Power Meter
Centrale de mesure
Central de medida
PM800 series

Installation manual
Notice d'installation
Manual de instalacion

Retain for future use.

Merlin Gerin
Square D

Schneider Electric

NOTICE

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 bulletin 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 immediately 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.

CAUTION

CAUTION, used without the safety alert symbol, indicates a potentially hazardous situation which, if not avoided, **can result in** property damage.

NOTE: Provides additional information to clarify or simplify a procedure.

PLEASE NOTE

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. This document is not intended as an instruction manual for untrained persons. No responsibility is assumed by Square D for any consequences arising out of the use of this manual.

CLASS A FCC STATEMENT

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designated to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Table of Contents

Table of Contents

What is the Power Meter?

The power meter is a multifunction, digital instrumentation, data acquisition and control device. It can replace a variety of meters, relays, transducers and other components. The power meter can be installed at multiple locations within a facility.

The power meter is equipped with RS-485 communications for integration into any power monitoring and control system. However, System Manager™ software (SMS) from POWERLOGIC, which is written specifically for power monitoring and control, best supports the power meter's advanced features.

The power meter is a true rms meter capable of exceptionally accurate measurement of highly nonlinear loads. A sophisticated sampling technique enables accurate, true rms measurement through the 63rd harmonic. You can view over 50 metered values plus extensive minimum and maximum data from the display or remotely using software.
Table 1–1 summarizes the readings available from the power meter.

Table 1–1: Summary of power meter Instrumentation

Real-time Readings	Power Analysis
• Current (per phase, residual, 3-Phase) • Voltage (L–L, L–N, 3-Phase) • Real Power (per phase, 3-Phase) • Reactive Power (per phase, 3-Phase) • Apparent Power (per phase, 3-Phase) • Power Factor (per phase, 3-Phase) • Frequency • Temperature (internal ambient) • THD (current and voltage) • K-Factor (per phase)	• Crest Factor (per phase) • Displacement Power Factor (per phase, 3-Phase) • Fundamental Voltages (per phase) • Fundamental Currents (per phase) • Fundamental Real Power (per phase) • Fundamental Reactive Power (per phase) • Harmonic Power • Unbalance (current and voltage) • Phase Rotation • Harmonic Magnitudes & Angles (per phase) • Sequence Components

Table 1–1: Summary of power meter Instrumentation

Energy Readings	Demand Readings
• Accumulated Energy, Real • Accumulated Energy, Reactive • Accumulated Energy, Apparent • Bidirectional Readings • Reactive Energy by Quadrant • Incremental Energy • Conditional Energy	• Demand Current (per phase present, 3-Phase avg.) • Average Power Factor (3-Phase total) • Demand Real Power (per phase present, peak) • Demand Reactive Power (per phase present, peak) • Demand Apparent Power (per phase present, peak) • Coincident Readings • Predicted Power Demands

Power Meter Hardware

Figure 1–1: Parts of the Power Meter 800

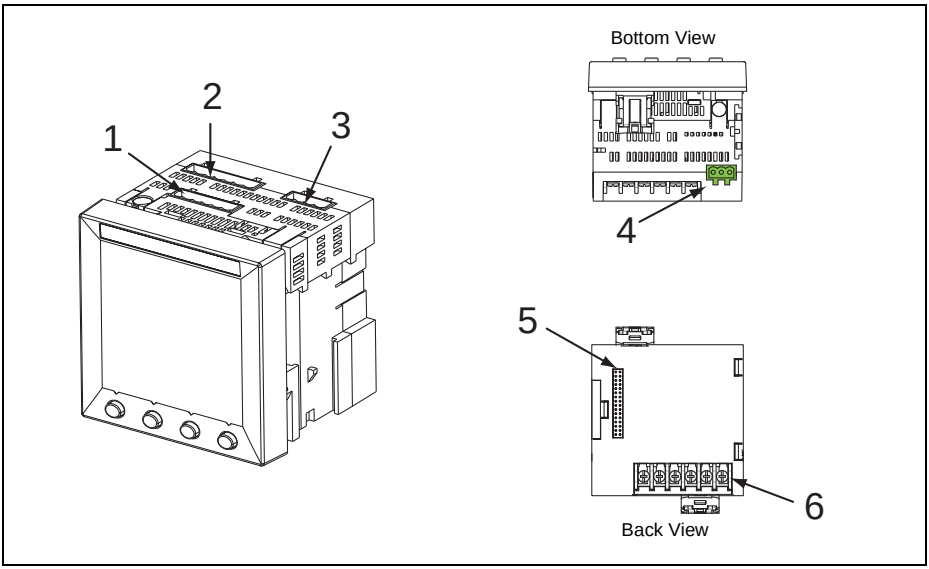


Table 1–2: Parts of the Power Meter

No.	Part	Description
1	Control power supply connector	Connection for control power to the power meter.
2	Voltage inputs	Voltage metering connections.
3	KY	KY pulse output.
4	RS-485 port (COM1)	The RS-485 port is used for communications with a monitoring and control system. This port can be daisy-chained to multiple devices.

Table 1–2: Parts of the Power Meter

5	Option module connector	Option modules fit on the back of the Power Meter in the option module connector.
6	Current inputs	Current metering connections.

Power Meter Parts and Accessories

Table 1–3: Power Meter Parts and Accessories

Description	Part Number	Document Number
Power Meter with Integrated Display		
PM810	63230-500-XXX	
PM810MG	63230-500-XXX	
PM820	63230-500-XXX	
PM820MG	63230-500-XXX	
PM850	63230-500-105	
PM850MG	63230-500-105A	
Power Meter without Display		
PM810U	63230-500-XXX	
PM810UMG	63230-500-XXX	
PM820U	63230-500-XXX	
PM820UMG	63230-500-XXX	
PM850U	63230-500-105	
PM850UMG	63230-500-105A	
Display		
PM8D	63230-501-100	
PM8DMG	63230-501-XXX	
Miscellaneous		
PM8 Hardware Kit	63230-500-16	

Box Contents

- Power Meter
- Hardware kit containing:
  - — Two retainers
  - — Template
  - — Install sheet
  - — Lugs
  - — DIN Slide
  - — Plug set
- Power Meter installation manual

Features

Some of the power meter's many features include:

- True rms metering to the 63rd harmonic
- Accepts standard CT and PT inputs
- 600 volt direct connection on voltage inputs
- Certified ANSI C12.20 revenue accuracy and IEC 60687 0.5S class revenue accuracy
- Certified ANSI C12.20 revenue accuracy and IEC 1036 class revenue accuracy
- High accuracy—0.075% current and voltage (typical conditions)
- Min/max readings of metered data
- Power quality readings—THD~~, K-factor, crest factor~~
- Real-time harmonic magnitudes and angles to the 63rd harmonic
- Downloadable firmware
- Easy setup through the integrated display (password protected) where you can view metered values
- Setpoint-controlled alarm and relay functions
- Onboard alarm and data logging
- Wide operating temperature range: –25° to +70°C for the main unit,
  –10° to 50°C for the display
- RS-485 communications
- Optional onboard logging memory
- Onboard logging memory

Firmware

~~This instruction bulletin is written to be used with firmware version 10.000 or higher.~~ See "Identifying the Firmware Version" on page 40 for instructions on how to determine the firmware version.

Topics Not Covered in this Bulletin

Some of the power meter's advanced features, such as onboard data logs and alarm log files, can only be set up over the communications link using System Manager™ Software from POWERLOGIC. SMS versions 3.3 and higher support the PM800 device type.This power meter instruction bulletin describes these advanced features, but does not tell how to set them up. For instructions on using SMS, refer to the SMS online help and the *SMS-3000 Setup Guide,* which is available in English, French, and Spanish. For information about related instruction bulletins, see Table 1–3 on page 4.

Before You Begin

This chapter contains important safety precautions that must be followed before attempting to install, service, or maintain electrical equipment. Carefully read and follow the safety precautions outlined below.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, BURN, OR EXPLOSION

- Only qualified workers should install this equipment. Such work should be performed only after reading this entire set of instructions.
- NEVER work alone.
- Before performing visual inspections, tests, or maintenance on 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 this equipment before working on or inside.
- Always use a properly rated voltage sensing device to confirm that all power is off.
- Beware of potential hazards, wear personal protective equipment, carefully inspect the work area for tools and objects that may have been left inside the equipment.
- Use caution while removing or installing panels so that they do not extend into the energized bus; avoid handling the panels, which could cause personal injury.
- The successful operation of this equipment depends upon proper handling, installation, and operation. Neglecting fundamental installation requirements may lead to personal injury as well as damage to electrical equipment or other property.
- Before performing Dielectric (Hi-Pot) or Megger testing on any equipment in which the power meter is installed, disconnect all input and output wires to the power meter. High voltage testing may damage electronic components contained in the power meter.

