PowerLogic™ Series EM4000
High-Density Meter Installation Guide

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Schneider Electric

Safety Information

Important Information

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service or maintain it. The following special messages may appear throughout this manual or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of either symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, can result in death or serious injury.

⚠ CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, can result in minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury. The safety alert symbol shall not be used with this signal word.

Please note

Electrical equipment should be installed, operated, serviced and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction, installation, and operation of electrical equipment and has received safety training to recognize and avoid the hazards involved.

Notices

FCC Part 15 Notice

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures.

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This Class B digital apparatus complies with Canadian ICES-003.

FCC Part 68 Notice

This equipment complies with Part 68 of the FCC rules and the requirements adopted by the Administrative Council for Terminal Attachments (ACTA). On the side of this equipment is a label that contains, among other information, a product identifier in the format US: AAAEQ##TXXXX. If requested, this number must be provided to the telephone company.

This equipment uses the following Universal Service Order Codes (“USOC”) jacks: RJ11.

A plug and jack used to connect this equipment to the premises wiring and telephone network must comply with the applicable FCC Part 68 rules and requirements adopted by the ACTA. A compliant telephone cord and modular plug or compliant modular jack is provided with this product.

The REN is used to determine the number of devices that may be connected to a telephone line. Excessive RENs on a telephone line may result in the devices not ringing in response to an incoming call. In most but not all areas, the sum of RENs should not exceed five (5.0). To be certain of the number of devices that may be connected to a line, as determined by the total RENs, contact the local telephone company. The REN for this product is part of the product identifier that has the format US: AAAEQ##TXXXX. The digits represented by ## are the REN without a decimal point (e.g., 03 is a REN of 0.3).

If this equipment, Digital Power Meter with Internal Modem, causes harm to the telephone network, the telephone company will notify you in advance that service may be temporarily discontinued. When advance notice is not practical, the

telephone company will notify you as soon as possible. You will also be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of this equipment. If this happens, the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

If you experience trouble with this equipment, Digital Power Meter with Internal Modem, please contact Schneider Electric at 615-287-3400. If this equipment is causing harm to the telephone network, the telephone company may request that you disconnect this equipment until the problem is resolved.

There are no user serviceable parts in this equipment.

Connection to party line service is subject to state tariffs. Contact the state public utility commission, public service commission or corporation commission for information.

If your premises has specially wired alarm equipment connected to the telephone line, ensure that the installation of this Digital Power Meter with Internal Modem does not disable your alarm equipment. If you have questions about what will disable alarm equipment, consult your telephone company or a qualified installer.

Network Compatibility Notice for the Internal Modem

The internal modem in meters equipped with this option is compatible with the telephone systems of most countries in the world, with the exception of Australia and New Zealand. Use in some countries may require modification of the internal modem’s initialization strings. If problems using the modem on your phone system occur, please contact Schneider Electric Technical Support.

Table of Contents

Introduction

This document describes the PowerLogic EM4033 and EM4080 meters, including procedures to install and start up the unit, and complete the initial configuration:

- “System Description” on page 1
- “Pre-Installation” on page 6
- “Installation Procedures” on page 7
- “Connecting Pulse Inputs” on page 26
- “Fuse Replacement” on page 30

This documentation is intended for those responsible for installing and configuring the PowerLogic EM4033 and EM4080 meters. Installers must be qualified electricians with knowledge of local and national code requirements. See “Safety Precautions” on page 5.

System Description

The PowerLogic EM4033 and EM4080 meters support:

- single-phase, 2-wire
- single-phase, 3-wire (network)
- three-phase wye and Delta services

Depending on how the meters are installed and configured, they can meter 8, 12, or 24 individual meter points. The PowerLogic EM4033 and EM4080 meters are designed for residential, commercial, and industrial use and display the power and consumption readings for each measurement point.

PowerLogic EM4000 series System Specifications

The PowerLogic EM4000 series system architecture includes:

- single-phase, 2-wire; single-phase, 3-wire (network); three-phase, 4-wire (wye); and three-phase, 3-wire (delta) compatibility
- 2 control voltage variants: 120V 60Hz and 277V 60Hz
- 120/208V, 120/240V and 277/480V configurations, and 347/600V with external potential transformers
- up to 8, 12, or 24 individual meter points
- local Ethernet configuration interface via PC and web browser
- Ethernet port for remote reporting
- Modbus RTU serial port, for remote reporting
- serial port for remote display
- 2 pulse inputs to connect metering devices

Table 1 lists the system specifications of the PowerLogic EM4033 and EM4080 meters.

Table 1: PowerLogic EM4000 series meter specifications

Specification	PowerLogic EM4033 meter	PowerLogic EM4080 meter
Dimensions	Height: 13.125 in. (33.5 cm) Width: 12 in. (30.5 cm) Depth: 2.125 in. (5.5 cm)	Height: 13.125 in. (33.5 cm) Width: 12 in. (30.5 cm) Depth: 2.125 in. (5.5 cm)
Weight	8.77 lb (3.98 kg)	8.77 lb (3.98 kg)
Sense voltage	100V to 300V 50/60Hz 2W+N+Protective Earth Wye 3W+N+Protective Earth Wye 3W+Protective Earth Delta	100V to 300V 50/60Hz 2W+N+Protective Earth Wye 3W+N+Protective Earth Wye 3W+Protective Earth Delta
Control voltage and current	North America: • 120V 125 mA 60 Hz • 277V 54 mA 60 Hz	North America: • 120V 125 mA 60 Hz • 277V 54 mA 60 Hz
Current transformers Measurement Category III	0.333 V secondary CT Note: All CTs used with the product must be UL recognized/listed.	80 mA secondary CT 200 A primary CT Meter burden: 4.04 ohms CT burden: 20 ohms Part number: METSECT80200 Note: All CTs used with the product must be UL recognized/listed.
Measurement accuracy (Accuracy compliant when used with 0.3% CTs)	ANSI C12.20 Class 0.5 IEC 62053-22 Class 0.5S	ANSI C12.20 Class 0.5 IEC 62053-22 Class 0.5S Measurement Canada Approved EG07 compliant
Pulse inputs 1 and 2	Dry form A and solid-state form A compatible Internal 3.3 V pull-up Maximum frequency 10 Hz Minimum pulse width 20 ms	Dry form A and solid-state form A compatible Internal 3.3 V pull-up Maximum frequency 10 Hz Minimum pulse width 20 ms
Non-volatile memory storage	120 days in 15-minute intervals	120 days in 15-minute intervals
Onboard Ethernet port	10/100 Mb/s	10/100 Mb/s
Onboard Modbus RTU serial port	RS422 or RS485 19200/9600 Baud	RS422 or RS485 19200/9600 Baud
Fuse rating (F1)	North America:120V: T125 mA, 250V	North America:120V: T125 mA, 250V
Environmental		
Operating temperature	-40 to 70°C	-40 to 70°C
Operating humidity	5% to 90% non-condensing	5% to 90% non-condensing
Usage environment	Indoor or enclosed outdoor environment	Indoor or enclosed outdoor environment
Maximum altitude	9843 ft (3000 m)	9843 ft (3000 m)
Pollution degree	2	2
Installation Category	II	II
Measurement Category	III	III

Front Panel Display

The PowerLogic EM4033 and EM4080 meters have the following front panel features (Figure 1 shows the PowerLogic EM4080 front panel):

- **LCD** — displays 2 rows of 16 characters for each of the meter points (8, 12, or 24)
- **Display button** — cycles through the available information for each of the meter points
- **Left and right arrow buttons** — selects which of the meter points is on the display

