

Section 4

Power Monitoring and Control



EcoStruxure Power Monitoring Expert Software

ION9000 Series Advanced Power Quality Meters

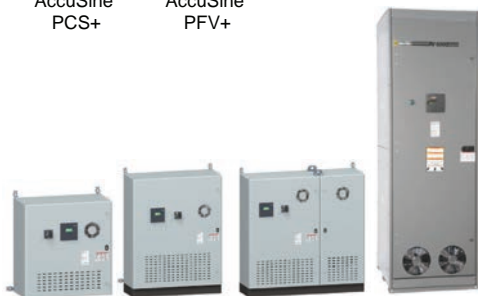


PowerLogic PM8000 Advanced Power Quality Meters



AccuSine PCS+

AccuSine PFV+



VarSet Low-Voltage Capacitor Banks

PowerLogic™ Energy and Power Management Systems 4-2

Power Monitoring Software	4-4
EcoStruxure™ Power Monitoring Expert Software	4-4
EcoStruxure™ Power Operation	4-5
Power Quality Meters — Selection	4-6
Power Quality Meters — ION9000	4-7
ION9000 Series Advanced Power Quality Meters	4-7
Power Quality Meters — ION8650	4-9
PowerLogic™ ION7400 Utility Feeder Meter	4-11
PowerLogic PM8000 Advanced Power Quality Meters	4-13
Power and Energy Meters	4-15
Series PM5000 Power Meters	4-15
Series PM2000 Power Meters	4-15
PowerLogic™ EM3500 Power and Energy Meters	4-16
PowerLogic™ EM3570 Power and Energy Meters	4-17
PowerLogic™ PM3000 Power and Energy Meters	4-18
iEM3000 Energy Meters	4-18
Power and Energy Meter Selection	4-21
PowerLogic™ EM4200 Enercept Meter	4-22
Multi Circuit Energy Meters	4-23
PowerLogic™ HDP6000 High-Density Power Meters	4-24
Communications—EcoStruxure™ Panel Server	4-26
EcoStruxure™ Panel Server	4-26
Engineering, Maintenance, and Training Services	4-28
Integration and Equipment	4-32
System Integration	4-32
Factory Assembled Equipment	4-33

Power Quality Improvement Solutions 4-35

Power Factor Correction	4-36
PowerLogic™ PFC Smart Cap Banks	4-36
PowerLogic™ PFC Smart Cap Banks	4-37
PowerLogic™ PFC	4-38
AccuSine PFV+ Electronic VAR Control	4-39
AccuSine Current Transformers	4-40
VarSet Hybrid	4-42
Harmonic Filtration	4-43
AccuSine PCS+ Active Harmonic Filter (AHF)	4-43
AccuSine PCSn Active Harmonic Filter (AHF)	4-44
PowerLogic™ AccuSine™ EVC+	4-45

POWER MONITORING AND CONTROL

4

Join the Next Generation of Power and Energy Management
More performance. More intelligence. More integration.

Our industry-leading systems offer the latest in technological advancements to help you simultaneously maximize reliability, availability, and quality, as well as improve operational and cost efficiency for your entire enterprise. You'll benefit from:

- **Holistic approach**
 Our solutions aggregate data from all your energy assets, including power, building, and process systems, into one user-friendly view so you can make more informed decisions and address problems efficiently.
- **Actionable intelligence**
 Our solutions provide real-time and historical information to multiple stakeholders anywhere in the world, including easy-to-use analytics, alarms and controls, as well as regulatory compliance and financial reporting.
- **Proactive capabilities**
 Our sophisticated products help you analyze and identify future needs so you can develop a long-term plan for things like energy purchasing, demand response, load changes, and equipment maintenance or replacement.



