and CommunicatorPQA® software version 4.0.249 and above support the Exclusive Client feature. This feature lets you allow an IP and/or MAC address. When that address is

used to connect to the meter, all other network communication with the meter, though the same Network card, is suspended. This ensures that anything being done, e.g., updating programmable settings, while the allowed address is being used to communicate with the meter, is secure.

- Click the checkbox and enter the IP address or MAC address you want to establish as the Exclusive Client.

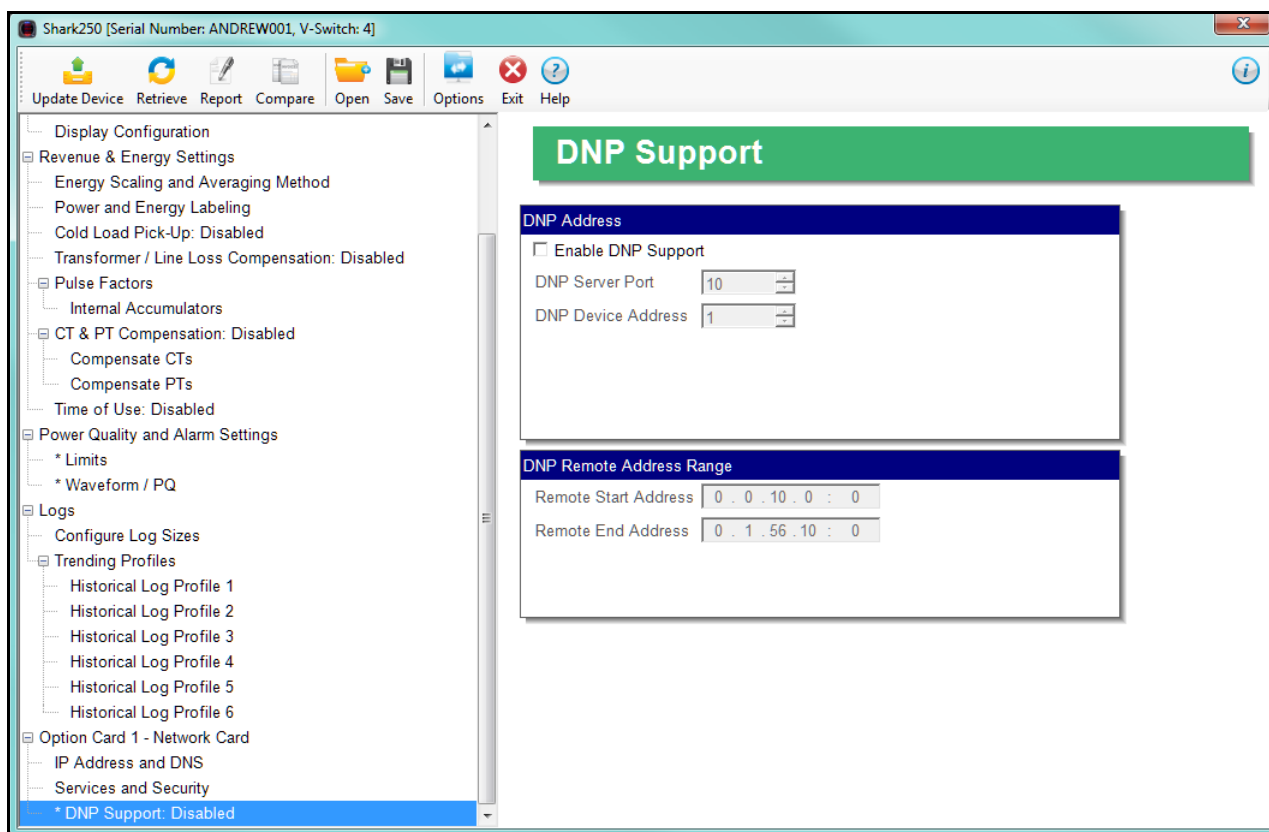
**NOTE:** To disable the exclusive Client feature, uncheck the checkbox - the IP and MAC addresses will be set to all zeros.

c. For the Gen 2 INP100S card, the Security section has these settings:

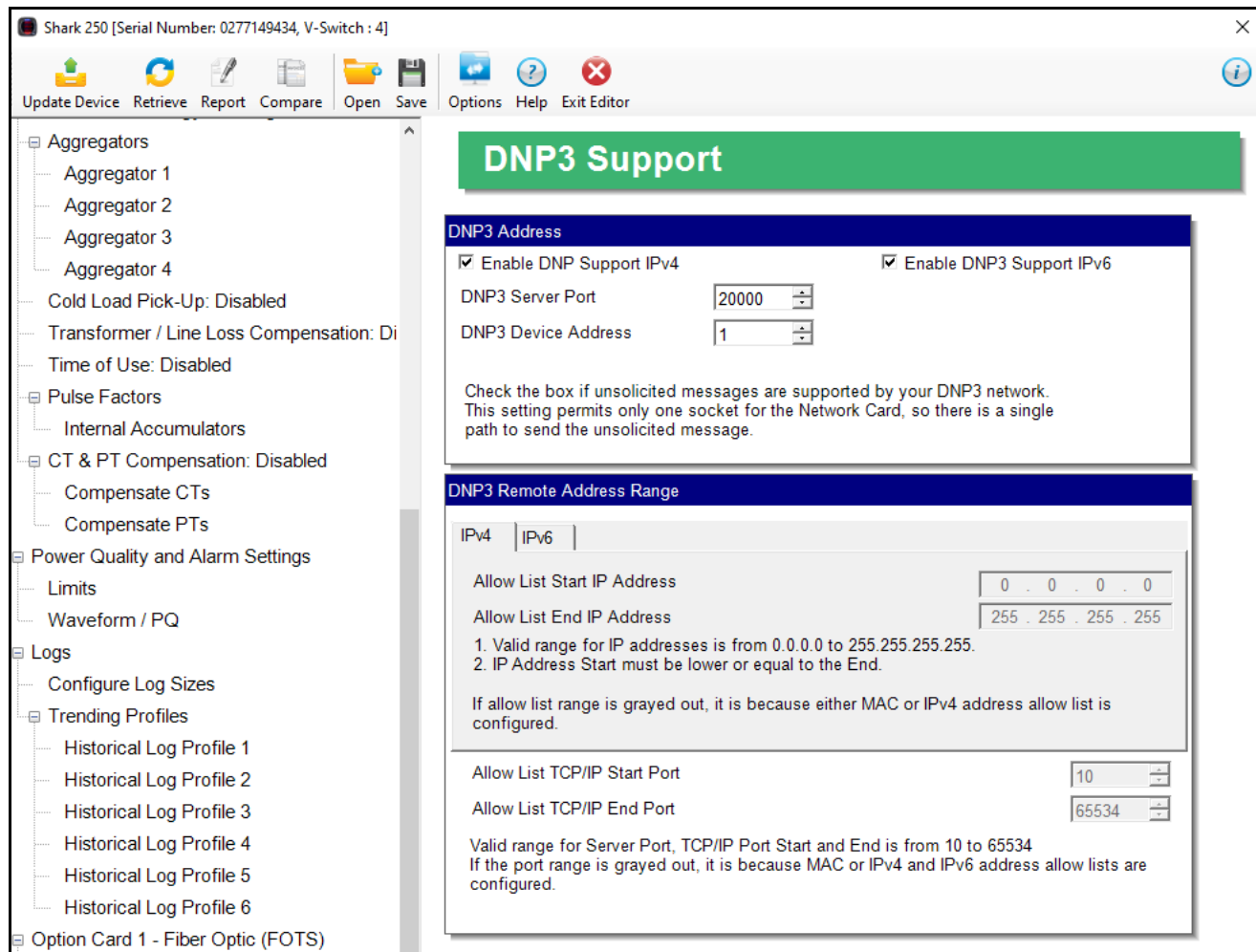
- IPv4 and IPv6 tabs let you set up firewall security:
  - i. Check the box to Enable IP(v4/v6) Address filtering. (Leave the box unchecked if you don't want to set firewall security).
  - ii. The Blocked Range Start and End IP Address fields are used to block a range of both IPv4 and IPv6 addresses.
  - iii. Use the Allowed IP Address to enter an IP address within the blocked IP address range that you give access to.
- There is also a MAC address tab, with an Enable checkbox and up to three Allowed MAC address fields.
- Check the box to enable Silent Mode for both IPv4 and IPv6. When Silent Mode is enabled, a TCP/Reset packet is not sent when an attempt to connect to an unbound port is made. When Silent Mode is disabled, the meter follows standard TCP/IP procedures for incoming connections to unused ports. This feature is useful in preventing hacking (attempted security intrusions).

**NOTES:**

- Contact your System Administrator for proper configuration.
  - See [Chapter 25: Firmware Updating, on page 25-1](#), for instructions on updating the legacy Network card's firmware. The Gen 2 INP100S card's firmware is updated via its webpage - see the *Shark® 270 Meter User Manual* for instructions.
3. From the Option Card menu, click DNP Support if you want to set up DNP over Ethernet for the Network Card. This screen lets you set up a DNP Server gateway for the Network Option card. This gateway enables DNP3 protocol communication over Ethernet, for the meter.
- You will see the screen shown below if you have the legacy INP100S.



- You will see the screen shown below if you have the Gen 2 INP100S card.



4. For both legacy and Gen 2 INP100S card's make these settings:

- Enable DNP Support: by default the DNP server support is disabled. Check the box to enable it. Once it is enabled, the other parameters can be entered.
- DNP Server Port: this is the TCP/IP port where the meter's Network card unit will be listening for incoming connections via the DNP protocol. Valid numbers are from 1 to 65535. We recommend that you set a value over 1024, because most of the lower numbers are reserved, or are already allocated to other popular services. If you set a port number of less than 10, the network card will set the port to its default, which is 20000.



- c. DNP Device Address: this is the meter's configured address (allowable setting is 1-65519).
- d. Single Socket Enforced - check the box if unsolicited messages are supported by your DNP network. This setting permits only one socket for the Network card, so there is a single path to send the unsolicited message.
- e. DNP Remote Address Range: this setting implements Internet security by letting you specify a range of IP addresses that are authorized to connect to the DNP port. Any requester with an IP address outside of this range will be rejected.
  - For the legacy INP100S card, enter the range in the Remote Start Address and Remote End Address fields. To disable the IP range restriction, write 0.0.0.0 in the start field and 255.255.255.255 in the end field. An example of a range is 172.20.167.100 in the Remote Start Address field and 172.20.167.150 in the Remote End Address field. That would authorize connection to the DNP port for any IP address from 172.20.167.100 up to and including 172.20.167.150.
  - For the Gen 2 INP100S card, for IPv4 and IPv6, enter:
    - The Allow List Start and End IP Addresses if you want to set up a range of allowed IP addresses.
  - For the Gen 2 INP100S card, use the Allow List TCP/IP Start and End Ports to set an allowable range of communication ports. Communication using any ports outside of the Allowed range will be rejected. This setting is used by both IPv4 and IPv6.

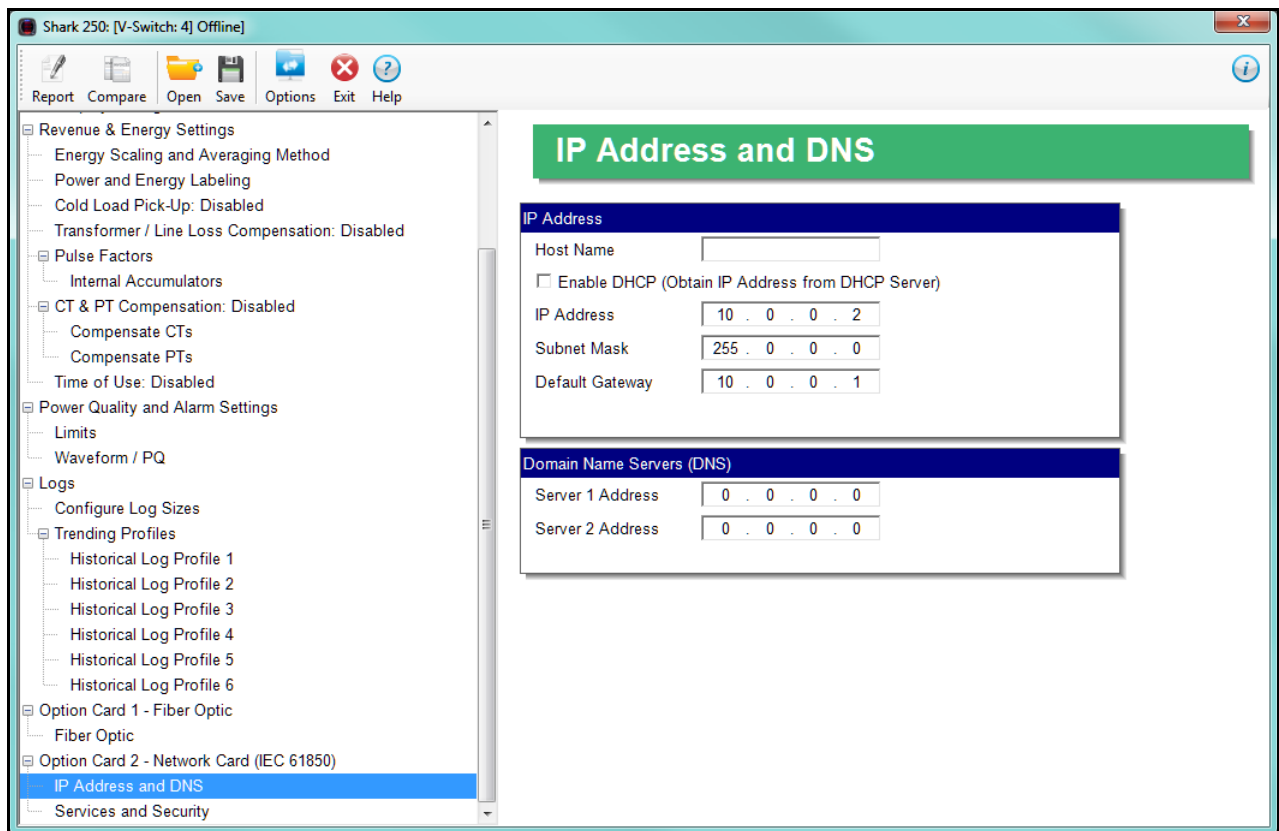
**NOTE:** The DNP3 Allow List settings will not be available if IPv4, IPv6, or MAC allow lists have already been configured for the Gen 2 INP100S card.

5. To implement any changes to the Network card settings, click the Update Device icon to send the new profile to the meter.

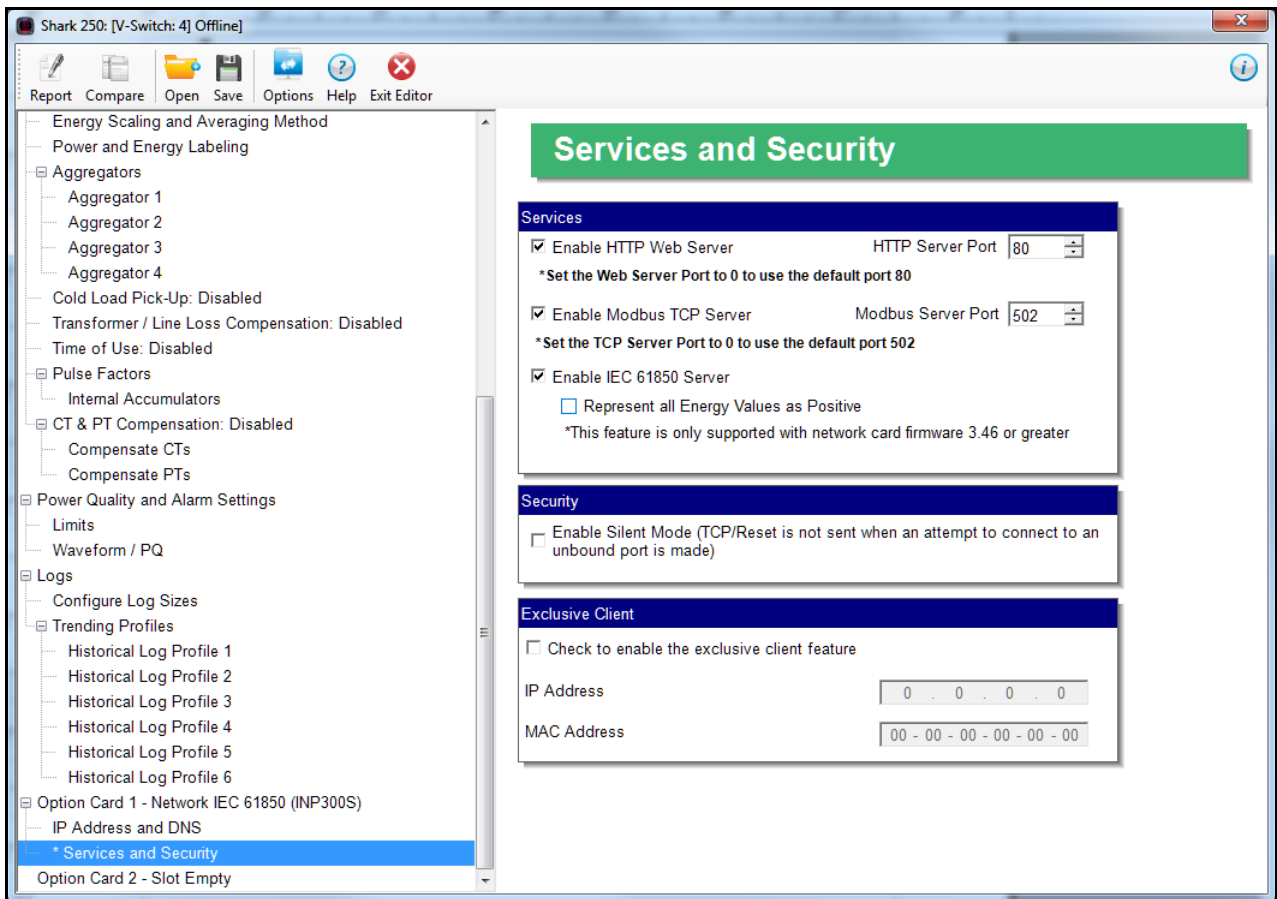
### 28.5.7: Configuring an IEC 61850 Card

The IEC 61850 card enables the meter to fit into an IEC 61850 network, which is an architecture used in substation automation. The settings for this card are the same as for the Network card, except that there is no DNP setting, since the IEC 61850 card uses its own protocol for communication.

1. Click Option Card 1/2 - IEC 61850>IP Address and DNS to set up the address information for the IEC 61850 card, or Option Card 1/2 - IEC 61850>Services and Security to enable/disable the servers and other features.



2. See the instructions in [28.5.6: Configuring a Network Card, on page 28-91](#), for instructions on setting up the IP Address and DNS configuration. For the Services and Security tab, click Option Card 1/2 - IEC 61850>Services and Security.



3. This screen allows you to disable certain features of the meter's Ethernet connection, for security purposes:

- The HTTP Web Server can be disabled, or its default port can be changed.
- The Modbus TCP server can be shut down, or its default port can be changed.
  - If the port entered is less than "10," the standard port is used: 80 for Web Server and 502 for Modbus TCP Server.
  - To disable one of the servers, uncheck the box next to it.
- To use the card for IEC 61850 communication, check the Enable IEC 61850 Server box. For INP300S Option cards with Network card firmware version 3.46 or greater, there is another option box under Enable IEC 61850 Server. It lets you specify that all energy values are represented as positive numbers: check the box to enable this option.

**NOTE:** To see what your Network card's firmware version is, open the Device Status screen. See [20.1.10: Device Information, on page 20-14](#).

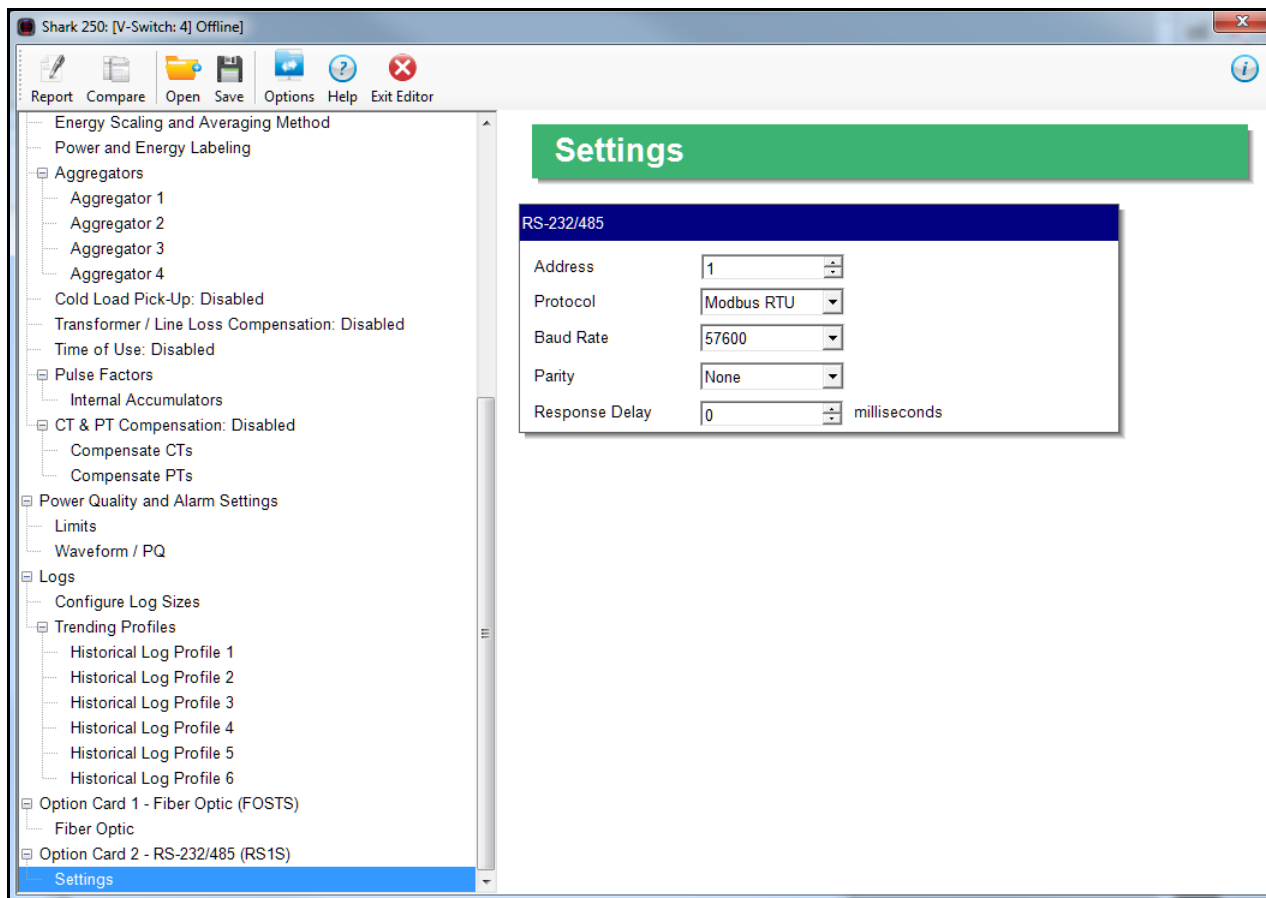
- When the Security feature "Silent Mode" is enabled, the meter will totally ignore incoming connections, in such a way that not even TCP/IP Reset packets will be sent. When "Silent Mode" is disabled, the meter follows standard TCP/IP procedures for incoming connections to unused ports. This feature is useful in preventing hacking (attempted security intrusions).
  - The Exclusive Client feature lets you Whitelist an IP and/or MAC address. When that address is used to connect to the meter, all other network communication with the meter, though the same Network card, is suspended. This ensures that anything being done, e.g., updating programmable settings, while the Whitelist address is being used to communicate with the meter, is secure.
    - Click the checkbox and enter the IP address or MAC address you want to establish as the Exclusive Client.
- NOTE:** To disable the exclusive Client feature, uncheck the checkbox - the IP and MAC addresses will be set to all zeros.

**NOTE:** If you do not know this information, contact your Systems Administrator.

## 28.5.8: Configuring an RS232/RS485 Card

The RS232 card lets you add an RS232 serial connection for the meter.

1. Click Option Card 1/2 - RS232.



2. Use this screen to make the following settings for the card:

- Address: 1 - 247 (Modbus); 1-65520 (DNP).
- Protocol: Modbus RTU; Modbus ASCII; DNP3.
- Baud Rate: 9600; 19200; 38400; 57600.
- Parity: None, Odd, Even.
- Response Delay (msec): the suggested delay is 50 msec, but you can increase the delay, if necessary.

3. To implement any changes, click the Update Device button to send the new profile to the meter.

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## 29: EnergyPQA.com® System

The EnergyPQA.com system documentation has been transferred from this chapter into two separate manuals.

- The *EnergyPQA.com AI Driven Energy Management System Setup Guide* contains instructions for the Admin or whomever is setting up the system.
- The *EnergyPQA.com AI Driven Energy Management System User Manual* contains instructions for using the system once it is set up: viewing dashboards, printing reports, etc.

Both manuals can be downloaded from EIG's website:

<https://www.electroind.com/products/energypqa-com-energy-management-system/>

Click Downloads>Tech Documents on the webpage to download the manual you need.

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## 30: ST40 Meter

This chapter explains how to configure an ST40 meter's programmable settings, which are stored in the unit's Device Profile. Chapter 7 contains detailed information on how to use the Device Profile.

### 30.1: Device Profile General Settings

1. From the Tree Menu on the left side of the ST40 meter's Device Profile screen, double-click on the General Settings line or click on the + button next to it. All of the settings in the General Settings group are listed.

ST 40: [V-Switch: 6] Offline

Report Compare Open Save Options Exit Editor Help

**General Settings**

- CT, PT Ratios and System Hookup
- Time Settings
- System Settings
- Communications
- Display Configuration

**Revenue & Energy Settings**

- Energy Scaling and Averaging Method
- Transformer / Line Loss Compensation: Disabled

**Power Quality and Alarm Settings**

- Limits
- Waveform / PQ

**Logs**

- Configure Log Sizes
- Trending Profiles
  - Historical Log Profile 1
  - Historical Log Profile 2
  - Historical Log Profile 3

### CT, PT Ratios and System Hookup

#### CT and PT Settings

		Ratio
CT Numerator (Primary)	5	< Update CT 1
CT Denominator (Secondary)	5	Update Ratio > 1
CT Multiplier	1	
PT Numerator (Primary)	120	< Update PT 1
PT Denominator (Secondary)	120	Update Ratio > 1
PT Multiplier	1	

#### System Wiring

3 Element Wye

#### Full Scales

Voltage	120
Current	5
Power	600
Power Total	1800

**Note:**  
To configure the CT and PT settings, either enter the Numerator, Denominator and Multiplier or enter the Denominator followed by the Ratio for the CT or PT and click the update button to have the software fill in the Numerator, Denominator and Multiplier

#### Minimum Voltage Threshold

Enter the voltage value as a percentage of the voltage full scale (between 0 and 12.7) 0 %

Based on the configuration of this screen the minimum primary voltage will be 10.00 V

**NOTE:** If your ST40 meter is the mV option, you will see the screen shown on the next page.

### 30.1.1: Configuring CT, PT Ratios, and System Hookup

The first screen you see is the CT, PT Ratios and System Hookup screen (to return to this screen from another screen, click General Settings>CT, PT Ratios and Hookup). Use this setting to configure Current Transformer and Potential Transformer ratios and to select the System Hookup.

ST 40 mV [Serial Number: 0168047127, V-Switch: 6]

Update Device Retrieve Set Connection Report Compare Open Save Options Exit Editor Help Test

**General Settings**

- CT, PT Ratios and System Hookup
- Time Settings
- System Settings
- Communications
- Display Configuration
- Revenue & Energy Settings
  - Energy Scaling and Averaging Method
  - Transformer / Line Loss Compensation: Disabled
- Power Quality and Alarm Settings
  - Limits
  - Waveform / PQ
- Logs
  - Configure Log Sizes
  - Trending Profiles
    - Historical Log Profile 1
    - Historical Log Profile 2
    - Historical Log Profile 3

## CT, PT Ratios and System Hookup

### CT and PT Settings

CT Numerator (Primary)

CT Denominator (Secondary)

CT Multiplier

PT Numerator (Primary)   Ratio

PT Denominator (Secondary)

PT Multiplier

### System Wiring

### Full Scales

Voltage	120
Current	5
Power	600
Power Total	1800

**Note:**  
To configure the CT and PT settings, either enter the Numerator, Denominator and Multiplier or enter the Denominator followed by the Ratio for the CT or PT and click the update button to have the software fill in the Numerator, Denominator and Multiplier

### Minimum Voltage Threshold

Enter the voltage value as a percentage of the voltage full scale (between 0 and 12.7)  %

Based on the configuration of this screen the minimum primary voltage will be: 10.00 V

**NOTE:** the screen shown above is for the ST40 mV meter. If your meter is an ST40 meter (not the mV option), the screen will look like the one on the previous page.

#### Functional Overview of CT and PT Ratios:

Current and Potential Transformers are used mainly for the following reasons:

- To insulate, and as a result isolate, the meter from high-voltage circuits.
- To change the primary voltage and current to standard values and sizes that the meter can measure.

The CT and PT transformers deliver fractions of the primary voltage and current to the meter. With properly set ratios and multipliers, the readings of the meter can be used to determine the energy, voltage, current, or power of the system.

**IMPORTANT!** You have two options for entering the CT and PT settings. You can either enter CT/PT Numerator, Denominator, and Multiplier manually (see instructions below), or you can enter the Ratios for CT/PT Denominator and click the Update CT/ Update PT buttons to let the software calculate the Numerator, Denominator, and Multiplier for you. You can then empty the Ratio fields and click the Update Ratio buttons to confirm the calculated settings: you will see the same ratios you initially entered.

**NOTES:**

- This option is available for the ST40 mV PT settings, only.
- Some ratios cannot be represented in the Shark® ST40 meter. The software will try to find the closest value, in that case.

1. For manual entry, make these settings:

- CT Ratios
  - CT Numerator (Primary): 1 - 9999
  - CT Denominator (Secondary): 1, 5, or 0.333 V  
**NOTE:** This field is display only. The ST40 meter is ordered as a 1 Amp or 5 Amp Current Secondary; the ST40 mV meter has a 0.333 V Secondary.
  - EITHER CT Multiplier (Scaling): 1, 10 or 100  
Multiplies the CT Numerator by this scale. The display can only read 4 digits, or 9999. Above that range the number must be multiplied to have it read K or M values.
  - OR Ratio: the ratio to be applied, and click Update CT
- PT Ratios
  - PT Numerator (Primary): 1 - 9999
  - PT Denominator (Secondary): 1 - 9999
  - PT Multiplier or PT Ratio: See the instructions for the CT Multiplier and Ratio, above.

- System Wiring
    - 3 Element Wye; 2.5 Element Wye; 2 CT Delta
- This value must be set properly for the meter to calculate readings correctly.

Example Settings:

For a CT of 2000/5A, set the following CT Ratios in the entry fields:

CT Numerator (Primary)        2000

CT Denominator (Secondary)   5

CT Multiplier                    1

The Current Full Scale field will read 2000.

For a system that has 14400V primary with a 120V secondary line to neutral (PT Ratio of 120:1), set the following PT Ratios in the entry fields:

PT Numerator (Primary) 1440

PT Denominator (Secondary) 120

PT Multiplier    10

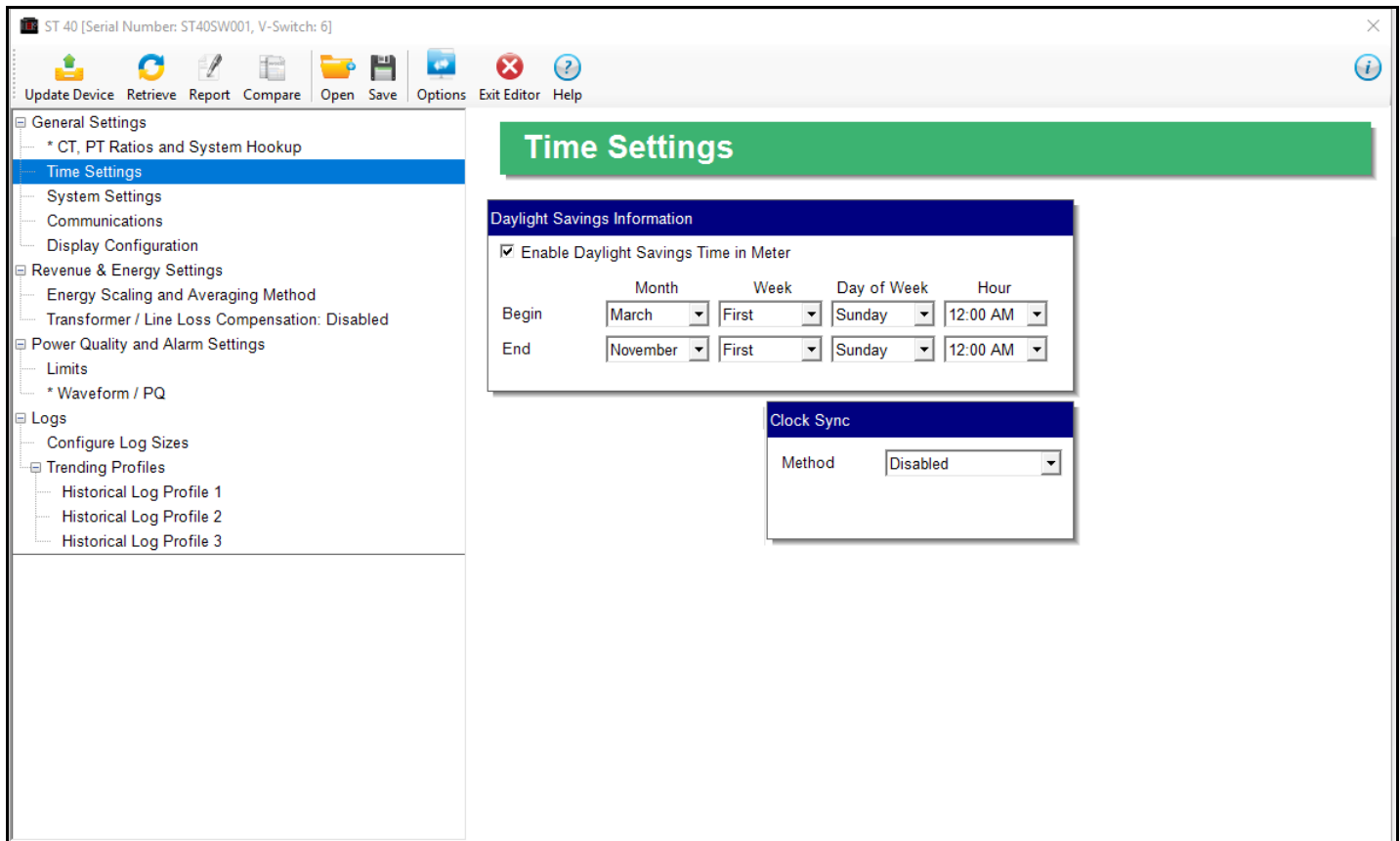
The Voltage Full Scale field will read 14.4k.

2. The Full Scales fields are display only.
3. Use the box at the bottom of the screen to enter the minimum voltage threshold, which is a percentage of the voltage full scale. This setting adjusts the pick up threshold for the voltage. You set a percentage of the PT primary (PT numerator X PT multiplier) up to 12.7 in the entry field. This allows a user to configure when the meter will start readings values above 0 voltage. The minimum primary voltage based on the percentage you entered is displayed at the bottom of the screen.
4. To implement any changes, click the Update Device button to send the new profile to the meter.

### 30.1.2: Configuring Time Settings

Use this setting to enable or disable Daylight Savings Time for the meter, to set the beginning and ending times for Daylight Savings Time, and to set up Time Zone information and clock synchronization information.

1. From the Tree Menu, click General Settings>Time Settings.



2. Check the box to Enable Daylight Savings time, or un-check it to Disable Daylight Savings Time.
3. Use the entry fields to set the start and end times for the Daylight Savings Time feature, if enabled. Select the values you want from the Month, Week, Day of the Week, and Hour fields.

**NOTE:** The Hour field uses a 24-Hour clock.

4. To enable clock synchronization, from the Clock Sync pull-down menu, select:

- Line (line synchronization) and then select 50Hz or 60Hz from the Line Frequency pull-down menu.

Line synchronization uses the frequency zero crossings to provide a time reference for the meter. This is the most common method to synchronize a meter's clock. EIG recommends that you always select this method unless there is a specific reason not to select it. If the meter is not synchronized to line frequency, it will default to internal crystal. Different meters differ in terms of drift, but typically meters with 20 ppm crystals will drift 30 seconds per month when set to internal crystal.

- If you do not want to use Line clock synchronization, click Disabled.

