

PowerLogic PM800 series

Intermediate metering

Technical data sheet



PM800 series

Functions and characteristics

PE86154



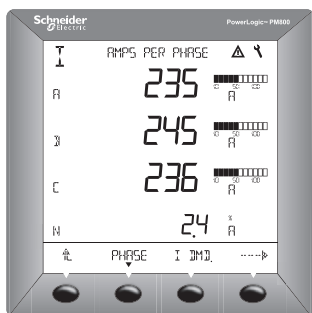
Front view of PowerLogic PM800 series meter with integrated display.

PB101823-50



Rear view of PowerLogic PM800 series meter.

PE86229



PowerLogic PM800 series meter display screen showing bar graphs.

The PowerLogic PM800 series meters 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, analogue inputs and outputs, and 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 -IT1(CBEMA)/SEMI F-47 standards. 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).

ANSI 12.20 Class 0.2S and IEC 62053-22 Class 0.5S accuracy for active energy
Accurate energy measurement for sub-billing and cost allocation.

PMD-S IEC61557-12 performance standard

Meets PMD/SD/K70/0.5 and PMD/SS/K70/0.5 requirements for combined Performance Measuring and monitoring Devices (PMD).

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 synchronisation 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 analogue 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

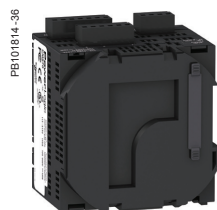
All models offer easy-to-install option modules (memory, I/O and communications) and downloadable firmware for enhanced meter capabilities.

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.

PM800 series

Functions and characteristics (cont.)



PowerLogic PM800 series meter without display.



PowerLogic PM800 series meter with integrated display.



PowerLogic PM800 series meter with remote display.



Remote display adapter with display and cable.



Remote display adaptor alone.

Part Numbers

Description

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 meter unit only, no display, basic instrumentation, THD, alarming, 80 kB logging (with PM810LOG)

PM810UMG

PM820 meter unit only, no display, basic instrumentation, THD, alarming, 80 kB logging

PM820UMG

PM850 meter unit only, no display, basic instrumentation, THD, alarming, 800 kB logging, waveform capture

PM850UMG

PM870 meter unit only, no display, basic instrumentation, THD, alarming, 800 kB logging, configurable waveform capture and disturbance detection.

PM870UMG

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 meter with integrated display,

PM810MG

PM820 meter with integrated display

PM820MG

PM850 meter with integrated display

PM850MG

PM870 meter with integrated display

PM870MG

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 m (9.9 ft 10 inches).

PM810 meter with remote display

PM810RDMG

PM820 meter with remote display

PM820RDMG

PM850 meter with remote display

PM850RDMG

PM870 meter with remote display

PM870RDMG

Parts and accessories

Remote display adapter with remote display and a 3 m (9 ft 10 inch) cable

PM8RDMG

Use this combination of remote display, adapter, and 3 m 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).

Remote display adapter alone

PM8RDA

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.

Part number list continued on next page.

PM800 series

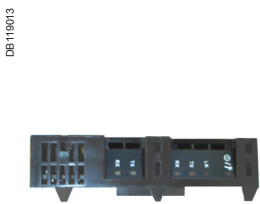
Functions and characteristics (cont.)



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



ECC module (front view)



ECC module (side view showing LED indicators).



PowerLogic PM8M26 module.



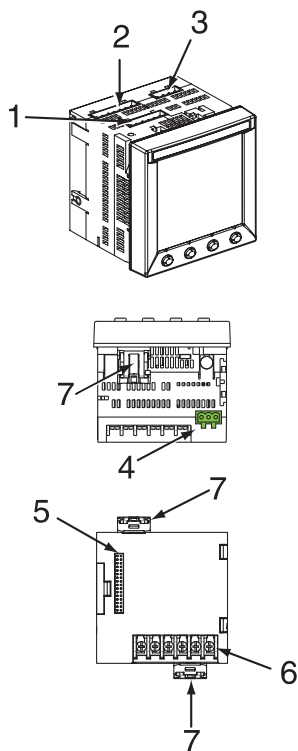
PowerLogic PM800 with PM8M22 and PM8M26 modules.

