PowerLogic power-monitoring units

Power Meter Series 800

Technical data sheet

2007

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Power Meter Series 800
Functions and characteristics
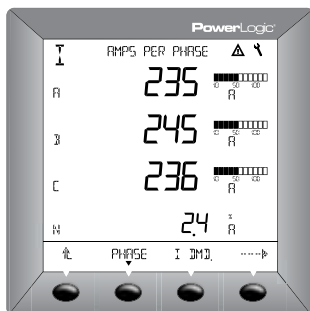
E90463

PB101813-51

Front view of Power Meter Series 800 meter with integrated display.

PB101823-50

Rear view of Power Meter Series 800 meter.

DB111799

Power Meter PM800 Series meter display screen showing bar graphs.

The PowerLogic Power Meter Series 800 offers many high-performance capabilities needed to meter and monitor an electrical installation in a compact 96 x 96 mm unit. All models include an easy-to-read display that presents measurements for all three phases and neutral at the same time, an RS-485 Modbus communication port, one digital input, one KY-type digital output, total harmonic distortion (THD) metering, and alarming on critical conditions. Four models offer an incremental choice of custom logging and power quality analysis capabilities. Expand any model with field-installable option modules that offer a choice of additional digital inputs and outputs, analog inputs and outputs, and *Transparent Ready* Ethernet port.

Applications
■ Panel instrumentation
■ Sub-billing, cost allocation and energy management
■ Remote monitoring of an electrical installation
■ Power quality analysis
■ Utility bill verification, utility contract optimization and load preservation.

Characteristics

Easy to install
Mounts using two clips, with no tools required. Direct connect the voltage inputs, with no need for potential transformers (PTs) up to 600 VAC.

Easy to operate
Intuitive navigation with self-guided, language-selectable menus.

System status at a glance
Large, anti-glare display with back-light provides summary screens with multiple values. Bar charts graphically represent system loading and I/O.

Custom alarming with time stamping
Over 50 alarm conditions, including over or under conditions, digital input changes, phase unbalance and more. The models PM850 and PM870 offer boolean logic that can be used to combine up to four alarms.

Power quality analysis
The PM800 series offers an incremental range of features for troubleshooting and preventing power quality related problems. All models offer THD metering. The PM810 with PM810LOG option and PM820 offer individual current and voltage harmonics readings. The PM850 and PM870 offer waveform capture (PM870 is configurable) and power quality compliance evaluation to the international EN50160 standard. The PM870 offers voltage and current disturbance (sag/swell) detection.

Extensive on-board memory
All models offer billing (energy and demand), maintenance, alarm and customizable data logs, all stored in non-volatile memory (PM810 requires PM810LOG option).

IEC 62053-22 class 0.5S accuracy for active energy
Accurate energy measurement for sub-billing and cost allocation.

Trend curves and short-term forecasting
The models PM850 and PM870 offer trend logging and forecasting of energy and demand readings to help compare load characteristics and manage energy costs.

Expandable I/O capabilities
Use the on-board or optional digital inputs for pulse counting, status/position monitoring, demand synchronization or control (gating) of the conditional energy metering. Use the on-board or optional digital outputs for equipment control or interfacing, controllable by internal alarms or externally through digital input status. Use the optional analog inputs and outputs for equipment monitoring or interfacing.

Metering of other utilities (WAGES)
All models offer five channels for demand metering of water, air, gas, electricity or steam utilities (WAGES) through the pulse counting capabilities of the digital inputs. Pulses from multiple inputs can be summed through a single channel.

Modular and upgradeable
All models offer easy-to-install option modules (memory, I/O and communications) and downloadable firmware for enhanced meter capabilities.

Remote display
The optional remote display can be mounted as far as 10 m from the metering unit. The adapter includes an additional 2- or 4-wire RS-485/RS-232 communication port.

Serial and Ethernet communications
All models include an RS-485 port supporting Modbus protocol (ASCII and RTU). An optional module provides Ethernet ModbusTCP/IP communications with e-mail on alarm, full function web server and Ethernet-to-serial line gateway functionality.

Power Meter Series 800
Functions and characteristics (cont.)

Power Meter Series 800 without display.

Power Meter Series 800 with integrated display.

Power Meter Series 800 with remote display.

Remote display adapter with display and cable.

Remote display adaptor alone.

Part Numbers

Description	
Power Meter without display	
Use the base meter unit without display to comply with voltage limitations for local regulations when door mounting is not possible, or when meter voltage exceeds regulations, or when local display is not required. When the meter is used without a display, configuration of the communications port is limited to the default (address 1, 9600 baud, parity even). Requires software to read data.	
PM810 power meter unit only, no display, basic instrumentation, THD, alarming, 80 kB logging (with PM810LOG)	**PM810UMG**
PM820 power meter unit only, no display, basic instrumentation, THD, alarming, 80 kB logging	**PM820UMG**
PM850 power meter unit only, no display, basic instrumentation, THD, alarming, 800 kB logging, waveform capture	**PM850UMG**
PM870 power meter unit only, no display, basic instrumentation, THD, alarming, 800 kB logging, configurable waveform capture and disturbance detection	**PM870UMG**

Power Meter with integrated display	
Use the meter with integrated display for panel mounting when door space is available and when voltage usage is within the local regulation limits.	
PM810 power meter with integrated display,	**PM810MG**
PM820 power meter with integrated display	**PM820MG**
PM850 power meter with integrated display	**PM850MG**
PM870 power meter with integrated display	**PM870MG**

Power Meter with remote display	
Conveniently packaged kit consist of a base meter (810, 820, 850 or 870) with a remote display, remote display adapter, and remote display cable 3.65 m (12 ft).	
PM810 power meter with remote display	**PM810RDMG**
PM820 power meter with remote display	**PM820RDMG**
PM850 power meter with remote display	**PM850RDMG**
PM870 power meter with remote display	**PM870RDMG**

Parts and accessories	
Remote display adapter with remote display and a 3.65 m (12 ft) cable Use this combination of remote display, adapter, and 3.65 m (12 ft) cable to equip a base meter unit for use with a remote display. In addition, the display can be carried from meter to meter, enabling you to purchase one display for multiple meters. Each base unit meter must be equipped with a remote display adapter (PM8RDA).	**PM8RDMG**
Remote display adapter alone When added to the front of the base unit (PM8xxU), the adapter brings two additional communication ports: one for the remote display and one 4-wire/2-wire RS 485/RS 232.	**PM8RDA**

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Power Meter PM870 with ECC module (bottom view showing connectors and configuration switches).