Advanced Power Management

Delivers power quality, availability, and reliability

- Maximize facility uptime by reducing power outages and ensuring back-up power generation
- Verify reliable power equipment operation and proactively optimize power networks
- Improve power reliability, availability, and quality through proactive analytics and diagnostics
- Optimize existing infrastructure capacity and avoid over-building
- Prolong asset life with proactive maintenance and optimization
- Reduce peak demand and power factor penalties with monitoring, alerts, and corrective actions
- Deliver enhanced network protection and control with data integration and automation

Superior Energy Management

Delivers cost and operational efficiencies

- Identify, prioritize, and verify savings through automated load management, benchmarking, and progress reporting
- Improve sustainability performance with greenhouse gas emissions tracking and industry compliance reporting
- Improve rates with energy suppliers through demand response programming
- Confirm ROI for system improvements with advanced reporting and analysis
- Identify billing discrepancies and avoid contract penalties by validating utility bills and confirming onsite generation benefits
- Encourage conservation among tenants, departments, and processes through cost allocation reporting

Don't settle for fragmented views and unreliable data

Maximize performance with a fully integrated power management solution

You'll benefit from our decades of expertise in electrical system management, hardware and software development, and integration. Our solutions are designed for compatibility so your installation is both optimized and more efficient. Our systems are modular and interoperable for better continuity of supply, enhanced safety for people and equipment, and more effective monitoring and control. Plus, our full range of in-person and remote services keep your system operating at peak performance.

Schneider Electric is committed to supporting growth in America. We offer thousands of American-made products and solutions for energy management and industrial automation to power smart industries and intelligent buildings, future-proof data centers, and build intuitive homes. To learn more, refer to <https://www.se.com/us/en/schneider-in-america/>.

Application

	Data Presentation & Management		Data Acquisition, Alarms & Monitoring			
	Enterprise	Online Energy Analysis	Supervisory Control & Data Acquisition	Power Monitoring System	Tenant Submetering	
	Data Centers; Industrial Buildings, Property Management, Utilities	Utilities	Water/Wastewater, Heavy Process Industry, Data Centers, Critical Power	Industrial, large commercial buildings, Military Bases, Healthcare	Commercial Buildings, Government Buildings, Military Bases	
Cost Management	Meter Application					
	Automatic Meter Reading			.	....	..
	Revenue Metering			.	....	..
	WAGES Utility Pulses				...	
	Sub-billing	...	...			....
	Measurement & Verification	....	..		...
	Cost Allocation & Utility Billing					
	Energy Usage Analysis	....	...	.	..	.
	Procurement Optimization	..	...	.	.
	Allocate Energy Costs	.			.	
	Interval Benchmarking & Profiling	....	...	.	..
	Total Load Aggregation	....			
	Energy Efficiency					
	Emissions Tracking	..	...	
	Power Factor Correction	.	.		...
	Peak Demand Reduction	..	.	...	...
Demand Response & Curtailment			...	...
Ensure Power Quality	Improve Maintenance Practices					
	Commissioning & Troubleshooting			...	....
	Equipment Monitoring: transformers, MCCs, switchgear, switchboards, circuit breaker status, protective equipment, capacitors, generators, panelboards, PDU, UPS, etc.			...	....
	Facility Planning					
	Identify Equipment Capacity				...	
	Determine Transformer Stress				...	
	Equipment Asset Optimization	..		..	...
	Improve Efficiency					
	Balance Circuit Loading				...	
	Balance Generator Usage				...	
Optimize Chiller & Mechanical Equipment				.		
Network Management	System Monitoring & Analysis					
	Transient Voltage Detection				....
	Sag/Swell Disturbance Monitoring				....
	Power Quality & Harmonic Analysis				....
	Power Quality Compliance	....		.	...
	Alarm & System Diagnostics					
	Electrical Distribution Alarm & Event Analysis	.		...	....
	Waveform capture viewing				....
Remote alarm notification			....	...
Engineering, Maintenance, and Training Services	Energy Services					
	Total Energy Control Services	....	see Engineering, Maintenance, and Training Services, page 4-28		...	see Engineering, Maintenance, and Training Services, page 4-28
	Peak Shaving/Generator Control	see Engineering, Maintenance, and Training Services, page 4-28		....	..	see Engineering, Maintenance, and Training Services, page 4-28
	Load Management/Shedding			....	..
	WAGES				...	
	Advanced Reliability Services					
	Auto Throw Over (ATO)			....	..	see Engineering, Maintenance, and Training Services, page 4-28
	Emergency Power Supply System Test Reporting				....
	Sequence of Events Recording (1ms time/stamp)	see Engineering, Maintenance, and Training Services, page 4-28		....	...
	GPS Time Stamping			....	...
	Power System Control			....	.
	Network Protection			....	..
	Consulting Services					
System Studies (SC/TCC/Arc Flash)	see Engineering, Maintenance, and Training Services, page 4-28					
Power System Assessments						