Failure to follow this instruction will result in death or serious injury

Mounting Considerations

Recommended panelboard mounting orientations are shown in Figure 3–1, Figure 3–2, and Figure 3–3. For DIN rail mounting, refer to “DIN Rail Mounting” on page 12. When choosing a mounting location, consider the following points:

- Allow for easy access to all parts of the power meter. Allow extra space for all wires, fuse disconnects, shorting blocks, accessories, or other components. Make sure to route the wires so that they do not cover the back of the unit or cooling vents on the power meter.
- For European Community (CE) compliance, see “Required Protection for CE Compliance” on page 15.

CAUTION

IMPROPER VENTILATION

- Only mount the power meter as described in this instruction bulletin.
- Provide the clearances around the power meter as illustrated in Figure 3–1, Figure 3–2, and Figure 3–3.

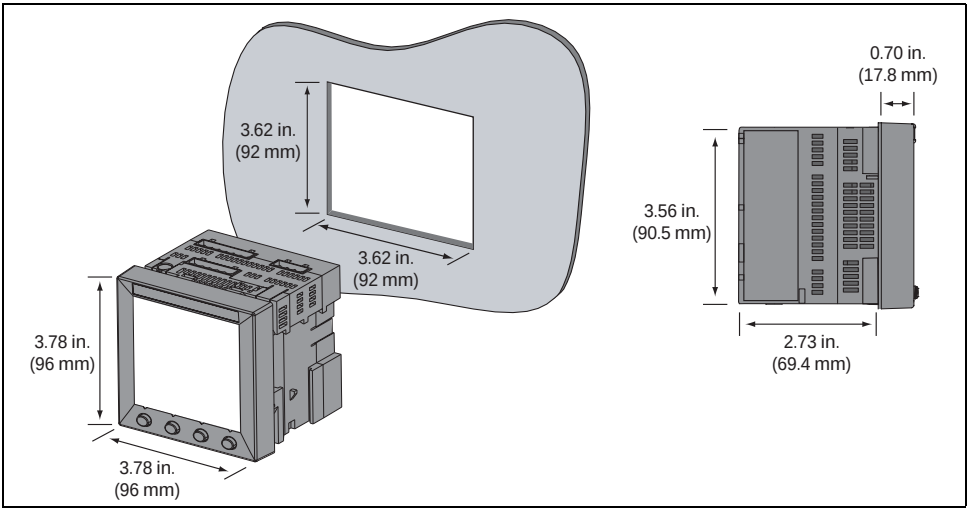
Failure to follow this instruction can result in equipment damage.

- Locate the power meter in an area where ambient conditions fall within the acceptable range. For control power voltages above 300 Vac, the temperature range is -20°C to +65°C. The front display has a range of -10°C to +50°C.

  NOTE: Ambient temperature refers to the immediate environment of the power meter, including the temperature within the enclosure in which it is mounted.

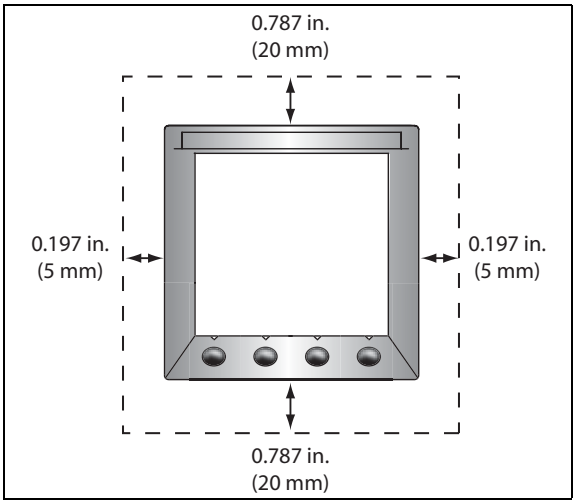
Dimensions

Figure 3–1: Power Meter dimensions



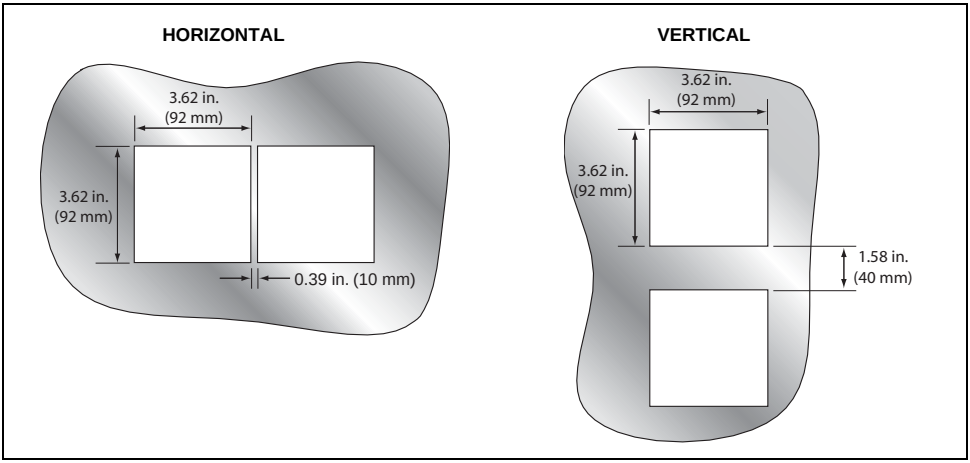
Clearances for Mounting a Single Power Meter

Figure 3–2: Clearances for single power meter installations



Clearance for Mounting Multiple Power Meters

Figure 3–3: Mounting clearances for multiple power meter installations



Mounting

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, BURN, OR EXPLOSION

- Only qualified workers should install and wire the power meter. Perform this work only after completely reading the installation and wiring chapters.
- Turn off all power supplying the power 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.

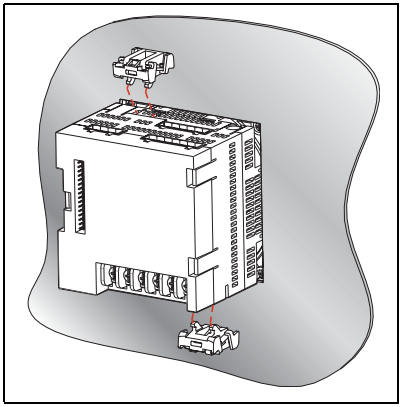
Failure to follow this instruction will result in death or serious injury.

Installation

Mounting

1. Refer to “Dimensions” on page 10 and “Mounting Considerations” on page 9.
2. Using the template included with the power meter, make a square cut-out 3.622 in. x 3.622 in. (92 mm x 92 mm).
3. Insert the power meter through the cut-out.
4. Attach the two retainer clips to the power meter as shown.

   There are two sets of retainer slots. The first set is for panelboards thinner than xx in. (xx mm). The second set is for panelboards xx in. to 0.25 in. (xx to 6 mm).



DIN Rail Mounting

1. Refer to “Dimensions” on page 10 and “Mounting Considerations” on page 9.
2. Place the power meter so that the slot in the base rests on one edge of the DIN rail and snap it into place securely.

NOTE: DIN rail mounting is only used to install power meters that do not have displays.

Replacing Other Meters With a Power Meter

1. Refer to “Dimensions” on page 10 and “Mounting Considerations” on page 9.
2. Remove the original meter. Refer to the meter’s documentation for instructions.

   NOTE: After removing the original meter, you should have a 4 in. round cut-out. The power meter will be inserted into this opening.
3. Remove the display from the power meter.
   a. Insert a screwdriver into the engraved slot of one of the clips on the display.
   b. Gently, but firmly pull the screwdriver towards the back of the power meter until the clip releases. Be sure to hold the display to keep the clip from reattaching.
   c. Repeat steps 3a and 3b to release the other clip.
   d. Gently pull the display off of the power meter. The remaining two attached clips will release.
4. Place the power meter behind the round cut-out.
5. Replace the display onto the power meter. The clips on the top and bottom of the display will securely snap into place.
6. Attach the two retainer clips to the power meter.

Introduction

This chapter explains how to make the wiring connections for the power meter.

Required Protection for CE Compliance

For CE compliance, use a CE-compliant protection device such as a Merlin Gerin Disconnect Circuit Breaker Type P25M #21104 (or IEC 947 equivalent), which must be connected directly to the metering voltage and control power inputs.

