

PowerLogic power-monitoring units

## Power Meter Series 800

Technical data sheet

2007



Transparent  
Ready™



The PowerLogic® Power Meter Series 800 offers all the high-performance measurement capabilities needed to monitor an electrical installation in a compact 96 x 96 mm unit. Its easy-to-read display shows all three phases and neutral at the same time.

Standard features of the Series 800 Power Meters include an RS 485 Modbus communication port (ASCII and RTU), digital input and digital output, THD metering, alarming and input metering capability. The PM820, PM850 and the PM870 also offer custom on-board logging and individual current and voltage harmonic readings. The PM850 includes waveform capture. The PM870 is a compact meter that offers voltage and current disturbance (sag and swell) detection and configurable waveform capture.

### Applications

#### Panel instrumentation

- sub-billing, cost allocation and utility bill verification
- remote monitoring of an electrical installation
- mid-range power quality analysis and energy management (the PM870 includes sag and swell detection)
- utility contract optimization and load preservation.

### Characteristics

#### Easy to install

Mounts with only two clips. No tools required.

#### Direct connect voltage inputs

No need for potential transformers (PTs) up to 600 V AC.

#### 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. Boolean logic (PM850 and PM870) can be used to combine up to four alarms.

#### Power quality analysis

The Power Meter Series 800 supports individual current and voltage harmonics readings (the PM810 requires a PM810LOG). The PM850 includes waveform capture. The PM870 features voltage and current disturbance (sag and swells) detection and configurable waveform capture. And both the PM850 and PM870 include EN 50160 power quality evaluation for help in troubleshooting and preventing power quality problems.

#### Extensive on-board memory

Billing (energy and demand), power quality and alarm logs are stored in non-volatile memory (PM810 with PM810LOG).

#### IEC 62053-22 class 0.5S for active energy

Accurate energy measurement for sub-billing and cost allocation.

#### Trend curves and short-term forecasting (PM850 and PM870)

Trend and compare energy and demand readings. Forecast upcoming values to anticipate and manage future energy costs.

#### WAGES capability

Five channels available on all models for input metering of various utilities (WAGES: water, air, gas, electricity, steam).

#### Modular and upgradeable

Easy-to-install option modules (memory and I/O) and downloadable firmware for enhanced meter capabilities.

#### Remote display

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



Power Meter PM870 unit (no display).



Power Meter PM870 with integrated display.



Power Meter PM870 with remote display.



Remote display adapter with display and a cable.



Remote display adapter alone. PM8M26 module.



Power Meter PM800 with PM8M22 and PM8M26 modules.

### Part Numbers

#### Description

##### Power Meter Unit (No Display)

Use the base meter unit without a 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.

<b>PM810 power meter</b> unit only, no display, basic instrumentation, THD, alarming, 80 kB logging (with PM810LOG)	<b>PM810UMG</b>
<b>PM820 power meter</b> unit only, no display, basic instrumentation, THD, alarming, 80 kB logging	<b>PM820UMG</b>
<b>PM850 power meter</b> unit only, no display, basic instrumentation, THD, alarming, 800 kB logging, waveform capture	<b>PM850UMG</b>
<b>PM870 power meter</b> unit only, no display, basic instrumentation, THD, alarming, 800 kB logging, configurable waveform capture and disturbance detection	<b>PM870UMG</b>

##### Power Meter with Integrated Display mounted on door

Use the meter with an integrated display when door space is available and when voltage usage is within the local regulation limits.

<b>PM810 power meter</b> with integrated display,	<b>PM810MG</b>
<b>PM820 power meter</b> with integrated display	<b>PM820MG</b>
<b>PM850 power meter</b> with integrated display	<b>PM850MG</b>
<b>PM870 power meter</b> with integrated display	<b>PM870MG</b>

##### 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).

<b>PM810 power meter</b> with remote display	<b>PM810RDMG</b>
<b>PM820 power meter</b> with remote display	<b>PM820RDMG</b>
<b>PM850 power meter</b> with remote display	<b>PM850RDMG</b>
<b>PM870 power meter</b> with remote display	<b>PM870RDMG</b>