Figure 1: PowerLogic EM4080 front panel

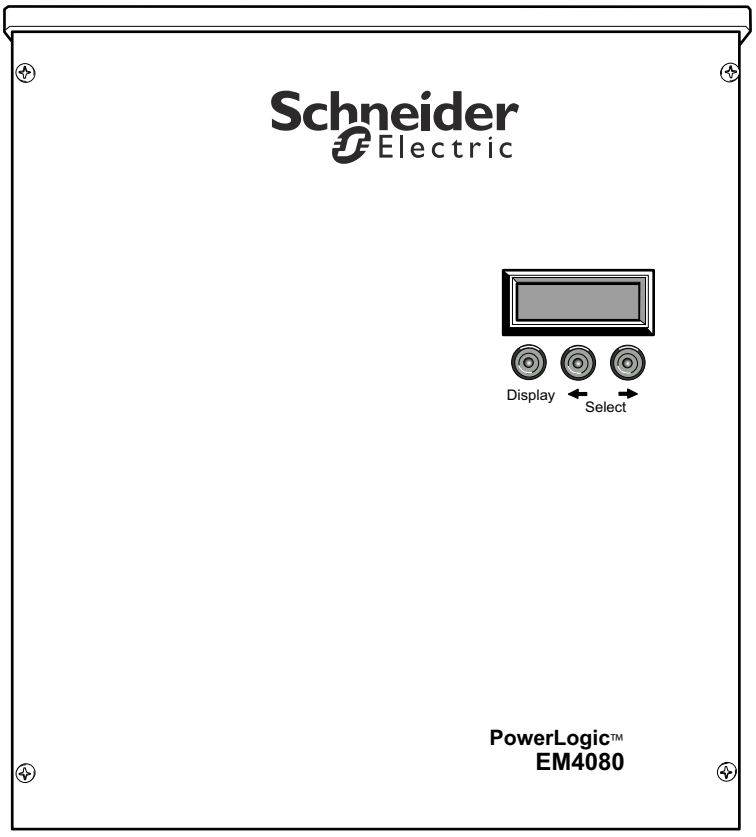
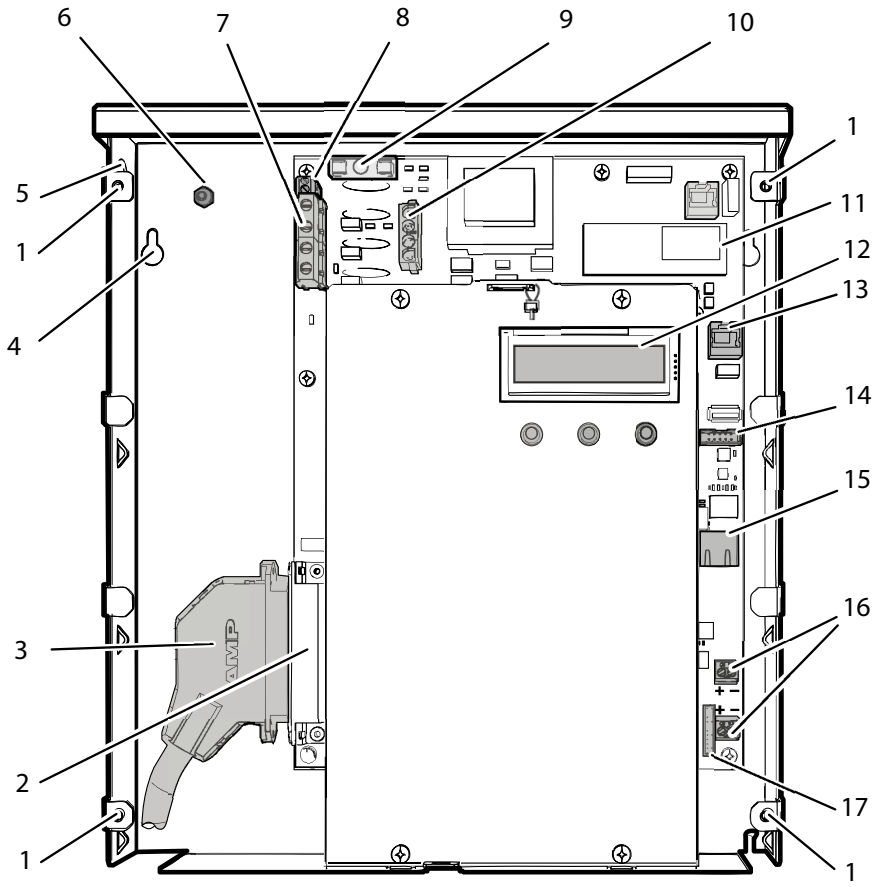


Figure 2 shows the internal view of thePowerLogic EM4033 and EM4080 meters.

Figure 2: PowerLogic EM4033 and PowerLogic EM4080 internal view



Legend:
1 Cover screw location
2 Meter point input connector
3 Cable connector
4 Mounting keyhole
5 Ingress punch-outs
6 Earth stud
6 Sense voltage terminal block
8 Control voltage terminal block
9 Fuse
10 Control voltage jumper
11 RTU interface
12 Display
13 Remote display connector
14 Serial RS232
15 Ethernet port
16 Pulse in terminal blocks
17 Pulse out connector

Safety Precautions

Carefully observe these safety instructions.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E.
- Only qualified electrical workers should install this equipment. Such work should be performed only after reading this entire set of instructions.
- The equipment must be accessible to authorized personnel only. Equipment must be installed in areas where access can be restricted.
- NEVER work alone.
- Before performing visual inspections, tests, or maintenance of this equipment, disconnect all sources of electric power. Assume that all circuits are live until they have been completely de-energized, tested, and tagged. Pay particular attention to the design of the power system. Consider all sources of power, including the possibility of backfeeding.
- Turn off all power supplying the meter and the equipment in which it is installed before working on it.
- Always use a properly rated voltage sensing device to confirm that all power is off.
- Before closing all covers and doors, carefully inspect the work area for tools and objects that may have been left inside the equipment.
- Successful equipment operation requires proper handling, installation, and operation. Neglecting fundamental installation requirements can lead to personal injury as well as damage to electrical equipment or other property.
- NEVER bypass external fusing.
- NEVER short the secondary of a Potential Transformer (PT).
- Always short the secondary of a current transformer prior to disconnecting current input loads.

Failure to follow these instructions will result in death or serious injury.

Electrical Standards Compliance

- Use the unit only in accordance with the electrical power rating
- The unit is only to be installed by a qualified electrician
- Initial installation of the unit must be inspected by the local electrical Inspection Authority
- Install the unit in compliance with the following local and national electrical codes:
  - Canada: Canadian Electrical Code, Part I, CSA C22.1
  - United States: National Fire Protection Association (NFPA) 70; US National Electrical Code
  - Elsewhere: International Electrotechnical Commission (IEC) 364, Part 1-7
- Ensure that the unit is properly earthed
- If the equipment is installed or used in a manner other than that specified in this document, it may void your warranty or impair the protection of the equipment.

Installation

This section contains the following installation topics:

Pre-Installation

The pre-installation checklist and site planning must be performed before installing the equipment at the site.

Receiving

The equipment required for each PowerLogic EM4000 meter installation includes:

- high-density meter (PowerLogic EM4033 or PowerLogic EM4080)
- For the PowerLogic EM4033 and PowerLogic EM4080, one 12-ft (4-m) AMP cable with one 50-pin connector supplied with each unit
- CD and meter configuration software, this installation manual and an installation record form

When you receive your order, verify that the items listed above are included with the shipment, and visually inspect them for damage. If any parts are missing or damaged, contact your Schneider Electric representative.

Pre-Installation Checklist

The installer must provide the following information, tools, and equipment before proceeding with the installation:

- certified current transformers for metering (not supplied)
- an appropriate 15-Amp maximum circuit breaker or a fused disconnect switch for the type of panel
- current/voltage meter to test the phasing of panels
- RJ45 Ethernet patch cable
- 4-wire 14 AWG (1.63 mm^2) cable for three-phase wye connected circuits, or 3-wire 14 AWG (1.63 mm^2) cable for a single-phase wye connected circuits
- small flat-head screwdriver
- #2 Phillips screwdriver
- crimping tool
- 18 AWG butt splice connector
- wire strippers
- four 1-inch (25 mm) #8 mounting screws suitable for selected mounting surface

Site Planning

1. Determine the number of PowerLogic EM4000 series meters to be installed and ensure adequate space. For clearances, see Figure 3 on page 8.
2. Determine the number of Ethernet drops required, and ensure they are installed before installing the PowerLogic EM4033 and EM4080 meters.

3. Determine the number and types of meters or monitors required (single-phase, network, or three-phase).
4. Determine the model number and correct sense voltage based on the voltage label on the top right side of the unit.

Access to Power and Lighting

The installation site must be supplied with access to the main electrical panel and any sub-panels. Portable or permanent lighting must be available to provide the installers with a clear view of the equipment and of the installation environment. Each installation may vary depending on physical site restrictions.

Installation Procedures

This section provides information about activities that must be performed to install the PowerLogic EM4033 and EM4080 meters in a single-phase 2-wire, single-phase 3-wire (network), or three-phase 4-wire application. The installation procedures must be performed in the following order:

1. “Mounting the PowerLogic EM4000 meter” on page 7
2. “Installing Potential Transformers for Three-Phase Service Greater Than 277V” on page 9
3. “Installing the Sense Voltage and Control Voltage Cables in Wye and Delta Services” on page 11
4. “Installing the Current Transformers” on page 18
5. “Connecting the Communications” on page 25
   a. “Connecting the Ethernet Cable” on page 25
   b. “Connecting the Modbus RTU Communications” on page 25
6. “Manually Testing Communications” on page 26
7. “Connecting Pulse Inputs” on page 26
8. “Recording the Meter Map” on page 28