NOTE: The disconnect circuit breaker must be placed within reach of the power meter and labeled: ***Disconnect Circuit Breaker for Power Meter****.*

Supported System Types

Table 4–1: Voltages Less Than or Equal to 347Vac L-N, Direct Connect No PTs

Single-Phase Wiring							
Number of Wires	**CTs**		**Voltage Connections**			**Meter Configuration**	
	Qty.	**ID**	**Qty.**	**ID**	**Type**	**System Type**	**PT Priority Scale**
2	1	I1	2	V1, Vn	L-N	10	No PT
2	1	I1	2	V1, V2	L-L	11	No PT
3	2	I1, I3	3	V1, V2,Vn	L-L with N	12	No PT
Three-Phase Wiring							
3	2	I1, I2	3	V1, V2, V3	Delta	30	No PT
	3	I1, I2, I3	3	V1, V2, V3	Delta	31	No PT
4	3	I1, I2, I3	3	V1, V2, V3, Vn	High Leg Delta	40	No PT
4	3	I1, I2, I3	3	V1, V2, V3, Vn	Wye	40	No PT

Table 4–2: Voltages Greater Than 347 Vac L-N/600 Vac L-L

Three-Phase Wiring							
Number of Wires	CTs		Voltage Connections			Meter Configuration	
	Qty.	ID	Qty.	ID	Type	System Type	PT Priority Scale
3	2	I1, I3	2	V1, V3 (V2, Vn to Ground)	Open Delta	30	Based on voltage
	3	I1, I2, I3	2	V1, V3 (V2, Vn to Ground)	Open Delta	31	Based on voltage
4	3	I1, I2, I3	3	V1, V2, V3, (Vn to Ground)	Grounded Wye	40	Based on voltage
	3	I1, I2, I3	2	V1, V3 (Vn to Ground)	Open Wye	42	Based on voltage

Wiring Diagrams

⚠ DANGER

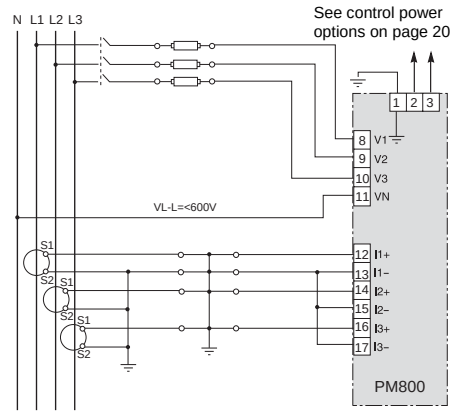
HAZARD OF ELECTRIC SHOCK, BURN, OR EXPLOSION

- Only qualified workers should install and wire the power meter. Perform this work only after completely reading the installation and wiring chapters.
- Turn off all power supplying the power meter and the equipment in which it is installed before working on it.
- Use a properly rated voltage testing device to verify that the power is off.

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

Wiring
Wiring Diagrams

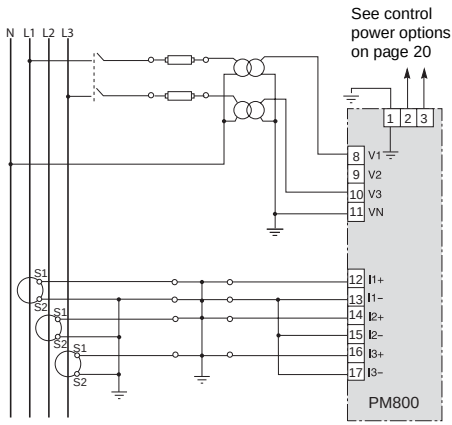
3-Phase 4-Wire Wye Direct Voltage Input Connection 3 CT



NOTES:

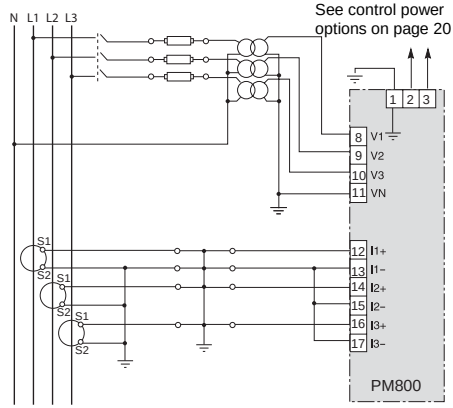
- Use with 480Y/277 V and 208Y/120 V systems.
- Use system type 3Ø4W3CT.

3-Phase 4-Wire Wye 3CT 2PT (calculated neutral)



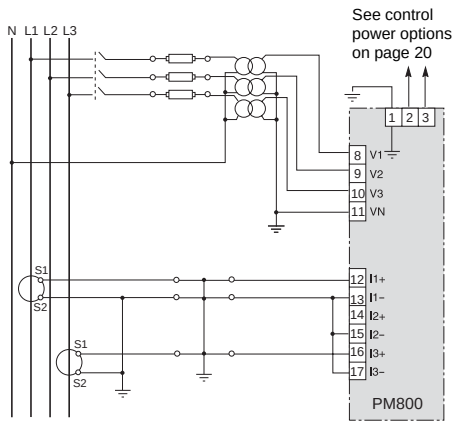
NOTE: Use system type 3Ø4W3CT2PT.

3-Phase 4-Wire Wye Connection 3 CT 3 PT



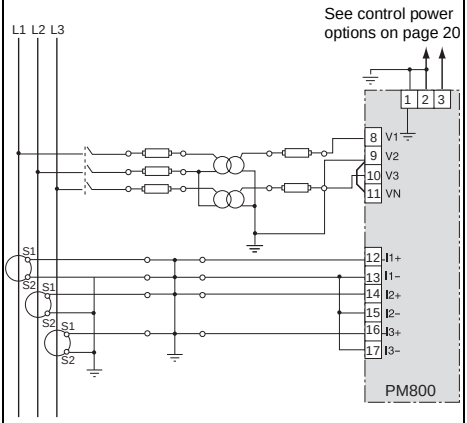
NOTE: Use system type 3Ø4W3CT.

Balanced 3-Phase 4-Wire Wye 3-Wire 3 PT 2 CT



NOTE: Use system type 3Ø4W2CT.

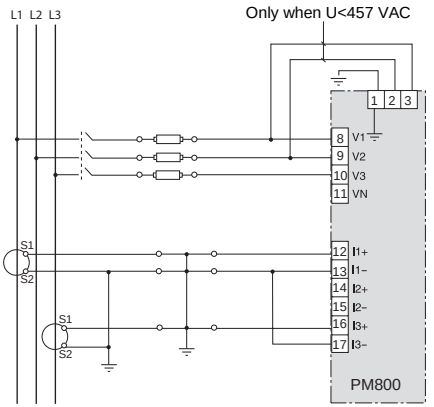
3-Phase 3-Wire Delta Connection 3CT 2PT



NOTES:

- Use System type 3Ø3W3CT.
- Install the jumper between V_2 and V_N when using VTs on a 3-wire system. Do not use a jumper for a direct voltage connection (no VTs).
- For an open delta PT connection with 120 V L-L secondaries, use system type 3Ø3W2CT.

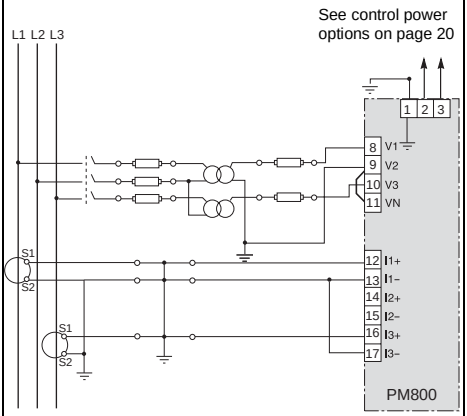
3-Phase 3-Wire 2 CT no PT (Direct Voltage Connection) Voltage Phase-Phase ≤ 600 V Nominal



NOTES:

- Control power can be drawn from fused voltage inputs Phase-Phase or an external source.
- For corner grounded delta applications, use PTs.
- Use system type 3Ø3W2CT.

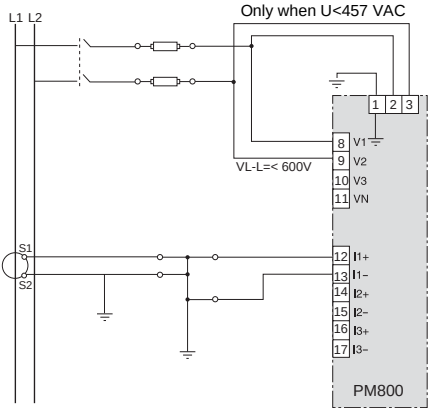
3-Phase 3-Wire Delta Connection 2 CT 2 PT



NOTES:

- Install the jumper between V_2 and V_N when using VTs on a 3-wire system. Do not use a jumper for a direct voltage connection (no VTs).
- For an open delta PT connection with 120 V L-L secondaries, use system type 3Ø3W2CT.

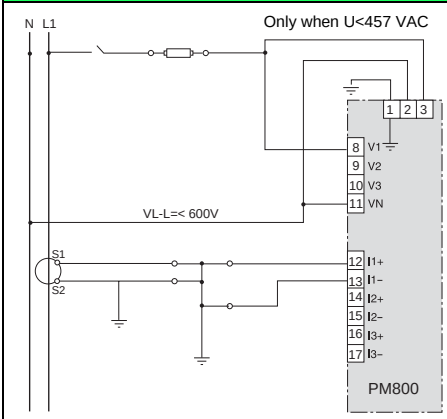
1-Phase Line-to-Line 2-Wire System 1 CT



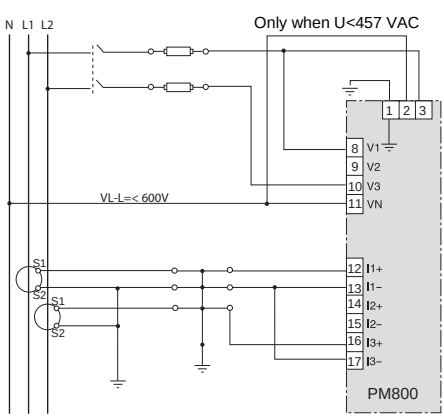
NOTE: The voltage input protection must be rated for the short circuit current at the connection points.

Wiring
Wiring Diagrams

1-Phase Line-to-Neutral 2-Wire System 1 CT

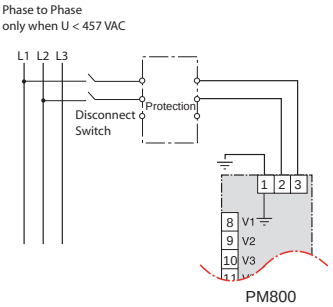


1-Phase 3-Wire Direct Voltage Connection 2 CT

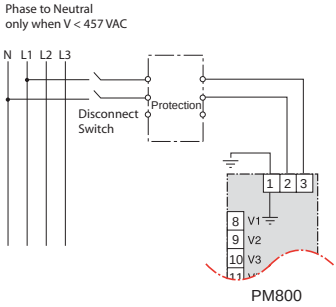


NOTE: This is supported in a future firmware release. Contact your local representative for a firmware update.

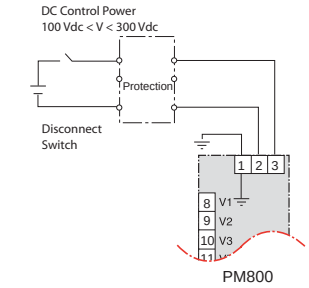
Direct Connect Control Power (Phase to Phase)



Direct Connect Control Power (Phase to Neutral)



Direct Connect Control Power (DC Control Power)



Direct Connect Control Power (Control Power Transformer)

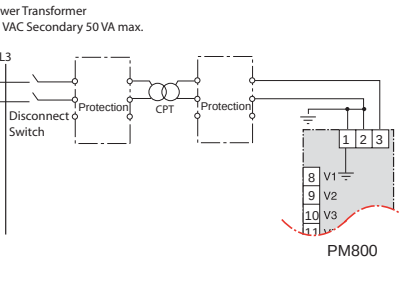


Table 4–3: Fuse Recommendation

Control Power Source	Source Voltage (V_S)	Fuse	Fuse Amperage
CPT	$V_S \leq 125$ V	FNM or MDL	250 mA
CPT	$125 < V_S \leq 240$ V	FNQ or FNQ-R	250 mA
CPT	$240 < V_S \leq 305$ V	FNQ or FNQ-R	250 mA
Line Voltage	$V_S \leq 240$ V	FNQ-R	250 mA
Line Voltage	$V_S > 240$ V	FNQ-R	250 mA
DC	$V_S > 300$ V	LP-CC	500 mA

Communications Capabilities

Table 5–1: Communications Capabilities of the Power Meter

Communications Port	RS-485: • 2-wire with shield • EIA compliant • Allows the power meter to be connected to a daisy-chain of up to 32 devices
Baud Rate	9600 19200 38400
Communications Distances	See Table 5–2 on page 21
Protocols	MODBUS RTU JBUS
Parity	ODD EVEN NONE

Table 5–2: RS-485 Communications Distances

Baud Rate	Maximum Communication Distances			
	1 to 16 Devices		17 to 32 Devices	
	Feet	Meters	Feet	Meters
9600	10,000	3,050	4,000	1,220
19200	5,000	1548	2,500	762.5
38400	2,500	762.5	1,500	457

NOTES:

- Distances are for 2-wire devices and 4-wire devices configured for 2-wire operation, such as the Series 600 Power Meter and the Series 3000 and 4000 Circuit Monitor.
- Distances listed should be used as a guide only and cannot be guaranteed for non-POWERLOGIC devices.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, BURN, OR EXPLOSION

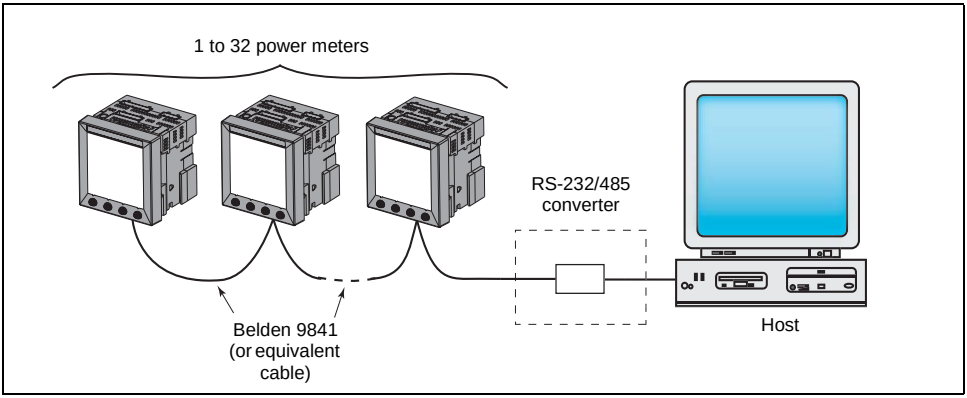
- Turn off all power supplying the power meter and the equipment in which it is installed before working on it.
- Use a properly rated voltage testing device to verify that the power is off.

Failure to follow this instruction will result in death or serious injury

Connecting to a PC Host Using the RS-485 Port

The RS-485 slave port allows the power meter to be connected to a daisy-chain of up to 31 devices to the serial communications port on a host device (see Figure 5–1). Refer to Table 5–2 on page 21 for cable distance limitations at varying baud rates. To make this type of connection, you must use a RS-232-to-RS-422/RS-485 converter. POWERLOGIC offers a converter kit for this purpose (part number MCI-101). For connection instructions, refer to the instruction bulletin included with the MCI-101 kit.

Figure 5–1: Power meters connected to a PC serial port through the RS-485 port on the power meter



Daisy-chaining Devices to the Power Meter

The RS-485 slave port allows the power meter to be connected in a daisy chain with up to 31, 2-wire devices. In this bulletin, communications link refers to a chain of devices that are connected by a communications cable.

To daisy-chain devices to the power meter, use communications cable containing a twisted-shielded pair (Belden 9841 or equivalent) and the three-terminal connector of the RS-485 port on the power meter. ~~The terminals are labeled:~~

~~18 (shield)~~

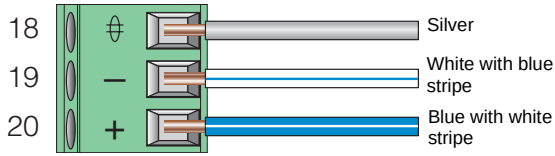
~~19 –~~

~~20 +~~

To connect to the power meter, follow these steps:

1. Strip the cable wires and insert them into the holes in the connector.
2. On the top of the connector, torque the wire binding screws 5–7 in-lb (0.56–0.79 N•m).

