

PowerLogic power-monitoring units

Power Meter Series 800



Technical data sheet

2006



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 RS485 Modbus communication port (ASCII and RTU), digital input and digital output, THD metering, alarming and input metering capability. The PM820 and PM850 also offer custom on-board logging and individual current and voltage harmonic readings. The PM850 includes waveform capture. The PM870 is the first compact meter to offer 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 can be used to combine up to four alarms.

Power quality analysis

The Power Meter Series 800 supports EN 50160 power quality evaluation. 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 current and voltage individual harmonic magnitudes and angles that help troubleshoot and prevent power quality problems.

Extensive on-board memory

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

IEC 62053-22 class 0.5S for real 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

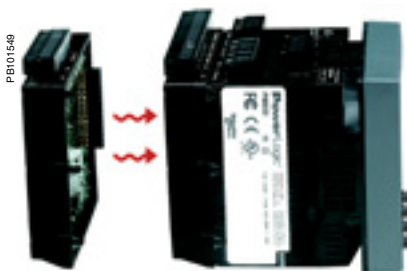
Easy-to-install option modules (memory and I/O) and downloadable firmware for enhanced meter capabilities.

Remote display

The optional remote display can be mounted as far as 10 m from the metering unit. The adapter includes an additional RS485/RS232 communication port.



Remote display adapter with remote display and cable.



Side view I/O modules and Power Meter Series 800.

Part Numbers

Description

Power Meter with Integrated Display

PM810 power meter with integrated display, basic instrumentation, THD, alarming	PM810MG
PM820 power meter with integrated display, basic instrumentation, THD, alarming, 80 kb logging	PM820MG
PM850 power meter with integrated display, basic instrumentation, THD, alarming, 800 kb logging, waveform capture	PM850MG
PM870 power meter with integrated display, basic instrumentation, THD, alarming, 800 kb logging, configurable waveform capture and disturbance detection	PM870MG

Power Meter Unit (No Display)

PM810 power meter unit only, no display	PM810UMG
PM820 power meter unit only, no display	PM820UMG
PM850 power meter unit only, no display	PM850UMG
PM870 power meter unit only, no display	PM870UMG

Optionnal modules

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

Parts and accessories

Remote display and adapter with a 3.55 m (12 ft) cable	PM8RDMG
Remote display adapter only	PM8RDA
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

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

Display selection guide

Application

Meter and 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.	PM810MG PM820MG PM850MG PM870MG
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Meter with 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.	PM810UMG PM820UMG PM850UMG PM870UMG
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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 System Manager™ Software (SMS) to read data.

Remote display

Meter and remote display kit

Conveniently packaged kit consist of a base meter (810, 820, or 850) with a remote display, remote display adapter, and remote display cable 3.6 m (12 ft).	PM810RDMG PM820RDMG PM850RDMG PM870RDMG
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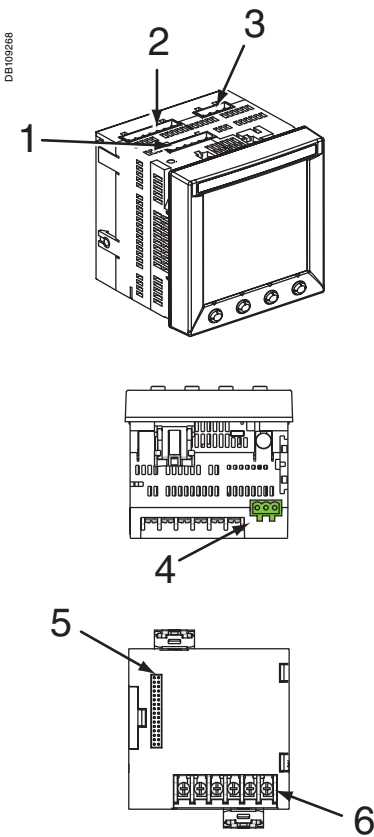
Remote display adapter alone

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 RS485/RS232.	PM8RDA
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Remote display and cable

Use this combination of remote display, adapter, and 3.6 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
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(1) Merlin Gerin brand not available in the United States.



