PowerLogic PM8000 series

Intermediate metering

Technical data sheet

Schneider Electric

PM8000 series
Functions and characteristics

PowerLogic PM8000 series meter

PowerLogic PM8000 series meter - rear view

PowerLogic PM8000 DIN rail mounted meter

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.

Applications 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 power quality (PQ) for compliance and to prevent problems.
■ Meters fully supported by StruxureWare Power Monitoring Expert and PowerSCADA Expert Software.

Main characteristics
■ Precision metering:
□ IEC 61557-12 PMD Sx K70 3000m 0.2 (performance measuring and monitoring functions).
□ Class 0.2S accuracy IEC 62053-22, ANSI C12.20 Class 0.2 (active energy).
□ Industry leading Class 0.5S* accuracy for reactive energy (IEC 62053-24).
□ Cycle-by-cycle RMS measurements updated every ½ cycle.
□ Full 'multi-utility' WAGES metering support.
□ Net metering.
□ Anti-tamper protection seals.

■ PQ compliance reporting and basic PQ analysis.
□ Monitors and logs parameters in support of international PQ standards,
  - IEC 61000-4-30 Class S
  - IEC 62586
  - EN 50160
□ Generates onboard PQ compliance reports accessible via onboard web pages:
  - Basic event summary and pass/fail reports, such as EN 50160 for power frequency, supply voltage magnitude, supply voltage dips, short and long interruptions, temporary over voltages, voltage unbalance and harmonic voltage.
  - ITIC (CBEMA) and SEMI curves, with alarm categorization to support further analyses.
  - NEMA Motor Derating curve.
  - Basic meter provides EN 50160 but can be configured to provide IEEE 519.
□ Harmonic analysis:
  - 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 in a COMTRADE format.
□ 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: provides indication of the captured disturbance occurring upstream or downstream of the meter; timestamped results provided in the event log, with degree of certainty of disturbance direction.

■ Used with StruxureWare Power Monitoring Expert software, provides detailed PQ reporting across entire network:
□ EN 50160 report.
□ IEC 61000-4-30 report.
□ PQ compliance summary.
□ ISO 50001.
□ Display of waveforms and PQ data from all connected meters.
■ Onboard data and event logging.
□ 512 MB of standard non-volatile memory. 10 MB of standard non-volatile memory dedicated to capture billing data, events, and waveforms.

*Certification pending

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PM8000 series
Functions and characteristics (cont.)

PowerLogic remote display.

PowerLogic I/O module.

PowerLogic PM8000 series meter with remote

□ No data gaps due to network outages or server downtime.
□ Min/Max log for standard values.
□ 50 user-definable data logs, recording up to 16 parameters on a cycle-by-cycle or other user definable interval.
□ Continuous logging or 'snapshot' triggered by setpoint and stopped after defined duration.
□ Trend energy, demand and other measured parameters.
□ Forecasting via web pages: average, minimum and maximum for the next four hours and next four days.
□ Time-of-use in conjunction with StruxureWare software.
□ Event log: 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.
□ Alarm notification via email text message.
□ In conjunction with StruxureWare Power Monitoring Expert, software alarms and alarm frequency are categorized and trended for easy evaluation of worsening/ improving conditions.

■ Excellent quality: ISO 9001 and ISO 14000 certified manufacturing.

Ease of use
■ Easy installation and setup.
■ Panel and DIN rail mounting options, remote display option.
□ Pluggable connectors.
□ Free setup application simplifies meter configuration.

■ Front panel.
□ Easy to read colour graphic display.
□ Simple, intuitive menu navigation with multi-language (8) support.

■ Flexible remote communications.
□ Multiple simultaneously operating communication ports and protocols allow interfacing with other automation systems; (e.g. waveforms, alarms, billing data, etc.) can be uploaded for viewing/analysis while other systems access real-time information.
□ Supports Modbus, ION, DNP3, IEC 61850.
□ Dual port Ethernet: 10/100BASE-TX; daisy-chaining capability removes need for additional switches.
□ Create redundant network loop using Rapid Spanning Tree Protocol (RSTP) and managed Ethernet switches.
□ Customize TCP/IP port numbers enable/disable individual ports.
□ RS-485 2-wire connection, up to 115200 baud, Modbus RTU and ION protocols, DNP3 is also supported via RS-485.
□ Ethernet to serial gateway with Modbus Master functionality, connecting to 31 downstream serial Modbus devices. Also supports Modbus Mastering over TCP/IP (Ethernet) network.
□ Full function web server with factory and customizable pages to access real-time and PQ compliance data.
□ Push historical data via email.
□ Advanced security: Up to 16 configurable user accounts.