- Manage power quality, availability, and reliability
- Optimize use of your electrical and infrastructure assets
- Drive energy efficiency initiatives and improve financial performance

EcoStruxure™ Power Monitoring Expert Software

EcoStruxure Power Monitoring Expert

EcoStruxure™ Power Monitoring Expert is an integrated power and energy management software platform that enables you to optimize your power distribution infrastructure, maximize operational efficiency, and improve your bottom-line performance. This complete, interoperable, and scalable solution will help you

- Maximize facility uptime and reliability
- Analyze and mitigate power quality related issues
- Track and optimize equipment performance
- Analyze energy consumption, uncover savings opportunities and accurately allocate energy related costs
- Enable compliance with power quality and energy standards such as ANSI/IEEE and ISO50001

Typical Applications

- Monitor the facility electrical network to verify reliable operation and proactively optimize performance
- Maximize facility uptime by improving response to power-related events and restore operations quickly
- Perform root cause analysis to power-related disturbances through sequence of events reporting
- Analyze and isolate the source of power quality problems
- Analyze total energy use from all electrical and piped utilities identify waste and reduce cost
- Improve sustainability performance with greenhouse gas emissions tracking and industry compliance reporting
- Identify billing discrepancies and avoid contract penalties by validating utility bills to verify accuracy
- Allocate energy costs to departments to drive accountability, awareness and support energy action programs like ISO50001
- Reduce peak demand and power factor penalties with monitoring, alerts, and corrective actions
- Negotiate rates with energy suppliers and enable participation in demand response programs
- Confirm return on investment for infrastructure improvements with advanced reporting and analysis
- Optimize existing infrastructure capacity and avoid over-building
- Prolong asset life with proactive maintenance and optimization

Functional Components:

- Power quality analytics
 - Monitor events and waveform plotting system-wide
 - Monitor harmonics, K-factor, crest factor, symmetrical components
 - Diagnose and isolate PQ problems to increase reliability
 - Automatically detect and report on voltage disturbances
 - Quickly evaluate PQ events plotted on standard ITIC curve
- Customized real-time monitoring
 - Access real-time status of sensitive power distribution components
 - Trend chart tools with customized views to reveal patterns and anomalies quickly
- Data analytics and visualization
 - Smart dashboards with configurable presentation widgets and kiosk options
 - Powerful graphics templates and libraries
 - Automated power quality reports and waveform analysis tools
 - Comprehensive templates for energy and power reporting, with flexible report distribution options
- Alarm and event management
 - Powerful alarm triggering, notification, and analysis tools
 - Accurate time-stamped sequence of events reporting for power system event root cause analyses
- Robust technical infrastructure
 - Solid data acquisition architecture including ready-to-use communications drivers with many electrical distribution devices
 - Fully compatible with current operating systems and databases
 - Interoperable with integration to other systems and devices through open data and protocol standards (ODBC, OPC, XML, Modbus, Web/SOAP Services)
 - Scalable to thousands of metered points through flexible deployment options



Modular Design:

Power Monitoring Expert also features many application modules that add specific functionality to extend the base platform. Available modules include

- Energy Analysis
- UPS Performance
- Breaker Performance
- Energy Cost Allocation & Billing
- Automated Generator Testing