Power Meter Series 800.
 1 Control power supply connector.
 2 Voltage inputs.
 3 Digital input/output.
 4 RS485 port.
 5 Option module connector.
 6 Current inputs.

Meter 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 and power 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. values	■	■	■
Active, reactive, apparent power		Present and max. values	■	■	■
Predicted active, reactive, apparent power		■	■	■	■
Synchronisation of the measurement window		■	■	■	■
Demand calculation mode		Block, sliding	■	■	■
Other measurements					
Hour counter		■	■	■	■
Power-quality measurements					
Harmonic distortion		Current and voltage	■	■	■
Individual harmonics		Current and voltage	31 ⁽¹⁾	31	63
Waveform capture			-	■	■
Sag and swell detection			-	-	■
Data recording					
Min/max of instantaneous values		■	■	■	■
Data logs		-	2	4	4
Event logs		-	■	■	■
Trending / forecasting		-	-	■	■
Alarms		■	■	■	■
Time stamping		■	■	■	■
Display and I/O					
White backlit LCD display		■	■	■	■
Multilingual: English, French, Spanish		■	■	■	■
Digital input		1	1	1	1
Digital output or pulse output		1	1	1	1
Input metering capability (number of channels)		5	5	5	5
Communication					
RS485 port		2-wire	2-wire	2-wire	2-wire
Modbus protocol		■	■	■	■
RS232/RS485, 2- or 4-wire Modbus RTU/ASCII (with addition of PM8RDA module)		■	■	■	■

⁽¹⁾ With PM810LOG.

I/O selection guide

The PM800 can be fitted with 2 optional modules, unless otherwise indicated ⁽²⁾

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 bias 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

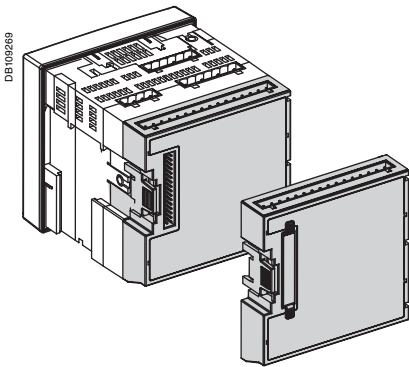
⁽²⁾ It is not possible to mount two PM8M22 modules. If the supply voltage of the PM800 is less than 208 V, only one PM8M2222 module can be mounted.



Rear view of Power Meter Series 800.

Electrical characteristics		
Type of measurement		True rms up to the 63rd harmonic On three-phase AC system (3P, 3P + N) 128 samples per cycle On single phase AC system (L-L, L-N, L-L+N)
Measurement accuracy	Current and voltage	±0.075 % of reading + ±0.025 % of full scale
	Power	PM810 ±0.5 % of reading + ±0.025 % of full scale
	PM820/PM850	±0.15 % of reading + ±0.025 % of full scale
	Frequency	±0.01 Hz from 45 to 67 Hz ±0.01 Hz from 350 to 450 Hz
	Active energy	IEC 62053-22 and ANSI C12.20 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) 0 to 3.2 MV AC (with external VT)
	Metering over-range	1.5 Un
	Impedance	2 MΩ (L-L) / 1 MΩ (L-N)
	Frequency measurement range	45 to 67 Hz and 350 to 450 Hz
	Input-current characteristics	CT ratings
		Secondary 1 A or 5 A
Measurement input range		0 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	110 to 415 ±10 % V AC, 11 VA
	DC	125 to 250 ±20 % V DC, 6 W
	Ride-through time	45 ms at 120 V AC
Input/outputs PM800	Static pulse output	Static 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	0 to 240 V AC or 0 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. / 24 V DC
PM8M26	Relay outputs	0 to 240 V AC, 0 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 - 30 V DC, 10 mA max. (feeds 8 digital inputs)
PM8M2222	Relay outputs	0 to 240 V AC, 0 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 Input	25 Hz, 50 % duty cycle (20 ms ON/OFF)
	PM8M2222 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
Installation category of options		II ⁽¹⁾
Mechanical characteristics		
Weight (meter + 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 (behind mounting surface)
	With 1 option	96 x 96 x 90 mm (behind mounting surface)
Environmental conditions		
Operating temperature	Meter	-25 °C to +70 °C ⁽²⁾
	Display	-10 °C to +50 °C
Storage temperature	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

(1) Installation category II, for power systems up to 347 V AC / 600 V AC.
(2) 65 °C if control power is above 305 V AC.