ECC module (front view)

*ECC module (side view showing LED indicators).*

PM8M26 module.

*Power Meter PM800 with PM8M22 and PM8M26 modules.*

Part Numbers - continued	
Description	
Optional modules	
Ethernet communication module provides a 10/100BaseTx UTP port, an RS-485 Modbus serial master port, Ethernet-to-serial line gateway functionality, and an embedded web server that is fully compliant with Transparent Ready - Level 1 (TRe1) systems.	**PM8ECC**
2 digital outputs (relays), 2 digital inputs	**PM8M22**
2 digital outputs (relays), 6 digital inputs	**PM8M26**
2 digital outputs (relays), 2 digital inputs, 2 analog outputs, 2 analog inputs	**PM8M2222**
PM810 optional logging module for on-board data recording, uses a non-volatile, battery-backed internal clock	**PM810LOG**
RJ11 Extender kit to mount RJ11 jack in panel door (for use with PM800, CM3000, and CM4000 series meters)	**RJ11EXT**
Cable for remote display adapter 1.25 m (4 ft)	**CAB4**
Cable for remote display adapter 3.65 m (12 ft)	**CAB12**
Cable for remote display adapter 9.14 m (30 ft)	**CAB30**

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Power Meter Series 800
Functions and characteristics (cont.)
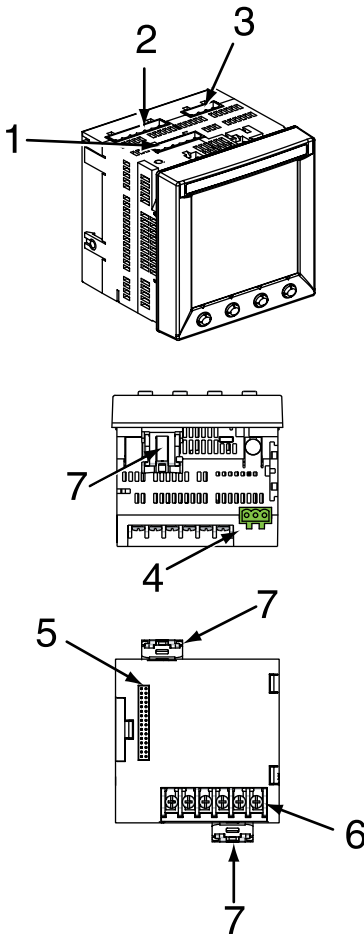
Power Meter Series 800 connectors.
1. Control power.
2. Voltage inputs.
3. Digital input/output.
4. RS 485 port.
5. Option module connector.
6. Current inputs.
7. Mounting clips.
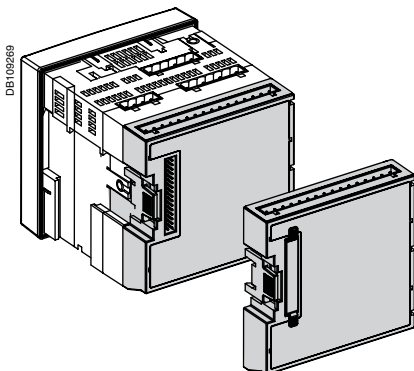
Power Meter PM800 Series with I/O module.

Selection guide		PM810	PM820	PM850	PM870
General					
Use on LV and HV systems		■	■	■	■
Current and voltage accuracy		0.1 %	0.1 %	0.1 %	0.1 %
Active energy accuracy		0.5 %	0.5 %	0.5 %	0.5 %
Number of samples per cycle		128	128	128	128
Instantaneous rms values					
Current, voltage, frequency		■	■	■	■
Active, reactive, apparent power	Total and per phase	■	■	■	■
Power factor	Total and per phase	■	■	■	■
Energy values					
Active, reactive, apparent energy		■	■	■	■
Configurable accumulation mode		■	■	■	■
Demand values					
Current	Present and max.	■	■	■	■
Active, reactive, apparent power	Present and max.	■	■	■	■
Predicted active, reactive, apparent power		■	■	■	■
Synchronisation of the measurement window		■	■	■	■
Demand calculation mode	Block, sliding, thermal	■	■	■	■
Other measurements					
Hour counter		■	■	■	■
Power quality measurements					
Harmonic distortion	Current and voltage	■	■	■	■
Individual harmonics	Current and voltage	31 [1]	31	63	63
Waveform capture		-	-	■	■ [2]
Sag and swell detection		-	-	-	■
Data recording					
Min/max of instantaneous values		■	■	■	■
Data logs		2 [1]	2	4	4
Event logs		-	■	■	■
Trending / forecasting		-	-	■	■
Alarms		■	■	■	■
Time stamping		■ [1]	■	■	■
Display and I/O					
White backlit LCD display		■	■	■	■
Multilingual: English, French, Spanish		■	■	■	■
Digital input		1	1	1	1
Digital output (KY)		1	1	1	1
Input / WAGES metering capability (channels)		5	5	5	5
Communication					
RS 485 port		2-wire	2-wire	2-wire	2-wire
Modbus protocol		■	■	■	■
RS 232/RS 485, 2- or 4-wire Modbus RTU/ASCII (with addition of PM8RDA module)		■	■	■	■

(1) With PM810LOG, battery-backed internal clock and 80 kB memory.   *(2) Configurable.*

Option modules selection guide

The PM800 can be fitted with 2 optional modules, unless otherwise indicated [3]

PM8ECC module

10/100BaseTx UTP port, RS-485 Modbus serial master port, Ethernet to serial line gateway, embedded web server

PM8M22 module

2 digital outputs (relays)

2 digital inputs

PM8M26 module

2 digital outputs (relays)

6 digital inputs

This module includes a 24 V DC power supply that can be used to power the digital inputs

PM8M2222 module

2 digital outputs (relays)

2 digital inputs

2 analog outputs 4-20 mA

2 analog inputs 0-5 V or 4-20 mA

(3) When using two PM8M2222 the temperature should not exceed 25 °C.