##### 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.

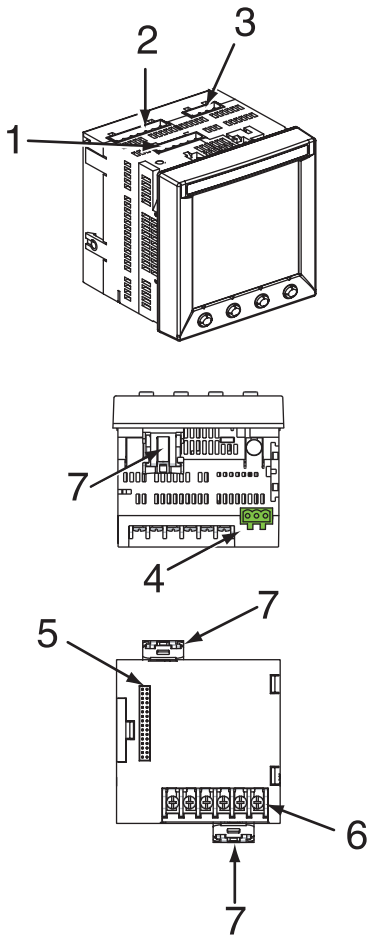
**PM8RDA**

##### Optional modules

2 digital outputs (relays), 2 digital inputs	<b>PM8M22</b>
2 digital outputs (relays), 6 digital inputs	<b>PM8M26</b>
2 digital outputs (relays), 2 digital inputs, 2 analog outputs, 2 analog inputs	<b>PM8M2222</b>
PM810 optional logging module for on-board data recording, uses a non-volatile, battery-backed internal clock	<b>PM810LOG</b>
RJ11 Extender kit to mount RJ11 jack in panel door (for use with PM800, CM3000, and CM4000 series meters)	<b>RJ11EXT</b>
Cable for remote display adapter 1.25 m (4 ft)	<b>CAB4</b>
Cable for remote display adapter 3.65 m (12 ft)	<b>CAB12</b>
Cable for remote display adapter 9.14 m (30 ft)	<b>CAB30</b>

(1) Merlin Gerin brand not available in the United States.

DB11764



### Power Meter Series 800.

1. Control power.
2. Voltage inputs.
3. Digital input/output.
4. RS 485 port.
5. Option module connector.
6. Current inputs.
7. Mounting clips.

Selection guide		PM810	PM820	PM850	PM870
<b>General</b>					
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
<b>Instantaneous rms values</b>					
Current, voltage, frequency		■	■	■	■
Active, reactive, apparent power		Total and per phase		■	■
Power factor		Total and per phase		■	■
<b>Energy values</b>					
Active, reactive, apparent energy		■	■	■	■
Configurable accumulation mode		■	■	■	■
<b>Demand values</b>					
Current		Present and max. values		■	■
Active, reactive, apparent power		Present and max. values		■	■
Predicted active, reactive, apparent power		■	■	■	■
Synchronisation of the measurement window		■	■	■	■
Demand calculation mode		Block, sliding and thermal		■	■
<b>Other measurements</b>					
Hour counter		■	■	■	■
<b>Power quality measurements</b>					
Harmonic distortion		Current and voltage		■	■
Individual harmonics		Current and voltage		31 <sup>(1)</sup>	31
Waveform capture		-	-	■	■ <sup>(2)</sup>
Sag and swell detection		-	-	-	■
<b>Data recording</b>					
Min/max of instantaneous values		■	■	■	■
Data logs		2 <sup>(1)</sup>	2	4	4
Event logs		-	■	■	■
Trending / forecasting		-	-	■	■
Alarms		■	■	■	■
Time stamping		■ <sup>(1)</sup>	■	■	■
<b>Display and I/O</b>					
White backlit LCD display		■	■	■	■
Multilingual: English, French, Spanish		■	■	■	■
Digital inputs		1	1	1	1
Digital outputs		1	1	1	1
Input metering capability (number of channels)		5	5	5	5
<b>Communication</b>					
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)		■	■	■	■

<sup>(1)</sup> With PM810LOG, battery-backed internal clock and 80 kB memory.