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
The PM8ECC supports a private host PM8ECC MIB. Use of this MIB allows the reading of Basic Metering Data, Configuration and Status of I/Os and Configuration and Status of Alarms, plus SNMP Trap generation in response to any PM8 on-board alarms.	
2 relay outputs, 2 digital inputs	PM8M22
2 relay outputs, 6 digital inputs	PM8M26
2 relay outputs, 2 digital inputs, 2 analogue outputs, 2 analogue 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 m (9 ft 10 inch)	CAB12
Cable for remote display adapter 9.14 m (30 ft)	CAB30

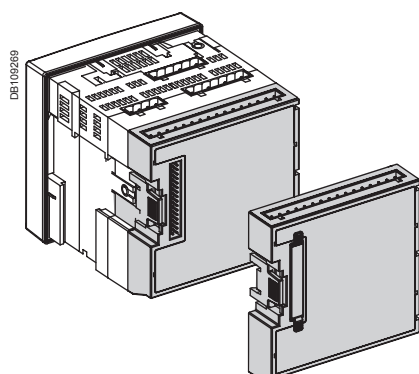
PM800 series

Functions and characteristics (cont.)



PowerLogic PM800 series 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.



PowerLogic PM800 series meter with I/O module.

Selection guide	PM810	PM820	PM850	PM870
Performance standard				
ANSI 12.20 Class 0.2S	■	■	■	■
PMD-S IEC 61557-12 PMD/SD/K70/0.5 and PMD/SS/K70/0.5	■	■	■	■
General				
Use on LV and HV systems	■	■	■	■
Current and voltage accuracy	0.5 %/0.2%	0.5 %/0.2%	0.5 %/0.2%	0.2 %/0.2%
Active energy accuracy (5% to 200% of load)	0.2 %	0.2 %	0.2%	0.2%
Number of samples per cycle	128	128	128	128
Instantaneous rms values				
Current, voltage, frequency	■	■	■	■
Active, reactive, apparent power Total & per phase	■	■	■	■
Power factor Total & per phase	■	■	■	■
Energy values				
Active, reactive, apparent energy	■	■	■	■
Configurable accumulation mode	■	■	■	■
Demand values				
Current Present & max.	■	■	■	■
Active, reactive, apparent power Present & max.	■	■	■	■
Predicted active, reactive, apparent power	■	■	■	■
Synchronisation of the measurement window	■	■	■	■
Demand calculation modeBlock, sliding, thermal	■	■	■	■
Other measurements				
Hour counter	■	■	■	■
Power quality measurements				
Harmonic distortion Current & voltage	■	■	■	■
Individual harmonics Current & voltage	31 ⁽¹⁾	31	63	63
Waveform capture	-	-	■ ⁽⁴⁾	■ ⁽²⁾
EN50160 - ITI(CBEMA)/SEMI F-47	-	-	■ ⁽⁴⁾	■
Sag and swell detection	-	-	-	■
Data recording				
Min/max of instantaneous values	■	■	■	■
Data logs	2 ⁽¹⁾	2	4	4
Event logs	-	■	■	■
Trending / forecasting	-	-	■	■
GPS synchronisation	■ ⁽¹⁾	■	■	■
Alarms	■	■	■	■
Time stamping	■ ⁽¹⁾	■	■	■
Display and I/O				
White backlit LCD display	■	■	■	■
Multilingual	■	■	■	■
Digital input (standard/optional)	1/12	1/12	1/12	1/12
Digital output (standard/optional)	1 KY/4 RY	1 KY/4 RY	1 KY/4 RY	1 KY/4 RY
Analogue inputs (standard/optional)	0/4	0/4	0/4	0/4
Analogue outputs (standard/optional)	0/4	0/4	0/4	0/4
Input metering capability (number of 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)	■	■	■	■
Ethernet 10/100Base Tx UTP port and RS485 Modbus serial master port with PM8ECC	■	■	■	■

