PowerLogic PM8000 series

Intermediate metering

Technical data sheet

Schneider Electric

PM8000 series
Functions and characteristics

PB113667

PB113668

The PowerLogic PM8000 series meter is a highly accurate, extremely reliable power and energy meter with unmatched flexibility and usability. The meter combines accurate 3-phase energy and power measurements with data logging, power quality analysis, alarming and I/O capabilities not typically available in such a compact meter.
The PM8000 series meters are compliant with stringent international standards that guarantee their metering accuracy and power quality measurements. Ideal for industrial and critical power installations that are responsible for maintaining the operation and profitability of a facility.

Features and benefits

■ Maximize profits by providing the highest output possible with the least amount of risk to availability.
■ Optimize availability and reliability of electrical systems and equipment.
■ Monitor PQ for compliance and to prevent PQ problems.
■ Meters matched with SE power monitoring software (PME and PSE).

Main characteristics

■ Precision metering:
□ Class 0.2S accuracy IEC62053-22 (real energy), PDM-S IEC 61557-12
□ Industry leading Class 0.5 accuracy for reactive energy
□ Cycle-by-cycle RMS measurements updated every ½ cycle…
□ Full 'multi-utility' WAGES metering support
□ Net metering module
□ Utility sealable

■ PQ compliance reporting and basic PQ analysis
□ Monitors and logs parameters in support of international PQ standards, IEC 61000-4-30 PQI-S, IEC 61586, PDM-S IEC 61557-12
□ Generates onboard PQ compliance reports accessible via onboard web page:
□ Basic event summary and pass/fail reports, such as EN50160 or IEEE519*, for power frequency, supply voltage magnitude, supply voltage dips, short and long interruptions, temporary over voltages, voltage unbalance and harmonic voltage.
□ ITIC (CBEMA), SEMI curves, with alarm categorization to support further analyses
□ NEMA Motor Derating curve
□ Basic meter provides EN50160 but can be configured to provide IEEE519
□ Harmonic analysis:
□ Basic THD on voltage and current, per phase, min/max, custom alarming
□ Individual harmonic magnitudes and angles on voltage and current, up to the 63rd harmonic.
□ High Resolution Waveform Capture: triggered manually or by alarm, captured waveforms available directly from the meter via FTP server
□ Disturbance Detection and Capture: sag/swell on any current and voltage channel, alarm on disturbance, event waveform capture with per-event information
□ Patented Disturbance Direction Detection : determine disturbance direction relative to the meter's position in the electrical system; timestamped results provided in the event log, with degree of certainty of disturbance direction

■ Used with StruxureWare Power Monitoring Expert, provides detailed PQ reporting across entire network:
□ EN50160 2010 report (new standard)
□ IEEE519 report
□ IEC62586 report
□ New Vista diagram(s) showing PQ Compliance summary
□ Display of waveforms and PQ data from all connected meters

PM8000 series
Functions and characteristics (cont.)

PB113670

PowerLogic PM8000 remote display.

PB113671

PowerLogic PM8000 communications module.

PB113669

PowerLogic PM8000 series meter with remote display.

■ Onboard data and event logging
□ 10 MB of standard non-volatile memory to capture billing data, events, and waveforms
□ No data gaps due to network outages or server downtime
□ Minimum/Maximum Log: for all instantaneous readings
□ Data Logs: 50 user-definable logs, recording up to 16 parameters on a cycle-by-cycle or up to 3600 second interval; Logging continuous or 'snapshot' triggered by setpoint and stopped after defined duration.
□ Trend Logs: Trend energy, demand and other measured parameters; Forecasting: via web pages, automatically forecasting average, minimum and maximum for the next four hours and next four days.
□ Multi-tariff and Time-of-use: In conjunction with StruxureWare, provides 8 multi-tariff periods with automatic seasonal time and rate adjustments, and network-synchronized clock; Active, reactive and apparent energy and demand, with maximum (peak) demand during each tariff period
□ Event Log: all user-defined alarm conditions, metering configuration changes, and power outages, timestamped to 1 millisecond