<sup>(2)</sup> Configurable.

### I/O selection guide

The PM800 can be fitted with 2 optional modules, unless otherwise indicated <sup>(3)</sup>

#### PM8M22 module

2 digital outputs (relays) for control or alarms

2 digital inputs for position monitoring

#### PM8M26 module

2 digital outputs (relays) for control or alarms

6 digital inputs for position monitoring or pulse counting

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

#### PM8M2222 module

2 digital outputs (relays) for control or alarms

2 digital inputs for position monitoring or pulse counting

2 analog outputs 4-20 mA

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

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

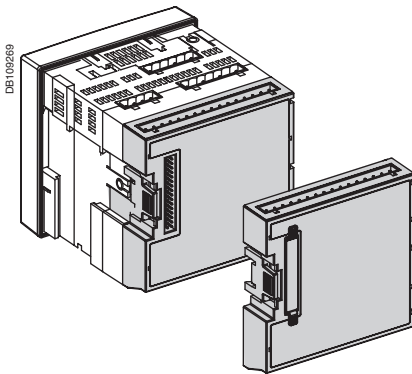


Rear view of Power Meter Series 800.

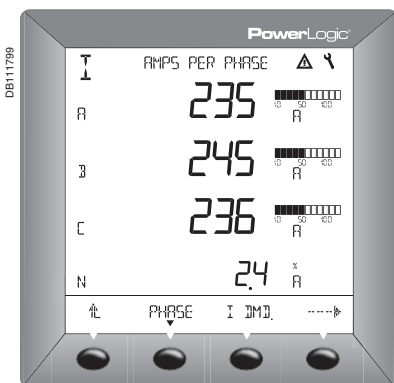
Electrical characteristics			
Type of measurement		63rd harmonic 128 samples per cycle	
Measurement accuracy	Current	0.325 % from 1 A to 10 A	
	Voltage	0.375 % from 50 V to 277 V	
	Power Factor	0.1 % from 1 A to 10 A	
	Power	0.2 %	
	Frequency	±0.02 % from 45 to 67 Hz	
	Active Energy	IEC 62053-22 Class 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/outputs PM800	Digital pulse output	Digital output (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	24 to 125 V AC/DC (±10 %) < 5 mA max. burden	
Options			
PM8M22	Relay outputs	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	Relay outputs	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 8 digital inputs)	
PM8M2222	Relay outputs	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	4-20 mA, burden 0 to 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
	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 <sup>(1)</sup>	
	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.





PM800 Series with I/O module.



PM800 Series display screen showing bar graphs.

### 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	CE industrial environment/FCC part 15 class A EN 55011
Harmonics emissions	IEC 61000-3-2
Flicker emissions	IEC 61000-3-3

### Safety

Europe	CE, as per IEC 61010-1 <sup>(1)</sup>
U.S. and Canada	UL508

### Onboard communications

RS 485 port	2-wire, up to 38400 baud, Modbus
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### Firmware 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 <sup>(2)</sup>	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