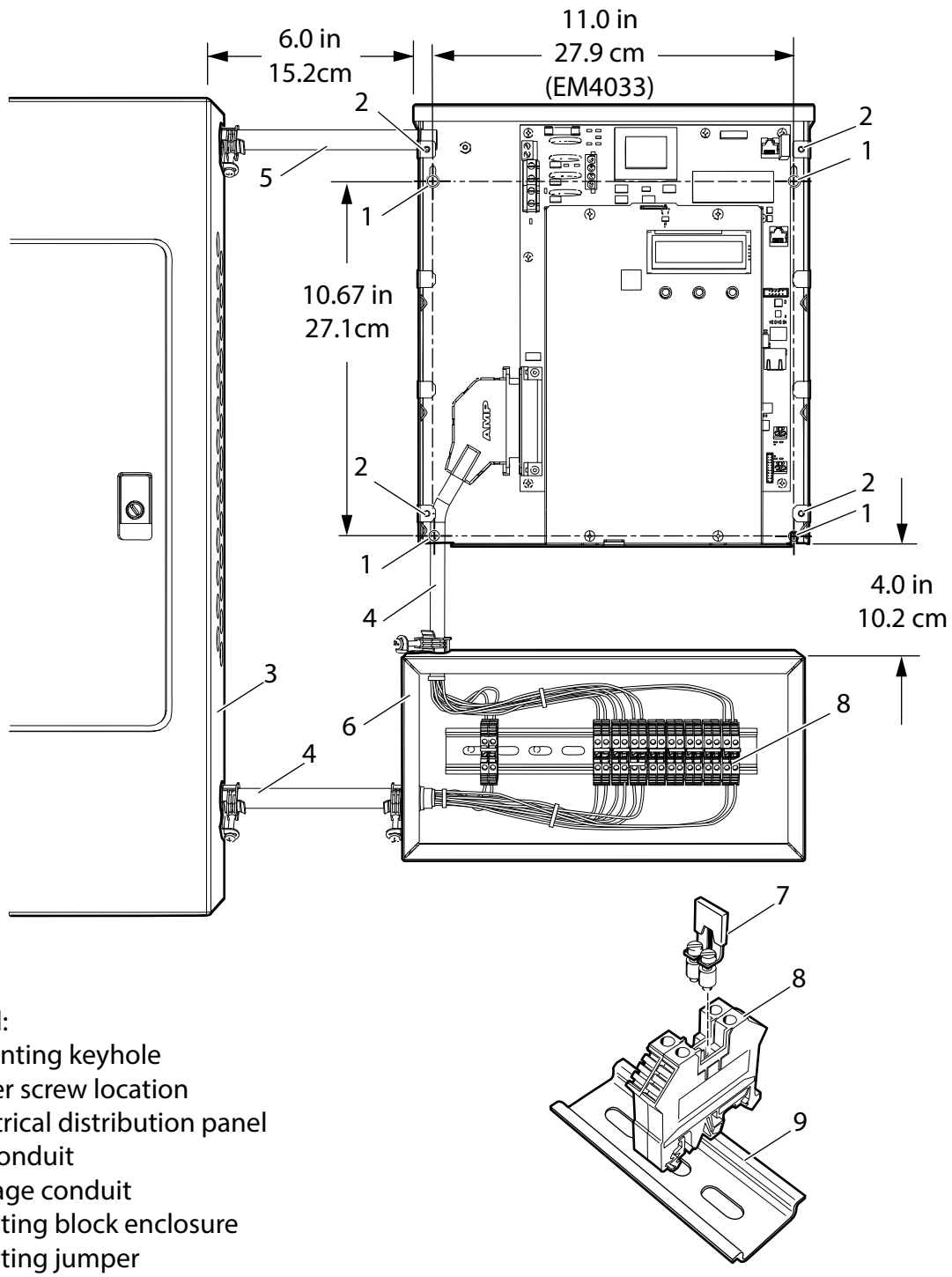
Mounting the PowerLogic EM4000 meter

Figure 3 shows the general mounting layout for metering 120V/208V wye services, and Figure 4 shows the general mounting layout for metering 347V/600V wye services.

1. Remove the front cover from the meter by removing the four screws with a #2 Phillips screwdriver. Retain the cover and screws for later re-installation.
2. Mount the PowerLogic meter on the wall and secure it by inserting a screw in each mounting keyhole and tightening the screws.
3. Mount the shorting block enclosure on the wall as shown in Figures 3 and 4. Secure it by inserting a screw in each mounting keyhole and tightening the screws.
4. Install the conduit for voltage and current connections.

In Figure 3, the meter is powered and takes its sense voltage directly from a breaker within the panel.

Figure 3: 120V Mounting Layout, Dimensions and Clearances



Legend:
1. Mounting keyhole
2. Cover screw location
3. Electrical distribution panel
4. CT conduit
5. Voltage conduit
6. Shorting block enclosure
7. Shorting jumper
8. Shorting block
9. DIN rail

Installing Potential Transformers for Three-Phase Service Greater Than 277V

Potential transformers are required when metering services greater than the rated voltage input of the meter. Potential transformers are used to reduce the line-to-neutral voltage of the service to 120V. The accuracy class should be 0.3% or better, with a burden rating of 30VA.

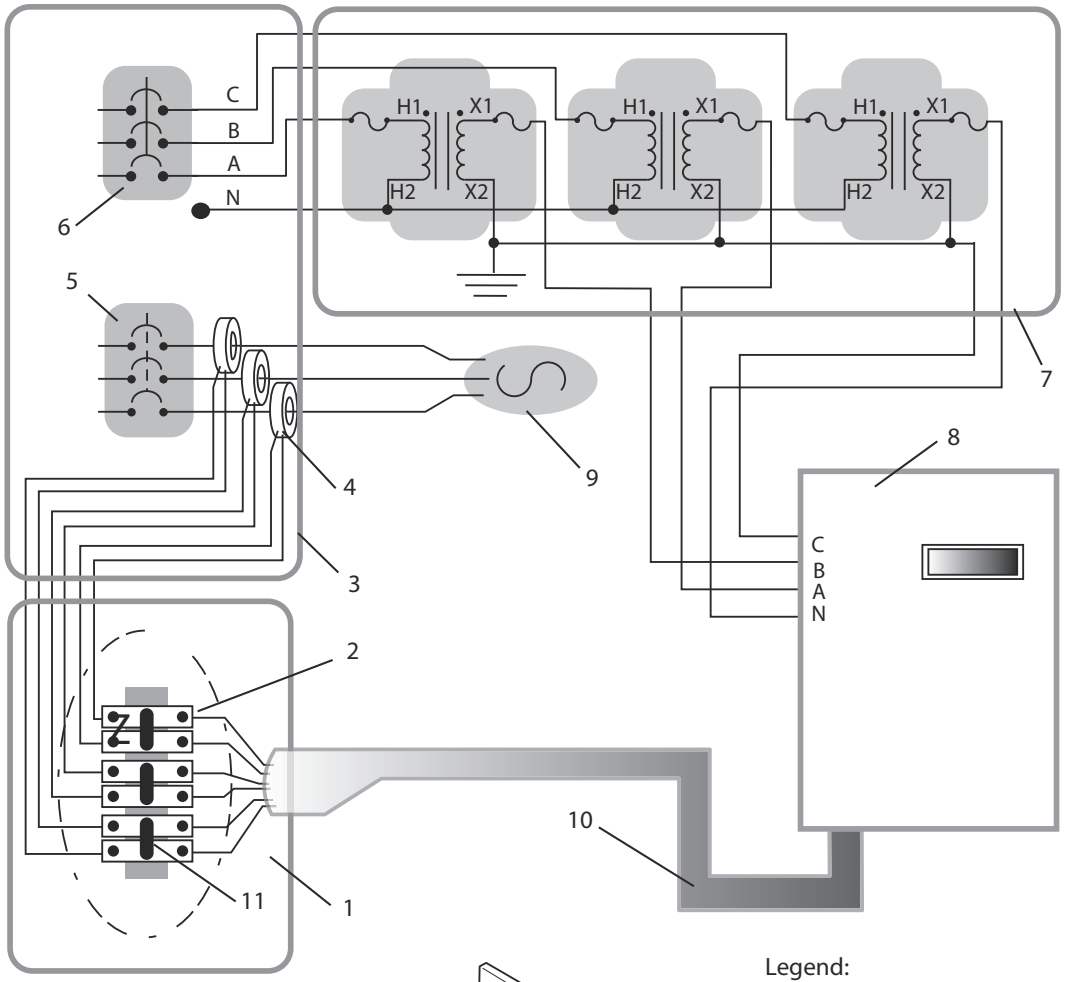
For applications in Canada, Measurement Canada approved potential transformers are required. Measurement Canada requires an accuracy class of 0.3% or better, with a 150VA rating.

NOTE: Potential transformer burden depends on the control voltage source. If control voltage is provided separately (not derived from the metered voltage), then lower transformer burden may be acceptable. Contact your local Schneider Electric representative for details.

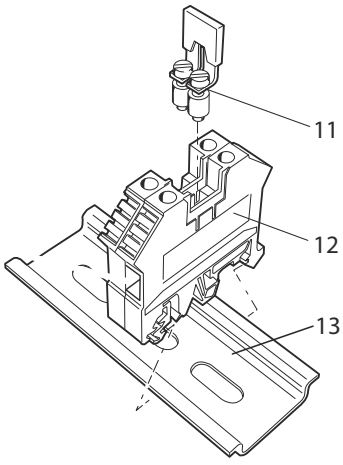
Mount the potential transformer enclosure between the supply voltage and the PowerLogic meters as shown in Figure 4. Transformer configuration must be Y||Y (wye-wye).

In Figure 4, the meter is powered from the potential transformers that are fed from a breaker within the 600Y/347V panel. The CT cable is connected to the shorting enclosure before connecting to the CTs in the panel.

