

CPU1000 Futura+

Advanced Multi-Function Power Transducer

with Remote Displays & Extensive Communication Capabilities

Futura+
SERIES

Power Monitoring & Analysis

- True RMS Voltage, Current, Power & Energy
- Max & Min Demand
- Harmonic Analysis
- Waveform Scope

On-Board Data Logging & Storage

- On-Board Historical Trending
- On-Board Event Recording
- On-Board Waveform Recording
- Power Quality with Voltage Stability & Reliability Recording
- Current Fault Recording

Advanced Communication Capabilities

- Dual Digital Com Ports
- Modbus & DNP 3.0
- 10 Channel Analog Retransmits (0-1 or 4-20mA)
- Up to 4 Remote Displays

Utility Grade Design

- Optically Isolated Sensing Voltages
- Universal AC/DC Power Supply
- Meets ANSI C62.41 (6 kV Voltage Burst), IEEE SWC C.37.90.1 (Surge Withstand)
- Reliable in Harsh Conditions



Description

The Futura+ Series, CPU 1000, is an advanced, easy-to-use multi-function electrical power monitor/transducer that measures every aspect of power including Voltage, Current, Watts, VARs, VA, PF, Freq. and Energy.

From basic energy metering to advanced power quality analysis, the CPU 1000 arms you with sophisticated monitoring capabilities. The unit's comprehensive on-board memory provides immediate access to historical, I/O and waveform recording. With the M200 memory option, the unit records up to 3 months of historical data and 100 waveform records. This makes the CPU 1000 one of the most prolific analysis devices at its pricing point.

The unit provides multiple paths of communication providing open protocol solutions. Built-In analog retransmits retrofit into existing analog milliamp input based data collection.

Comprehensive Measurements

- Three Phase Voltage (L - N)
- Three Phase Voltage (L - L)
- Three Phase Amps
- Neutral Current (Calculated)
- Bidirectional kW (Three Phase & Total)
- Bidirectional kVAR (Three Phase & Total)
- Bidirectional kVA (Three Phase & Total)
- PF (Three Phase & Total)
- Frequency
- Bidirectional kWh
- Bidirectional kVARh
- Bidirectional kVAh
- %THD
- Harmonics to the 31st Order

Advanced Measurements

- Voltage Max/Min
- Amps Demand Max/Min
- kW Max/Min

- kVAR Max/Min
- kVA Max/Min
- PF Max/Min
- Frequency Max/Min
- %THD Max

User Alarm Set Points

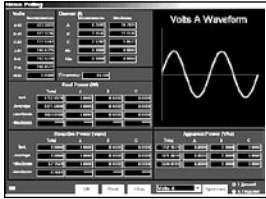
- Over/Under Voltage
- Over/Under Current
- Over/Under kVA
- Over/Under kW
- Over/Under kVAR
- Over/Under PF
- Over/Under Frequency
- Over %THD
- Phase Reversal
- Reverse Power
- Logic & Hysteresis
- Relay Output Control

Power Quality/Harmonic Analysis

The CPU 1000 conducts an extensive harmonic and power quality analysis. The unit measures and calculates harmonic distortion to the 31st order for each voltage and current channel. Using the M150 and M200 memory modules, the unit will record voltage disturbances such as surges, sags and transients.

Waveform Scope

The unit also provides data to build a graphical, real time depiction of each waveform channel. This allows the user to view actual waveforms for each voltage and current channel using PC software.



Extensive On Board Memory

The CPU 1000 is available with several different on-board memory options allowing you to choose the memory option that is necessary for your specific power monitoring application needs.