PM800 Series with I/O module.

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
U.S. and Canada	UL508

Communication

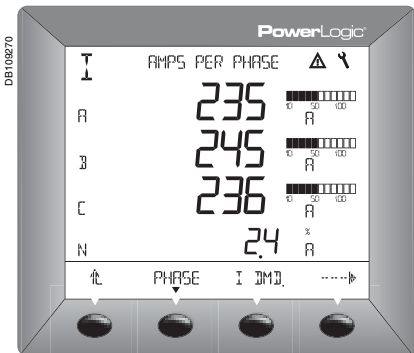
RS 485 port	2-wire, up to 38400 baud, Modbus
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Firmware characteristics

Data Logs	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
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 Four priority levels 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	80 kbytes in 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

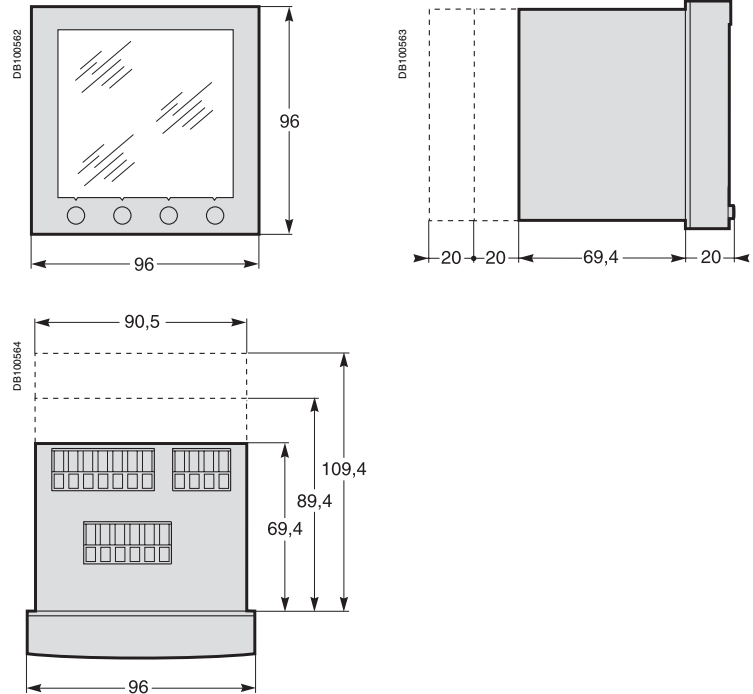
Languages	English, French, Spanish	
Display screen	Back-lit white LCD (6 lines total, 4 concurrent values)	
Dimensions	Display screen viewable area	73 x 69 mm
	Integrated display Overall	96 x 96 mm
	Depth meter + display	69.4 mm + 17.8 mm
	Remote display Overall	96 x 96 x 40 mm
Weight	Meter with remote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



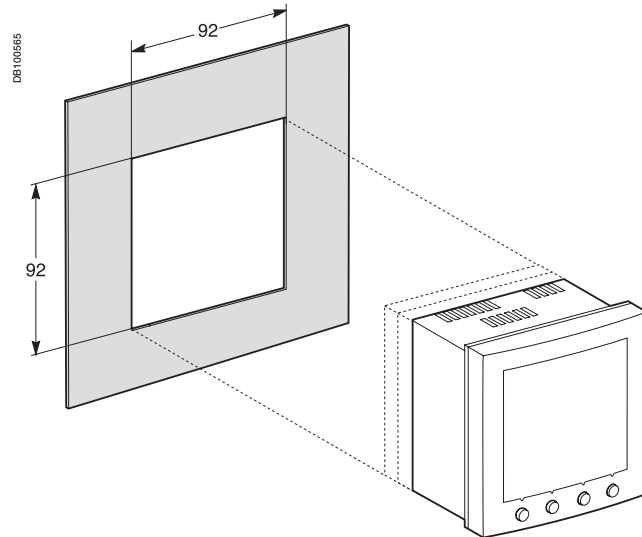
PM800 Series display screen showing bar graphs.