■ Alarming and control
□ 50+ definable alarms to log critical event data, trigger waveform recording, or perform control function:
□ Trigger on any condition, with cycle-by-cycle and 1-second response time
□ Combine alarms using Boolean logic and to create alarm levels.
□ Timestamped alarm events stored in Event log.
□ Alarm notification via email and SMS text message
□ In conjunction with StruxureWare PME, alarm frequency categorized and trended for easy evaluation of worsening/improving conditions
■ Excellent quality: ISO 9001 / 14000 certified manufacturing

Usability
■ Easy installation and setup:
□ Panel and DIN rail mounting options, remote display option
□ Pluggable connectors
□ Free setup application simplifies meter configuration
■ Front panel:
□ Colour graphical display conveys data in immediately understandable way
□ Simple, intuitive menu navigation with multi-language (8) support
■ Flexible remote communications:
□ Multiple simultaneously operating communication ports and protocols allow the meter to be used as part of a power and energy management system and interface with other automation systems; e.g. captured waveforms, alarms, billing data and more can be uploaded to software for viewing and analysis while other systems access real-time information.
□ Support for Modbus TCP/IP, DNP3 serial, DNP3 TCP/IP, IEC61850
□ Dual port Ethernet: 10/100baseTx; Supports daisy-chaining, no need for additional Ethernet hubs; Can create redundant network loop using Rapid Spanning Tree Protocol (RSTP) and managed Ethernet switches; Individual TCP/IP protocol or port enable / disable
□ RS-485: 2-wire connection, up to 38.4 kbaud, Modbus RTU and ION protocols
□ Ethernet to serial gateway with Modbus Master functionality for connecting to 31 downstream serial Modbus devices, acquire data from any Modbus Serial device or Modbus TCP/IP Ethernet connected device on the network, then display via web page, make available to upstream software such as Stx PME, log it onboard, or use it in a custom framework for applications such as totalization or control.
□ Full function web server with factory and customizable web pages for simple access to real-time, historical, and PQ compliance data
□ "Push" historical files via email
□ Advanced security: configurable user accounts

■ Time synchronization via
□ SNTP: accurate to around 1 second
□ Unique NTP and IRIG-B time sync with 1 ms accuracy across the system: NTP implementation allows 1ms timestamping without additional connections to meter or external equipment..
□ Unique IRIG-B time sync: accurate to microseconds (requires additional hardware - GPS antenna, GPS receiver, IRIG-B clock, cabling for distribution, power supplies, and meter input).

PM8000 series
Functions and characteristics (cont.)

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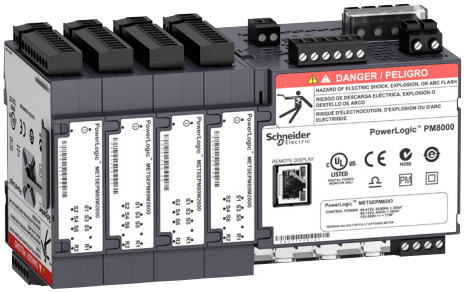

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Adaptability

■ ION frameworks allow customizable, scalable applications, object-oriented programming compartmentalizes functions increased flexibility and adaptability.

□ Applications include: Ability to access and aggregate data from Modbus devices on serial port or across the network (Modbus TCP/IP), logging and/or processing data by totalizing, unit conversion or other calculations, applying complex logic for alarming or control operations, data visualization via web pages

Modular I/O options

■ Base model includes

□ 4 digital status/counter inputs: to trigger alarms, trigger logging, synchronized to demand pulse or control conditional energy accumulation. Provides engineering units conversion for water, air, gas, electricity or steam utilities (WAGES) via digital input pulse counting, multiple inputs summed through a single channel.

□ 2 digital output relays: act in response to internal commands or alarms, digital input status changes, or remote control from software such as StruxureWare PME.