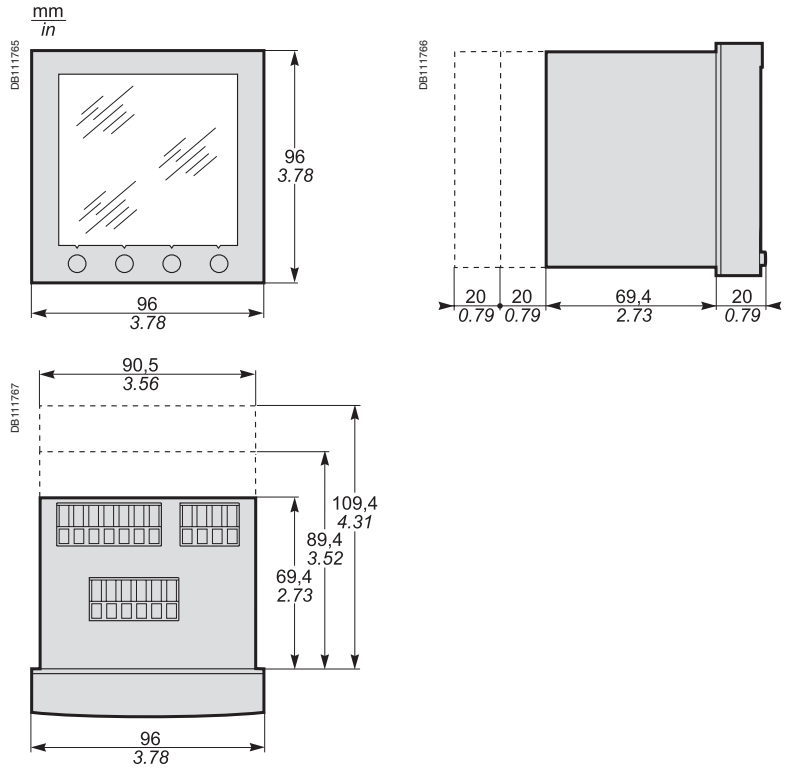
Languages	English, French, Spanish	
Display screen	Back-lit white LCD (6 lines total, 4 concurrent values)	
Dimensions	Display screen viewable area	73 x 69 mm
	Integrated display Overall	96 x 96 mm
	Depth meter + display	69.4 mm + 17.8 mm
	Remote display Overall	96 x 96 x 40 mm
Weight	Meter with remote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

<sup>(1)</sup> Protected throughout by double insulation.

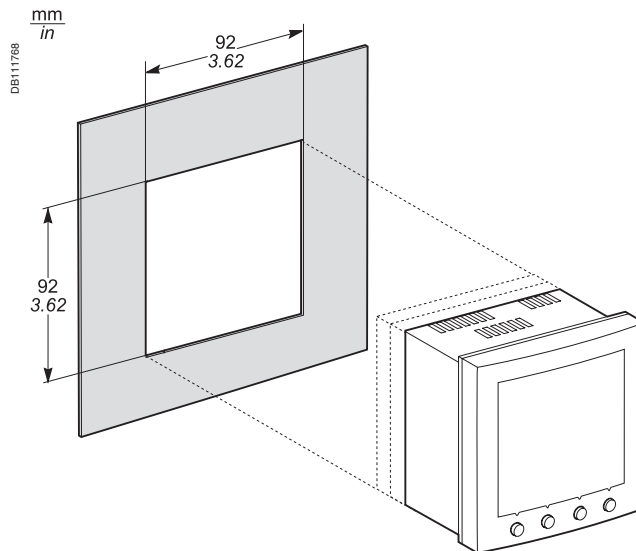
<sup>(2)</sup> Waveform capture with PM850 and PM870 only.