Power meter with integrated display

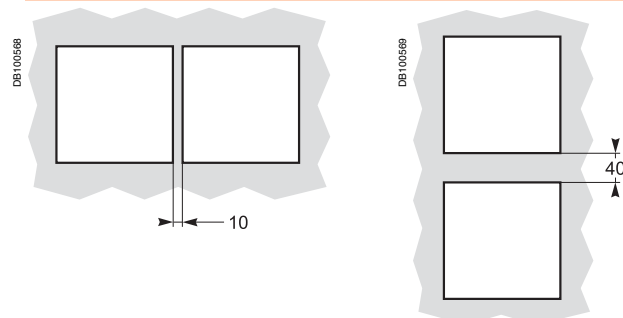
Dimensions



Front-panel mounting (meter with integrated display)

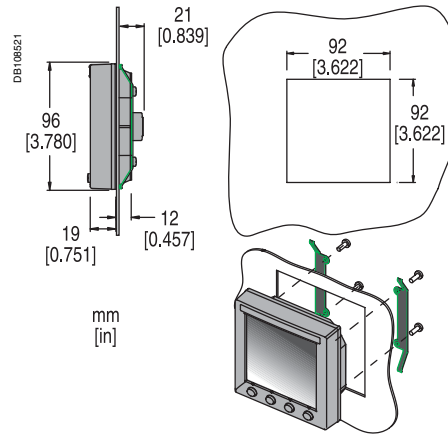


Spacing between units

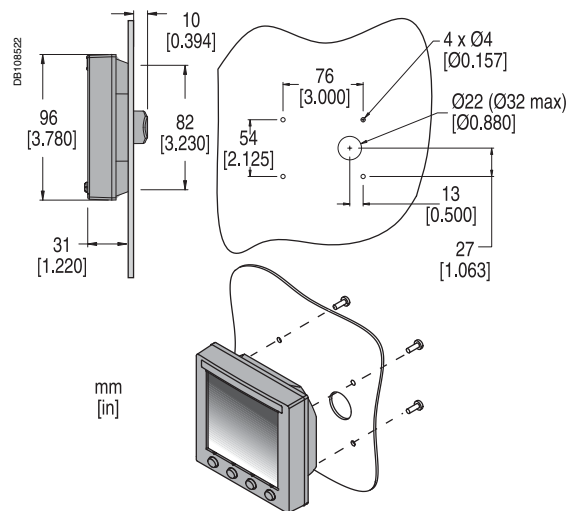


Remote display door mounting

Flush mounting

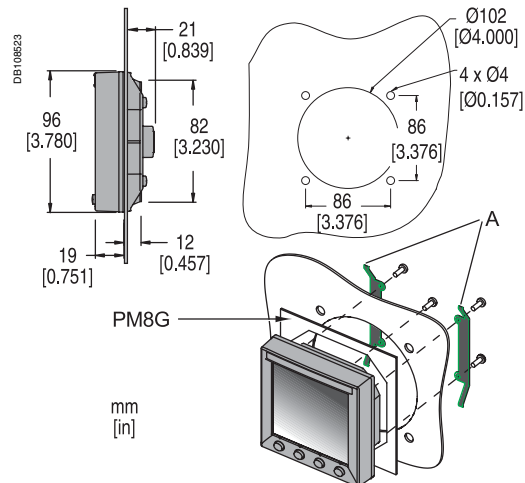


Surface mount

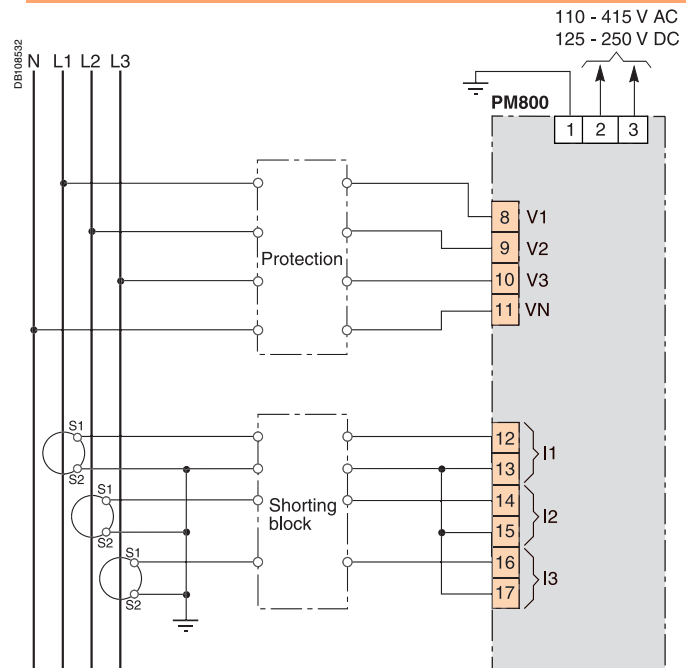


For mounting in a Ø102 cutout

(to replace an analogue device: ammeter, voltmeter, etc.)

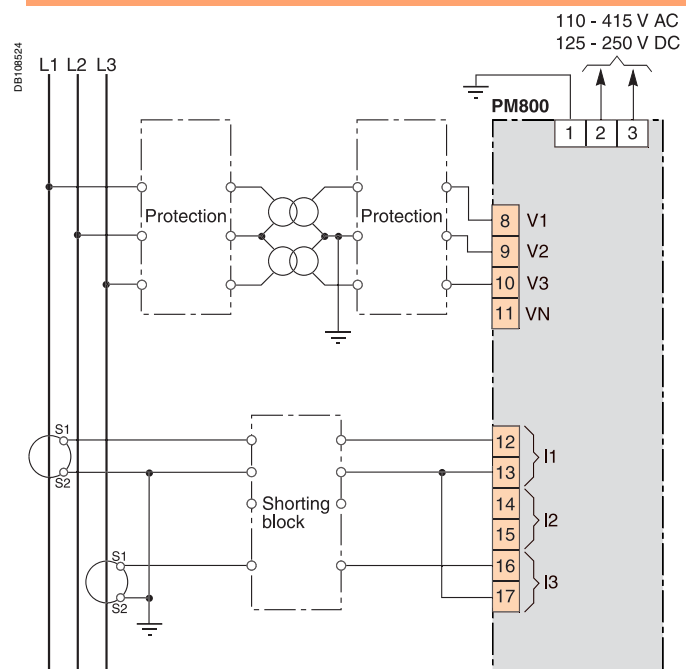


4-wire connection with 3 CTs and no PT



Connection example.