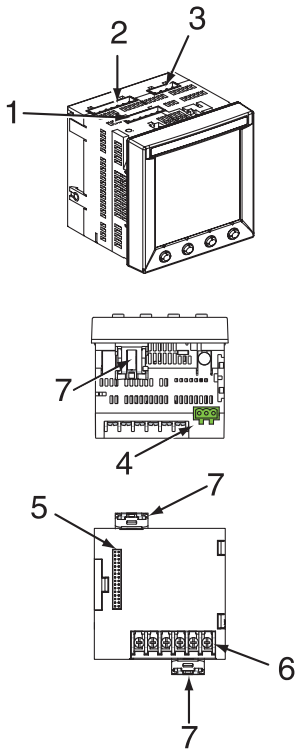
□ 1 KY (form A) energy pulse output: for interfacing with other systems

■ A range of optional field-installable expansion modules add digital and analogue I/O as required. Up to four expansion modules per meter.

□ Digital I/O module: 6 in, 2 relay out

□ Analog I/O module: 4 in, 2 out: analogue inputs for consumption/demand calculation capabilities.

PM8000 series
Functions and characteristics (cont.)



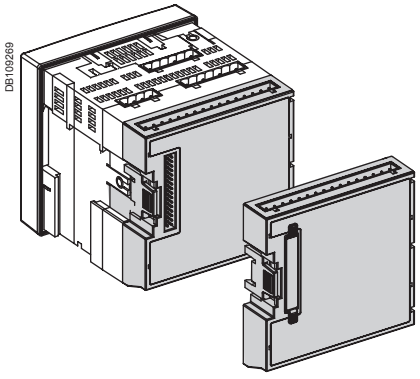
PowerLogic PM8000 series connectors.
1. Control power.
2. Voltage inputs.
3. Digital input/output.
4. RS 485 port.
5. Option module connector.
6. Current inputs.
7. Mounting clips.

Meters Available in First Release (July 2014)

METSEPM8240	Panel mount meter
METSEPM8243	DIN rail mount meter
METSEPM89RD96	display, 3 meter cable, mounting hardware for 30mm hole (plastic nut & centering pin), mounting hardware for 92mm cutout (plastic adapter plate)

Accessories available in First Release (July 2014)

METSEPM8000SK	Terminal covers and sealing instructions
METSEPMAK	Adapters for mounting meter and RMD back to back & ANSI 4”, 0.3 meter (1 ft.) Ethernet cable
METSECAB1	Display Cable, 1 meter
METSECAB3	Display Cable, 3 meters
METSECAB10	Display Cable, 10 meters
METSEPM8240DEMO	PM8240 sample meter
METSEPM8244DEMO	PM8243 sample meter with RMD
METSEPM8000DEMOK	PM8000 demo kit
METSEPM8000DEMOT	PM8000 table top display
9761DEMO7650PMxxx	ION demo case
METSEPM8HWK	5 connectors, mounting brackets, 4 CT screws
METSEPM8RDHWK	3 metre cable, centering pin, mounting nut, 92mm cutout mounting hardware, gasket



PowerLogic PM8000 series meter with I/O module.

PM8000 series
Functions and characteristics (cont.)