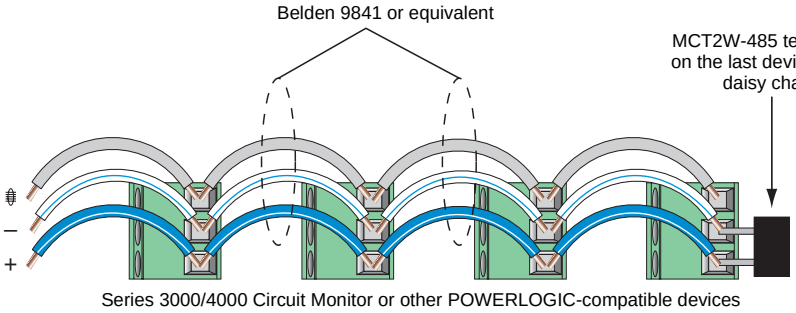
Figure 5–2: RS-485 connection



Daisy-chain 2-wire Devices

To daisy-chain the power meter to another 2-wire POWERLOGIC device, wire the power meter's RS-485 communications terminals to the matching communications terminals of the next device. In other words, wire the **+** terminal of the power meter to the **+** terminal of the next device, wire **–** to **–**, and shield to shield as shown in Figure 5–3.

Figure 5–3: Daisy-chaining 2-wire devices



Belden 9841 wire colors: blue with white stripe (+), white with blue stripe (–), and silver (shield)

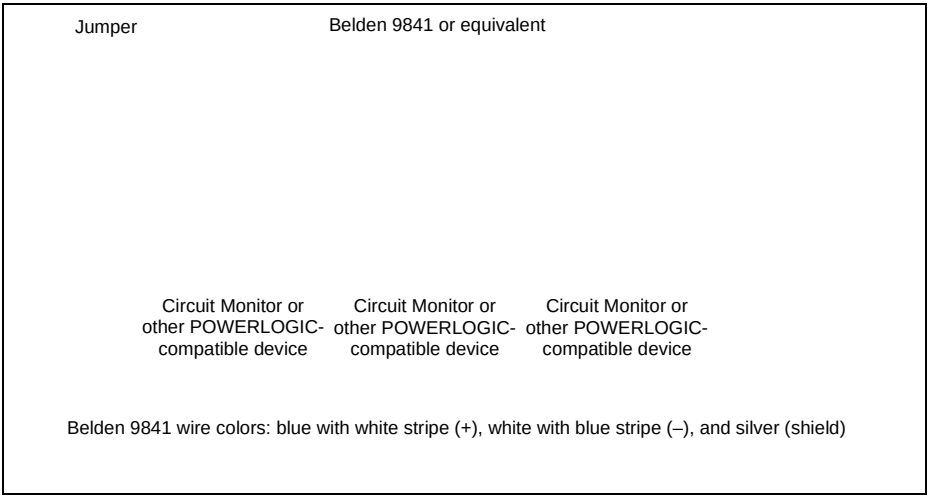
- If the power meter is the first device on the daisy chain, connect it to the host device using the MCI-101 kit (or equivalent RS-232 to RS-422/RS-485 converter). See “Connecting the First Device on the Daisy Chain” on page 26 in this chapter for instructions.
- If the power meter is the last device on the daisy chain, terminate it. See “Terminating the Communications Link” on page 27 in this chapter for instructions.
- See Table 5–2 on page 21 for the maximum daisy-chain communications distances for 2-wire devices.

Using the MCT2W-485 Terminator

To terminate the power meter using the MCT2WMCTAS-485 terminator (part no. 3090MCTAS485), insert the wires of the terminator directly into terminals 19 and 20 of the RS-485 communications connector on the power meter as shown in Figure 5–3.

Daisy-chain 4-wire Devices

Figure 5–4: Daisy-chaining 4-wire devices

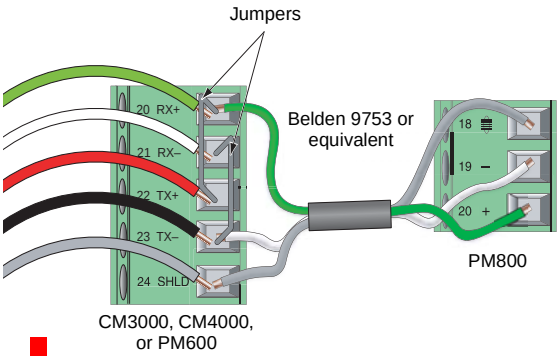


- If the power meter is the first device on the daisy-chain, connect it to the personal computer or programmable controller using the CAB-107 cable (or equivalent cable). See “Connecting the First Device on the Daisy Chain” on page 26 in this chapter for instructions.
- If the power meter is the last device on the daisy-chain, terminate it. See “Terminating the Communications Link” on page 27 in this chapter for instructions.
- See Table 5–2 on page 21 for the maximum daisy-chain communications distances for 2-wire devices.

Daisy-chain 4-wire Devices for 2-wire MODBUS or JBUS

When wiring 4-wire communications terminals for 2-wire MODBUS or JBUS, jumper RX+ to TX+ and RX– to TX– as shown in Figure 5–5.

Figure 5–5: Jumpers for 4-wire devices on 2-wire daisy chain



Connecting the First Device on the Daisy Chain

If the power meter is the first device on the daisy chain, refer to

1. Connect the host master device to the first power meter using the following steps:
   a. Cut a length of 9841 Belden cable long enough to reach from the host device to the power meter. Strip 1-1/4 in. (32 mm) of cable sheath from both ends.
   b. On one end of the Belden cable, carefully strip 0.25 in (6 mm) of insulation from the end of each wire to be connected.
   c. Remove the black and red wires from both ends of the cable.
   d. Insert the wire ends of the Belden cable into the DB-9 or terminal connector using Figure

5–5 as a reference. Torque the DB-9 terminal screws to 5–7 in-lb (0.56–0.79 N•m).

e. On the other end of the Belden cable, carefully strip 0.4 in–0.45 in (10–11 mm) of insulation from the end of each wire to be connected.

f. Insert the wire ends of the Belden cable into the RS-485 terminal connector of the power meter, making sure to connect **+** to **+**, and so forth. Torque the RS-485 terminal screws to 5–7 in-lb (0.56–0.79 N•m).

Terminating the Communications Link

For proper RS-485 communications performance, you must terminate the last device on the communications link using the MCT2W-485 terminator, which inserts directly into the connector in the RS-485 port of the power meter as illustrated in Figure 5–3 on page 24.

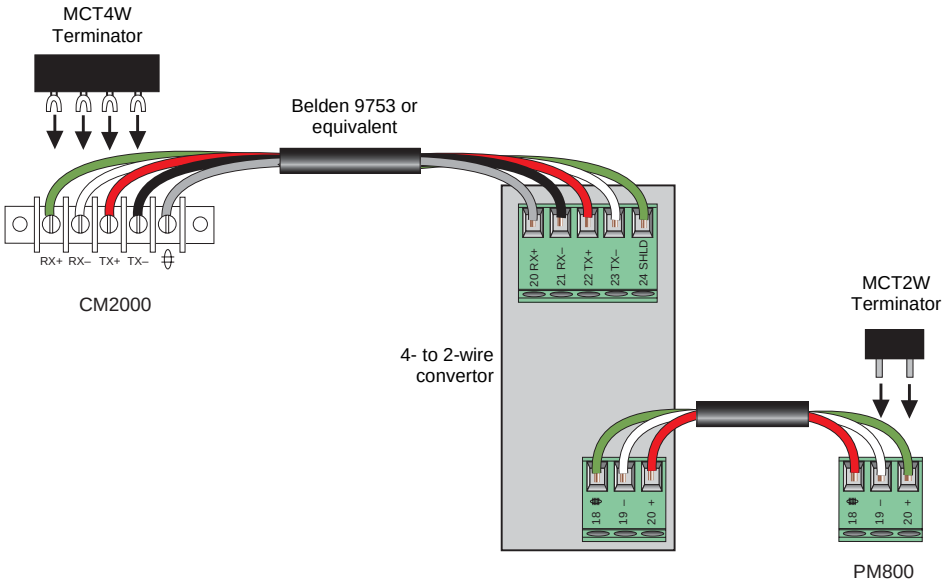
Notes:

- *Terminate **only the last device** on the link. If a link has only one device, terminate that device.*
- *Some POWERLOGIC devices use a removable communications connector. If the last device on the communications link is not a power meter, refer to the instruction bulletin for that device for termination instructions.*

Connecting to a Series 2000 Circuit Monitor

When wiring a power meter to a CM2000, you will need to use a 4- to 2-wire convertor.