### Power meter with integrated display

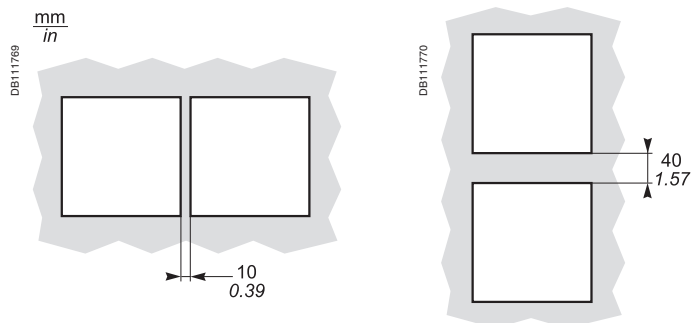
#### Dimensions



### Front-panel mounting (meter with integrated display)

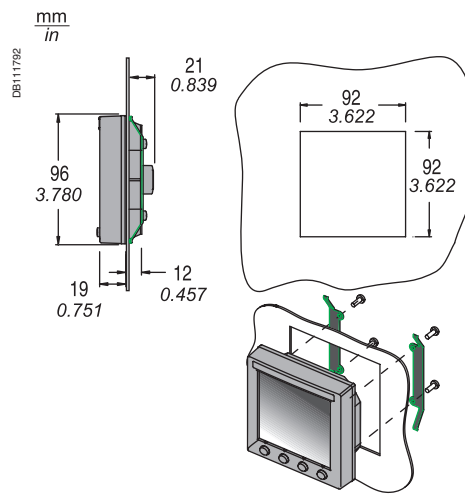


### Spacing between units

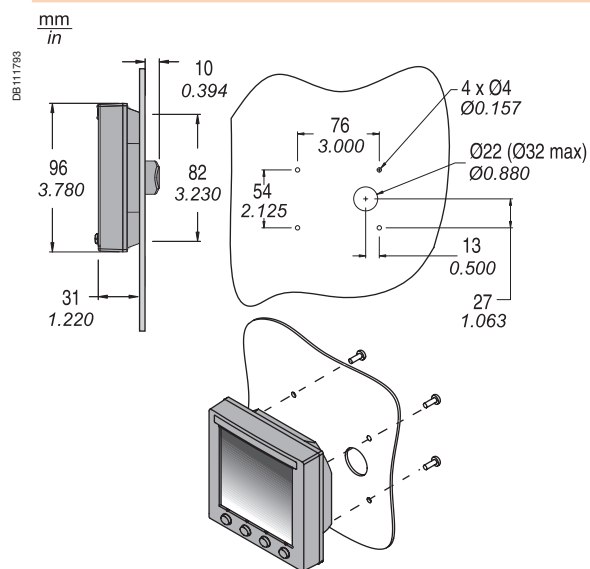


### Remote display door mounting

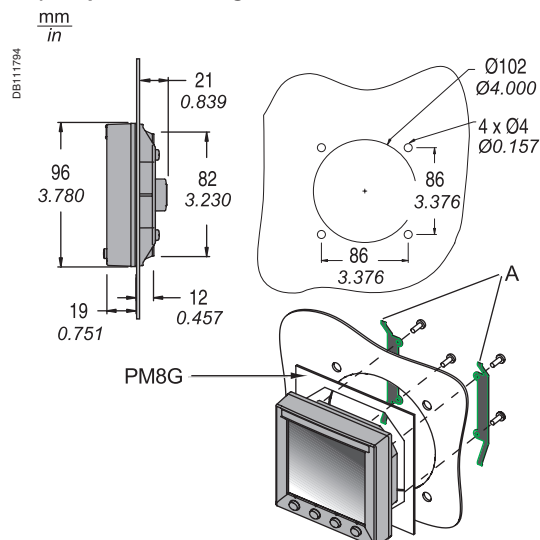
#### Flush mounting



#### Surface mount

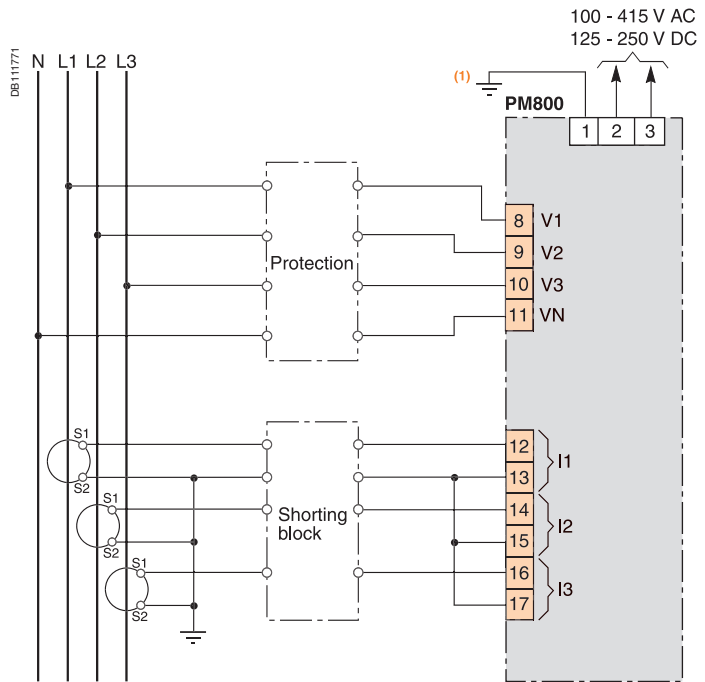


#### For mounting in a Ø102 cutout (to replace an analogue device: ammeter, voltmeter, etc.)



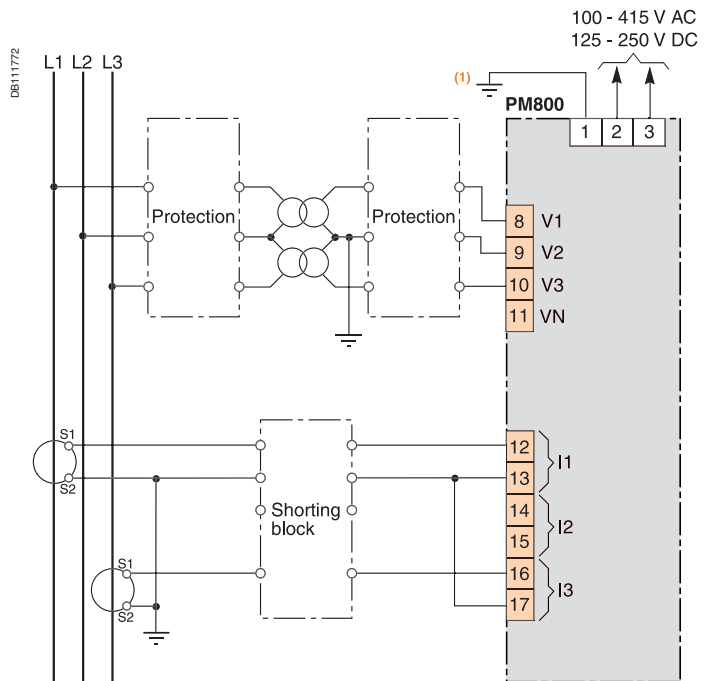


### 4-wire connection with 3 CTs and no PT



Connection example.

### 3-wire connection with 2 CTs and 2 PTs

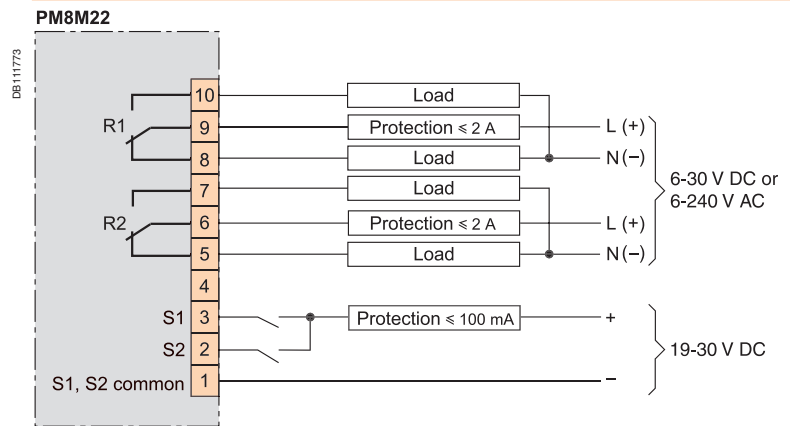


Connection example.