Figure 4: Typical three-phase 347V installation



Shorting block detail



Legend:
1 Shorting block enclosure
2 Shorting block
3 Distribution panel
4 Current transformer
5 Load breaker
6 Meter breaker
7 Transformer enclosure
8 PowerLogic meter
9 Load
10 Current input cable
11 Shorting jumper
12 Shorting block
13 DIN rail

Installing the Sense Voltage and Control Voltage Cables in Wye and Delta Services

The sense voltage (A, B, C, N) provides phase voltages for metering. The configuration depends on the type of service being metered:

- see “For a single-phase panel with the 120V variant of the meter:” on page 13
- see “For a 208Y/120V three-phase wye panel with the 120V variant of the meter:” on page 14
- see “For a 480Y/277V three-phase wye panel with the 277V variant of the meter:” on page 15
- see “For a 600Y/347V or higher three-phase wye panel with potential transformers with the 120V variant of the meter:” on page 16
- see “For a three-phase Delta panel with the 120V variant of the meter:” on page 17

The PowerLogic EM4033 and EM4080 meters are shipped from the factory with a control voltage jumper that can be used to connect the control voltage input and the sense voltage inputs to provide control voltage to the unit. The following procedures explain how to connect the sense voltage inputs for each of the service types.

For a single-phase panel, use a 3-wire (red, black, white), 14 AWG (1.63 mm^2), 90^oC (194^oF) cable. For a three-phase panel, use a 4-wire (red, black, blue, white), 14 AWG (1.63 mm^2), 90^oC (194^oF) cable. For a Delta service, use a 3-wire (red, black, blue), 14 AWG (1.63 mm^2), 90^oC (194^oF) cable. Metallic, flexible armored cable (BX cable) is recommended for commercial installations as shown in Figure 5 on page 13.

The PowerLogic meters must be connected to the sense voltage and control voltage through a properly rated disconnect that disconnects all line and neutral wires, so it can be powered down. The disconnect must be located within easy reach of the meter operator, and must be labeled as such. Opening the disconnect or breaker is the disconnect device. For multiple PowerLogic meter installations, the same disconnect can be used to power all meters, and must be labeled for all meters it supplies power to. The disconnect device must meet IEC 60947-1, IEC 60947-3 and/or comply with the local electrical code.

To install the control voltage cable in a 208Y/120V or 120/240V application:

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn off all power supplying this equipment before working on or inside equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace all devices, doors and covers before turning on power to this equipment.
- The meters must be connected to the sense voltage and control voltage through a properly rated voltage disconnect (not shown in the wiring diagrams).

Failure to follow these instructions will result in death or serious injury.

NOTE: If the circuit breaker panel does not designate phase A, phase B and phase C feeds, make your own designation and use it for the rest of the installation.

1. Before connecting the sense voltages, turn off the power to the circuit being connected.
2. Always use a properly rated voltage sensing device to confirm power is off.
3. Connect the sense voltages phase A, B, C, and N leads from the voltage disconnect to the meter as described in Figure 5 on page 13 and Figure 6 on page 14.

NOTE: The phase wiring sequence A, B, C between the PowerLogic EM4000 meter and the panel must match or the measurement readings will be wrong.

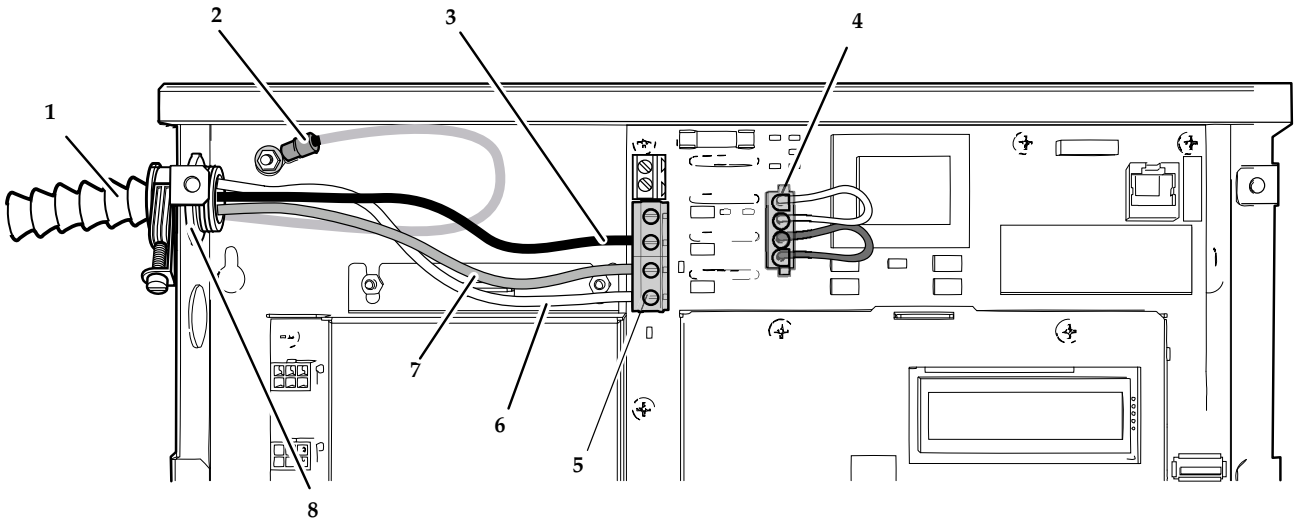
4. If more than one meter is being installed, repeat this procedure for each additional meter.

For a single-phase panel with the 120V variant of the meter:

- Connect meter terminal A to the voltage disconnect phase A (red wire)
- Connect meter terminal B to the voltage disconnect phase B (black wire)
- Connect meter neutral terminal to neutral bar in the voltage disconnect panel (white wire)
- Connect earth wire to earth post using lug provided
- Meter terminal C is not connected
- Install power supply shorting jumpers (see Figure 5)

The PowerLogic EM4033 and EM4080 meters are rated for direct input of 120V to 277V 60Hz phase potential. When metering services greater than 120V, the meter is powered from a separate 120V instrument transformer. Figure 7 shows the wiring of the control voltage transformer for a 277V service.

Figure 5: PowerLogic EM4000 meter in a 120/240V single-phase connection

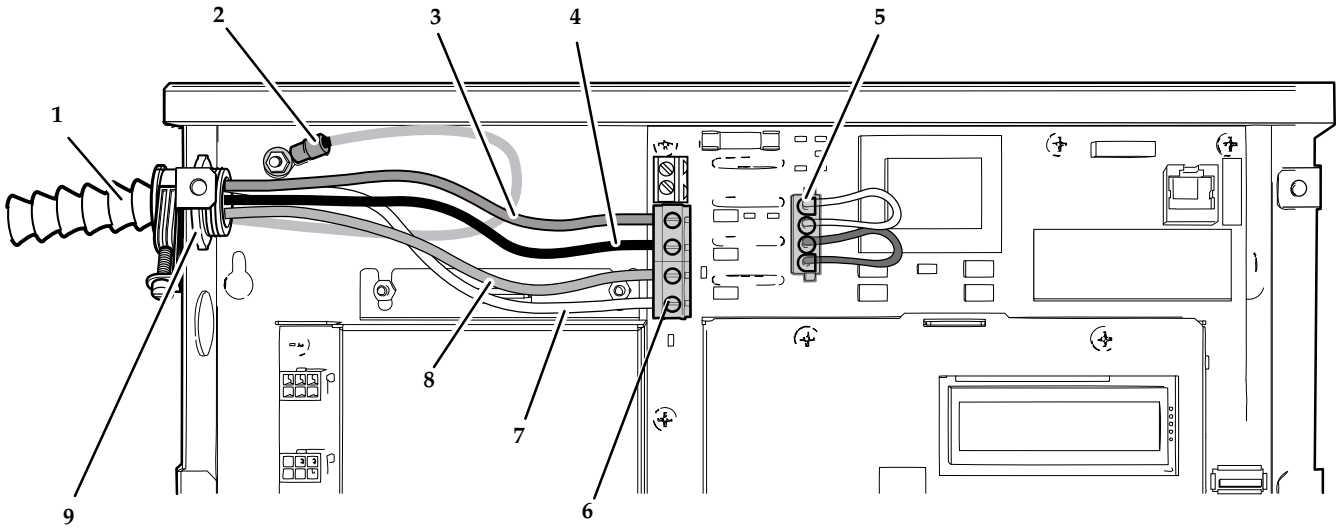


Legend:
1 BX cable
2 Earth
3 Phase B (black)
4 Shorting jumper
5 Sense voltage terminal block (J3)
6 Neutral (white)
7 Phase A (red)
8 0.75-inch (1.9-cm) strain relief

For a 208Y/120V three-phase wye panel with the 120V variant of the meter:

- Connect meter terminal A to the voltage disconnect phase A (red wire)
- Connect meter terminal B to the voltage disconnect phase B (black wire)
- Connect meter terminal C to the voltage disconnect phase C (blue wire)
- Connect meter neutral terminal to neutral bar in the voltage disconnect panel (white wire)
- Connect earth wire to earth post using lug provided
- Install power supply shorting jumpers (see Figure 6)

Figure 6: PowerLogic EM4000 meter 208Y/120V three-phase wye service connection



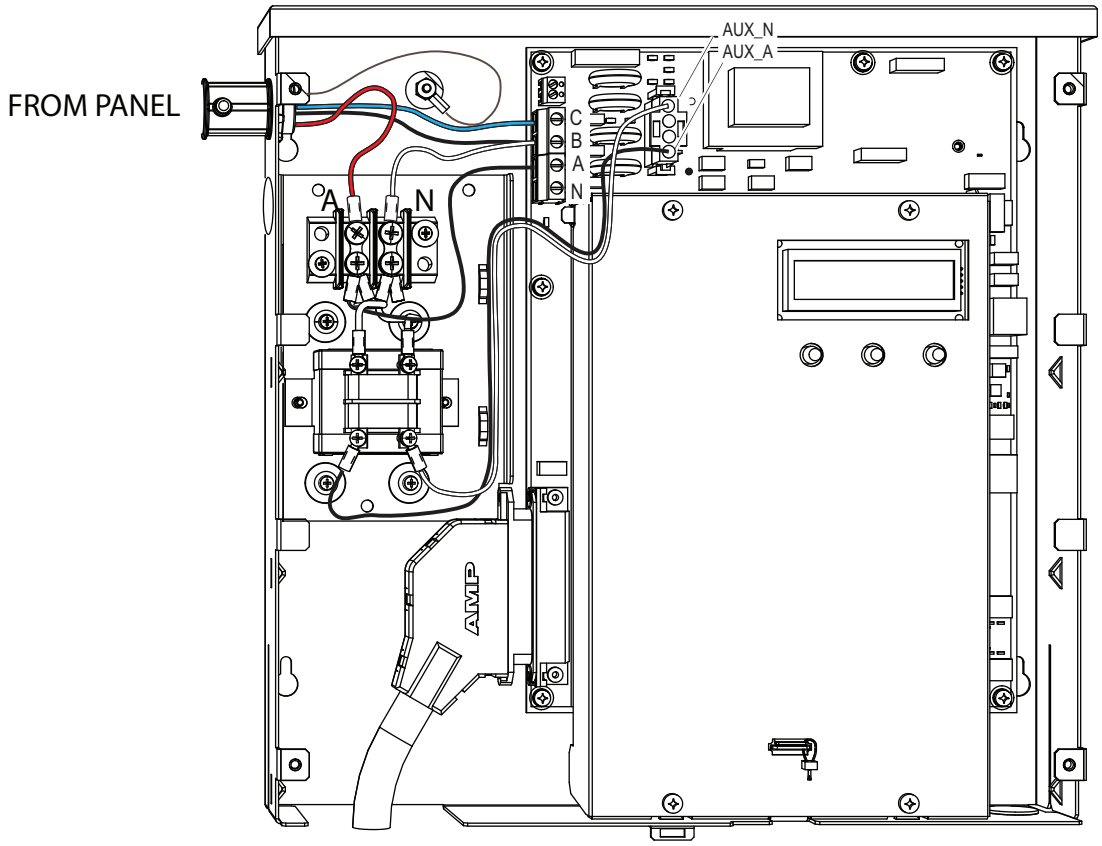
Legend:

1 BX cable
2 Earth
3 Phase C (blue)
4 Phase B (black)
5 Shorting jumper
6 Sense voltage terminal block (J3)
7 Neutral (white)
8 Phase A (red)
9 0.75-inch (1.9-cm) strain relief

For a 480Y/277V three-phase wye panel with the 277V variant of the meter:

- Connect meter terminal A to the voltage disconnect phase A (red wire)
- Connect meter terminal B to the voltage disconnect phase B (black wire)
- Connect meter terminal C to the voltage disconnect phase C (blue wire)
- Connect meter neutral terminal to neutral bar in the voltage disconnect panel (white wire)
- Connect earth wire to earth post using lug provided
- From the auxiliary power transformer, connect 120V auxiliary power to AUXA and AUXN on the meter (see Figure 7)

Figure 7: PowerLogic EM4000 meter 480Y/277V three-phase wye service connection

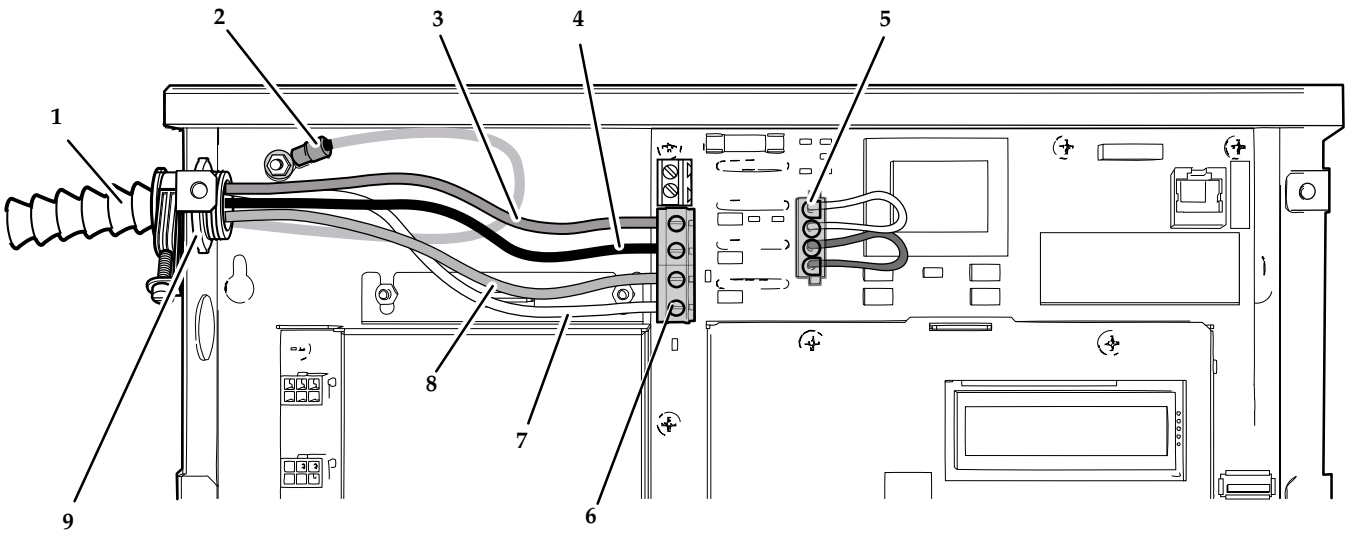


For a 600Y/347V or higher three-phase wye panel with potential transformers with the 120V variant of the meter:

- Connect meter terminal A to the voltage disconnect phase A (red wire)
- Connect meter terminal B to the voltage disconnect phase B (black wire)
- Connect meter terminal C to the voltage disconnect phase C (blue wire)
- Connect meter neutral terminal to neutral bar in the voltage disconnect panel (white wire)
- Connect earth wire to earth post using lug provided
- Install power supply shorting jumpers (see Figure 8)

NOTE: For the wiring of the potential transformers, see Figure 4.

Figure 8: PowerLogic EM4000 meter 600Y/347V or higher three-phase wye service with potential transformers connection



Legend:
1 BX cable
2 Earth
3 Phase C (blue)
4 Phase B (black)
5 Shorting jumper
6 Sense voltage terminal block (J3)
7 Neutral (white)
8 Phase A (red)
9 0.75-inch (1.9-cm) strain relief

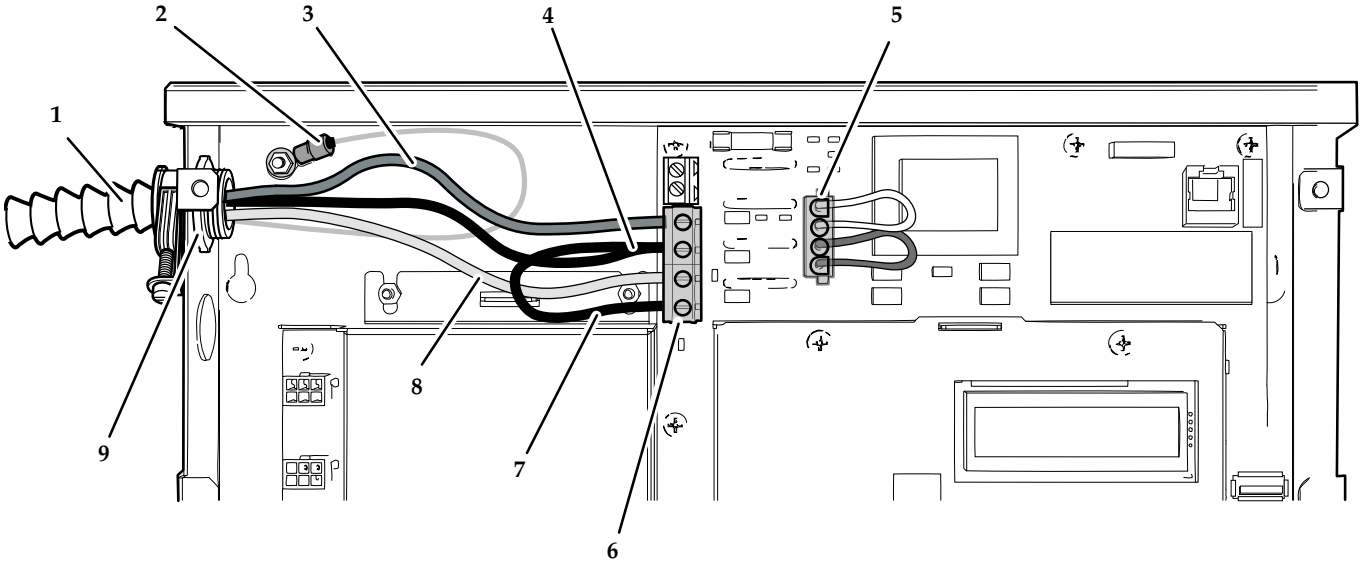
Delta service metering

To use the PowerLogic EM4000 meter in a Delta service, the line-to-line voltage from the Delta service must be reduced to 120V line-to-line using appropriate potential transformers. Metering a Delta service requires only two potential transformers, and only two CTs for phase A and C.

For a three-phase Delta panel with the 120V variant of the meter:

- Connect meter terminal A to the voltage disconnect phase A (red wire)
- Connect meter terminal C to the voltage disconnect phase C (blue wire)
- Connect meter neutral terminal to meter terminal B (black wire)
- Connect earth wire to earth post using lug provided (see Figure 9)

Figure 9: PowerLogic EM4000 meter three-phase Delta service connection



Legend:
1 BX cable
2 Earth
3 Phase C (blue)
4 Phase B (black)
5 Shorting jumper
6 Sense voltage terminal block (J3)
7 J3-B to J3-N shorting wire
8 Phase A (red)
9 0.75-inch (1.9-cm) strain relief

Installing the Current Transformers

The two models of PowerLogic EM4000 meter use current transformers (CTs) with different secondary outputs. The PowerLogic EM4033 meter uses split-core 0.333V CTs (see Figure 10), and the PowerLogic EM4080 meter uses 80mA CTs only (see Figure 11) and is typically used where accuracy is important and long secondary CT wiring is required (up to 300 feet [91.44 meters]). The PowerLogic EM4080 meter can also use a 5A CT if a 5A converter has first been installed.

For instructions, see “Installing the CTs on the PowerLogic EM4033 and PowerLogic EM4080” on page 20, and “Installing 5A Converters and CTs on the PowerLogic EM4080” on page 21.

Current transformers connect to the PowerLogic EM4033 and PowerLogic EM4080 meters through the 50-conductor CT cable provided with the meter. Table 2 describes the CT wire pairs and the cable color scheme for each meter point. You can also find this information on the inside of the meter’s outer cover.

Each CT has an X1 (positive) and X2 (neutral) wire pair and uses butt-splice connectors to attach the CT to a specific meter wire pair. The direction of the energy flow is indicated on the CT by: a label (“This side towards source”); an arrow that points away from the source; or a stamp/label indicating which side is H1 (H1 side faces toward the source).

CT shorting blocks are recommended for all CT installations. CTs measuring live current must either be connected to the PowerLogic meter via the 25-pair CT cable, or the secondary output of the CTs must be shorted together. Open-circuit CTs may generate a hazardous voltage and could damage equipment or cause personal injury.

Figure 10: PowerLogic EM4033 split-core 0.333V current transformer

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Use only 0.333V (333mV) secondary rated CTs.

Failure to follow these instructions will result in death or serious injury.

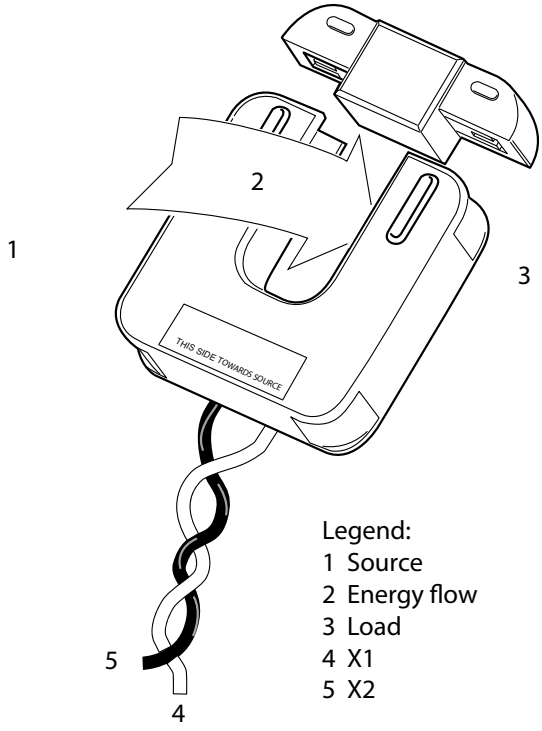


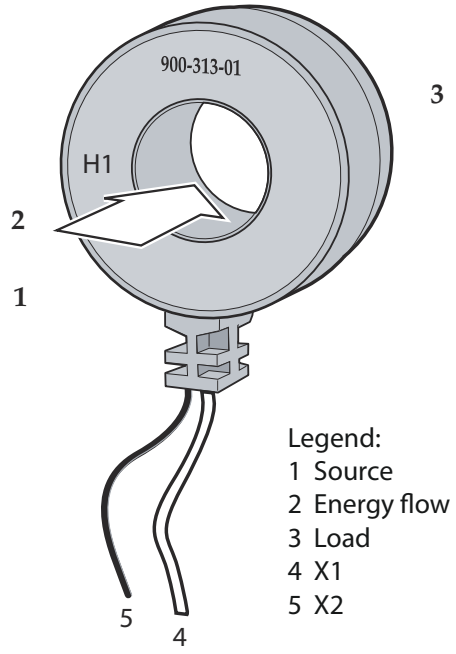
Figure 11: PowerLogic EM4080 mA current transformer

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Use only 80 mA secondary rated CTs.

Failure to follow these instructions will result in death or serious injury.



Installing the CTs on the PowerLogic EM4033 and PowerLogic EM4080

Do not apply power until you have made these connections and followed all of the instructions below:

- Connect all CTs to the appropriate circuits
- Connect the CTs to the cables
- Connect the cables to the PowerLogic EM4000 meter

To install the mA current transformers on the PowerLogic EM4080 or the 0.333V current transformers on the PowerLogic EM4033, follow these steps:

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Turn off all power supplying this equipment before working on or inside the equipment.
- Always use a properly rated voltage sensing device to confirm the power is off.
- NEVER open circuit a CT; use the shorting block to short circuit the leads of the CT before removing the connection from the meter.
- Do not crimp the insulation when making the wire connections.

Failure to follow these instructions will result in death or serious injury.

1. Connect the 50-pin connector to the PowerLogic connector located at the bottom side of the unit, and secure it in place with the retaining clips.
2. Feed the free end of the cable through the bottom left of the meter enclosure.
   This cable is made up of twisted-pair wires for connecting the individual CTs to the metered points. The color codes for the X1 (positive) and X2 (neutral) connections for each CT are listed in Table 2 on page 24.

NOTE: The direction of the energy flow is indicated on the CT.

3. Turn off the power feed to the panel where the CTs are being installed. Always use a properly rated voltage sensing device to confirm power is off.Feed the CT cable into the panel through an appropriate punch-out with an approved strain relief.
4. Strip the plastic sheaths on the cable to an appropriate length to expose the wire pairs. Cut and strip the CT leads and wire pair leads to an appropriate length. Crimp the CT leads to the wire pairs for each meter point.
5. Connect the X1 lead of the CT to the X1 lead of the cable, then connect the X2 lead of the CT to the X2 lead of the cable (see Table 2).
6. When using solid-core CTs, remove the feed wire from the circuit breaker, place the CT over the wire, and reconnect to the circuit breaker. Ensure that the arrow on the CT label is pointing in the direction of the energy flow (toward the load).
7. When using split-core CTs, separate the halves of the CT and place the CT over the wire to the circuit breaker. Ensure that the CT is facing the source as shown on the label. Install cable ties to ensure that the CT halves are held together securely.
8. Repeat steps 4 to 7 for the remaining CTs.

Installing 5A Converters and CTs on the PowerLogic EM4080

When both low-current (200A and 400A) and high-current (600A or higher) circuits need to be measured with the same PowerLogic meter, converters are available to allow the use of Measurement Canada approved 5A CTs with the appropriate current rating. 5A CT converters transform the 5A maximum output from a standard CT to the 80mA maximum of the PowerLogic meter.

The 5A side of the converter is the black and red wire pair, and the 80mA side of the converter is the black and white wire pair.

NOTE: It is recommended that 5A converters and shorting devices be installed in a sealable metal enclosure.

To connect the 5A CT to the converter on the PowerLogic EM4080, follow these steps:

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

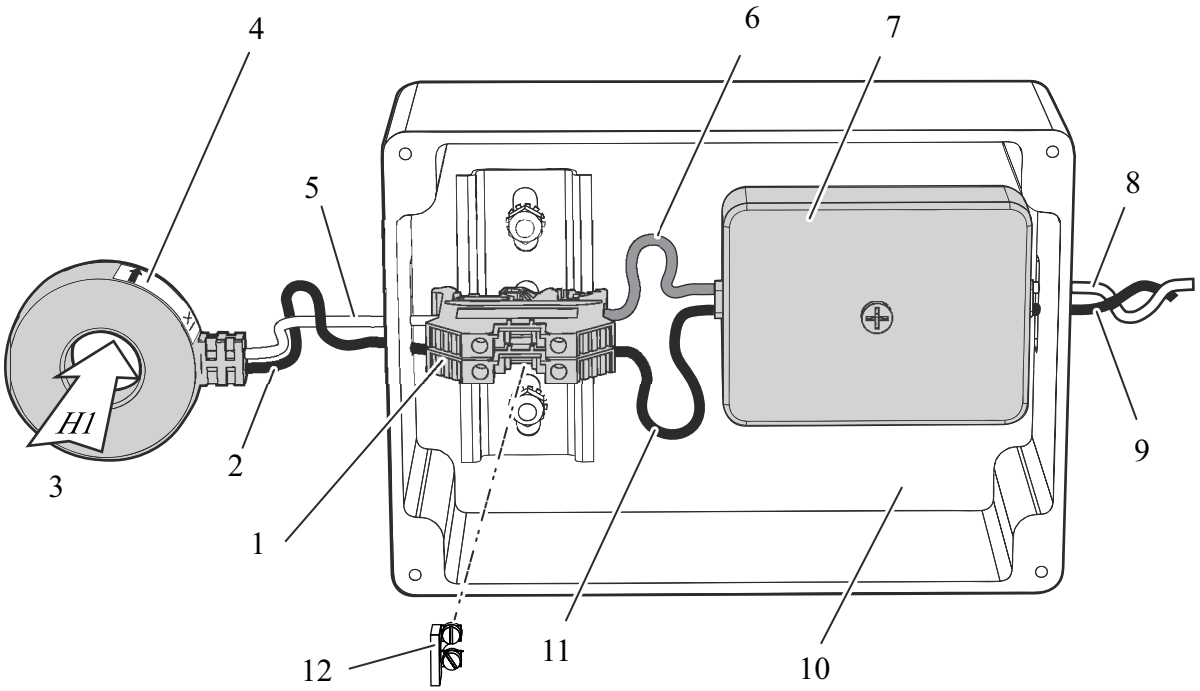
- Turn off all power supplying this equipment before working on or inside the equipment.
- Always use a properly rated voltage sensing device to confirm the power is off.
- NEVER open circuit a CT; use the shorting block to short circuit the leads of the CT before removing the connection from the meter.
- Do not crimp the insulation when making the wire connections.

Failure to follow these instructions will result in death or serious injury.

1. Connect the X1 lead of the 5A CT to the shorting device.
2. Connect the X2 lead of the 5A CT to the shorting device.
3. Connect the X1 lead (red) from the 5A side of the converter to the CT X1 lead on the shorting device.
4. Connect the X2 lead (black) from the 5A side of the converter to the CT X2 lead on the shorting device.
5. Connect the X1 lead (white) from the 80mA side of the converter to the X1 lead within the 25 pair cable for the selected meter point ID listed in Table 2.
6. Connect the X2 lead (black) from the 80mA side of the converter to the X2 lead within the 25 pair cable for the selected meter point ID listed in Table 2

Figure 12 shows a 5A CT connected to the converter.

Figure 12: PowerLogic EM4080 5A CT connection to converter



Legend:
1 Shorting block
2 X2
3 Energy flow
4 5A CT
5 X1
6 Red (X1)
7 5A Converter
8 X1 to 25-pair cable
9 X2 to 25-pair cable
10 Enclosure
11 Black (X2)
12 Shorting bar

Table 2: PowerLogic EM4000 meter CT color pair identification

1-phase, 24 meter points			Network- or 1-phase, 12 meter points			3-phase, 8 meter points		
Meter point ID (meter point #-probe #)	**Connect X1 CT lead to:**	**Connect X2 CT lead to:**	**Meter point ID (meter point #-probe #)**	**Connect X1 CT lead to:**	**Connect X2 CT lead to:**	**Meter point ID (meter point #-probe #)**	**Connect X1 CT lead to:**	**Connect X2 CT lead to:**
1-1	Black	Green	1-1	Black	Green	1-1	Black	Green
2-1	Black	White	1-2	Black	White	1-2	Black	White
3-1	Black	Red	2-1	Black	Red	1-3	Black	Red
4-1	Red	Green	2-2	Red	Green	2-1	Red	Green
5-1	Red	White	3-1	Red	White	2-2	Red	White
6-1	Black	Orange	3-2	Black	Orange	2-3	Black	Orange
7-1	Black	Brown	4-1	Black	Brown	3-1	Black	Brown
8-1	Black	Yellow	4-2	Black	Yellow	3-2	Black	Yellow
9-1	Black	Blue	5-1	Black	Blue	3-3	Black	Blue
10-1	Green	Yellow	5-2	Green	Yellow	4-1	Green	Yellow
11-1	Green	Blue	6-1	Green	Blue	4-2	Green	Blue
12-1	Green	White	6-2	Green	White	4-3	Green	White
13-1	Blue	White	7-1	Blue	White	5-1	Blue	White
14-1	Green	Orange	7-2	Green	Orange	5-2	Green	Orange
15-1	Green	Brown	8-1	Green	Brown	5-3	Green	Brown
16-1	Blue	Yellow	8-2	Blue	Yellow	6-1	Blue	Yellow
17-1	Brown	White	9-1	Brown	White	6-2	Brown	White
18-1	Orange	White	9-2	Orange	White	6-3	Orange	White
19-1	Red	Orange	10-1	Red	Orange	7-1	Red	Orange
20-1	Red	Yellow	10-2	Red	Yellow	7-2	Red	Yellow
21-1	Red	Brown	11-1	Red	Brown	7-3	Red	Brown
22-1	Blue	Orange	11-2	Blue	Orange	8-1	Blue	Orange
23-1	Yellow	White	12-1	Yellow	White	8-2	Yellow	White
24-1	Blue	Brown	12-2	Blue	Brown	8-3	Blue	Brown

Connecting the Communications

Connections for communications using the Ethernet port or Modbus RTU port are described in this section.

Connecting the Ethernet Cable

If the Ethernet port is used to report data, an RJ45 patch cable is required to connect the Ethernet port to the local Ethernet network.

1. Route the cable through the slot in the PowerLogic EM4000 meter enclosure.
2. If the local network automatically assigns IP addresses through a DHCP server, the PowerLogic EM4000 meter will be able to report using its factory default IP settings. If the local network is configured for static IP addresses, refer to the PowerLogic EM4000 meter Configuration Guide for instructions on how to configure default static IP addresses.

Connecting the Modbus RTU Communications

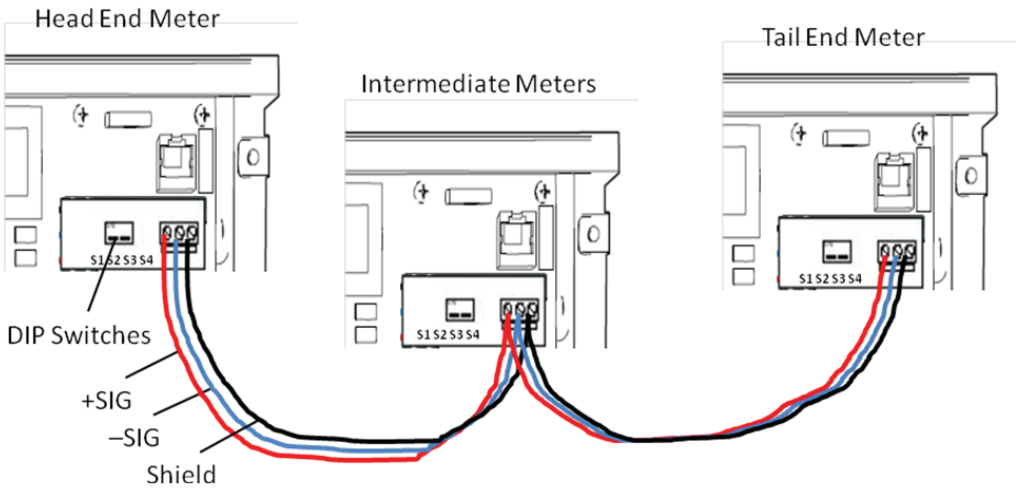
If the Modbus port is used to report data, an RS422/RS485 serial cable is required to connect the Modbus RTU port to the local Modbus network.

1. Route the cable through the slot in the PowerLogic EM4000 meter enclosure.
2. Depending on the position of the PowerLogic EM4000 meter in the Modbus network as shown in Figure 13, set the DIP switches as follows:

PowerLogic meter location	S1	S2	S3	S4
Head end	On	Off	Off	Off
Intermediate	Off	Off	Off	Off
Tail end	On	On	On	Off

3. Refer to the PowerLogic meter Configuration Guide for instructions on how to configure the baud rate, parity settings, and Modbus base address for the RS485 RTU communications.

Figure 13: Modbus wiring diagram



Connecting Pulse Inputs

Each PowerLogic meter has two pulse inputs that can be used to count and report pulses generated by another meter (pulsing device).