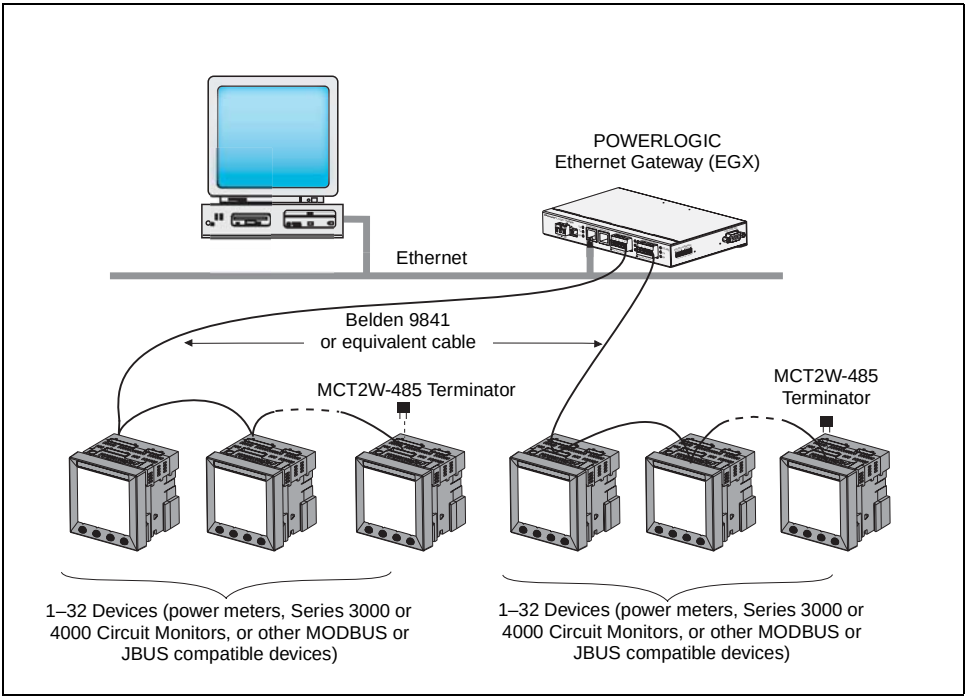
Figure 5–1: Using a 4- to 2-wire convertor to connect a PM800 to a CM2000



Connecting to a POWERLOGIC Ethernet Gateway (EGX)

The POWERLOGIC Ethernet Gateway is a network communications interface that performs protocol conversion between POWERLOGIC-compatible devices and standard Ethernet network protocols. An Ethernet Gateway has serial ports that support from 8 to 32 POWERLOGIC devices, depending on the Ethernet Gateway model. More devices can be daisy-chained when a signal repeater is used. Refer to the instruction bulletin that ships with your Ethernet Gateway for more information and installation procedures.

Figure 5–6: Power meters connected to Ethernet using a POWERLOGIC Ethernet Gateway

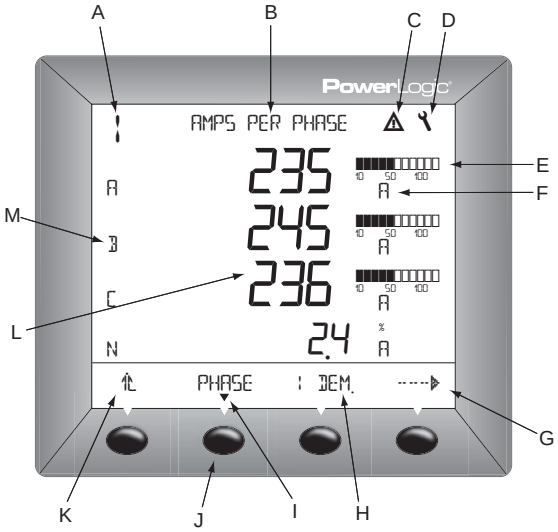


Operating the Display

The power meter is equipped with a large, back-lit LCD display. It can display up to five lines of information plus a sixth row of menu options. Figure 6–1 shows the different parts of the power meter.

Figure 6–1: Power Meter Display

A. Type of measurement
B. Screen Title
C. Alarm indicator
D. Maintenance icon
E. Bar Chart (%)
F. Display more menu items
G. Menu item
H. Selected menu indicator
I. Button
J. Return to previous menu
K. Values
L. Phase



How the Buttons Work

The buttons are used to select menu items, display more menu items in a menu list, and return to previous menus. A menu item appears over one of the four buttons. Pressing a button selects the menu item and displays the menu item's screen. When you have reached the highest menu level, a black triangle appears beneath the selected menu item. To return to the previous menu level, press the button below ⮤. To cycle through the menu items in a menu list, press the button below ⋯▸ (see Figure 6–1).

*NOTE: Each time you read "*press*" in this manual, press the appropriate button beneath the menu item.*

*For example, if you are asked to "*Press PHASE*," you would press the button below the PHASE menu item.*

Changing Values

When a value is selected, it flashes to indicate that it can be modified. A value is changed by doing the following:

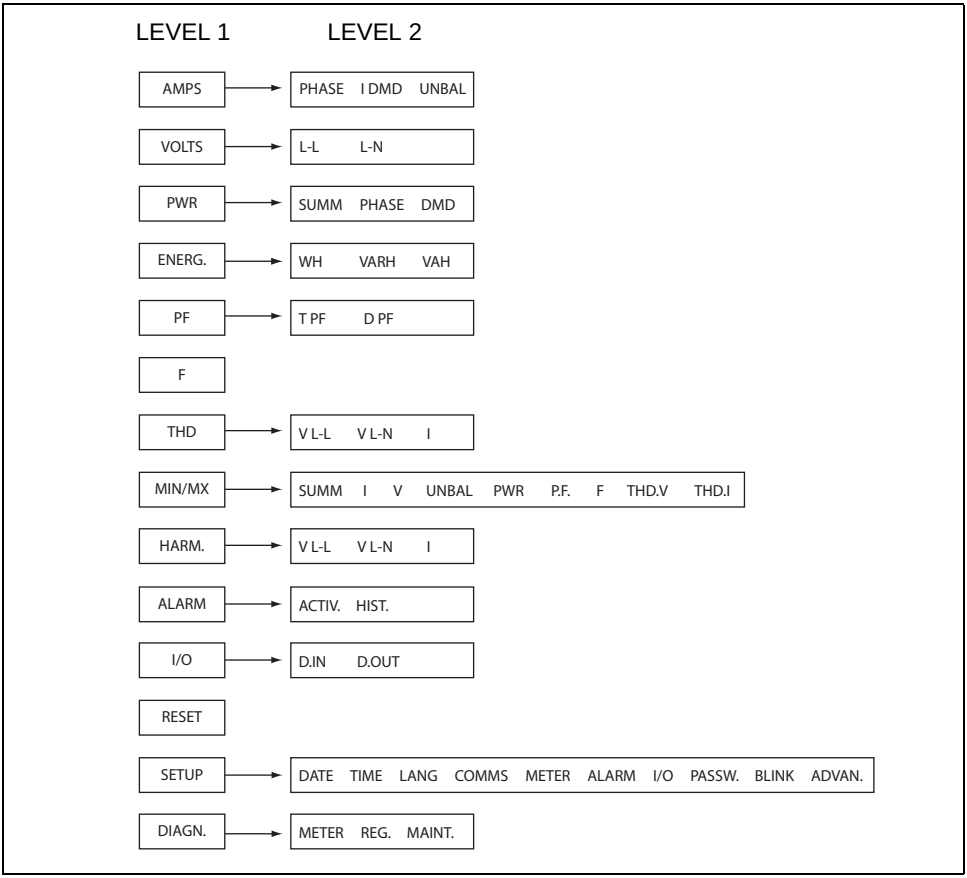
- Press + or – to change numbers or scroll through available options.
- If you are entering more than one number, press ⇠ to move to the next number in the sequence.
- To save your changes and move to the next field, press OK.

Menu Overview

The figure below shows the menu items of the first two levels of the power meter. Level 1 contains all of the menu items available on the first screen of the power meter. Selecting a Level 1 menu item takes you to the next screen level containing the Level 2 menu items.

NOTE: The ⇢ is used to scroll through all ~~of a level's~~ menu items on a level.

Figure 6–1: Abbreviated List of Power Meter Menu Items



Set Up the Power Meter

NOTE: If you are setting up the power meter using SMS, it is recommended you set up communications first (see "Set Up Communications" on page 37).