5. To implement any changes, click the Update Device button to send the new profile to the meter.

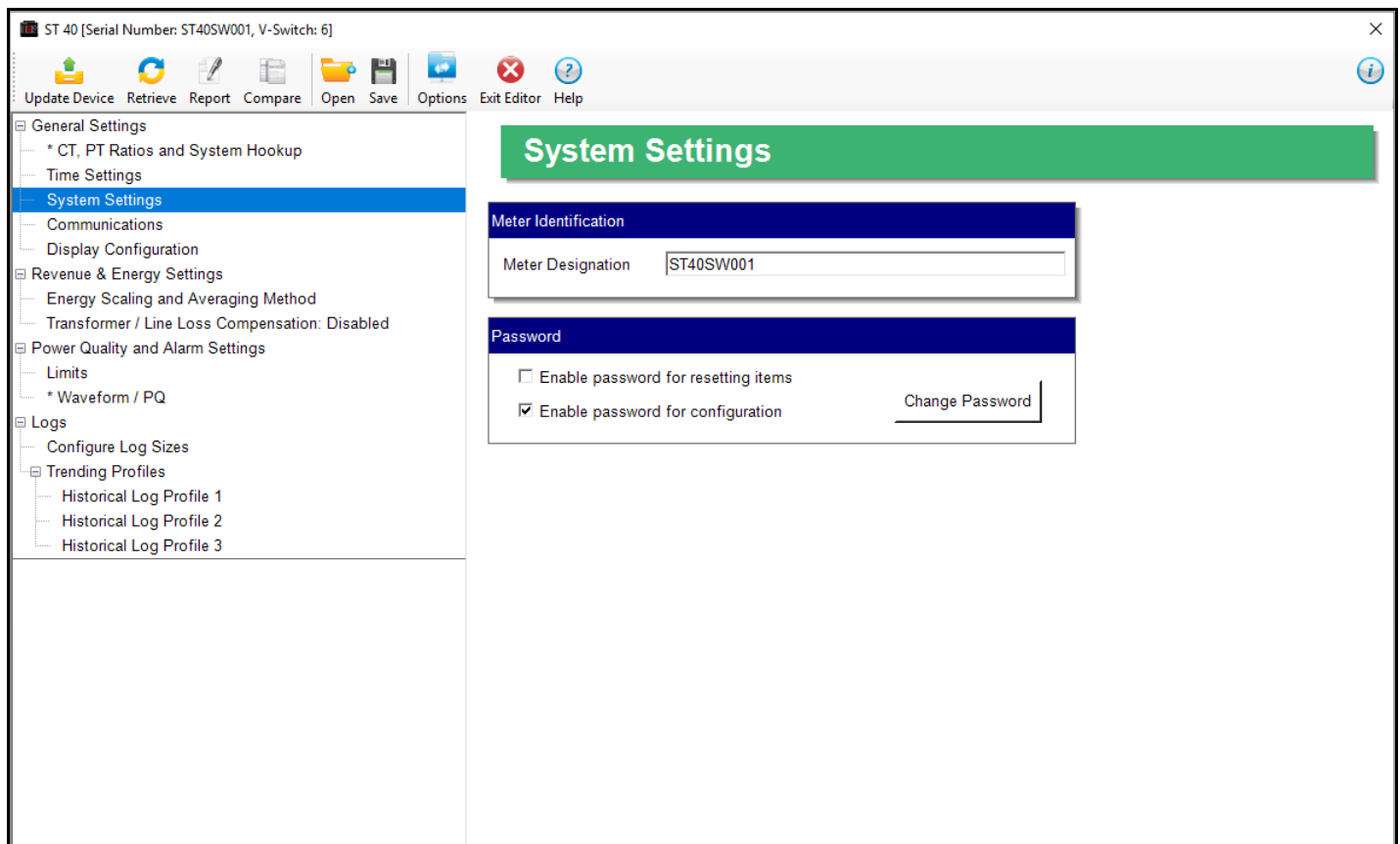
### 30.1.3: Configuring System Settings

Use the system settings to set password protection and a meter ID. You can enable or disable a Password for Resetting (Reset Max/Min Energy Settings, Energy Accumulators, and the Individual Logs) and Configuration (Device Profile) in the Systems Settings screen.

Once password protection is enabled for the meter and the Device Profile is updated, anyone who attempts to make a change that is under password protection is prompted to enter the password. If the correct Password is not entered, the change doesn't take place.

**NOTE:** If you enable a Password for Resetting, you must also enable it for Configuration.

1. From the Tree Menu, click General Settings>System Settings.

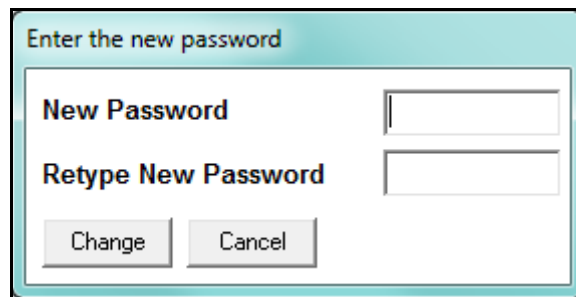


2. From this screen, you can do the following:

- Enable or Disable Password for Resetting and/or Configuration: check the box next to Yes or No. Enabling Password protection prevents unauthorized tampering with devices.

**IMPORTANT!** You must set up a password before enabling Password Protection. Click the Change button next to Change Password if you have not already set up a password.

- Change the Password: click the Change button.
  - Change the Device Designation: input a new designation into this field.
3. When you click the Change button next to Change Password in the Settings screen, you will see the Enter the New Password screen.



- a. Type in the new password (0 -9999).
- b. Retype the password.
- c. Click Change. The new password is saved and you see the following message window.

**NOTES:** If Password Protection has already been enabled for configuration and you attempt to change the password, you will see the Enter Password screen after you click Change. Enter the old password and click OK to proceed with the password change.

4. To implement any changes, click the Update Device button to send the new profile to the meter.



### 30.1.4: Configuring Communication Settings

Use this screen to enter communication settings for the meter's two on-board ports: the USB (COM 1) and RS485 Port (COM 2).



**IMPORTANT!** The settings on this screen are the current settings for communication. Any changes you make may affect communication between the Shark® meter and your PC. If your meter has the Ethernet or BACnet option, keep the RS485 settings shown below.

1. From the Tree Menu, click General Settings>Communications.

ST 40 [Serial Number: ST40SW001, V-Switch: 6]

Update Device Retrieve Report Compare Open Save Options Exit Editor Help

**General Settings**

- \* CT, PT Ratios and System Hookup
- Time Settings
- System Settings
- Communications**
- Display Configuration

**Revenue & Energy Settings**

- Energy Scaling and Averaging Method
- Transformer / Line Loss Compensation: Disabled

**Power Quality and Alarm Settings**

- Limits
- \* Waveform / PQ

**Logs**

- Configure Log Sizes
- Trending Profiles
  - Historical Log Profile 1
  - Historical Log Profile 2
  - Historical Log Profile 3

## Communications

### COM1 (USB)

Response Delay  milliseconds

### COM2 (RS-485)

Address

Protocol

Baud Rate

Response Delay  milliseconds

Parity

### DNP Options for Voltage, Current and Power

Return values in ☐ Secondary ☒ Primary

	Divisor	Full scale	DNP Value at Full scale
Voltage	<input type="text" value="1"/>	14.40K	14400
Current	<input type="text" value="1"/>	2000.00	2000
Power(k)	<input type="text" value="1"/>	86.40M	32767

☐ Optimal Scaling

Note: A value that is 'Bold', indicates that over range will occur in reading before full scale is reached.

2. The screen fields and acceptable entries are as follows:

- COM 1 (USB)
  - Response Delay: 0 - 750 (50msec increments)
- COM 2 (RS-485)
  - Address: 1 - 247 (Modbus); 1-65520 (DNP)

- Protocol: Modbus RTU, Modbus ASCII or DNP3
- Baud Rate: 1200, 2400, 4800, 9600, 19200, 38400, 57600
- Response Delay: 0 - 750 (50 msec increments)  
Response Delay is the delay the meter should use before responding to queries. If your connecting device requires a delay before receiving information, use response delay to program the time to wait before the meter starts responding to queries.
- Parity: Odd, Even, or None (For Parity setting your meter must have Run-time Firmware version 26 or higher.)
- DNP Options for Voltage, Current, and Power:  
These fields allow you to choose Primary or Secondary units for DNP, and to set custom scaling if you choose Primary. The Scaling fields appear after you click the Primary radio button (see partial screen capture, below).

DNP Options for Voltage, Current and Power

Return values in ☐ Secondary ☒ Primary

	Divisor	Full scale	DNP Value at Full scale
Voltage	1	14.40K	14400
Current	1	2000.00	2000
Power(k)	1	86.40M	<b>32767</b>

Optimal Scaling

Note: A value that is 'Bold', indicates that over range will occur in reading before full scale is reached.

DNP Primary Units Scaling Fields

Click for Optimal Scaling by

Scaling is used with Primary readings so that you can ensure that your readings will not go beyond the DNP range before they reach Full Scale. The valid range for DNP Object 30 is -32768 to +32767. If the scaling you enter will cause the values to fall outside the DNP range, the values will be shown in bold or red in the DNP Value at Full Scale fields.

Click the Optimal Scaling button to have the software choose a divisor for voltage, current, and power, that will not result in an over/under-range.

**NOTE:** You must set the DNP polling software to multiply by the divisor amount before showing the final value.

3. To implement any changes, click the Update Device button to send the new profile to the meter.

### 30.1.5: Setting Display Configuration

Some users may want to lock the meter to a particular faceplate display or series of displays. For example, if you would like the meter to act only as a Volt meter, or only as an ammeter, the meter can be configured to display only the relevant screen. Use this setting to lock the display of the ST40 meter's faceplate to the specific combination you want. Refer to the meter's Installation and Operation Manual for additional information on the faceplate.

1. From the Tree Menu, click General Settings>Display Configuration.

ST 40 [Serial Number: ST40SW001, V-Switch: 6]

Update Device Retrieve Report Compare Open Save Options Exit Editor Help

General Settings

- \* CT, PT Ratios and System Hookup
- Time Settings
- System Settings
- Communications
- Display Configuration**

Revenue & Energy Settings

- Energy Scaling and Averaging Method
- Transformer / Line Loss Compensation: Disabled

Power Quality and Alarm Settings

- Limits
- \* Waveform / PQ

Logs

- Configure Log Sizes
- Trending Profiles
  - Historical Log Profile 1
  - Historical Log Profile 2
  - Historical Log Profile 3

## Display Configuration

### Phases

Phases Displayed: A, B and C

☒ Auto Scroll Display

### Enable Face Plate of Display

☒ Volts L-N ☒ Current ☒ VARh ☒ VA/Hz

☒ Volts L-L ☐ W/VAR ☒ VAh ☒ Wh

### Display

Power Direction: View as Load

☐ Flip Power Factor Sign

Current (I) Display Autoscale: On

☐ Display Voltage in Secondary

☐ Use IEEE/IEC power coordinate system

### Voltage Format

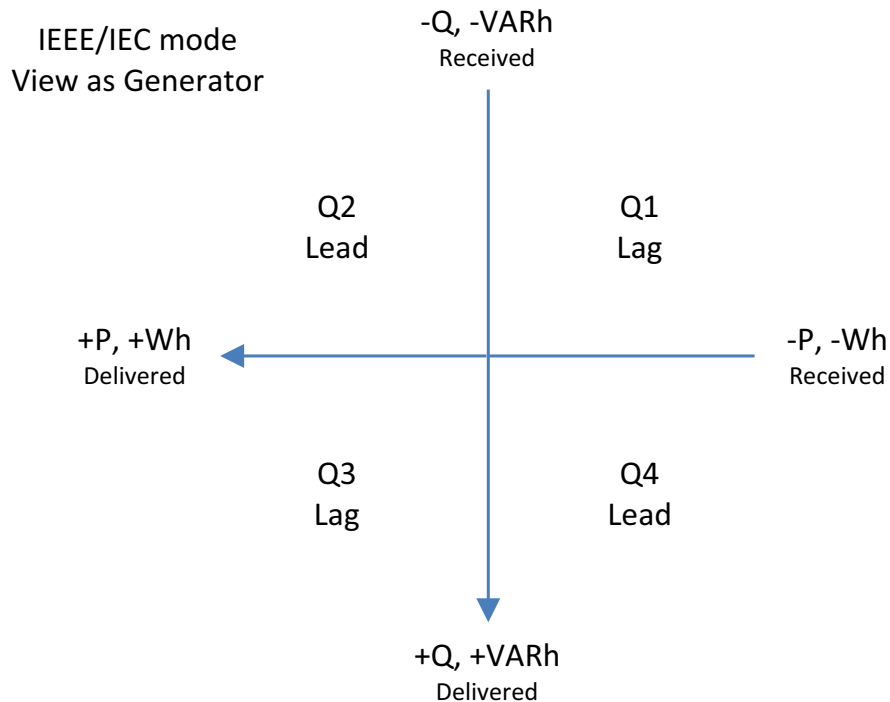
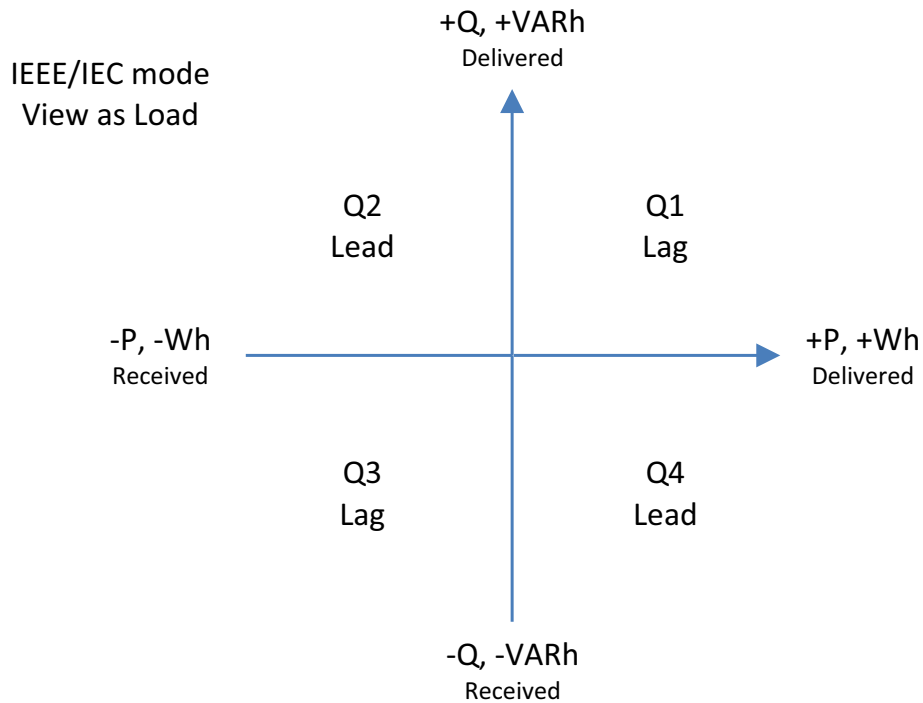
☐ Enable Fixed Scale for Voltage Display

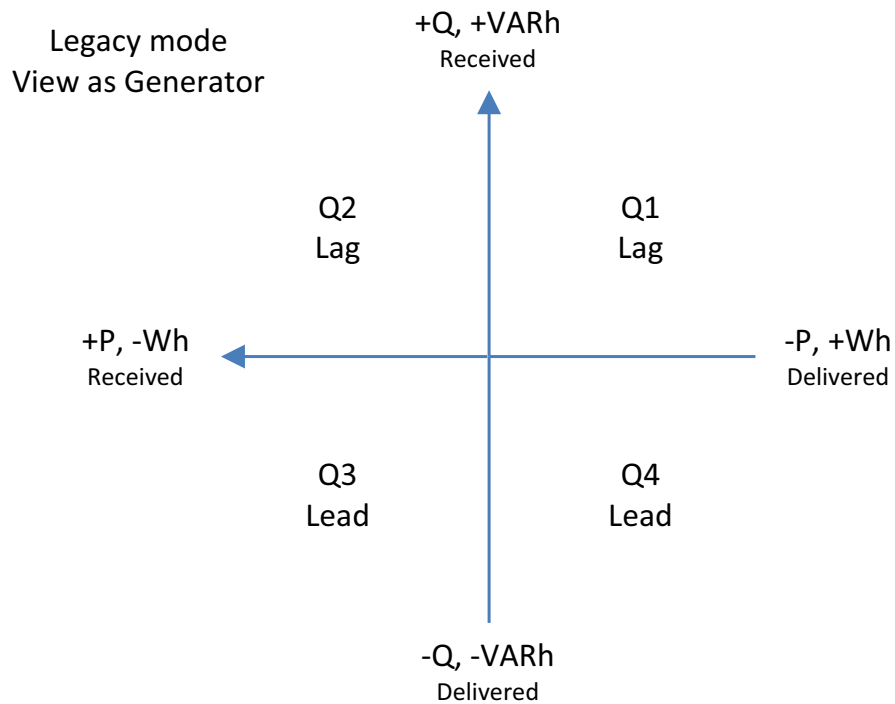
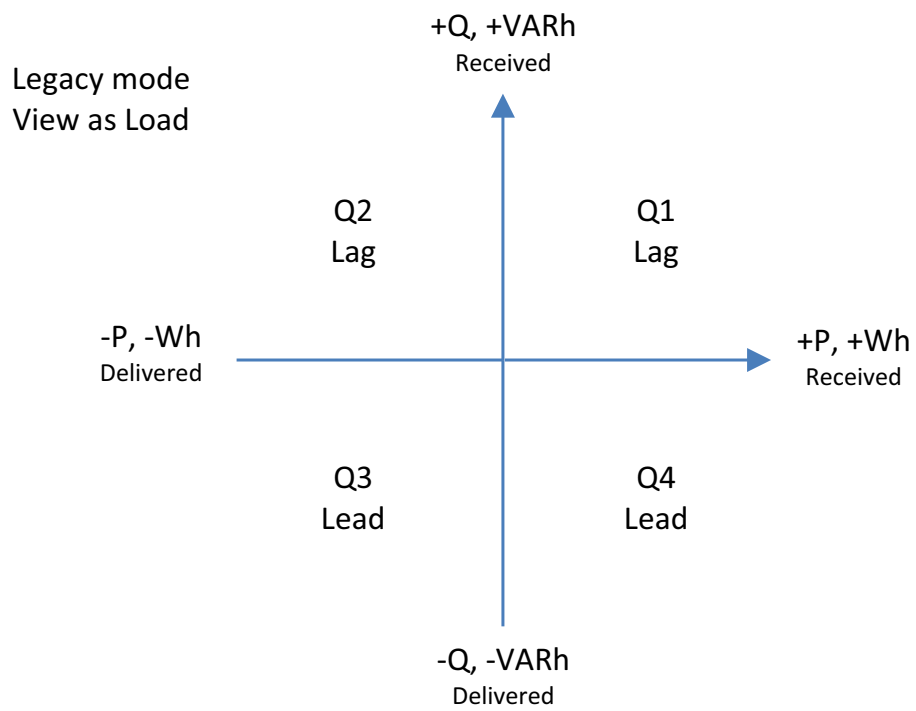
2. The screen fields and acceptable entries are as follows:

- Phases Displayed: A; A and B; A, B, and C. This field determines which phases display on the faceplate. For example, if you select A and B, only those two phases will be displayed on the faceplate.
- Auto Scroll Display: Yes or No. This field enables/disables the scrolling of selected readings on the faceplate. If enabled, the readings scroll every 5 seconds.

- Enable on Face Plate of Display: Check the boxes of the Readings you want displayed on the faceplate of the meter. If you make no selection, Amps are displayed by default.
- Power Direction: View as Load or View as Generator; this controls how energy is accumulated in the Shark® meter. View as Load means the energy readings are accumulated as Whrs Received, View as Generator means the energy readings are accumulated as Whrs Delivered.
- Flip Power Factor Sign: Check box for Yes; leave unchecked for No.
- Current (I) Display Autoscale: On to apply scaling to the current display or Off (No decimal places).
- Display Voltage in Secondary: Check box for Yes; leave unchecked for No.

- Use IEEE/IEC Power Coordinate System: Check box for Yes; leave unchecked for No. Select Yes to use the IEEE/IEC system shown in the charts below. Select No if you want to use the legacy system shown in the charts on the next page.





- Enable Fixed Scale for Voltage Display: To enter a scaling factor for the Voltage display:
  - a. Check the box next to Enable Fixed Scale for Voltage Display. The screen changes - see the figure below.



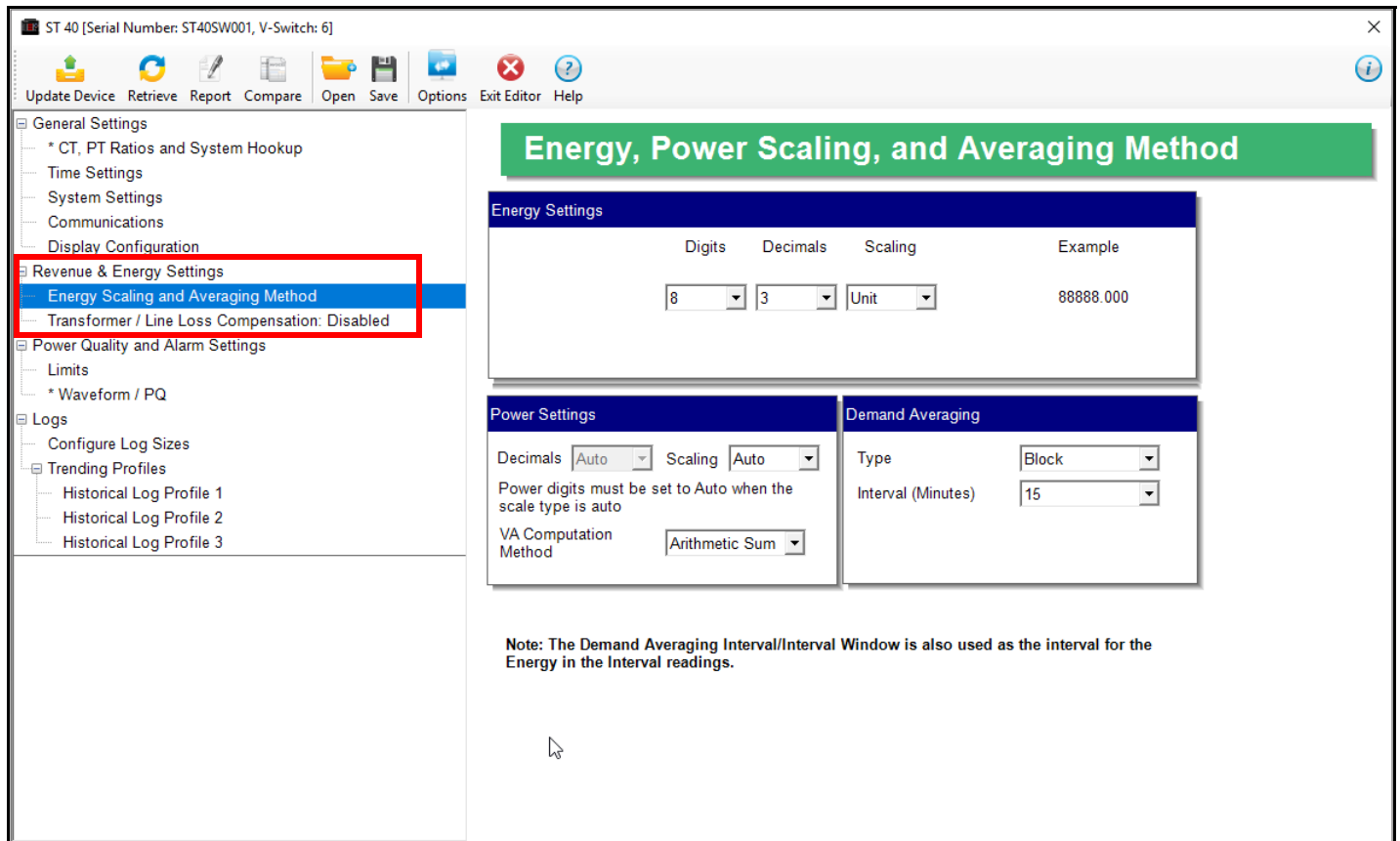
☒ Enable fixed scale for voltage display

Decimal points      0 - 9999V ▼

- b. Select the scaling you want to use from the pull-down menu. The options are: 0-9999V, 100.0kV-999.9kV, 10.00kV-99.99kV, or 0kV-9.999kV.
3. To implement any changes, click the Update Device button to send the new profile to the meter.

## 30.2: Revenue and Energy Settings

From the Tree Menu on the left side of the ST40 meter's Device Profile screen, double-click on the Revenue and Energy Settings line or click on the + button next to it. The settings in the Revenue and Energy Settings group are listed.



### 30.2.1: Configuring Energy, Power Scaling, and Averaging

From the Tree Menu, click Revenue & Energy Settings> Energy, Power Scaling, and Averaging (see the screen above). Use this setting to configure:

- The display and storage of Energy registers in the meter
- The display of Power data in the meter
- The method of VA computation
- The interval over which Average values are computed, as well as the Interval Energy



## Functional Overview of Energy Settings, VA Computation, and Averaging:

- **Energy Scaling**

Energy Setting includes:

Digits (the number of digits in the reading)

Decimals (the number of decimal places in the reading)

Energy Scale: the scale of the reading - unit; kilo (number times 1000); Mega (number times 1 million)

Energy settings allow you to balance the resolution (or accuracy) of the energy stored, with the interval over which energy rollover occurs. For example, the maximum resolution for a k scale reading is: 99999.999k.

To calculate the speed at which the energy will rollover, you must know the Power Full Scale, which is computed from the CT and PT Full Scale values (see 30.1.1: Configuring CT, PT Ratios, and System Hookup, on page 30-2). The formula for calculating Power Full Scale is:

Wye system:  $\text{CT Full Scale} \times \text{PT Full Scale} \times 3$

Delta system:  $\text{CT Full Scale} \times \text{PT Full Scale} \times 3 \times \sqrt{3}$

For example, for a CT Full Scale of 2000, PT Full Scale of 14400, Wye system:  
 $2000 \times 14400 \times 3 = 86400000$

In this example, the energy will increment at 86400000 Watts per hour, or 24000 Watts per second.

This value allows you to determine the number of digits, decimal places, and energy scale you want to configure for the Energy settings, when you take into account the rollover time.

To determine the number of hours before rollover, use this formula:

$[\text{Max Resolution}]/[\text{Full Scale}] = \text{\#Hours}$ , where Max Resolution = maximum digits and decimals for the Energy scale in use.

Using the example from above, with an energy scale of Mega, the formula would be:

$99999.999 \text{ M}/86.4 \text{ M} = 1157.4074 \text{ hours}$  or about 48 days until rollover.

**NOTE:** To increase the number of days until rollover, you can increase the number

of digits (to 8), decrease the number of decimal places (to 0), or increase the Energy Scale (to M).

- **VA Computation Method:**

There are two optional methods of VA Computation:

**Arithmetic Sum** - the formula for this calculation is:

$$VA_T = VA_a + VA_b + VA_c$$

**Vector Sum** - the formula for this calculation is:

$$VA_T = \sqrt{W_T^2 + VAR_T^2}$$

Generally, the superior method for calculating VA is to use the Vectoral method; however, both methods are provided.

- **Demand Averaging**

Demand is the average rate of energy use over time. The Shark® ST40 meter supports two types of demand averaging: Block demand and Rolling demand.

Block demand records the average demand for time intervals that you define (usually 5, 15 or 30 minutes).

Rolling demand functions like multiple, overlapping Block demands. You define the subintervals at which an average of demand is calculated. An example of Rolling demand would be a 15-minute Demand block using 5-minute subintervals, thus providing a new demand reading every 5 minutes, based on the last 15 minutes.

1. The screen fields and acceptable entries are as follows:

- Energy Settings
  - Digits: 5; 6; 7; 8
  - Decimals: 0 - 6
  - Scaling: Unit; Kilo (k); Mega (M)

For example: a reading for Digits: 8; Decimals: 3; Scaling: K would be formatted: 00123.456 k.

**NOTES:**

- Your selection in the Energy Settings fields determines the precision of energy stored for display and polling. Refer to the Functional Overview at the beginning of this section for more information.
- If you are changing the energy settings, we recommend you first reset the Energy Accumulators, in order to prevent erroneous counts. See 20.1.7: Reset Device Information, on page 20-7, for instructions on resetting the ST40 meter's Energy Accumulators.
- Power Settings
  - Decimals: Select Auto or the number of decimals you want from the examples in the pull-down menu; e.g., XXX.X specifies on decimal place.
  - Scaling - select Unit, Kilo (k), Mega (M), or Auto. Note that if you select Auto, the Decimals field is grayed out and you cannot make any changes to it.
  - VA Computation Method: Arithmetic Sum or Vector Sum (See explanation on the previous page.)
- Demand Averaging
  - Type: Block or Rolling
  - Interval (Block demand) or Sub-Interval (Rolling demand): 5; 15; 30; 60
  - Number of Subintervals: 1; 2; 3; 4
  - Interval Window: This field is display only. It is the product of the values entered in the Sub-Interval and Number of Subintervals fields.

**NOTE:** You will only see the Number of Subintervals and Interval Window fields if you select Rolling demand.

2. To implement any changes, click the Update Device button to send the new profile to the meter.

### 30.2.2: Transformer/Line Loss Compensation

Transformer losses are power used by the transformer while working. The more load on the transformer, the higher the transformer losses. There are two types of transformer losses:

- No load losses - these are the fixed losses that keep the transformer up and running.
- Load losses - these vary with changes in the load.

When the meter is located on the secondary side of a customer's transformer, a utility will want to add the transformer losses into the energy usage calculation. However, this practice is regulated by local jurisdiction and regulations. The meter has the capability to add in or subtract out these transformer losses, depending on the user's specific needs.

Line losses are similar to transformer losses, except that they are used to compensate for loss incurred on wires, such as transmission lines.

Transformer/Line Loss Compensation allows you to add or subtract transformer and/or line losses to meter registration.

1. From the Tree Menu, click Revenue & Energy Settings>Transformer/Line Loss Compensation.

ST 40 [Serial Number: ST40SW001, V-Switch: 6]

Update Device Retrieve Report Compare Open Save Options Exit Editor Help

General Settings  
 \* CT, PT Ratios and System Hookup  
 Time Settings  
 System Settings  
 Communications  
 Display Configuration  
 Revenue & Energy Settings  
 Energy Scaling and Averaging Method  
**Transformer / Line Loss Compensation: Disabled**  
 Power Quality and Alarm Settings  
 Limits  
 \* Waveform / PQ  
 Logs  
 Configure Log Sizes  
 Trending Profiles  
 Historical Log Profile 1  
 Historical Log Profile 2  
 Historical Log Profile 3

## Transformer / Line Loss Compensation

Percent Loss of Watts		
	Positive Watts	Negative Watts
Due to Iron	0	0
Due to Copper	0	0

Percent Loss of VARS		
	Positive Watts	Negative Watts
Due to Iron	0	0
Due to Copper	0	0

Disabled

Subtract from Watts and VAR

TLC Calculator

2. This screen displays the current values for the meter's Transformer Loss Compensation. The screen fields and acceptable entries are as follows

- Percent Loss of Watts due to Iron and Copper/Positive Watts and Negative Watts
- Percent Loss of VARS due to Iron and Copper/Positive and Negative Watts
- Drop-down menu #1. Choose from: Disabled, Fe Only, Cu Only, Both Fe and Cu.
- Drop-down menu #2. Choose from: Add to Watts and VAR; Add to Watts and Subtract from VAR; Subtract from Watts and Add to VAR; Add to Watts and VAR; Subtract from Watts and VAR.

3. Click TLC Calculator to find the values to enter into the Percent Loss fields. The TLC Calculator button launches the TLC Calculator that makes the calculations for you once you enter the required data.

**NOTE:** Appendix A contains a screen captures of the TLC Calculator with example numbers, and an explanation of Loss Compensation considerations.

4. Enter the percent Loss of Watts and VARS for copper and iron in the appropriate fields.
5. To implement any changes, click the Update Device button to send the new profile to the meter.

### 30.3: Power Quality and Alarms Settings

From the Tree Menu on the left side of the ST40 meter's Device Profile screen, double-click on the Power Quality and Alarms Settings line or click on the + button next to it. All of the settings in the Power Quality and Alarms Settings group are listed.

The screenshot shows the ST40 Device Profile screen with the 'Limits' settings table and 'Full Scales' section. The 'Power Quality and Alarm Settings' group is highlighted in the left tree menu, and the 'Limits' sub-item is selected.

Limit ID	Assigned Channel	Setting	Setpoint		Return Hysteresis	
			% of Fullscale	Primary	% of Fullscale	Primary
1	Primary Readings: Volts A-N	Above	110.0%	15,840.000	109.0%	15,696.000
		Below	90.0%	12,960.000	91.0%	13,104.000
2	Primary Readings: Volts B-N	Above	110.0%	15,840.000	109.0%	15,696.000
		Below	90.0%	12,960.000	91.0%	13,104.000
3	Primary Readings: Volts C-N	Above	110.0%	15,840.000	109.0%	15,696.000
		Below	90.0%	12,960.000	91.0%	13,104.000
4	Primary Readings: Amps A	Above	110.0%	2,200.000	109.0%	2,180.000
		Below	0.0%	0.000	0.0%	0.000
5	Primary Readings: Amps B	Above	110.0%	2,200.000	109.0%	2,180.000
		Below	0.0%	0.000	0.0%	0.000
6	Primary Readings: Amps C	Above	110.0%	2,200.000	109.0%	2,180.000
		Below	0.0%	0.000	0.0%	0.000
7	Primary Readings: Frequency	Above	110.0%	66.000	109.0%	65.400
		Below	90.0%	54.000	91.0%	54.600
8		Above				
		Below				

Full Scales	
Voltage	14400
Current	2000
Frequency	60
Power	28800000

### 30.3.1: Configuring Limits

1. From the Tree Menu, click Power Quality and Alarm Settings>Limits (see the screen on the previous page). The current settings for Limits are shown in the screen. Use this screen to assign Limits for the ST40 meter.

#### **Functional Overview for Limits:**

Limits are transition points used to divide acceptable and unacceptable measurements. When a value goes above or below the limit, an out-of-limit condition occurs. You can set and configure up to eight Limits for the ST40 meter.

Once they are configured, you can view the out-of-Limits (or Alarm) conditions in the Limits Log (see Chapter 19) or Limits Polling screen (see Chapter 5). You can also use Limits to trigger relays.

You can assign the eight limits to readings from three groups of parameters:

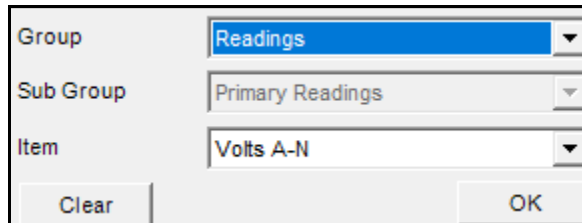
- Readings (Instantaneous Voltage; Instantaneous Current; Total and Per Phase Power and Power Factor; Frequency; Neutral Current; Symmetrical Components and Voltage Imbalances)
- Demand (Current; Per Phase, Total Power and Power Factor)
- THD (For Voltage and Current)

2. The bottom of the screen shows the Full Scale values for:

- Voltage
- Current
- Frequency
- Power
- Power Total
- Power Factor
- THD

3. To set or change a Limit:

- a. Select a limit by double-clicking on the Assigned Channel field.
- b. You will see the screen shown below.

A screenshot of a software dialog box for selecting a limit. It contains three dropdown menus: 'Group' with 'Readings' selected, 'Sub Group' with 'Primary Readings' selected, and 'Item' with 'Volts A-N' selected. At the bottom are 'Clear' and 'OK' buttons.

Group	Readings
Sub Group	Primary Readings
Item	Volts A-N
<div>ClearOK</div>	

- c. Select a Group and an Item for the Limit.
- d. Click OK. The Limit you selected will now appear in the Limits screen.

3. To configure a Limit, double-click on the following fields to set their values:

- Above and Below Set Point: Percent of Full Scale (the point at which the reading goes out of limit: see figure on the next page).

For example:

100% of 120V Full Scale = 120 V

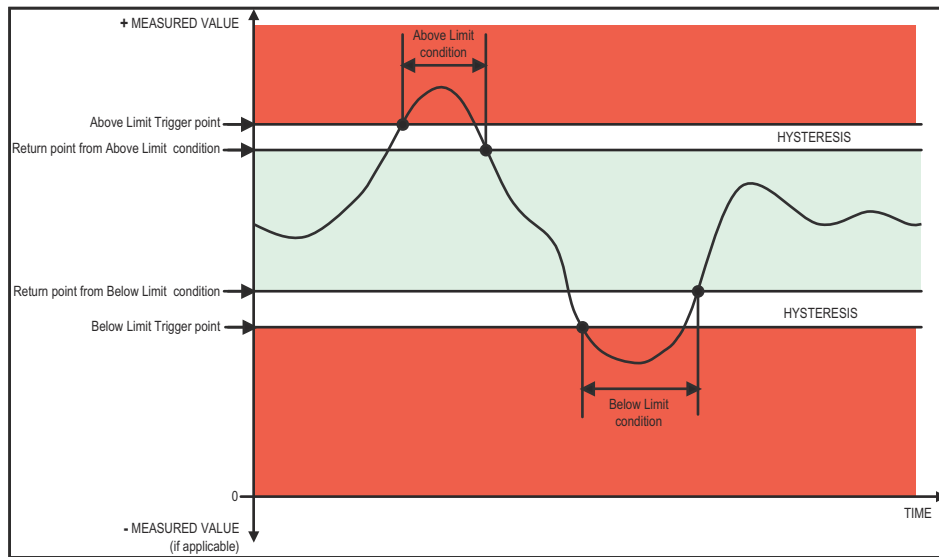
90% of 120V Full Scale = 108 V



- Above and Below Return Hysteresis (the point at which the limit's status changes from out of limit to within limit: see figure below).

For example, with a 120 V Full Scale:

- Above Set Point = 110% of Full Scale (Out of Limit above 132 V)
- Below Set Point = 90% of Full Scale (Out of Limit below 108 V)
- Above Return Hysteresis = 105% of Full Scale (Stay Out of Limit until below 126 V)
- Below Return Hysteresis = 95% of Full Scale (Stay Out of Limit until above 114 V)



#### NOTES:

- The Primary fields are display only. They show what the set point and return Hysteresis value are for each limit.
  - If the Above Return Hysteresis is greater than the Above Set Point, the Above Limit is Disabled; if the Below Return Hysteresis is less than the Below Set Point, the Below Limit is Disabled. You may want to use this feature to disable either the Above Limit or Below Limit condition for a reading.
  - If you are entering negative limits, be aware that the negative value affects the way the above and below limits function, since negative numbers are processed as signed values.
4. To implement any changes, click the Update Device button to send the new profile to the meter.

### 30.3.2: Configuring Waveform/PQ

The Waveform/PQ capability allows the meter to act as a high-speed waveform recorder to record any anomaly that occurs within a cycle of duration. This provides a user with advanced waveform analysis including pre- and post- waveform recording.

The meter has the capability to record both surges and sags of the measured signals. A voltage surge is any event that increases the RMS voltage for one cycle, calculated every half cycle. A voltage sag is a dip in the RMS of one cycle of voltage, calculated every half cycle. A current fault (or surge) is also calculated in the same manner. When the RMS value of any of these triggers exceeds the threshold settings, the meter will trigger a waveform capture.

This setting determines at what point the meter executes a waveform capture and/or records a power quality event. See Chapter 19 for instructions on viewing Waveform and PQ logs. See 30.4.2: Trending Profiles/ Configuring Historical Logs, on page 30-31 for instructions on configuring the log sectors for the ST40 meter.

**NOTE:** PQ and Waveform Thresholds are given as a percentage of the Full Scales ( Full Scale fields). Full Scales are based on the CT and PT Ratios set in the CT, PT Ratios and System Hookup setting. Before programming the Waveform/PQ Thresholds, set the CT and PT ratios. See 30.1.1: Configuring CT, PT Ratios, and System Hookup, on page 30-2, for instructions.

1. From the Tree Menu, click Power Quality and Alarm Settings>Waveform/PQ. The current settings, if any, are shown in the screen.