Table 4.1: Power Monitoring Expert Plan Features

Package features	Advanced	Advanced+
This table identifies the two plan levels and what features would be included or can be added.		
Core		
Energy monitoring and analysis	•	•
Capacity management	•	•
Electrical distribution monitoring and alarming	•	•
Thermal and arc flash monitoring	•	•
Power quality monitoring	•	•
Access to latest software releases and updates	•	•
Customer success management	•	•
Energy efficiency		
Cost allocation and utility bill verification	•	•
Energy efficiency compliance	•	•
Energy benchmarking	•	•
Energy modeling and verification		•
Power reliability		
Power quality analysis and compliance	•	•
Power events analysis	•	•
Asset performance		•
Connectivity		
Protocols to integrate with connected products	•	•
Protocols to integrate with 3rd party systems	•	•
Extended connectivity to 3rd party systems		•
Add-on		
Insulation monitoring	o	o
Backup power testing	o	o
# of connected devices	Incremental of 10 devices	

Note:
 • Included feature
 o Optional feature

EcoStruxure™ Power Operation

- Increase uptime of power systems
- Provides accurate and actionable information in real time
- Highlights issues, remediation, and their impacts

EcoStruxure™ Power Operation (EPO) is electrical distribution network monitoring and control software that provides vital tools to enhance your power system reliability and operational efficiency. Its powerful architecture combines our proven expertise in electrical distribution with the speed and control of high-performance to reduce outages while increasing power system efficiency. An excellent fit for virtually every industry and application, Power Operation delivers exceptional scalability so that it can grow to match your changing business requirements while driving down the total cost of ownership. Components interact seamlessly across Schneider Electric’s extensive product portfolio and third party suppliers.

- Dynamic electrical network view to improve production, reduce costs and boost safety
- Highly reliable monitoring and control tailored to unique electrical network needs
- Detailed electrical information across the multi-vendor network
- Fast issue resolution and reporting to improve electrical network quality and energy use
- Report KPIs, energy costs, and filtered alarming
- Real-time visualization of the network
- Disturbance waveform views for analysis and control for remediation

For quoting and pricing, please contact PowerLogic™ Sales at 615-287-3535.



Power Quality Meter Selection

Features [1]	ION9000	ION9000T	ION8650			ION7400	PM8000
			A	B	C		
Inputs, outputs and control power							
3-phase / single-phase	• / •	• / •	• / •	• / •	• / •	• / •	• / •
Digital in and out / analog in and out	46 / 24	46 / 24	16 / 4	16 / 4	16 / 4	36 / 24	36 / 24
Power supply options	AC / -	AC / -	AC/DC	AC/DC	AC/DC	AC/DC	AC/DC
Power and energy measurements							
Voltage, current, frequency, power factor	•	•	•	•	•	•	•
Power / Demand	•	•	• / •	• / •	• / •	• / •	• / •
Energy / time-of-use (energy per shift)	• / •	• / •	• / •	• / •	• / •	• / •	• / •
IEC / ANSI energy accuracy class (% of reading)	0.1	0.1	0.2(1)	0.2(1)	0.2(1)	0.2	0.2
Loss compensation	•	•	•	•	•	•	-
Power quality analysis							
EN50160 compliance reporting / IEC 61000-4-30 Class A or S	• / A	• / A	• / A	• / S	- / -	• / A[2]	• / S
Flicker measurement	•	•	•	•	-	•[3]	-
Transient detection duration	20 µs	100 ns	17 µs	-	-	-	-
Sag and swell monitoring / disturbance direction detection	• / •	• / •	• / -	• / -	• / -	• / •[4]	• / •
Harmonic distortion: total/ individual / inter	• / • / •	• / • / •	• / • / •	• / • / -	• / • / -	• / • / -	• / • / -
Waveform capture	•	•	•	-	-	•	•
Rapid Voltage Change	•	•	-	-	-	•	•
On-board data and event logging							
Trending / forecasting / billing	• / • / •	• / • / •	• / - / •	• / - / •	• / - / •	• / • / •	• / • / •
Minimum and maximum	• / •	• / •	•	•	•	•	•
Events and alarms with timestamps	•	•	•	•	•	•	•
Timestamp resolution (seconds)	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Time sync: Network / GPS / IIRIG-B / DCF77-B / PTP	• / • / • / • / •	• / • / • / • / •	• / • / • / - / -	• / • / • / - / -	• / • / • / - / -	• / • / • / - / -	• / • / • / - / -
Setpoints, alarms and control							
Log alarm conditions / call out on alarm	• / •	• / •	• / •	• / •	• / •	• / •	• / •
Trigger data logging / waveform capture	• / •	• / •	• / •	• / -	• / -	• / •	• / •
Trigger relay or digital output	•	•	•	•	•	•	•
Special features							
Custom programming	•	•	•	•	•	•	•
Downloadable firmware	•	•	•	•	•	•	•
Communications							
Ports:							
Ethernet: Copper / Fiber	2 / 1	2 / 1	• / •	• / •	• / •	2 / 1	2 / 1
Ethernet-to-serial gateway	•	•	•	•	•	•	•
Telephone modem	-	-	•	•	•	-	-
Modem-to-serial gateway	-	-	•	•	•	-	-
Verizon 4G LTE Cellular Modem[5]	-	-	•	•	•	-	-
Infrared port	•	•	•	• / •	• / •	•	-
RS485/RS232	• / -	• / -	• / •	• / •	• / •	• / -	• / -
Misc: Web server / Email / SNMP / XML	• / • / • / •	• / • / • / •	• / • / - / •	• / • / - / •	• / • / - / •	• / • / • / •	• / • / • / •
Protocols: Modbus / DNP / MV-90 / DLMS	• / • / • / -	• / • / • / -	• / • / • / -	• / • / • / -	• / • / • / -	• / • / • / -	• / • / • / -
Protocols: IEC61850 / Jbus / M-Bus / LON / BACnet	• / - / - / - / -	• / - / - / - / -	• / - / - / - / -	• / - / - / - / -	• / - / - / - / -	• / - / - / - / -	• / - / - / - / -