M100 Memory Module — Historical & Event Memory

This module stores up to 110,000 snapshots of information per value in non-volatile mass memory. The storage

Storage Capabilities

Memory Modules	Historical	Recording*	I/O Event Stamping	Waveform Recording**
M100	110,000 Snapshots ①②	90 Days	255 for Relay and Input Status Contacts ③	N/A
M150	55,000 snapshots ①②	45 Days	255 for Relay and Input Status Contacts ③	25 Waveform Records
M200	110,000 snapshots ①②	90 Days	255 for Relay and Input Status Contacts ③	100 Waveform Records

* Recording Time is Based on 10 Values Logged at 15 Minute Intervals.
 ** Each Record is 10 Cycles Prior/50 Cycles Post Event, All 6 Channels Simultaneously.
 ① Snapshots Can be Configured to any Desired Time Interval from 1 Second to 2.5 Hours.
 ② Both Instantaneous and Average Readings Stored.
 ③ Must be Used with L200 I/O Module

interval is programmable from 1 second to 180 minutes. The default storage interval is 15 minutes. Using this module, you can trend any parameter such as kW usage, Voltage, Watt/VAR distribution and any other desired parameter.

The event portion of the memory, when used with the L200 I/O module, records when a status input or a relay output changes state.

M150 Memory Module — Historical, Event & Waveform Storage

This module provides historical, event and waveform recording. The M150 offers 55,000 historical points and full event recording. All memory is stored in a FIFO buffer.

Additionally, the module records waveforms based on RMS triggers. Set the meter to trigger on above/below voltage

and above current. When the unit triggers a waveform recording, it records 10 cycles prior and 50 cycles past the event. All 6 channels are recorded simultaneously. This module provides 25 captured waveform events and is a good economical choice for an advanced metering solution.

M200 Memory Module — Advanced Memory

The M200 module is the advanced memory module offered in the CPU 1000 power monitor. This module provides significantly more memory capability. Using this memory module, you are assured that your monitor is always recording and providing you with a comprehensive analysis of any occurrences in the power distribution system.

The M200 provides 110,000 snapshots of historical data, full I/O event recording and 100 waveform events consisting of 60 cycles of recording for each event. This is a significant amount of waveform recording capability.

In addition, unique to this design, the memory can be configured to store any desired amount of waveforms (in intervals of 60) when an event occurs. You can program the unit to record for long duration event or short duration events depending on the application. This is the memory of choice for users who want to capitalize on their investment. This memory is stored in a FIFO buffer.

Display Modules



P11

A Single Function Digital Display Module Available for Every Function.



P14/15

P14: Displays Instantaneous Real Power (W), Total Kilowatt Hour (Wh) and Watt Demand (WD).
P15: VAR/VARh/VARD. 6 1/2 Digit Resolution.



P31

Amps Module Displaying Phases A-B-C and N. Also Displays % THD for Each Reading.

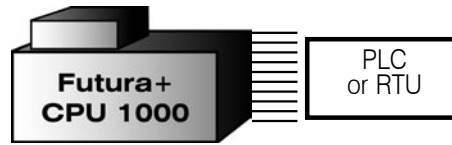
Advanced Communication Capabilities

Dual Digital Communication Ports

Dual digital communication ports allow communication with RTUs, SCADA, PLCs, or remote monitoring software using Modbus or DNP 3.0 protocol. The first serial port allows for real time polling and data downloads using EI protocol. The second port provides a Modbus RTU, Modbus ASCII or DNP 3.0 output.

Using dual ports allows the unit to communicate to RTUs and other data collection systems in real time while having an additional serial port available for data downloads and remote interrogation. In this manner, you are assured that the monitor is always available for data collection even while communicating in real-time to a third party system.

10 Channel Analog Outputs (0-1mA or 4-20mA)



Built-In Analog Transducer Outputs

The CPU 1000 features 10 channels of analog transducer outputs replacing all existing transducers (0-1mA or 4-20mA.) Bidirectional as well as unidirectional outputs are available. The analog transducer signals are custom scalable and allow you to wire the meter to communicate to any pre-existing data collection system. This is invaluable in retrofit applications. Communicate analog now and upgrade to digital later. With the CPU 1000 meter, you have the best of both worlds.