■ Time synchronization via:
□ GPS clock (RS-485) or IRIG-B (digital input) to +/- 1 millisecond.
□ Also supports Network Time Protocol (NTP/SNTP) and time set function from StruxureWare software server.

Adaptability
■ ION™ frameworks allow customizable, scalable applications, object-oriented programming, compartmentalizes functions, and increases flexibility and adaptability.
□ Applications include: 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.

PM8000 series
Functions and characteristics (cont.)

PowerLogic PM8000 series meter with I/O modules.

Standard meter I/O
- 3 digital status/counter inputs.
- 1 KY (form A) energy pulse output for interfacing with other systems.

Modular I/O options
- Optional expansion modules (up to 4 per meter) add digital/analogue I/O.

Option modules include:

- Digital module
  - □ 6 digital status/counter inputs.
  - □ 2 Form C relay outputs, 250 V AC / 30 V DC, max current 8 A at 250 V AC or 5 A at 24 V DC, 20 k cycles (resistive).

- Analogue module
  - □ 4 analogue inputs (4-20 mA; 0-30 V).
  - □ 2 analogue outputs (4-20 mA; 0-10 V) for interfacing with building management sensors and systems.

Commercial Reference numbers	
Meter description	**Commercial ref. no.**
DIN96 panel mount meter	**METSEPM8240**
DIN rail mount meter	**METSEPM8243**
DIN rail mount meter with remote display	**METSEPM8244**
Accessories description	**Commercial ref. no.**
Remote display, 3 m cable, mounting hardware for 30 mm hole (nut & centering pin), mounting hardware for DIN96 cutout (92 x 92 mm) adapter plate	**METSEPM89RD96**
Terminal covers for utility sealing	**METSEPM8000SK**
Adapters for mounting meter and remote display back to back & ANSI 102 mm, 300 mm Ethernet cable	**METSEPMAK**
Display cable, 1 metre	**METSECAB1**
Display cable, 3 metres	**METSECAB3**
Display Cable, 10 metres	**METSECAB10**
Digital I/O module (6 digital inputs & 2 relay outputs)	**METSEPM89M2600**
Analogue I/O module (4 analogue inputs & 2 analogue outputs)	**METSEPM89M0024**
PM8000 hardware kit	**METSEPM8HWK**
PM8000 remote display hardware kit	**METSEPM8RDHWK**

PowerLogic™ PM8000 bottom view DIN mounting.

Features guide		PM8000
General		
Use on LV and MV systems		■
Current accuracy (5 A Nominal)		0.1 % reading
Voltage accuracy (57 V L-N/100 V L-L to 400 V L-N/690 V L-L)		0.1 % reading
Active energy accuracy		0.2 %
Number of samples/cycle or sample frequency		256
Instantaneous rms values		
Current, voltage, frequency		■
Active, reactive, apparent power	Total and per phase	■
Power factor	Total and per phase	■
Current measurement range (autoranging)		0.05 A to 10 A
Energy values		
Active, reactive, apparent energy		■
Settable accumulation modes		■
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		■
Setting of calculation mode	Block, sliding	■
Power quality measurements		
Harmonic distortion	Current and voltage	■
Individual harmonics	Via front panel and web page	63
	Via StruxureWare software	63
Waveform capture		■
Detection of voltage swells and sags		■
Fast acquisition	1/2 cycle data	■
EN 50160 compliance checking		■
Customizable data outputs (using logic and math functions)		■
Data recording		
Min/max of instantaneous values		■
Data logs		■
Event logs		■
Trending/forecasting		■
SER (Sequence of event recording)		■
Time stamping		■
GPS synchronisation (+/- 1 ms)		■
Memory (in Mbytes)		512
Display and I/O		
Front panel display		■
Wiring self-test		■
Pulse output		1
Digital or analogue inputs(max)		27 digital 16 analogue
Digital or analogue outputs (max, including pulse output)		1 digital 8 relay 8 analogue
Communication		
RS-485 port		1
Ethernet port		2
Serial port (Modbus, ION, DNP3)		■
Ethernet port (Modbus/TCP, ION TCP, DNP3 TCP, IEC 61850 [2])		■
Ethernet gateway		■
Alarm notification via email		■
HTTP web server		■
SNMP with custom MIB and traps for alarms		■
SMTP email		■
NTP time synchronization		■
FTP file transfer		■