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

Input/Output modules	PM8M22	PM8M26*	PM8M2222
Relay outputs	2	2	2
Digital inputs	2	6	2
Analogue outputs 4-20 mA			2
Analogue inputs 0-5 Vdc or 4-20 mA			2

* Includes a 24 Vdc Power Supply that can be used to power the digital inputs

(1) With PM810LOG, battery-backed internal clock and 80 kB memory. (2) Configurable. (3) Series 800 Power Meters supports up to two option modules. When PM8M2222 & PM8ECC are mounted together with control power > 370 V AC temperature rating must be reduced to -25°C to 50°C. Same applies when using two PM8M2222. (4) PM850 does not include sag or swell detection.

PM800 series

Functions and characteristics (cont.)

Electrical characteristics			
Type of measurement		63rd harmonic, 128 samples per cycle	
Measurement accuracy standard PMD-S IEC 61557-12 compliant			
	Current	0.5% from 0.5 A to 10 A	
	Voltage	0.2% 10 V - 277 V	
	Power Factor	+/- 0.002 from 0.500 leading to 0.500 lagging	
	Active Power	0.2%	
	Frequency	+/- 0.01 Hz at 45 to 67 Hz +/- 0.01 Hz at 350 to 450 Hz	
	Active Energy	IEC 62053-22 Class 0.5S and ANSI C12.20 Class 0.2S	
	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 MW
	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 AC
	Permissible overload		15 A continuous 50 A for 10 seconds per hour 500 A for 1 second per hour
	Impedance		< 0.1 W
	Load		< 0.15 VA
	Control Power	AC	115 to 415 ±10 % V AC, 15 VA with options at 45 to 67 Hz or 350 to 450 Hz
DC		125 to 250 ±20 % V DC, 10 W with options	
Ride-through time		45 ms at 120 V AC or 125 V DC	
Inputs/Outputs ⁽²⁾			
Standard (meter unit)	1 digital KY pulse output		6 to 220 V AC ± 10% or 3 to 250 V DC ± 10%, 100 mA max. at 25 °C, 1350 V rms isolation
	1 digital input		24 to 125 V AC/DC ±10 %, < 5 mA maximum burden, 1350 Vrms isolation
PM8M22 option	2 relay outputs ⁽¹⁾		6 to 240 V AC or 6 to 30 V DC 2 A rms, 5 A max. for 10 seconds per hour
	2 digital inputs		19 to 30 V DC, 5 mA max. at 24 V DC
PM8M26 option	2 relay outputs ⁽¹⁾		6 to 240 V AC, 6 to 30 V DC 2 A rms, 5 A max. for 10 seconds per hour
	6 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 option	2 relay outputs ⁽¹⁾		6 to 240 V AC, 6 to 30 V DC 2 A rms, 5 A max. for 10 seconds per hour
	2 digital inputs		20 to 150 V AC/DC, 2 mA max.
	2 analogue outputs		4 to 20 mA dc into 600 ohms maximum
	2 analogue inputs		Adjustable from 0 to 5 V DC or 4-20 mA
Switching frequency (digital I/O)	Standard	Input/output	25 Hz, 50 % duty cycle (20 ms ON/OFF)
	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 characteristics			
Weight (meter with integrated display)		0.6 kg	
IP degree of protection (IEC 60529)		IP52 integrated display. Type 12 compliant remote display (with gasket). 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 ⁽²⁾	
	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) Mechanical endurance: 15 million operations, Electrical endurance: 25000 commutations at 2 A / 250 V AC (2) Series 800 Power Meters supports up to two option modules. When PM82222 & PM8ECC are mounted together with control power >370 V AC temperature rating must be reduced to -25 °C to 50 °C. Same is true when using two PM8M2222.