NOTE:

1. The ION8650 is two times more accurate than the 0.2 IEC/ANSI accuracy classes according to the same conditions used to specify the 0.2 accuracy class.
2. ION8800, ION8650, ION8600, PM8000 also offer Modbus Master capabilities.

[1] Specifications represent maximum capabilities with all options installed. Some options are not available concurrently. This is not a complete feature list, please refer to detailed product specifications.

[2] Advanced Variant is Class A and Standard Variant is Class S.

[3] Flicker not available on Essential Variant.

[4] Disturbance Direction Detection not available on Essential Variant.

[5] Only available on socket meter versions.



ION9000 Series Advanced Power Quality Meters

Web enabled PowerLogic™ ION9000 series meters are used to monitor electric distribution networks, service entrances and substations. It enables businesses to manage complex energy supply contracts that include power quality guarantees. Low-range current accuracy makes it ideal for independent power producers and cogeneration applications that require the accurate bi-directional measurement of energy. It is well suited to load curtailment, equipment monitoring and control and energy pulsing and totalization applications. Integrate it with Power Management Software applications. The ION9000T captures extremely fast voltage events that are missed by most other power meters, enabling advanced diagnostics and high-resolution event associations for fast, conclusive diagnosis and resolution to transient voltages.

ION9000 Power and Energy Meter Features

- PQ compliance reporting and basic PQ analysis:
 - Monitors and logs parameters in support of international PQ standards
 - IEC 61000-4-30 Class A (test methods as per IEC 62586-2)
 - High resolution waveform capture: triggered manually or by alarm. Captured waveforms available directly from the meter via FTP in a COMTRADE format, and viewable in the meter's web interface.
 - Generates PQ compliance reports accessible via onboard web pages
- Harmonic analysis:
 - THD and TDD per phase, min/max, custom alarming
 - Individual harmonic magnitudes and angles on voltage and current, up to the 63rd harmonic
- 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
- Transient capture of events 20 microseconds or longer in duration on any voltage channel with waveform capture and per-event information
- PowerLogic ION9000T provides high-speed transient capture (HSTC) of voltage events 100 nanoseconds or longer in duration and up to 10,000 V in magnitude on voltage channels and with an alarm on the event, the ION9000T provides high-speed and disturbance waveform captures, as well as per-event statistics on each transient.
- Metering precision:
 - IEC 61557-12 PMD/SD/K70/0.2 and PMD/SS/K70/0.2 3000m (performance measuring and monitoring devices (PMD))
 - Class 0.1S accuracy IEC 62053-22, ANSI C12.20 Class 0.1 (active energy)
 - Industry leading Class 0.5S accuracy for reactive energy (IEC 62053-24)
 - Cycle-by-cycle RMS measurements updated every cycle
 - Full 'multi-utility' WAGES metering support
 - Net metering
 - Anti-tamper protection seals and hardware metrology lock
- Cybersecurity:
 - Security events logging with Syslog protocol support
 - HTTPS secure protocol
 - Ability to enable or disable any communication port and any protocol per port
 - Anti-tamper protection seals and hardware metrology lock