**Waveform / PQ**

Channel	Setting	Setpoints		Enables	
		% Fullscale	Primary	PQ	Waveform
Volts A-N	Surge	150.0%	21,600	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Sag	90.0%	12,960	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Volts B-N	Surge	150.0%	21,600	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Sag	90.0%	12,960	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Volts C-N	Surge	150.0%	21,600	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Sag	90.0%	12,960	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
I A	Surge	150.0%	3,000	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
I B	Surge	150.0%	3,000	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
I C	Surge	150.0%	3,000	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Waveform Configuration		Full Scales	
Capture Sample Rate	128	Voltage	14400
Pre-trigger Cycles	3	Current	2000
Total Cycles	16		
Note: This includes the triggering cycle			

2. Set the Surge and Sag Setpoints (in percent of Full Scale), for Voltage, and the Surge Setpoint for Current. When you enter the percentage for a reading, the primary value is displayed in the Primary field. The bottom of the screen displays the Full Scales for Voltage and Current.
3. Click the checkbox under PQ to enable PQ recording when the programmed threshold is exceeded.
4. Click the checkbox under Waveform to enable Waveform recording when the programmed threshold is exceeded.

5. Select the sampling rate from the Capture Sample Rate pull-down menu. The options are: 32, 64, 128, 256, 512.
6. From the Pre-trigger pull-down menu, select the number of cycles of waveform data prior to the triggering event, that you want to be included in the waveform capture. The options are 2 to 63.

**NOTE:** Increasing the number of pre-cycles will decrease the number of cycles of data recorded after the event.

7. To implement any changes, click the Update Device button to send the new profile to the meter.

## 30.4: Logs

From the Tree Menu on the left side of the ST40 meter's Device Profile screen, double-click on the Logs line or click on the + button next to it. All of the settings in the Logs group are listed.

**Log Sizes**

Historical Log 1 - 3

512k 576k 640k 832k 320k

Waveform Log PQ Log

Historical Logs				
Log	Color	Bytes Allocated	Records Available	Log Duration
Historical Log 1	Cyan	512KB	14552	10 Days 2 Hours 32 Minutes
Historical Log 2	Green	576KB	16371	11 Days 8 Hours 51 Minutes
Historical Log 3	Red	640KB	10910	7 Days 13 Hours 50 Minutes

Waveform/PQ Logs				
Log	Color	Bytes Allocated	Number of Capture Sectors	
Waveform Log	Teal	832KB	26	13
PQ Log	Purple	320KB	5115	5

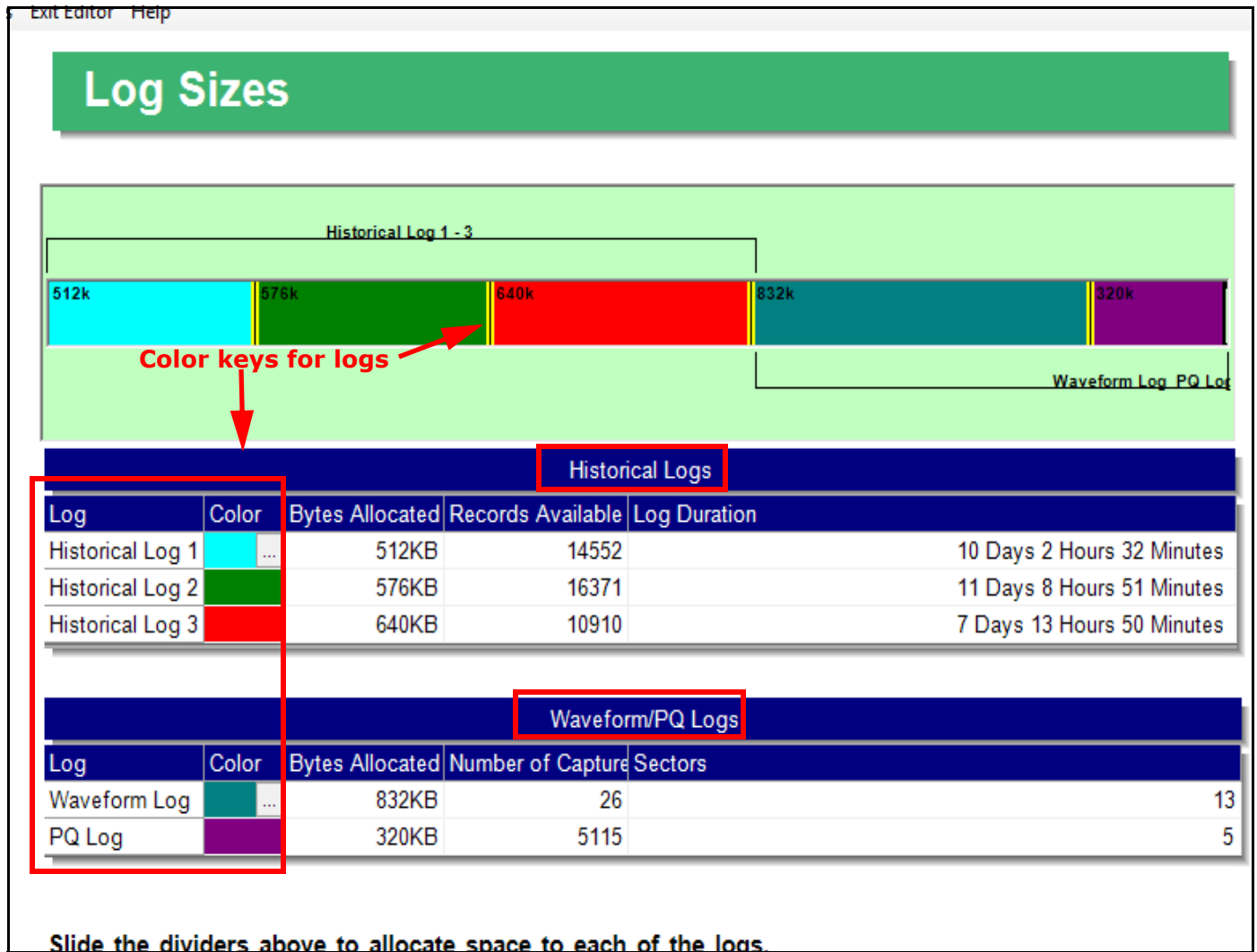
Slide the dividers above to allocate space to each of the logs.  
Waveform must have 3 or more sectors allocated.

### 30.4.1:Configuring Log Sizes

The ST40 meter allows a user to configure the amount of memory allocated for each log, so you can optimize the number of records stored for each log.

- Use this setting to increase or decrease the amount of records each of the ST40 meter's three Historical logs can store, and the duration each log can run, before becoming filled. This allows a user to set the amount of memory allocated per log for the amount of recording days desired before the memory fills and gets rolled over.
- Also use this setting to set the allocation for the Waveform and Power Quality (PQ) logs.

1. From the Tree Menu, click Logs/Configure Log Sizes. You will see the screen on the previous page. The screen is color-coded for ease of use. The color key is shown in the box(es) labeled Historical Logs and Waveform/PQ Logs.



- The first Log box shows the current space allocation for the ST40 meter's three Historical logs, including:
  - The number of bytes allocated to each log.
  - The number of records available for each log.
  - The duration of each log.
- The second Log box shows the same information, along with the current space allocation for the Waveform/PQ Logs, including:
  - The number of bytes allocated to each log.

2. To change the current allocation for a log:
  - a. Click on one of the double yellow lines dividing the individual logs.
  - b. You will see a line with arrows on each side. Drag the line in either direction to increase or decrease the log allocation. The display fields for the logs will reflect any changes you make to the allocation.

**NOTE:** The Waveform log must have at least 3 sectors allocated to it.
3. To implement any changes, click the Update Device button to send the new profile to the meter.

### 30.4.2: Trending Profiles/ Configuring Historical Logs

Use this setting to select the parameters to be stored in each of the ST40 meter's three Historical Logs. For additional information on logs, including using the HHF Converter, see Chapters 16 and 19.

#### **Functional Overview of Historical Logs:**

The ST40 meter allows a user to set up 3 separate historical profile logs that can log up to 64 parameters. Each of these logs can log at different time frames. For example, one log can be set for one minute intervals to record voltage; while another log can be set for 15 minute intervals for energy consumption logging.

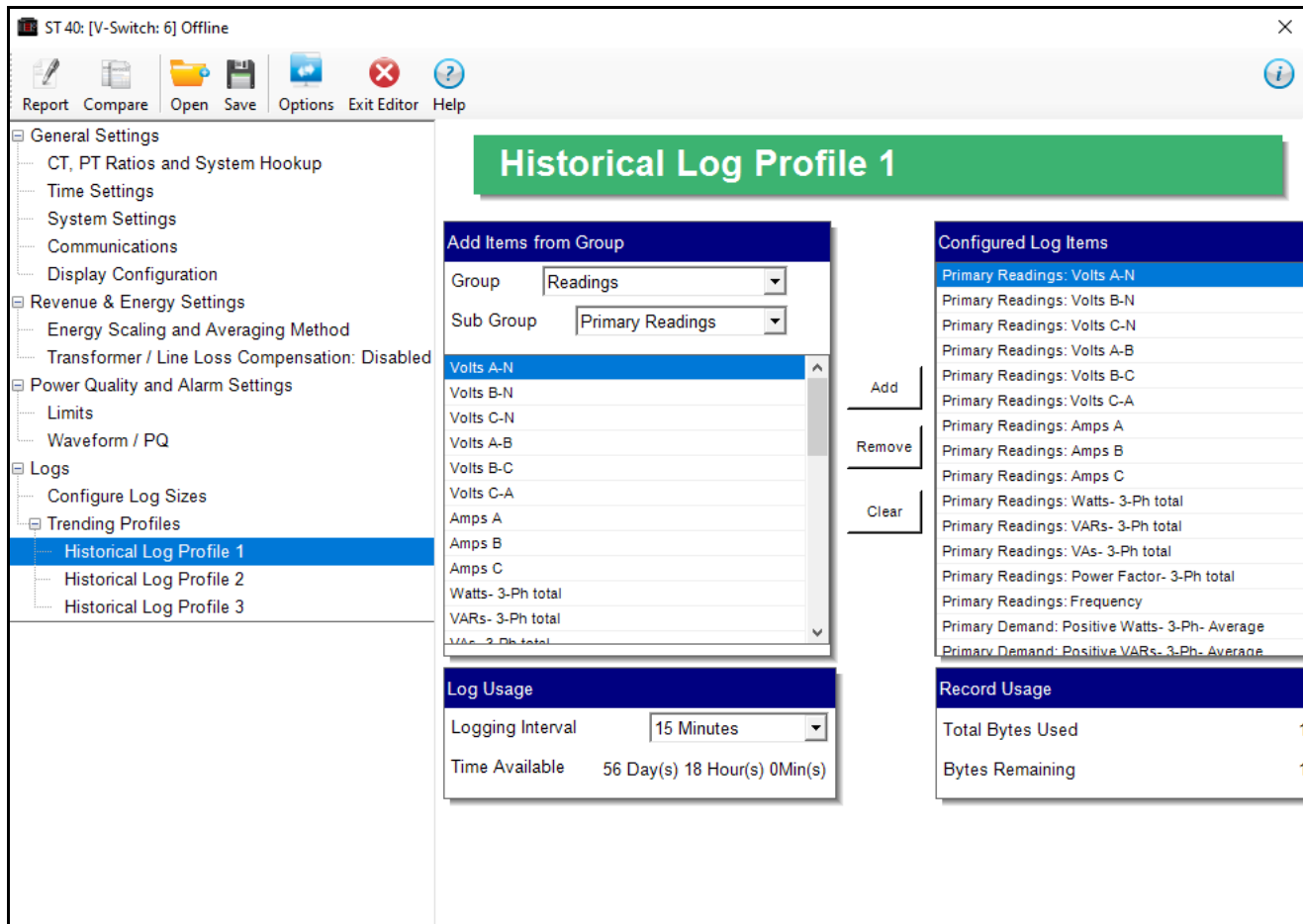
Having three historical logs additionally affords you the flexibility of programming each log with unique parameters. For example, you might program Historical Log 1 to record Power Quality parameters (for example, THD), Log 2 to record Demand parameters, and Log 3 to record Energy parameters.

Historical Log parameters can be selected from six groups:

- Readings (Primary Readings and Uncompensated Readings sub-groups)
- Energy
- Demand
- Phase Angles
- Max/Min (Primary Minimums, Primary Maximums, Short Term Minimums, Short Term Maximums sub-groups)

- Harmonics/THD (For voltage and current)

1. From the Tree Menu, click Logs>Trending Profiles>Historical Log Profile (1-3).



This screen allows you to select items to be stored in the historical log you selected. The Group field determines the items that are available for selection.

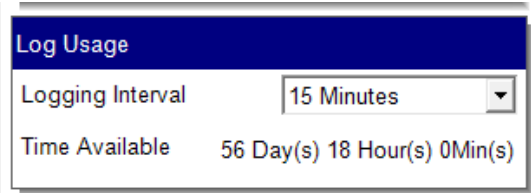
2. Select a Group and sub-group, if applicable.

3. Select items for your log:

- Highlight the item(s) you want in the Selectable Items box.
- Click Add. The item(s) are added to the Selected Items box.
- To remove item(s), highlight them in the Selected Items box and click Remove.



4. In the Log Usage box, set the Logging Interval. The available choices are: 1, 3, 5, 10, 15, 30, 60. The Logging Interval determines when the meter takes a snapshot.



Log Usage	
Logging Interval	15 Minutes
Time Available	56 Day(s) 18 Hour(s) 0Min(s)

**IMPORTANT!** If you are trending Energy in the Interval, the Logging interval must be the same as the Demand interval.

The Time Available shows how long the log will record before rolling over.

**NOTE:** The Record Usage box shows the total bytes used and the remaining bytes for the log.



Record Usage	
Total Bytes Used	108
Bytes Remaining	126

5. To implement any changes, click the Update Device button to send the new profile to the meter.

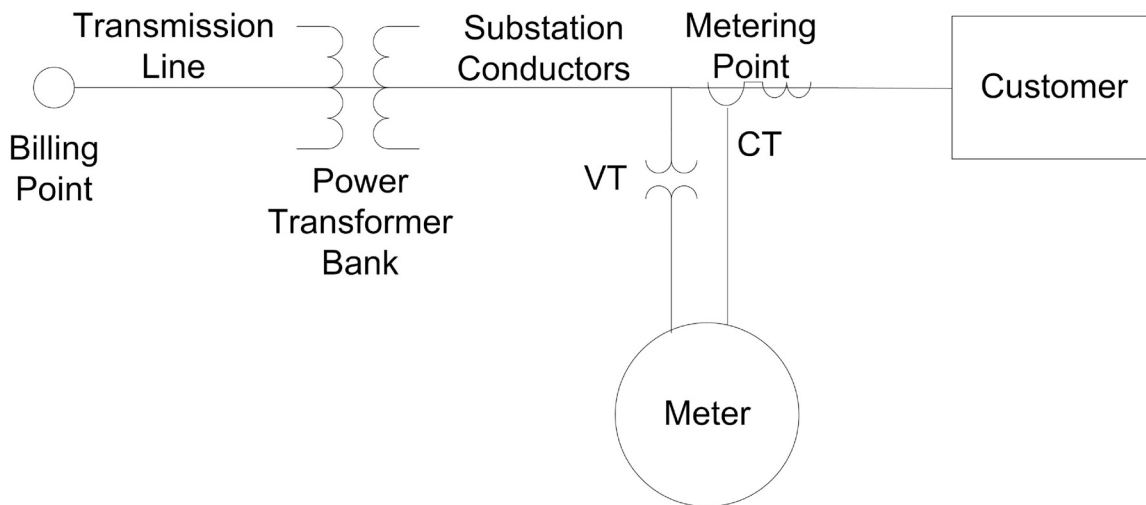
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# A: Transformer/Line Loss Compensation

## A.1: What is System Loss Compensation?

System Loss Compensation is a metering technique that adds or subtracts losses to meter registration. This technique is used because it is often much less expensive and safer to meter the low voltage side of a Power Transformer than the contractual billing point.

System Loss Compensation also provides a method for moving the billing point from a boundary point on a transmission line back to a practical metering point.



System Loss Compensation adjusts for losses between the billing point and the metering point. These losses are lumped into Transmission Line Losses, Power Transformer Losses and Substation Conductor Losses. The EIG Loss Calculator allows for the use of any or all of these elements at a meter installation.

### A.1.1: EIG Loss Calculator Overview

The EIG Loss Calculator is simple to use and can easily be adapted for your requirements. It comprises a complete model that handles loss compensation from meter to distribution line, covering Power Transformer losses, Substation Conductor losses, Transmission Line losses, and optionally, adjustments for Transmission Line Charging effects. It produces a printable document of the installation, with technical description that can be used with both customers and reviewing agencies.

To use the calculator, you plug data into Excel Spreadsheet cells, which have been color-coded for ease of use. In addition, the calculator contains:

- Instructions for its use
- Technical descriptions of calculations performed
- Equations expressed in typical metering abbreviations
- "Mouse over" notes on Key Cells, explaining their function.

The current version of the EIG Loss Calculator contains the following enhancements:

- Substation Conductor losses
- Optional adjustment for Transmission Line Charging effects
- Programmable Meter Nominal Current (see explanation in Section A.2)
- Enhanced color coding of data and page tabs
- Improved instructions and technical descriptions.

## **A.2: Loss Model**

The model used is a typical Loss Model used in Electricity Metering. The primary source for this model is the "Handbook for Electricity Metering". However, if your business uses a different model, the Spreadsheet can be easily modified to use your model.

The elements and assumptions used in the model are described in the following sections.

## **A.3: Loss Triangles and Calculations**

The Loss Triangles are developed from the Simplified Transformer High Side Model. Loss values not supplied by the Manufacturer are calculated by solving the Load and No-Load Loss triangles.

- No-Load Calculations:
  - No-Load Watts (NLW) are given by the manufacturer's data.

- No-Load VA is defined as:

$$NLVA = \%I_x \times kVAR$$

NLVA = No-Load VA

$I_x$  = Exciting Current

NLV = No-Load VARs

NLVC = Compensated No-Load VARs

- Then, No-Load VARs (NLVC) can be calculated as:

$$NLV = \sqrt{NLVA^2 - NLW^2}$$

- Full Load Calculations:
  - Full Load Watts (FLW) are given by the manufacturer's data.
  - Full Load VA is defined as:

$$FLVA = \%Z \times kVAR$$

FLVA = Full Load VA

Z = Impedance

FLV = Full Load VARs

NLVC = Compensated No Load VARs

- Then, No-Load VARs (NLVC) can be calculated as:

$$FLV = \sqrt{FLVA^2 - FLW^2}$$

**NOTE:** All calculations are done on a single element basis averaging the Total number or using the per element number entered in the spreadsheet. It is assumed that Total numbers are the sum of the three (3) actual element values provided by the Transformer Manufacturer.

## A.4: System Losses

### A.4.1: Transmission Line Losses

- Transmission Line Losses are made up of series resistance, series capacitance and shunt capacitance.
- Total Line Length = 3 x Line Length

$$I_p = \frac{kVAR}{3 \times V_{L-N}}$$

Line Current is calculated at rated kVA.

$I_p$  = Primary Current

$$LLW = I_p^2 \times R \times TLL$$

Then,

Line Loss Watts

where R is the resistance in ohms/unit of length

$$LLW = I_p^2 \times X \times TLL$$

Line Loss VARs

where X is effective series inductive reactance in ohms/unit of length

### A.4.2: Substation Conductor Losses

- Substation Losses are calculated at secondary current of the Power Transformer Bank at Rated kVA.
- Total Conductor Length = 3 x Conductor Length

$$I_r = \frac{kVAR}{3 \times \frac{V}{L-N}}$$

Rated secondary current

$$CLW = I_r^2 \times R \times TLL$$

Conductor Loss Watts

where R is the Resistance in ohms/unit of length

$$CLV = I_r^2 \times X \times TLL$$

Conductor Loss VARs

where X is effective series inductive reactance in ohms/unit of length

= Apparent Power or Power in Circuit

$$I_r^2 \quad (\text{voltage} \times \text{current})$$

**A.4.3: Total System Losses**

- Transformer, Transmission Line and Substation Conductor Losses are combined to compute Total System Losses. The EIG Loss Calculator does not require that all pieces of the model be used to calculate System Losses.
- Losses are then shifted to the Primary of the Instrument Transformers using the Compensation Calculation Assumptions:

LWFE = Core Loss Watts	LVFe = Core Loss VARs
LWCu = Copper Loss Watts	LVCu= Copper Loss VARs

**A.4.4: Meter Loss Coefficients**

- Losses are scaled by the meter rating to compute Meter Loss Coefficients.

$$VAm = 3 \times Vm \times TA \times CTR \times VTR$$

Meter VA Rating where:  
TA= Test Amps  
CTR= CT Ratio  
VTR= VT (PT) Ratio  
VAm = VA (apparent power) in meter circuit

LWFE= LWFE/VAm	No-Load Loss Watts
LVFE= LVFE/VAm	No-Load Loss VARs
LWCu= LWCu/VAm	Full Load Loss Watts
LVCu=LVCu/VAm	Full Load Loss VARs



### A.4.5: Dynamic Compensation Calculations

- The EIG meter dynamically computes system losses instantaneously using the Meter Loss Coefficients and the assumed voltage and current relationships for Watts and VARs.

- No-Load Loss Watts are proportional to V Squared.
- Load Loss Watts are proportional to I Squared.
- No-Load Loss VARs are proportional to V to the 4th power.
- Load Loss VARs are proportional to I Squared.

Demand, Energy, TOU and Load Profile values are compensated instantaneously.

### A.4.6: Transmission Line Charging Current

- Capacitive effects are not part of the basic EEI/IMO transmission line loss model but can be significant when large energy transfers occur.
- Capacitive Reactance per unit of length is the only additional input required. The unit of measure is megohm-miles or megohm-kilometers.

So,

$$X_c = \frac{X_c \text{ per unit}}{\text{LineLength}} \times 10^6$$

in ohms

then, calculate charging current

$$I_c = \frac{\text{PrimaryVoltage}}{X_c}$$

in amps

so,

$$Capacitive Losses = \frac{3 \times V_{primary} \times I_c}{1000}$$

The 3 is included because 3 lines are assumed.

**NOTE:** the sign of Capacitive Losses is negative.

Since both the Inductive and Capacitive Losses are quadrature components they can be added as scalars.

Then,

$$Total \text{ kvars Losses} = Reactive \text{ Losses} + Capacitive \text{ Losses}$$

**NOTE:** Adding the Capacitive Losses always reduces total kvar losses because of the negative sign on the capacitive losses.

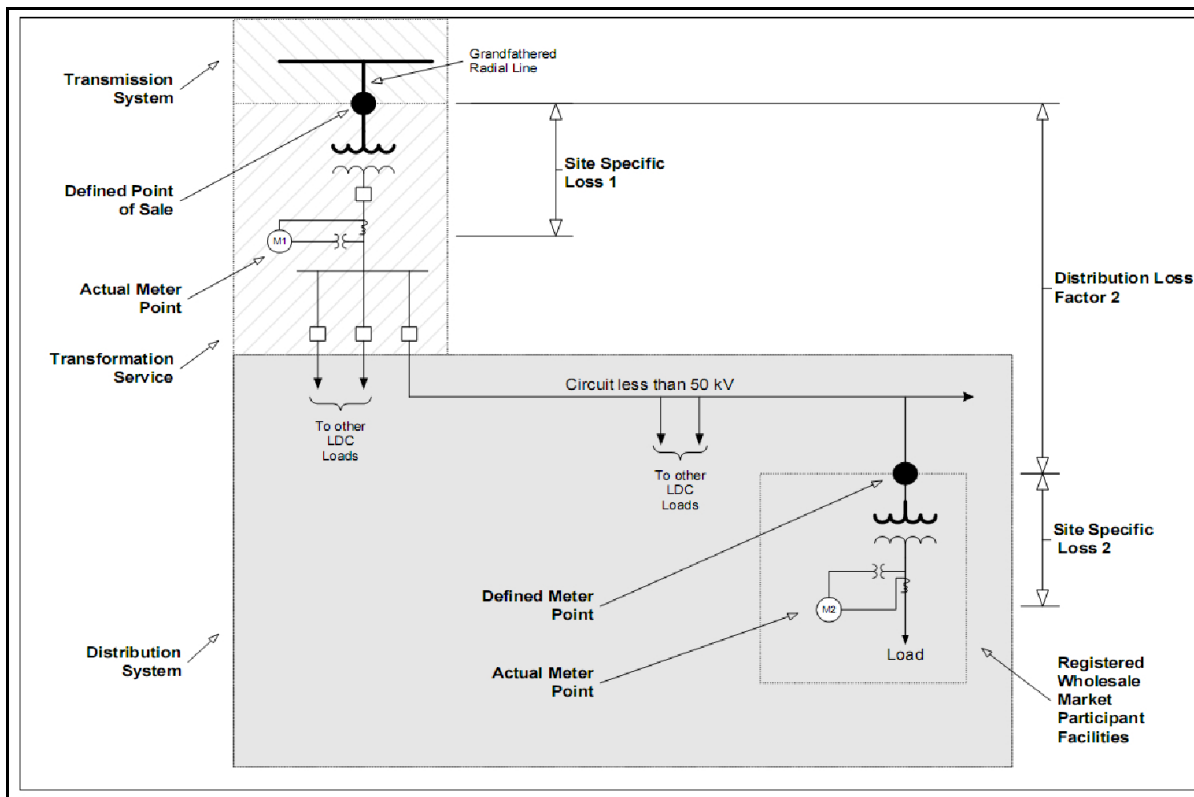
- The EIG Loss Calculator makes these adjustments for Line Charging on the Line Loss Page of the Excel Spreadsheet. This adjustment is optional and not typically used in most metering applications. However, Transmission Engineers do use these adjustment on Medium Length Lines (10 to 50 miles), when the meter is upstream of net energy flow.

### A.5: EIG Meter Loss Compensation Setting

All real and reactive energy measurements in EIG meters, unless otherwise labeled, are compensated for losses once Loss Compensation is enabled in the Device Profile. See sections 11.2.6 (Nexus® 1500/1500+ meter), 12.2.6 (Nexus® 1262/1272 meter), 13.2.6 (Nexus® 1252 meter), 27.2.4:Transformer / Line Loss Compensation, on page 27-34 (for Nexus® 1450 meter), 8.2.2: Transformer/Line Loss Compensation, on page 8-21 (for Shark® 200/200S meter), 28.2.5: Transformer/Line Loss Compensation, on page 28-51 (for Shark® 250 meter), and 26.2.4: Transformer/Line Loss Compensation, on page 26-56 (for Shark® 270 meter), for TLC setting instructions.

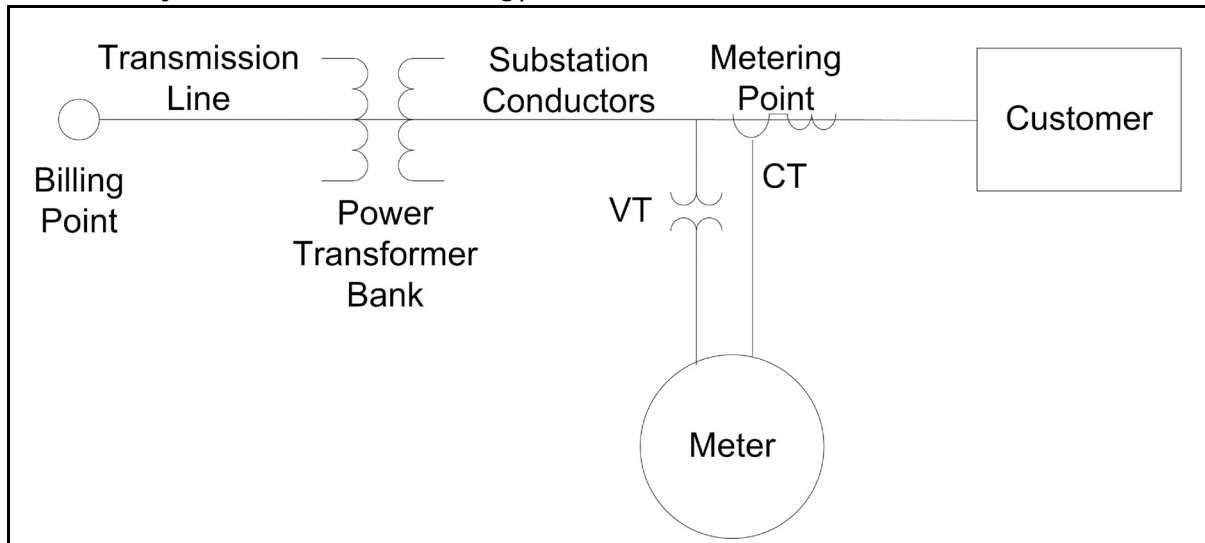
### A.5.1: Common Compensation Examples

**NOTE:** For Revenue Metering, how compensation is handled is usually dictated by the Metering Tariff and that should be your primary guide. These examples may or may not agree with your company's practice and the applicable Tariff at a metering point. They are simply intended to present examples of how Loss Compensation can be used. Refer to the IMO Loss Diagram, below.



### A.5.1.1: Application Example #1: Substation Instrumentation or SCADA Metering

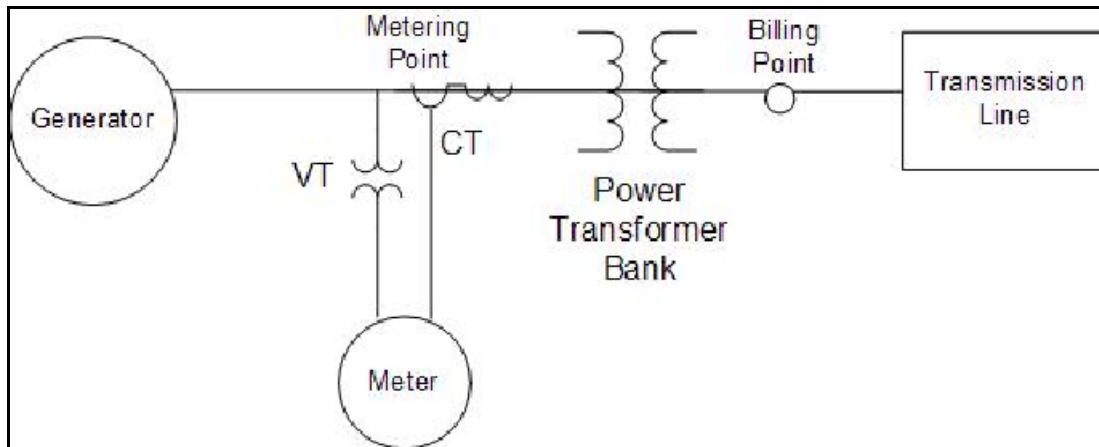
- Objective: Monitor Net Energy and VAr flow.



- In this application, the meter will not see the real (Watts) and reactive energy (VAr) delivered by the Electrical Distribution System used to charge and energize the Power Transformer that it would have seen if it was placed at the metering point so these losses must be added to the meter readings.
- Assumptions:
  1. We want to compensate the meter reading to add both No Load (Fe) and Full Load (Cu) losses from the Power Transformer. From the Transformer and Line Loss Compensation screen's first pull-down menu, select: Both Fe and Cu.
  2. We also want to add both estimated Watts and VAr to the meter readings. From the Transformer and Line Loss Compensation screen's second pull-down menu, select: Add to Watts and VAr.
  3. With the meter on the low voltage side of the Power Transformer only Delivered Energy needs to be compensated for losses, Received energy is properly metered because the Power Transformer is energized from the Primary side. From the Transformer and Line Loss Compensation screen's third pull-down menu, select: +Watts.

### A.5.1.2: Application Example #2: Generation Instrumentation or SCADA Metering

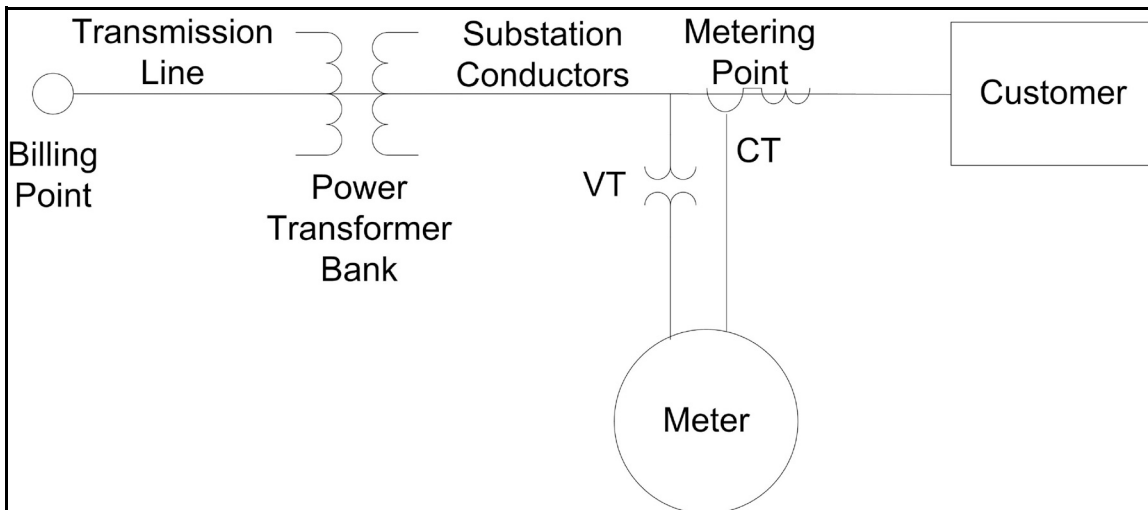
- Objective: Monitor Net Energy and VAr flow.



- In this application, the meter will see the real (Watts) and reactive energy (VARs) delivered by the Generator that is used to charge and energize the Power Transformer. However, the billing point is on the Load side of the Power Transformer and the losses should not be added to the meter readings. So to compensate the meter, we must subtract the metered losses.
- Assumptions:
  1. We want to compensate the meter reading by subtracting both No Load (Fe) and Full Load (Cu) losses from the Power Transformer. From the Transformer and Line Loss Compensation screen's first pull-down menu, select: Both Fe and Cu.
  2. We also want to subtract both estimated Loss Watts and Loss VARs from the meter readings. From the Transformer and Line Loss Compensation screen's second pull-down menu, select: Subtract from Watts and VARs.
  3. With the meter on the Generator side of the Power Transformer only Energy flowing to the Transmission Line needs to be compensated for losses because the Power Transformer is energized from the Generator Side. From the Transformer and Line Loss Compensation screen's third pull-down menu, select: +Watts.

### A.5.1.3: Application Example #3: Revenue Metering at Industrial or Commercial Customer

- Objective: Meter per Tariff for this customer class or per contract.



**NOTE:** The following comments are typical but may not be in agreement with the Tariff or Contract to be applied or your company practice.

- The meter has been placed on the secondary side of the Power Transformer but the customer is buying energy on the Primary Side of the Power Transformer, therefore, transformer losses are part of the customer's load and should be added to the meter reading. No credit is given to the customer for Watts or VArS the customer supplies to the Utility System.
- In this application, the meter will not see the real (Watts) and reactive energy (VArS) delivered by the Electrical Distribution System used to charge and energize the Power Transformer that it would have seen if it was placed at the metering point so these losses must be added to the meter readings.
- Assumptions:
  1. We want to compensate the meter reading to add both No Load (Fe) and Full Load (Cu) losses from the Power Transformer. From the Transformer and Line Loss Compensation screen's first pull-down menu, select: Both Fe and Cu.
  2. We also want to add both estimated Watts and VArS to the meter readings. From the Transformer and Line Loss Compensation screen's second pull-down menu, select: Add to Watts and VAr.

3. At the metering point we want to know only Delivered energy flow and ignore any real or reactive energy supplied by the customer to the Electrical System. From the Transformer and Line Loss Compensation screen's third pull-down menu, select: +Watts Only.

- In this example we also need to consider the meter's displayed quantities. The EIG meter is a true Four Quadrant Meter but Tariff Requirements in this case ignore Watts and VARs that the customer sends to Distribution System.

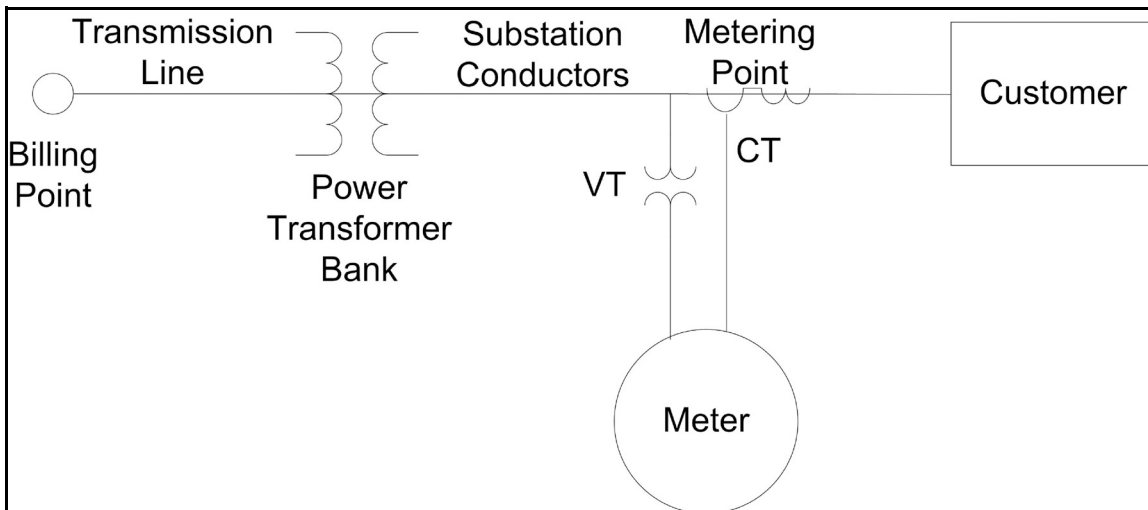
**NOTE:** See A.5.2: Four Quadrant Power Flow Conventions, on page A-16, for a graphic display of the terms used.

- For more information on display options see the User Manual for the EIG meter model you are using, but all Shark® and Nexus® meters can display and log Four Quadrant Metering Quantities.
- In this example the quantities used for Revenue Metering would be:
  1. Q1 – Delivered Watts
  2. Q1 – Lagging VARs

All of the other quantities are still available in the meter but only these will typically be used for billing purposes and displayed for the customer.