PM800 series

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	CE industrial environment/FCC part 15 class A EN 55011
Harmonics emissions	IEC 61000-3-2
Flicker emissions	IEC 61000-3-3
Surge immunity	IEC 61000-4-12
Surge withstand capability (SWC)	ANSI C37.90.1.2002

Safety

Europe	CE, as per IEC 61010-1  ⁽¹⁾
U.S. and Canada	cULus (UL508 and CAN/CSA C22.2 No. 14-M95, Industrial Control Equipment)

Onboard communications

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

Data Logs	PM810 with PM810LOG, PM820, PM850 and PM870: - 1 billing log - 1 customisable 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 shift	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, AND, 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 (all models)	Update via the communication ports File download available free from www.powerlogic.com
Bar graphs (all models)	Graphical representation of system performance

Display characteristics

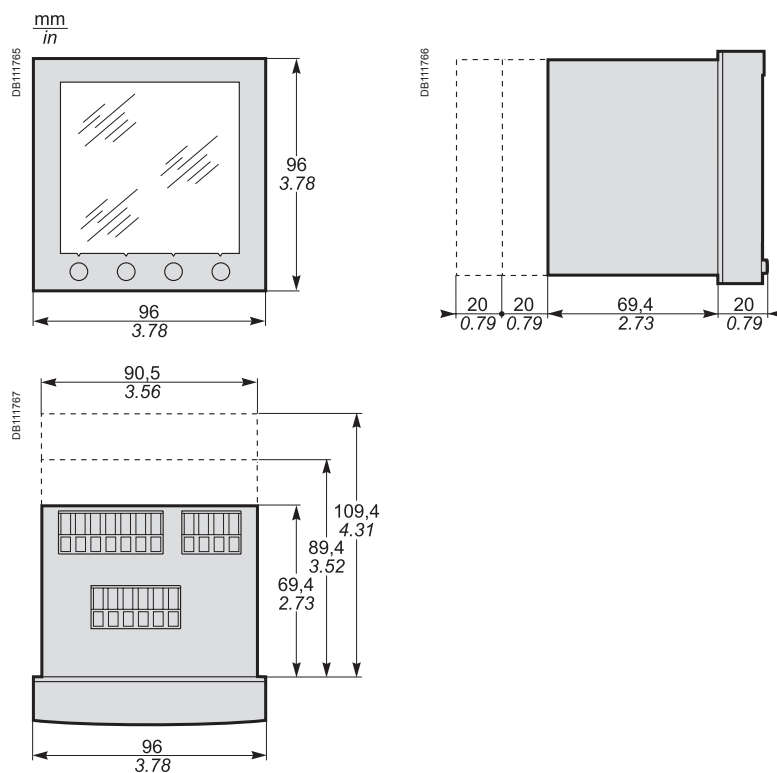
Languages	English, French, Spanish, German, Russian, Turkish and Portuguese.	
Display screen	Back-lit white LCD (6 lines total, 4 concurrent values)	
Dimensions	Display screen viewable area	73 x 69 mm
	Integrated display Overall	96 x 96 mm
	Depth meter + display	69.4 mm + 17.8 mm
	Remote display Overall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