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Power Meter Series 800
Functions and characteristics (cont.)

Electrical characteristics

Type of measurement			63rd harmonic, 128 samples per cycle
Measurement accuracy	Current		0.325 % from 1 A to 10 A
	Voltage		0.375 % from 50 V to 277 V
	Power Factor		0.1 % from 1 A to 10 A
	Power		0.2 %
	Frequency		±0.02 % from 45 to 67 Hz
	Active Energy		IEC 62053-22 Class 0.5S
	Reactive Energy		IEC 62053-23 Class 2
Data update rate			1 s
Input-voltage characteristics	Measured voltage		0 to 600 V AC (direct L-L) 0 to 347 V AC (direct L-N) up to 3.2 MV AC (with external VT)
	Metering over-range		1.5 Un
	Impedance		5 MΩ
	Frequency measurement range		45 to 67 Hz and 350 to 450 Hz
Input-current characteristics	CT ratings	Primary	Adjustable from 5 A to 32767 A
		Secondary	1 A or 5 A
	Measurement input range		5 mA to 10 A
	Permissible overload		15 A continuous 50 A for 10 seconds per hour 500 A for 1 second per hour
	Impedance		< 0.1 Ω
	Load		< 0.15 VA
Control Power	AC		100 to 415 ±10 % V AC, 15 VA with options
	DC		125 to 250 ±20 % V DC, 10 W with options
	Ride-through time		45 ms at 120 V AC
Onboard input/ output	Digital output (KY)		6 to 220 ±10 % V AC or 3 to 250 ±10 % V DC, 100 mA max. at 25 °C) 1350 V rms isolation
	Digital input		20 to 150 V AC/DC (±10 %) < 5 mA max. burden

Options

PM8M22	Digital outputs (relay)		6 to 240 V AC or 6 to 30 V DC 2 A rms, 5 A max. for 10 seconds per hour
	Digital inputs		19 to 30 V DC, 5 mA max. at 24 V DC
PM8M26	Digital outputs (relay)		6 to 240 V AC, 6 to 30 V DC 2 A rms, 5 A max. for 10 seconds per hour
	Digital inputs		20 to 150 V AC/DC, 2 mA max.
	24 V internal supply		20 - 34 V DC, 10 mA max. (feeds 6 digital inputs)
PM8M2222	Digital outputs (relay)		6 to 240 V AC, 6 to 30 V DC 2 A rms, 5 A max. for 10 seconds per hour
	Digital inputs		20 to 150 V AC/DC, 2 mA max.
	Analog outputs		4 to 20 mA into 600 Ω max.
	Analog inputs		Adjustable from 0 to 5 V DC or 4-20 mA
Switching frequency	PM8M22	Input/output	1 Hz, 50 % duty cycle (500 ms ON/OFF)
	PM8M26 and PM8M2222	Input	25 Hz, 50 % duty cycle (20 ms ON/OFF)
		Output	1 Hz, 50 % duty cycle (500 ms ON/OFF)
Mechanical endurance (digital outputs)			15 million operations
Electrical endurance (digital outputs)			250000 commutations at 2 A / 250 V AC

Mechanical characteristics

Weight (meter with integrated display)		0.6 kg
IP degree of protection (IEC 60529)		IP52 front display, IP30 meter body
Dimensions	Without options	96 x 96 x 70 mm (mounting surface)
	With 1 option	96 x 96 x 90 mm (mounting surface)

Environmental conditions

Operating temperature	Meter	-25 °C to +70 °C [1]
	Display	-10 °C to +50 °C
Storage temp.	Meter + display	-40 °C to +85 °C
Humidity rating		5 to 95 % RH at 40 °C (non-condensing)
Pollution degree		2
Installation category		III, for distribution systems up to 347 V L-N / 600 V AC L-L
Dielectric withstand		As per EN 61010, UL508
Altitude		3000 m max.

(1) 65 °C if control power is above 305 V AC.

Power Meter Series 800
Functions and characteristics (cont.)

Electromagnetic compatibility

Electrostatic discharge	Level III (IEC 61000-4-2)
Immunity to radiated fields	Level III (IEC 61000-4-3)
Immunity to fast transients	Level III (IEC 61000-4-4)
Immunity to impulse waves	Level III (IEC 61000-4-5)
Conducted immunity	Level III (IEC 61000-4-6)
Immunity to magnetic fields	Level III (IEC 61000-4-8)
Immunity to voltage dips	Level III (IEC 61000-4-11)
Conducted and radiated emissions	C€ industrial environment/FCC part 15 class A EN 55011
Harmonics emissions	IEC 61000-3-2
Flicker emissions	IEC 61000-3-3