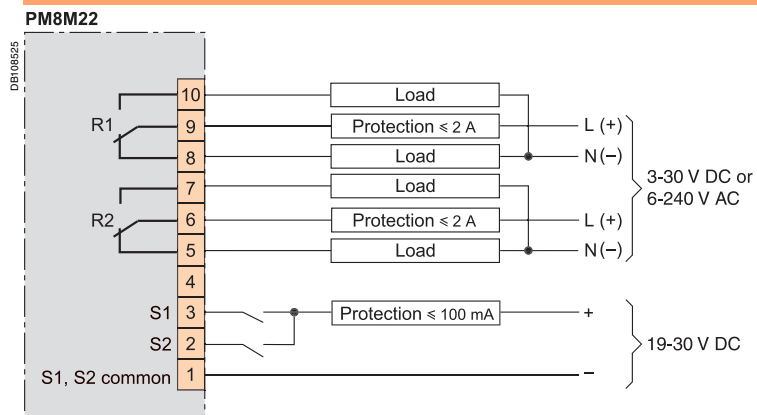
3-wire connection with 2 CTs and 2 PTs



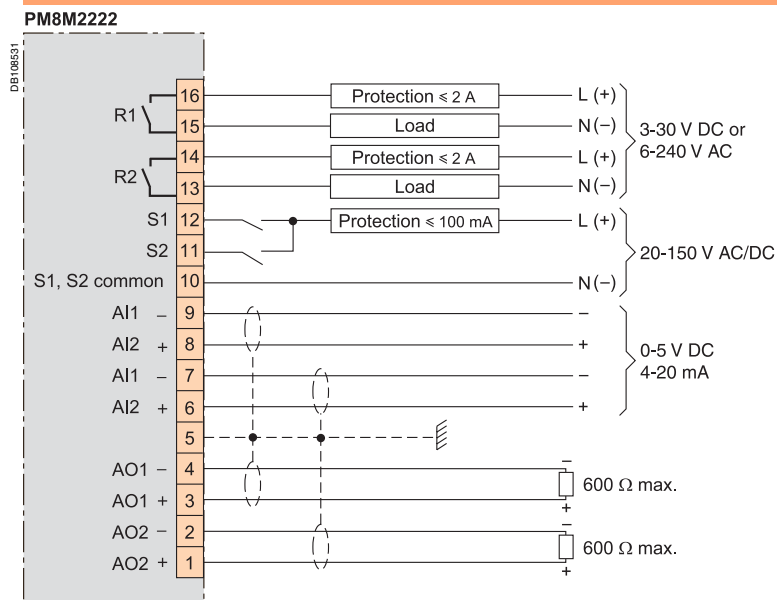
Connection example.

Note: Other types of connection are possible. See product documentation.