Electrical characteristics		PM8000
Type of measurement		True rms to 256 samples per cycle
Measurement accuracy	Current & voltage	Class 0.2 as per IEC 61557-12
	Active Power	Class 0.2 as per IEC 61557-12
	Power factor	Class 0.5 as per IEC 61557-12
	Frequency	Class 0.2 as per IEC 61557-12
	Active energy	Class 0.2S IEC 62053-22 (In=5 A) Class 0.2 IEC 61557-12, ANSI C12.20 Class 0.2
	Reactive Energy	Class 0.5S IEC 62053-24
Data update rate		1/2 cycle or 1 second
Input-voltage characteristics	Specified accuracy voltage	57 V L-N/100 V L-L to 400 V L-N/690 V L-L
	Impedance	5 M per phase
	Specified accuracy frequency - Frequency	42 Hz to 69 Hz (50/60 Hz nominal)
	Limit range of operation - frequency	20 Hz to 450Hz
Input-current characteristics	Rated nominal current	1 A (0.5S), 5 A (0.2S) , 10 A (0.2 ANSI)
	Specified accuracy current range	Starting Current: 5 mA Accurate Range: 50 mA - 10 A
	Permissible overload	200 A rms for 0.5S, non-recurring
	Impedance	0.0003 per phase
	Burden	0.024 VA at 10 A
Power supply	AC	90-415 V AC ±10 % (50/60 Hz ± 10 %)
	DC	120-300 V DC ±10 %
	Ride-through time	100 ms (6 cycles at 60 Hz) min., any condition 200 ms (12 cycles at 60 Hz) typ., 120 V AC 500 ms (30 cycles at 60 Hz) typ., 415 V AC
	Burden	Meter Only: 18 VA max at 415 V AC, 6 W at 300 V DC Fully optioned meter: 36 VA max at 415 V AC, 17 W at 300 V DC.
Input/outputs	Meter Base Only	3 form A digital inputs (30 V AC/60 V DC) 1 form A (KY) solid state digital output (30V AC/60 V DC, 75 mA).
	Optional	Digital - 6 form A digital inputs (30 V AC / 60 V DC) wetted + 2 form C relay outputs (250 V AC / 30 V DC, 8 A at 250 V AC or 5 A at 24 V DC)
		Analogue - 4 analogue inputs (4-20 mA, 0-30 V DC) + 2 analogue outputs (4-20 mA, 0-10 V DC).
Mechanical characteristics		
Weight		Integrated Display Model 0.581 kg DIN rail mounted Model 0.528 kg IO modules 0.140 kg Remote display 0.300 kg
IP degree of protection		IP 54, UL type 12: Panel mount and Remote display, front. IP 30: Panel mount rear, DIN rail mount, I/O modules.
Dimensions	Panel mount model	96 x 96 x 77.5 mm
	DIN model	90.5 x 90.5 x 90.8 mm
	Remote display	96 x 96 x 27 mm
	IO modules	90.5 x 90.5 x 22 mm
Environmental conditions		
Operating temperature		-25 ºC to 70 ºC
Remote Display Unit		-25 ºC to 60 ºC
Storage temperature		-40 ºC to 85 ºC
Humidity rating		5 % to 95 % non-condensing
Installation category		III
Operating altitude (maximum)		3000 m above sea level

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Electromagnetic compatibility	
Product standards	IEC 62052-11 and IEC 61326-1
Immunity to electrostatic discharge	IEC 61000-4-2
Immunity to radiated fields	IEC 61000-4-3
Immunity to fast transients	IEC 61000-4-4
Immunity to surges	IEC 61000-4-5
Immunity to conducted disturbances	IEC 61000-4-6
Immunity to power frequency magnetic fields	IEC 61000-4-8
Immunity to conducted disturbances, 2-150 kHz	CLC/TR 50579
Immunity to voltage dips & interruptions	IEC 61000-4-11
Immunity to ring waves	IEC 61000-4-12
Conducted and radiated emissions	EN 55022, EN 55011, FCC part 15, ICES-003
Surge withstand Capability (SWC)	IEEE C37.90.1

Safety	
Safety Construction	IEC/EN 61010-1 ed.3, CAT III, 400 V L-N / 690 V L-L UL 61010-1 ed.3 and CSA-C22.2 No. 61010-1 ed.3, CAT III, 347 V L-N / 600 V L-L IEC/EN 62052-11, protective class II

Communication [1]	
Ethernet to serial line gateway	Communicates directly with up to 32 unit load ION slave devices.
Web server	Customisable pages, new page creation capabilities, HTML/XML compatible.
Serial port RS 485	Baud rates of 2400 to 115200, pluggable screw terminal connector.
Ethernet port(s)	2 x 10/100BASE-TX, RJ45 connector (UTP).
Protocol	Modbus, ION, DNP3, IEC 61850, HTTP, FTP, SNMP, SMTP, DPWS, RSTP, NTP, SNTP, GPS protocols.

Firmware characteristics	
High-speed data recording	Down to 1/2 cycle interval burst recording, stores detailed characteristics of disturbances or outages. Trigger recording by a user-defined setpoint, or from external equipment.
Harmonic distortion	Up to 63rd harmonic for all voltage and current inputs.
Sag/swell detection	Analyse severity/potential impact of sags and swells: magnitude and duration data suitable for plotting on voltage tolerance curves per phase triggers for waveform recording, control.
Disturbance direction detection	Determine the location of a disturbance more quickly and accurately by determining the direction of the disturbance relative to the meter. Analysis results are captured in the event log, along with a timestamp and confidence level indicating level of certainty.
Instantaneous	High accuracy of standard speed (1s) and high-speed (1/2 cycle) measurements, including true rms per phase and total for: voltage, current, active power (kW),reactive power (kvar), apparent power (kVA), power factor, frequency, voltage and current unbalance, phase reversal.
Load profiling	Channel assignments (800 channels via 50 data recorders) configurable for any measurable parameter, including historical trend recording of energy, demand, voltage, current, power quality, or any measured parameter. Trigger recorders based on time interval, calendar schedule, alarm/event condition, or manually.
Trend curves	Historical trends and future forecasts to better manage demand, circuit loading, and other parameters. Provides average, min, max and standard deviation every hour for last 24 hours, every day for last month, every week for last 8 weeks and every month for last 12 months.
Waveform captures	Simultaneous capture of all voltage and current channels sub-cycle disturbance capture, maximum cycles is 100,000 (16 samples/cycle x 96 cycles, 10 MB memory), max 256 samples/cycle.
Alarms	Threshold alarms: adjustable pickup and dropout setpoints and time delays, numerous activation levels possible for a given type of alarm, user-defined or automatic alarm threshold settings, user-defined priority levels (optional automatic alarm setting).

PM8000 series
Functions and characteristics (cont.)

Firmware characteristics (cont.)	
Advanced security	Up to 16 users with unique access rights. Perform resets, time sync, or meter configurations based on user privileges.
Memory	512 MB (10 MB for programming and interval logging).
Firmware update	Update via the communication ports.
Display characteristics	
Integrated or Remote display	320 x 240 (1/4 VGA) Colour LCD, configurable screens , 5 buttons and 2 LED indicators (alarm and meter status).
Languages	English, French, Spanish, Russian, Portugese,German, Italian, Chinese.
Notations	IEC, IEEE.
The HMI menu includes	
Alarms	Active alarms, historic alarms.
Basic Reading	Voltage, current, frequency, power summary.
Power	Power summary, demand, power factor.
Energy	Energy total, delivered, received.
Events	Timestamped verbose event log.
Power Quality	EN 50160, harmonics, phasor diagrams.
Inputs/Outputs	Digital inputs, digital outputs, analogue inputs, analogue outputs.
Nameplate	Model, serial and FW version.
Custom Screens	Build your own metrics.
Setup Menu	Meter setup, communications setup, display setup, date/time/clock setup, alarm setup, language setup, time of use setup, resets, password setup.

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PM8000 Series
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As standards, specifications and designs develop from time to time, please ask for confirmation of the information given in this document.

Design: Schneider Electric
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have been awarded the Green Premium ecolabel

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Product

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