#### A.5.1.4: Application Example #4: Revenue Metering at Industrial Cogeneration

- Objectives:
  - Measure Delivered and Received Watts and all VArS supplied to the customer; no credit is given to the customer for VArS the customer supplies to the Utility System.
  - Meter per Tariff for this customer class or per contract.



**NOTE:** The following comments are typical but may not be in agreement with the Tariff or Contract to be applied or your company practice.

- The meter has been placed on the secondary side of the Power Transformer but the customer is buying energy on the Primary Side of the Power Transformer, therefore, transformer losses are part of the customer's load and should be added to the meter reading. No credit is given to the customer for VArS the customer supplies to the Utility System, but Watts supplied by the customer are used to offset the energy the customer buys.
- In this application, the meter will not see the real (Watts) and reactive energy (VArS) delivered by the Electrical Distribution System used to charge and energize the Power Transformer that it would have seen if it was placed at the metering point, so these losses must be added to the meter readings.



**NOTE:** Losses are typically subtracted instead of added when the meter is placed on the Supply side of the Power Transformer instead of the more typical Load side installation.

- Assumptions:
  1. We want to compensate the meter reading to add both No Load (Fe) and Full Load (Cu) losses from the Power Transformer. From the Transformer and Line Loss Compensation screen's first pull-down menu, select: Both Fe and Cu.
  2. We also want to add both estimated Watts and VARs to the meters readings. From the Transformer and Line Loss Compensation screen's second pull-down menu, select: Add to Watts and VAR.
  3. At the metering point we want to know only Delivered energy flow and ignore any real or reactive energy supplied by the customer to the Electrical System. From the Transformer and Line Loss Compensation screen's third pull-down menu, select: Both +Watts and - Watts.
- To obtain the Tariff Quantities we need to look at 4 Quadrant Data. The following metered values would typically be used:
  1.  $Q1 + Q4$  - Delivered Watts/Watthours – this is energy delivered to the load.
  2.  $Q2 + Q3$  - Received Watts/Watthours – this is energy received from the load.
  3.  $Q1 + Q2$  - Lagging VARs – these are typically referred to as Supplied or Delivered VARs
- An alternative would be to measure QHours if that is part of the Tariff.

**NOTE:** QHours are not typically used with Electronic Meters.

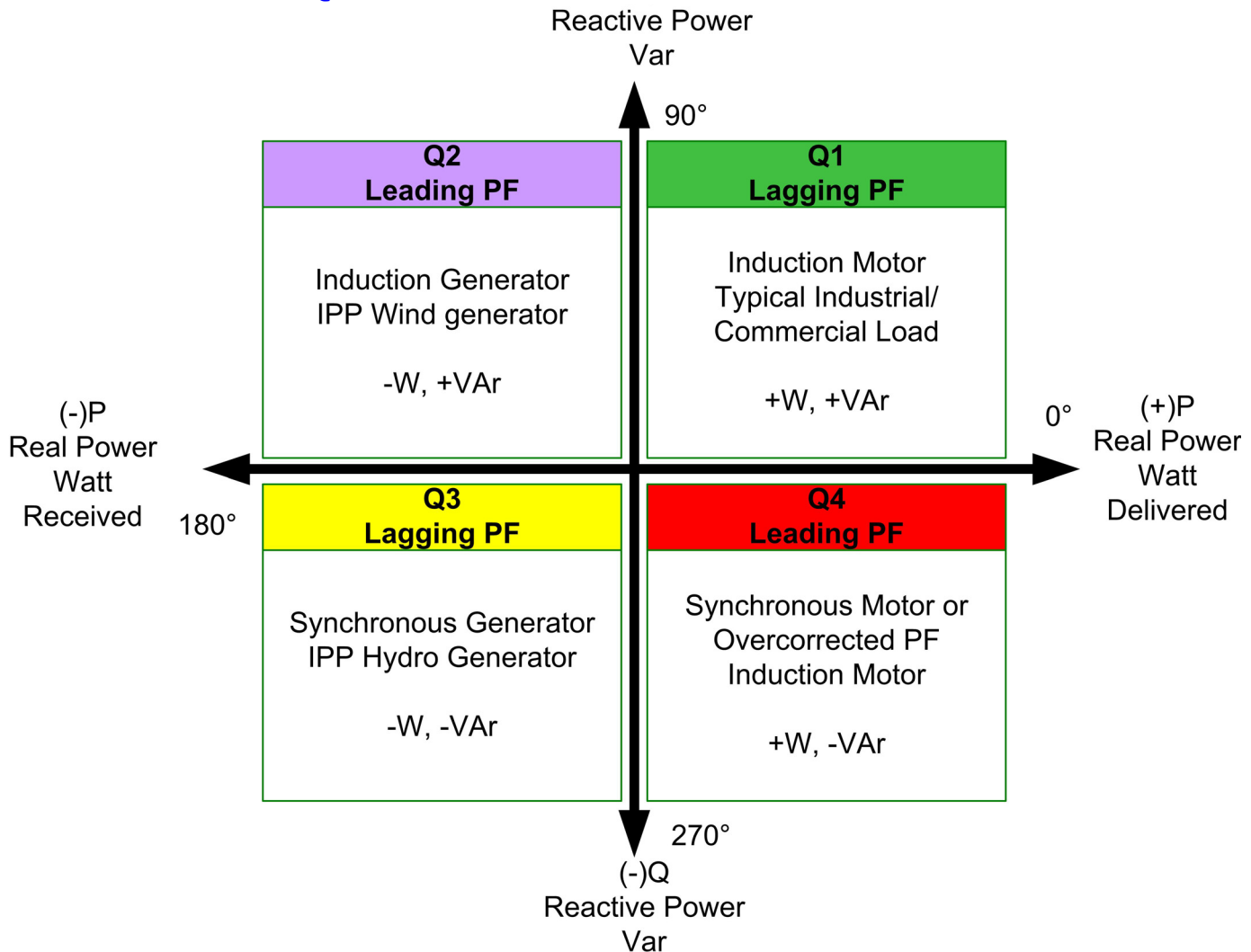
**NOTE:** Typically, VARs would not be used for billing except if a Power Factor Penalty condition exists. To determine if PF is outside of Tariff Requirements, we would typically set the Power Factor Limit as a Device Profile Limit in the Communicator PQA™ software and Log Power Factor. This would provide documentation of when and how badly the Metered Load dropped below the required minimum Power Factor.

### A.5.1.5: Loss Calculation References

For more information, consult the following documents:

- MDP\_STD\_005 - IMO Site Specific Loss Adjustments
- EEI Handbook for Electricity Metering
- MDP\_PRO\_0011 IMO Market Manual 3: Metering, Part 3.5 Site Specific Loss Adjustments

### A.5.2: Four Quadrant Power Flow Conventions



**NOTE:** The Terms "Export/Import" and "Delivered/Received" are equivalent and use the Utility Power Grid as their reference. So, "Delivered or Export" refers to Energy Flow from the Power Grid to the Load.

The Delivered and Received conventions shown are the default setting for EIG meters. However, these setting can be changed in the meter's Device Profile Labels screen. For instructions, refer to the chapter that explains how to program the Device Profile settings for your meter model: 8 (Shark® 200/200S meter) 11 (Nexus® 1500/1500+ meter), 12 (Nexus® 1262/1272 meter), 13 (Nexus® 1252 meter), 26 (Shark® 270 meter), 27 (Nexus® 1450 meter), or 28 (Shark® 250 meter).

## **A.6: EIG Loss Compensation Calculator Instructions and Examples**

Click the TLC Calculator button on the Transformer and Line Loss Compensation screen (see A.5: EIG Meter Loss Compensation Setting, on page A-8). The following pages contain Loss Compensation Calculator instructions and several copies of the Loss Calculator screens with example numbers to assist you.

### A.6.1: EIG Loss Compensation Calculator Instructions

For 3 stator meters with 3 PTs and 3 CTs.

- This model has been tested by Electro Industries/GaugeTech and has been demonstrated to provide answers consistent with the Loss Model presented in the EEI Handbook for Electricity Metering, 10th Edition. **However, Electro Industries/GaugeTech assumes no liability associated with its use.**
- Information in red text is for advanced users who need to modify the model to meet their business requirements.
- Start
  1. Begin data entry on Transformer Loss Calculation Sheet (Xmfr Loss).  
**NOTE:** Make sure that unwanted data is not left in the spreadsheet from a previous use.
  2. Data is entered in Yellow cells only: do not change data in other cells. You can use the examples later on in this chapter to verify proper operation of the model.

- Transformer Loss Calculation
3. Enter Transformer Manufacturer Supplied or Measured Data for Transformer Bank. Typical values that are often used are shown in the table below.

Value	Comment
No Load Loss Watts	Core or Iron Losses
Load Loss Watts	Copper or I squared r Losses
Exciting Current	
Impedance	
Transformer kVA Rating	Rating of whole bank in kVA
Rated Primary L_L Volts	Primary Line to Line Voltage Rating
V Secondary Side of Xmfr Line-Line	Secondary Line-Line Voltage

- The model assumes there are three power transformers.
  - Transformer data may be entered as Total or per element values.
  - Total values are the sum of the values for all three transformers.
  - Calculations are made on a per element basis using either Total values divided by 3 or per elect values.
4. Enter configuration of transformer secondary - Wye or Delta.
5. Enter Instrument Transformer Information

#### Example Data

Instrument Transformers	Primary	Secondary
Voltage Xmfr	7200	120
Current Xmfr	500	5

Enter primary and secondary values for voltage and current ITs. The model calculates CTR, VTR, and TF. The Model assumes 3 CTs and 3 VTs (PTs) are used.

6. The meter rating should not be changed unless you are using a special version of the meter and the Instruction Book instructs you to change these values.
7. Select Nominal Metered Current (the red box). The EEI/IMO Model uses TA for Nominal Current. You can find the TA on the meter nameplate; the TA for Nexus® meters is 2.5A. 2.5 is the value most typically entered into this box on the spreadsheet. However, many Electric Companies use 1/2 of Class Current (10A) or Class Current for Nominal Current. This is a carryover from Rates written before Class 20 meters became the standard class for Transformer Rated Meter, and has been carried forward as part of the Rate Structure. The selection of Nominal Metered Current is very important because all losses will be scaled against this nominal value. Leave 2.5 as the Nominal Current unless your company practice differs. If you are not using Transmission Line or Substation Conductor Losses, the values shown in Red on the Total Losses Sheet should be entered into the CommunicatorPQA® software when programming the EIG meter.

**NOTE:** If you see values for Transmission Line or Substation Conductor Losses, go to those sheets and clear data from yellow cells.

- If you are using Transmission Line or Substation Conductor Losses, continue with the instructions.

Transmission Line Losses:

8. Entry of transmission Line Data is optional. If the data entries are left at zero then no addition losses are added to the Total Losses. This is easily verified by checking the loss summary on the System Losses Sheet. The Total System Losses will show zero contribution from Line and Substation Losses.
9. Enter per unit ohmic values, resistance per unit and conductive reactance per unit.

10. Enter the length of a single conductor. The model assumes 3 conductors and calculates Total Conductor Length.
11. Enter the per unit label. Typically Miles (Mile) or Kilometers (KM). This value does not affect the model calculations but is carried for clarity.
12. Line Losses will now be reflected in Total System Losses. If you are not using Substation Conductor Losses, the values now shown in Red on the Total Losses Sheet should be entered into the CommunicatorPQA® software when programming the EIG meter.

**NOTE:** If you see values for Substation Conductor Losses go to that sheet; clear data from yellow cells.

- If you are using Substation Conductor Losses, continue with instructions.

Substation Conductor Losses:

13. Entry of Substation Conductor Data is optional. If the data entries are left at zero, then no additional losses are added to the Total Losses. This is easily verified by checking the loss summary on the System Losses Sheet. The Total System Losses will show zero contribution from Substation Losses.
14. Enter per unit ohmic values, resistance per unit and conductive reactance per unit.
15. Enter the length of a single conductor. The model assumes 3 conductors and calculates Total Conductor Length.
16. Enter the per unit label. Typically Feet (FT) or Meters (M). This value does not affect the model calculations but is carried for clarity.
17. Substation Conductor Losses will now be reflected in Total System Losses. The values now shown in Red on the Total Losses Sheet should be entered into the CommunicatorPQA® software when programming the EIG meter.

### A.6.2: Example 1 Data

#### System Losses (Transformer, Line and Substation Conductor Losses)

- This example will use all elements of the Loss Calculator, compensation for Transmission Line Losses, Substation Conductor Losses, and Power Transformer Losses. Examples 2 and 3 are less complex Transformer Loss Compensation examples with Wye and Delta circuits. This example will present an application and a filled Spreadsheet. Examples 2 and 3 will present the application.

**NOTE:** The TLC Calculator has pop-up instructions for all of the entry fields to help you fill out the spreadsheet.

- Application Description
  - Installation Description: The installation includes a 36-mile transmission line, a 10 MVA transformer bank and 156 feet of substation conductor.
- Transformer Data Supplied by Manufacturer

kVA rating of transformer bank	10MVA
Rated primary voltage	115kV
Secondary line-to-line voltage	12,470 V
Secondary line-to-neutral voltage	7200 V
No-load watts loss	45 kW
Copper losses at 75°C	135 kW
Percent impedance	7.5
Percent exciting current	1.03
Secondary Connection	Wye

**NOTE:** If the transformer bank is composed of three single-phase transformers, each transformer's VA, Watt and VAR losses are added to obtain total losses.



- Transmission Line Data

Resistance per mile	0.306 ohms per mile
Inductive reactance per mile	0.451 ohms per mile
Line length	36 miles

**NOTE:** The spreadsheet will compute Total Line Length assuming three conductors, Total Line Length = 3 x Line Length.

- Substation Conductor Data

Resistance per 1000 feet	0.005 ohms per 1000 feet
Inductive reactance per 1000 feet	0.090 ohms per 1000 feet
Conductor length	156 feet

**NOTE:** The spreadsheet will compute Total Conductor Length assuming three conductors, Total Conductor Length = 3 x Conductor Length.

- Metering Data:

The model assumes a three-phase, 4-wire meter installation with 3 Voltage Transformers and 3 Current Transformers. This is not a limitation because all EIG Transformer Rated Meters are 3 stator, 4-wire meters. The model should not be used with other meter types.

Voltage Transformer Ratio, VTR	$7200/120 = 60/1$
Current Transformer Ratio, CTR	$500/5 = 100/1$
Meter Voltage Rating, $V_m$	120V
Meter Test Amps, $TA, I_{nom}$	2.5A

### A.6.2.1: Example 1 Spreadsheet - System Losses Summary for Example 1 with Example Numbers

*Electro Industries / GaugeTech*

1800 Shames Drive, Westbury, NY 11590

(877) EIMETER (877.346.3837)

#### System Losses Summary

*EIG Loss Compensation Calculator*

**Meter Correction Factors from this sheet are manually entered into EIG Communicator Software**

**Note: Begin Data Entry by Going to Xfmr Loss Sheet**

Company:	Example 1	Project	
Name:		Location	
Date:			

Comments:

Example of Loss Calculator with Transformer, Substation, and Line Losses

Meter Correction Factors for Communicator Software		Loss Factors	
		Calc	Used
% No-Load Loss Watts	%LWFE	0.83344	0.833
% Full-Load Loss Watts	%LWCU	1.17956	1.180
% No-Load Loss VARs	%LVFE	1.71616	1.716
% Full-Load Loss VARs	%LVCU	4.66247	4.662

**Wye**

These values  
are used by  
Communicator  
Software

Losses Shifted to IT Primary		per element	Total	Unit
LWFE	Core-Loss Watts	15.00	45.0100	kW
LWCU	Watts Loss due to Cu	21.23	63.70	kW
LVFE	Core-Loss VARs	30.89	92.67	kVAr
LVCU	VA Rated Loss due to Cu	83.92	251.76	kVAr
VA <sub>nom</sub>	Nominal Meter VA Rating		5,400.00	kVA

Total System Losses					
total losses <i>Note: If no data entered in Line or Substation Loss sheets contribution to total is zero</i>					
Type	Source		kWatts Loss		kVAr Losses
No-Load Losses	Transformer Core	NLW	135.00	NLV	277.95
Load Losses	Transformer Windings	FLW	405.00	FLV	2,207.25
	Transmission Line	LLW	27.77	LLV	40.92
	Substation Conductors	CLW	0.51	CLV	9.03
	Total Load Losses	TLW	433.28	TLV	2,257.20

per element losses

Type	Source		kWatts Loss		kVAr Losses
No-Load Losses	Transformer Core	NLW	45.00	NLV	92.65
Load Losses	Transformer Windings	FLW	135.00	FLV	735.75
	Transmission Line	LLW	27.77	LLV	40.92
	Substation Conductors	CLW	0.17	CLV	3.01
	Total Load Losses	TLW	162.94	TLV	779.68

Comments:


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**Legend**

Information Only	
Required Data	
Calculated Value	
Data from other Sheet	
Enter this Data	
Comments	

### A.6.2.2: Example 1 Spreadsheet - Xmfr Loss for Example 1 with Example Numbers

#### Electro Industries / GaugeTech

1800 Shames Drive, Westbury, NY 11590

(877) EIMETER [877-346-3837]

#### Transformer Losses

#### EIG Loss Compensation Calculator

Company:	Example 1		Substation:	
Name:			Xmfr Bank No.:	
Date:			Xmfr S/N:	
Xmfr Manf:			Company Number	
Winding				
HV - High				
XV - Low				
YV - Tert.				
Comments:				

Transformer Losses		Losses		Unit
		per Element	Total	
No Load VA	NLVA	34.3333	102.9999	kVA
No Load Watts	NLW	15.0000	45.0000	kW
No-Load Loss VARs	NLV	30.8833	92.6498	kVAr
Full Load VA	FLVA	250.0000	750.0000	kVA
Full-Load Loss Watts	FLW	45.0000	135.0000	kW
Full-Load Loss VARs	FLV	245.9167	737.7500	kVAr

3 Phase Power Transformer Data		Losses			
Value		Total	Per element	Calculated	kVA
No Load Loss Watts	LWFe	45,000.00		15,000.00	15.00
Full Load Loss Watts	LWCu	135,000.00		45,000.00	45.00
% Exciting Current	%Ix	1.03			
% Impedance	%Z	7.5			
Transformer kVA Rating	kVA Rated	10,000.00		3,333.33	
Rated Primary L-L Volts	Vp	115,000			

Power Transformer - 3 Transformer bank		
Secondary Side Voltage [V]	Vs	12470
Secondary Side Rated Current [A]	I Rated	267.31
Feed - Load Connection		Wye

Meter Setup/ Installation Data		Three Element Meter with 3 PTs and 3 CTs		
Instrument Transformers	Primary	Secondary	Ratio	
Voltage Transformer	7200	120	60	
Current Transformer	500	5	100	
Transformers Factor	TF	6000		
Nominal Voltage	VM	120		
Nominal Current	Inom	5		
Meter Test Amps	TA	5		
Meter Class	CL	20		
Meter Form	Fm	x		

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### A.6.2.3: Example 1 Spreadsheet - Line Loss for Example 1 with Example Numbers

#### Electro Industries / GaugeTech

1800 Shames Drive, Westbury, NY 11590

(877) EIMETER [877-346-3837]

#### Line Losses

EIG Loss Compensation Calculator

Three Element Meter with 3 PT's and 3 CT's

Note: Leave Data Entry Cells Blank if not including Line Losses

Company:	Example 1	Substation:	
Name:		Stn Trf Bank No.:	
Date:			

Metering Point Information	

Line Losses		Losses		
Value		per phase	Total	Unit
Total Line Length			108.0000	Mile
Line Current	Ip		28.9855	Amp
Line Loss Watts	LLW	27.7656	83.2968	kW
Line Loss VArS	LLV	13.6408	40.9225	kVA

Transmission Line Impedance Data				
Value		per Unit	Total	Unit
Resistance	R/unit	0.360000	33.0480	Ohms
Inductive Reactance	XL/unit	0.415000	48.7080	Ohms
Length of Line	LL - Units	36.0000		
Length Unit	U	Mile		
Resistive Losses			27.7656	kW
Inductive Losses			40.9225	kars

Note: Please make sure data entered uses a consistent unit of length

Adjustment for Line Charging Current				
Value		per Unit	Total	Unit
Capacitive Reactance	XC-unit	0.0000	0.0000	Ohms
Charging Current per line	Amps		0.0000	Amps
Capacitive Losses	kvar		0.0000	kvars

Line Losses reflected to Secondary of PT		Losses		
Value		per phase	Total	Unit
Nominal Pri kVA Rating	VA mom-pri		54.2174	kVA
Nominal Sec kVA Rating	VA mom-sec		54.2174	kVA
Line Loss Watts	LLW	32.6654	97.9962	kW
Line Loss VArS	LLV	13.6408	40.9225	kVA

Transformer Data from Xmfr Loss Sheet				
Value		per phase	Total	Unit
Transformer kVA Rating	kvars	3333.3333	10,000.00	kvars
Rated Primary L_L Volts	Vp	115,000.00		Volts

Note: This Data must be entered on Transformer Loss Sheet before completing Line Loss Calculation

Notes:

#### Legend

Information Only	
Required Data	
Calculated Value	
Data from other Sheet	
Enter this Data	
Comments	

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spreadsheet is designed only to be used with EIG named or

### A.6.2.4: Example 1 Spreadsheet - Substation Losses for Example 1 with Example Numbers

#### Electro Industries / GaugeTech

1800 Shames Drive, Westbury, NY 11590

(877) EIMETER [877-346-3837]

#### Substation Losses

EIG Loss Compensation Calculator

Three Element Meter with 3 PT's and 3 CT's

Note: Leave Data Entry Cells Blank if not including Line Losses

Company:	Example 1	Substation:	
Name:		Stn Trf Bank No.:	
Date:			

Substation Information	

Line Losses		Losses		
		Total	per Element	Unit
Total Conductor Length		156.00		FT
Secondary Current @ Rating	Ir	462.991		Amp
Conductor Loss Watts	CLW	0.167	0.056	kW
Conductor Loss VArS	CLV	3.010	1.003	kVA

Transmission Line Impedance Data		
Value		per Unit
Resistance		0.000005
Inductive Reactance	x	0.000090
Length of Conductor	CL	52.00
Length Unit	U	FT

Legend	
Information Only	
Required Data	
Calculated Value	
Data from other Sheet	
Enter this Data	
Comments	

Note: This Data must be entered on Transformer Loss Sheet before completing Substation Loss Calculation

Transformer Data from Xmfr Loss Sheet			
Value			
Transformer kVA Rating	kVAr	10,000	3333.3333
Rated Secondary L_N Volts	Vr	7,200	

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### A.6.3: Example 2 - Transformer Losses Data - Delta Connected

- Application Description
- Installation Description: The installation includes three 115 kV, 3.333 MVA single phase power transformers with a Delta connected secondary.
- Transformer Data Supplied by Manufacturer

kVA rating of transformer bank	9999kVA
Rated primary voltage	115kV
Secondary line-to-line voltage	2520V
No-load watts loss	28680W
Copper losses at 75°C	56027W
Percent impedance	8.1
Percent exciting current	0.183
Secondary Connection	Delta

**NOTE:** If the transformer bank is composed of three single-phase transformers, each transformer's VA, watt, and VAR losses are added to obtain total losses.

- Metering Data:

The model assumes a three-phase, 4-wire meter installation with 3 Voltage Transformers and 3 Current Transformers. This is not a limitation because all EIG Transformer Rated Meters are 3 stator, 4-wire meters. The model should not be used with other meter types.

Voltage Transformer Ratio, CTR	$3000/5 = 600/1$
Current Transformer Ratio, VTR	$2400/120 = 20/1$
Meter Voltage Rating, $V_m$	120V
Meter Test Amps, $TA, I_{nom}$	2.5A

### A.6.3.1: Example 2 Spreadsheet - System Losses Summary for Example 2 with Example Numbers

*Electro Industries / GaugeTech*

1800 Shames Drive, Westbury, NY 11590

(877) EIMETER (877.346.3837)

#### System Losses Summary

*EIG Loss Compensation Calculator*

**Meter Correction Factors from this sheet are manually entered into EIG Communicator Software**

**Note: Begin Data Entry by Going to Xfmr Loss Sheet**

Company:	Example 2	Project	
Name:		Location	
Date:			

Comments:

Example of Loss Calculation with Transformer Losses only

Meter Correction Factors		Loss Factors	
for Communicator Software		Calc	Used
% No-Load Loss Watts	%LWFE	0.24087	0.241
% Full-Load Loss Watts	%LWCU	0.22242	0.222
% No-Load Loss VARs	%LVFE	0.72173	0.722
% Full-Load Loss VARs	%LVCU	3.20751	3.208

Enter These  
Values in  
Communicator  
Software

Losses Shifted to IT Primary		per element	Total	Unit
LWFE	Core-Loss Watts	8.67	26.0100	kW
LWCU	Watts Loss due to Cu	8.01	24.02	kW
LVFE	Core-Loss VARs	25.98	77.95	kVAr
LVCU	VA Rated Loss due to Cu	115.47	346.41	kVAr
VA <sub>nom</sub>	Nominal Meter VA Rating		10,800.00	kVA

Total System Losses					
total losses <i>Note: If no data entered in Line or Substation Loss sheets contribution to total is zero</i>					
Type	Source		kWatts Loss		kVAr Losses
No-Load Losses	Transformer Core	NLW	28.68	NLV	94.74
Load Losses	Transformer Windings	FLW	56.03	FLV	807.98
	Transmission Line	LLW	0.00	LLV	0.00
	Substation Conductors	CLW	0.00	CLV	0.00
	Total Load Losses	TLW	56.03	TLV	807.98

per element losses					
Type	Source		kWatts Loss		kVAr Losses
No-Load Losses	Transformer Core	NLW	9.56	NLV	31.58
Load Losses	Transformer Windings	FLW	18.68	FLV	269.33
	Transmission Line	LLW	0.00	LLV	0.00
	Substation Conductors	CLW	0.00	CLV	0.00
	Total Load Losses	TLW	18.68	TLV	269.33

Comments:


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#### Legend

Information Only	
Required Data	
Calculated Value	
Data from other Sheet	
Enter this Data	
Comments	

### A.6.3.2: Example 2 Spreadsheet - Xmfr Loss for Example 2 with Example Numbers

#### Electro Industries / GaugeTech

1800 Shames Drive, Westbury, NY 11590

(877) EIMETER [877-346-3837]

#### Transformer Losses

EIG Loss Compensation Calculator

Company:	Example 2		Substation:	
Name:			Xmfr Bank No.:	
Date:			Xmfr S/N:	
Xmfr Manf:			Company Number	
Winding				
HV - High				
XV - Low				
YV - Tert.				
Comments:				

Transformer Losses		Losses		
		per Element	Total	Unit
No Load VA	NLVA	32.9967	98.9901	kVA
No Load Watts	NLW	9.5600	28.6800	kW
No-Load Loss VARs	NLV	31.5815	94.7445	kVAr
Full Load VA	FLVA	269.9730	809.9190	kVA
Full-Load Loss Watts	FLW	18.6757	56.0271	kW
Full-Load Loss VARs	FLV	269.3263	807.9788	kVAr

3 Phase Power Transformer Data		Losses			
Value		Total	Per element	Calculated	kVA
No Load Loss Watts	LWFe	28,680.00		9,560.00	9.56
Full Load Loss Watts	LWCu	56,027.00		18,675.67	18.68
% Exciting Current	%Ix	0.99			
% Impedance	%Z	8.1			
Transformer kVA Rating	kVA Rated	9,999.00		3,333.00	
Rated Primary L_L Volts	Vp				

Power Transformer - 3 Transformer bank		
Secondary Side Voltage [V]	Vs	2520
Secondary Side Rated Current [A]	I Rated	2291.00
Feed - Load Connection		Delta

Meter Setup/ Installation Data		Two Element Meter with 2 PTs and 2CTs		
Instrument Transformers	Primary	Secondary	Ratio	
Voltage Transformer	2400	120	20	
Current Transformer	3000	5	600	
Transformers Factor	TF	12000		
Nominal Voltage	VM	207.8460969		
Nominal Current	Inom	5		
Meter Test Amps	TA	5		
Meter Class	CL	20		
Meter Form	Fm	x		

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### A.6.3.3: Example 2 Spreadsheet - Line Loss for Example 2 with Example Numbers

#### Electro Industries / GaugeTech

1800 Shames Drive, Westbury, NY 11590

(877) EIMETER [877-346-3837]

#### Line Losses

EIG Loss Compensation Calculator

Three Element Meter with 3 PT's and 3 CT's

Note: Leave Data Entry Cells Blank if not including Line Losses

Company:	Example 2	Substation:	
Name:		Stn Trf Bank No.:	
Date:			

Metering Point Information	

Line Losses		Losses		
Value		per phase	Total	Unit
Total Line Length			0.0000	Mile
Line Current	Ip		28.9826	Amp
Line Loss Watts	LLW	0.0000	0.0000	kW
Line Loss VArS	LLV	0.0000	0.0000	kVA

Transmission Line Impedance Data				
Value		per Unit	Total	Unit
Resistance	R/unit		0.0000	Ohms
Inductive Reactance	XL/unit		0.0000	Ohms
Length of Line	LL - Units			
Length Unit	U	Mile		
Resistive Losses			0.0000	kW
Inductive Losses			0.0000	kars

Note: Please make sure data entered uses a consistent unit of length

Adjustment for Line Charging Current				
Value		per Unit	Total	Unit
Capacitive Reactance	XC-unit	0.0000	0.0000	Ohms
Charging Current per line	Amps		0.0000	Amps
Capacitive Losses	kvar		0.0000	kvars

Line Losses relected to Secondary of PT		Losses		
Value		per phase	Total	Unit
Nominal Pri kVA Rating	VA mom-pri		32.8696	kVA
Nominal Sec kVA Rating	VA mom-sec		32.8696	kVA
Line Loss Watts	LLW	0.0000	0.0000	kW
Line Loss VArS	LLV	0.0000	0.0000	kVA

Transformer Data from Xmfr Loss Sheet				
Value		per phase	Total	Unit
Transformer kVA Rating	kvars	3333.0000	9,999.00	kvars
Rated Primary L L Volts	Vp	0.00		Volts

Note: This Data must be entered on Transformer Loss Sheet before completing Line Loss Calculation

Notes:	

Legend	
Information Only	
Required Data	
Calculated Value	
Data from other Sheet	
Enter this Data	
Comments	

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### A.6.3.4: Example 2 Spreadsheet - Substation Losses for Example 2 with Example Numbers

#### Electro Industries / GaugeTech

1800 Shames Drive, Westbury, NY 11590

(877) EIMETER [877-346-3837]

#### Substation Losses

EIG Loss Compensation Calculator

Three Element Meter with 3 PT's and 3 CT's

Note: Leave Data Entry Cells Blank if not including Line Losses

Company:	Example 2	Substation:	
Name:		Stn Trf Bank No.:	
Date:			

Substation Information	

Line Losses		Losses		Unit
		Total	per Element	
Total Conductor Length		0.00		FT
Secondary Current @ Rating	Ir	2290.843		Amp
Conductor Loss Watts	CLW	0.000	0.000	kW
Conductor Loss VArS	CLV	0.000	0.000	kVA

Transmission Line Impedance Data		
Value		per Unit
Resistance		
Inductive Reactance	x	
Length of Conductor	CL	
Length Unit	U	FT

Legend	
Information Only	
Required Data	
Calculated Value	
Data from other Sheet	
Enter this Data	
Comments	

Note: This Data must be entered on Transformer Loss Sheet before completing Substation Loss Calculation

Transformer Data from Xmfr Loss Sheet			
Value			
Transformer kVA Rating	kVAr	9,999	3333.0000
Rated Secondary L_N Volts	Vr	7,200	

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### A.6.4: Example 3 - Transformer Losses Data

- Application Description
- Installation Description: The installation includes a 138 kV, 16.8 MVA transformer bank with a Wye connected secondary.
- Transformer Data Supplied by Manufacturer

kVA rating of transformer bank	16800kVA
Rated primary voltage	138kV
Secondary line-to-line voltage	13090V
Secondary line-to-neutral voltage	7558V
No-load watts loss	15400W
Copper losses at 75°C	69200W
Percent impedance	9.78
Percent exciting current	0.133
Secondary Connection	Wye

- Metering Data:  
The model assumes a three-phase, 4-wire meter installation with 3 Voltage Transformers and 3 Current Transformers. This is not a limitation because all EIG Transformer Rated Meters are 3 stator, 4-wire meters. The model should not be used with other meter types.

Voltage Transformer Ratio, CTR	$1500/5 = 300/1$
Current Transformer Ratio, VTR	$7200/120 = 60/1$
Meter Voltage Rating, $V_m$	120V
Meter Test Amps, $TA, I_{nom}$	5A

### A.6.4.1: Example 3 Spreadsheet - System Losses Summary for Example 3 with Example Numbers

*Electro Industries / GaugeTech*

(877) EIMETER (877.346.3837)

1800 Shames Drive, Westbury, NY 11590

#### System Losses Summary

*EIG Loss Compensation Calculator*

**Meter Correction Factors from this sheet are manually entered into EIG Communicator Software**

**Note: Begin Data Entry by Going to Xfmr Loss Sheet**

Company:	Example 3	Project	
Name:		Location	
Date:			

Comments:

Transformer losses only

Meter Nominal Current 5A

Meter Correction Factors		Loss Factors	
for Communicator Software		Calc	Used
% No-Load Loss Watts	%LWFE	0.04314	0.043
% Full-Load Loss Watts	%LWCU	0.87524	0.875
% No-Load Loss VARs	%LVFE	0.06765	0.068
% Full-Load Loss VARs	%LVCU	20.76262	20.763

Enter These  
Values in  
Communicator  
Software

Losses Shifted to IT Primary		per element	Total	Unit
LWFE	Core-Loss Watts	4.66	13.9800	kW
LWCU	Watts Loss due to Cu	94.53	283.58	kW
LVFE	Core-Loss VARs	7.31	21.92	kVAr
LVCU	VA Rated Loss due to Cu	2,242.36	6,727.09	kVAr
VA <sub>nom</sub>	Nominal Meter VA Rating		32,400.00	kVA

Total System Losses					
total losses <i>Note: If no data entered in Line or Substation Loss sheets contribution to total is zero</i>					
Type	Source		kWatts Loss		kVAr Losses
No-Load Losses	Transformer Core	NLW	15.40	NLV	26.61
Load Losses	Transformer Windings	FLW	69.20	FLV	1,641.58
	Transmission Line	LLW	0.00	LLV	0.00
	Substation Conductors	CLW	0.00	CLV	0.00
	Total Load Losses	TLW	69.20	TLV	1,641.58

per element losses

Type	Source		kWatts Loss		kVAr Losses
No-Load Losses	Transformer Core	NLW	5.13	NLV	8.87
Load Losses	Transformer Windings	FLW	23.07	FLV	547.19
	Transmission Line	LLW	0.00	LLV	0.00
	Substation Conductors	CLW	0.00	CLV	0.00
	Total Load Losses	TLW	23.07	TLV	547.19

Comments:


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**Legend**

Information Only	
Required Data	
Calculated Value	
Data from other Sheet	
Enter this Data	
Comments	

### A.6.4.2: Example 3 Spreadsheet - Xmfr Loss for Example 3 with Example Numbers

#### Electro Industries / GaugeTech

1800 Shames Drive, Westbury, NY 11590

(877) EIMETER [877-346-3837]

#### Transformer Losses

#### EIG Loss Compensation Calculator

Company:	Example 3		Substation:	
Name:			Xmfr Bank No.:	
Date:			Xmfr S/N:	
Xmfr Manf:			Company Number	
Winding				
HV - High				
XV - Low				
YV - Tert.				
Comments:				

Transformer Losses		Losses		
		per Element	Total	Unit
No Load VA	NLVA	10.2480	30.7440	kVA
No Load Watts	NLW	5.1333	15.3999	kW
No-Load Loss VARs	NLV	8.8696	26.6088	kVAr
Full Load VA	FLVA	547.6800	1,643.0400	kVA
Full-Load Loss Watts	FLW	23.0667	69.2001	kW
Full-Load Loss VARs	FLV	547.1940	1,641.5821	kVAr

3 Phase Power Transformer Data		Losses			
Value		Total	Per element	Calculated	kVA
No Load Loss Watts	LWFe	15,400.00		5,133.33	5.13
Full Load Loss Watts	LWCu	69,200.00		23,066.67	23.07
% Exciting Current	%Ix	0.183			
% Impedance	%Z	9.78			
Transformer kVA Rating	kVA Rated	16,800.00		5,600.00	
Rated Primary L_L Volts	Vp	138,000			

Power Transformer - 3 Transformer bank		
Secondary Side Voltage [V]	Vs	13091
Secondary Side Rated Current [A]	I Rated	2291.00
Feed - Load Connection		Wye

Meter Setup/ Installation Data		Three Element Meter with 3 PTs and 3 CTs		
Instrument Transformers	Primary	Secondary	Ratio	
Voltage Transformer	7200	120		60
Current Transformer	1500	5		300
Transformers Factor	TF	18000		
Nominal Voltage	VM	120		
Nominal Current	Inom	5		
Meter Test Amps	TA	5		
Meter Class	CL	20		
Meter Form	Fm	x		

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### A.6.4.3: Example 3 Spreadsheet - Line Loss for Example 3 with Example Numbers

#### Electro Industries / GaugeTech

1800 Shames Drive, Westbury, NY 11590

(877) EIMETER [877-346-3837]

#### Line Losses

EIG Loss Compensation Calculator

Three Element Meter with 3 PT's and 3 CT's

Note: Leave Data Entry Cells Blank if not including Line Losses

Company:	Example 3	Substation:	
Name:		Stn Trf Bank No.:	
Date:			

Metering Point Information	

Line Losses		Losses		
Value		per phase	Total	Unit
Total Line Length			0.0000	Mile
Line Current	Ip		40.5797	Amp
Line Loss Watts	LLW	0.0000	0.0000	kW
Line Loss VArS	LLV	0.0000	0.0000	kVA

Transmission Line Impedance Data				
Value		per Unit	Total	Unit
Resistance	R/unit		0.0000	Ohms
Inductive Reactance	XL/unit		0.0000	Ohms
Length of Line	LL - Units			
Length Unit	U	Mile		
Resistive Losses			0.0000	kW
Inductive Losses			0.0000	kars

Note: Please make sure data entered uses a consistent unit of length

Adjustment for Line Charging Current				
Value		per Unit	Total	Unit
Capacitive Reactance	XC-unit	0.0000	0.0000	Ohms
Charging Current per line	Amps		0.0000	Amps
Capacitive Losses	kvar		0.0000	kvars

Line Losses reflected to Secondary of PT		Losses		
Value		per phase	Total	Unit
Nominal Pri kVA Rating	VA mom-pri		142.2826	kVA
Nominal Sec kVA Rating	VA mom-sec		142.2826	kVA
Line Loss Watts	LLW	0.0000	0.0000	kW
Line Loss VArS	LLV	0.0000	0.0000	kVA

Transformer Data from Xmfr Loss Sheet				
Value		per phase	Total	Unit
Transformer kVA Rating	kvars	5600.0000	16,800.00	kvars
Rated Primary L L Volts	Vp	138,000.00		Volts

Note: This Data must be entered on Transformer Loss Sheet before completing Line Loss Calculation

Notes:	

Legend	
Information Only	
Required Data	
Calculated Value	
Data from other Sheet	
Enter this Data	
Comments	

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### A.6.4.4: Example 3 Spreadsheet - Substation Losses for Example 3 with Example Numbers

#### Electro Industries / GaugeTech

1800 Shames Drive, Westbury, NY 11590

(877) EIMETER [877-346-3837]

#### Substation Losses

EIG Loss Compensation Calculator

Three Element Meter with 3 PT's and 3 CT's

Note: Leave Data Entry Cells Blank if not including Line Losses

Company:	Example 3	Substation:	
Name:		Stn Trf Bank No.:	
Date:			

Substation Information	

Line Losses		Losses		Unit
		Total	per Element	
Total Conductor Length		0.00		FT
Secondary Current @ Rating	Ir	790.984		Amp
Conductor Loss Watts	CLW	0.000	0.000	kW
Conductor Loss VARS	CLV	0.000	0.000	kVA

Transmission Line Impedance Data		
Value		per Unit
Resistance		
Inductive Reactance	x	
Length of Conductor	CL	
Length Unit	U	FT

Legend	
Information Only	
Required Data	
Calculated Value	
Data from other Sheet	
Enter this Data	
Comments	

Note: This Data must be entered on Transformer Loss Sheet before completing Substation Loss Calculation

Transformer Data from Xmfr Loss Sheet			
Value			
Transformer kVA Rating	kVAr	16,800	5600.0000
Rated Secondary L_N Volts	Vr	7,200	

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# B: CommunicatorPQA® Software Command Line Arguments, Version 1.20

Current 8-5-2014

## B.1: Overview

- The CommunicatorPQA® application supports two forms of command line arguments:
  - The earlier 'slash' commands ('/s'), documented in Section B.2.
  - The newer 'dash' commands ('--cmd'), documented in Section B.3.
- Note that the two types are mutually exclusive: if the first command found starts with '--', then the command line is processed as dash commands. Otherwise, the slash command processing is used.
- By default, when used in command line mode, the CommunicatorPQA® application will shut down after all the commands are executed.
- The CommunicatorPQA® application supports log retrieval from Nexus® 1500 and Shark® 200 meters via the -- command line.