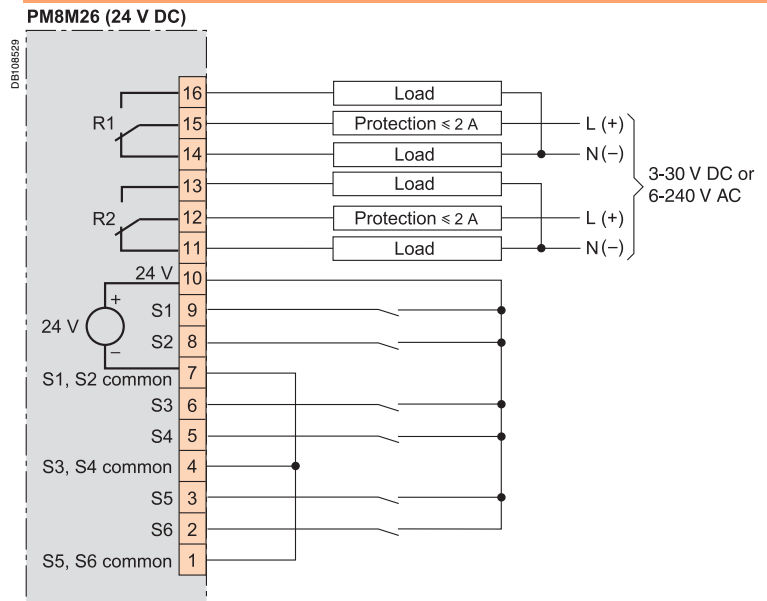
PM8M22 module



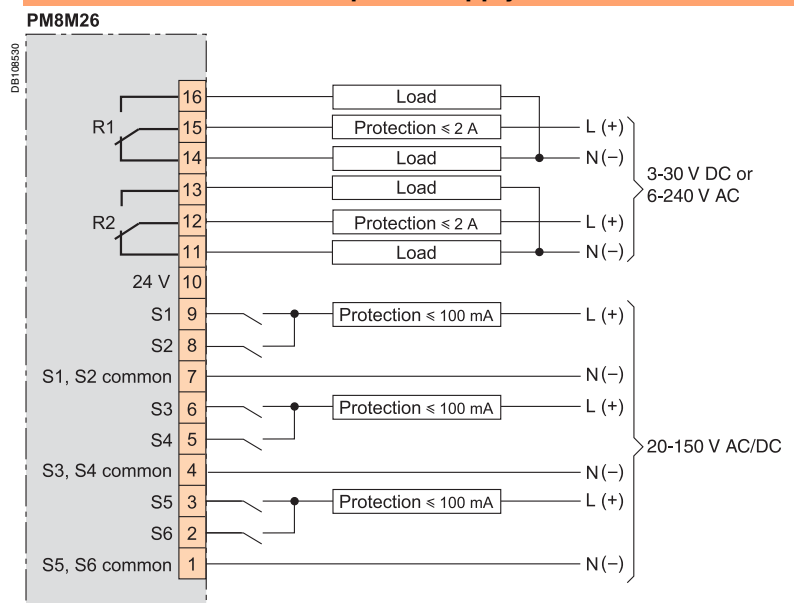
PM8M2222 module



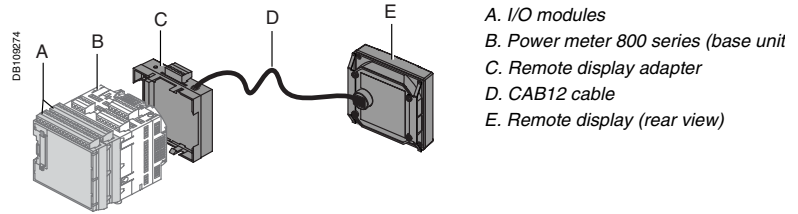
PM8M26 module internal 24 V DC power supply



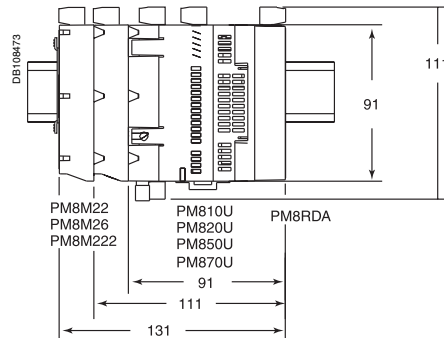
PM8M26 module external power supply



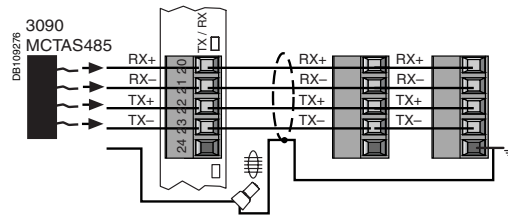
Remote display kit



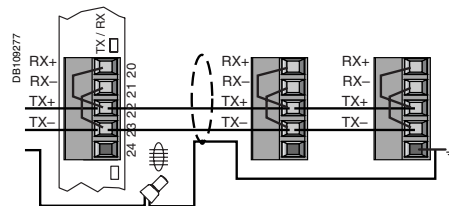
Dimension (meter with I/O and remote display adapter)



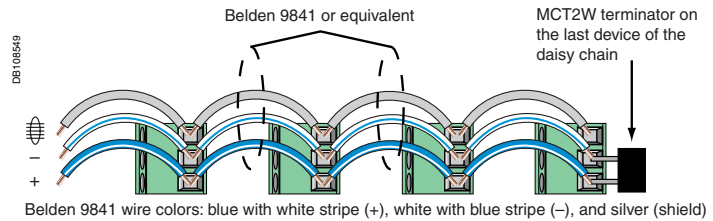
4-wire connection (RS 485) of remote display adapter



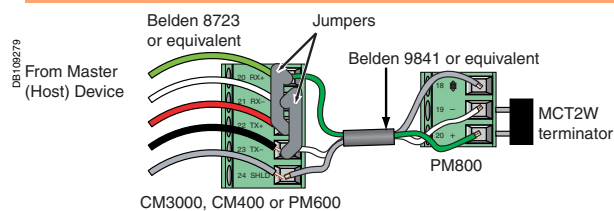
2-wire connection (RS 485) of remote display adapter



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

Notes

Schneider Electric Industries SAS

Postal address:
Electrical Distribution Communication
38050 Grenoble cedex 9 - France
Tel : +33 (0)4 76 57 60 60

<http://www.schneider-electric.com>
<http://www.merlin-gerin.com>

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Design: Schneider Electric
Publication: Schneider Electric
Printed: