Electrical Energy Meter for Multi-Circuit Loads Product Bulletin

LIT-12013645

2021-05-12

Overview

The Johnson Controls® Electrical Energy Meter (EEM) is a revenue grade power meter with an ANSI C12.20-2015 Class 0.2 standard, and is scalable up to 48 circuits. The maximum voltage without the addition of potential transformers is 600 V line to line, and 374 V line to neutral. The EEM is a cost effective way to integrate granular electrical power consumption data into the BAS. It can be deployed in either existing commercial buildings or new construction projects. The EEM features a 5-year warranty. The EEM meter uses Rogowski coils or current transducers (CT).

Note: See Table 3 and Table 4 for the coils and CTs compatible with the EEM meter.

Every meter includes the necessary hardware for installation:

- Mounting screws
- Wall anchors
- Cable ties
- Connector kit for the CTs or Rogowski coils

Figure 1: Meter connections and user interface



Features and benefits

Table 1: Features and benefits

Feature	Benefit
Web portal	Configure the meter from anywhere which minimizes the number of people required at the job site
Backlit 4 line LCD display	Configure this capability offline
BACnet® MS/TP and IP, Modbus Remote Terminal Unit (RTU) and TCP, or Electronic Industries Alliance (EIA-485)	Use backward and forward compatible communications capability
90° rotatable display	Locate the meter relative to the exisitng conduit
NEMA 1 enclosure	Mount the enclosure on the wall without any need for another enclosure
Dual voltage inputs with 12 and 48 load models	Use single and three phase on the same meter
Polarity correction from the web portal	Eliminate need to physically reverse CT installation
Bi-directional capability Institute of Electrical and Electronic Engineers, Inc. (IEEE-754) data format	Ideal for renewable energy applications like solar
Data logging capability up to 62 days	Granularly manage loads from the meter against the BAS
One pulse output and two pulse inputs	Enable integration with other meter types or loads
National Fire Protection Association (NFPA70E) compliant USB interface	No PPE required for making configuration changes
NIST calibration certificate included in the box	Compliance requirement for the meter on site

Ordering information

Table 2: Meter ordering information

Product Code Number	Description
EEM-MULTI-03	Electrical Energy Meter, three loads, Ethernet and serial communictions, onboard display
EEM-MULTI-12	Electrical Energy Meter, 12 loads, Ethernet and serial communications, onboard display
EEM-MULTI-48	Electrical Energy Meter, 48 loads, Ethernet and serial communications, onboard display

Table 3: Rogowski Coil

Product Code Number	Description
EEM-CT-PF-S	EEM Rogowski Coil, 12 in. length, 3.5 in. ID, 600 V, 1500 A maximum, 3 ft extendable lead
EEM-CT-PF-M	EEM Rogowski Coil, 24 in. length, 7.5 in. ID, 600 V, 3000 A maximum, 3 ft extendable lead
EEM-CT-PF-L	EEM Rogowski Coil, 36 in. length, 11.5 in. ID, 600 V, 6000 A maximum, 3 ft extendable lead

Table 4: Current Transducers

Product Code Number	Description
EEM-CTS-020	EEM split core, 0.5 in. ID, 600 V, 80 A maximum, 15 ft extendable lead
EEM-CTS-050	EEM split core, 0.5 in. ID, 600 V, 100 A maximum, 15 ft extendable lead
EEM-CTS-100	EEM split core, 1 in. ID, 600 V, 200 A maximum, 15 ft extendable lead
EEM-CTS-200	EEM split core, 1 in. ID, 600 V, 250 A maximum, 15 ft extendable lead
EEM-CTS-400	EEM split core, 1 in. ID, 600 V, 400 A maximum, 15 ft extendable lead

Differences between Rogowski Coils and traditional current transducers

Apply Rogowski coils to circuits with at least a 100 A nominal load. As the circuit ampacity increases, the size and bulk of a traditional CT can be difficult to manage inside a tight panel. Rogowski Coils provide additional mounting flexibility compared to traditional CTs, and in particular ease strain relief considerations during installation.

ⓘ **Note:** You can extend the lead length for both the Rogowski Coils and the traditional CT models to 300 ft without any other system modification.