Multiple Remote Displays

Choice of Display Modules

The CPU 1000 Series provides a multitude of different display choices. Just select the applicable display or combination of displays that meet your individual application needs. Up to 4 displays can be powered directly from the CPU 1000's power supply. The displays can be mounted both locally and remotely (up to 4,000 feet from CPU 1000.) All displays are LED based to ensure durability in harsh conditions.

Physical Construction

Voltage Optical Isolation

The voltage inputs are optically isolated. Issues such as noisy grounds, switching noise, SWC or any other such problems pose no threat to the CPU 1000 meter. The input structure is one of the safest and most durable designs available.

Case Construction

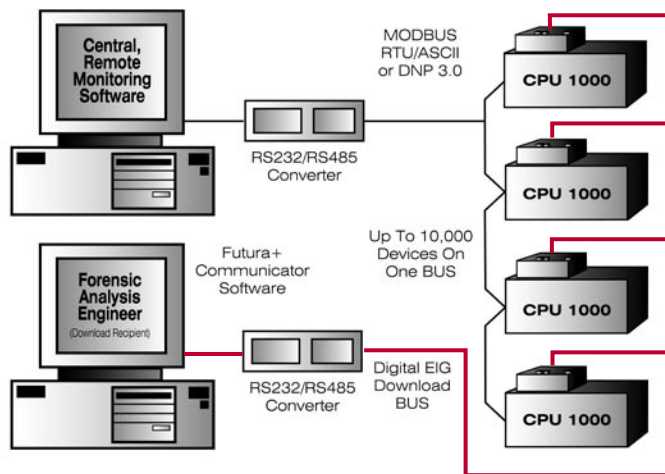
Designed for harsh environments, the unit is mounted in a shielded metal case. It offers no visible openings and is resistant to contamination from harmful dust, sand or other matter. All screws and hardware are non-corrosive stainless steel.

Power Supply

The power supply offers both primary MOV protection and active line filtering to reduce any damaging occurrences to the supply. This design meets ANSI C42.21 (Surge Test 6.0KV) and ANSI C37.90.1 (Surge Withstand Capability).

Communication Ports

All communication ports are isolated from the main unit and additionally isolated from each other. This design avoids dangerous ground loops.



P32

Volts Module Displays A-N, B-N, C-N Phases, Total Harmonic Distortion and Phase-to-Phase Readings.



P33

Power Module Provides Values for KW, KVAR, VA and PF.



P34

Multi-Function Digital Display with a Simultaneous 3 Phase Presentation of Voltage, Current, and Power. It Displays %THD for Each Voltage and Current Reading.

Specifications

INPUT VOLTAGE RANGE

- 150V Phase to Neutral Standard*
- 300V Phase to Neutral (OPTION G)

*Used with PTs for Extended Input Voltage.

I/O ISOLATION

- 2500V AC 60 Hz
- Minimum isolation between any input to output of analog retransmitting module, digital communication module or relay output terminals.

CONTROL POWER REQUIREMENTS

- 115V ±20%, 12VA (OPTION 115A)
- 230V ±20%, 12VA (OPTION 230A)
- 24-48V DC, ±20%, 12VA (OPTION D)
- 125V DC, ±20%, 12VA (OPTION D2)

INPUT CURRENT RANGE

- 10A maximum (programmable to any CT ratio)

HARMONIC RANGE

- 3 Channels Volt to Neutral**
- 3 Channels A, B and C Current**

**To the 31st Harmonic

SENSING METHOD

- True RMS

INPUT WITHSTAND CAPABILITIES

- Voltage & Current Continuous 200% Rated; Surge 10x Rated per 3 Seconds
- Surge Withstand: per IEEE C37.90.1

COMMUNICATION FORMAT

- Protocols: DNP 3.0, Modbus RTU/ASCII, EI Bus
- 1 Start Bit, 8 Data Bits, 1 Stop Bit; Programmable up to 9600 Baud on Real Time Port, 38,400 Baud on Download Port

FREQUENCY RANGE

- Fundamental 45-75 Hz

AMBIENT TEMPERATURE

- Operating -20°C to +70°C

CONSTRUCTION

- Metal Housing

BURDEN

Per Element

- Voltage 0.3VA MAX
- Current 0.2VA MAX

DISPLAY UPDATE TIME

- 1 Second

WAVEFORM RECORDING

- Dual Analog to Digital Processing
- One Second Update
- Waveform Capable of Viewing 5 Times Full Scale RMS for Current and 2 1/2 Times RMS for Voltage

TIME CLOCK

- On-Board Time/Date Clock - Non Volatile

SHIPPING

- 6 lbs.

