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EM-1000 /EM-2000/ EM-3000 Series Multifunction Power and Energy Meters

EM-1000 Series Meter Description

The EM-1000 Series monitor is an affordable multifunction power meter designed to be used in electrical substations, panel boards and as a power meter for OEM equipment. The unit provides multifunction measurement of all electrical parameters. It is easy to use and install and is perfect both for new metering applications and as a simple replacement of existing analog meters.

The EM-1000 Series meter is designed with advanced measurement capabilities, allowing it to achieve high performance accuracy. The EM-1000 Series meter is specified as a 0.5% class energy meter, meeting ANSI C12.20 (0.5%) and IEC 62053-22 (0.5%) accuracy classes.

The EM-1000 Series meter supplies multifunction measurement including voltage, current, power, frequency, energy, etc. For serial communication, the EM-1000 Series meter has a combination RS485/Pulse Com port.

The EM-1000 Series meter has an LED with 3 .56", bright red lines of display for easy readability.It features an anti-dither algorithm to improve reading stability, benefitting operators. The unit utilizes high speed DSP technology with high resolution A/D conversion to provide stable and reliable measurements.

EM-1000 Series Meter Features

- 0.5% Class Accuracy
- Measurements Including Voltage, Current, Power, Frequency, Energy, Etc.
- Standard RS485 with Modbus Protocol
- Large Bright Red LED Display
- % of Load Bar for Analog Meter Perception
- Fits Both ANSI and DIN Cut-outs
- Great For Retrofit and New Applications
- Uses Minimal Panel Space and Depth
- Easy-to-Use Faceplate Programming
- Phasor Diagram Showing Wiring Status
- Display Auto-Scroll Feature
- Color Coordinated Voltage and Current Inputs

Applications

- Commercial Metering
- Industrial Metering
- Power Generation
- Campus Metering
- Sub-metering
- Indication Meter Replacement

Available Models

The EM-1000 Series meter can be ordered in any of the following models:

- B – Volts and Amps Meter – Default model
- C – Volts, Amps, kW, kVAR, PF, kVA, Freq
- D – Volts, Amps, kW, kVAR, PF, kVA, Freq, kWh, kVAh, kVARh

Advanced Communication Capability

Back Mounted Communication Port with KYZ Pulse

- RS485 – This port allows RS485 communication using Modbus Protocol. Baud rates are from 9,600 to 57,600.
- KYZ Pulse – In addition to the RS485, this port includes a KYZ pulse mapped to positive energy. This is a fixed energy pulse.

EM-1000 Series Meter

Rugged and Safe Voltage and Current Inputs

The EM-1000 Series meter is ruggedly designed for harsh electrical applications in both high voltage and low voltage power systems. This is especially important in Power Generation, Utility Substation and Critical User applications. The structural and electrical design of this meter was developed based on the recommendations and approval of many of our utility customers.

High Isolation Universal Voltage Inputs

Voltage inputs allow measurement of up to 416 Volts Line to Neutral and 721 Volts Line to Line. This insures proper meter safety when wiring directly to high voltage systems. One unit will perform to specification on 69 Volt, 120 Volt, 230 Volt, 277 Volt and 347 Volt power systems.

Short Circuit Safe Current Inputs

Current inputs use a unique dual input method:

- Method One – CT Lead Pass Through. The CT Lead passes directly through the meter without any physical termination on the meter. This insures that the meter cannot be a point of failure on the CT circuit. This is preferable to utility users when sharing relay class CTs. No Burden is added to the secondary CT circuit.
- Method Two – Current "Gills." This unit additionally provides ultra-rugged termination pass-through bars, allowing the CT leads to be terminated on the meter. The EM-1000 Series meter's stud-based design insures that your CTs will not open in a fault condition.

ANSI and DIN Installation

The unit mounts directly in an ANSI C39.1 (4" round form) or an IEC 92 mm DIN square form. This is perfect for new installations and for existing panels. In new installations, simply use DIN or ANSI punches. For existing panels, pull out old analog meters and replace them with the EM-1000 Series meter. The meter uses standard voltage and current inputs so that CT and PT wiring does not need to be replaced.