Safety

Europe	C€, as per IEC 61010-1 ▣ [1]
U.S. and Canada	UL508

Onboard communications

RS 485 port	2-wire, up to 38400 baud, Modbus

Model-dependent characteristics

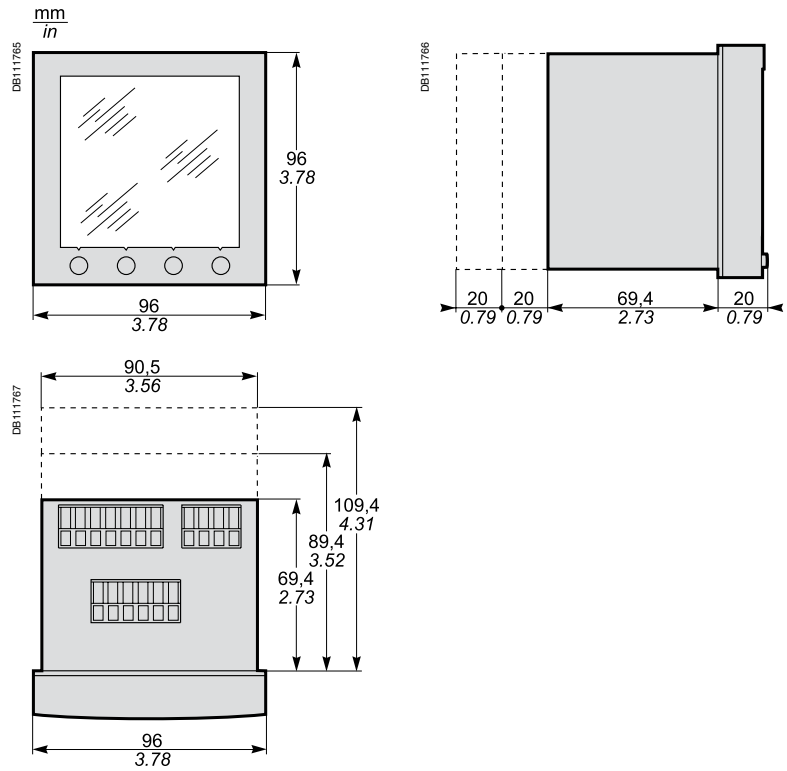|	
Data Logs	PM810 with PM810LOG, PM820, PM850 and PM870: - 1 billing log - 1 customizable log PM850 and PM870 only: 2 additional custom logs
Min./max.	Worst min. and max. with phase indication for Voltages, Currents, Voltage unbalance, and THD. Min. and max. values for power factor (True and Displacement), power (P, Q, S) and frequency
One event log	Time stamping to 1 second
Trend curves (PM850 and PM870 only)	Four trend curves: 1 minute, 1 hour, 1 day and 1 month. Min./max./avg. values recorded for eight parameters: - every second for one minute for the 1-minute curve - every minute for one hour for the 1-hour curve - every hour for one day for the 1-day curve - every day for one month for the 1-month curve
Hour counter	Load running time in days, hours and minutes
Energy per interval	Up to three user-defined intervals per day Available for all models (the PM810 requires the PM810LOG module)
Forecasting (PM850 and PM870 only)	Forecasting of the values for the trended parameters for the next four hours and next four days
PM850 waveform capture	Triggered manually or by alarm, 3-cycle, 128 samples/cycle on 6 user configurable channels
PM870 enhanced waveform capture	From 185 cycles on 1 channel at 16 samples per cycle up to 3 cycles on 6 channels at 128 samples per cycle
Alarms	Adjustable pickup and dropout setpoints and time delays, numerous activation levels possible for a given type of alarm Historical and active alarm screens with time stamping Response time: 1 second Boolean combination of four alarms is possible using the operators NAND, OR, NOR and XOR on PM850 and PM870 Digital alarms: status change of digital inputs
Memory available for logging and waveform capture [2]	80 kbytes in PM810 with PM810LOG and PM820 800 kbytes in PM850 and PM870
Firmware update	Update via the communication ports File download available free from powerlogic.com website
Bar graphs	Graphical representation of system performance

Display characteristics

Languages	English, French, Spanish		
Display screen	Back-lit white LCD (6 lines total, 4 concurrent values)		
Dimensions	Display screen viewable area		73 x 69 mm
	Integrated	Overall	96 x 96 mm
		Depth meter + display	69.4 mm + 17.8 mm
	Remote display	Overall	96 x 96 x 40 mm
Weight	Meter with remote display adapter		0.81 kg
	Remote display		0.23 kg

(1) Protected throughout by double insulation.
(2) Waveform capture with PM850 and PM870 only.

Power Meter Series 800
Installation and connection

Power meter with integrated display
Dimensions

$\dfrac{mm}{in}$

DB111765

96
3.78

96
3.78

DB111766

20
0.79

20
0.79

69,4
2.73

20
0.79

DB111767

90,5
3.56

109,4
4.31

89,4
3.52

69,4
2.73

96
3.78

Front-panel mounting (meter with integrated display)

$\dfrac{mm}{in}$

DB111768

92
3.62

92
3.62

Spacing between units

$\dfrac{mm}{in}$

DB111769

10
0.39

DB111770

40
1.57

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Power Meter Series 800
Installation and connection (cont.)
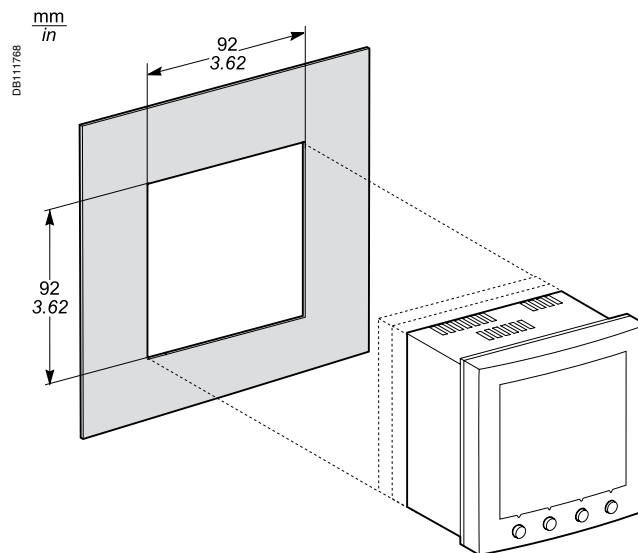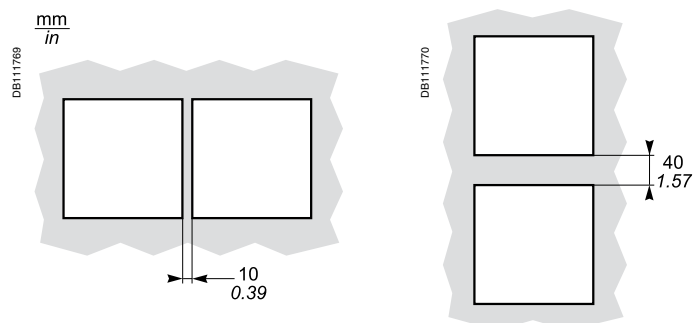
Remote display door mounting
Flush mounting

