

PowerLogic® Series 800 Power Meter PM820, PM850, PM870

63230-500-224A1

6/2006

Retain for future use.

Installation manual



HAZARD CATEGORIES AND SPECIAL SYMBOLS

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 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.

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. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

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 designed 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. This Class A digital apparatus complies with Canadian ICES-003.

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CHAPTER 1—INTRODUCTION

About This Manual

This instruction manual explains how to install and set up a PowerLogic® Series 800 Power Meter. Unless otherwise noted, the information contained in this manual refers to the following Power Meters:

- Power Meter with integrated display
- Power Meter without a display
- Power Meter with a remote display.

Refer to “Power Meter Parts and Accessories” on page EN-6 for all available models and model numbers. For a list of supported features, see “Features” on page EN-8.

Topics Not Covered in This Manual

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 (SMS) from PowerLogic. This power meter instruction bulletin describes these advanced features, but does not explain how to set them up. For instructions on using SMS, refer to the SMS online help and the SMS setup guide, which is available in English, French, and Spanish. See Table 1–1 for a list of power meter models supported by SMS.

NOTE: For additional information, download the reference manual at powerlogic.com. Select your country > Literature > Meters > Series 800 Power Meter > Instructional > PM800 Reference Manual.

Table 1–1: Power Meter Models Supported By SMS

SMS Type	SMS Version	PM820	PM850	PM870
SMS121	3.3.2.2 or higher	✓	✓	—
SMS1500	3.3.2.2 or higher	✓	✓	—
SMS3000	3.3.2.2 or higher	✓	✓	—
SMSDL	4.0 or 4.0 with Service Update 1	✓	✓	—
	4.0 with Service Update 2 or higher	✓	✓	✓
SMSSE	4.0 or 4.0 with Service Update 1	✓	✓	—
	4.0 with Service Update 2 or higher	✓	✓	✓
SMSPE	4.0 or 4.0 with Service Update 1	✓	✓	—
	4.0 with Service Update 2 or higher	✓	✓	✓

Power Meter Hardware

Figure 1–1: Parts of the Series 800 Power Meter

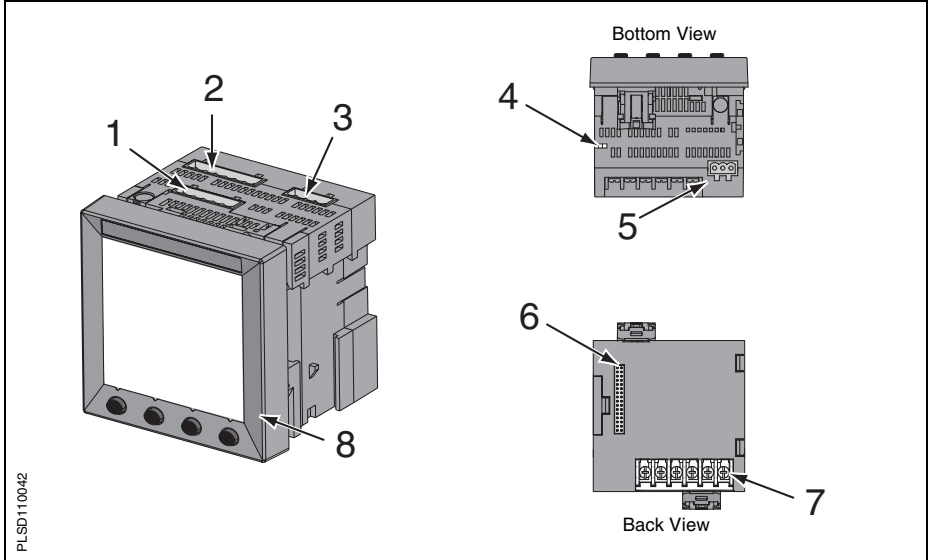
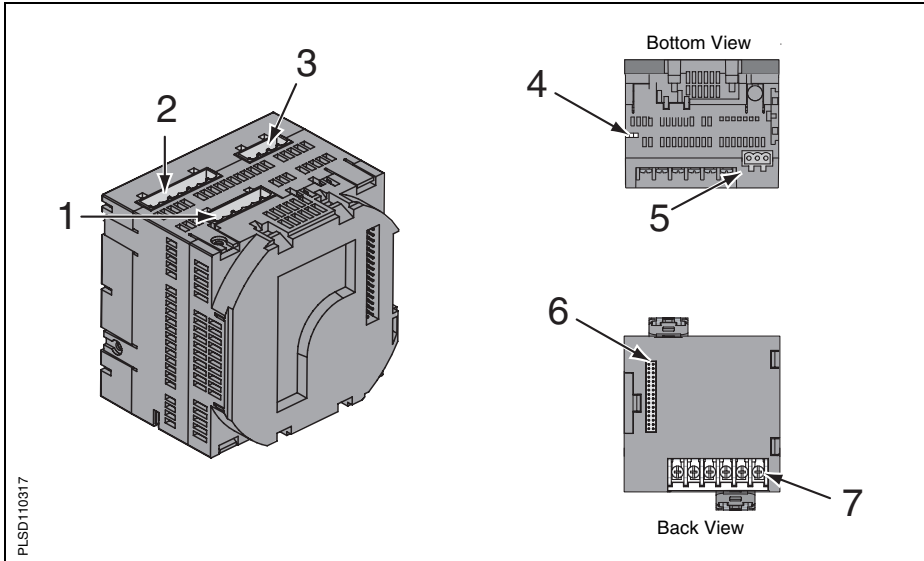


Table 1–2: Parts of the Power Meter

No.	Part	Description
1	Control power supply connector	Connection for control power to the power meter.
2	Voltage inputs	Voltage metering connections.
3	I/O connector	KY pulse output/digital input connections
4	Heartbeat LED	A green flashing LED indicates the power meter is ON.
5	RS485 port (COM1)	The RS485 port is used for communications with a monitoring and control system. This port can be daisy-chained to multiple devices.
6	Option module connector	Used to connect an option module to the power meter.
7	Current inputs	Current metering connections.
8	Integrated display	Visual interface to configure and operate the power meter.

Power Meter Without Display

Figure 1–2: Parts of the Series 800 Power Meter without display



PLSD110317

Table 1–3: Parts of the Series 800 Power Meter Without Display

No.	Part	Description
1	Control power supply connector	Connection for control power to the power meter.
2	Voltage inputs	Voltage metering connections.
3	I/O connector	KY pulse output/digital input connections
4	Heartbeat LED	A green flashing LED indicates the power meter is ON.
5	RS485 port (COM1)	The RS485 port is used for communications with a monitoring and control system. This port can be daisy-chained to multiple devices.
6	Option module connector	Used to connect an option module to the power meter.
7	Current inputs	Current metering connections.

Power Meter With Remote Display

NOTE: The remote display (PM8RD) is used with a power meter without a display. See “Power Meter Without Display” on page EN-4 for the parts of the power meter without a display.

Figure 1–3: Parts of the remote display and the remote display adapter

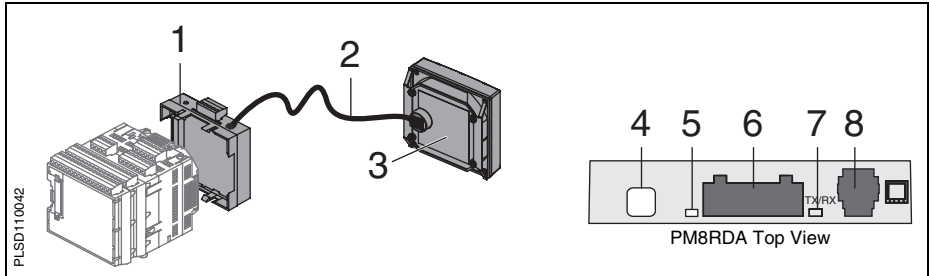


Table 1–4: Parts of the Remote Display

No.	Part	Description
1	Remote display adapter (PM8RDA)	Provides the connection between the remote display and the power meter, and provides an additional RS232/RS485 connection (2- or 4-wire).
2	Cable CAB12	Connects the remote display to the remote display adapter.
3	Remote display (PM8D)	Visual interface to configure and operate the power meter.
4	Communications mode button	Use to select the communications mode (RS232 or RS485).
5	Communications mode LED	When lit the LED indicates the communications port is in RS232 mode.
6	RS232/RS485 port	The RS485 port is used for communications with a monitoring and control system. This port can be daisy-chained to multiple devices.
7	Tx/Rx Activity LED	The LED flashes to indicate communications activity.
8	CAB12 port	Port for the CAB12 cable used to connect the remote display to the remote display adapter.

Power Meter Parts and Accessories

Table 1–5: Power Meter Parts and Accessories



Description	Model Number	
	Square D	Merlin Gerin
Power Meters		
Power Meter with Integrated Display	PM820 ^① PM850 ^② PM870 ^③	PM820MG ^① PM850MG ^② PM870MG ^③
Power Meter without Display	PM820U ^① PM850U ^② PM870U ^③	PM820UMG ^① PM850UMG ^② PM870UMG ^③
Power Meter with Remote Display	PM820RD ^① PM850RD ^② PM870RD ^③	PM820RDMG ^① PM850RDMG ^② PM870RDMG ^③
Accessories		
Remote Display with Remote Display Adapter	PM8RD	PM8RDMG
Remote Display Adapter	PM8RDA	
Input/Output Modules	PM8M22, PM8M26, PM8M2222	
Cable (12 inch) Extender Kit for displays	RJ11EXT	
Retrofit Gasket (for 4 in. round hole mounting)	PM8G	
CM2000 Retrofit Mounting Adapter	PM8MA	

- ① The Power Meter units for these models are identical and support the same features (see “Features” on page EN–8).
- ② The Power Meter units for these models are identical and support the same features (see “Features” on page EN–8).
- ③ The Power Meter units for these models are identical and support the same features (see “Features” on page EN–8).