- Perfect for switchgear panel direct retrofit
- Uses minimal panel space
- Mounts in only 4.25" panel depth

EM-1000/EM-2000/EM-3000 Series Multifunction Power and Energy Meters (Continued)

Technical Specifications

EM-1000 Series Meter	
Voltage Inputs	20-416 Volts Line to Neutral, 20-721 Volts Line to Line Universal Voltage Input Input Withstand Capability – Meets IEEE C37.90.1 (Surge Withstand Capability) Programmable Voltage Range to Any PT Ratio Supports: 3 Element WYE, 2.5 Element WYE, 2 Element Delta, 4 Wire Delta Systems Burden: 0.014VA/Phase at 120 Volts Input Wire Gauge Max (AWG 12 / 2.5mm2)
Current Inputs	Class 10: (0 to 10)A, 5 Amp Nominal, 10 Amp Maximum Fault Current Withstand (For 23° C, 3 Phase Balanced WYE or Delta load): 100 Amps for 10 Seconds, 300 Amps for 3 Seconds, 500 Amps for 1 Second Programmable Current to any CT Ratio Burden 0.005VA Per Phase Max at 11 Amps Pickup Current 0.1% of Nominal Pass Through Wire Gauge Dimension: 0.177" / 4.5mm Continuous Current Withstand: 20 Amps for Screw Terminated or Pass Through Current Connections
Isolation	All Inputs and Outputs are Galvanically Isolated to 2500 Volts AC
Environmental Rating	Storage: (-20 to +70)° C Operating: (-20 to +70)° C Humidity: to 95% RH Non-Condensing Faceplate Rating: NEMA12 (Water Resistant)
Sensing Method	RMS Sampling at 400+ Samples per Cycle on All Channels Measured Readings Simultaneously
Update Rate	All Parameters up to Every 60 Cycles
Power Supply	(90 to 265) Volts AC
Communication Format	RS485 Port (Through Backplate) Com Port Baud Rate: (9,600 to 57,600) Com Port Address: 0-247 8 Bit, No Parity Modbus RTU, ASCII
KYZ Pulse	Type Form A On Resistance: 23-35 Ohm Peak Voltage: 350 VDC Continuous Load Current: 120mA Peak Load Current: 350mA (10ms) Off State Leakage Current @ 350VDC: 1mA
Dimensions and Shipping	Weight: 2 lbs/0.907 kg Basic Unit: (H4.85 x W4.85 x L4.25) in/(H12.32 x W12.32 x D10.54) cm Mounts in Either 92mm Square DIN or ANSI C39.1 4" Round Cut-outs Shipping Container Dimensions: 6" Cube
Compliance	IEC62053-22 (0.5% Accuracy) ANSI C12.20 (0.5% Accuracy) ANSI (IEEE) C37.90.1 Surge Withstand ANSI C62.41 (Burst) EN61000-6-2 - Immunity for Industrial Environments: 2005 EN61000-6-4 - Emission Standards for Industrial Environments: 2007 EN61326-1 - EMC Requirements: 2006 UL File #E363785 UL Spec: 61010-1

EM-1000 Series Meter Accuracy - For 23^{O} C, 3 Phase Balanced Wye or Delta Load

Parameter	Accuracy	Accuracy Input Range
Voltage L-N [V]	0.2% of reading[2]	(69 to 480)V
Voltage L-L [V]	0.4% of reading	(120 to 600)V
Current Phase [A]	0.2% of reading[1]	(0.15 to 5)A
Current Neutral (calculated) [A]	2.0% of Full Scale[1]	(0.15 to 5)A @ (45 to 65)Hz
Active Power Total [W]	0.5% of reading[1,2]	(0.15 to 5)A @ (69 to 480)V @ +/- (0.5 to 1) lag/lead PF
Active Energy Total [Wh]	0.5% of reading[1,2]	(0.15 to 5)A @ (69 to 480)V @ +/- (0.5 to 1) lag/lead PF
Reactive Power Total [VAR]	1.0% of reading[1,2]	(0.15 to 5)A @ (69 to 480)V @ +/- (0 to 0.8) lag/lead PF
Reactive Energy Total [VARh]	1.0% of reading[1,2]	(0.15 to 5)A @ (69 to 480)V @ +/- (0 to 0.8) lag/lead PF
Apparent Power Total [VA]	1.0% of reading[1,2]	(0.15 to 5)A @ (69 to 480)V @ +/- (0.5 to 1) lag/lead PF
Apparent Energy Total [VAh]	1.0% of reading[1,2]	(0.15 to 5)A @ (69 to 480)V @ +/- (0.5 to 1) lag/lead PF
Power Factor	1.0% of reading[1,2]	(0.15 to 5)A @ (69 to 480)V @ +/- (0.5 to 1) lag/lead PF
Frequency	+/- 0.01Hz	(45 to 65)Hz
Load Bar	+/- 1 segment[1]	(0.005 to 6)A

[1] For 2.5 element programmed units, degrade accuracy by an additional 0.5% of reading.