To begin power meter setup, do the following:

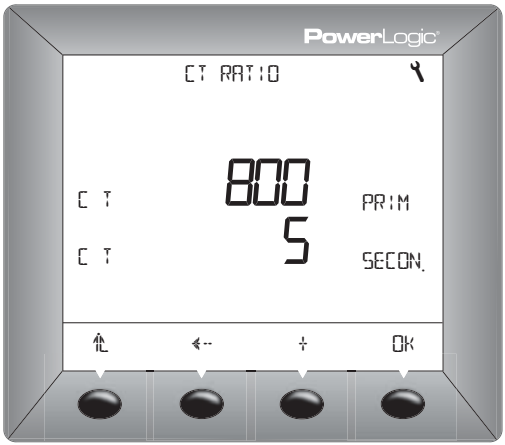
1. Scroll through the Level 1 menu list until you see SETUP.
2. Press SETUP.
3. Enter your password.

   NOTE: The default password is 0000.

Follow the directions in the following sections to set up the meter for first time use.

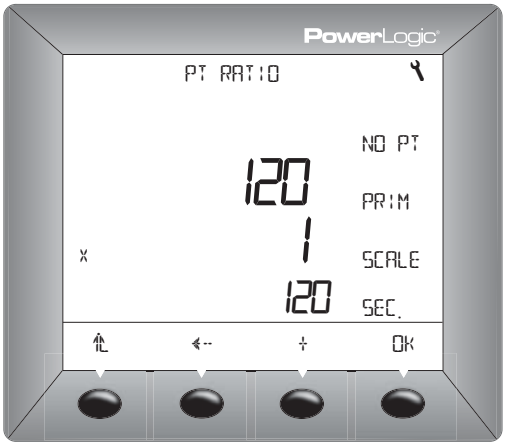
Set Up CTs

1. Press ⇢ until METER is visible.
2. Press METER.
3. Press CT.
4. Enter the PRIM CT (primary CT) number.
5. Press OK.
6. Enter the SECON. CT (secondary CT) number.
7. Press OK.
8. Press ↑ to return to the METER SETUP screen.



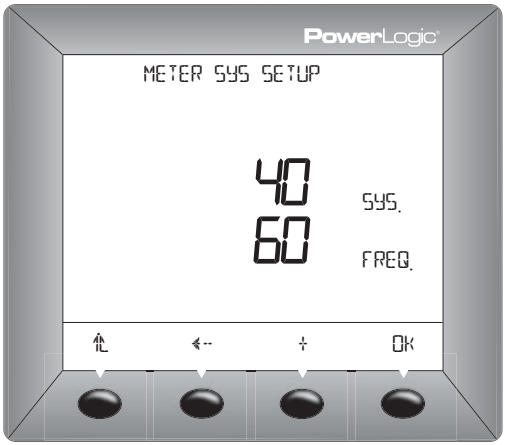
Set Up PTs

1. Press ⇢ until METER is visible.
2. Press METER.
3. Press PT.
4. Select NO PT or PT.
5. Press OK.
6. Enter the PRIM (primary) value.
7. Press OK.
8. Enter the SCALE value.
9. Press OK.
10. Enter the SEC. (secondary) value.
11. Press OK.
12. Press ↑ to return to the METER SETUP screen.



Set Up the Meter System Type

1. Press ⇢ until METER is visible.
2. Press METER.
3. Press SYS.
4. Select the SYS (system type).
5. Press OK.
6. Select the FREQ (frequency).
7. Press OK.
8. Press ↑ to return to the METER SETUP screen.

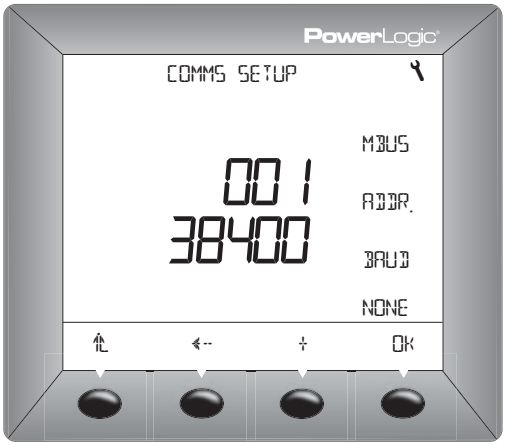


Minimum Setup

Set Up the Power Meter

Set Up Communications

1. Press ⇢ until COMMS is visible.
2. Press COMMS.
3. Select the protocol: MBUS or JBUS.
4. Press OK.
5. Enter the ADDR (power meter address).
6. Press OK.
7. Select the BAUD (baud rate).
8. Press OK.
9. Select the parity: EVEN, ODD, or NONE.
10. Press OK.
11. Press ↑ to return to the METER SETUP screen.



Introduction

This chapter describes information related to maintenance of your power meter.

The power meter does not ~~require regular internal hardware maintenance, nor does it~~ contain any user-serviceable parts. If the power meter requires service, contact your local sales representative. Do not open the power meter. Opening the power meter voids the warranty.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, BURN, OR EXPLOSION

Do not attempt to service the power meter. CT and PT inputs may contain hazardous currents and voltages. Only authorized service personnel from the manufacturer should service the power meter.

Failure to follow this instruction will result in death or serious injury.

⚠ CAUTION

HAZARD OF EQUIPMENT DAMAGE

Do not perform a Dielectric (Hi-Pot) or Megger test on the power meter. High voltage testing of the power meter may damage the unit. Before performing Hi-Pot or Megger testing on any equipment in which the power meter is installed, disconnect all input and output wires to the power meter.

Failure to follow this instruction can result in injury or equipment damage.

Power Meter Memory

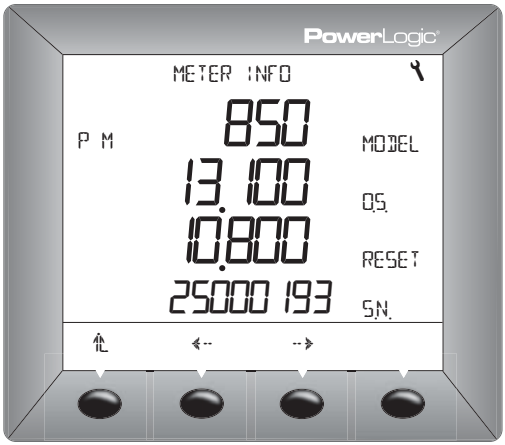
The power meter uses its nonvolatile memory (RAM) to retain all data and metering configuration values. Under the operating temperature range specified for the power meter, this nonvolatile memory has an expected life of up to 100 years. The power meter stores its data logs on a memory chip, which has a life expectancy of up to 20 years under the operating temperature range specified for the power meter. The life of the power meter's internal battery-backed clock is over 20 years at 25°C.

NOTE: Life expectancy is a function of operating conditions; this does not constitute any expressed or implied warranty.

Identifying the Firmware Version

1. From the first menu level, press ----▸ until DIAG is visible.
2. Press DIAG.
3. Press METER.

   The number next to O.S. is the firmware version. In this example, 13.100 is the firmware version.
4. After you're finished, press ↑ to return to the METER SETUP screen.



Viewing the Display in Different Languages

The power meter can be set to use one of three different languages: English, French, and Spanish. Other languages are available. Please contact your local sales representative for more information about other language options.

The power meter language can be selected by doing the following:

1. From the first menu level, press ⋯▸ until SETUP is visible.
2. Enter your password, then press OK.
3. Press ⋯▸ until LANG is visible.
4. Press LANG.
5. Select the language: ENGL, SPAN, or FREN.
6. Press ↑ to return to the METER SETUP screen.

Getting Technical Support

Please refer to ~~the following *Technical Support Contacts* by country~~ the *Technical Support Contacts* provided in the power meter shipping carton for a list of support phone numbers by country.