mm
in

DB111792

21
0.839

96
3.780

92
3.622

92
3.622

19
0.751

12
0.457

Surface mount

mm
in

DB111793

10
0.394

96
3.780

82
3.230

4 x Ø4
Ø0.157

76
3.000

Ø22 (Ø32 max)
Ø0.880

54
2.125

13
0.500

31
1.220

27
1.063
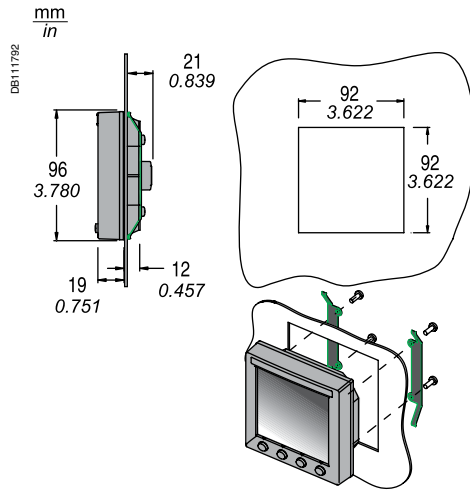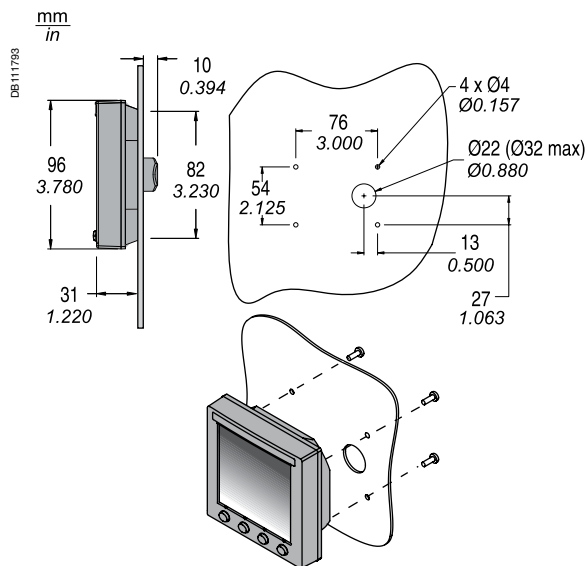
For mounting in a Ø102 cutout
(to replace an analogue device: ammeter, voltmeter, etc.)