Power Meter Series 800

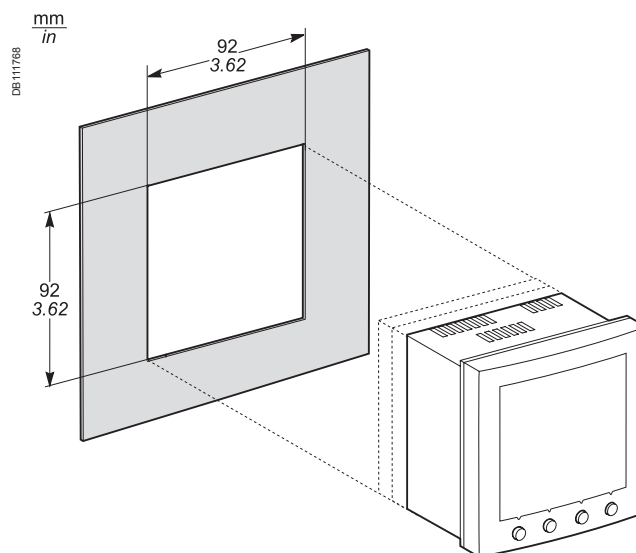
Dimensions and connection

Power meter with integrated display

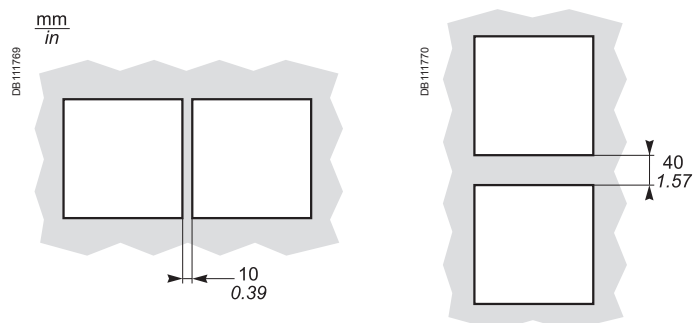
Dimensions



Front-panel mounting (meter with integrated display)



Spacing between units

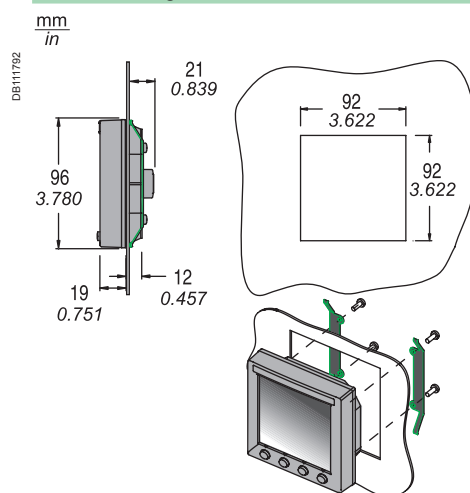


Power Meter Series 800

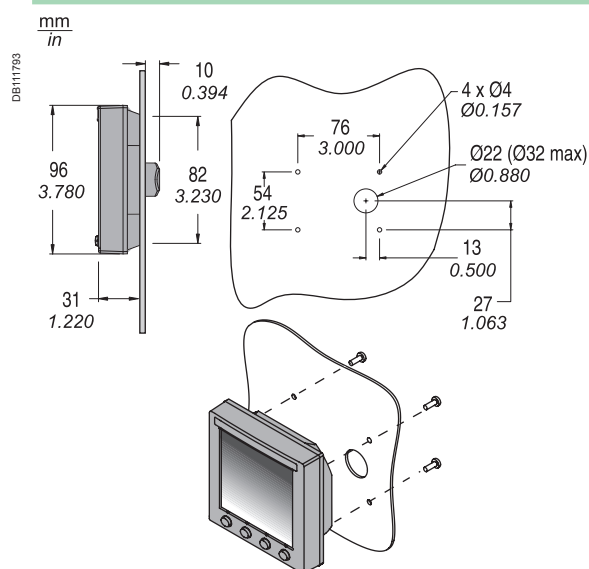
Dimensions and connection (cont.)

Remote display door mounting

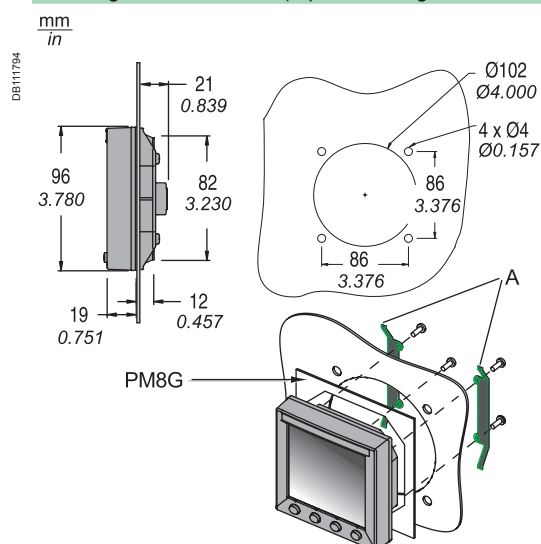
Flush mounting



Surface mount



Mounting in a Ø102 cutout (replace analogue device: ammeter, voltmeter, etc.)



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