## B.2: Command Line Arguments - Slash Commands

### B.2.1: Script Command Line Method

Tells the CommunicatorPQA® software to perform a task corresponding to the Script ID Number.

**/snnnn                      Script ID Number**

Example:

**CommExt /s1234** (/s Script ID Number)

**uc:                              Start Log Converter**

0 Do not start log converter

1 Start log converter

If left out of command line, Start Log Converter is assumed.

Example: CommExt with Script 1234 will Start Log Converter if Log Retrieval is in the script.

**CommExt /s1234 uc:1**

### **B.2.2: Application Command Line Method**

Tells the CommunicatorPQA® software to make a connection and display a particular application screen.

**/c (additional arguments with a space between each argument)**

Example 1: Nexus® device with address 2 on network with IP address 135.15.173.79 using Modbus TCP Start on device status screen.

**CommExt /c cm:1 ad:2 pr:3 ip:135.15.173.12 np:502**

Example 2: Nexus® device with address 2 at remote location with Phone Number 555-545-5110 using Modbus ASCII Start on device status screen.

**CommExt /c cm:0 ad:2 pr:1 cp:3 BR:3 um:1 pn:555-545-5110**

**cm: Connect Mode**

0 Serial Port

1 Network

If left out of command line, Serial Port is assumed.

**ec: Echo Mode**

0 Off

1 On (When the Shark® meter's Fiber Optic Option Card's switch is set to Echo On)

If left out of command line, defaults to 0. Used when selected connection mode is Serial Port, with a Fiber Optic Option Card in a Shark® meter.

**ad: Address**

1 - 247

If left out of command line, Address 1 is assumed.

**nm: Network Mode**

0 One IP Address for n Devices

If left out of command line, 0 is assumed.

**pr: Protocol**

0 Modbus RTU

1 Modbus ASCII

2 DNP3 (Not Supported)

3 Modbus TCP

4 EI Protocol

If left out of command line, Modbus RTU is assumed.

**ip: IP Address or Host Name**

xxx.xxx.xxx.xxx or 1 - 16 Alphanumeric characters with no spaces.

If left out of command line, error is assumed.

**np: Network Port**

502 Open Modbus (Modbus TCP)

If left out of command line, Port 502 is assumed.

**cp: Com Port**

1 - 98

If left out of command line, Com Port 1 is assumed.

**br: Baud Rate**

0 1200

1 2400

2 4800

3 9600

4 19200

5 38400

6 57600

7 115200

If left out of command line, Baud Rate of 9600 is assumed.

**um:                    Use Modem**

0 No

1 Yes

If left out, No modem is selected.

**pn:                    Phone Number**

Use No Spaces. User-defined Phone Number of the Remote Modem.

**ms:                    Modem Setup String**

User-defined Setup String (if the originate modem has been used for another program and needs to be reset).

**dc:                    Data Switch Connect String for Modem**

User-defined Data Switch String to connect to Remote Modem.

Check with the device's manual to create the Data Switch String appropriate for the device.

Typical characters used with CommunicatorPQA® software are:

,                    (pause one second)

                    (escape sequence or switch to command mode)

**PTnn**            (command) (number 01-16)

**Enter**           (<CR> ASCII character 13)

**dd: Data Switch Disconnect String for Modem**

User-defined.

**ss: Start screen**

0 Device Status

1 Phasors Diagram (Nexus® meters Only)

2 Instantaneous Polling

3 Poll All (Nexus® meters Only)

4 Poll Max/Min

5 Poll Power Readings (Use 19 to 22 for Nexus® meters)

6 Poll Harmonics

7 Poll Internal Inputs

8 Poll Multiple Devices (Nexus® meters Only)

9 Poll Pulse Accumulations (Nexus® meters Only)

10 Poll Limit Status

11 Poll Time of Use Readings (Nexus® meters Only)

12 Poll Nexus® External Digital Inputs (Nexus® meters Only)

13 Poll Nexus® External Analog Inputs (Nexus® meters Only)

14 Poll Nexus® ElectroLogic™ Status (Nexus® meters Only)

15 Poll Relay Control

16 Poll Readings with DDE Service (Nexus® meters Only)

17 Poll Log Statistics

18 Log Retrieval Screen

19 Poll Power and Demand (Nexus® meters Only)

- 20 Poll Energy (Nexus® meters Only)
- 21 Poll Power Only (CommunicatorPQA® Application Only, Nexus® meters Only)
- 22 Poll Demand Only (CommunicatorPQA® Application Only, Nexus® meters Only)
- 23 Poll Nexus® meter Time
- 24 Poll Shark® meter Volts and Current (Shark® 100 meter)
- 25 Poll Shark® meter Power and Energy (Shark® 100 meter)
- 26 Poll Shark® meter Phasor Diagram (Shark® 100 meter)
- 30 Device Status (Shark® 200 meter)
- 31 Phasor Diagram (Shark® 200 meter)
- 32 Instantaneous Polling (Shark® 200 meter)
- 33 Poll Max/Min (Shark® 200 meter)
- 34 Poll Power and Energy (Shark® 200 meter)
- 35 THD/Harmonics (Shark® 200 meter)
- 36 Average Demand (Shark® 200 meter)
- 37 Option Card Accumulators (Shark® 200 meter)
- 39 Option Card Digital Input Status (Shark® 200 meter)
- 40 Limits Status Screen (Shark® 200 meter)
- 41 Symmetrical Components (Shark® 200 meter)
- 42 Real Time Trends (Shark® 200 meter)
- 43 Shark Time (Shark® 200 meter)
- 44 Relay Control (Shark® 200 meter)
- 45 Option Card Status (Shark® 200 meter)

46 Device Information (Shark® 200 meter)

47 Device Profile (Shark® 200 meter)

48 Log Status/Retrieval (Shark 200)

**NOTES:**

- If the number is undefined, i.e. less than 0 or greater than 48, the CommunicatorPQA® application will automatically shut down.
- If left out of command line, Start screen is Device Status.

**dn: Device Name**

Must use period as placeholder for a space.

**In: Location Name**

Must use period as placeholder for a space.

**vm: View Mode**

0 Normal

1 Hide Main Window and Exit Program upon closing of Start Screen.

CommunicatorPQA® application acts as a plug-in for integrating with third party software.

If left out, Normal is the View Mode.

**am: Answer Modem**

0 No

1 Open Port. Wait for Modem to ring and attempt to answer Modem if ringing.

If left out, software does not answer Modem.

**dr: Dial Out Receive Call**

0 No

1 After software successfully answers the call, it looks for a reason of call code. Based on the code, Software performs automated functions. Upon completion of all functions, software places the Remote Modem into command mode, sends an acknowledgment and hangs up. Software closes the Communications Port and exits software.

**mp: Modem Password**

Must use period as placeholder for a space.

**dt: User Defined DDE Topic Name for Start Screen 16**

Topic Name must contain no spaces.

If left out, Meter Designation is used as Topic.

**lr: Retrieve Log Number (Nexus® meters only)**

1 Historical Log 1

2 Historical Log 2

3 Both 1 and 2



The table below shows how to select the additional log combinations.

Log to Retrieve	Bits															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Historical Log 1																x
Historical Log 2															x	
Limit Log														x		
PQ/Wave-form Log													x			
Digital Input Log												x				
Digital Output Log											x					
Reserved (Max/Min Log)										x						
Flicker									x							
System of Events Log								x								
Reset Log (Disabled)							x									
EN50160						x										
Binary Number, e.g.														1	0	1

Use this table in the following way:

- Put a 1 in column of the log(s) you want to retrieve, a 0 in the column of any unwanted logs that are between the selected logs.

In the example above, Historical Log 1 and the Limit Log are selected. A '1' is placed in each of their columns. Since Historical Log 2 is between them and is not selected a '0' is placed in its column.

- Convert the Binary number to Decimal.

In this example: 101(binary) = 5(decimal) = 5

- c. Put the decimal number in the `lr` command line.

In this example, you would use the number 5 to retrieve Historical Log 1 and the Limit Log.

## B.3: Command Line Arguments - Dash Commands

### B.3.1: Command Line Reference

`--connect [connstr]`

`--stay_open`

`--retrieve_log [log],[log]`

`--username [username]`

`--password [password]`

`--start_screen [start screen]`

### B.3.2: Dash Commands

- If dash commands are used, then slash commands are not processed (and will become arguments to the dash commands). Dash commands separate each command by the '--', with each argument (separated by spaces) until the next command belonging to the previous command.
- Dash commands do support quoting arguments. So, if an argument has spaces (e.g., a filename), you can put quotation marks around it so that it will be processed as one argument.

`--connect [connstr]`: Connect with the specified parameters. If no further commands are specified, include `--stay_open` to prevent the software from automatically shutting down.

[connstr]: The connection string to describe how to connect.

`mn://[host]{:[port],[addr],[protocol]}`  
Modbus over Network connection

[host]: The IP address to connect to. May be a dotted quad (1.2.3.4), or an Internet address ([www.mynexusmeter.com](http://www.mynexusmeter.com)).

[port]: The TCP port to connect to; defaults to 502.

[addr]: The Modbus device address to connect to; must be between 1 and 247.

[protocol]: The Modbus protocol to use; defaults to TCP. Valid options are:

TCP: Modbus TCP

ASCII: Modbus ASCII

RTU: Modbus RTU

For example:

mn://172.20.166.98:502,21,TCP

ms://[com]{:[baud],[databit],[parity],[stopbit],[addr],[protocol]}

Modbus over Serial connection

[com]: The com port to connect to; may be the name (COM7) or just the number (7).

[baud]: The baud rate to use to connect with; default is 57600.

[addr]: The Modbus device address to connect to; must be between 1 and 247.

[protocol]: The Modbus protocol to use; defaults to RTU. Valid options are:

TCP: Modbus TCP

ASCII: Modbus ASCII

RTU: Modbus RTU

Specify a blank argument to use the default. For example:

ms://COM7:57600,,,,10,RTU

--silent: Prevents warning and error messages from being displayed (when possible).

--stay\_open: By default, the software shuts down after all commands are executed. This command prevents that from happening, allowing further action by the user.

--retrieve\_log: "[log1],[log2], ..., [logn]"

Valid Log Names to be used in the command line args:

Historical Log 1:	"INT1" or "INTERVAL_1"
Historical Log 2:	"INT2" or "INTERVAL_2"
Historical Log 3:	"INT3" or "INTERVAL_3"
Historical Log 4:	"INT4" or "INTERVAL_4"
Historical Log 5:	"INT5" or "INTERVAL_5"
Historical Log 6:	"INT6" or "INTERVAL_6"
Historical Log 7:	"INT7" or "INTERVAL_7"
Historical Log 8:	"INT8" or "INTERVAL_8"
Event Triggered Log:	"EVTT" or "EVENT_TRIGGERED"
Limit/Alarm:	"LIMT" or "LIMIT_LOG"
Digital Input:	"DIGI" or "DIGITAL_INPUT"
Digital Output:	"DIGO" or "DIGITAL_OUTPUT"
Flicker:	"FLIC" or "FLICKER"
Waveform:	"WAVE" or "WAVEFORM"
Power Quality:	"PQ" or "PQ_LOG"
System Event:	"SYS" or "SYSTEM_EVENT"
Transient:	"TRAN" or "TRANSIENT"
EN50160:	"EN50160"

For example:

```
--connect mn://172.20.167.39 --retrieve_log "INTERVAL_1, INTERVAL_2"
```

--username [username]: Set the username for log retrieval to the value in [username]; by default it is blank.

--password [password]: Set the password for log retrieval to the value in [password]; by default it is blank.

--start\_screen [start screen]: Starts the program on the screen in [start screen].

Valid Start Screen Names to be used in the command line args:

For Nexus®, Shark® 200, Shark® 100, and MP200 Devices:

Screen	[Start Screen]
Device Status Screen:	device_status
Phasor Screen:	phasor_diagram
Polling Screen:	inst_polling
Demand Screen:	demand
Energy Screen:	energy
Alarm Status Screen:	alarm_status
Device Profile Screen:	device_profile
Firmware Update Screen:	firmware_update

For Nexus® Devices:

Screen	[Start Screen]
Log Status Screen:	log_status
Harmonics Screen:	harmonics
Retrieve Time Screen:	retrieve_time
Power Screen:	power
Max and Min Values Screen:	max_and_min
Pulse Accumulations Screen:	pulse_accumulations
Short Term Max and Min Values Screen:	short_term_max_and_min
Symmetrical Components Screen:	symmetrical_components
Flicker Screen:	flicker

For Shark® 200 Devices:

Screen	[Start Screen]
Log Status Screen:	log_status
Harmonics Screen:	harmonics
Retrieve Time Screen:	retrieve_time
Power Screen:	power
Max and Min Values Screen:	max_and_min
Pulse Accumulations Screen:	pulse_accumulations
Short Term Max and Min Values Screen:	short_term_max_and_min
Symmetrical Components Screen:	symmetrical_components
Real Time Trends Screen:	real_time_trends

For Shark® 100 Devices:

Screen	[Start Screen]
Power Screen:	power
Real Time Trends Screen:	real_time_trends

For MP200™ Devices:

Screen	[Start Screen]
Log Status Screen:	log_status
Retrieve Time Screen:	retrieve_time
Max and Min Values Screen:	max_and_min
Pulse Accumulations Screen:	pulse_accumulations
Short Term Max and Min Values Screen:	short_term_max_and_min

## C: Ethernet Network Error Codes

### C.1: Network Error Codes Reported by Any Software That Uses Ethernet (Including CommunicatorPQA® Software)

Error# 10004: "Interrupted system call."

Error# 10009: "Bad file number."

Error# 10013: "Permission Denied."

Error# 10014: "Bad Address."

Error# 10022: "Invalid Argument."

Error# 10024: "Too many open files."

Error# 10035: "Operation would block."

Error# 10036: "Operation now in progress."

Error# 10037: "Operation already in progress."

Error# 10038: "Socket operation on nonsocket."

Error# 10039: "Destination address required."

Error# 10040: "Message too long."

Error# 10041: "Protocol wrong type for socket."

Error# 10042: "Protocol not available."

Error# 10043: "Protocol not supported."

Error# 10044: "Socket type not supported."

Error# 10045: "Operation not supported on socket."

Error# 10046: "Protocol family not supported."

Error# 10047: "Address family not supported by protocol family."

Error# 10048: "Address already in use."

Error# 10049: "Can't assign requested address."

Error# 10050: "Network is down."

Error# 10051: "Network is unreachable."

Error# 10052: "Network dropped connection."

Error# 10053: "Software caused connection abort."

Error# 10054: "Connection reset by peer."

Error# 10055: "No buffer space available."

Error# 10056: "Socket is already connected."

Error# 10057: "Socket is not connected."

Error# 10058: "Can't send after socket shutdown."

Error# 10059: "Too many references: can't splice."

Error# 10060: "Connection timed out."

Error# 10061: "Connection refused."

Error# 10062: "Too many levels of symbolic links."

Error# 10063: "File name too long."

Error# 10064: "Host is down."

Error# 10065: "No route to host."

Error# 10066: "Directory not empty."

Error# 10067: "Too many processes."

Error# 10068: "Too many users."

Error# 10069: "Disk quota exceeded."

Error# 10070: "Stale NFS file handle."

Error# 10071: "Too many levels of remote in path."



Error# 10091: "Network subsystem is unusable."

Error# 10092: "Winsock DLL cannot support this application."

Error# 10093: "Winsock not initialized."

Error# 10101: "Disconnect."

Error# 11001: "Host not found."

Error# 11002: "Nonauthoritative host not found."

Error# 11003: "Nonrecoverable error."

Error# 11004: "Valid name, no data record of requested type."

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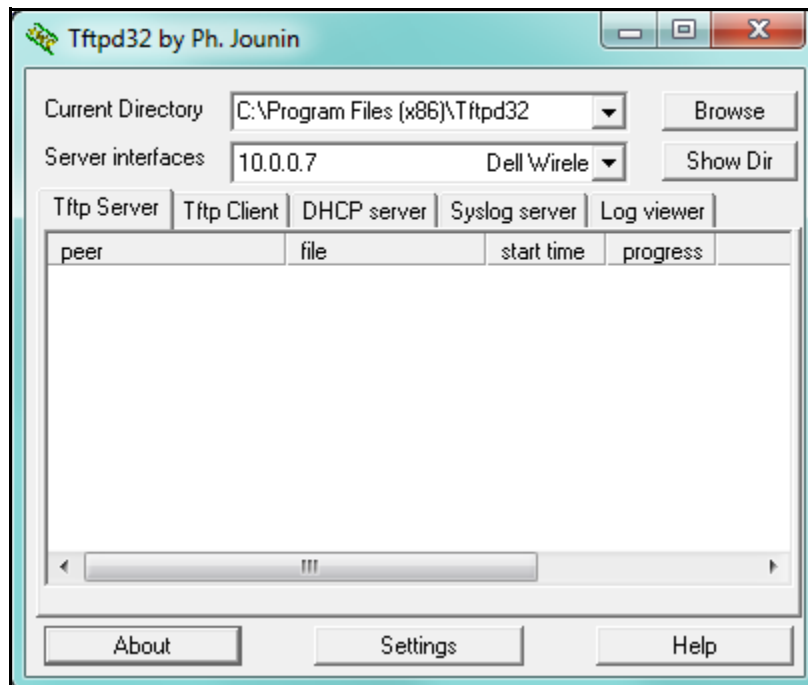
## D: TFTP Server Program Setup

**NOTE:** The Advanced Settings screen for the Nexus® 1252/1262/1272 meters' Network card has a TFTP option you can use to update the card's firmware. However, you may want to use an alternate method, e.g., if the device is "stuck" in Boot mode.

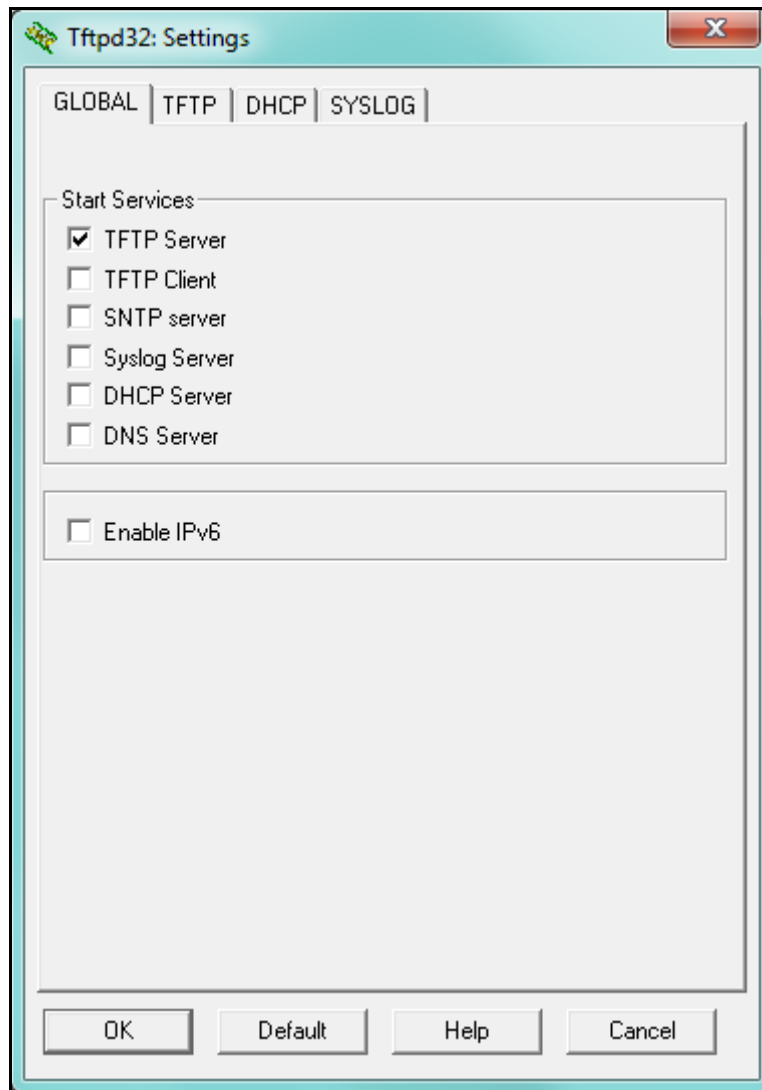
A free shareware TFTP (Trivial File Transfer Protocol) server program known as tftpd32 is available to customers to use for updating firmware for the INP100/INP200 Ethernet card for Nexus® 12xx meters. The program can be downloaded (for no charge) online at [http://tftpd32.jounin.net/tftpd32\\_download.html](http://tftpd32.jounin.net/tftpd32_download.html).

The setup requirements for the application are:

- Windows® Operating System
  - A working Ethernet card with a valid IP Address
  - Winzip software (only if the Windows® Operating System does not open the zip file automatically)
1. Install the TFTP32 application. You will see the screen below after the application has installed. Note that the Current Directory is the location of the TFTP32 application.

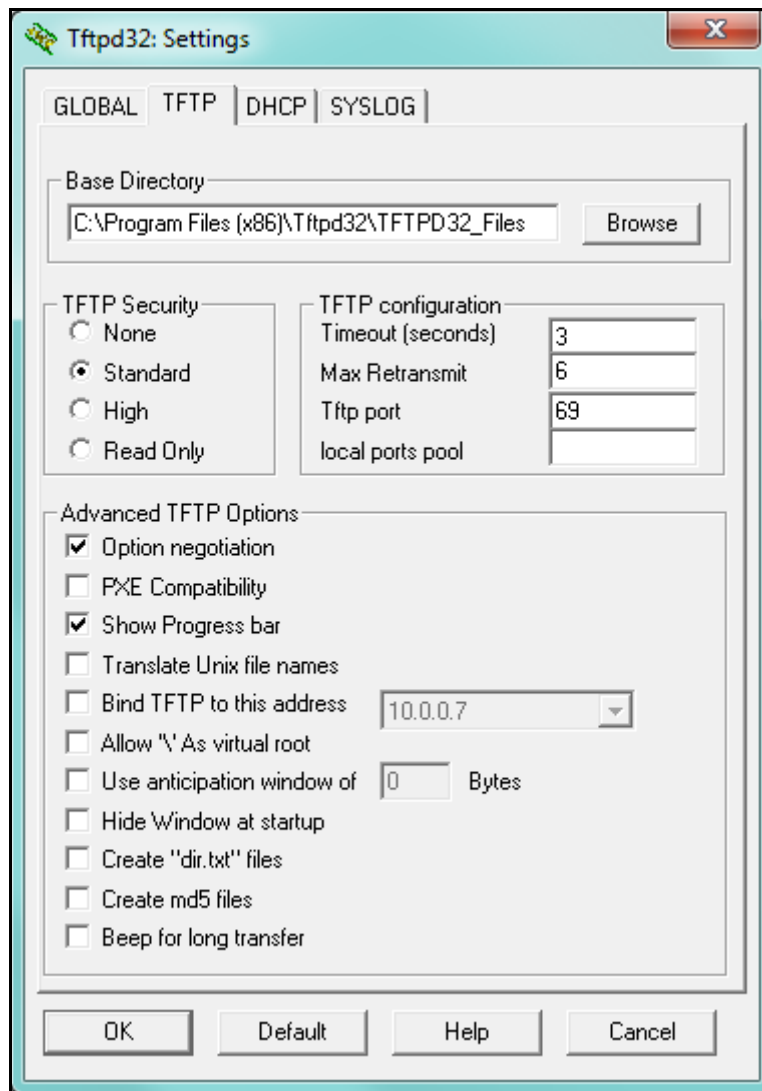


2. Click the Settings tab at the bottom of the screen.



3. Be sure that ONLY TFTP Server is selected on this Global tab screen.

4. Click the TFTP tab at the top of the screen.



5. Shown above are the settings EIG recommends. The Base Directory is the location of the firmware files. You should create a new folder somewhere on your PC's hard drive where you will store any INP100/INP200 firmware files and then Browse to locate that folder. In the example above, the folder created is called TFTPD32\_Files and it was placed in the Tftpd32 folder in the Program Files directory. All firmware files for INP100/INP200 would be placed inside the C:\Program Files\Tftpd32\TFTP\_Files folder before updating firmware.
6. Click OK to save the settings.
7. You will see a message window informing you that you must restart the application to save the settings. Click OK.

8. Make a serial connection between your PC and the meter.

9. Click Tools>Network Card Settings. You will see the screen shown below.

#### Screen Elements:

- 1: Connect button
- 2: Boot Version box
- 3: Flash File Update Settings section
- 4: Write Settings button
- 5: Update Runtime/Update Boot buttons
- 6: Refresh button
- 7: OK button

10. Click the Connect button. This allows the software to send commands to the meter and Network card, causing the Network card to go into Boot mode. As a result, Network card Boot firmware information will be displayed in the screen in the Boot Version box, as shown in the example above.

11. When you see from the messages that the Network card is in Boot mode, enter the correct settings for the firmware file update using TFTP, in the Flash File Update Settings section.
12. Click the Write Settings button.
13. Connect an RJ45 cable from the PC to the Network card so that the Network card can access the TFTP server.
14. To update the Network card's Boot firmware, click the Update Boot button; to update the Network card's Runtime firmware, click the Update Runtime button.
15. The Network card will start the firmware update process. Click the Refresh button to retrieve the Network card's firmware information again, to verify that the firmware version was updated properly.
16. Click OK to close this screen and allow the Network card to restart.

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# E: Troubleshooting

## E.1: Troubleshooting Using the Phasor Diagram

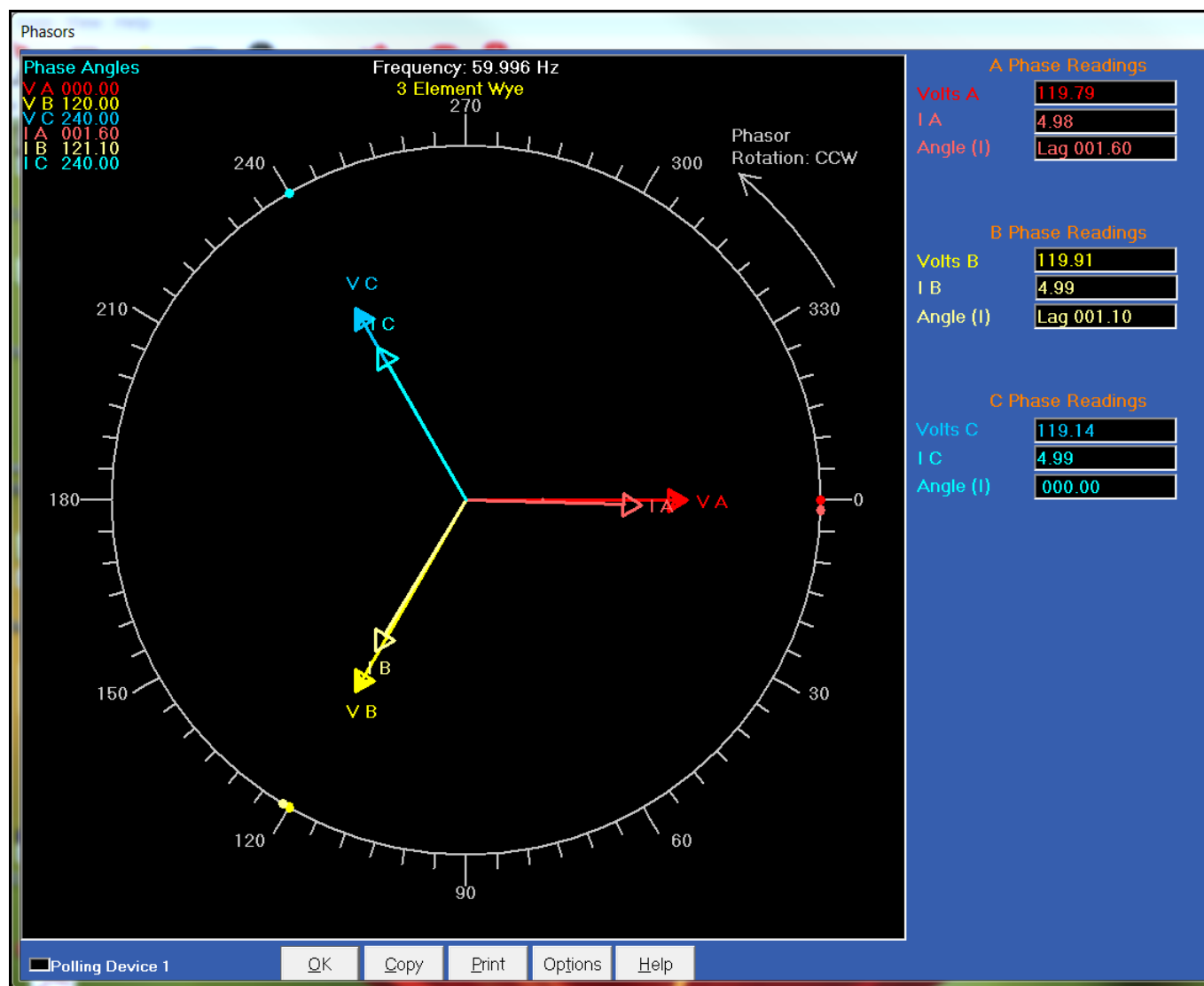
A Phasor diagram is a vector representation of the voltage and current angles of a three phase power system. By looking at the six channels of waveform in a phasor representation, you can obtain troubleshooting information to determine if the voltage and current inputs are wired properly.

Generally, a Phasor diagram relies on Volts AN to be fixed at 0 degrees. Then, rotating clockwise, the next voltage is Volts BN, and thirdly Volts CN. Current is also represented on the Phasor diagram. If the current is leading, it is a capacitive load. If the current is lagging, it is an inductive load. For example, current influenced by motor loads is usually inductive.

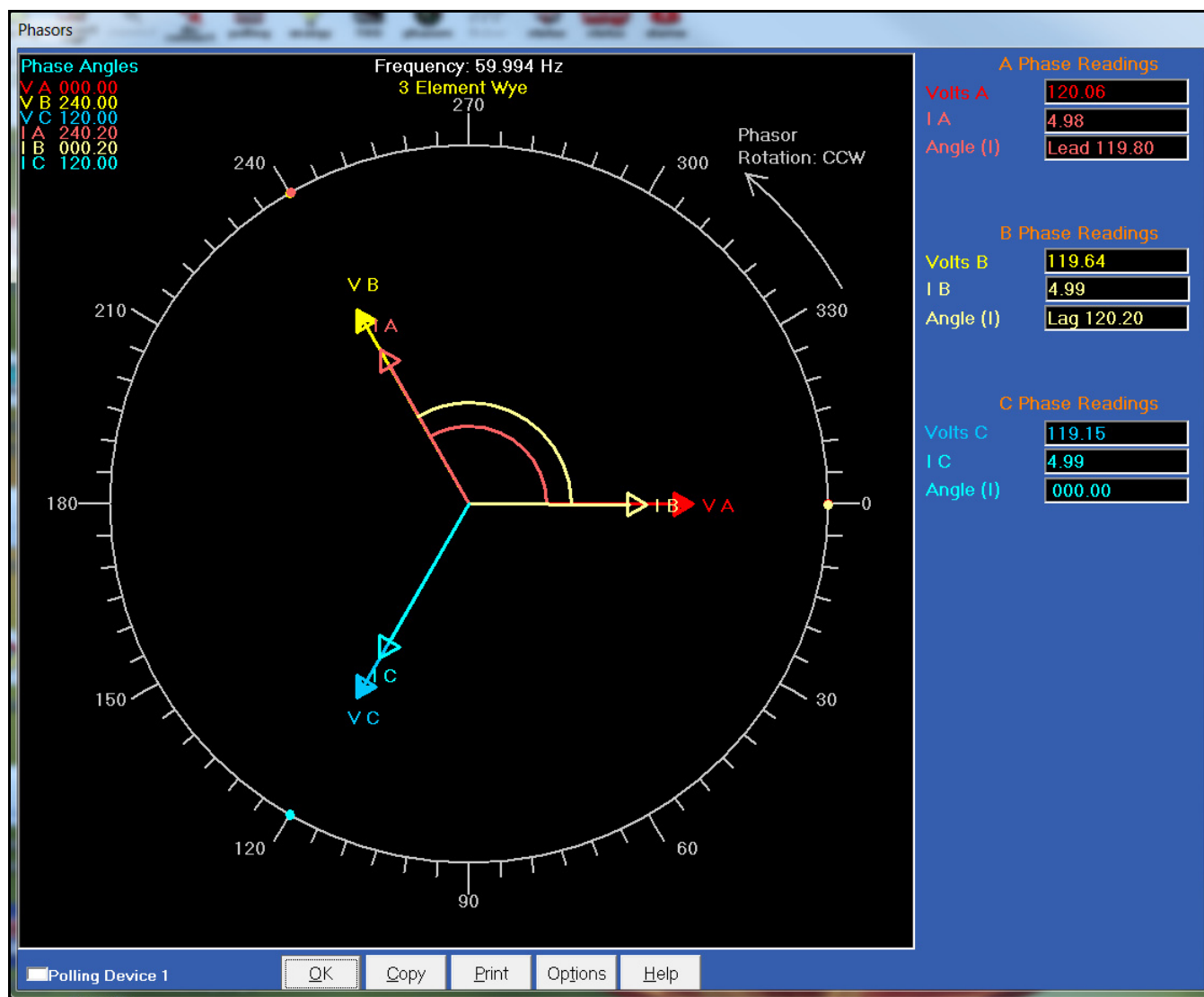
To open the phasor diagram for the connected meter, either:

- Click Real-Time Poll>Power Quality and Alarms>Phasors
- Click the Phasors icon in the Icon Bar

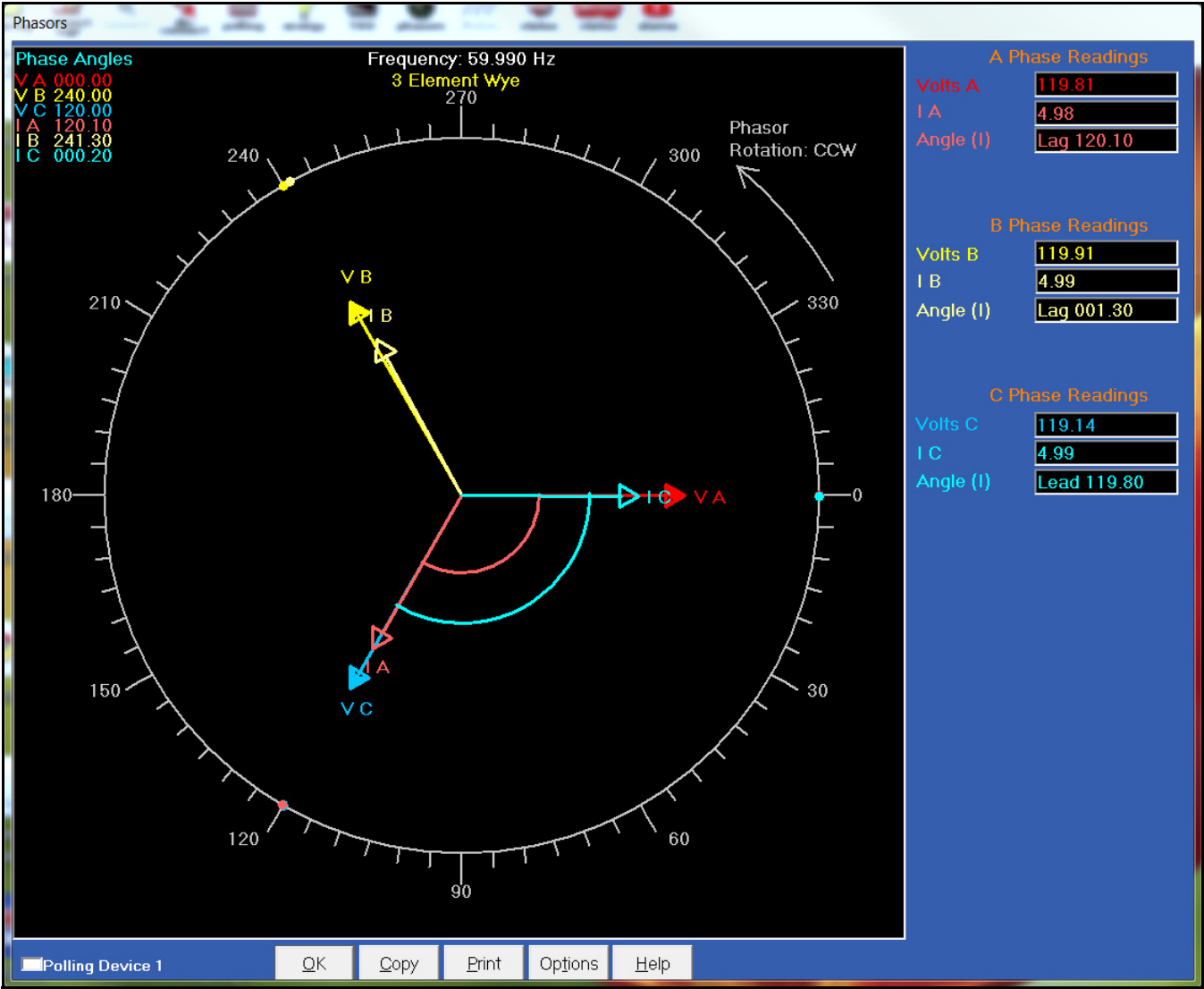
Use the following phasor diagrams and their description as a guide.