 - User accounts with strong passwords
 - Used with Schneider Electric's advanced software tools, provides detailed PQ reporting across entire network:
 - EN 50160 compliance report
 - IEEE 519 harmonic compliance report
 - IEC 61000-4-30 report
 - Power quality compliance summary
 - Energy reports for consumption analysis and cost management
 - WAGES dashboards and reports
 - Display of waveforms and PQ data from all connected meters
 - Onboard web-based waveform viewer
 - EcoStruxure™ Power Events Analysis, including alarm management, sequency of events, and root cause analysis
- Data and event logging:
 - Onboard data and event logging
 - 2 GB of standard non-volatile memory
 - No data gaps due to network outages or server downtime
 - Min/max log for standard values
 - 100 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
- Advanced time-of-use capability
- Security/event log: alarm conditions, metering configuration changes, power outages, firmware download, and user login/logout all 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 1/2-cycle and 1-second response time
 - Combine alarms using Boolean logic enabling customization of alarms
 - Alarm notification via email
 - In conjunction with Schneider Electric's EcoStruxure software, alarms, software alarms, and alarm frequency are categorized and trended enabling sequence of events and root cause analyses

Table 4.2: Typical PowerLogic ION9000 Power and Energy Meter Ordering Configurations

Description ^[6]	Catalog Number
ION9000 meter, DIN mount, no display, HW kit	METSEION92030 METSEION92030-US ^[7]
ION9000 meter, DIN mount, 192 mm display, B2B adapter, HW kit	METSEION92040 METSEION92040-US ^[7]
ION9000 meter, LVDC control power, DIN mount, no display, HW kit	METSEION92130 METSEION92130-US ^[7]
ION9000 meter, LVDC control power, DIN mount, 192mm display, B2B adapter, HW kit	METSEION92140 METSEION92140-US ^[7]
ION9000 meter, low voltage current sensor inputs, DIN mount, no display, HW kit	METSEION93030
ION9000 Meter, low voltage current sensor inputs, DIN mount, 192mm display, B2B adapter, HW kit	METSEION93040
ION9000 meter, low voltage current sensor inputs, LVDC control power, DIN mount, no display, HW kit	METSEION93130
ION9000 meter, low voltage current sensor inputs, LVDC control power, DIN mount, 192mm display, B2B adapter, HW kit	METSEION93140
ION9000 meter, high-speed transient capture, DIN mount, no display, HW kit	METSEION95030 METSEION95030-US ^[7]
ION9000 meter, high-speed transient capture, DIN mount, 192 mm display, B2B adapter, HW kit	METSEION95040 METSEION95040-US ^[7]
Remote display, color LCD, 96 x 96 mm	METSEPM89RD96
Remote display, color touchscreen, 192 x 192 mm	METSERD192
I/O module, 2 relay outputs, 6 digital inputs	METSEPM89M2600
I/O module, 2 analog outputs, 4 analog inputs	METSEPM89M0024
ION9000 meter hardware kit – plugs, terminal guards, spare grounding screw, DIN clips	METSE9HWK
ION9000 meter hardware kit for low voltage current sensor models	METSE9HWKLVCS
RD192 remote display hardware kit	METSERD192HWK
ION9000 B2B adapter	METSE9B2BMA
ION9000 USB cover hardware kit	METSE9USBK
ION9000 Current Input hardware kit – terminal screws, CT covers	METSE9CTHWK
Battery replacement kit – ION7400/ION9000/PM8000	METSEPMBATK
ION7x50 Mounting Adapter Kit	METSE7X4MAK

^[6] NOTE: Contact your local Schneider Electric representative for complete ordering information.