Connect the output of the pulsing device to one of the two **pulse input** terminal blocks in the PowerLogic meter, as shown in Figure 2. Each terminal block has a negative terminal pin on the right, and a positive terminal pin on the left. The pulse inputs are compatible with both dry and solid-state form A contacts, 10 Hz (maximum), 20 ms pulse width (minimum).

When the pulsing device provides dry relay contacts, the PowerLogic meter pulse inputs are not polarity-sensitive. When the pulsing device provides solid-state form A outputs, the negative terminal from the source device must be connected to the negative terminal of the PowerLogic meter **pulse in** terminal block.

The pulsing device can be located up to 1,000 feet away from the PowerLogic meter with 22 AWG twisted pair wire.

Start-Up Sequence

Use the following procedure to start up the PowerLogic EM4000 meter.

1. Ensure that all CT and sense voltage wiring is securely installed.
2. Remove all tools from the work area.
3. Re-install all cover plates and equipment covers.
4. Power up the meter. The LCD on the front panel of the meter indicates the operating status of the unit as follows:
   a. Initial power up message “PowerLogic EM4000”
   b. After the internal configuration is complete, the display shows default information for the first meter.

Manually Testing Communications

This procedure clears the meter memory, manually tests the communications from the PowerLogic EM4000 meter, and updates the meter clock. To force the meter to send data, follow these steps:

1. Press and hold the Display button for 5 to 7 seconds until the diagnostics mode is displayed, then release.
2. If communicating via Ethernet, press the Display button until "Local IP Address" appears on the display.
   a. If the IP address is 169.254.0.10, the meter has not found a DHCP server. As a result, the meter will use its default IP configuration and may not be able to report. See the PowerLogic EM4000 meter Configuration Guide for instructions on how to program default IP addresses.
   b. If the IP address is not 169.254.0.10, the meter has acquired an IP address from the local network, and will be able to report data and synchronize time.
3. Press the Display button until the “Send” command appears on the display.
4. Press the left or right arrow button to manually force the PowerLogic EM4000 meter to report metering data using the Ethernet or modem connection. This clears data from the PowerLogic EM4000 meter memory, and ensures the time is set correctly.

Display Navigation

The PowerLogic EM4000 meter has three buttons to control the information presented on the LCD. The display has a normal and a diagnostics mode. The PowerLogic EM4000 meter starts in normal mode, and enters diagnostics mode when the Display button is pressed and held for 5 seconds. To adjust the contrast, hold down the Display button, and use the right and left arrow buttons to increase and decrease the contrast respectively.

Normal Mode

In Normal mode, the Display button scrolls through the information for each meter. The left and right arrow buttons select the previous or next meter points respectively. The following information is available:

- Real Energy Delivered kWh D
- Real Energy Received kWh R
- Real Power Watts
- Reactive Energy Delivered kVarhD
- Reactive Energy Received kVarhR
- Reactive Power Var
- Peak Demand Peak W (Watts)

In Normal mode, the right and left arrow buttons scroll the display from meter points 1 to 8, 1 to 12, or 1 to 24, depending on your configuration.

Diagnostics Mode

Diagnostics mode is accessed by pressing and holding the Display button for 5 seconds. In Diagnostics mode, pressing the Display button will scroll through the following additional information:

- Send data command
- CT Primary value and Real Power Watts per phase
- Current (Amps) per phase
- Power factor (pf) per phase
- Phase angle (degrees) per phase
- Voltage per phase
- Local IP address
- Reset factory default IP address command
- Verify
- Badge #
- Date and time (UTC)

In Diagnostics mode, the right and left arrow buttons scroll the display from meter 1 to 8, 1 to 12, or 1 to 24, depending on your configuration. When the local IP address is shown on the LCD, use the right and left arrow buttons to scroll through the following information:

- Remote host server IP address
- Time server IP address
- Default IP address
- Default NetMask

- Default gateway
- PPP user name
- Phone number
- AT command string
- Alternate phone number
- Unit serial number
- Firmware build number
- Ethernet port MAC address
- Firmware revision
- Potential transformer ratio

Recording the Meter Map

The final step in the installation process is to complete the Installation Record, and record the mapping of the meters to the wired points. A copy of Figure 14, which is organized to resemble a breaker panel, is provided with each PowerLogic EM4000 meter, and is to be completed and delivered to your system administrator.

Figure 14: Installation Record (sample shown)

PowerLogic EM4033 and EM4080 Sealing Sheet

Panel Description: _____
Customer: _____
Address: _____
City: _____
State: _____
Zip Code: _____
Inspection Date: _____
Inspector: _____
EM4800 MAC _____ EM4800 Serial #: _____

Schneider Electric

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www.powerlogic.com

Installation										
Volts		Amps		Hz		Phase		Wire		Service	Y

Units												
Insp #	Maker	Badge #	Serial #	Type	Volts	Amps	Multi	Kh	Phase	Wire	Elements	Sealed
				Network	120		1	1				

PTs								
Meter	Maker	Serial # A	Serial #B	Serial # C	Type	Primary	Secondary	PT Ratio

Interval

Note: Connect the X1 lead (positive Lead) of the CT to the first colour of each wire pair (X1 CT input)

CT Amps	Brkr Amps	Breaker Description	circuit	phase	circuit	Breaker Description	Brkr Amps	CT Amps
			1	A	2			
			3	B	4			
			5	C	6			
			7	A	8			
			9	B	10			
			11	C	12			
			13	A	14			
			15	B	16			
			17	C	18			
			19	A	20			
			21	B	22			
			23	C	24			
			25	A	26			
			27	B	28			
			29	C	30			
			31	A	32			
			33	B	34			
			35	C	36			
			37	A	38			
			39	B	40			
			41	C	42			
			43	A	44			
			45	B	46			
			47	C	48			
			49	A	50			
			51	B	52			
			53	C	54			
			55	A	56			
			57	B	58			
			59	C	60			

Maintenance

Do not perform any operation or maintenance procedures that are not described in this product documentation. Visually inspect the equipment yearly and ensure it is free of dust or other particles. If necessary, wipe with a clean cloth. Individual components are not user-serviceable and must be returned to Schneider Electric for repair.

Fuse Replacement

⚠ DANGER

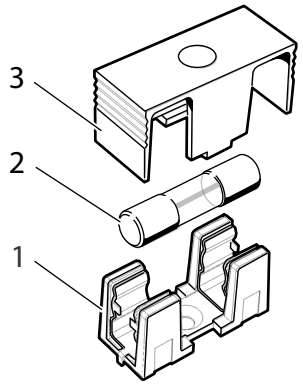
HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E.
- Turn off all power supplying this equipment before working on or inside equipment.
- Always use a properly rated voltage sensing device to confirm the power is off.
- Replace all devices, doors and covers before turning on power to this equipment.

Failure to follow these instructions will result in death or serious injury.

1. Turn off all sources of power before attempting to replace the fuse. Always use a properly rated voltage sensing device to confirm the power is off.
2. Remove the outer cover from the unit.
3. Locate fuse F1 at the top left corner inside the unit.
4. Remove the fuse cover, then remove the fuse from the holder as shown in Figure 15.
5. Replace fuse F1 with a fuse that meets the specifications listed in Table 1 on page 2.
6. Replace the fuse cover.
7. Re-install the cover and turn on the power source.

Figure 15: Replacing the fuse



Legend:
1 Fuse holder
2 Fuse
3 Fuse cover

Regulatory Compliance

The PowerLogic EM4000 meter must be installed by a qualified electrician with knowledge of local installation regulations. Initial installation of the unit, and any subsequent modification to the unit, must be inspected by the local electrical inspection authority.

The PowerLogic EM4000 meter complies with the standards listed in Table 3.

Table 3: Regulatory Compliance

Discipline	Regulatory and industry standard
Standards	UL certified to IEC/EA/UL/CSA 61010-1 2nd Edition CSA-C22.2 No. 61010-1-04
Emissions (EMC)	FCC Part 15 Class B, ICES-003 EN55022, IEC 6100-4-5
Surge power/telephone lines	ANSI/TIA968-A: 2002

Equipment servicing and access

The information in this section must be considered as a mandatory requirement, and must be strictly adhered to when installing and operating PowerLogic EM4033 and EM4080 meters.

Access to equipment

The equipment must be accessible to authorized personnel only. Equipment must be installed in areas where access can be restricted.

Servicing the equipment

No preventive maintenance is required on any of the equipment. Visually inspect the equipment yearly and ensure it is free of dust or other particles. If necessary, wipe with a clean cloth.

Component servicing

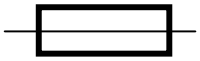
Individual components are not user-serviceable, and must be returned to Schneider Electric for repair. If an equipment fault occurs, do not attempt to repair the faulty component.

All maintenance activities should be performed by qualified personnel only. Do not perform any operating or maintenance procedures that are not described in the product documentation provided by Schneider Electric.

Graphical symbols

Table 4 shows the graphical symbols that appear on the equipment.

Table 4: Graphical symbols that appear on equipment

Symbol	Description
	Indicates the supply wire protective earth, also known as chassis ground, for the primary ground.
	This symbol indicates a replaceable fuse.

Index

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PowerLogic™ Series EM4000
High-Density Meter Installation Guide

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