General		PM8000		
Use on LV and MV systems		■		
Intermediate metering with THD and min/max readings		■		
Instantaneous rms values				
Current	per phase, neutral and ground (PM5500)	■		
Voltage	Total, per phase L-L and L-N	■		
Frequency		■		
Real, reactive, and apparent power	Total and per phase	Signed, Four Quadrant		
True Power Factor	Total and per phase	Signed, Four Quadrant		
Displacement PF	Total and per phase	Signed, Four Quadrant		
% Unbalanced I, VL-N, VL-L		■		
Direct monitoring of neutral current				■
Energy values*				
Accumulated Active, Reactive and Apparent Energy		Received/Delivered; Net and absolute; Time Counters		
Demand values*				
Current average		Present, Last, Predicted, Peak, and Peak Date Time		
Active power		Present, Last, Predicted, Peak, and Peak Date Time		
Reactive power		Present, Last, Predicted, Peak, and Peak Date Time		
Apparent power		Present, Last, Predicted, Peak, and Peak Date Time		
Peak demand with time stamping D/T for current and powers		■		
Demand calculation	Sliding, fixed and rolling block, thermal methods	■		
Synchronization of the measurement window to input, communication command or internal clock		■		
Settable Demand intervals		■		
Demand calculation for Pulse input (WAGES)				■
Other measurements*				
I/O timer		■		
Operating timer		■		
Load timer		■		
Alarm counters and alarm logs		■		
Power quality measurements				
THD, thd (Total Harmonic Distortion) I, VLN, VLL per phase		I,VLN, VLL		
TDD (Total Demand Distortion)		■		
Individual harmonics (odds)		15th	31st	63rd
Neutral Current metering with ground current calculation				■
Data recording				
Min/max of instantaneous values, plus phase identification*		■		
Alarms with 1s timestamping*		■		
Data logging			2 fixed parameters kWh and kVAh with configurable interval and duration (e.g. 2 parameters for 60 days at 15 minutes interval)	Up to 14 selectable parameters with configurable interval and duration (e.g. 6 parameters for 90 days at 15 minutes interval)
Memory capacity			256 kB	1.1 MB
Min/max log		■	■	■
Maintenance, alarm and event logs			■	■
Customizable data logs				■
Inputs / Outputs / Mechanical Relays				
Digital inputs			2 (SI1, SI2)	4 (SI1, SI2, SI3, SI4) with WAGES support
Digital outputs		1 (kWh only)	2 (configurable)	
Form A Relay outputs			2	
Timestamp resolution in seconds			1	
Whetting voltage			■	

PM8000 series
Functions and characteristics (cont.)

Electrical characteristics			PM5100	PM5300	PM5500
Type of measurement: True rms on three-phase (3P, 3P + N), zero blind			64 samples per cycle		128 samples per cycle
Measurement accuracy	PDM-S IEC 61557-12		PMD/[SD|SS]/K70/0.5		PMD/[SD|SS]/K70/0.2
	Active Energy		Class 0.5S as per IEC 62053-22		Class 0.2S as per IEC 62053-22
	Reactive Energy		Class 2S as per IEC62053-24		Class 1S as per IEC62053-24
	Active Energy		±0.5%		±0.2%
	Reactive Energy		±2%		±1%
	Active Power		Class 0.5 as per PDM-S IEC 61557-12		Class 0.2 as per IEC PDM-S 61557-12
	Apparent Power		Class 0.5 as per PDM-S IEC 61557-12		
	Current, Phase		Class 0.5 as per PDM-S IEC 61557-12		±0.15%
	Voltage, L-N		Class 0.5 as per PDM-S IEC 61557-12		±0.1%
	Frequency		±0.05%		
	MID Directive EN50470-1, EN50470-3		Annex B and Annex D (Optional model references) Class C		
Input-voltage (up to 1.0 MV AC max, with voltage transformer)	Nominal Measured Voltage range		20 V L-N / 35 V L-L to 400 V L-N /690 V L-L absolute range 35 V L-L to 760 V L-L		20 V L-N / 20 V L-L to 400 V L-N /690 V L-L absolute range 20 V L-L to 828 V L-L
	Impedance		5 M Ω		
	F nom		50 or 60 Hz ±5%		50 or 60 Hz ±10%
Input-current	I nom		1 A or 5 A		
	Measured Amps with over range and Crest Factor		Starting current: 5mA Operating range: 50mA to 8.5A		Starting current: 5m A Operating range: 50 mA to 10 A
	Withstand		Continuous 20A, 10s/hr 50A, 1s/hr 500A		
	Impedance		< 0.3 mΩ		
	F nom		50 or 60 Hz ±5%		50 or 60 Hz ±10%
	Burden		<0.026VA at 8.5A		
AC control power	Operating range		100 - 277 V AC L-N / 415 V L-L +/-10% CAT III 300V class per IEC 61010		100-480 V AC ±10% CAT III 600V class per IEC 61010
	Burden		<5 W,11 VA at 415V L-L		<5W/16.0 VA at 480 V AC
	Frequency		45 to 65 Hz		
	Ride-through time		80 mS typical at 120V AC and maximum burden. 100 mS typical at 230 V AC and maximum burden 100 mS typical at 415 V AC and maximum burden		35 ms typical at 120 V L-N and maximum burden 129 ms typical at 230 V L-N and maximum burden
DC control power	Operating range		125-250 V DC ±20%		
	Burden		<4 W at 250 V DC		typical 3.1W at 125 V DC, max. 5W
	Ride-through time		50 mS typical at 125 V DC and maximum burden		
Outputs	Relay	Max output frequency		0.5 Hz maximum (1 second ON / 1 second OFF - minimum times)	
		Switching current		250 V AC at 8.0 Amps, 25 k cycles, resistive 30 V DC at 2.0 Amps, 75 k cycles, resistive 30 V DC at 5.0 Amps, 12.5 k cycles, resistive	
		Isolation		2.5 kV rms	
	Digital outputs		1	2	2
		Max load voltage	40 V DC		30 V AC / 60 V DC
		Max load current	20 mA		125 mA
		On Resistance	50 Ω max		8 Ω
		Meter constant	from 1 to 9,999,999 pulses per kWh		
		Pulse width for Digital Output	50% duty cycle		
		Pulse frequency for Digital Output	25 Hz max.		
		Leakage current	0.03 micro Amps		1 micro Amps
		Isolation	5 kV rms		2.5 kV rms
	Optical outputs				
		Pulse width (LED)	200 ms		
		Pulse frequency	50 Hz. max.		2.5 kHz. max
		Meter constant	from 1 to 9,999,999 pulses per kWh		