^[7] Catalog numbers ending in “-US” are Buy American Act (BAA) compliant. Schneider Electric is committed to supporting growth in America. We offer thousands of American-made products and solutions for energy management and industrial automation to power smart industries and intelligent buildings, future-proof data centers, and build intuitive homes. To learn more, refer to <https://www.se.com/us/en/schneider-in-america/>.



ION8650 Power and Energy Meters

The web-enabled PowerLogic™ ION8650 is used to monitor electric distribution networks, service entrances and substations. It enables businesses to manage complex energy supply contracts that include power quality guarantees. Low-range current accuracy makes it ideal for independent power producers and cogeneration applications that require the accurate bi-directional measurement of energy. It is well suited to load curtailment, equipment monitoring and control and energy pulsing and totalization applications. Integrate it with Power Management Software applications to get the most out of the meter's capabilities and data produced.

Applications

- Revenue metering
- Cogeneration and IPP monitoring
- Power Quality Compliance monitoring
- Power quality analysis
- Demand and power factor control
- Load curtailment
- Equipment monitoring and control
- Energy pulsing and totalization
- Instrument transformer correction
- Outage Notification

ION8650 Power and Energy Meter Features

- **Feature set C includes:**
 - 9S, 35S, 36S socket and switchboard cases
 - True RMS 3-phase voltage, current, power and meets stringent ANSI revenue metering standards including ANSI C12.20 0.2 and Class 2, 10, & 20
 - Power quality: sag/swell, individual, even, odd, total harmonics to the 31st and symmetrical components
 - 32 Mb log/event memory, min/max for any parameter, historical logs up to 80 channels, timestamp resolution to 0.001 seconds and GPS time synchronization
 - Transformer/line loss compensation and Instrument transformer correction
 - Communications: Ethernet, Serial, Modem, Internet and Ethernet to serial gateway and ION, DNP 3.0, Modbus RTU, Modbus TCP, MV-90 protocols, IEC 61850
 - C model limited to IR + 2 other ports at one time. Ports can be enabled/disabled by user
 - Dial-out capability when memory is near full
 - Multi-user, multi-level security with control and customized access to sensitive data for up to 50 users
 - Data push capability through SMTP (email)
 - 65 setpoints — math, logic, trig, log, linearization formulas
 - Password protection and anti-tamper seal protection
 - Built-in I/O: 4 KYZ digital outs and 3 form A digital ins, 4 KYZ digital outs and 1 form A digital out and 1 form A digital in, an optional external I/O expander provides additional I/O
 - Optional Outage Notification Card for JSON outage notification message over ethernet
- **Feature set B adds the following to feature set C:**
 - Harmonics—individual, total even, total odd up to the 63rd
 - 64 Mb standard memory
 - Historical logs up to 320 channels
 - Modbus RTU Master on serial ports
 - Cycle setpoint minimum response time
- **Feature set A adds the following to feature sets C and B:**
 - Waveform capture up to 1024 samples/cycle, PQ compliance monitoring, flicker to EN50160 Ed2, IEC 61000-4-7/4-15 (also configurable to IEEE519 2014, IEEE159, SEMI) CBEMA/ITIC
 - Transient detection to 17µs at 60 Hz
 - Harmonics: magnitude, phase and inter-harmonics to the 50th
 - 128 Mb standard memory
 - Max 96 cycles of waveform logs and 800 channels of historical logs

Table 4.3: Typical PowerLogic ION8650 Power and Energy Meter Ordering Configurations