~~Belgium / China / France /Italy / Northern & Eastern Europe/ Republic of South Africa:~~

~~POWERLOGIC System Technical Support~~
~~Tel: +33 (0)4 76 39 41 55~~
~~Fax: +33 (0)4 76 39 40 72~~

~~Schneider Electric~~
~~Centre M4 - MEYLAN 38240~~
~~FRANCE~~

~~North, Central & South America / Ireland / UK / Spain / Asia Pacific (except China):~~

~~Power Management Operation~~
~~Technical Support Schneider Electric~~
~~295 Tech Park Drive, Suite 100~~
~~LaVergne, TN USA 37086~~

~~Tel: (615) 287-3400~~
~~Fax: (615) 287-3404~~
~~e-mail: PMOsuprt@squareD.com~~
~~www.powerlogic.com~~

~~For all other countries:~~

~~POWERLOGIC System Technical Support~~
~~Tel: +33 (0)4 76 39 41 55~~
~~Fax: +33 (0)4 76 39 40 72~~

~~Schneider Electric~~
~~Centre M4 - MEYLAN 38240~~
~~FRANCE~~

Troubleshooting

The information in Table 8–1 describes potential problems and their possible causes. It also describes checks you can perform or possible solutions for each. After referring to this table, if you cannot resolve the problem, contact the your local Square D/Schneider Electric sales representative for assistance.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, BURN, OR EXPLOSION

- This equipment must be installed and serviced only by qualified personnel.
- Qualified persons performing diagnostics or troubleshooting that require electrical conductors to be energized must comply with NFPA 70 E - Standard for Electrical Safety Requirements for Employee Workplaces and OSHA Standards - 29 CFR Part 1910 Subpart S - Electrical.
- Carefully inspect the work area for tools and objects that may have been left inside the equipment.
- Use caution while removing or installing panels so that they do not extend into the energized bus; avoid handling the panels, which could cause personal injury.
- Turn off all power supplying this equipment before working on or inside.
- Always use a properly rated voltage sensing device to confirm that all power is off.

Failure to follow this instruction will result in death or serious injury.

Table 8–1: Troubleshooting

Potential Problem	Possible Cause	Possible Solution
The maintenance icon is illuminated on the power meter display.	When the maintenance icon is illuminated, it indicates a potential hardware or firmware problem in the power meter.	When the red maintenance LED is illuminated, “Maintenance LED” is added to the menu under “Diagnostics.” Error messages display to indicate the reason the LED is illuminated. Note these error messages and call Technical Support or contact your local sales representative for assistance.
The display is blank after applying control power to the power meter.	The power meter may not be receiving the necessary power.	• Verify that the power meter line (L) and neutral (N) terminals (terminals 25 and 27) are receiving the necessary power. • Verify that the heartbeat LED is ON.
The data being displayed is inaccurate or not what you expect.	Power meter is grounded incorrectly.	Verify that the power meter is grounded as described in “Grounding the Power Meter” in the installation manual.
	Incorrect setup values.	Check that the correct values have been entered for power meter setup parameters (CT and PT ratings, System Type, Nominal Frequency, and so on). See “Set Up the Power Meter” on page 35 for setup instructions.
	Incorrect voltage inputs.	Check power meter voltage input terminals (9, 10, 11,12) to verify that adequate voltage is present.
	Power meter is wired improperly.	Check that all CTs and PTs are connected correctly (proper polarity is observed) and that they are energized. Check shorting terminals. See “Wiring Diagrams” on page 16. Initiate a wiring check from the power meter display.

Table 8–1: Troubleshooting

Cannot communicate with power meter from a remote personal computer.	Power meter address is incorrect.	Check to see that the power meter is correctly addressed. See “Set Up Communications” on page 37 for instructions.
	Power meter baud rate is incorrect.	Verify that the baud rate of the power meter matches the baud rate of all other devices on its communications link. See “Set Up Communications” on page 37 for instructions.
	Communications lines are improperly connected.	Verify the power meter communications connections. Refer to the **Communications** chapter in the installation manual for instructions.
	Communications lines are improperly terminated.	Check to see that a multipoint communications terminator is properly installed. See “Terminating the Communications Link” on page 27 in the installation manual for instructions.
	Incorrect route statement to power meter.	Check the route statement. Refer to the SMS online help for instructions on defining route statements.

Specifications

Table A–1: Specifications

Current Inputs (Each Channel)	
Current Range	0 –10 A ac
Nominal Current	5 A ac
Withstand:	
Continuous	15 A
10 sec/hr	50 A
1 sec/hr	500 A
Burden	< 0.15 VA
Input Impedance	< 0.1 Ohm
Voltage Inputs (Each Channel)	
Nominal Full Scale	0 – 600 Vac L-L, 347 Vac L-N
Metering Over-range	50%
Input Impedance	> 2 M Ohm
Metering Frequency Range	45–67 Hz, 350–450 Hz
Metering Category	III
Accuracy	Complies with ANSI C12.20 0.5
Current	±[0.075% Reading + 0.025% full scale] ①
Voltage	±[0.075% Reading + 0.025% full scale] ②
Power	±[0.015% Reading + 0.025% full scale] ③
Frequency	±0.01 Hz at 45–67 Hz
Sampling	
	Zero blind
	128 samples/cycle
Harmonic Resolution	
Metered Values	63rd harmonic
Waveform Capture	
	Manual or alarm initiation
	1 Cycle at 128 samples/cycle

Specifications based on 50/60 Hz nominal systems.

①Full scale = 10A. Add 0.006%(°C - 25) to the upper limit error for temperatures below 25°C.

②Full scale = 600V. Add 0.001%(°C) to the upper limit error for temperatures above 50°C.

③Full scale = 120V x 10A. Add 0.006%(°C) to the upper limit error for temperatures below 25°C.

④Requires 5°C derating when using display and control power above 305V.

⑤Derate load current 0.56mA/°C above 25°C.

Table A–1: Specifications

I/O	
Standard KY output	
	3 Vac/dc to 240 Vac or 300 Vdc 1350 Vrms isolation 100 mA max. at 25°C ⑤
Standard Digital Input	
Turn on voltage	20–138 Vac/Vdc
Burden	5 mA
Control Power	
AC Control Power	
Operating Range	90–457 Vac
Burden	11 VA
Frequency	45–67 Hz, 350–450 Hz
Ride Through	45 ms at 120 Vac
DC Control Power	
Operating Range	100–300 Vdc
Burden	6 W
Ride Through	45 ms at 125 Vdc
Environment	
Operating Temperature	
Meter	-25°C to +70°C ④
Display	0°C to +55°C
Operating Environment	
Relative Humidity	5–95% (non-condensing)
Max. Elevation	3,000 m
Pollution Degree	2

Specifications based on 50/60 Hz nominal systems.

①Full scale = 10A. Add 0.006%(°C - 25) to the upper limit error for temperatures below 25°C.

②Full scale = 600V. Add 0.001%(°C) to the upper limit error for temperatures above 50°C.

③Full scale = 120V x 10A. Add 0.006%(°C) to the upper limit error for temperatures below 25°C.

④Requires 5°C derating when using display and control power above 305V.

⑤Derate load current 0.56mA/°C above 25°C.

Table A–1: Specifications

Regulatory/Standards Compliance	
Emissions	
Radiated	FCC part 15 Class A, EN55011
Conducted	FCC part 15 Class A, EN55011
Harmonics	IEC 1000-3-2
Flicker	IEC 1000-3-3
Immunity	
ESD	IEC 1000-4-2 Level 3
Radiated	IEC 1000-4-3 Level 3
EFT	IEC 1000-4-4 Level 3
Surges	IEC 1000-4-5 Level 3
Conducted	IEC 1000-4-6 Level 3
Mag. Field	IEC 1000-4-8 Level 3
Voltage Dips	IEC 1000-4-11
Accuracy	
	ANSI C12.20 Class 0.5 and IEC 60687 Class 0.5 S
Standards (listed)	
USA	UL 508
Canada	cUL 508
Europe	CE per EN 61010

Specifications based on 50/60 Hz nominal systems.

①Full scale = 10A. Add 0.006%(°C - 25) to the upper limit error for temperatures below 25°C.

②Full scale = 600V. Add 0.001%(°C) to the upper limit error for temperatures above 50°C.

③Full scale = 120V x 10A. Add 0.006%(°C) to the upper limit error for temperatures below 25°C.

④Requires 5°C derating when using display and control power above 305V.

⑤Derate load current 0.56mA/°C above 25°C.

Specifications

Specifications

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Power Meter PM800 Series
Installation Manual

Schneider Electric
Power Management Operations
295 Tech Park Drive, Suite 100
LaVergne, TN 37128
Tel: +1 (615) 287-3400
www.powerlogic.com

This product must be installed, connected, and used in compliance with prevailing standards and/or installation regulations.

As standards, specifications, and designs change from time to time, please ask for confirmation of the information given in this publication.

Ce produit doit être installé, raccordé et utilisé en repectant les normes et/ou les règlements d'installation en vigueur.

En raison de l'évolution des normes et du matériel, les caractéristiques et cotes d'encombrement données ne nous engagent qu'après confirmation par nos services.

Este producto debera instalarse, conectarse y utilizarse en conformidad conlas normas y/o los reglementos de instalación vigentes.

Debido a la evolución constante de las normas ydes material, nos comprometemos únicamente con las característics y cotas de volumen previa confirmación de nuestros servicios.

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