Figure 2: Rogowski Coil



Figure 3: Current Transducer



Figure 4: Meter connections and user interface

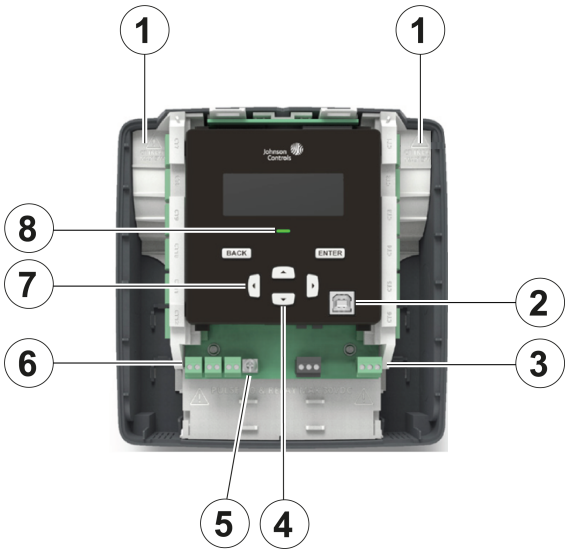


Table 5: Meter connections and user interface

Number	Description
1	CT inputs side entry
2	PC connection with supplied USB cable, USB-B
3	SPDT alarm relay
4	Ethernet RJ45 connection
5	Earth ground screw
6	Pulse IO, 2 inputs, 1 output
7	Interface keys
8	Status LED