Box Contents

Table 1–6: Box contents based on model

Model Description	Box Contents
Power Meter with Integrated Display	<ul style="list-style-type: none"> • Power Meter with integrated display • Hardware kit (63230-500-16) containing: <ul style="list-style-type: none"> — Two retainer clips — Template — Install sheet — Lugs — Plug set — Terminator MCT2W • Power Meter installation manual
Power Meter without Display	<ul style="list-style-type: none"> • Power Meter without display • Hardware kit (63230-500-16) containing: <ul style="list-style-type: none"> — Two retainer clips — Template — Install sheet — Lugs — DIN Slide — Plug set — Terminator MCT2W • Power Meter installation manual
Power Meter with Remote Display	<ul style="list-style-type: none"> • Power Meter without display • Remote display (PM8D) • Remote display adapter (PM8RDA) • Hardware kit (63230-500-42) containing: <ul style="list-style-type: none"> — Two retainer clips — Communications cable (CAB12) — Mounting screws — Crimp connector — Communications connector — Terminator MCT2W • Power Meter installation manual

Features

Table 1–7: Series 800 Power Meter Features

	PM820	PM850	PM870
True rms metering to the 63rd harmonic	✓	✓	✓
Accepts standard CT and PT inputs	✓	✓	✓
600 volt direct connection on voltage inputs	✓	✓	✓
High accuracy — 0.075% current and voltage (typical conditions)	✓	✓	✓
Min/max readings of metered data	✓	✓	✓
Input metering (five channels) with PM8M22, PM8M26, or PM8M2222 installed	✓	✓	✓
Power quality readings — THD	✓	✓	✓
Downloadable firmware	✓	✓	✓
Easy setup through the integrated or remote display (password protected)	✓	✓	✓
Setpoint-controlled alarm and relay functions	✓	✓	✓
Onboard alarm logging	✓	✓	✓
Wide operating temperature range: -25° to +70°C for the power meter unit	✓	✓	✓
Communications: Onboard: one Modbus RS485 (2-wire) PM8RD: one configurable Modbus RS232/RS485 (2- or 4-wire)	✓ ✓	✓ ✓	✓ ✓
Active energy accuracy: IEC 62053-22 and ANSI C12.20 Class 0.5S	✓	✓	✓
Nonvolatile clock	✓	✓	✓
Onboard data logging	80 KB	800 KB	800 KB
Real-time harmonic magnitudes and angles (I and V): To the 31st harmonic To the 63rd harmonic	✓ —	— ✓	— ✓
Waveform capture Standard Advanced	— —	✓ —	✓ ✓
EN50160 evaluations	—	✓	✓
Current and voltage sag/swell detection and logging	—	—	✓

Firmware

This instruction bulletin is written to be used with firmware version 10.5. See “Identifying the Firmware Version” on page EN-56 for instructions on how to determine the firmware version. To download the latest firmware version, follow the steps below:

1. Using a web browser, go to <http://www.powerlogic.com>.
2. Select **United States**.
3. Click **downloads**.
4. Enter your login information, then click **LogIn**.
5. Click **PM8 Firmware** under the POWERLOGIC section.
6. Follow the instructions on the web page that explains how to download and install the new firmware.

CHAPTER 2—SAFETY PRECAUTIONS

DANGER

HAZARD OF ELECTRIC SHOCK, BURN, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. For example, in the United States, see NFPA 70E.
- This equipment must only be installed and serviced by qualified electrical personnel.
- 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 equipment.
- Always use a properly rated voltage sensing device to confirm that all power is off.
- Beware of potential hazards and 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.
- NEVER bypass external fusing.
- 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.

CHAPTER 3—INSTALLATION

Installation Considerations

Table 3–1: Mounting Summary for Power Meter Models and Accessories

Description	Model Number		Section
	Square D	Merlin Gerin	
Power Meters			
Power Meter with Integrated Display	PM820 PM850 PM870	PM820MG PM850MG PM870MG	“Dimensions” on page EN–15 “Mounting” on page EN–15
Power Meter without Display	PM820U PM850U PM870U	PM820UMG PM850UMG PM870UMG	“DIN Rail Mounting” on page EN–20
Power Meter with Remote Display	PM820RD PM850RD PM870RD	PM820RDMG PM850RDMG PM870RDMG	“PM8RD Dimensions and Mounting Options” on page EN–23
Accessories			
Remote Display with Remote Display Adapter	PM8RD	PM8RDMG	“PM8RDA Dimensions” on page EN–21 “PM8RD Dimensions and Mounting Options” on page EN–23
Remote Display Adapter	PM8RDA		“PM8RDA Dimensions” on page EN–21 “PM8RDA Installation” on page EN–22
Retrofit Gasket (for 4 in. round cutout mounting)	PM8G		“Replacing Analog Meters” on page EN–18
CM2000 Retrofit Mounting Adapter	PM8MA		

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.
- Install the power meter in a protective enclosure (for example, in the USA use a NEMA Type 1 rated enclosure or better).

- For European Community (CE) compliance, the disconnect circuit breaker must be placed within reach of the power meter and labeled: **Disconnect Circuit Breaker for Power Meter**.

NOTE: The disconnect circuit breaker must be rated for the short circuit current at the connection points.

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.

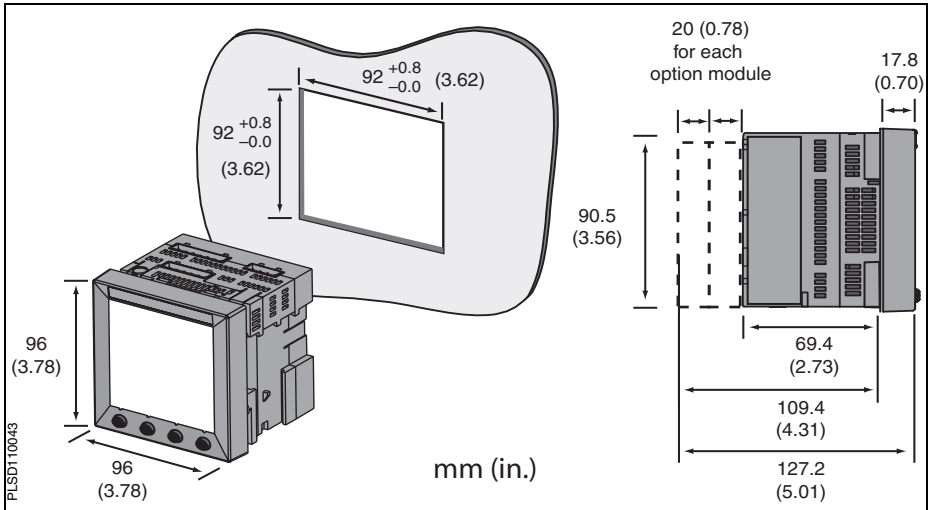
- Locate the power meter in an area where ambient conditions fall within the acceptable range. For control power voltages above 300 Vac, the temperature range for the meter block is -25°C to +65°C. The front display has a range of -10°C to +50°C.

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

Power Meter With Integrated Display

Dimensions

Figure 3–1: Power Meter with integrated display dimensions



Mounting

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, BURN, OR ARC FLASH

- Apply personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E.
- 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.

ENGLISH

Figure 3–2: Clearances for mounting a single power meter

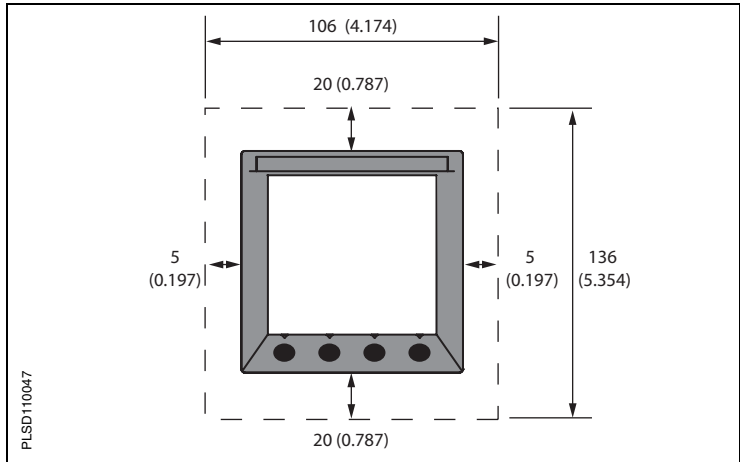
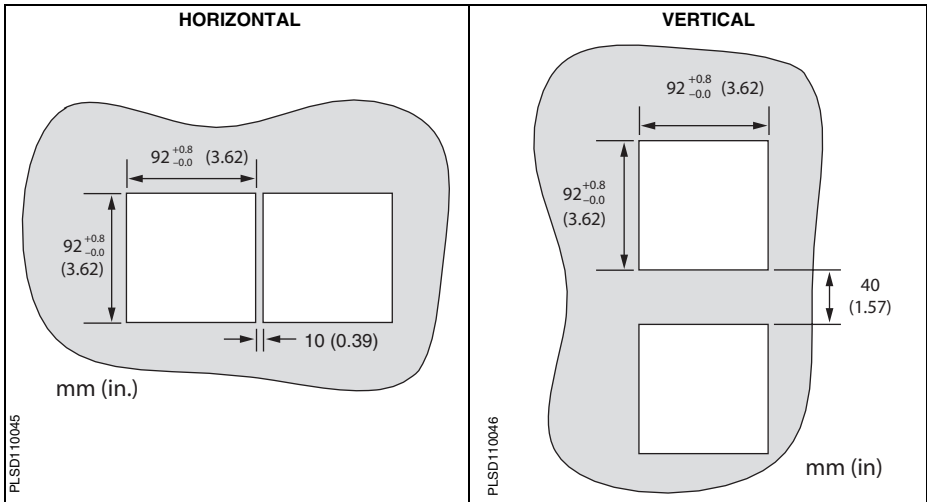


Figure 3–3: Clearances for mounting multiple power meters

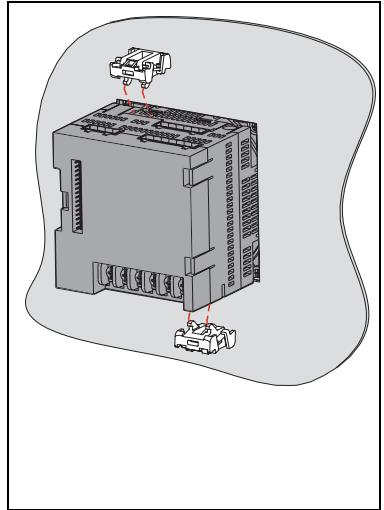


Mounting a Power Meter with an Integrated Display

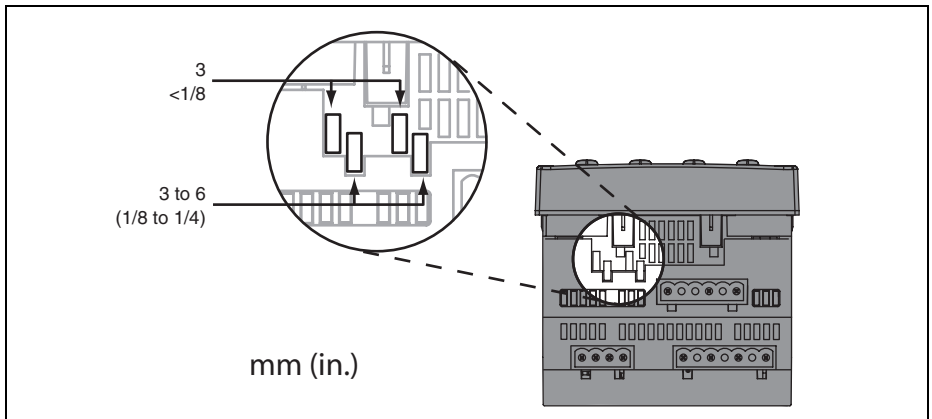
1. Refer to “Installation Considerations” on page EN-13, “Dimensions” on page EN-15, and “Mounting” on page EN-15.
2. Using the template included with the power meter, make a square cut-out 3.622 in. x 3.622 in. (92 mm x 92 mm).
3. Insert the power meter through the cut-out.
4. Attach the two retainer clips to the power meter as shown.