[2] For unbalanced voltage inputs where at least one crosses the 150V auto-scale threshold (for example, 120V/120V/208V system), degrade accuracy by additional 0.4%.

The EM-1000 Series meter's accuracy meets the IEC62053-22 Accuracy Standards for 0.5% Class meters.

EM-1000 Series Meter Ordering Chart

Product-Series	Network Protocol	Freq.	-Power Supply	Current Class	-Mounting	V-Switch™ Pack	0	0
EM-1 EM-1000 Series Meter	4 Modbus 485	60 60 Hz System	-0 90-265 VAC	0 5 Amp Secondary	-A ANSI Mounting	B Default V-Switch Volts/ Amps		
					-D DIN Mounting	C above with Power and Freq		
						D above with DNP 3.0 and Energy Counters		

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EM-1000/EM-2000/EM-3000 Series Multifunction Power and Energy Meters (Continued)

EM-2000 Series Meter Description

The EM-2000 Series monitor is a revenue grade power meter with native BACnet/IP protocol. This meter is designed to integrate seamlessly into existing and new building management systems using the popular BACnet protocol. The unit allows users to gather data on voltage, current, power and energy usage throughout a facility.

The EM-2000 Series meter's metrology is industry recognized as superior, providing revenue testable 0.2% Energy accuracy with compliance to modern ANSI and IEC standards (ANSI C12.20 (0.2%) and IEC 62053-22 (0.2%) accuracy classes). The unit utilizes advanced DSP technology, high sampling rates and 24-bit analog to digital conversion to measure and analyze power accurately and reliably.

The EM-2000 Series meter was designed to be the perfect device for "Green" initiatives, LEED certified projects, smart buildings and all kinds of smart energy projects. It has embedded RJ45 10/100BaseT Ethernet communication that supplies an embedded Web server, that lets you view energy usage through any standard browser. By letting you track energy use and power quality from wherever you are, the meter gives you the information you need to accurately identify cost-saving measures and respond to power quality problems when they arise.

EM-2000 Series Meter Features

- Multifunction Measurements of AC Voltage, Current, Power and Energy
- Industry Recognized Superior 0.2% Energy Class Accuracy
- BACnet / IP 100BaseT Ethernet Protocol
- Available in Meter or Transducer Version
- Highly Reliable Industrial Rated Design
- Utility Block and Rolling Average Demand
- Adjustable Demand Profiles
- Max and Min Available on Most Other Parameters
- Voltage Provides Instantaneous Max and Min for Surge and Sag Limits

Applications

- LEED Projects
- Smart t Buildings
- Commercial Energy Management
- HVAC Efficiency Monitoring
- Building Management Systems

EM-2000 Series Meter's BACnet / IP Through the Web

The EM-2000 Series meter's BACnet / IP comes standard with a Web interface. Use the BACnet / IP Interface to remotely set up the BACnet / IP configuration and track energy usage through the Internet with any standard Web browser. You do not need to be on-site - you can check on your buildings from anywhere in the world! There is also a Modbus TCP Socket that can be used to simultaneously poll Modbus TCP through the same device.

Traceable Watt-Hour Test Pulse for Accuracy Verification

The EM-2000 Series meter is a traceable revenue meter. It contains a utility grade test pulse allowing power providers to verify and confirm that the meter is performing to its rated accuracy. This is an essential feature required of all billing grade meters.

EM-2000 Series Meter

Rugged and Safe Voltage and Current Inputs

The EM-2000 Series meter is ruggedly designed for harsh electrical applications in both high voltage and low voltage power systems. This is especially important in Power Generation, Utility Substation and Critical User applications. The structural and electrical design of this meter was developed based on the recommendations and approval of many of our utility customers.

High Isolation Universal Voltage Inputs

Voltage inputs allow measurement of up to 416 Volts Line to Neutral and 721 Volts Line to Line. This insures proper meter safety when wiring directly to high voltage systems. One unit will perform to specification on 69 Volt, 120 Volt, 230 Volt, 277 Volt and 347 Volt power systems.

Short Circuit Safe Current Inputs

Current inputs use a unique dual input method:

- Method One – CT Lead Pass Through. The CT Lead passes directly through the meter without any physical termination on the meter. This insures that the meter cannot be a point of failure on the CT circuit. This is preferable to utility users when sharing relay class CTs. No Burden is added to the secondary CT circuit.
- Method Two – Current "Gills." This unit additionally provides ultra-rugged termination pass-through bars, allowing the CT leads to be terminated on the meter. The EM-2000 Series meter's stud-based design insures that your CTs will not open in a fault condition.

ANSI and DIN Installation

The unit mounts directly in an ANSI C39.1 (4" round form) or an IEC 92 mm DIN square form. This is perfect for new installations and for existing panels. In new installations, simply use DIN or ANSI punches. For existing panels, pull out old analog meters and replace them with the EM-2000 Series meter. The meter uses standard voltage and current inputs so that CT and PT wiring does not need to be replaced.

- Perfect for switchgear panel direct retrofit
- Uses minimal panel space
- Mounts in only 4.25" panel depth

EM-1000/EM-2000/EM-3000 Series Multifunction Power and Energy Meters (Continued)

Technical Specifications

EM-2000 Series Meter	
Voltage Inputs	20-416 Volts Line to Neutral, 20-721 Volts Line to Line Universal Voltage Input Input Withstand Capability – Meets IEEE C37.90.1 (Surge Withstand Capability) Programmable Voltage Range to Any PT Ratio Supports: 3 Element WYE, 2.5 Element WYE, 2 Element Delta, 4 Wire Delta Systems Burden: 0.36VA/Phase Max at 600 Volts; 0.014VA/Phase at 120 Volts Input Wire Gauge Max (AWG 12 / 2.5mm2)
Current Inputs	Class 10: (0 to 10)A, 5 Amp Nominal, 10 Amp Maximum; Class 2: (0 to 2)A, 1 Amp Nominal, Secondary Fault Current Withstand (For 23° C, 3 Phase Balanced WYE or Delta load): 100 Amps for 10 Seconds, 300 Amps for 3 Seconds, 500 Amps for 1 Second Programmable Current to any CT Ratio Burden 0.005VA Per Phase Max at 11 Amps Pickup Current 0.1% of Nominal Pass Through Wire Gauge Dimension: 0.177" / 4.5mm Continuous Current Withstand: 20 Amps for Screw Terminated or Pass Through Current Connections
Isolation	All Inputs and Outputs are Galvanically Isolated to 2500 Volts AC
Environmental Rating	Storage: (-20 to +70)° C Operating: (-20 to +70)° C Humidity: to 95% RH Non-Condensing Faceplate Rating: NEMA12 (Water Resistant)
Sensing Method	RMS Sampling at 400+ Samples per Cycle on All Channels Measured Readings Simultaneously
Update Rate	Watt, VAR, and VA- Every 6 Cycles; All Other Parameters - Every 60 Cycles
Power Supply	(90 to 265) Volts AC / (100 to 370) Volts DC (18- to 60) Volts DC optional power supply
Communication Format	BACnet/IP Ethernet (Through Backplate) IrDA (Through Faceplate) Com Port Baud Rate: (57,600bps) Com Port Address: 0-247 Modbus TCP, ASCII
KYZ Pulse	Type Form A On Resistance: 23-35 Ohm Peak Voltage: 350 VDC Continuous Load Current: 120mA Peak Load Current: 350mA (10ms) Off State Leakage Current @ 350VDC: 1mA Opto-Isolation: 3750V (6 0Hz, 1min)
Dimensions and Shipping	Weight: 2 lbs/0.907 kg Basic Unit: (H4.85 x W4.85 x L4.25) in/(H12.32 x W12.32 x D10.54) cm Mounts in Either 92mm Square DIN or ANSI C39.1 4" Round Cut-outs Shipping Container Dimensions: 6" Cube
Compliance	IEC62053-22 (0.2% Accuracy) ANSI C12.20 (0.2% Accuracy) ANSI (IEEE) C37.90.1 Surge Withstand ANSI C62.41 (Burst) EN61000-6-2 - Immunity for Industrial Environments: 2005 EN61000-6-4 - Emission Standards for Industrial Environments: 2007 EN61326-1 - EMC Requirements: 2006 UL File #E363785 UL Spec: 61010-1

EM-1000/EM-2000/EM-3000 Series Multifunction Power and Energy Meters (Continued)

EM-2000 Serial Meter Accuracy - For 23° C, 3 Phase Balanced Wye or Delta Load

Parameter	Accuracy	Accuracy Input Range
Voltage L-N [V]	0.1% of reading[2]	(69 to 480)V
Voltage L-L [V]	0.1% of reading	(120 to 600)V
Current Phase [A]	0.1% of reading[1]	(0.15 to 5)A
Current Neutral (calculated) [A]	2.0% of Full Scale[1]	(0.15 to 5)A @ (45 to 65)Hz
Active Power Total [W]	0.2% of reading[1,2]	(0.15 to 5)A @ (69 to 480)V @ +/- (0.5 to 1) lag/lead PF
Active Energy Total [Wh]	0.2% of reading[1,2]	(0.15 to 5)A @ (69 to 480)V @ +/- (0.5 to 1) lag/lead PF
Reactive Power Total [VAR]	0.2% of reading[1,2]	(0.15 to 5)A @ (69 to 480)V @ +/- (0 to 0.8) lag/lead PF
Reactive Energy Total [VARh]	0.2% of reading[1,2]	(0.15 to 5)A @ (69 to 480)V @ +/- (0 to 0.8) lag/lead PF
Apparent Power Total [VA]	0.2% of reading[1,2]	(0.15 to 5)A @ (69 to 480)V @ +/- (0.5 to 1) lag/lead PF
Apparent Energy Total [VAh]	0.2% of reading[1,2]	(0.15 to 5)A @ (69 to 480)V @ +/- (0.5 to 1) lag/lead PF
Power Factor	0.2% of reading[1,2]	(0.15 to 5)A @ (69 to 480)V @ +/- (0.5 to 1) lag/lead PF
Frequency	+/- 0.01Hz	(45 to 65)Hz
Load Bar	+/- 1 segment[1]	(0.005 to 6)A

[1] For 2.5 element programmed units, degrade accuracy by an additional 0.5% of reading.

- For 1A (Class 2) Nominal, degrade accuracy by an additional 0.5% of reading.
- For 1A (Class 2) Nominal, the input current range for Accuracy specification is 20% of the values listed in the table.

[2] For unbalanced voltage inputs where at least one crosses the 150V auto-scale threshold (for example, 120V/120V/208V system), degrade accuracy by additional 0.4%.

EM-2000 Series Meter Ordering Chart

Product-Series	Network Protocol	Freq.	-Power Supply	Current Class	-Mounting	V-Switch Pack	0	0
EM-2 EM-2000 Series Meter	7 BACnet/IP	50 50 Hz System	-0 90-265 VAC/100-370 VDC	5 5 Amp Secondary	-A ANSI Mounting	0 Default V-Switch Volts/ Amps		
		60 60 Hz System	-1 18-60 VDC	1 1 Amp Secondary	-D DIN Mounting			

EM-1000/EM-2000/EM-3000 Series Multifunction Power and Energy Meters (Continued)

EM-3000 Series Meter Description

The EM-3000 Series meter is a high performance product designed to measure revenue grade electrical energy usage and communicate back that information using modern communication media. The unit supports RJ45 Ethernet or IEEE 802.11 WiFi Ethernet connections. This allows it to be placed anywhere within a facility and have it communicate back to central software quickly and automatically. The unit also has a front IrDA port that can be read and configured with an IrDA-equipped device, such as a laptop PC.

The unit is designed with advanced measurement capabilities, allowing it to achieve high performance accuracy. The EM-3000 Series meter is specified as a 0.2% class energy meter for billing applications.

The EM-3000 Series meter uses standard 5 or 1 Amp CTs (either split or donut). It surface mounts to any wall and is easily programmed in minutes. The unit is designed specifically to be a low cost, highly accurate sub-meter with advanced communication and easy installation.