PM8000 series
Functions and characteristics (cont.)

Electrical characteristics (cont'd)		PM5100	PM5300	PM5500
Status Inputs	ON Voltage		18.5 to 36 V DC	30 V AC / 60 V DC max
	OFF Voltage		0 to 4 V DC	
	Input Resistance		110 k Ω	100 k Ω
	Maximum Frequency		2 Hz (T ON min = T OFF min = 250 ms)	25 Hz (T ON min = T OFF min = 20 ms)
	Response Time		20 ms	10 ms
	Opto Isolation		5 kV rms	2.5 kV rms
	Whetting output		24 V DC/ 8mA max	
	Input Burden		2mA @24V DC	2 mA @ 24 V AC/DC
Mechanical characteristics				
Product weight		380 g	430 g	450 g
IP degree of protection (IEC 60529)		IP52 front display, IP30 meter body		
Dimensions W x H x D [protrusion from cabinet] *		96 x 96 x 72mm (77mm for PM5500) (depth of meter from housing mounting flange) [13mm]		
Mounting position *		Vertical		
Panel thickness		6 mm maximum		
Environmental characteristics				
Operating temperature	Meter	-25 °C to 70 °C		
	Display (Display functions to -25° with reduced performance)	-25 °C to +70 °C		
Storage temp.		-40 °C to +85 °C		
Humidity range		5 to 95 % RH at 50 °C (non-condensing)		
Polution degree		2		
Altitude		2000 m CAT III / 3000 m CAT II		3000 m max. CAT III
Electromagnetic compatibility**				
Harmonic current emissions		IEC 61000-3-2		
Flicker emissions		IEC 61000-3-3		
Electrostatic discharge		IEC 61000-4-2		
Immunity to radiated fields		IEC 61000-4-3		
Immunity to fast transients		IEC 61000-4-4		
Immunity to surge		IEC 61000-4-5		
Conducted immunity 150kHz to 80MHz		IEC 61000-4-6		
Immunity to magnetic fields		IEC 61000-4-8		
Immunity to voltage dips		IEC 61000-4-11		
Radiated emissions		FCC part 15, EN 55022 Class B		
Conducted emissions		FCC part 15, EN 55022 Class B		

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