There are two sets of retainer slots. The first set is for installation locations thinner than 1/8 in. (3 mm). The second set is for installation locations 1/8 in. to 1/4 in. (3 to 6 mm).

NOTE: Use on a flat surface of a protective enclosure (for example, in the USA use a NEMA Type 1 rated enclosure or better).



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Replacing Analog Meters

ENGLISH

CAUTION

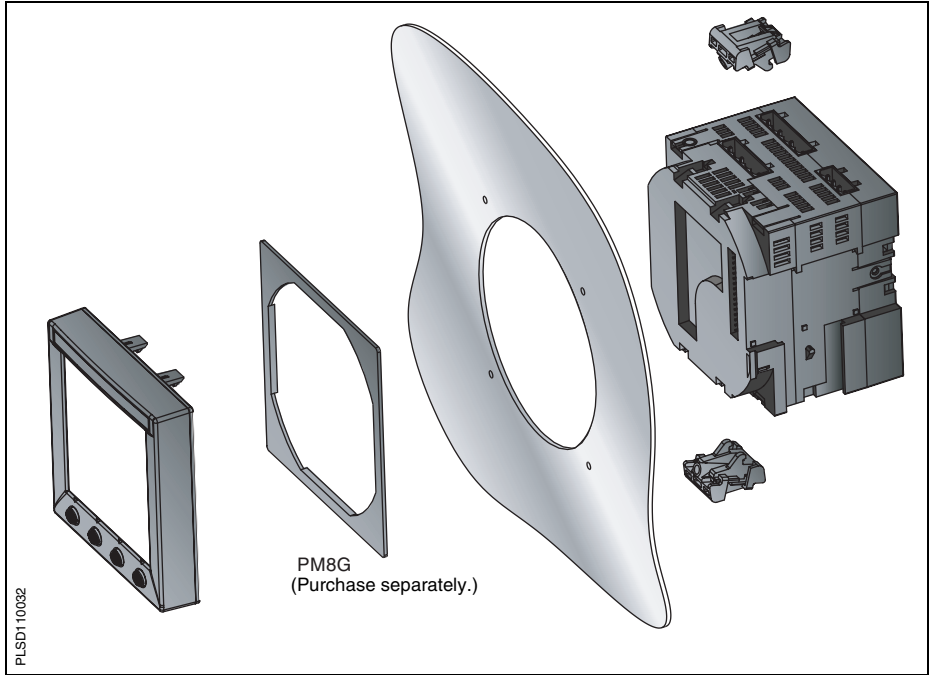
ESD-SENSITIVE EQUIPMENT

You must ground yourself and discharge any static charge before removing or attaching the display.

Failure to follow this instruction can result in equipment damage.

1. Refer to “Installation Considerations” on page EN–13, “Dimensions” on page EN–15, and “Mounting” on page EN–15.
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. Ground yourself and discharge any static charge.
4. 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 front of the power meter display 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 adjacent clip and the clips on the other side.
 - d. Gently pull the display off of the power meter.
5. Place the power meter behind the round cut-out.
6. Replace the display onto the power meter. The clips on the top and bottom of the display will securely snap into place.
7. Attach the two retainer clips to the power meter.

Figure 3–4: Installing a power meter into an existing 4.5 in. round cut-out

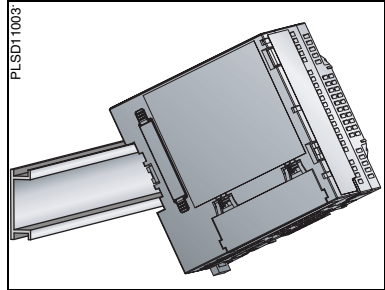


Power Meter Without Display

DIN Rail Mounting

1. Refer to “Installation Considerations” on page EN-13.
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 (see Table 1-5 on page EN-6 for a list of models).



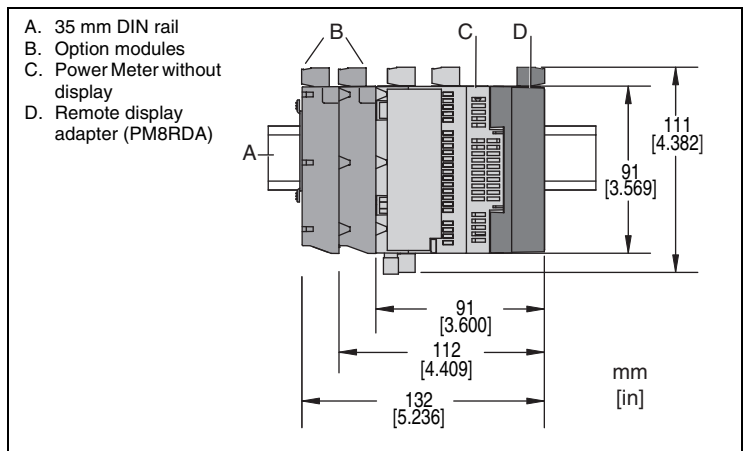
Power Meter With Remote Display

This section explains how to install a remote display and a remote display adapter. A Power Meter without a display (PM8XXU models) can be used with a remote display kit (PM8RD).

PM8RDA Dimensions

NOTE: Refer to “Installation Considerations” on page EN-13, “Dimensions” on page EN-15, and “Mounting” on page EN-15 for additional information

Figure 3–5: PM8RDA Dimensions



PM8RDA Installation

CAUTION

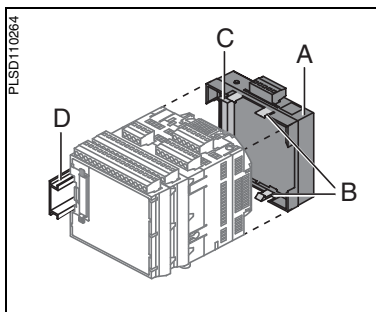
ESD-SENSITIVE EQUIPMENT

You must ground yourself and discharge any static charge before removing or attaching the display.

Failure to follow this instruction can result in equipment damage.

- A. PM8RDA
- B. Snap hooks
- C. Connector
- D. 35 mm DIN rail

1. Guide the adapter onto the DIN rail, align the 4 snap hooks, and connect them to the meter.
2. Press the adapter onto the meter until it snaps into place.



PM8RD Dimensions and Mounting Options

NOTE: Refer to “Installation Considerations” on page EN-13, “Dimensions” on page EN-15, and “Mounting” on page EN-15 for additional information

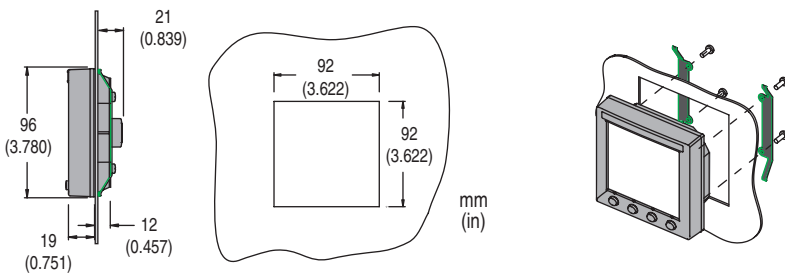
⚠ DANGER

HAZARD OF ELECTRIC SHOCK, BURN, OR ARC FLASH

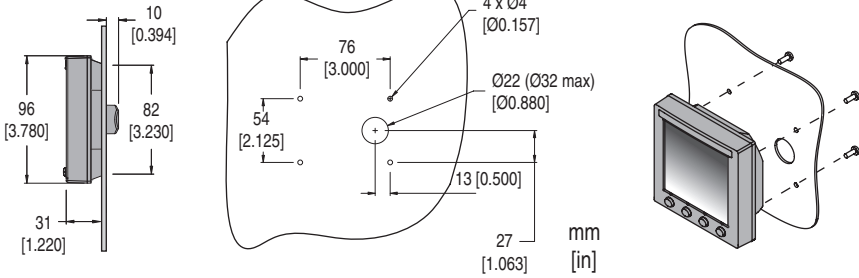
- Apply personal protective equipment (PPE) and follow safe electrical work practices. For example, in the USA, see NFPA 70E.
- Only qualified workers should install and wire the power meter. Perform this work only after completely reading the installation and wiring chapters.
- Turn off all power supplying 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.

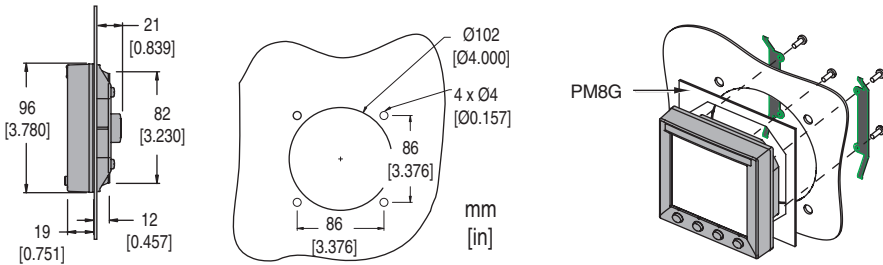
Square Cutout



Surface Mount for CM3000/CM4000 Display Retrofit



Replacing Analog Meters




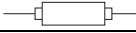


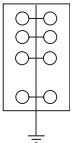


CHAPTER 4—WIRING

Introduction

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

The following symbols are used in the diagrams:

Table 4–1: Wiring Diagram Symbols

Symbol	Description
	Voltage disconnect switch
	Fuse
	Earth ground
	Current transformer
	Shorting block
	Potential transformer US equivalent: 

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 4–2: Voltages Less Than or Equal to 347Vac L-N/600Vac L-L, Direct Connect No PTs

Single- or Two-Phase Wiring								
Number of Wires	CTs		Voltage Connections			Meter Configuration		Figure Number
	Qty.	ID	Qty.	ID	Type	System Type	PT Primary Scale	
2	1	I1	2	V1, Vn	L-N	10	No PT	4–1
2	1	I1	2	V1, V2	L-L	11	No PT	4–2
3	2	I1, I2	3	V1, V2, Vn	L-L with N	12	No PT	4–3
Three-Phase Wiring *								
3	2	I1, I3	3	V1, V2, V3	Delta	30	No PT	4–4
	3	I1, I2, I3	3	V1, V2, V3	Delta	31	No PT	4–5
4	3	I1, I2, I3	3	V1, V2, V3, Vn	4-wire Delta	40	No PT	4–6
	3	I1, I2, I3	3	V1, V2, V3, Vn	Wye	40	No PT	4–6

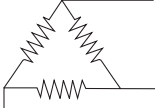
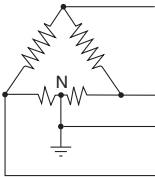
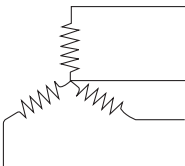
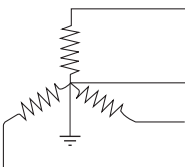
* See Table 4–4 on page EN–27 for system type wiring diagrams.

Table 4–3: Voltages Greater Than 347 Vac L-N/600 Vac L-L

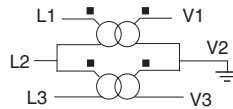
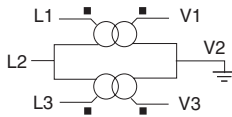
Three-Phase Wiring *								
Number of Wires	CTs		Voltage Connections			Meter Configuration		Figure Number
	Qty.	ID	Qty.	ID	Type	System Type	PT Primary Scale	
3	2	I1, I3	2	V1, V3 (V2 to Ground)	Delta	30	Based on voltage	4–7
	3	I1, I2, I3	2	V1, V3 (V2 to Ground)	Delta	31	Based on voltage	4–8
4	3	I1, I2, I3	3	V1, V2, V3, (Vn to Ground)	Grounded Wye	40	Based on voltage	4–9
	3	I1, I2, I3	2	V1, V3 (Vn to Ground)	Wye	42	Based on voltage	4–10
	2	I1, I2, I3	3	V1, V2, V3 (Vn to Ground)	Grounded Wye	40	Based on voltage	4–11

* See Table 4–4 on page EN–27 for system type wiring diagrams.

Table 4-4: System Type Wiring Diagrams

Diagram	System Type
	Delta
	4-wire Delta
	Wye
	Grounded Wye

NOTE: In 2 PT systems, these connections are equivalent.



Wiring Diagrams

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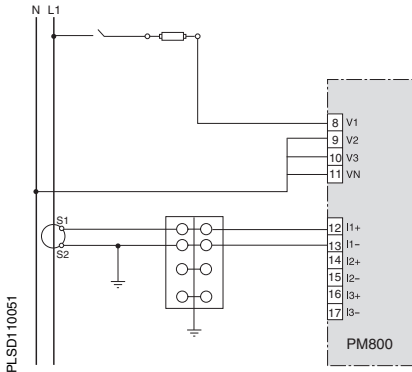
DANGER

HAZARD OF ELECTRIC SHOCK, BURN, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. For example, in the United States, see NFPA 70E.
- This equipment must only be installed and serviced by qualified electrical personnel.
- 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 verify that the power is off.
- Never short the secondary of a PT.
- Never open circuit a CT; use the shorting block to short circuit the leads of the CT before removing the connection from the power meter.

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

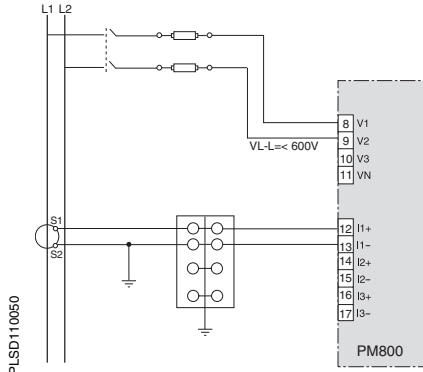
Figure 4–1: 1-Phase Line-to-Neutral 2-Wire System 1 CT



NOTES:

- To avoid distortion, use parallel wires for control power and voltage inputs. Keep the fuse close to the power source.
- Use system type 10.

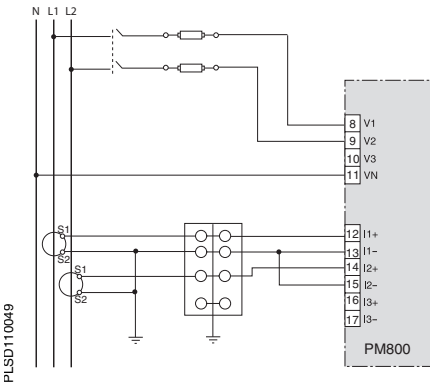
Figure 4–2: 2-Phase Line-to-Line 2-Wire System 1 CT



NOTES:

- To avoid distortion, use parallel wires for control power and voltage inputs. Keep the fuses close to the power source.
- Use system type 11.

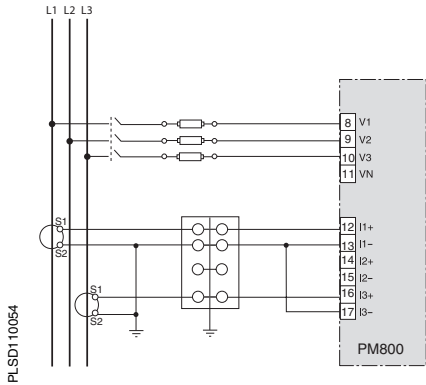
Figure 4–3: 2-Phase 3-Wire Direct Voltage Connection 2 CT



NOTE:

- To avoid distortion, use parallel wires for control power and voltage inputs. Keep the fuses close to the power source.
- Use system type 12.

Figure 4–4: 3-Phase 3-Wire 2 CT no PT

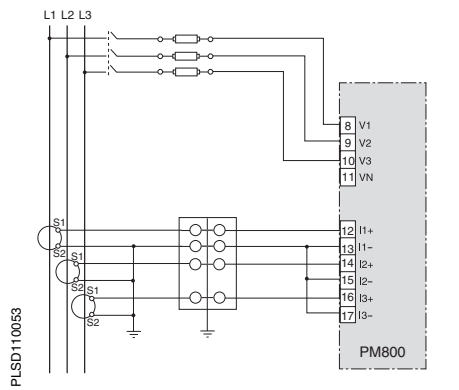


NOTES:

- Use system type 30.

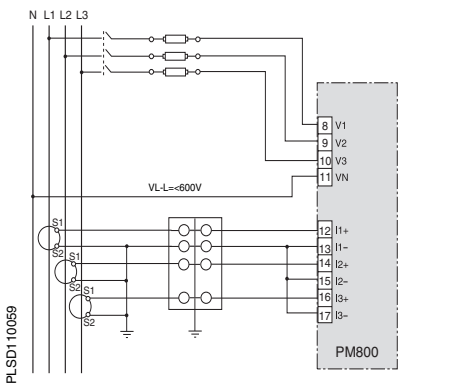
ENGLISH

Figure 4-5: 3-Phase 3-Wire 3 CT no PT



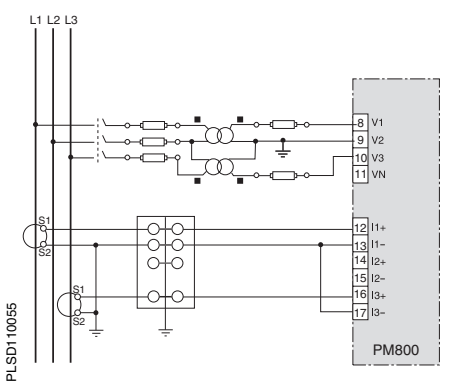
- NOTES:
- Use system type 31.

Figure 4-6: 3-Phase 4-Wire Wye Direct Voltage Input Connection 3 CT



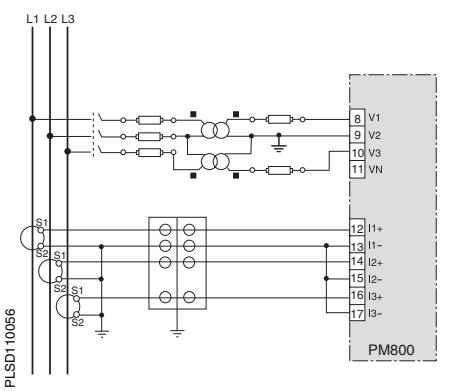
- NOTES:
- Use with 480Y/277 V and 208Y/120 V systems.
 - Use system type 40.

Figure 4-7: 3-Phase 3-Wire Delta Connection 2 CT 2 PT



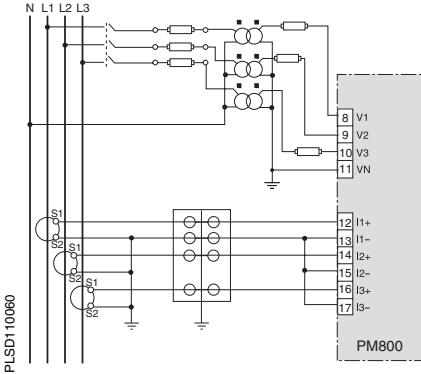
- NOTES:
- For an open delta PT connection with 120 V L-L secondaries, use system type 30.
 - Pay close attention to polarity marks when connecting CTs (S1, S2) and PTs (■ =X₁).

Figure 4-8: 3-Phase 3-Wire Delta Connection 3CT 2PT



- NOTES:
- Use System type 31.
 - For an open delta PT connection with 120 V L-L secondaries, use system type 31.
 - Pay close attention to polarity marks when connecting CTs (S1, S2) and PTs (■ =X₁).

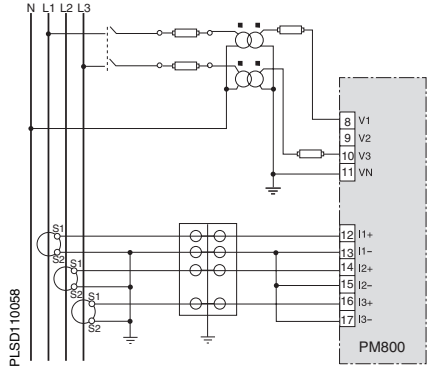
Figure 4–9: 3-Phase 4-Wire Wye Connection 3 CT 3 PT



NOTES:

- Use system type 40.
- Pay close attention to polarity marks when connecting CTs (S1, S2) and PTs (■ =X₁).

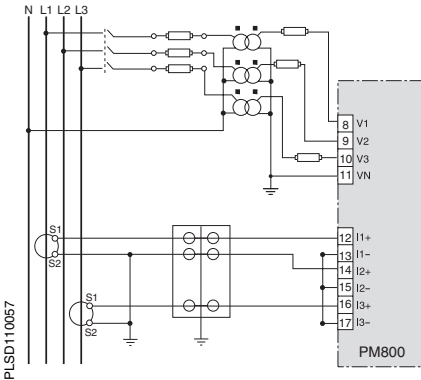
Figure 4–10: 3-Phase 4-Wire Wye 3CT 2PT (for balanced voltage)



NOTES:

- Use system type 42.
- Pay close attention to polarity marks when connecting CTs (S1, S2) and PTs (■ =X₁).

Figure 4–11: 3-Phase 4-Wire Wye 3-wire 3 PT 2 CT (for balanced 3-wire loads)



NOTES:

- Use system type 40.
- Neutral current readings will be reported as zero.
- Pay close attention to polarity marks when connecting CTs (S1, S2) and PTs (■ =X₁).

Figure 4–12: Direct Connect Control Power (Phase to Phase)

Phase to Phase only when
voltage < $415 \pm 10\%$ VAC max.

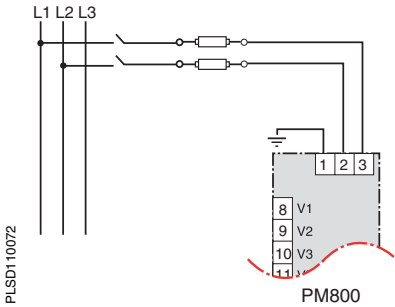


Figure 4–13: Direct Connect Control Power (Phase to Neutral)

Phase to Neutral only when
voltage < $415 \pm 10\%$ VAC max.

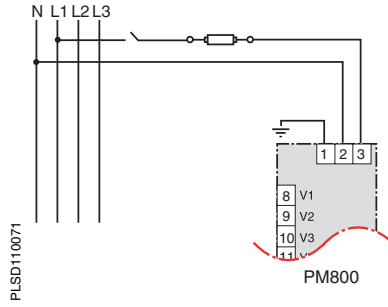


Figure 4–14: Direct Connect Control Power (DC Control Power)

DC Control Power
 $100 \text{ Vdc} < V < 300 \text{ Vdc}$

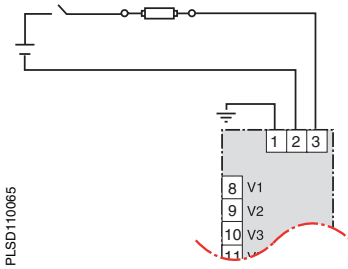


Figure 4–15: Control Power Transformer Connection

Control Power Transformer
120 or 240 Vac Secondary 50 Va max.

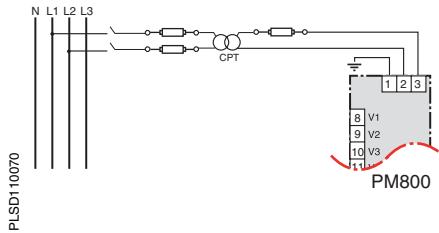
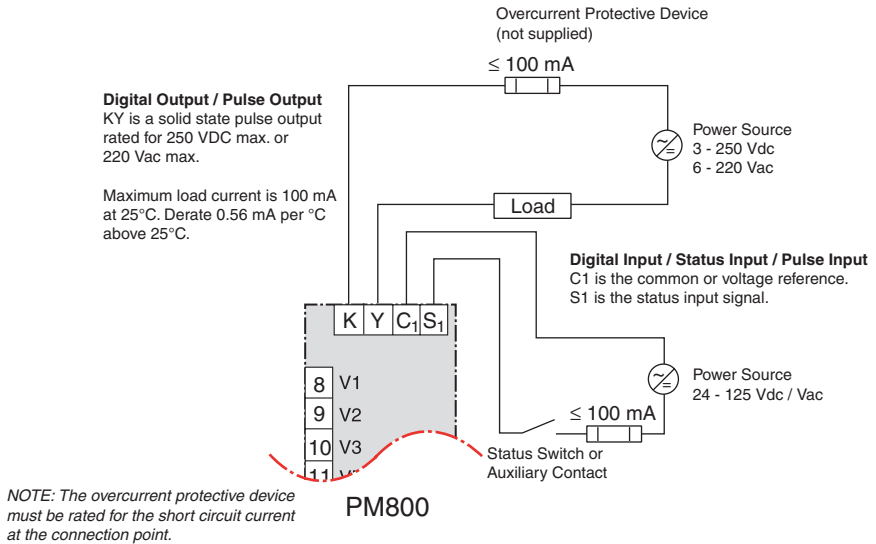


Table 4–5: Fuse Recommendation

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

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

Figure 4–16: Standard Input/Output Wiring



CAUTION

VOLTAGE TRANSIENTS OVER 500 V CAN DAMAGE DIGITAL INPUTS

- Do not use digital inputs to directly monitor circuits with highly inductive loads.
- Use auxiliary contacts and isolated power supply when monitoring inductive loads.

Failure to follow this instruction will result in equipment damage.

Switching of inductive devices such as relay coils and motors results in high voltage transients from back electromotive force (EMF). To monitor this type of circuit, use an isolated power supply, such as the 24 Vdc power supply included with the PM8M26, and an auxiliary contact on the circuit breaker or switch.

CHAPTER 5—COMMUNICATIONS

Onboard Communications Capabilities

Table 5–1: 2-wire, RS485 Port Capabilities

Communications Port	RS485: <ul style="list-style-type: none"> • 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.
Protocols	Modbus RTU Jbus 7-, 8-bit ASCII
Parity	ODD EVEN NONE

Table 5–2: 2-wire, RS485 Communications Distances

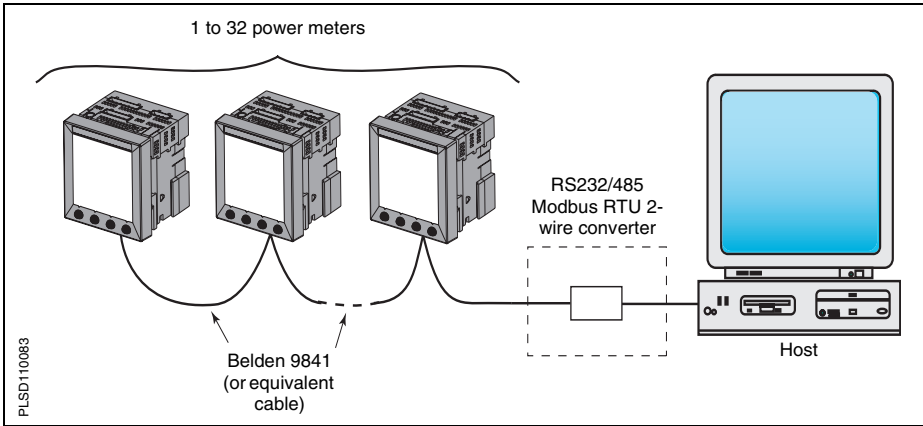
Baud Rate	Maximum Communication Distances	
	1 to 32 Devices	
	Feet	Meters
9600	8,000	2,438
19200	6,000	1,829
38400	3,000	914

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. Refer to the master device’s documentation for any additional distance limitations.

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Figure 5-1: Power meters with integrated displays connected to a PC serial port through the onboard 2-wire RS485 port



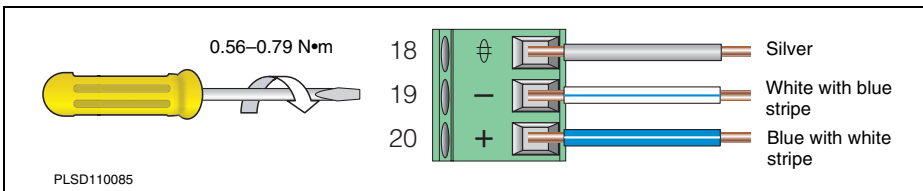
Daisy-chaining Devices to the Power Meter

The RS485 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 RS485 port on the power meter. To connect to the power meter, follow these steps:

1. Strip 0.25 in. (6 mm) of insulation from both ends of the cable wires and insert one end 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).

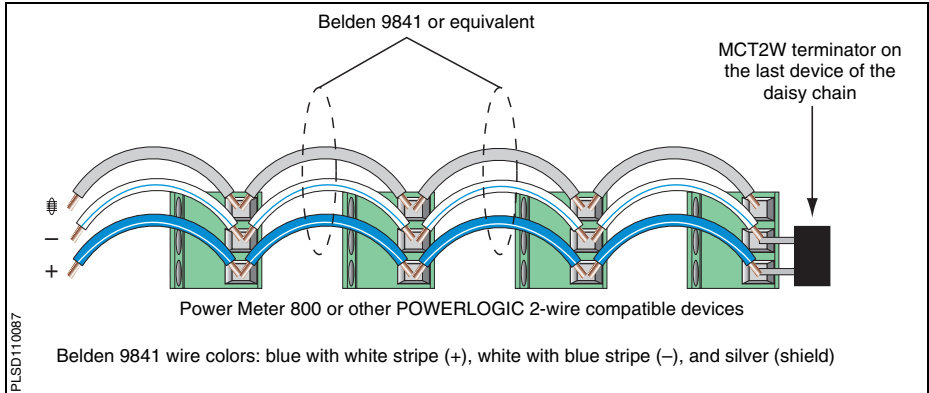
Figure 5-2: RS485 connection



2-wire Devices

To daisy-chain the power meter to another 2-wire POWERLOGIC device, wire the power meter's RS485 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

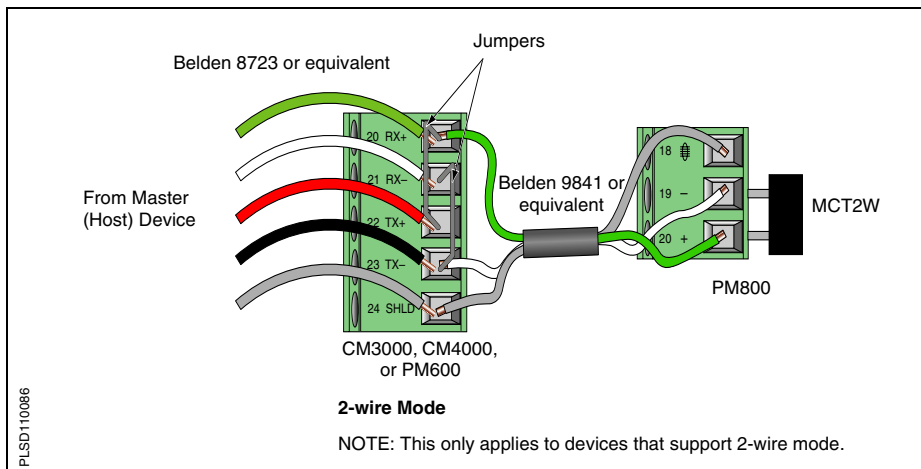


- If the power meter is the first device on the daisy chain, connect it to the host device using the MCI-101 kit (or equivalent RS232 to RS422/RS485 converter). See “Connecting the First Device” on page EN–38 in this chapter for instructions.
- If the power meter is the last device on the daisy chain, terminate it. See “Terminating the Communications Link” on page EN–38 in this chapter for instructions.
- See Table 5–2 on page EN–35 for the maximum daisy-chain communications distances for 2-wire devices.

4-wire Devices for 2-wire Modbus or Jbus

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

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



Connecting the First Device

If the power meter is the first device on the daisy chain, refer to Figure 5–4.

Terminating the Communications Link

For proper RS485 communications performance, you must terminate the last device on the communications link using the MCT2W terminator, which inserts directly into the connector in the RS485 port of the power meter as illustrated in Figure 5–3 on page EN–37.

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.

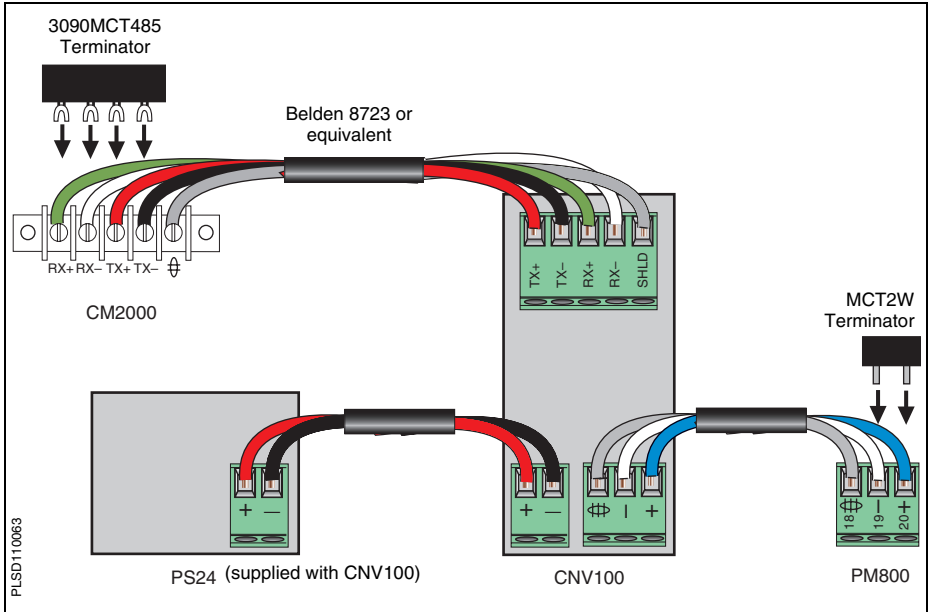
Using the MCT2W Terminator

To terminate the power meter using the MCT2W terminator, insert the wires of the terminator directly into terminals 19 and 20 of the RS485 communications connector on the power meter as shown in Figure 5–3.

Connecting to a 4-Wire Daisy Chain (CM2000)

When wiring a power meter to a 4-wire daisy chain supporting a CM2000, you will need to use a 4- to 2-wire converter.

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

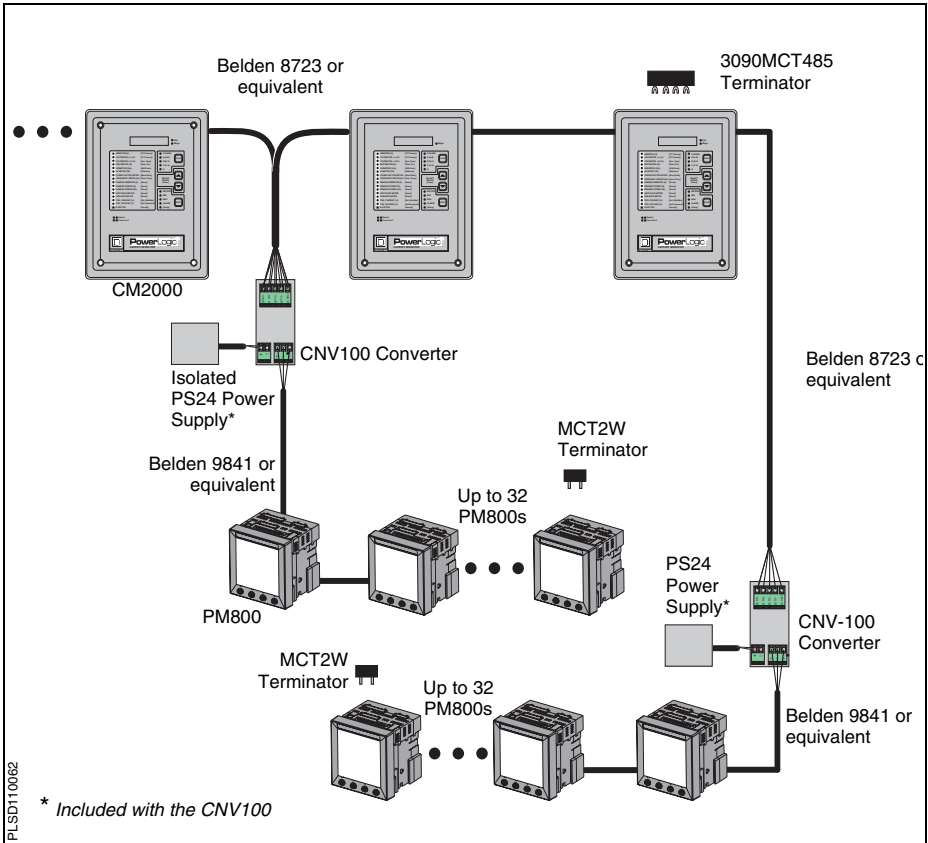


Notes:

- CM2000 to CNV100:
CM2000 (RX+ = Green, RX- = White, TX+ = Red, TX- = Black, Shield = Gray)
- PS24 to CNV100: + = Red, - = Black
- CNV100 to PM800: Shield = Gray, - = White with blue stripe, + = Blue with white stripe

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Figure 5-6: Connect Power Meters with integrated displays to a 4-wire daisy chain (Series 2000 Circuit Monitor)

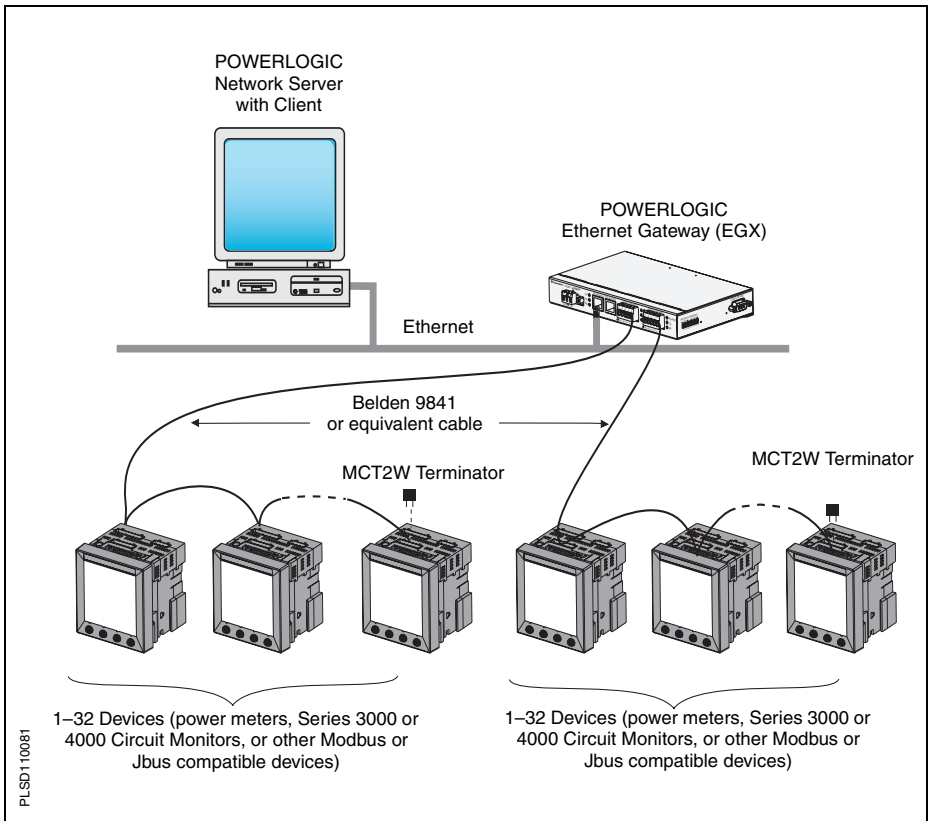


Connecting to an Ethernet Gateway (EGX)

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 5-7: Power meters connected to Ethernet using a POWERLOGIC Ethernet Gateway



Power Meter With Remote Display Communications Capabilities

The communications port on the remote display adapter can be configured to operate as a 2-wire, RS485 port; a 4-wire, RS485 port; or a RS232 port.

NOTE: The 4-wire, RS485 configuration is useful for integrating Power Meters into existing 4-wire, RS485 daisy chains because extra converters (CNV100) are not required.

Table 5–3: RS485 Port Capabilities

	2-wire	4-wire
Communications Port	<ul style="list-style-type: none"> • 2-wire with shield • EIA compliant • Allows the power meter to be connected to a daisy-chain of up to 32 devices 	<ul style="list-style-type: none"> • 4-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	9600 19200 38400
Communications Distances	See Table 5–4.	See Table 5–4.
Protocols	Modbus RTU Jbus 7-, 8-bit ASCII	Modbus RTU Jbus 7-, 8-bit ASCII
Parity	ODD EVEN NONE	ODD EVEN NONE

Table 5–4: 2-wire, RS485 Communications Distances

Baud Rate	Maximum Communication Distances	
	1 to 32 Devices	
	Feet	Meters
9600	8,000	2,438
19200	6,000	1,829
38400	3,000	914


NOTE: Distances listed should be used as a guide only and cannot be guaranteed for non-POWERLOGIC devices. Refer to the master device's documentation for any additional distance limitations.

Table 5–5: 4-wire, RS485 Communications Distances

Baud Rate	Maximum Communication Distances	
	1 to 16 Devices	17 to 32 Devices
9600	3,048 m (10,000 ft.)	1,219 m (4,000 ft.)
19200	1,548 m (5,000 ft.)	762 m (2,500 ft.)
38400	1,524 m (5,000 ft.)	762 m (2,500 ft.)

NOTE: Distances listed should be used as a guide only and cannot be guaranteed for non-POWERLOGIC devices. Refer to the master device's documentation for any additional distance limitations.

Power Meter With Remote Display Connections

 **DANGER**

HAZARD OF ELECTRIC SHOCK, BURN, OR ARC FLASH

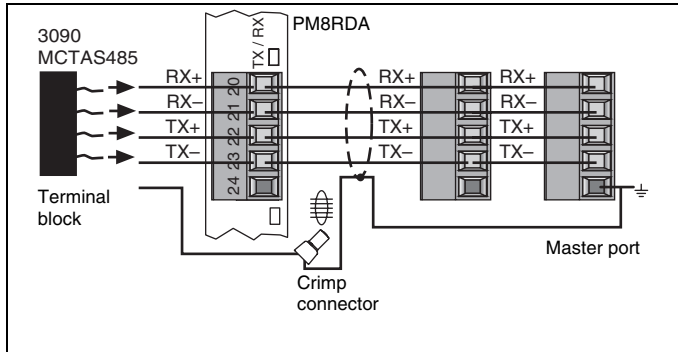
- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. For example, in the United States, see NFPA 70E.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Perform this work only after completely reading the installation 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 verify that the power is off.
- Never short the secondary of a PT.
- Never open circuit a CT; use the shorting block to short circuit the leads of the CT before removing the connection from the power meter.

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

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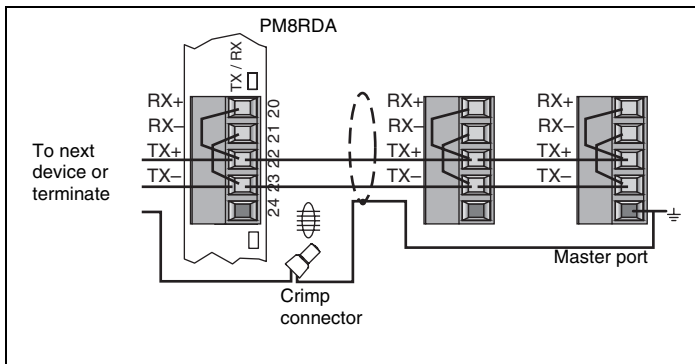
RS485, 4-wire

- Use Belden 8723, 9842, or equivalent
 - RX+ Green, RX- White
 - TX+ Red, TX- Black
 - Shield Silver (use crimp connector).
- For Belden 9842
 - RX+ Blue/White stripe
 - RX- White/Blue stripe TX+ Orange/White stripe
 - TX- White/Orange stripe
- Connect shield to earth ground at the master port **only**.
- If the display is the last device, terminate it with 3090MCTAS485 terminator (not included).