EM-3000 Series Meter Features

- 0.2% Class Revenue Certifiable Energy and Demand Sub-meter
- Meets ANSI C12.20 (0.2%) and IEC 62053-22 (0.2%) Classes
- Multifunction Measurement Capability
- Bright Red LED Display with three .56" lines
- % of Load Bar for Analog Meter Perception
- Ethernet or Wireless Ethernet via Modbus TCP
- Direct Interface with Most Building Management Systems
- Very Easy To Install - Small Footprint

Applications

- Universities
- Commercial Buildings
- Shopping Malls
- Airports
- Industrial Sub-metering
- Government Facilities
- Military
- Energy Efficiency OEMs

Available Models

The EM-3000 Series meter can be ordered in either of the following models:

- E – Volts and Amps Meter with Energy Counters– Default model
- F – Volts and Amps Meter with Energy Counters, and Harmonics and Limits

WiFi or Land Based Ethernet

The EM-3000 Series meter gives you two Ethernet options — either an RJ45 wired, or a WiFi connection. Both connections are easily configurable using Telnet. The sub-meter communicates over any existing wireless or wired Ethernet infrastructure. Just install the unit, plug in its IP address, and the device automatically connects to your LAN.

The WiFi option allows the EM-3000 Series meter to be used on standard WiFi base stations, providing a simple, over-the-counter wireless architecture. You can extend the network simply by adding WiFi access points. Wireless Ethernet is reliable and easy to integrate, making it the superior solution for mass meter deployment.

EM-3000 Series Meter

Benefits of WiFi Over Dedicated Radio

- Standard Infrastructure - No Dedicated Hardware
- Low Cost to Deploy and Expand
- Superior Speed over Dedicated Wireless Networks
- Significantly Easier to Configure and Maintain
- Secure Connection - WEP, WPA, or WPA2 Wireless Security
- Standard Modbus TCP Data Stream
- Can Be Easily Integrated through Internet

IrDA Port

The EM-3000 Series meter has an IrDA port on its faceplate, for remote interrogation by an IrDA-equipped laptop PC.

Traceable Watt-Hour Test Pulse for Accuracy Verification

The EM-3000 Series meter is a traceable revenue meter. It contains a utility grade test pulse allowing power providers to verify and confirm that the meter is performing to its rated accuracy. This is an essential feature required of all billing grade meters.

KYZ Pulse

For applications in which a pulse is needed, the unit also provides a KYZ output which pulses proportional to the amount of energy consumed. This feature is used for pulse counting applications or for building management systems where serial or Ethernet protocol is not available.

Utility Peak Demand Metering

The EM-3000 Series meter provides user-configured Block Window or Rolling Window Demand. This allows you to set up a particular utility demand profile. Block Window Demand is demand used over a fixed user-configured demand period (usually 5, 15 or 30 minutes). Rolling Window Demand is a fixed window demand that moves for a user specified sub-interval period. An example is a 15-minute demand using 3 subintervals, providing a new demand reading every 5 minutes based on the last 15 minutes. Readings for kW, kVAR, kVA and PF are calculated using utility demand structures. Other parameters offer max and min capability over the user-selectable averaging period. Voltage provides a non-rolling instantaneous max and min reading, displaying the highest surge and lowest sag seen by the meter.

EM-1000/EM-2000/EM-3000 Series Multifunction Power and Energy Meters (Continued)

Technical Specifications

EM-3000 Series Meter	
Voltage Inputs	20-416 Volts Line to Neutral, 0-721 Volts Line to Line Universal Voltage Input Input Withstand Capability – Meets IEEE C37.90.1 (Surge Withstand Capability) Programmable Voltage Range to Any PT Ratio Supports: 3 Element WYE, 2.5 Element WYE, 2 Element Delta, 4 Wire Delta Systems Burden: 0.36VA/Phase Max at 600 Volts; 0.014VA/Phase at 120 Volts Input Wire Gauge AWG #16-26
Current Inputs	Class 10: (0 to 10)A, 5 Amp Nominal,10 Amp Maximum; Class 2: (0 to 2)A, 1 Amp Nominal, Secondary Fault Current Withstand (For 23° C, 3 Phase Balanced WYE or Delta load): 100 Amps for 10 Seconds Programmable Current to any CT Ratio Burden 0.005VA Per Phase Max at 11 Amps Pickup Current 0.1% of Nominal
Isolation	All Inputs and Outputs are Galvanically Isolated to 2500 Volts AC
Environmental Rating	Storage: (-20 to +70)° C Operating: (-20 to +70)° C Humidity: to 95% RH Non-Condensing Faceplate Rating: NEMA12 (Water Resistant)
Sensing Method	RMS Sampling at 400+ Samples per Cycle on All Channels Measured Readings Simultaneously Harmonic %THD (% of Total Harmonic Distortion)
Update Rate	Watt, VAR, and VA- Every 6 Cycles; All Other Parameters - Every 60 Cycles
Power Supply	(90 to 400) Volts AC / (100 to 370) Volts DC Burden 16VA Max
Communication Format	10/100BaseTEthernet or 802.11b WiFi Modbus TCP 9,600 to 57,600 Baud Rate Com Port Address 0-247
Dimensions	Basic Unit: (H7.9 x W7.6 x D3.2) in/(H20.07 x W19.30 x D8.13) cm Weight: 4 lbs/1.81 kg
Compliance	IEC62053-22 (0.2% Accuracy) ANSI C12.20 (0.2% Accuracy) ANSI (IEEE) C37.90.1 Surge Withstand ANSI C62.41 (Burst) EN61000-6-2 - Immunity for Industrial Environments: 2005 EN61000-6-4 - Emission Standards for Industrial Environments: 2007 EN61326-1 - EMC Requirements: 2006 UL File #E363785 UL Spec: 61010-1