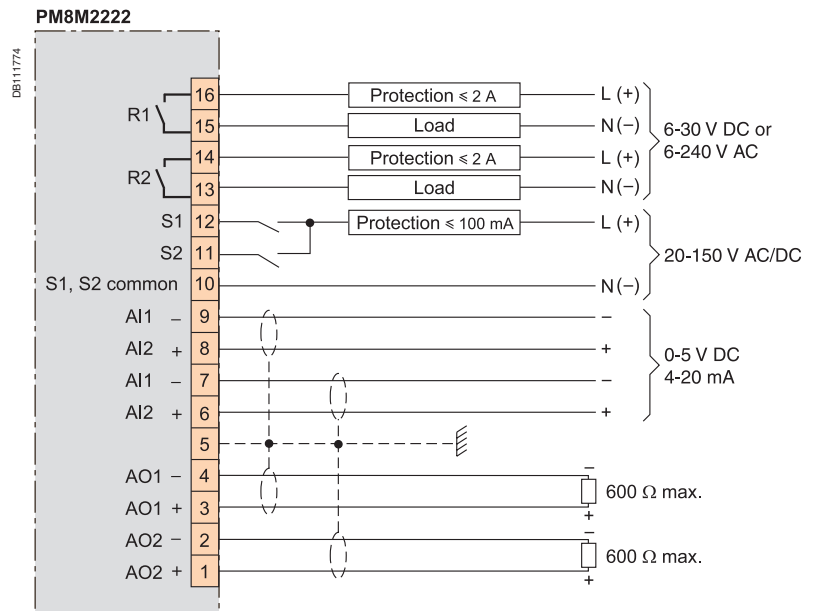
(1) Functional earth terminal.