RS485, 2-wire

- Use Belden 9841 or equivalent.
 - TX+ Blue
 - TX- White
- Jumper RX+ to TX+ and RX- to TX-
- See "Communications" on page EN-35 for more information about RS485, 2-wire connections.



RS232 Mode

To connect the power meter to a computer, follow the instructions below:

1. Make the RS232 connections from the serial RS232 port on the computer to the RS232 port on the PM8RDA.
2. Apply control power to the meter **only**.
3. To change to RS232 mode, press and hold the mode button until the LED is lit. LED is lit in RS232 mode.

NOTE: Communications mode default is RS485. LED is unlit.

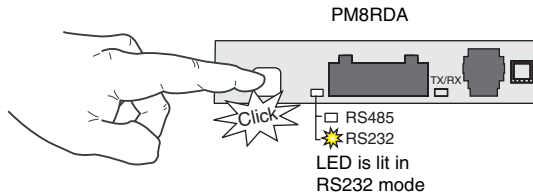
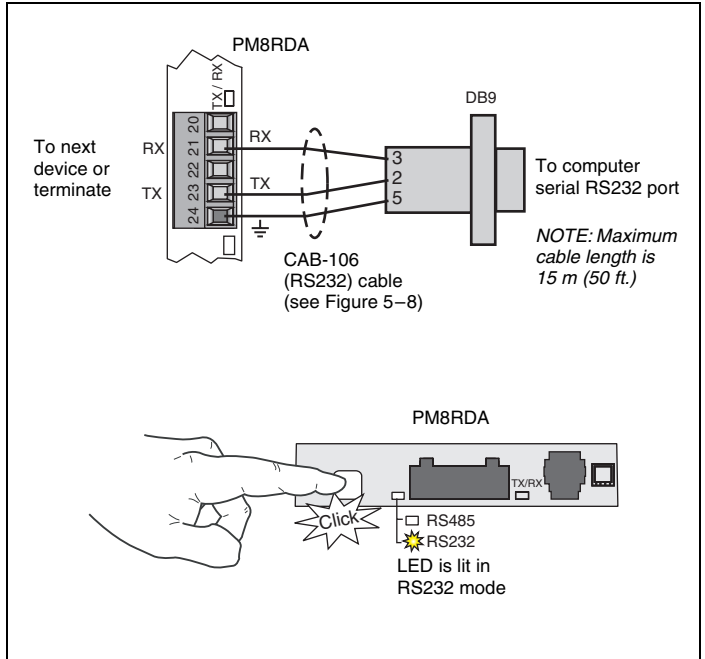
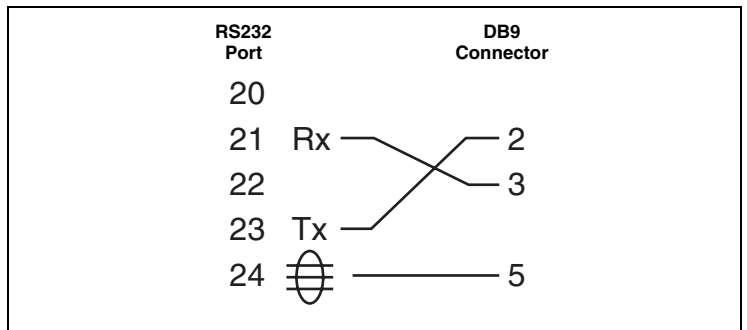


Figure 5–8: CAB-106 (RS232) cable pinout



CHAPTER 6—OPERATION

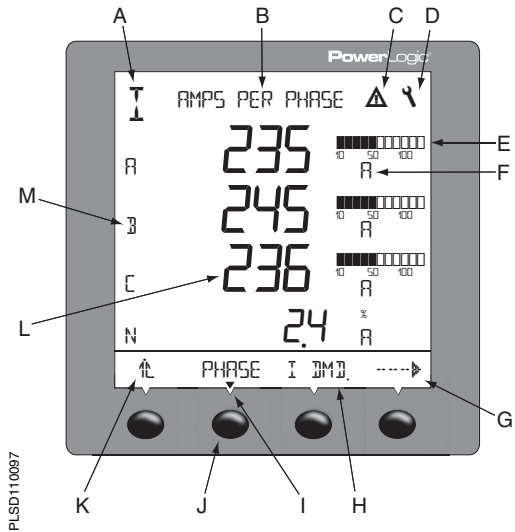
This section explains how to use a display with a power meter. For a list of all power meter models using an integrated display or a remote display, see Table 1–5 on page EN–6.

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. Units
- G. Display more menu items
- H. Menu item
- I. Selected menu indicator
- J. Button
- K. Return to previous menu
- L. Values
- M. 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 and release the appropriate button beneath the menu item. For example, if you are asked to “Press PHASE,” you would press and release 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.


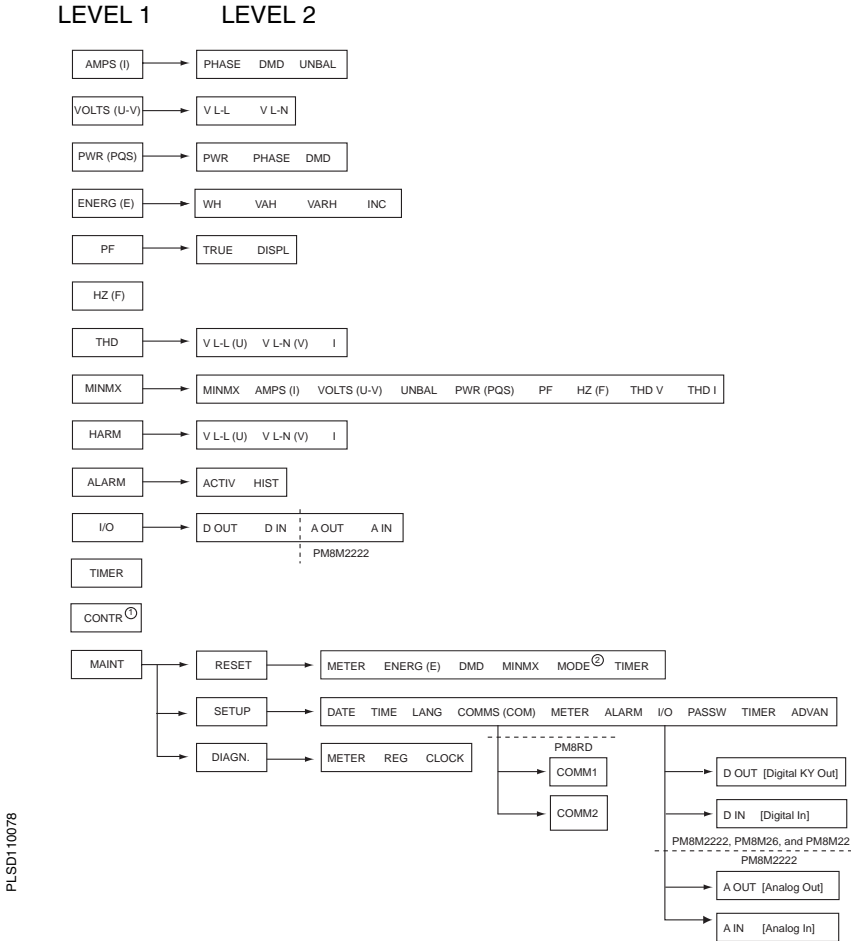
NOTE: The  is used to scroll through all menu items on a level.

Figure 6–2: Abbreviated List of PM820(RD), PM850(RD), and PM870(RD) Menu Items



① Available with some models.

② IEC is the default for Merlin Gerin branded power meters, and IEEE is the default mode for Square D branded power meters.

CHAPTER 7—MINIMUM SETUP

Set Up the Power Meter

This section explains how to setup a Power Meter using a display. To configure a Power Meter without a display use System Manager Software (SMS).

NOTE: If you are setting up the Power Meter using SMS, it is recommended you set up communications first. The default settings are 1) Protocol: Modbus RTU, 2) Address: 1, 3) Baud rate: 9600, and 4) Parity: Even.

To begin power meter setup, do the following:

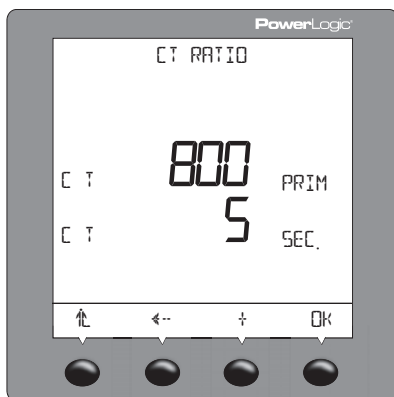
1. Scroll through the Level 1 menu list until you see MAINT.
2. Press MAINT.
3. Press SETUP.
4. Enter your password.

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 \rightarrow until METER is visible.
2. Press METER.
3. Press CT.
4. Enter the PRIM (primary CT) number.
5. Press OK.
6. Enter the SEC. (secondary CT) number.
7. Press OK.
8. Press \uparrow until you are asked to save your changes.
9. Press YES to save the changes.



PLSD110106

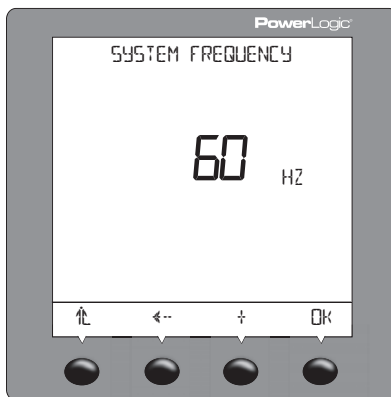
Set Up PTs

1. Press \rightarrow until METER is visible.
2. Press METER.
3. Press PT.
4. Enter the SCALE value: x1, x10, x100, NO PT (for direct connect).
5. Press OK.
6. Enter the PRIM (primary) value.
7. Press OK.
8. Enter the SEC. (secondary) value.
9. Press OK.
10. Press \uparrow until you are asked to save your changes.
11. Press YES to save the changes.



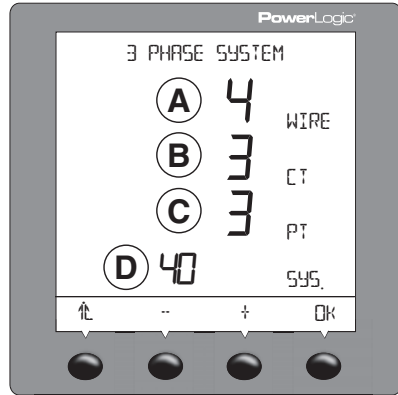
Set Up Frequency

1. Press \rightarrow until METER is visible.
2. Press METER.
3. Press \rightarrow until HZ is visible.
4. Press HZ.
5. Select the frequency.
6. Press OK.
7. Press \uparrow until you are asked to save your changes.
8. Press YES to save the changes.