Dimensions

Figure 5: 3 and 12-circuit models

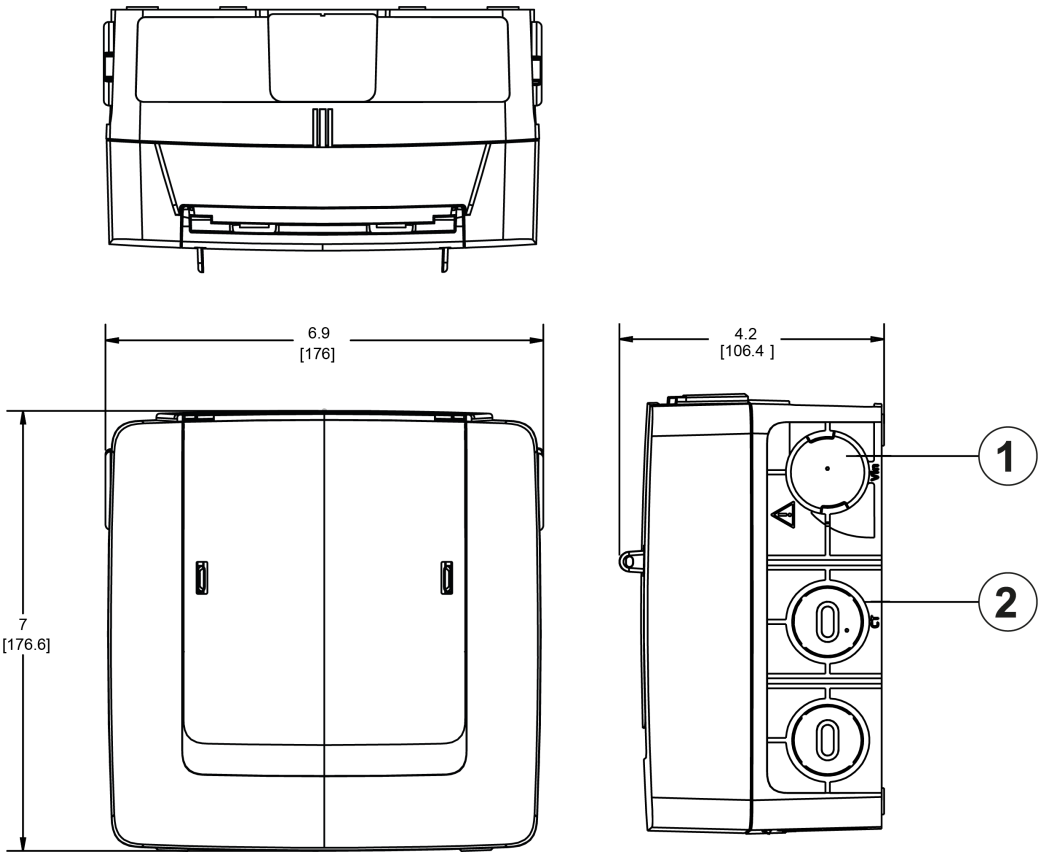


Table 6: Conduit openings

Number	Conduit opening
1	Two 3/4 in. conduit opening
2	Four conduit openings

Figure 6: 48 circuit models

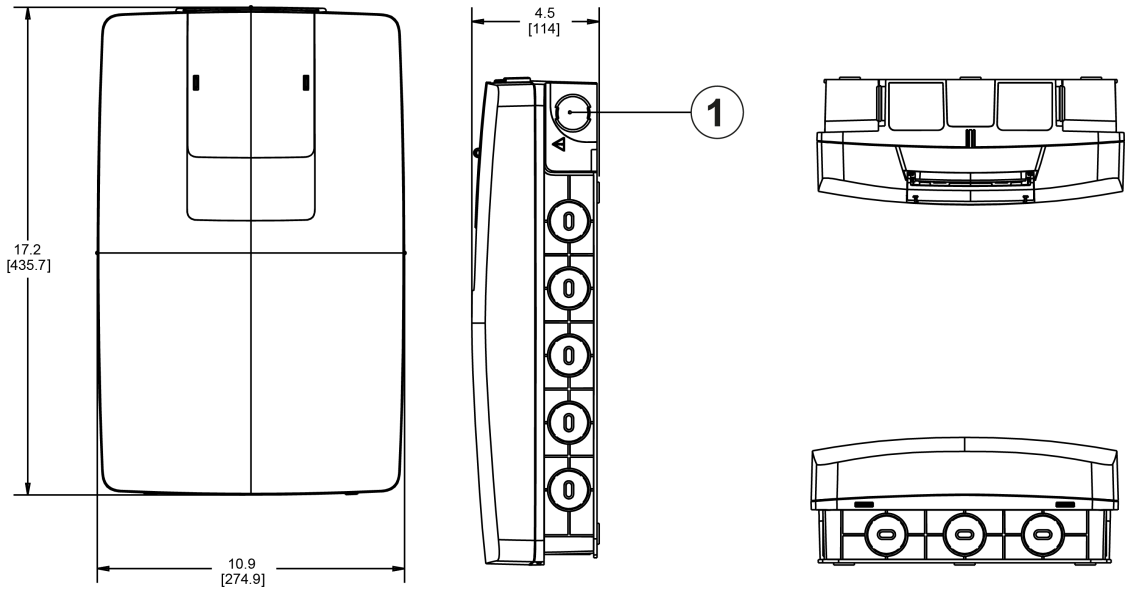


Table 7: Conduit openings

Number	Conduit opening
1	Two 3/4 in. conduit opening

Technical specifications

Table 8: EEM for multi-cirucuit loads

Specification	Description
Service type	Single phase, split phase, Three phase-four wire (WYE), three phase-tree wire (Delta)
Power	Self-powered from Vin1 L1 and L2, 80 VAC - 600 VAC RMS CAT III, 50 Hz/60 Hz, 5 W max
AC protection	0.5 A fuse 200 kA interrupt capacity
Voltage inputs	80 VAC - 347 VAC line-to-neutral, 80 VAC - 600 VAC line-to-line, CAT III power meter 12 and 48 have two sets voltage inputs
Current inputs	3, 12, or 48 CT inputs, split or solid core CT: Configurable up to 2 V, Rogowski Coil: Patrol Flex
Maximum current input	150% of CT rating (mV CTs) to maintain accuracy, Measure up to 6000 A with Patrol Flex Rogowski Coils
Measurement type	True RMS up to 50th harmonic 60 Hz, One to three phase AC system
Line frequency	50 Hz/60 Hz, Measurement taken L1-N
Waveform sampling	12 kS/s
Parameter update rate	1 s
Measurements	V, A, kW, kVAR, kVA, aPF, dPF, kW peak demand, import (received) kWh, export (delivered) kWh, Net kWh, import (received) kVAh, export (delivered) kVAh, net kVAh, import (received) kVARh, export (delivered) kVARh, Net kVARh, total harmonic distortion (THD), Phase angle, frequency; All parameters for each phase and element load total
Accuracy	0.2% ANSI C12.20-2015 Class 0.2
Real-time clock backup	5 year (by user replaceable coin battery
Display	4-line 20 characters backlit LCD, One green and red status LED