EM-1000/EM-2000/EM-3000 Series Multifunction Power and Energy Meters (Continued)

EM-3000 Series Meter Accuracy - For 23° C, 3 Phase Balanced Wye or Delta Load

Parameter	Accuracy	Accuracy Input Range
Voltage L-N [V]	0.1% of reading[2]	(69 to 480)V
Voltage L-L [V]	0.1% of reading	(120 to 600)V
Current Phase [A]	0.1% of reading[1]	(0.15 to 5)A
Current Neutral (calculated) [A]	2.0% of Full Scale[1]	(0.15 to 5)A @ (45 to 65)Hz
Active Power Total [W]	0.2% of reading[1,2]	(0.15 to 5)A @ (69 to 480)V @ +/- (0.5 to 1) lag/lead PF
Active Energy Total [Wh]	0.2% of reading[1,2]	(0.15 to 5)A @ (69 to 480)V @ +/- (0.5 to 1) lag/lead PF
Reactive Power Total [VAR]	0.2% of reading[1,2]	(0.15 to 5)A @ (69 to 480)V @ +/- (0 to 0.8) lag/lead PF
Reactive Energy Total [VARh]	0.2% of reading[1,2]	(0.15 to 5)A @ (69 to 480)V @ +/- (0 to 0.8) lag/lead PF
Apparent Power Total [VA]	0.2% of reading[1,2]	(0.15 to 5)A @ (69 to 480)V @ +/- (0.5 to 1) lag/lead PF
Apparent Energy Total [VAh]	0.2% of reading[1,2]	(0.15 to 5)A @ (69 to 480)V @ +/- (0.5 to 1) lag/lead PF
Power Factor	0.2% of reading[1,2]	(0.15 to 5)A @ (69 to 480)V @ +/- (0.5 to 1) lag/lead PF
Frequency	+/- 0.01Hz	(45 to 65)Hz
Total Harmonic Distortion	5.0%[1]	(0.5 to 10)A or (69 to 480)V, measurement range (1 to 99.99)%
Load Bar	+/- 1 segment[1]	(0.005 to 6)A

[1] For 2.5 element programmed units, degrade accuracy by an additional 0.5% of reading.

- For 1A (Class 2) Nominal, degrade accuracy by an additional 0.5% of reading.
- For 1A (Class 2) Nominal, the input current range for Accuracy specification is 20% of the values listed in the table.

[2] For unbalanced voltage inputs where at least one crosses the 150V auto-scale threshold (for example, 120V/120V/208V system), degrade accuracy by additional 0.4%.

EM-3000 Series Meter Ordering Chart

Product-Series	Network Protocol	Freq.	-Power Supply	Current Class	-Mounting	V-Switch Pack	0	0
EM-3 EM-3000 Series Meter	8 WiFi	50 50 Hz System	-0 90-400 VAC/100-370 VDC	5 5 Amp Secondary	-W Default	E Default V-Switch Volts/ Amps, Energy Counters		
		60 60 Hz System		1 1 Amp Secondary		F above with Harmonics and Limits		

Refer to the EM-1000/EM-2000 Series Meters' Installation and Operation Manual (LIT-12011867) and the EM-3000 Series Meter Installation and Operation Manual (LIT-12011874) for important product application information.