**1. System: WYE Hookup with Unity Power Factor**

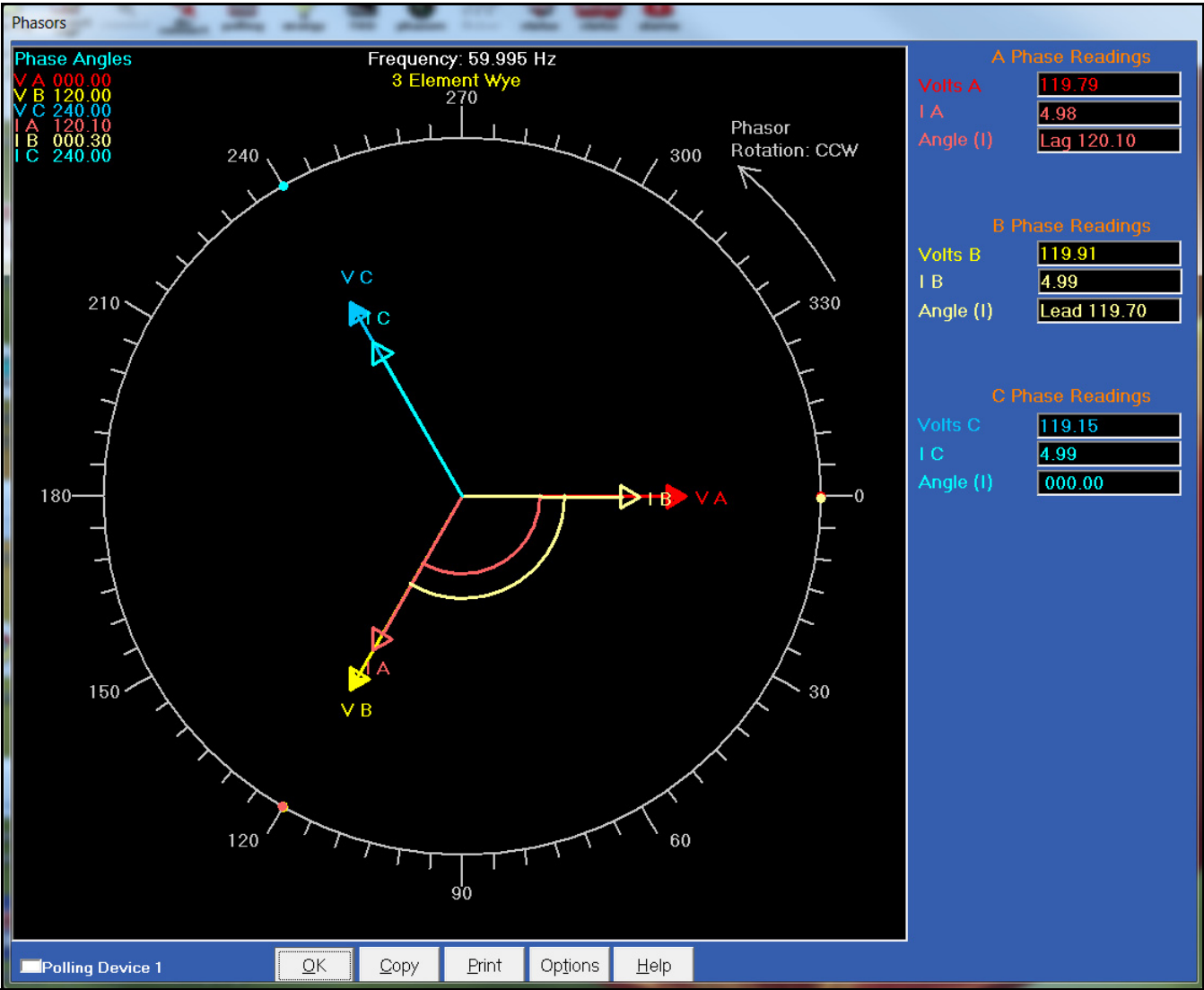
This diagram shows an ideal WYE system, with voltage  $120^\circ$  apart, and current having a perfect resistive load.

**2. System: WYE Hookup with the VA and VB Swapped**

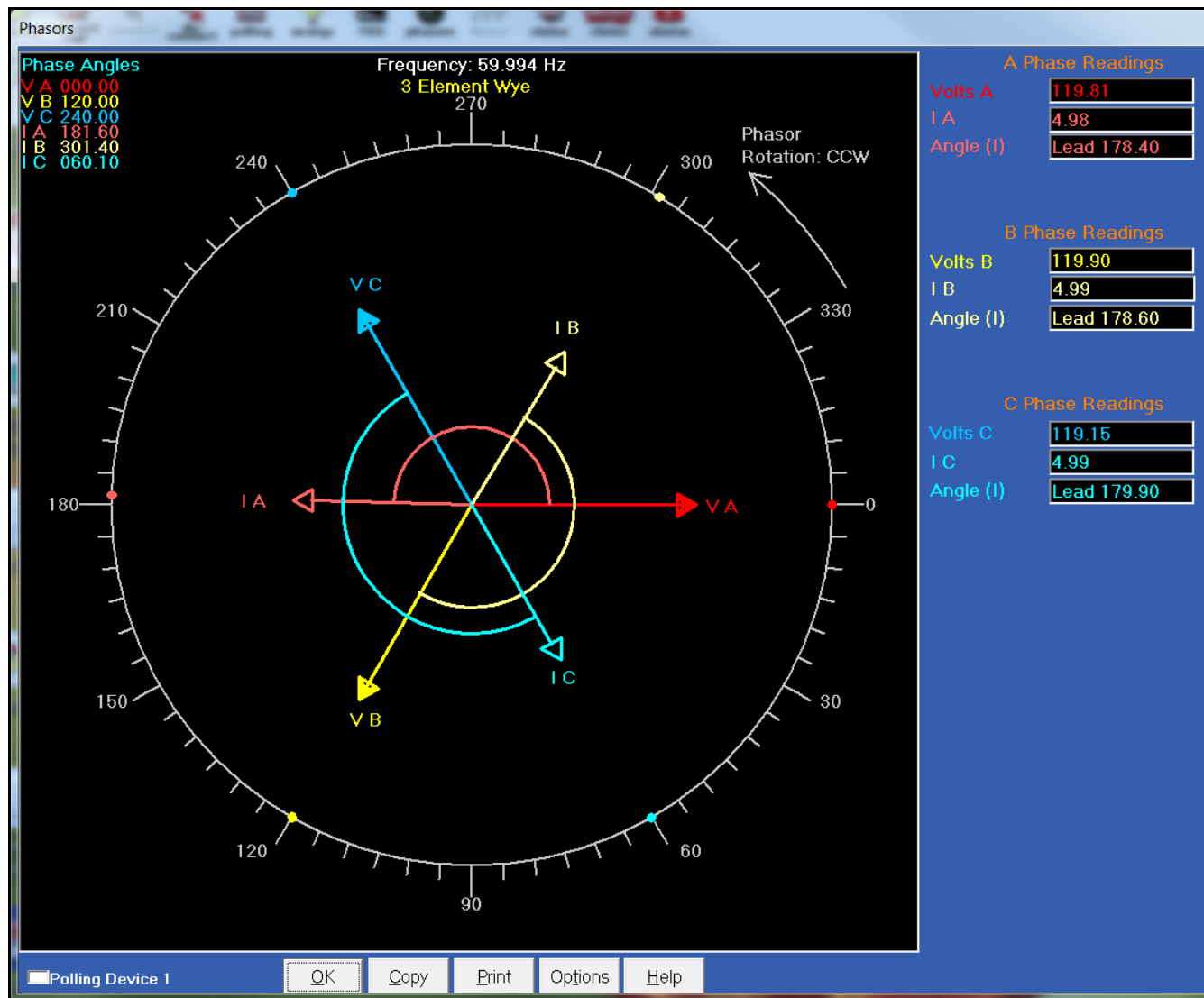
3. System: WYE Hookup - VA and VC Swapped

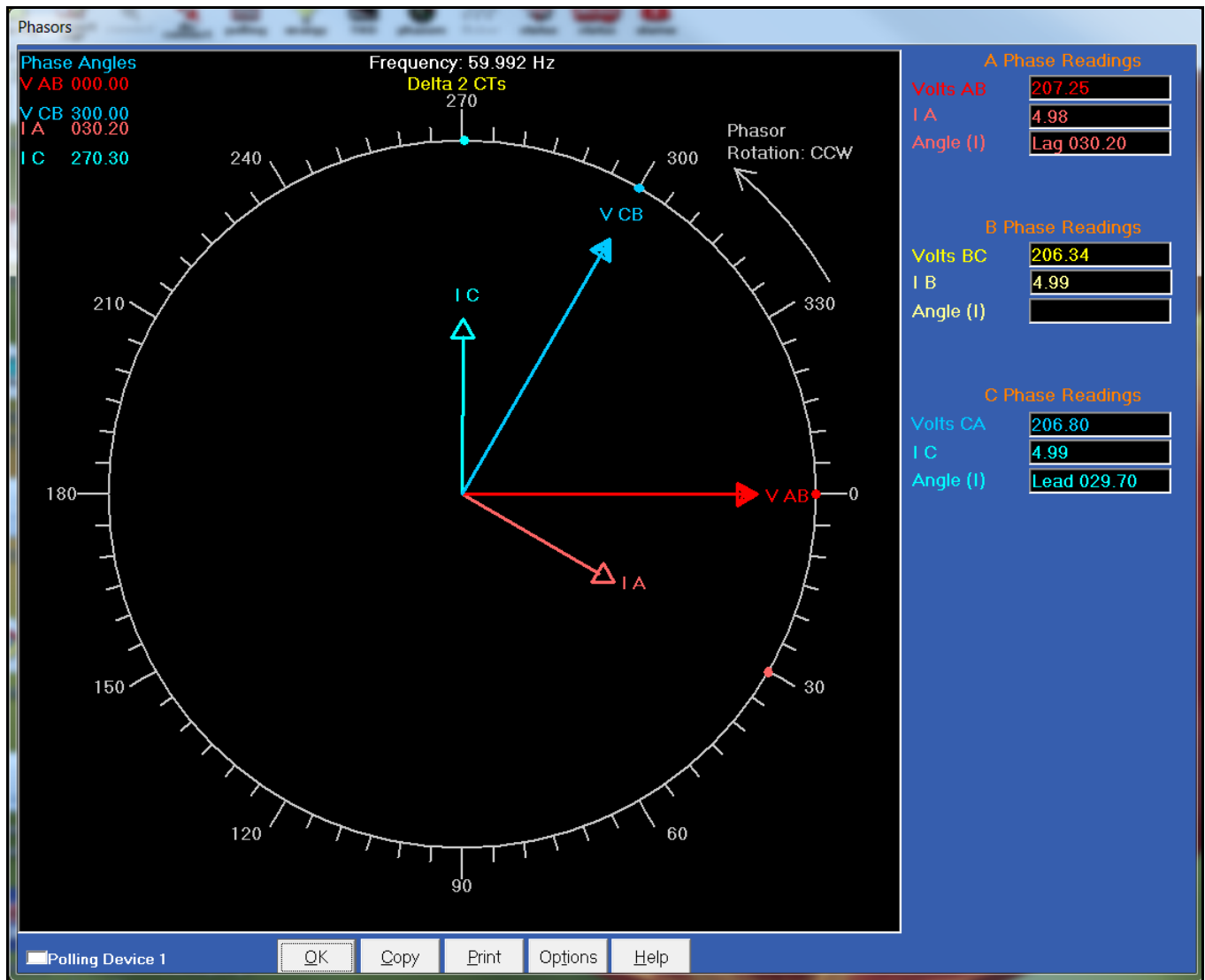


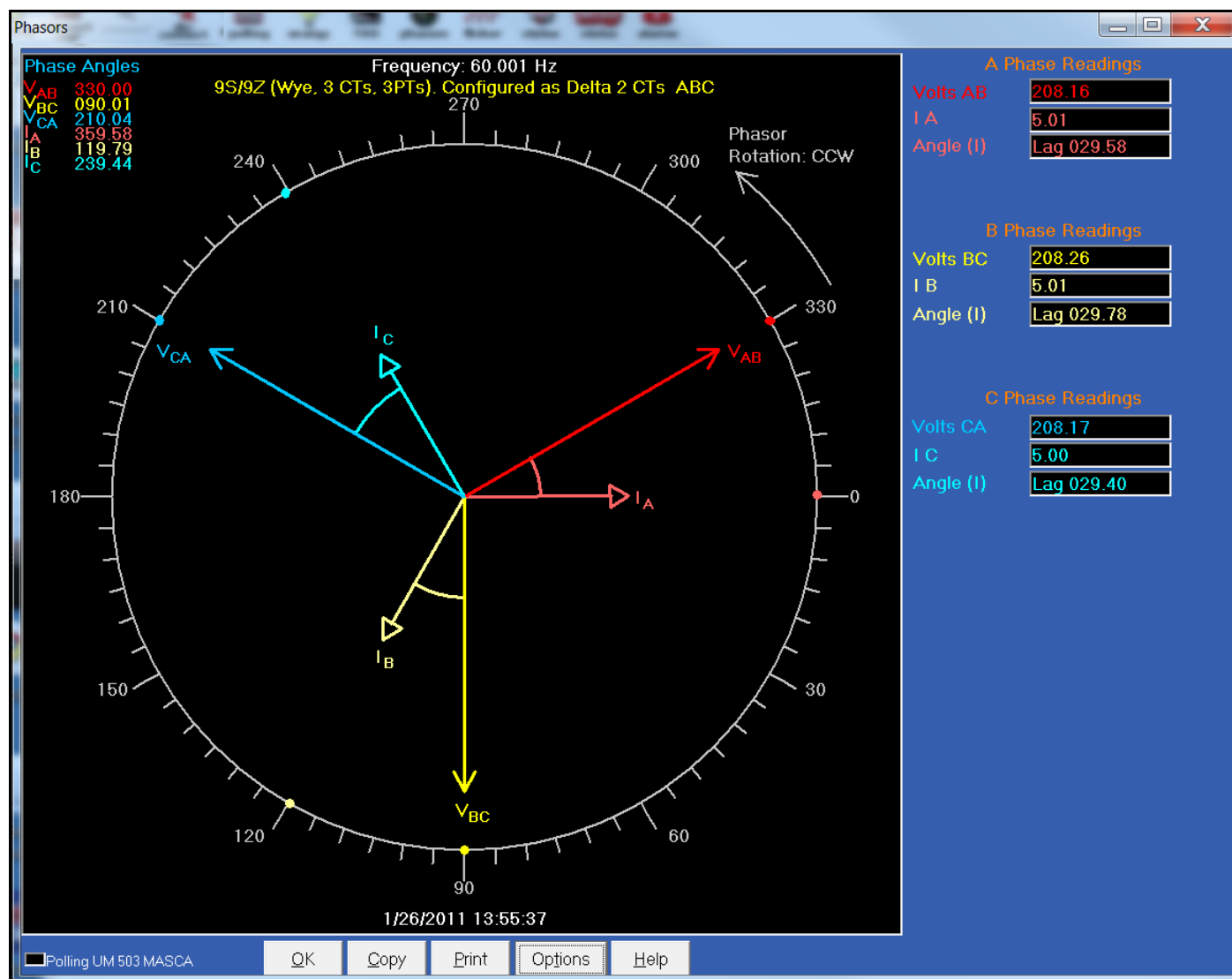
4. System: WYE Hookup with IA and IB Swapped



**5. System: WYE Hookup - Either the Hi and Low Swapped on all CTs  
or Generating Power**

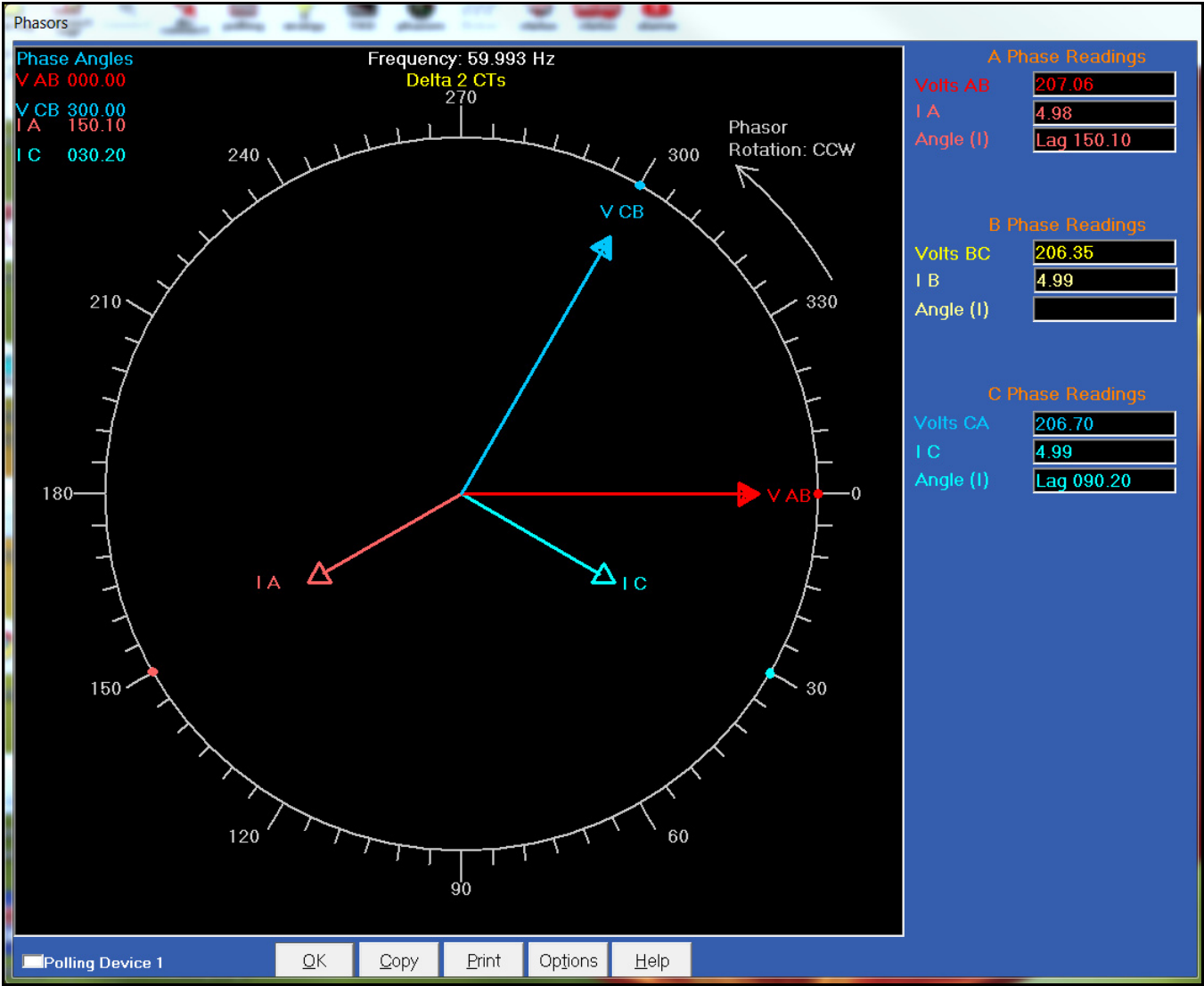


**6. System: Delta Hookup - Shark® or Nexus® Meter with 2 Voltage Settings**

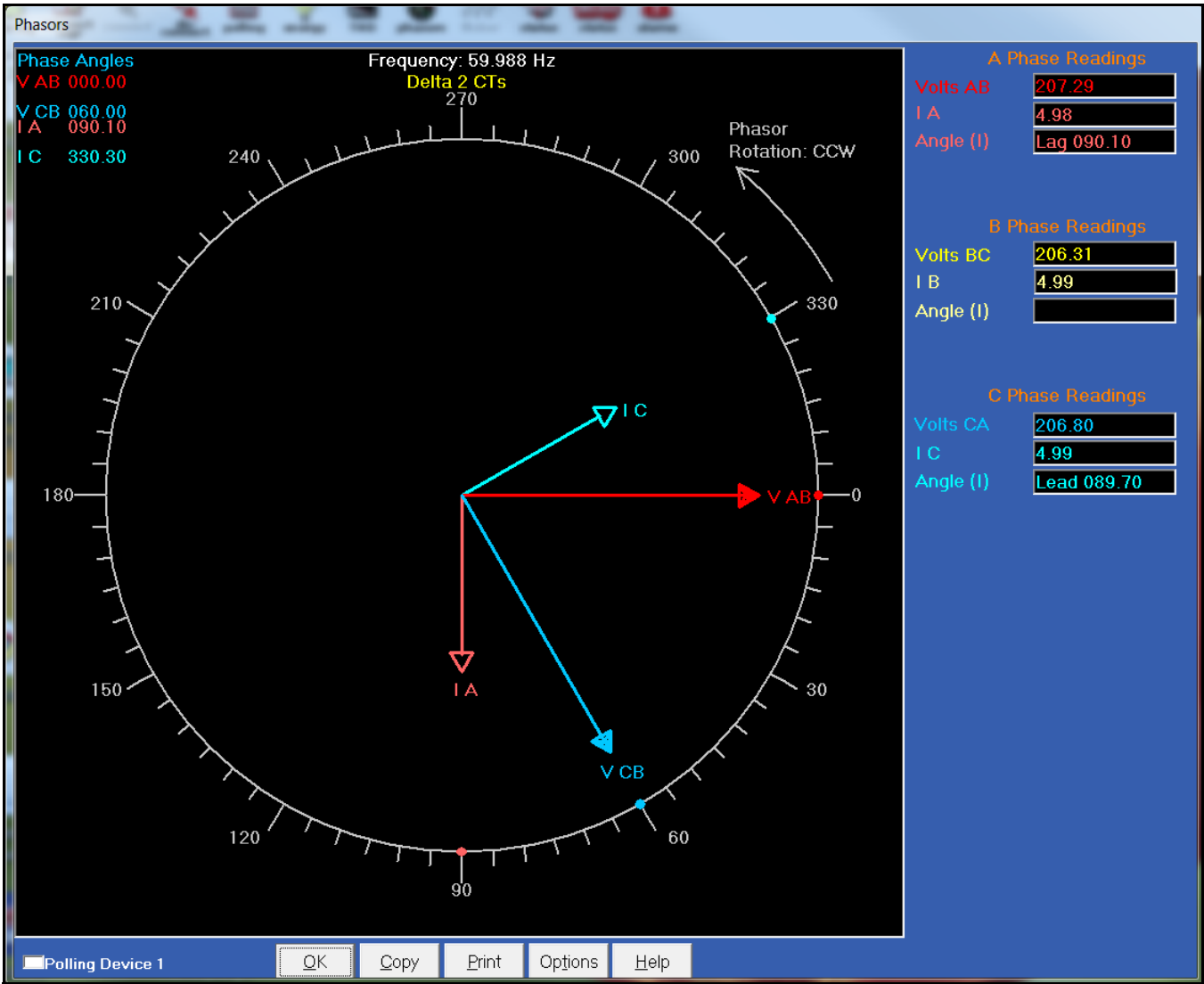
**7. System: Delta Hookup - Nexus® Meter with 3 Voltage Settings**

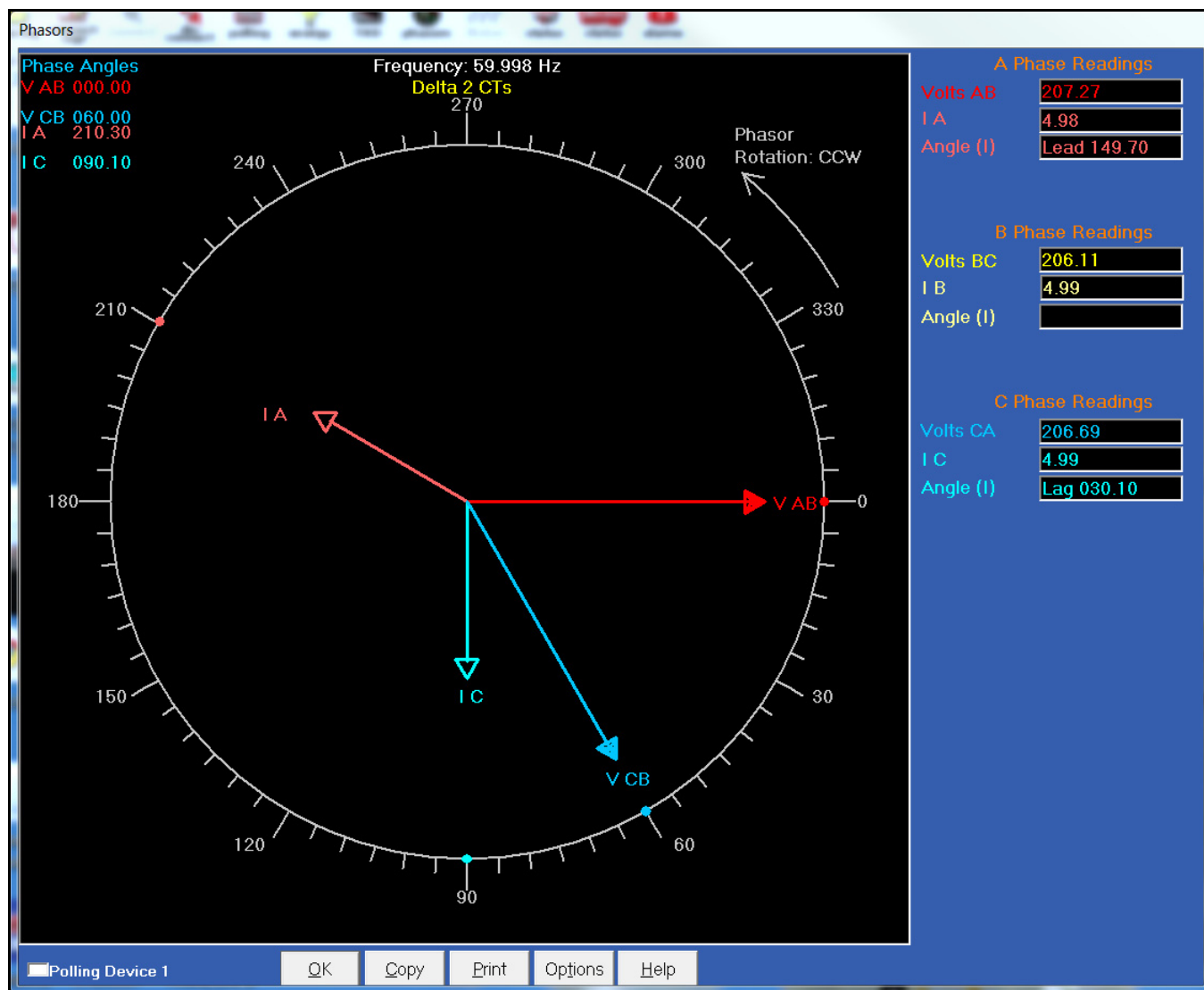


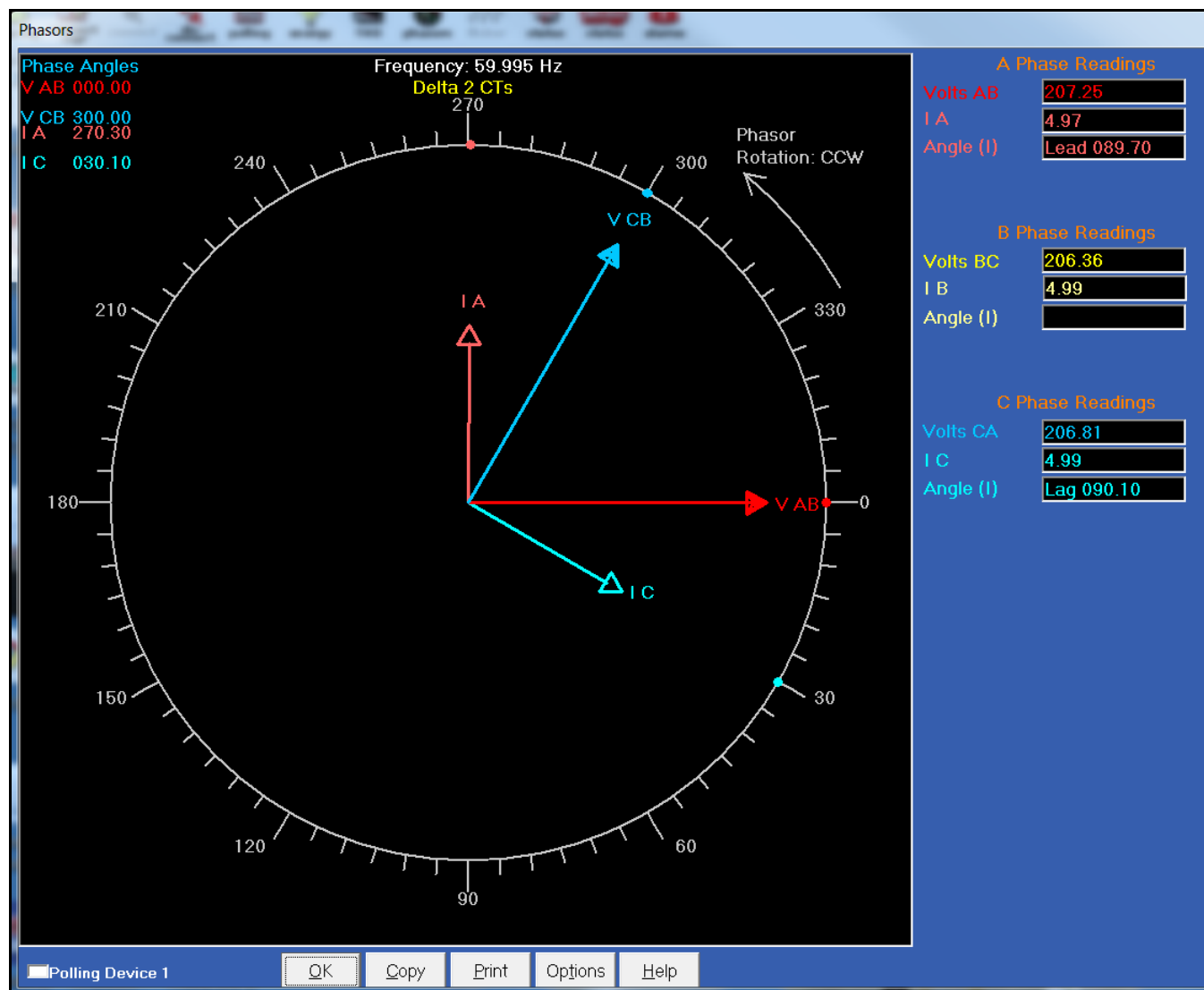
8. System: Delta Hookup - VA and VB Swapped

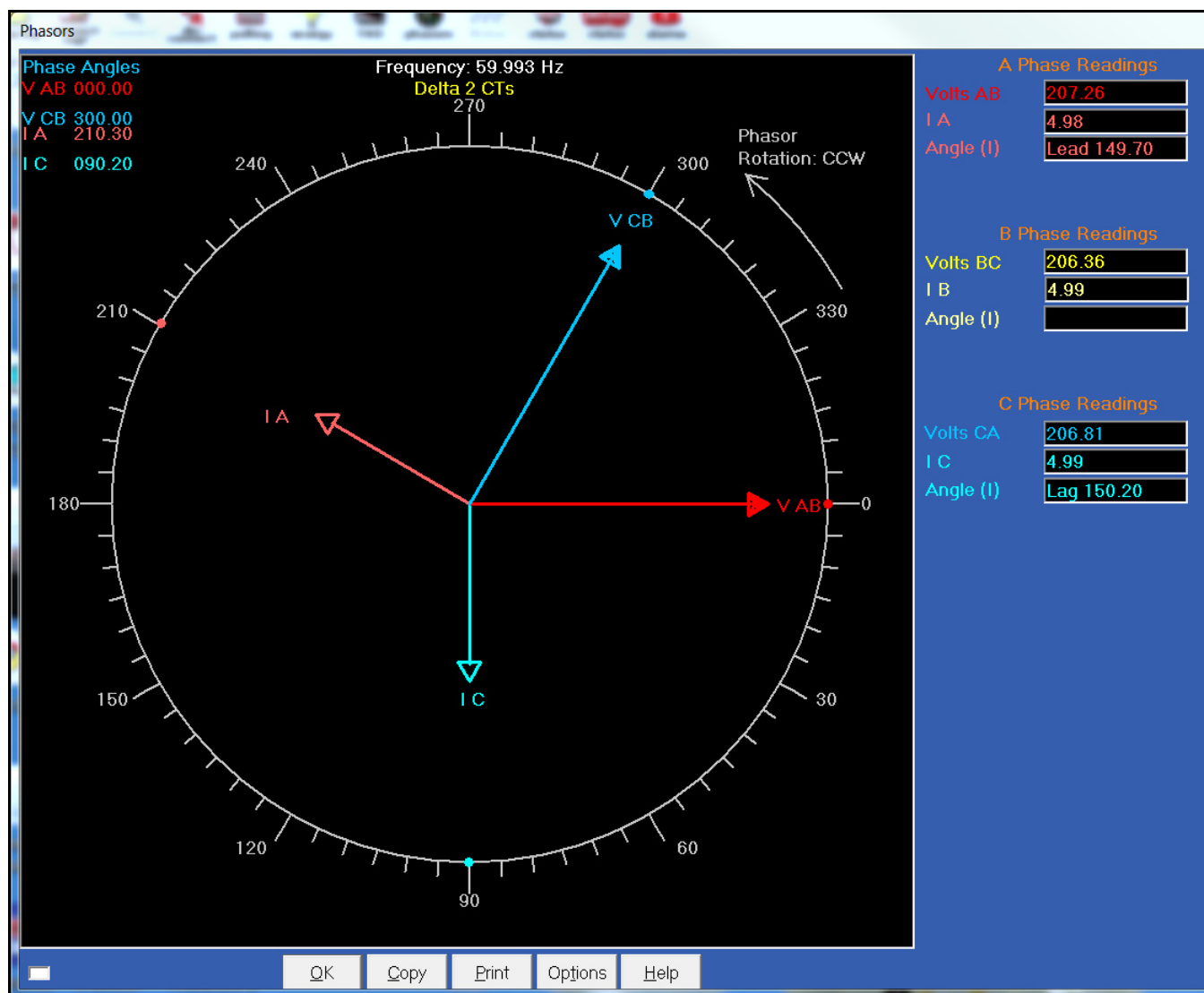


9. System: Delta Hookup - VA and VC Swapped



**10. System: Delta Hookup - VA in C, VB in A, VC in B**

**11. System: Delta Hookup - IA and IC Swapped**

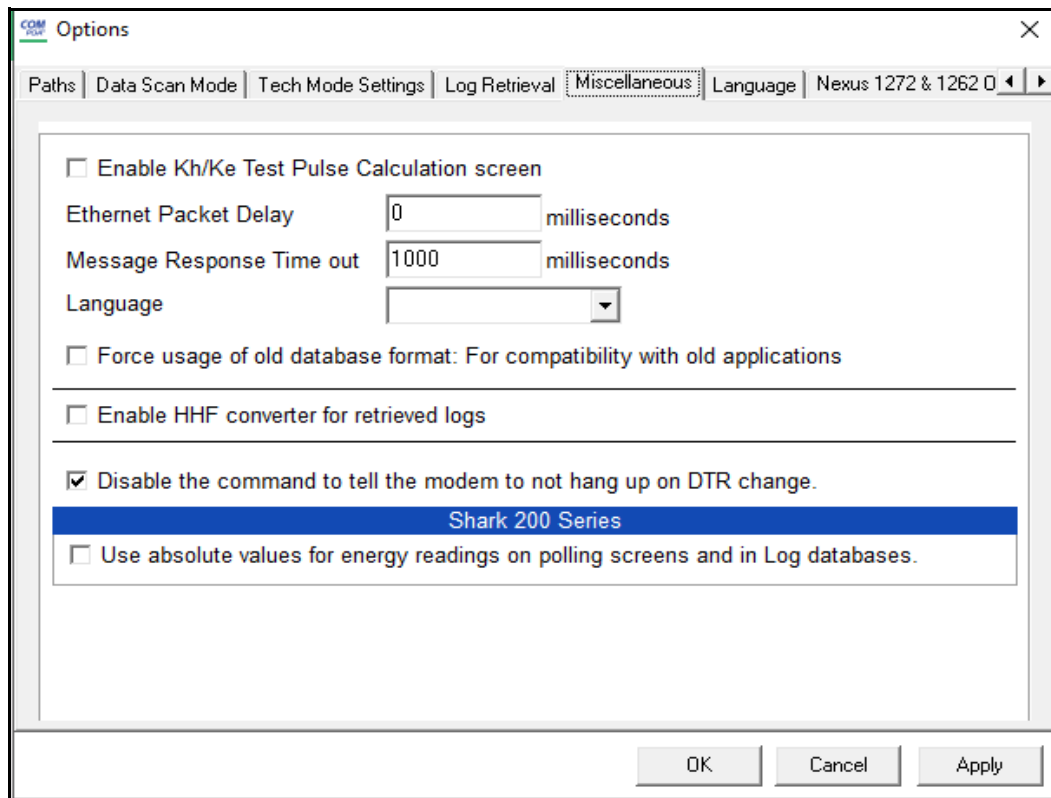
**12. System: Delta Hookup - Either all the CTs Swapped or Generating Power**

## E.2: Optical Port Communication Problems

If you are having new communication problems with your Optical port reader, this may be due to software changes that were implemented for the Nexus® 1500/1500+ and Shark® 250/270 meters, to disable a modem from hanging up on a DTR change during log retrieval or meter configuration. You may encounter a problem with this fix, since the Optical port reader using DTR to determine the Inverted or Not Inverted mode.