mm
in

DB111794

21
0.839

96
3.780

82
3.230

Ø102
Ø4.000

4 x Ø4
Ø0.157

86
3.376

86
3.376

19
0.751

12
0.457

A

PM8G

Power Meter Series 800
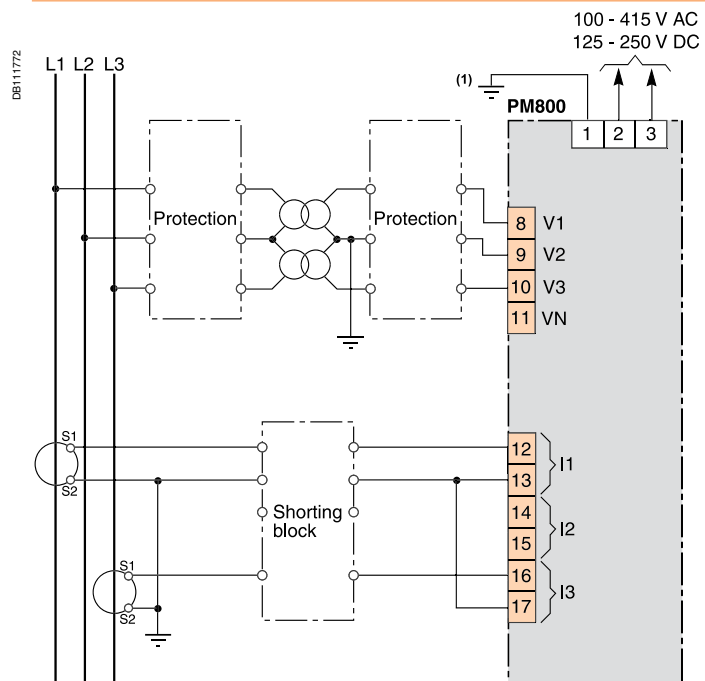## Installation and connection (cont.)
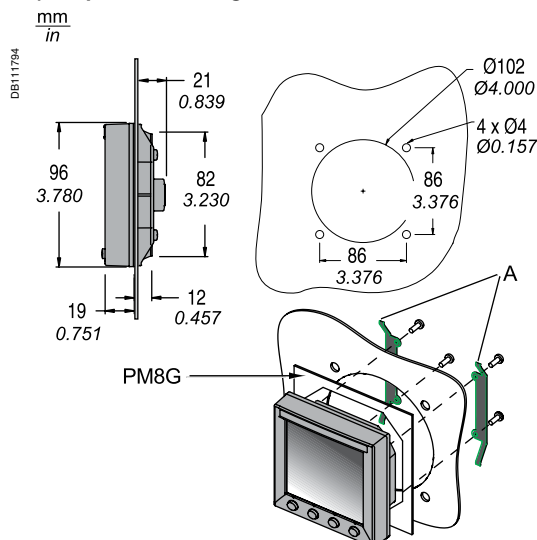
4-wire connection with 3 CTs and no PT
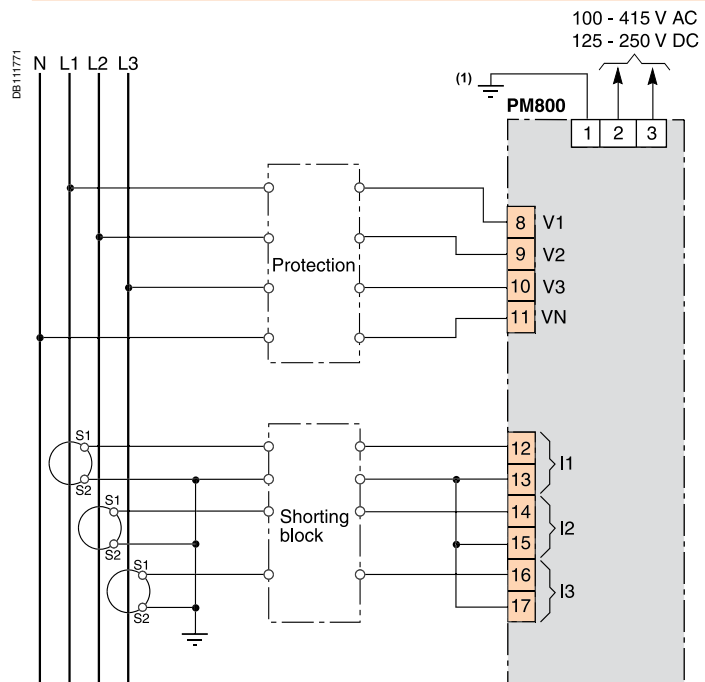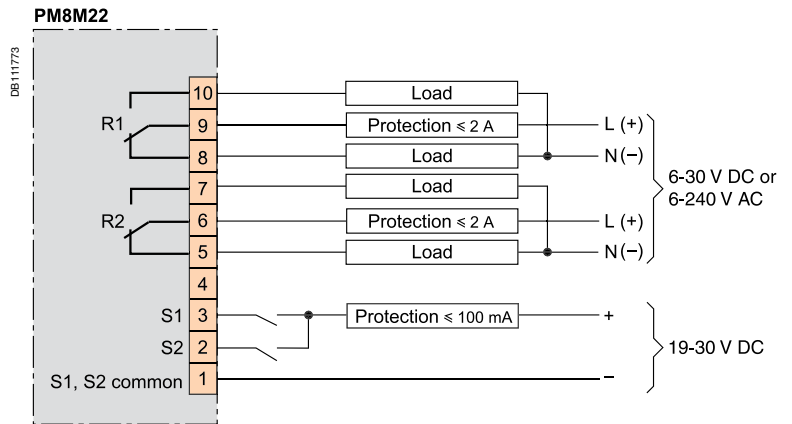
Connection example.

3-wire connection with 2 CTs and 2 PTs

Connection example.

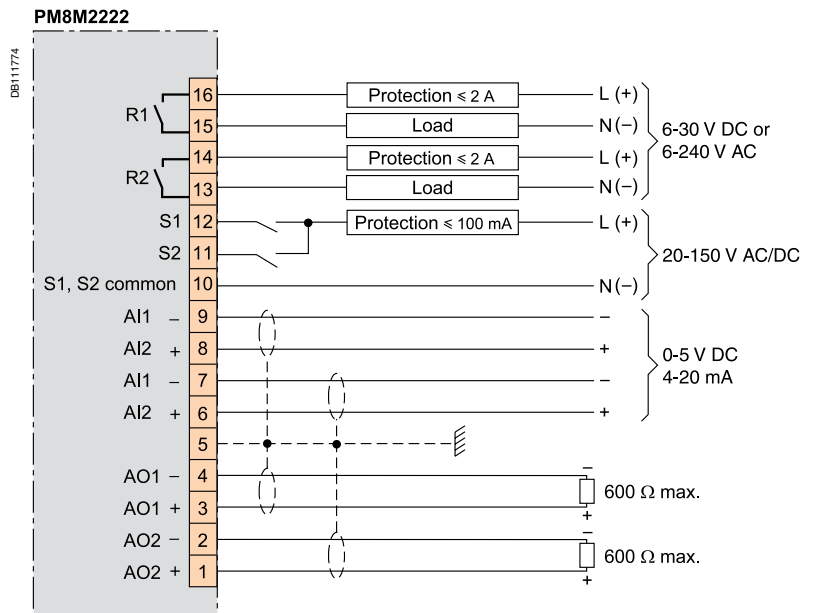**(1)** *Functional earth terminal.*

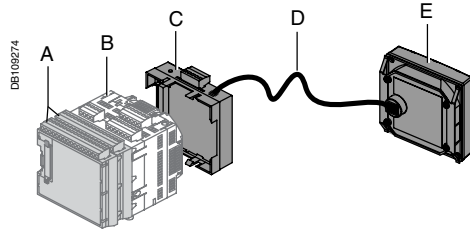**Note:** *other types of connection are possible. See product documentation.*

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Power Meter Series 800
Installation and connection (cont.)