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

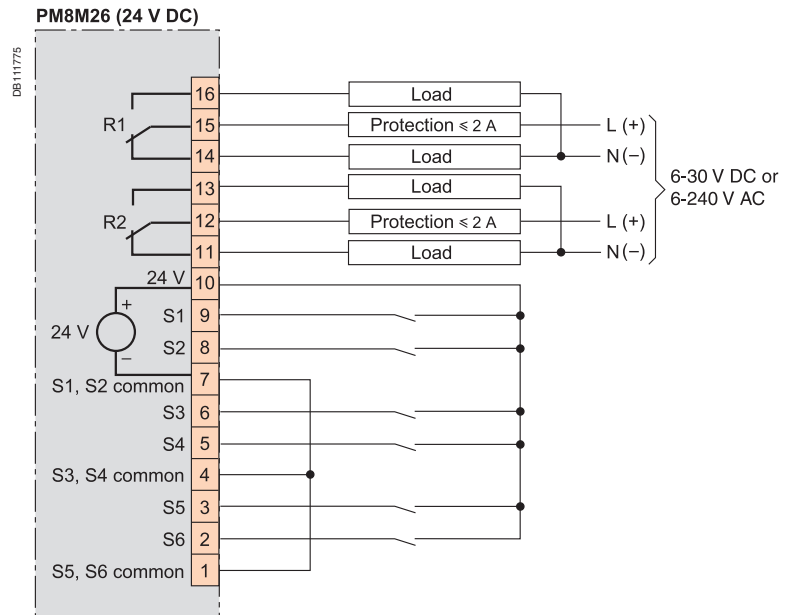
### PM8M22 module



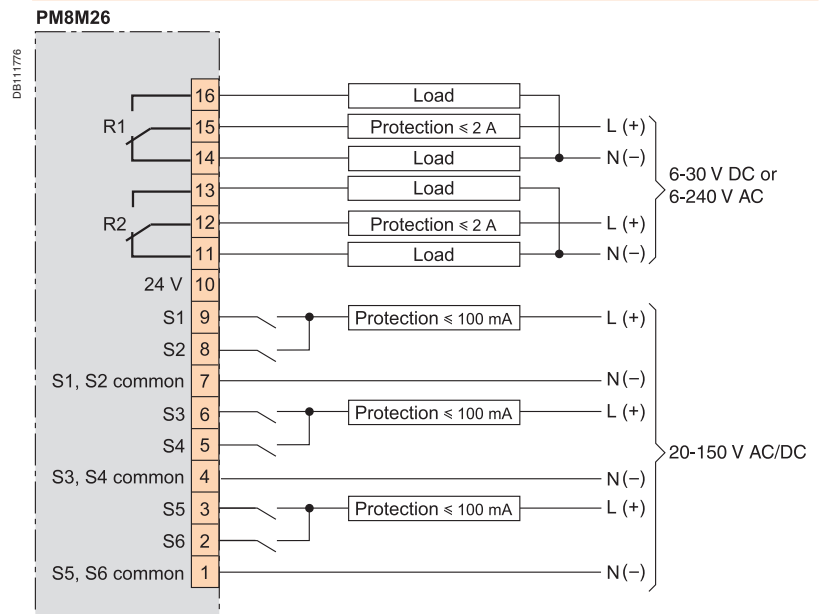
### PM8M2222 module



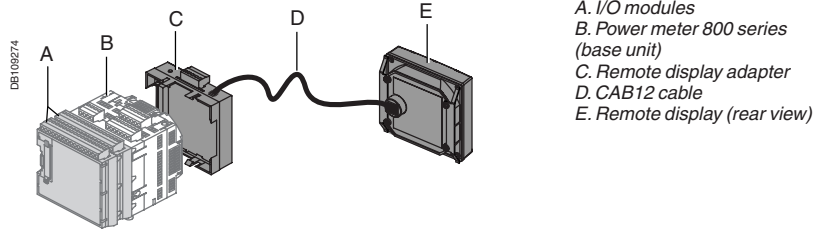
### PM8M26 module internal 24 V DC power supply



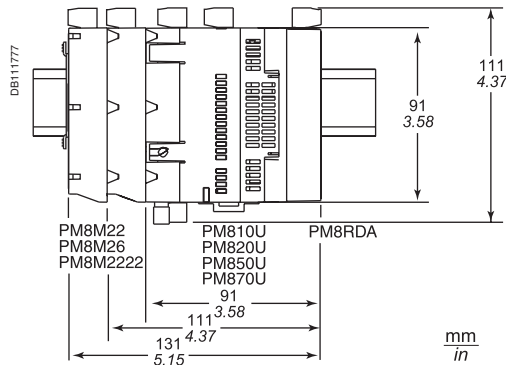
### PM8M26 module external power supply



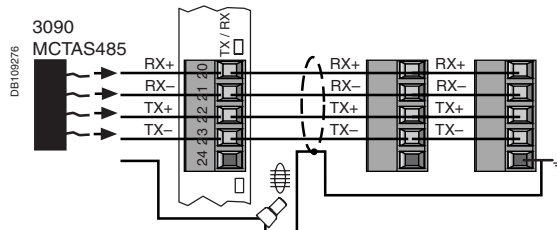
### Remote display kit



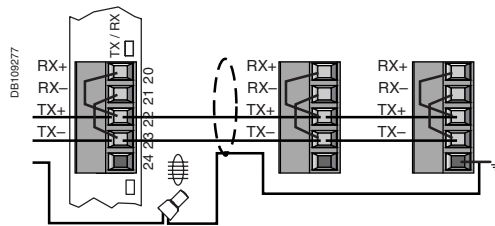
### Dimension (meter with I/O and remote display adapter)



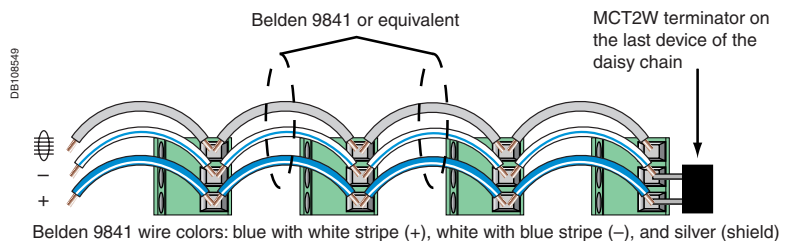
### 4-wire connection (RS 485) of remote display adapter



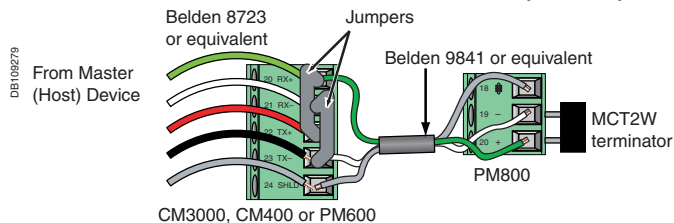
### 2-wire connection (RS 485) of remote display adapter



### 2-wire daisy-chain connection of devices (RS 485)



### 4-wire daisy-chain connection of devices, connected to 2-wire Modbus or Jbus connection of devices (RS 485)



# Notes

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# Notes

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**Schneider Electric Industries SAS**

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