To fix this issue, follow these instructions:

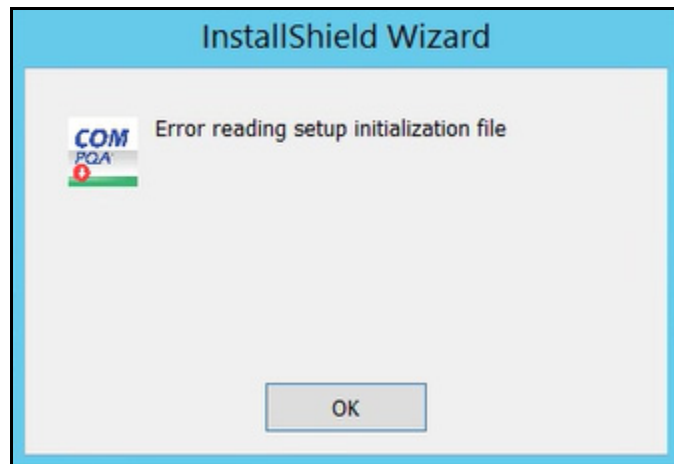
1. From the CommunicatorPQA® software's Main screen, click View>Options to open the Options screen.
2. Click the Miscellaneous tab.



3. Check the box next to Disable the command to tell the modem not to hang up on DTR change. (By default, this box is un-checked).
4. Click OK (or Apply, if you are going to make other changes using the Options screen).

### E.3: Installation Error

If you see the following message when you are installing the CommunicatorPQA® application, the installation file is corrupt.



Click OK to close the message window and retrieve the software download file again from EIG's website: <https://www.electroind.com/products/communicatorpqa-power-monitoring-software/>.

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## F: Landis + Gyr Custom Reports

### F.1: Overview

The MeterManagerPQA® application has a custom report function that was developed for use with the Landis + Gyr server. This appendix gives you instructions for using the custom reports feature.

Custom reports are generated from the data logged by EIG meters and downloaded by the MeterManagerPQA® software. The report data can be formatted and scaled as needed for its use. The specific details of the reports are saved in report templates, which can be automatically generated on a set schedule. Once the report is generated, you can store it in a location local to the server or upload it to an SFTP server for secured, wider access.

There are three report types:

- EMED - This is an energy summation usage report. It reports single values on a meter by meter basis.
- CMEP - This is an interval data report. It reports on a meter by meter, channel by channel basis. It includes flags for each interval that indicate events such as daylight savings time (DST), short or long energy intervals, or missing intervals. See [F.8: Shark® 270 Meter CMEP Custom Report Interval Flags, on page F-28](#), for the flags used for the Shark® 270 meter's CMEP custom report.
- Events - This is the System Events report. It contains for each meter all events that occurred during the report's period (e.g., for the past 24 hours if the period is set as "daily").

The following sections explain the process of setting up and generating custom reports.

## F.2: Step One: Configure the Meter's Log Profile

To download the specific data you need for your EMED and CMEP reports, you must first configure the meters' trending logs to retrieve the data channels (i.e., data fields) you need and to log them every 15 minutes, as required for the custom reports. (The Events report doesn't need to be configured by you, since the report has a fixed format. See [F.7: Shark® 270 Meter Logged Events, on page F-27](#) for the events logged for the Shark® 270 meter.) The chapters in this manual devoted to the individual meters contain detailed instructions on setting up the trending logs and their intervals. A basic example is given here for a Nexus® 1500+ meter. Refer to the links below to access the instructions for all EIG meters.

**NOTE:** The specific data fields that are available for the custom reports depend on the Landis + Gyr implementation for your meters/system. The data fields available for the Shark® 270 meter are listed in [F.6: Shark® 270 Meter Available Data Channels, on page F-26](#). See your network administrator for the data fields available for other EIG meters.

Nexus® 1252 meter: [13.4: Trending Profile Settings, on page 13-71](#).

Nexus® 1262/1272 meter: [12.4: Trending Profile Settings, on page 12-92](#).

Nexus® 1450 meter: [27.4: Trending Profile Settings, on page 27-73](#).

Nexus® 1500+ meter: [11.4: Trending Profile Settings, on page 11-106](#).

Shark® 200/200S meter: [8.4: Trending Profiles Settings, on page 8-31](#).

Shark® 250 meter: [28.4: Logs, on page 28-66](#).

Shark® 270 meter: [26.4: Logs Setting, on page 26-79](#).

ST40 meter: [30.4: Logs, on page 30-29](#).

MP200™ Metering System: [10.4: Trending Profiles Settings, on page 10-24](#).

1. From the Device Profile, open the log settings for one of the historical logs. See the example below.

The Group and Subgroup menus let you view available data channels in Selectable Items.

The Add and Remove buttons let you move data channels into Selected Items.

The data channels here will be logged.

Click to set the interval for this log to 15 minutes.

2. Use the Group and Subgroup fields to display and locate the data channels you want to use in the report. To add a field to the report, click on it in the Selectable Items list and click Add. The data field will be moved to the Selected Items list. (If you want to remove an item from the Selected Items list, click on it and click Remove. It will be put back into the Selectable Items list.)

3. When you have finished selecting data channels, click Set Interval.

Log 1 Interval			Log 5 Interval		
0	Hour	15	Minutes	0	Seconds
0	Hour	15	Minutes	0	Seconds
Log 2 Interval					
0	Hour	15	Minutes	0	Seconds
Log 3 Interval					
0	Hour	15	Minutes	0	Seconds
Log 4 Interval					
0	Hour	15	Minutes	0	Seconds
Log 5 Interval					
0	Hour	15	Minutes	0	Seconds
Log 6 Interval					
0	Hour	15	Minutes	0	Seconds
Log 7 Interval					
Configured for EN50160 / IEC 61000-4-30					
Log 8 Interval					
Configured for EN50160 / IEC 61000-4-30					

OK Help Cancel

4. Make sure the log you configured is set to a 15 minute logging interval. Click OK to close the Interval setting screen and then click OK to close the trending log screen.

5. Click Update Device to send the trending log settings to the meter.

### F.3: Step 2 - Configure Demand Reset for the Meter

There are two ways to reset demand for custom reports. You can either set up automatic demand reset using the meter's Time of Use (TOU) profile, or you can manually reset demand using the CommunicatorPQA® application.

**NOTE:** Resetting demand may not be a requirement of your specific application. Consult your metering administrator if you are not sure if it is required.

#### F.3.1: Automatic Demand Reset (Nexus® 1450/1500+ and Shark® 250/270 meters only)

1. From the meter's Device Profile screen, click Revenue and Energy Settings>TOU.

Time of Use

☒ Enable Time of Use

OK

2. Make sure the box is checked to enable TOU, then click OK to close the window and click Update Device to save any changes.

- Once the meter resets, click TOU Calendar, TOU Rate Configurator. See Chapter 15: [Time of Use, on page 15-1](#) for detailed instructions for setting up TOU for your meter. The two settings you will need to make for demand reset are:

- Select Self Read Mode
- Under Billing Period, select the dates the resets should be performed on.  
**NOTE:** If specific (that is, non-recurring) dates are required, you will need to update the TOU billing period each year to set up those dates.

- Save the TOU settings and update the meter.

### F.3.2: Manual Demand Reset

- Connect to your meter through the CommunciatorPQA® application and select Tools > Reset Device Information.

Reset Device Parameters

Log Data    **Accumulators, Max / Min and Demands**    TOU Registers

☒ Reset Max / Min and Demand

☐ Reset Hour, I Squared T, and V Squared T Counters

☐ Reset Internal Input Accumulations and Aggregations

☐ Reset Internal KYZ Out Accumulations

☐ Reset Total Average Power Factor

☐ Reset Cumulative Demand Registers

OK    Cancel    Help

The screen shown here is from a Nexus® 1500+ meter - the Reset screen for your meter may look a bit different.

- Select Reset Max/Min and Demand (or Reset Max/Min Blocks) and click OK (or Reset), depending on your screen.

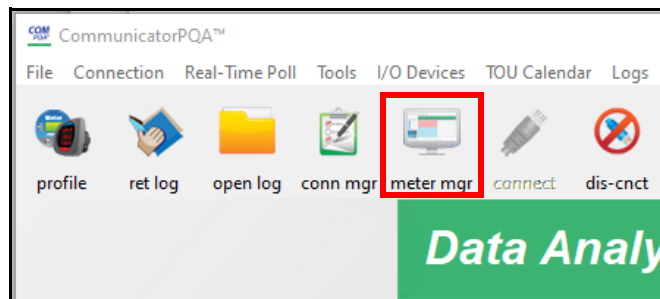
**NOTE:** If Reset Max/Min Blocks is disabled, TOU may be enabled, or security may not allow you to reset that item. Check the TOU profile, and disable as necessary.

- To confirm that the demand has been reset, from the CommunicatorPQA® main screen click Real-Time Poll > Real Time Readings > Poll Max and Min Readings. Scroll to the Demand Last Reset field, and verify that the reset occurred when you sent the Demand Reset command.

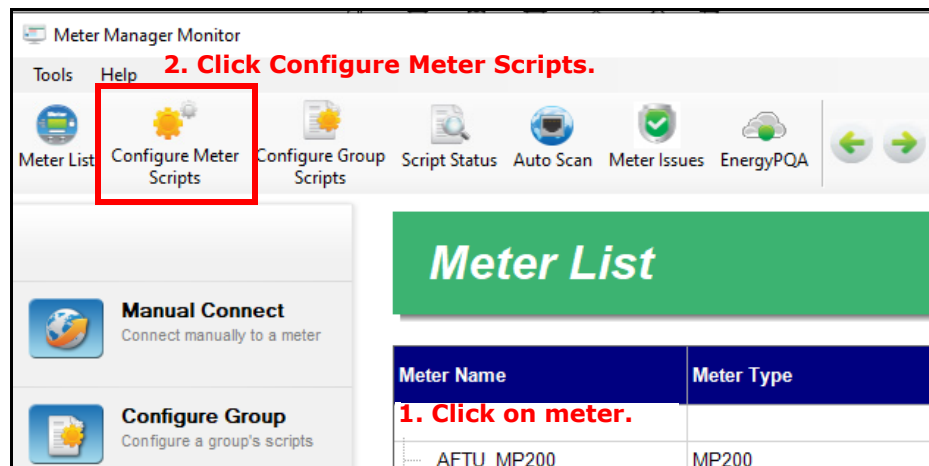
## F.4: Step 3 - Configure Meter Settings

Custom reports use meter-specific fields, such as ESIID and Meter ID, which are not available directly from the meter's programmable settings. To configure these settings:

1. Open MeterManagerPQA® by selecting it from the CommunicatorPQA® application icon bar.



2. From the Meter List, click on the meter you are making settings for and then click Configure Meter Scripts.



3. Click the Meter Config tab.

**Configure Meter Scripts**

Name: MP200\_3  
Serial: 0116560625  
Type: MP200

**1. Click Meter Config tab.**

**2. Click Add.**

**3. Enter the field you need and its value, if applicable.**

**4. Click Save.**

**Repeat steps 2 and 3 as necessary.**

Label	Value
purpose	OK
esiid	09ELECTRO
meter_id	99287916
commodity	E
premise_id	EVAL03A
program_id	7038

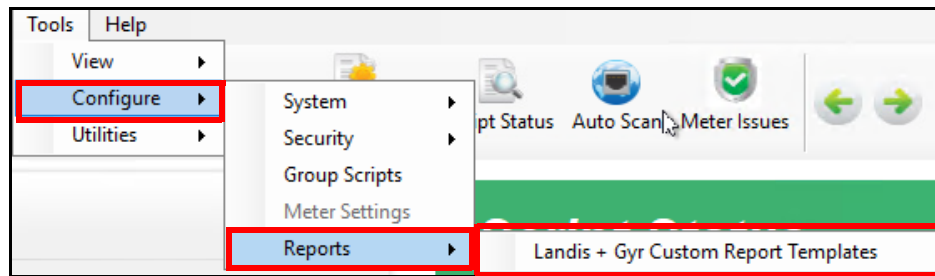
Add or remove configurable fields specific to the selected meter. This feature allows for user settable tags and values such as addresses, locations, service dates, etc. To add a configurable field click the Add button. A new row will appear in the grid, simply type in a label and value to add a field. To remove a field, select a row from the grid and click the remove button. Remember to save when you are finished editing.

4. Add the user data settings you need for the custom reports and click Save. You can then select the new data settings from the Fields configuration in the template - see [F.5.1: Create a New Report Template, on page F-12](#).

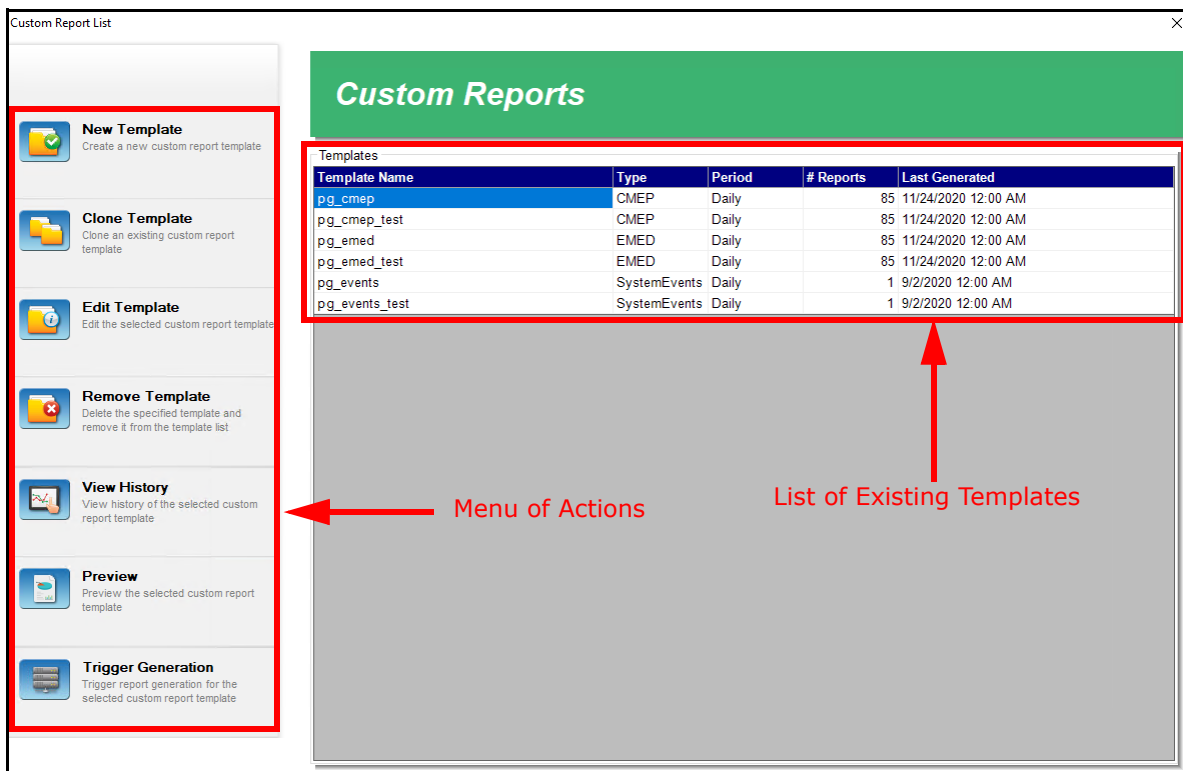
## F.5: Step 4 - Configure Custom Report Templates

You access the Custom Reports feature from the MeterManagerPQA® screen. See [Chapter 18: MeterManagerPQA® Application, on page 18-1](#) for full instructions on using the MeterManagerPQA® application.

1. From the top of the Meter Manager Monitor screen, click Tools>Configure>Reports>Landis + Gyr Custom Report Templates.



2. You will see the Custom Report List screen. This screen gives you access to all custom report functions.





- Any already created report templates are listed in the screen, with their name, type of report, report period, number of reports, and the date and time they were last generated.
- The menu on the left side of the screen lets you perform the following actions:
  - New Template - create a new template (see [F.5.1: Create a New Report Template, on page F-12](#)).
  - Clone Template - click on a template in the list and click Clone Template to open a copy of the selected template in the Edit Template screen. Follow the instructions in [F.5.1: Create a New Report Template, on page F-12](#) to make any changes and then save the cloned template with a new name.
  - Edit Template - click on a template in the list and click Edit Template to open the selected template in the Edit Template screen. Follow the instructions in [F.5.1: Create a New Report Template, on page F-12](#) to make any changes. Note that if you double-click on one of the templates in the list, the Edit Template screen opens with that template.
  - Remove Template - click on a template in the list and click Remove Template to delete the selected template and remove it from the list. Note that the template history will also be deleted.

- View History - click to view the report history of the selected template.

See the example screen, below.

View History				
Template Name EMED_template_2		Report Period Daily		
Report Type EMED		# Reports 22		
Last Generated 4/27/2021 12:04:58 AM		Meter Last Times		
Date Generated	Report Start Time	Report End Time	Date Stored	Status
05/20/2021 9:14:54 AM	04/06/2021 12:05:00 AM	04/07/2021 12:04:58 AM	4/27/2021 12:04 AM	
05/20/2021 9:15:16 AM	04/06/2021 12:05:00 AM	04/07/2021 12:04:58 AM	4/27/2021 12:04 AM	
05/20/2021 9:15:18 AM	04/07/2021 12:05:00 AM	04/08/2021 12:04:58 AM	4/27/2021 12:04 AM	
05/20/2021 9:15:20 AM	04/08/2021 12:05:00 AM	04/09/2021 12:04:58 AM	4/27/2021 12:04 AM	
05/20/2021 9:15:22 AM	04/09/2021 12:05:00 AM	04/10/2021 12:04:58 AM	4/27/2021 12:04 AM	
05/20/2021 9:15:24 AM	04/10/2021 12:05:00 AM	04/11/2021 12:04:58 AM	4/27/2021 12:04 AM	
05/20/2021 9:15:26 AM	04/11/2021 12:05:00 AM	04/12/2021 12:04:58 AM	4/27/2021 12:04 AM	
05/20/2021 9:15:28 AM	04/12/2021 12:05:00 AM	04/13/2021 12:04:58 AM	4/27/2021 12:04 AM	
05/20/2021 9:15:30 AM	04/13/2021 12:05:00 AM	04/14/2021 12:04:58 AM	4/27/2021 12:04 AM	
05/20/2021 9:15:32 AM	04/14/2021 12:05:00 AM	04/15/2021 12:04:58 AM	4/27/2021 12:04 AM	
05/20/2021 9:15:34 AM	04/15/2021 12:05:00 AM	04/16/2021 12:04:58 AM	4/27/2021 12:04 AM	
05/20/2021 9:15:36 AM	04/16/2021 12:05:00 AM	04/17/2021 12:04:58 AM	4/27/2021 12:04 AM	
05/20/2021 9:15:38 AM	04/17/2021 12:05:00 AM	04/18/2021 12:04:58 AM	4/27/2021 12:04 AM	
05/20/2021 9:15:40 AM	04/18/2021 12:05:00 AM	04/19/2021 12:04:58 AM	4/27/2021 12:04 AM	
05/20/2021 9:15:42 AM	04/19/2021 12:05:00 AM	04/20/2021 12:04:58 AM	4/27/2021 12:04 AM	
05/20/2021 9:15:44 AM	04/20/2021 12:05:00 AM	04/21/2021 12:04:58 AM	4/27/2021 12:04 AM	
05/20/2021 9:15:46 AM	04/21/2021 12:05:00 AM	04/22/2021 12:04:58 AM	4/27/2021 12:04 AM	
05/20/2021 9:15:48 AM	04/22/2021 12:05:00 AM	04/23/2021 12:04:58 AM	4/27/2021 12:04 AM	
05/20/2021 9:15:50 AM	04/23/2021 12:05:00 AM	04/24/2021 12:04:58 AM	4/27/2021 12:04 AM	
05/20/2021 9:15:52 AM	04/24/2021 12:05:00 AM	04/25/2021 12:04:58 AM	4/27/2021 12:04 AM	
05/20/2021 9:15:54 AM	04/25/2021 12:05:00 AM	04/26/2021 12:04:58 AM	4/27/2021 12:04 AM	
05/20/2021 9:15:56 AM	04/26/2021 12:05:00 AM	04/27/2021 12:04:58 AM	4/27/2021 12:04 AM	

- If you double-click on one of the reports and it is a local file (a file stored in a location the local server can access), the file will open.

- Click on a date and then click Meter Last Times to open the screen shown below.

Meter Data Range Feedback

Showing Data Range Feedback for: EMED\_template\_2

Meter Name	Meter Serial	Last Date
FinalTest_Cal_Nx	0000000100000006	5/18/2021
AFTU_SHK270	0167963638	4/27/2021 3:45 PM
S200_25	0176663332	5/18/2021

- This screen is display only. It shows the meters in this template and the last date their data was reported. This will generally be the same as the most recent date in the template history, but if the meter was offline, for example, the date may be different.
- Preview - click to view the report formatting with placeholder (i.e., not real) data. See the example screen below.

Template Preview: pg\_events

H	EVENT01	1	1			
D	Meter	99287916	EVAL03A	10	User Logout	12022020121500AM
D	Meter	99287916	EVAL03A	2	DST Clock Set	12022020123000AM
D	Meter	99287916	EVAL03A	10	User Logout	12022020124500AM
D	Meter	99287916	EVAL03A	2	DST Clock Set	12022020010000AM
D	Meter	99287916	EVAL03A	2	DST Clock Set	12022020011500AM
D	Meter	99287916	EVAL03A	10	User Logout	12022020013000AM
D	Meter	99287916	EVAL03A	2	DST Clock Set	12022020014500AM
D	Meter	99287916	EVAL03A	2	DST Clock Set	12022020020000AM
D	Meter	99287916	EVAL03A	2	DST Clock Set	12022020021500AM
D	Meter	99287916	EVAL03A	10	User Logout	12022020023000AM
D	Meter	99287916	EVAL03A	10	User Logout	12022020024500AM
D	Meter	99287916	EVAL03A	2	DST Clock Set	12022020030000AM

Enlarge the screen to view all of the fields.


- Trigger Generation - click to manually trigger generation of the selected template.


### F.5.1: Create a New Report Template


The instructions in this section are for creating a new template, but the steps are the same for editing an existing template, except that the template will already have settings, which you can then make changes to.


1. Click on the New Template icon in the menu on the left of the Custom Report List screen.


Add New Custom Report Template


 **New Template**  
Create new custom report template

 **Save Template**  
Save the custom report template

 **Preview Template**  
Preview the custom report template

 **Import Template**  
Import an existing custom report template

 **Export Template**  
Export an existing custom report template

 **Exit**  
Exit the custom report template editor

Template Name

Schedule

[Incremental](#)

Report Type

Storage

[Local](#)

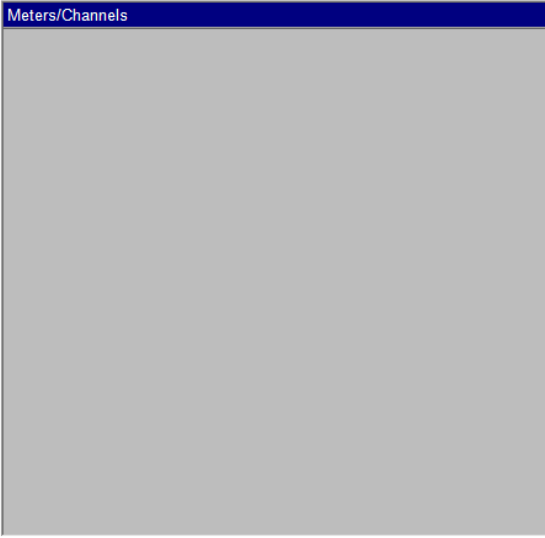
Other Options

Edit

Edit

Edit

Meters and Channels



Edit

Fields

Name	Type
Record Type	Fixed - EMED01
PremiseID	Meter Field - premise_id
ESIID	Meter Field - esiid
Provisioned	Meter Field - provisioned
Meter	Meter Field - meter_id
kWh	Last Value - energy.wh.q14
DateTime	Last Time - energy.wh.q14
Peak	Max Value - demand.watt.pos.total
Peak Date	Max Time - demand.watt.pos.total
Dmd	Fixed -
kVARh1	Last Value - energy.varh.q12
negativeKWh	Last Value - energy.wh.q23
kW4	Last Value - demand.cumulative.wh.q14
numDmdReset	Last Value - demand.resetcount
Program ID	Meter Field - program_id

Edit

2. The Menu of Actions on the left side of the screen gives you the following options:

- New Template - to create another new custom report template, click this icon. Remember to save the first report template you created before creating another one.
- Save Template - click to save a template you created.

- Preview Template - same action as for the Custom Reports List screen - see [F.5: Step 4 - Configure Custom Report Templates, on page F-8](#).
- Import Template - click to locate a custom report template file that was previously exported and bring its settings into the new report template. You can then make any changes you want and save the new template with a different name.
- Export Template - click to export the current template to a file on the local computer.
- Exit - click to return to the Custom Report List screen.

3. Make the following settings:

- Template Name - enter a name for the new template.
- Schedule - Click edit to the right of the Schedule field.

Schedule

Period Incremental

Start From 2020/12/01 14:25

OK Cancel

- Click on the Period menu to choose the report period.

Schedule

Period Incremental

Start From

Incremental  
Hourly  
Daily  
Weekly  
Monthly

OK Cancel

The choices are:

- Incremental - select to generate a report from the last time generated to the newest time available, for the meters in the report.
- Monthly - select to generate a report on each calendar month.

- Weekly - select to generate a report on each calendar week, beginning on Sunday.
  - Daily - select to generate a report for each day, starting at the specified time.
  - Hourly - select to generate a report for a configurable number of hours.
- Click on the Start From menu to open a calendar that lets you select the date when the first report should be generated.

The screenshot shows a 'Schedule' dialog box. The 'Period' dropdown is set to 'Incremental'. The 'Start From' field displays '2020/12/01 14:25' with a calendar icon. A calendar for December 2020 is open, showing the 1st of December selected. To the right of the calendar is a 'Cancel' button and a list of report types: 'Peak Date', 'Dmd', 'kVARh1', and 'negativeKWh'. At the bottom of the calendar, it says 'Today: 12/1/2020'.

- c. Report Type - click on the menu to choose from EMED, CMEP, or SystemEvents for this report (see [F.1: Overview](#), on page F-1 for an explanation of report types).

- d. Click the Edit button to the right of the Storage field to set up storage accessible to the local server or to upload via SFTP.

**Storage**

**Check box to save report on local machine**

☐ Local

Report Location **Browse to select the location for the file** Browse

Name Override **See instructions below** Insert Field

**Check box to save files on an SFTP server**

☐ SFTP

URL **Enter the SFTP server url** Username **Enter username and password**

Port **Enter the SFTP port** Password **\*\*\*\*\*** Insert Field

Name Override **See instructions below** Insert Field

**Click OK**

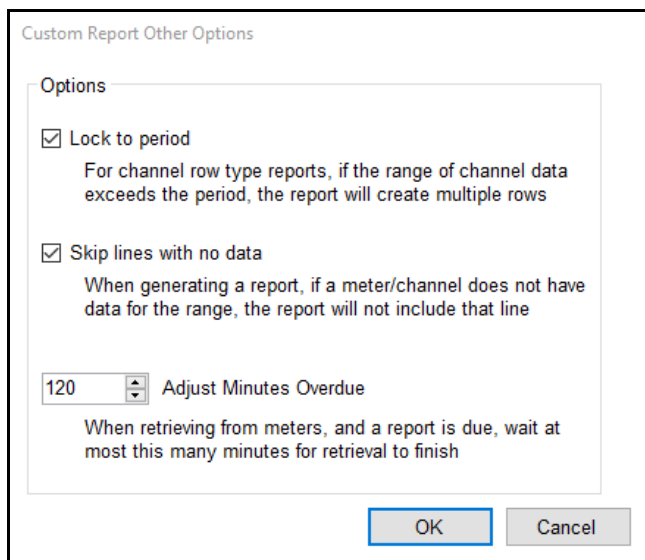
OK Cancel

- Name Override lets you specify a dynamic name for the report, i.e., a name that will change depending on the values at the time the report is generated, e.g., the current date. To set up a dynamic name, click Insert Field to the right of Name Override.

<report.name>	Inserts the name of the report template.	<span>Browse</span>
<start.date>	Inserts the start date of the report range, as yyyyMMddH	<span>Insert Field</span>
<gen.date>	Inserts the generation date of the report, as yyyyMMddH	

- Click on a field to add it to the Name Override. You can repeat this step to add a second field, or all three fields, to the report title.

e. Click Edit to the right of the Other Options field to open the screen below.



The dialog box is titled "Custom Report Other Options". It contains three sections:

- Options**
  - ☒ **Lock to period**  
For channel row type reports, if the range of channel data exceeds the period, the report will create multiple rows
  - ☒ **Skip lines with no data**  
When generating a report, if a meter/channel does not have data for the range, the report will not include that line
- Adjust Minutes Overdue**  
A numeric input field with a pull-down arrow, currently showing "120". Below it, text reads: "When retrieving from meters, and a report is due, wait at most this many minutes for retrieval to finish"

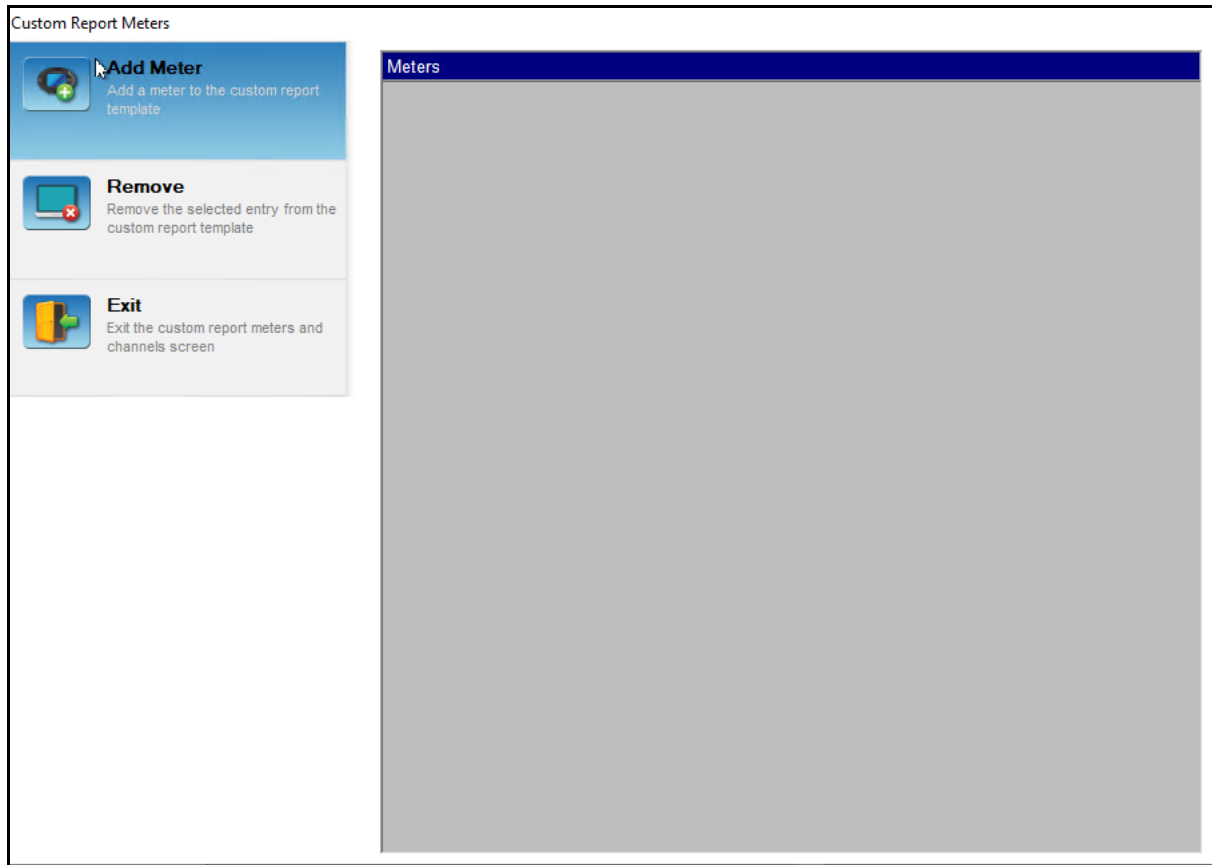
At the bottom right are "OK" and "Cancel" buttons.

- Check the Lock to Period box to create additional rows if the channel data exceeds the period - this applies to reports set up with channel rows.
  - Check the Skip Lines with No Data box to eliminate report lines with no data.
  - From the pull-down menu, select the number of minutes the system should wait for the meter data retrieval to finish, when a report is due. In the example screen, the setting of 120 will cause the report to be up to two hours later than scheduled.
- f. Click OK if you have made selections on this screen or click Cancel if you do not want to change anything.

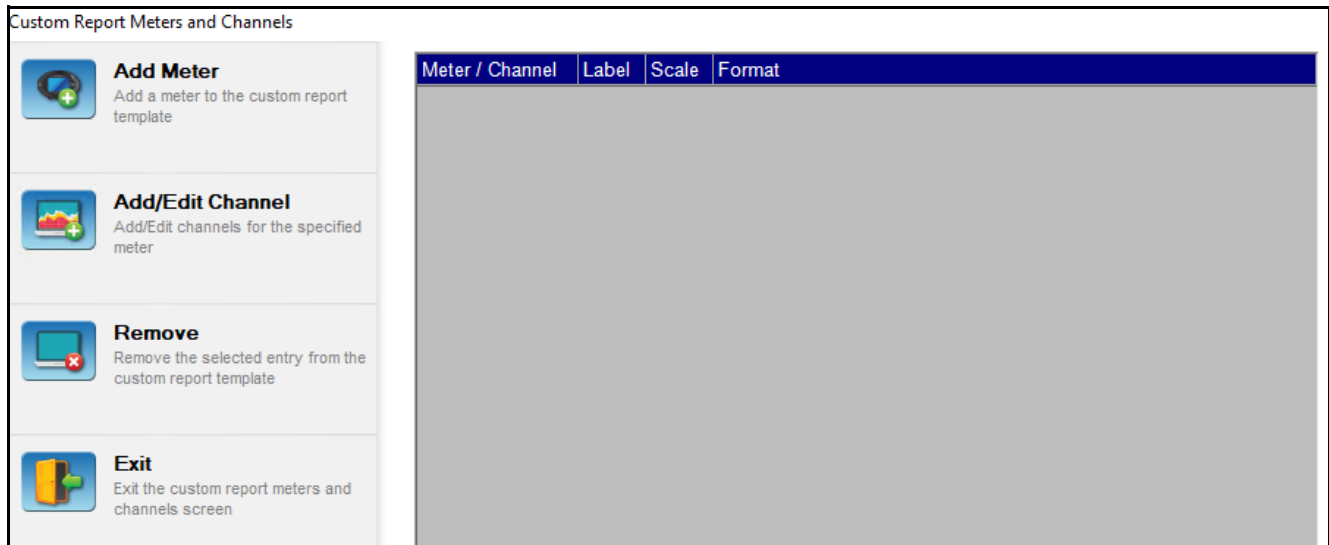


g. Click Edit above the Meter/Channels box to add or delete meters from the report.

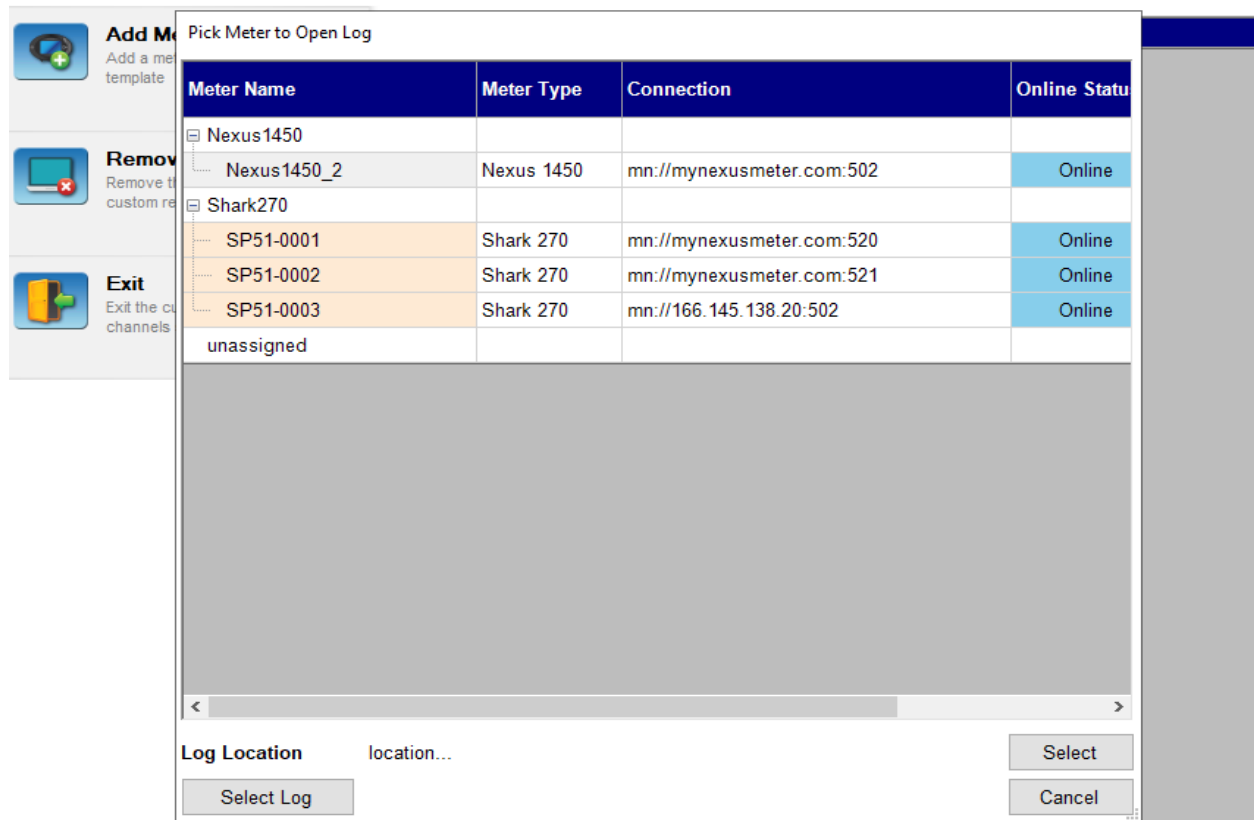
- If you are creating a report template for an EMED or System Events report type, you will see the screen shown below.