PM8M22 module

PM8M22

DB111773

Terminal	
10	Load
R1 9	Protection ≤ 2 A — L (+)
8	Load — N (−)
7	Load
R2 6	Protection ≤ 2 A — L (+)
5	Load — N (−)
4	
S1 3	Protection ≤ 100 mA — +
S2 2	
S1, S2 common 1	−

6-30 V DC or 6-240 V AC

19-30 V DC

PM8M2222 module

PM8M2222

DB111774

Terminal	
R1 16	Protection ≤ 2 A — L (+)
15	Load — N (−)
R2 14	Protection ≤ 2 A — L (+)
13	Load — N (−)
S1 12	Protection ≤ 100 mA — L (+)
S2 11	
S1, S2 common 10	N (−)
AI1 − 9	−
AI2 + 8	+
AI1 − 7	−
AI2 + 6	+
5	
AO1 − 4	
AO1 + 3	600 Ω max.
AO2 − 2	
AO2 + 1	600 Ω max.

6-30 V DC or 6-240 V AC

20-150 V AC/DC

0-5 V DC / 4-20 mA

PM8M26 module internal 24 V DC power supply

PM8M26 (24 V DC)

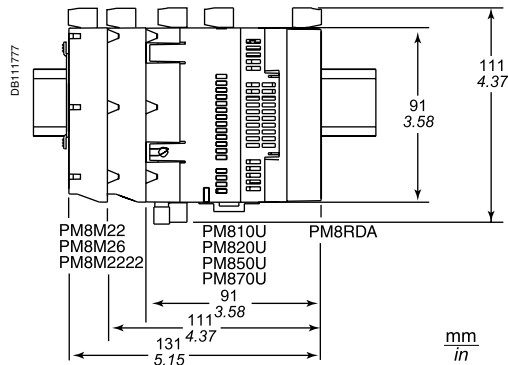### PM8M26 module external power supply
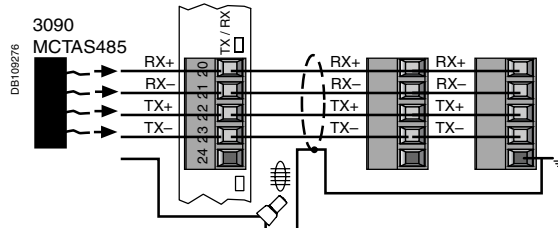
PM8M26

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Remote display kit

A. I/O modules
B. Power meter 800 series (base unit)
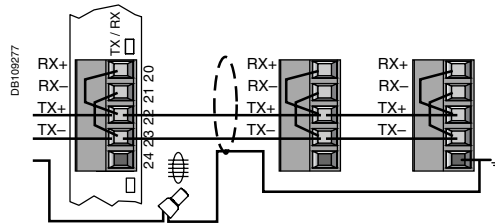C. Remote display adapter
D. CAB12 cable
E. Remote display (rear view)

Dimension (meter with I/O and remote display adapter)

PM8M22
PM8M26
PM8M2222

PM810U
PM820U
PM850U
PM870U

PM8RDA

111
4.37

91
3.58

91
3.58

111
4.37

131
5.15

mm
in

4-wire connection (RS 485) of remote display adapter

3090
MCTAS485

TX / RX

RX+
RX−
TX+
TX−

24 23 22 21 20

RX+
RX−
TX+
TX−

RX+
RX−
TX+
TX−

2-wire connection (RS 485) of remote display adapter

TX / RX

RX+
RX−
TX+
TX−

24 23 22 21 20

RX+
RX−
TX+
TX−

RX+
RX−
TX+
TX−

Wiring color codes

2-wire connections

Belden 9841 cable:
- (+) blue, white stripe
- (−) white, blue stripe
- (shield) silver

4-wire connections

Belden 9843 cable:
- (TX+) blue, white stripe
- (TX−) white, blue stripe
- (RX+) orange, white stripe
- (RX−) white, orange stripe
- (SG) green, white stripe
- (unused) white, green stripe
- shield

Belden 9842 cable:
- (TX+) blue, white stripe
- (TX−) white, blue stripe
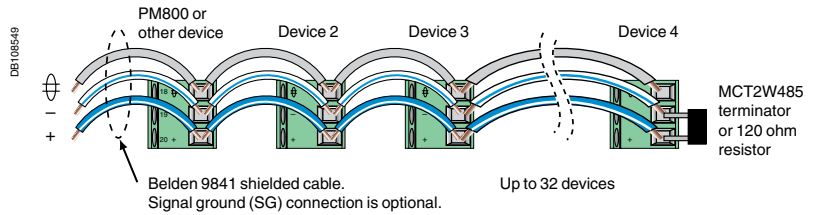- (RX+) orange, white stripe
- (RX−) white, orange stripe
- shield

Belden 8723 cable:
- (TX+) green
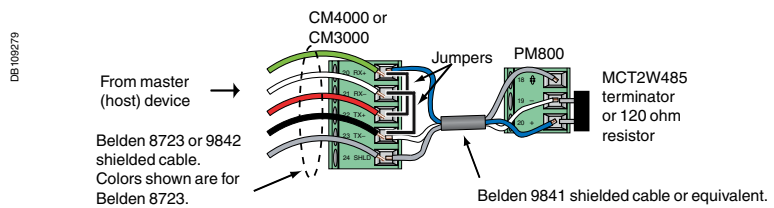- (TX−) white
- (RX+) red
- (RX−) black
- shield

Surge protection

For surge protection, it is recommend that the shield wire be connected directly to an external earth ground at a single point.

PM800 meter unit RS-485 port 2-wire daisy-chain connection

PM800 or other device   Device 2   Device 3   Device 4

MCT2W485 terminator or 120 ohm resistor

Belden 9841 shielded cable.
Signal ground (SG) connection is optional.

Up to 32 devices

PM800 meter unit RS-485 port 4-wire to 2-wire Modbus or Jbus connection

CM4000 or CM3000

Jumpers   PM800

From master (host) device

MCT2W485 terminator or 120 ohm resistor

Belden 8723 or 9842 shielded cable. Colors shown are for Belden 8723.