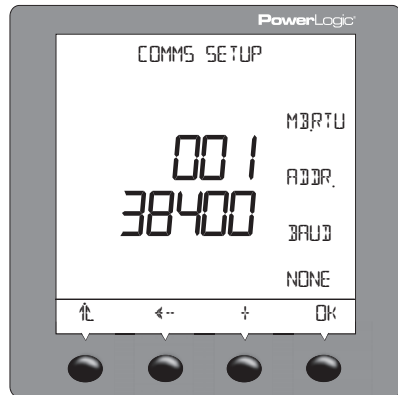
Set Up the Meter System Type

1. Press \rightarrow until METER is visible.
2. Press METER.
3. Press \rightarrow until SYS is visible.
4. Press SYS.
5. Select your system type based on the (A) number of wires, (B) number of CTs, (C) the number of voltage connections (either direct connect or with PT), and (D) the SMS system type.
6. Press OK.
7. Press \uparrow until you are asked to save your changes.
8. Press YES to save the changes.



Power Meter With Integrated Display Communications Setup



1. Press \rightarrow until COMMS (communications) is visible.
2. Press COMMS (communications).
3. Select the protocol: MB.RTU (Modbus RTU), Jbus, MB. A.8 (Modbus ASCII 8 bits), MB. A.7 (Modbus ASCII 7 bits).
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 \uparrow until you are asked to save your changes.
12. Press YES to save the changes.



PLSD110100



Power Meter With Remote Display Communications Setup

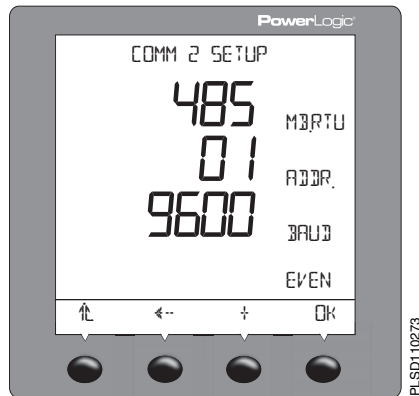
Comm1 Setup

1. Press  until COMMS (communications) is visible.
2. Press COMM1 (communications).
3. Select the protocol: MB.RTU (Modbus RTU), Jbus, MB. A.8 (Modbus ASCII 8 bits), MB. A.7 (Modbus ASCII 7 bits).
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  until you are asked to save your changes.
12. Press YES to save the changes.



Comm2 Setup

1. Press  until COMMS (communications) is visible.
2. Press COMM2 (communications).
3. Select the protocol: MB.RTU (Modbus RTU), Jbus, MB. A.8 (Modbus ASCII 8 bits), MB. A.7 (Modbus ASCII 7 bits).
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  until you are asked to save your changes.
12. Press YES to save the changes.



CHAPTER 8—MAINTENANCE AND TROUBLESHOOTING

Introduction

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

The power meter does not 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, EXPLOSION, OR ARC FLASH

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 equipment damage.

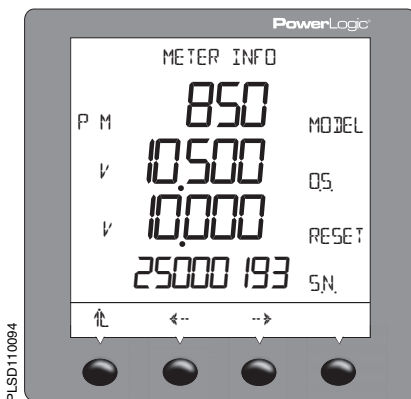
Power Meter Memory

The power meter uses its nonvolatile memory 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 10 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 \rightarrow until MAINT is visible.
2. Press MAINT.
3. Press DIAG.
4. Press METER.
The number next to O.S. is the firmware version. In this example, 10.500 is the firmware version.
5. After you're finished, press \uparrow 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 \leftarrow until MAINT is visible.
2. Press MAINT.
3. Press SETUP.
4. Enter your password, then press OK.
5. Press \leftarrow until LANG is visible.
6. Press LANG.
7. Select the language: ENGL, SPAN, or FREN.
8. Press OK.
9. Press \uparrow .
10. Press YES to save your changes.



Technical Support

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

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 your local Square D/Schneider Electric sales representative for assistance.

DANGER

HAZARD OF ELECTRIC SHOCK, BURN, OR ARC FLASH

- Apply personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E.
- This equipment must be installed and serviced only by qualified personnel.
- 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.
- 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.

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

Heartbeat LED

The heartbeat LED helps to troubleshoot the power meter. The LED works as follows:

- **Normal operation** — the LED flashes at a steady rate during normal operation.
- **Communications** — the LED flash rate changes as the communications port transmits and receives data. If the LED flash rate does not change when data is sent from the host computer, the power meter is not receiving requests from the host computer.
- **Hardware** — if the heartbeat LED remains lit and does not flash ON and OFF, there is a hardware problem. Do a hard reset of the power meter (turn OFF power to the power meter, then restore power to the power meter). If the heartbeat LED remains lit, contact your local sales representative.
- **Control power and display** — if the heartbeat LED flashes, but the display is blank, the display is not functioning properly. If the display is blank and the LED is not lit, verify that control power is connected to the power meter.

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 maintenance icon is illuminated, go to DIAGNOSTICS > MAINTENANCE . Error messages display to indicate the reason the icon 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.	<ul style="list-style-type: none"> • 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 blinking. • Check the fuse.

Table 8–1: Troubleshooting

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 EN–51 for setup instructions.
	Incorrect voltage inputs.	Check power meter voltage input terminals L (8, 9, 10, 11) 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 EN–28. Initiate a wiring check using SMS.
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 “Power Meter With Integrated Display Communications Setup” on page EN–53 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 “Power Meter With Integrated Display Communications Setup” on page EN–53 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 EN–38 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.

APPENDIX A—SPECIFICATIONS

Power Meter 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	5 M Ohm
Metering Frequency Range	45–67 Hz, 350–450 Hz
Metering Category	III
Accuracy	
Current	±[0.075% Reading + 0.025% full scale] ①
Voltage	±[0.075% Reading + 0.025% full scale] ②
Power	±[0.15% Reading + 0.025% full scale] ③
True Power Factor	±0.002 to 0.500 leading and ±0.002 to 0.500 lagging
Frequency	±0.01 Hz at 45–67 Hz ±0.01 Hz at 350–450 Hz
Energy:	
Active	IEC 62053-22 and ANSI C12.20 Class 0.5S
Reactive	IEC 62053-23 Class 2

Specifications based on 50/60 Hz nominal systems.

- ① Full scale = 10A. Add 0.006%/(°C - 25) to the upper limit error for temperatures below 25°C.
- ② Full scale = 600V. Add 0.001%/(°C) to the upper limit error for temperatures above 50°C.
- ③ Full scale = 120V x 10A. Add 0.006%/(°C) to the upper limit error for temperatures below 25°C.
- ④ Requires 5°C derating when using the display and control power above 305 Vac.
- ⑤ Derate load current 0.56 mA per °C above 25°C.

Table A-1: Specifications

Sampling	
Technique	Zero blind (takes samples from every cycle)
Samples per cycle	128
Harmonic Resolution	
Metered Values	63rd harmonic
Waveform Capture (PM850, PM870)	
Capture Initiation	Manual or alarm
Cycles Captured	PM850: 3 cycles at 128 samples/cycle PM870: Configurable. From 185 cycles on one channel at 16 samples/cycle to 3 cycles on six channels at 128 samples/cycle. See Chapter 9—Waveform Capture in the PM800 Reference Manual for more information.
Maximum Captures	5
I/O	
Standard KY output	
Load Voltage	3–250 ±10% Vdc 6–220 ±10% Vac
Isolation	1350 Vrms isolation
Load Current	100 mA max. at 25°C ⑤
Maximum Output Frequency	25 Hz
ON Resistance	50 Ohms maximum
Leakage Current	0.03 µA (typical)
Turn ON/OFF Time	3 ms
Standard Digital Input	
Turn on voltage	24–125 ±10% Vac/Vdc
Turn off voltage	5 V
Maximum input frequency	25 Hz
Isolation	1350 Vrms
Burden	< 5 mA

Specifications based on 50/60 Hz nominal systems.

- ① Full scale = 10A. Add 0.006%/(°C - 25) to the upper limit error for temperatures below 25°C.
- ② Full scale = 600V. Add 0.001%/(°C) to the upper limit error for temperatures above 50°C.
- ③ Full scale = 120V x 10A. Add 0.006%/(°C) to the upper limit error for temperatures below 25°C.
- ④ Requires 5°C derating when using the display and control power above 305 Vac.
- ⑤ Derate load current 0.56 mA per °C above 25°C.

Table A-1: Specifications

Control Power	
AC Control Power	
Operating Range	115–415 \pm 10% Vac
Burden	15 VA maximum with options
Frequency	45–67 Hz, 350–450 Hz
Ride Through	45 ms at 120 Vac
DC Control Power	
Operating Range	125–250 \pm 20% Vdc
Burden	10 W maximum with options
Ride Through	45 ms at 125 Vdc
Environment	
Operating Temperature	
Meter	-25°C to +70°C ④
Display	-10°C to +50°C
Operating Environment	
Relative Humidity	5–95% (non-condensing)
Maximum Elevation	3,000 m
Pollution Degree	2
IP Rating	
Meter	30
Display	52
<i>NOTE: The display must be mounted on a flat surface.</i>	
Regulatory/Standards Compliance	
Emissions	
Radiated	FCC part 15 Class A, EN55011
Conducted	FCC part 15 Class A, EN55011
Harmonics	IEC 61000-3-2
Flicker	IEC 61000-3-3

Specifications based on 50/60 Hz nominal systems.

- ① Full scale = 10A. Add 0.006%/(°C - 25) to the upper limit error for temperatures below 25°C.
- ② Full scale = 600V. Add 0.001%/(°C) to the upper limit error for temperatures above 50°C.
- ③ Full scale = 120V x 10A. Add 0.006%/(°C) to the upper limit error for temperatures below 25°C.
- ④ Requires 5°C derating when using the display and control power above 305 Vac.
- ⑤ Derate load current 0.56 mA per °C above 25°C.

Table A-1: Specifications

Immunity IEC 61000-6	
ESD	IEC 61000-4-2 Level 3
Radiated	IEC 61000-4-3 Level 3
EFT	IEC 61000-4-4 Level 3
Surges	IEC 61000-4-5 Level 3
Conducted	IEC 61000-4-6 Level 3
Magnetic Field	IEC 61000-4-8 Level 3
Voltage Dips	IEC 61000-4-11 Level
Standards (listed)	
USA	UL 61010 / IEC 61010
Europe	CE per EN 61010

Specifications based on 50/60 Hz nominal systems.

- ① Full scale = 10A. Add 0.006% (°C - 25) to the upper limit error for temperatures below 25°C.
- ② Full scale = 600V. Add 0.001% (°C) to the upper limit error for temperatures above 50°C.
- ③ Full scale = 120V x 10A. Add 0.006% (°C) to the upper limit error for temperatures below 25°C.
- ④ Requires 5°C derating when using the display and control power above 305 Vac.
- ⑤ Derate load current 0.56 mA per °C above 25°C.

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