- If you are creating a CMEP report type, the screen shown also contains data channel settings for the meter.



- If this is a new report, there won't be any meters listed. Click Add Meter.



- The available meters are listed, showing the meter name, type (i.e., model), connection details, and online status. To select a meter, click on it.

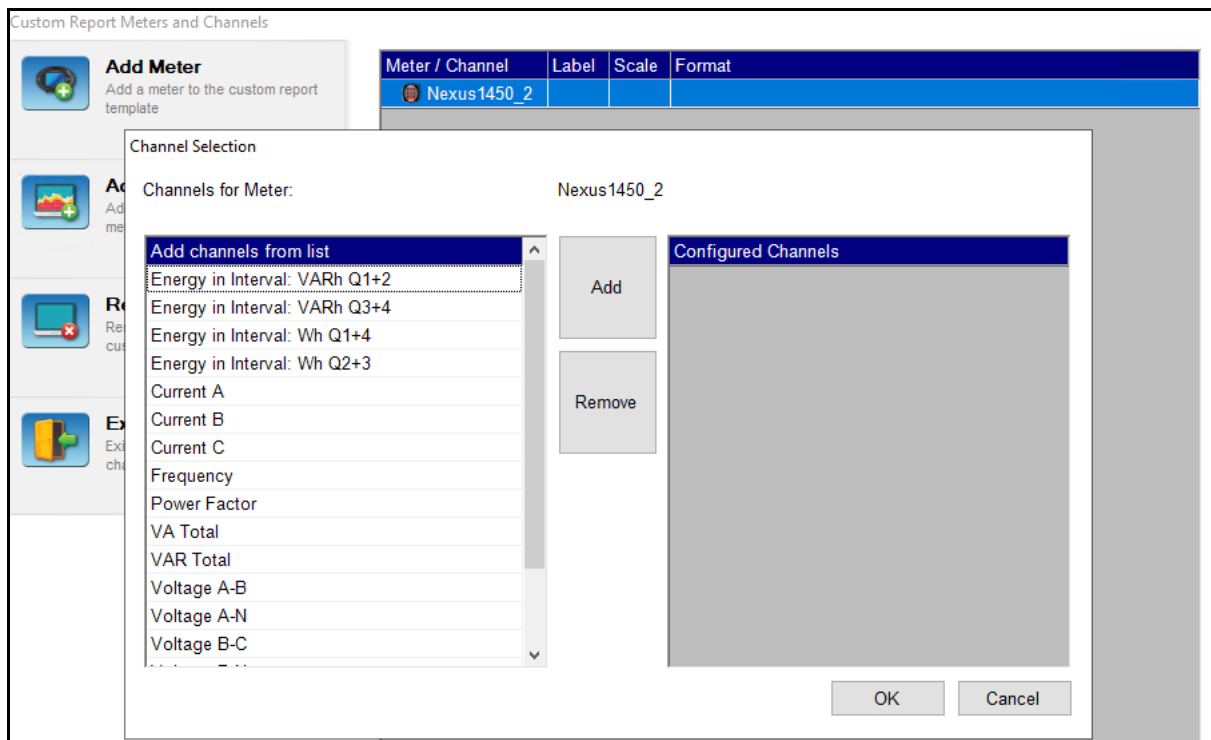
Pick Meter to Open Log

Meter Name	Meter Type	Connection	Online Status
[-] Nexus1450			
Nexus1450_2	Nexus 1450	mn://mynexusmeter.com:502	Online
[-] Shark270			
SP51-0001	Shark 270	mn://mynexusmeter.com:520	Online
SP51-0002	Shark 270	mn://mynexusmeter.com:521	Online
SP51-0003	Shark 270	mn://166.145.138.20:502	Online
unassigned			

Log Location    C:\Users\Public\Documents\Electro Industries\Communicator\_Ext\Retrieved Logs\Nexus1450\_2\_\_0000000168025830\Nexus1450\_2\_\_000000016802

Select    Cancel

- Note that you are actually selecting the meter's log, which contains the data channels you want in the report. The log location is listed at the bottom of the screen. If you want to use this log, click Select.
- The Pick Meter to Open Log screen will close and you will see the Custom Report Meters screen. You can add another meter or remove meters. When you are done, click Exit to close the screen.
- For a CMEP report type template, once you select the meter and its log file, you can add data channels for the meter. These data channels can be selected from the data channels available in the log file. To add a data channel, click on a meter in the list and click Add/Edit Channel.



- The available data channels depend on the settings you made for the meter's historical log.
- To add a channel, click on it in the Channels for Meter list and click Add. (If you need to remove a channel you added, click on it in the Configured Channels list and click Remove.)
- When you are done adding channels, click OK. The Custom Reports and Channels screen will now show the additional channels for the meter.

Custom Report Meters and Channels

**Add Meter**  
Add a meter to the custom report template

**Add/Edit Channel**  
Add/Edit channels for the specified meter

**Remove**  
Remove the selected entry from the custom report template

**Exit**  
Exit the custom report meters and channels screen

Meter / Channel	Label	Scale	Format
Nexus1450_2			
Energy in Interval: VARh Q3+4	Energy in Interval: VARh Q3+4	0.10	0.000
Current A	Current A		
Current B	Current B		
Current C	Current C		

- The data channel will be listed along with its label. You can specify any label you want. This label will be displayed as the channel name in the report. You can add scaling and formatting settings by clicking in the Scale and Format fields for the channel. If you don't want to apply scale or format settings, just leave these fields blank.
- You can continue to add channels and meters. To edit a channel, click on the channel in the list and click Add/Edit Channel. (To remove a channel, click Remove Channel.)
- When you are done adding meters and channels, click Exit. The meters and channels will be listed in the Add New Custom Report Template screen.

Report Type

CMEP

Storage

Other Options

Edit

Edit

Meters and Channels

Edit

Meters/Channels

Nexus1450\_2

Energy in Interval: VARh Q3+4

Current A

Current B

Current C


Fields


Edit


Name	Type
Record Type	Fixed - MEPMD01
Record Version	Fixed - 20080519
Time Stamp	Report Start Time
PremiseID	Meter Field - premise_id
ESIID	Meter Field - esiid
Provisioned	Meter Field - provisioned
Meter ID	Meter Field - meter_id
Purpose	Meter Field - purpose
Commodity	Meter Field - commodity
Units	Channel Name
Calculation Cons	Fixed -
First Time	First Time -
Interval	Interval of Log Data
Count	Count of Log Data Items
Data	Log Data


- The report fields, i.e., report columns, that are listed in the Create New Report Template screen are determined by the report type you selected. If you want to add or delete a report field, click Edit above the Fields box.


**Edit Fields**



**Add Field**  
 Add a field to the custom report template



**Remove Field**  
 Remove the selected field from the custom report template


**Edit Field**  
 Edit selected field for the current custom report template


**Move Up**  
 Move the selected field up in the current field order


**Move Down**  
 Move the selected field down in the current field order


**Clear All**  
 Clear all fields for this custom report template


**Exit**  
 Exit the custom report Edit Fields screen

Field Code	Label	Parameter
Fixed	Record Type	fixed=EMED01
Meter Field	PremiseID	
Meter Field	ESIID	
Meter Field	Provisioned	
Meter Field	Meter	
Last Value	kWh	chan=<energy.wh.q14>, format=0.000, scalar=0.001
Last Time	DateTime	chan=<energy.wh.q14>, format=MMddyyyyhhmmssstt
Max Value	Peak	chan=<demand.watt.pos.total>, format=0.00
Max Time	Peak Date	chan=<demand.watt.pos.total>, format=MMddyyyyhhmmssstt
Fixed	Dmd	
Last Value	kVARh1	chan=<energy.varh.q12>, format=0.000, scalar=0.001
Last Value	negativeKWh	chan=<energy.wh.q23>, format=0.00, scalar=0.001
Last Value	kW4	chan=<demand.cumulative.wh.q14>, format=0.00, scalar=0.001
Fixed	numDmdReset	fixed=3
Meter Field	Program ID	

**NOTE:** If you select SystemEvents as the report type, there are no fields listed, since its report fields are fixed.

- To add a field to the report template, click Add Field.

**Add Field** Click to select Field for report template

Field:

Label:

Value:

- The possible field types are listed in the Fields submenu. Click on the type you are adding.

- After you select the field, you will enter the Label, which will be the column header for that field in the report template. Other than Label, each field type has specific settings. The field types and their settings are listed, below.
- **Fixed** – Specifies a fixed value to always use in the report, such as the Record Type EMED01 value. The fixed value can then be entered at the bottom, in the Value field.
- **Meter Setting** – Specifies a meter setting to be used in the report, such as ESIID. This will pull the matching value from each meter's configuration - see [F.2: Step One: Configure the Meter's Log Profile, on page F-2](#).
- **First/Last/Max Channel Value** – The first, last, or maximum value for the specified data channel in the time range of the report. For EMED reports, the channel is specified. For CMEP reports, the channel comes from the channel that was configured in the Meters/Channels list.
- **First/Last/Max Channel Time** – The time of the first, last, or maximum value for the specified channel in the time range of the report. For EMED reports, the channel is specified. For CMEP reports, the channel comes from the channel that was configured in the Meters/Channels list.



- **Channel Name** (CMEP report type only) The channel name configured for the channel in the Meters/Channels list.
  - **Count of Log Data Items** (CMEP report type only) - The number of data items for the channel in the report.
  - **Interval of Log Data** (CMEP report type only) – The interval between data items in the report.
  - **Report Start/End Time** – The start and end time of the report. Note that this is the report’s time range, not the time of an individual meter’s data. If the data reported for a meter is from before or after the report’s time range and you want to know the specific time range of the meter’s data, select the First/Last Channel Time field type, instead.
  - **Log Data** (CMEP report type only)– The log data for the channel, fixed to a 15 minute interval. Note that this is an “expanding column.” This means that, if necessary, any field after this field will be pushed over, and this field will fill the report with as many columns as necessary to represent all interval data for all channels.
- The Edit Fields screen also lets you remove fields, edit existing fields, clear all the fields in the list, and move the listed fields up and down, which will change the location of the field in the report. Use the icons on the left side of the screen to perform these functions. When you are finished with the Edit Fields screen, click Exit. Any changes you made to the fields will be shown in the Add New Custom Report Template screen.
8. Click Save Template from the left side of the screen to save the new report template.

## F.6: Shark® 270 Meter Available Data Channels

As mentioned in [F.2: Step One: Configure the Meter's Log Profile, on page F-2](#), the data channels that will be used for the custom reports depend on the Landis +/- Gyr implementation. The data channels used by the Shark® 270 meter are already determined. They are shown in the table below.

Group	Log Channel	Custom Report Channel
Measured Values : Readings	Voltage A-N	Voltage A-N
Measured Values : Readings	Voltage B-N	Voltage B-N
Measured Values : Readings	Voltage C-N	Voltage C-N
Measured Values : Readings	Current A	Current A
Measured Values : Readings	Current B	Current B
Measured Values : Readings	Current C	Current C
Energy : Scaled Energy in Interval	Wh Received	Energy in Interval: Wh Q1+4
Energy : Scaled Energy in Interval	Wh Delivered	Energy in Interval: Wh Q2+3
Energy : Scaled Energy in Interval	VARh Received	Energy in Interval: VARh Q1+2
Energy : Scaled Energy in Interval	VAh Total	Energy in Interval: VAh Q1+2+3+4
Energy : Scaled Energy	Wh Received	Energy: Wh Q1+4
Energy : Scaled Energy	Wh Delivered	Energy: Wh Q2+3
Energy : Scaled Energy	VARh Received	Energy: VARh Q1+2
Energy : Scaled Energy	VAh Total	Energy: VAh Q1+2+3+4
Max/Min Demand : Voltage max in the Interval	V A-N Short Term Max	Short Term Interval: Voltage A-N Max
Max/Min Demand : Voltage max in the Interval	V B-N Short Term Max	Short Term Interval: Voltage B-N Max
Max/Min Demand : Voltage max in the Interval	V C-N Short Term Max	Short Term Interval: Voltage C-N Max
Average Demand : Cumulative Demand	Watts Delivered	Cumulative Demand: Wh Q1+4
Average Demand : Demand	Received Watts 3-Ph Avg	Demand: Positive Watts
Average Demand : Demand	Delivered Watts 3-Ph Avg	Demand: Negative Watts
Meter Status	Max/Min Demand Reset Counter	Demand: Reset Count

## F.7: Shark® 270 Meter Logged Events

As mentioned in [F.2: Step One: Configure the Meter's Log Profile, on page F-2](#), the Events custom report is configured to accept events that the meter automatically logs in its System Events log. The events for the Shark® 270 meter Events custom report are shown in the following table.

Group	Event	Category ID
startup	Meter Runtime Started	0
	Default Settings Applied	6
log	Log Reset	3
clock	Meter Clock Set	2
	DST Clock Set	2
	Clock Sync Failed	2
	Clock Sync Resumed	2
resets	Max/Min Reset	3
	Energy Reset	3
	Accumulators Reset	3
	Demand Reset	3
	TOU Reset	3
settings	Security Settings Edited	10
	V-Switch Changed	4
	Programmable Settings Changed	4
boot	Device Exited to Boot	0
test mode	Test-Mode Activated	7
	Test-Mode Exited	7
	Preset Energy Save	7
	Preset Energy Save Failure	7
demand	Demand Deferral Inactive	9
	Demand Deferral Active	9
security	User Login	10
	User Logout	10
	Secure Action Denied	10
	Security Enabled	10
	Security Disabled	10
	User Login Failed	10
	Sealing Switch Enabled	10
	Sealing Switch Disabled	10

## **F.8: Shark® 270 Meter CMEP Custom Report Interval Flags**

As mentioned in [F.1: Overview, on page F-1](#), the CMEP custom report contains flags for specific situations, such as DST. The CMEP flags for the Shark® 270 meter are listed below.

- Common Status, bitmask flags, high nibble
  - 0x00: OK
  - 0x01: DST - DST was in effect for this interval.
  - 0x04: Clock set forwards
  - 0x08: Clock set backwards
- Channel Status, enum, low nibble
  - 0x00: OK
  - 0x02: Short interval - Flag that the interval was shorter.
  - 0x03: Long interval - Flag that the interval was longer.
  - 0x04: Missing interval - No data is available for this interval.

# G: Migrating a CommunicatorPQA® Installation

## G.1: Overview

If you are using CommunicatorPQA® primarily for general polling or meter configuration, it may not be necessary to migrate your installation when installing CommunicatorPQA® on a new server. However, EIG recommends you follow the procedure in this appendix to migrate your CommunicatorPQA® system to the new server in the following instances:

- You have custom settings, for example ReportExporter, meter passwords, custom logs that are set to auto retrieve, time sync, or complex retrieval schedules.
- You have large meter lists in MeterManagerPQA®.
- You need to retain meter log data for longer than the meter's internal storage allows.
- You are using the EnergyReporterPQA™ application.

To migrate CommunicatorPQA® from one server to another involves transferring meter log databases, application settings, and the PostgreSQL database.

- **Meter Log Databases** - These files store the logs retrieved from the meters. They are the most important files to transfer if you want to keep more log data than what is stored in your meters. If you only need the recent meter log data that is still in the meter, you do not need to transfer these databases.
- **PostgreSQL Database** - This database stores the MeterManagerPQA® and EnergyReporterPQA™ settings and data. It will need to be transferred to retain them. If you are not using any features of MeterManagerPQA® or EnergyReporterPQA™, the PostgreSQL database does not need to be transferred.
- **Application Settings** - Application settings such as paths need to be transferred manually, and revised as appropriate for the new server. This procedure lists the application settings to check when performing a migration.

**NOTE:** This process does not migrate all data, and will not include debug information or collected statistics. Only the major data, such as meter logs, EnergyReporterPQA™ data, and settings, will be transferred.

## G.2: Preliminary Steps

Before you begin the migration procedure, follow these steps:

1. Ensure there is sufficient hard drive space.
  - When using EnergyReporterPQA™, exporting the PostgreSQL databases creates very large temp files, which are stored on the Windows system drive (C:/). While these temp files will be deleted automatically at the end of the export, they can equal the size of the PostgreSQL database. The export will fail if there is insufficient space on the drive. Make sure you clear extra space before beginning the procedure and minimize the number of running applications.
2. Stop usage of the system.
  - To ensure the integrity of the system transferred, it is best to minimize usage of the old server before beginning the migration. This includes logging off users and stopping automatic retrievals. This will ensure a consistent system and maximize resources during the migration.
3. Check the new system.
  - Always make sure the new installation meets the requirements of running a CommunicatorPQA® system before beginning the transfer (see [1.2: Installation Requirements, on page 1-3](#)). Pay special attention to recommended disk space, as the disk space used will often quickly increase immediately after the migration, as CommunicatorPQA® updates settings and data for the new system. EIG also recommends that you do not use MeterManagerPQA® and EnergyReporterPQA™ on a system shared with other high usage applications, as this will impact the performance of the CommunicatorPQA® system.
4. Make sure you have a license for the new server.
  - Make sure you have an EIG software Enterprise or Professional license before beginning your migration. If you have an Enterprise license, activate it by logging in to EnergyPQA® via MeterManagerPQA®, i.e., clicking the Cloud icon from the MeterManagerPQA® screen (see [18.10: Scripts, on page 18-112](#)). If you have a Professional license, contact Sales at Electro Industries (sales@electroind.com) to determine the best way to license your new server.

5. Make sure you have admin rights on both the old and new servers.

- Some of the actions required on both the old server and the new one require starting/stopping services and configuring restricted files. Make sure you either have, or have access to, admin rights during the migration process.

### **G.3: Procedure**

Follow this migration procedure.

1. Install the software on the new server:

- a. Retrieve the latest version of CommunicatorPQA® software from [electroind.com](https://www.electroind.com) and install it on the new server (<https://www.electroind.com/products/communicatorpqa-power-monitoring-software/>).
- b. Enter your license information and ensure that CommunicatorPQA® is activated properly (i.e., that your license is accepted). This is important, since you need MeterManagerPQA® software to transfer the old settings. (Note that the unlicensed version of the CommunicatorPQA® application does not have MeterManagerPQA®.)

2. Copy over software settings. Most settings for MeterManagerPQA® and EnergyReporterPQA™ are stored in the PostgreSQL database, but some rely on local configuration files. Before transferring the data, copy over the settings for the various applications. Following are some common settings to transfer:

- EnergyReporterPQA™ report path - Configure the EnergyReporterPQA™ report path in EnergyReporter Settings Editor>Options, if you need to create a custom path on the server - see the EnergyReporterPQA™ User Manual for instructions. You can download the manual from <https://www.electroind.com/products/energyreporterpqa-utility-billing-software/>).
- CommunicatorPQA® settings - Most of the CommunicatorPQA® settings can be safely left as their default values, but a few features need to be enabled on the new server, if you will be using them - specifically, the log retrieval settings, communications logging, and extra report generation (such as PQDIF and COM-TRADE). These can be reviewed in the CommunicatorPQA Tools>Options screen - see [20.1.20: 4GLTE Cell Modem Status \(Shark® 270 Meter\)](#), on page 20-58.



**IMPORTANT!** Do not configure the retrieved logs or archived logs' paths through the CommunicatorPQA® Options screens, as this can result in discrepancies between manual and automatic log retrieval.

3. Stop all meter retrievals on the old server.

- Before transferring meter log data or PostgreSQL data, stop the MeterManager-PQA® service (see [18.14: Service Control, on page 18-165](#) for instructions on doing this) and make sure all other users are logged out. This ensures that the databases are not being modified during the migration process.

4. Export the PostgreSQL database.

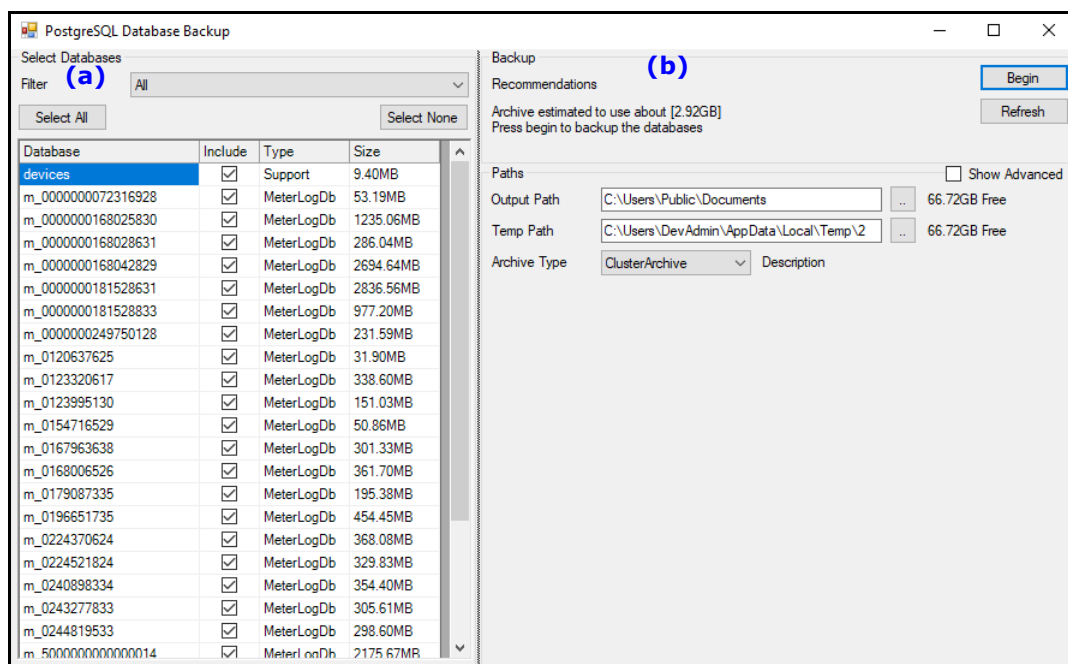
- To export the PostgreSQL database you only need to run the pg\_tools.exe application. This application is available in the MeterManagerPQA® application directory:

C:\Program Files (x86\Electro Industries\MeterManager\pg\_tools.exe.

See the screen, below.

- When you run the application, you will be asked where to store the archive file (b). Make sure there is enough space to store multiple GB, as this file can be very large on some systems.

**IMPORTANT!** Because you are retrieving multiple meters' log databases, this can be an extremely large download. EIG recommends that you download files in stages, using the filter shown in the screen shown below (a).





- b. Pg\_tools will then export all the data from the database and create the archive file. You can then transfer this file to the new server.

Archiving Database..		
Action	Progress	Status
Archiving m_meter_test		Executing archive dump
Archiving m_0000000168025830		
Creating archive file		
Archiving settings		Database Archived to 'C:\Users'
Archiving reportexporter		Database Archived to 'C:\Users'
Archiving report		Database Archived to 'C:\Users'
Archiving multi_data_storage		Database Archived to 'C:\Users'
Archiving metermanager		Database Archived to 'C:\Users'
Archiving management_db		Database Archived to 'C:\Users'
Archiving m_meter_test_01		Database Archived to 'C:\Users'
Archiving m_0123320617		Database Archived to 'C:\Users'
Archiving devices		Database Archived to 'C:\Users'
Archiving dbutils_insertbatch		Database Archived to 'C:\Users'
Archiving dbcom_test		Database Archived to 'C:\Users'

#### 6. Import PostgreSQL database.

- Once you've transferred the dbc archive file to the new server, import it by dragging the file on to pg\_tools.exe, located at (C:\Program Files (x86)\Electro Industries\MeterManager\pg\_tools.exe). This will then import the data to the new server.

#### 7. Verify the migration.

- Verify that everything is operating correctly by manually inspecting your configuration, as detailed in the following bullets.
  - Meter List - Verify that all your meters show up in the meter list and meter log data can be accessed. Also verify that you can connect to all your meters: this can be done automatically with the Online Scan script (see the instructions for the Test All Connections option in [18.12.1: Test All Connections, on page 18-158](#)).
  - ReportExporter Configuration - Check that ReportExporter configured reports are available and are configured correctly (see [18.6: Report Exporter, on page 18-58](#)).

- EnergyReporterPQA™ Data - Verify that the EnergyReporterPQA™ data can be viewed by going to EnergyReporter Settings Editor>Meter>Edit Meter Data and viewing the data. Verify the range of data available and spot check the data. See the EnergyReporterPQA™ User Manual for instructions. You can download the manual from <https://www.electroind.com/products/energyreporterpqa-utility-billing-software/>.

8. Reconfigure migrated settings.

- Some settings, such as the ReportExporter report locations, are computer specific. If you are not using the default export location, check to see if you need to reconfigure the report locations. Also, if you are using mapped drives, the configured mapped drive settings may need to be reconfigured for the new server.

## G.4: Troubleshooting

Following are some issues you may encounter and remedial actions.

1. Meters offline:

- Meter Ethernet IP addresses can be different on the new server, depending on your network topology. Confirm that all IP addresses are configured appropriately and that your network firewalls are not blocking PING or Modbus TCP (TCP 502) from the new server.

2. Smaller than expected dbc archive or missing data in EnergyReporterPQA™ after exported the PostgreSQL database:

- If you are using the EnergyReporterPQA™ application and the dbc archive file is small (<50 MB) or if EnergyReporterPQA™ is missing data, the export may have encountered a problem. The most common causes are:
  - Restricted space on the C:\ drive on the old server.
  - Limited memory on the old server.
  - Restricted permissions.
  - Older file systems that limit maximum file sizes.
- If you encounter this problem and freeing up space does not help, contact Electro Industries technical support at 516-334-0870, for further assistance.

# Glossary

0.1 Second Values:	These values are the RMS values of the indicated quantity as calculated after approximately 50 milliseconds (3 cycles) of sampling.
1 Second Values:	These values are the RMS values of the indicated quantity as calculated after one second (60 cycles) of sampling.
Alarm:	An event or condition in a meter that can cause a trigger or call-back to occur.
Annunciator:	A short label that identifies particular quantities or values displayed, for example kWh.
Average (Current):	<p>When applied to current values (amps) the average is a calculated value that corresponds to the thermal average over a specified time interval. The interval is specified by the user in the meter profile. The interval is typically 15 minutes.</p> <p>So, Average Amps is the thermal average of Amps over the previous 15-minute interval. The thermal average rises to 90 of the actual value in each time interval. For example, if a constant 100 Amp load is applied, the thermal average will indicate 90 Amps after one time interval, 99 Amps after two time intervals and 99.9 Amps after three time intervals.</p>
Average (Input Pulse Accumulations):	When applied to Input Pulse Accumulations, the "Average" refers to the block (fixed) window average value of the input pulses.
Average (Power):	When applied to power values (Watts, VARs, VA), the average is a calculated value that corresponds to the thermal average over a specified time

interval. The interval is specified by the user in the meter profile. The interval is typically 15 minutes. So, the Average Watts is the thermal average of Watts over the previous 15-minute interval. The thermal average rises to 90 of the actual value in each time interval. For example, if a constant 100kW load is applied, the thermal average will indicate 90kW after one time interval, 99kW after two time intervals and 99.9kW after three time intervals.

**Bit:** A unit of computer information equivalent to the result of a choice between two alternatives (Yes/No, On/Off, for example).

Or, the physical representation of a bit by an electrical pulse whose presence or absence indicates data.

**Binary:** Relating to a system of numbers having 2 as its base (digits 0 and 1).

**Block Window Avg:** The Block (Fixed) Window Average is the average power calculated over a (Power) user-set time interval, typically 15 minutes. This calculated average corresponds to the demand calculations performed by most electric utilities in monitoring user power demand. (See Rolling Window Average.)

**Byte:** A group of 8 binary digits processed as a unit by a computer (or device) and used especially to represent an alphanumeric character.

**CBEMA Curve:** A voltage quality curve established originally by the Computer Business Equipment Manufacturers Association. The CBEMA Curve defines voltage disturbances that could cause malfunction or damage in microprocessor devices. The curve is

	characterized by voltage magnitude and the duration which the voltage is outside of tolerance. (See ITIC Curve.)
Channel:	The storage of a single value in each interval in a load profile.
Cold Load Pickup:	This value is the delay from the time control power is restored to the time when the user wants to resume demand accumulation.
CRC Field:	Cyclic Redundancy Check Field (Modbus communication) is an error checksum calculation that enables a Slave device to determine if a request packet from a Master device has been corrupted during transmission. If the calculated value does not match the value in the request packet, the Slave ignores the request.
CT (Current) Ratio:	A Current Transformer Ratio is used to scale the value of the current from a secondary value up to the primary side of an instrument transformer.
Cumulative Demand:	The sum of the previous billing period's maximum demand readings at the time of billing period reset. The maximum demand for the most recent billing period is added to the previously accumulated total of the maximum demands.
Demand:	The average value of power or a similar quantity over a specified period of time.
Demand Interval:	A specified time over which demand is calculated.
Display:	User-configurable visual indication of data in a meter.
DNP3:	A robust, non-proprietary protocol based on existing open standards. DNP3 is used to operate

	between various systems in electric and other utility industries and SCADA networks.
EEPROM:	Nonvolatile memory. Electrically Erasable Programmable Read Only Memory that retains its data during a power outage without need for a battery. Also refers to meter's FLASH memory.
Energy Register:	Programmable record that monitors any energy quantity. Example: Watthours, VARhours, VAhours.
Ethernet:	A type of LAN network connection that connects two or more devices on a common communications backbone. An Ethernet LAN consists of at least one hub device (the network backbone) with multiple devices connected to it in a star configuration. The most common versions of Ethernet in use are 10BaseT and 100BaseT as defined in IEEE 802.3 standards. However, several other versions of Ethernet are also available.
Exception Response:	Error Code (Modbus communication) transmitted in a packet from the Slave to the Master if the Slave has encountered an invalid command or other problem.
Flicker:	Flicker is the sensation that is experienced by the human visual system when it is subjected to changes occurring in the illumination intensity of light sources. IEC 61000-4-15 and former IEC 868 describe the methods used to determine Flicker severity.
Form:	Wiring and Hookup configuration for the Nexus® 1262/1272 meter.
Harmonics:	Measuring values of the fundamental current and voltage and percent of the fundamental.

Heartbeat Pulse:	Energy indicator on the face of the Nexus® 1252 meter; pulses are generated per the programmed Ke value.
I2T Threshold:	When the current is above the set threshold, data will begin to be accumulated.
Infrared Test Pulse:	Energy indicator located on the upper left side of the face of the Nexus® 1262/1272 meter; pulses are generated per the programmed Ke value.
Integer:	Any of the natural numbers, the negatives of those numbers, or zero.
Internal Modem:	An optional modem within the meter's enclosure that connects to the RJ11 telephone connector.
Invalid Register:	In the Nexus® meter's Modbus Map there are gaps between Registers. For example, the next Register after 08320 is 34817. Any unmapped Register stores no information and is said to be invalid.
ITIC Curve:	An updated version of the CBEMA Curve that reflects further study into the performance of microprocessor devices. The curve consists of a series of steps, but still defines combinations of voltage magnitude and duration that will cause malfunction or damage.
Ke:	kWh per pulse; i.e. the energy.
kWh:	Kilowatt hours; kW x demand interval in hours.
KYZ Output:	Output where the rate of changes between 1 and 0 reflects the magnitude of a metered quantity.
LCD:	Liquid Crystal Display.
LED:	Light Emitting Diode.

Master Device:	In Modbus communication, a Master Device initiates and controls all information transfer in the form of a Request Packet to a Slave Device. The Slave responds to each request.
Maximum Demand:	The largest demand calculated during any interval over a billing period.
Modbus ASCII:	Alternate version of the Modbus protocol that utilizes a different data transfer format. This version is not dependent upon strict timing, as is the RTU version. This is the best choice for telecommunications applications (via modems).
Modbus RTU:	The most common form of Modbus protocol. Modbus RTU is an open protocol spoken by many field devices to enable devices from multiple vendors to communicate in a common language. Data is transmitted in a timed binary format, providing increased throughput and therefore, increased performance.
Network:	A communications connection between two or more devices to enable those devices to send and receive data to one another. In most applications, the network will be either a serial type or a LAN type.
NVRAM:	Nonvolatile Random Access Memory is able to keep the stored values in memory even during the loss of circuit or control power. High speed NVRAM is used in EIG meters to gather measured information and to insure that no information is lost.
Optical Port:	A port that facilitates infrared communication with a meter. Using an ANSI C12.13 Type II magnetic optical communications coupler and an RS232 or USB cable from the coupler to a PC, the meter



	can be programmed with CommunicatorPQA® software.
Packet:	A short fixed-length section of data that is transmitted as a unit. For example: a serial string of 8-bit bytes.
Percent ( ) THD:	Percent Total Harmonic Distortion. (See THD.)
Protocol:	A language that will be spoken between two or more devices connected on a network.
PT Ratio:	Potential Transformer Ratio used to scale the value of the voltage to the primary side of an instrument transformer. Also referred to as VT Ratio.
Pulse:	The closing and opening of the circuit of a two-wire pulse system or the alternate closing and opening of one side and then the other of a three-wire system (which is equal to two pulses).
Q Readings:	Q is the quantity obtained by lagging the applied voltage to a wattmeter by 60 degrees. Values are displayed on the Uncompensated Power and Q Readings screen.
Quadrant: (Programmable Values and Factors on the Nexus Meter)	<p>Watt and VAR flow is typically represented using an X-Y coordinate system. The four corners of the X-Y plane are referred to as quadrants. Most power applications label the right hand corner as the first quadrant and number the remaining quadrants in a counter-clockwise rotation.</p> <p>Following are the positions of the quadrants: 1st - upper right, 2nd - upper left, 3rd - lower left and 4th - lower right. Power flow is generally positive in quadrants 1 and 4. VAR flow is positive in quadrants 1 and 2. The most common load conditions are: Quadrant 1 - power flow positive,</p>

	VAR flow positive, inductive load, lagging or positive power factor; Quadrant 2 - power flow negative, VAR flow positive, capacitive load, leading or negative power factor.
Register:	An entry or record that stores a small amount of data.
Register Rollover:	A point at which a Register reaches its maximum value and rolls over to zero.
Reset:	Logs are cleared or new (or default) values are sent to counters or timers.
Rolling Window Average (Power):	The Rolling (Sliding) Window Average is the average power calculated over a user-set time interval that is derived from a specified number of sub-intervals, each of a specified time. For example, the average is calculated over a 15-minute interval by calculating the sum of the average of three consecutive 5-minute intervals. This demand calculation methodology has been adopted by several utilities to prevent customer manipulation of kW demand by simply spreading peak demand across two intervals.
RS232:	A type of serial network connection that connects two devices to enable communication between devices. An RS232 connection connects only two points. Distance between devices is typically limited to fairly short runs. Current standards recommend a maximum of 50 feet but some users have had success with runs up to 100 feet. Communications speed is typically in the range of 1200 bits per second to 57,600 bits per second. RS232 connection can be accomplished using Port

	1 of the Nexus® 1252 meter or EIG meters' Optical Ports.
RS485:	A type of serial network connection that connects two or more devices to enable communication between the devices. An RS485 connection will allow multi-drop communication from one to many points. Distance between devices is typically limited to around 2,000 to 3,000 wire feet. Communications speed is typically in the range of 1200 bits per second to 115,000 bits per second.
Sag:	A voltage quality event during which the RMS voltage is lower than normal for a period of time, typically from 1/2 cycle to 1 minute.
Secondary Rated:	Any Register or pulse output that does not use any CT or VT Ratio.
Serial Port:	The type of port used to directly interface with a PC.
Slave Device:	In Modbus communication, a Slave Device only receives a Request Packet from a Master Device and responds to the request. A Slave Device cannot initiate communication.
Surge/Swell:	A voltage quality event during which the RMS voltage is higher than normal for a period of time, typically from 1/2 cycle to 1 minute.

**TDD:** The Total Demand Distortion of the current waveform. The ratio of the rootsum-square value of the harmonic current to the maximum demand load current (see equation below).

**NOTE:** The TDD displayed in the Harmonics screen is calculated by the meter, using settings in the Device Profile.

$$TDD_I = \frac{\sqrt{I_2^2 + I_3^2 + I_4^2 + I_5^2 + \dots}}{I_L} \times 100$$

**THD:** Total Harmonic Distortion is the combined effect of all harmonics measured in a voltage or current. The THD number is expressed as a percent of the fundamental (see equation below). For example, 3 THD indicates that the magnitude of all harmonic distortion measured equals 3 of the magnitude of the fundamental 60Hz quantity. The THD displayed is calculated by your meter.

$$THD_I = \frac{\sqrt{I_2^2 + I_3^2 + I_4^2 + I_5^2 + \dots}}{I_1} \times 100$$

**Time stamp:** A stored representation of the time of an event. Time stamp can include year, month, day, hour, minute and second and Daylight Savings Time indication.

**TOU:** Time of Use.

**Uncompensated Power:** VA, Watt and VAR readings not adjusted by Transformer Loss Compensation.

**V2T Threshold:** When the voltage is above the set threshold, data will begin to be accumulated.

Voltage, Vab:	Vab, Vbc, Vca are all Phase-to-Phase voltage measurements. These voltages are measured between the three phase voltage inputs to the meter.
Voltage, Van:	Van, Vbn, Vcn are all Phase-to-Neutral voltages applied to the monitor. These voltages are measured between the phase voltage inputs and Vn input to the meter. Technologically, these voltages can be “measured” even when the meter is in a Delta configuration and there is no connection to the Vn input. However, in this configuration, these voltages have limited meaning and are typically not reported.
Voltage Imbalance/Unbalance:	As defined by National Equipment Manufacturer’s Association (NEMA), the formula for voltage unbalance is:

$$VoltageUnbalance = \frac{\text{Maximum deviation from the mean of } Vab, Vbc, Vca}{\text{Mean of } Vab, Vac, Vca}$$

Voltage Quality Event:	An instance of abnormal voltage on a phase. The events the meter will track include sags, swells, interruptions and imbalances.
VT Ratio:	The Voltage Transformer Ratio is used to scale the value of the voltage to the primary side of an instrument transformer. Also referred to as PT Ratio.

Voltage, Vaux:

This is the fourth voltage input measured from between the Vaux and Vref inputs. This input can be scaled to any value. However, the actual input voltage to the meter should be of the same magnitude as the voltages applied to the Va, Vb and Vc terminals.