Belden 9841 shielded cable or equivalent.
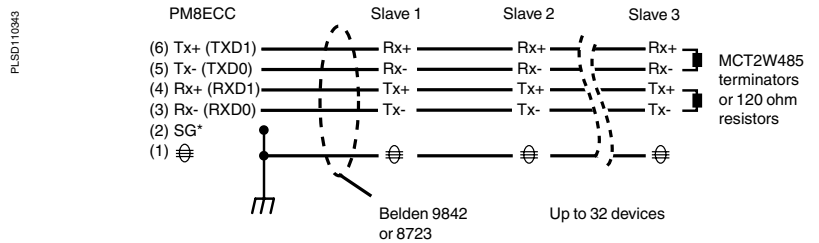
Merlin Gerin

Power Meter Series 800
Installation and connection (cont.)

PM8ECC module RS-485 port connections for 4-wire devices that support separate signal ground and shield wire
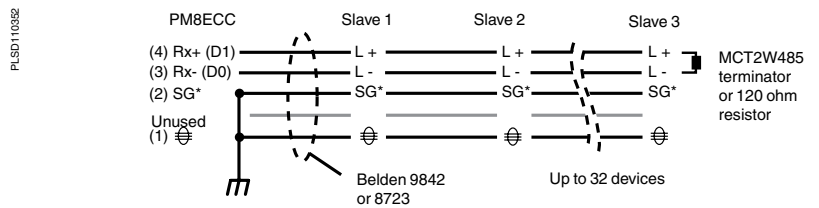
PM8ECC		Slave 1	Slave 2	Slave 3	
(6) Tx+ (TXD1)		Rx+	Rx+	Rx+	MCT2W485
(5) Tx- (TXD0)		Rx-	Rx-	Rx-	terminators
(4) Rx+ (RXD1)		Tx+	Tx+	Tx+	or 120 ohm
(3) Rx- (RXD0)		Tx-	Tx-	Tx-	resistors
(2) SG*		SG*	SG*	SG*	
(1) ⏚		⏚	⏚	⏚	

Belden 9843   Up to 32 devices
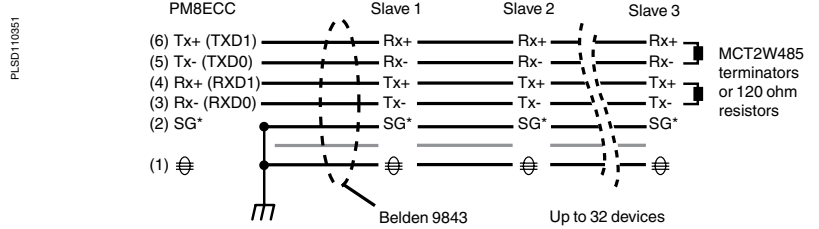
Note: SG is signal ground.

PM8ECC module RS-485 port connections 4-wire devices that do not support separate signal ground and shield wire

PM8ECC		Slave 1	Slave 2	Slave 3	
(6) Tx+ (TXD1)		Rx+	Rx+	Rx+	MCT2W485
(5) Tx- (TXD0)		Rx-	Rx-	Rx-	terminators
(4) Rx+ (RXD1)		Tx+	Tx+	Tx+	or 120 ohm
(3) Rx- (RXD0)		Tx-	Tx-	Tx-	resistors
(2) SG*					
(1) ⏚		⏚	⏚	⏚	

Belden 9842 or 8723   Up to 32 devices

Note: SG is signal ground.

PM8ECC module RS-485 port connections for 2-wire devices that support separate signal ground and shield wire

PM8ECC		Slave 1	Slave 2	Slave 3	
(4) Rx+ (D1)		L +	L +	L +	MCT2W485
(3) Rx- (D0)		L -	L -	L -	terminator
(2) SG*		SG*	SG*	SG*	or 120 ohm
Unused					resistor
(1) ⏚		⏚	⏚	⏚	

Belden 9842 or 8723   Up to 32 devices

Note: SG is signal ground.

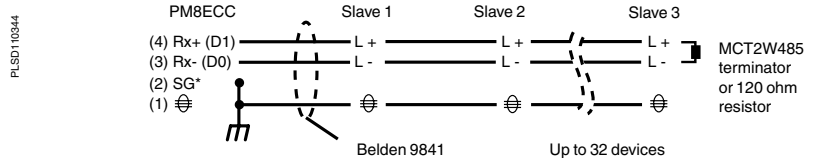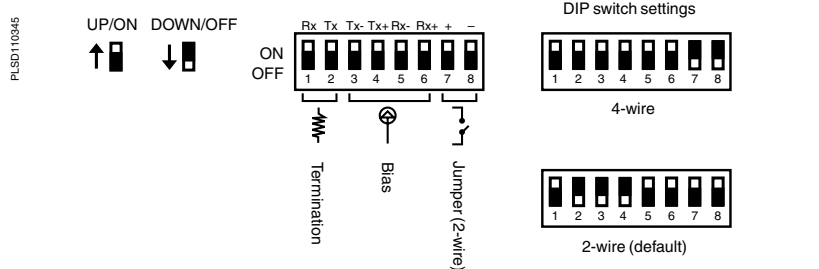**PM8ECC module RS-485 port connections 2-wire devices that do not support separate signal ground and shield wire**

PM8ECC		Slave 1	Slave 2	Slave 3	
(4) Rx+ (D1)		L +	L +	L +	MCT2W485
(3) Rx- (D0)		L -	L -	L -	terminator
(2) SG*					or 120 ohm
(1) ⏚		⏚	⏚	⏚	resistor

Belden 9841   Up to 32 devices

Note: SG is signal ground.

PM8ECC module RS-485 port biasing and termination

UP/ON   DOWN/OFF

Rx Tx Tx- Tx+ Rx- Rx+ +   −

ON
OFF
 1   2   3   4   5   6   7   8

Termination   Bias   Jumper (2-wire)

DIP switch settings

 1 2 3 4 5 6 7 8
4-wire

 1 2 3 4 5 6 7 8
2-wire (default)

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