COMPLIANCE

- ANSI/IEEE C37.901. Surge Withstand
- ANSI C62.41 Surge Immunity (6 KV)
- ANSI C12 Revenue Accuracy
- IEC 687 Revenue Accuracy

Accuracy

Parameters	Accuracy*	Range
Volts & Current ①	0.15%	0-2000 ②
Watts & Energy ②	0.2%	0-2000 / 5 1/2 Digit Counter ②
VA & VARs ②	0.3%	0-2000 / 5 1/2 Digit Counter ②
VAh & VARh ②		
PF ②	0.50 %	1.0 TO ±0.5
Frequency	0.01 Hz	47-75 Hz
Harmonic	0.50%	0-100%
Current Neutral (Calculated) ①	2%	0-2000 ②

① Reads in Kilovolts over 2000

② Reads in MW, MVA, MVR for readings over 2,000

*Accuracy in % of full scale

Note: Complete Mounting and Wiring Diagrams can be downloaded directly from www.electroind.com

Ordering Information

Specify a unit by writing its option numbers below. See sample. Specify your CT and Pt ratio, Delta or Wye System. If a specification is given, it will be preprogrammed in the factory.

Model	Connection	Volts	Amps	Power	Operating Voltage	Control Power	Com Port	Memory	I/O	Analog Output
Option Numbers:										
-										
Example:										
CPU 1000	3E	V	A	KW	120	115A	SF485DB	M200	L200	1mA0
CPU 1000	3E	V	A	KW	120	115A	X	X	X	X
	3 Element Wye System	Volts Labeling	Amps Labeling	Kilowatt Labeling	120/208 Volts Used Direct or with PTs	±20% 12VA	None	None	None	None
	2.5E	KV	KA	MW	G	230A	SF232DB	M100	L200	1mA0
	2.5 Element Wye System	Kilovolts Labeling	Kiloamps Labeling	Megawatt Labeling	277/480 Direct Hookup	±20% 12VA				
	2E				75	D	SF485DB	M150	L200KYZ	20mA0
	2 Element Delta System				69 Volt Line to Neutral 120 Volt Line to Line	24-48V DC ±20% 12VA				
						D2		M200		
						125V DC ±20% 12VA				

Hardware Options

M100	M150	M200	L200	L200KYZ
512k Mass Memory Historical Data Logging	512k Mass Memory Historical Data Logging and 25 Captured Event Waveforms	1024k Mass Memory for Historical Data Logging and 100 Captured Event Waveforms	I/O Module 3 Relay Outputs and 4 Status Inputs	I/O Module 3 KYZ Pulses and 4 Status Inputs
1mA0	20mA0	SF232DB	SF485DB	
Analog Output Module 10 Channels of 0-1mA Retransmitting Signals	Analog Output Module 10 Channels of 4-20mA Retransmitting Signals	RS232 Communication Adapter	RS485 Multi-Drop, Daisy Chain Communication Adapter 4000 Foot Range	

Display Options

Up to 4 displays with a CPU 1000 power supply. All displays include 6 feet of cable. If additional Length is desired, please specify. Look up display descriptions on previous pages.

<input type="checkbox"/> P1	<input type="checkbox"/> P14/15	<input type="checkbox"/> P31	<input type="checkbox"/> P32	<input type="checkbox"/> P33	<input type="checkbox"/> P34	<input type="checkbox"/> ISO485
Single Function	Energy	Amps	Volts	Power	Multifunction	Isolation Module (for long distance display applications)



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