Table 8: EEM for multi-cirucuit loads

Specification	Description
Alarm replay output	User configurable SPDT relay, 30 VDC/VAC, 2 arms
Pulse inputs/output	Two isolated 30 VDC input max. One isolated output with open collector 30 VDC max., Maximum pulse rate 20 Hz, Minimum pulse width 20 ms
Web browser	Support all major browsers
Communications	10/100 Mbps Ethernet, or Ethernet over USB. Ethernet over USB requires one USB 2.0 port and Ethernet over USB dirvers
Security	PIN protection
Hardware	Isolated EIA-485, Ethernet, and USB
Supported protocols	Modbus RTU, BACnet MS/TP, Modbus TCP or BACnet/IP
Maximum communication length	1,000 m for EIA-485, 100 m for Ethernet
Communication baud rate	9600, 19200, 38400 (default), 57600, 76800
Modbus RTU data bits	8
Modbus RTU parity	None
Modbus RTU stop bits	1
Wire connections	12 AWG - 28 AWG 600 VAC voltage input screw terminals, 12 AWG -24 AWG 600 VAC CT input screw terminals, 14 AWG- 20 AWG 300 V I/O screw terminals, voltage connection must be 14 AWG or larger wires and 600 VAC rated to meet safety requirement
Mounting	DIN rail or 4-point screw mount for 3/12 channel. 48 channel uses 5 point mounting holes only.
Temperature	Operationg -4°F to 140°F (-20°C to 60°C), Storage -22°F to 176°F (-30°C to 80°C)
Humidity	5% - 95% non-condensing
Enclosure	ABS/Polycarbonate, 94-V0 flammability rating Connections: 3/4 in. EMT conduit ports for power 3/4 in. EMT knock-outs for load lines, 3 and 12 load 1 in. knock-outs for load lones, 48 load
Main enclosure IP20	High voltage area IP40
Enclosure dimensions	3 and 12 load: L 7 in. x W 6.8 in. x H 3.8 in. 48 load: L 17.2 in. x W 10.8 in. x H 4.4 in.
Warranty	All products within this bulletin have a 5-year parts warranty.
EEM-CT Series Compliance CE	Europe LVD, EMC, RoHS EN 61010-1, EN 61010-031, EN 61010-2-032, EN 61326-1
	United States UL 61010-1, UL 61010-031, UL 61010-2-032
	Canada CAN/CSA-C22.2 No. 61010-1, CAN/CSA-C22.2 No. 61010-031, CAN/CSA-C22.2 No. 61010-2-032
EEM-CTS Series Compliance CE	Europe LVD, EMC, RoHS EN 61010-1, EN 61000-6-4, EN 61000-6-2

Table 8: EEM for multi-cirucuit loads

Specification	Description
	United States UL 2808
	Canada CAN/CSA-C22.2 No. 61010-1
EEM-MULTI Series Compliance CE	Europe LVD, EMC, RoHS EN 61010-1, EN 61010-2-030, EN 61326-1
	United States UL 61010-1, UL 61010-2-030 FCC: 47 CFR Part 15
	Canada CSA-C22.2 No. 61010-1, CSA-C22.2 No. 61010-2-030

Repair information

If the Electrical Energy Meter for Multi-Circuit Loads fails to operate within its specifications, replace the unit. For a replacement meter, contact the nearest Johnson Controls representative.

Product warranty

This product is covered by a limited warranty, details of which can be found at www.johnsoncontrols.com/buildingswarranty.

Software terms

Use of the software that is in (or constitutes) this product, or access to the cloud, or hosted services applicable to this product, if any, is subject to applicable end-user license, open-source software information, and other terms set forth at www.johnsoncontrols.com/techterms. Your use of this product constitutes an agreement to such terms.

Patents

Patents: https://jcipat.com

Single point of contact

APAC	Europe	NA/SA
JOHNSON CONTROLS C/O CONTROLS PRODUCT MANAGEMENT NO. 32 CHANGJIJANG RD NEW DISTRICT WUXI JIANGSU PROVINCE 214028 CHINA	JOHNSON CONTROLS WESTENDHOF 3 45143 ESSEN GERMANY	JOHNSON CONTROLS 507 E MICHIGAN ST MILWAUKEE WI 53202 USA

Contact information

Contact your local branch office:
www.johnsoncontrols.com/locations

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