Description	Catalog Number
ION8650; feature set A, 9S socket base, 5 A nominal current inputs, 10 MB memory, 127–177 Vac, 60 Hz, communications card with: 10BaseT, RS-232/485, RS-485, Optical port, 4 Digital Outputs, 3 Digital Inputs	S8650A0C0E6E1B0A
ION 8650; feature set A, 9S socket base, 5 A nominal current inputs, 128 MB memory, 120-277 VAC, 60 Hz, comms card with: 10/100BaseT, RS-232/485 port, RS-485, 56k internal modem (RJ11), Infrared Optical Port; No I/O, Password Protected, no security lock	S8650A0C0E6C7A0A
ION 8650; feature set C, 9S socket base, 5 A nominal current inputs, 32 MB memory, 120-277 VAC, 60 Hz, comms card with 10/100BaseT, RS-232/485 port, RS-485 port, Infrared Optical Port, No I/O, Password Protected, no security lock	S8650C0C0H6E1A0A

Table 4.4: ION8650 Order Codes/Descriptions

Brand	Model	Feature Set	Form Factor	Current Inputs	Voltage Inputs	Power Supply	System Freq	Comm	I/O	Security	Special Order	AA Code
S	8650				C	0					A	-AAxxx
ION8650		Order Code	Description									
Brand		S	Schneider branded									
Model		8650	ION8650 advanced revenue meter with Class 0.1 accuracy + IRIG-B									
Feature Set		A	128MB Memory Class A power quality analysis, waveforms and transient capture with 1024 samples/cycle.									
		B	64MB memory, energy meter Class S EN50160 power quality monitoring.									
		C	32MB memory, basic tariff/energy metering (4 data recorders, 64 channels).									
Form Factor		0	Form 9/29/36S Base - 57-277 VLN (autoranging) 3-Element, 4-Wire / 2 1/2-Element, 4-Wire									
		1	Form 35S Base - 120-480 VLL (autoranging) 2-Element, 3-Wire									
		4	Form 9/29/35/36S FT21 Switchboard (meter + case) with break out panel									
		7	Form 9/29/35/36S FT21 Switchboard (meter + case) with break out cable									
Current Inputs		C	1, 2 or 5 Amp nominal, 20 Amp full scale current input (24 Amp fault capture, start at 0.001A)									
Voltage Inputs		0	Standard (see Form Factor above)									
Power Supply		E	Form 9S, 36S (socket) and Form 9,36 (FT21 switchboard): 120-277 Vac. Form 35S (socket) and Form 35 (FT21 switchboard): 120-480 Vac. Powered from the meter's voltage connections.									
		H	Auxiliary Power Pigtail: 65-120 Vac, 80-160 Vdc (power from external source), North American Plug Style									
		J	Auxiliary Power Pigtail: 160-277 Vac, 200-350 Vdc (power from external source), North American Plug Style									
System Frequency		5	50 Hz									
		6	60 Hz									
Communications ^[8]		C7	Ethernet (10/100BASE-T), 56k universal internal modem (RJ11), RS-232/485 port, RS-485 port, Infrared Optical port									
		E1	Ethernet (10/100BASE-T), RS-232/485 port, RS-485 port, Infrared Optical port									
		F1	Ethernet (100BASE-FX multi-mode) with male ST connectors, RS-232/485 port, RS-485 port, Infrared Optical port (available on socket meters only, Forms 0 & 1 above. I/O card not available if this option is ordered.)									
		S1	Ethernet (10/100-BASE-T), Verizon 4G cell modem - SIM CARD OPTION, RS 232/485 port, RS 485 port, Infrared optical port									
Input/Output Option		A	None									
		B	4 Form C Digital Outputs, 3 Digital Inputs (not available with Communications option F1)									
		C	4 Form C Digital Outputs, 1 Form A Digital Output, 1 Digital Input									
		D	Ride-Through Module for JSON outage notification message over Ethernet. (only available with comms option E1, C7 & S1)									
Security		0	Password protected, no security lock									
		1	Password protected with security lock enabled									
		7	Password protected, no security lock (available in US only)									
		8	Password protected with security lock enabled (available in US only)									
Special Order Options		A	None									

4

POWER MONITORING AND CONTROL

[8] In addition to Infrared Optical port Feature Set C can use any two ports (configurable).



PowerLogic ION7400

PowerLogic™ ION7400 Utility Feeder Meter

The PowerLogic™ ION7400 utility feeder 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 panel or DIN mounted ION7400 meter is flexible enough to fit into a utility's existing billing or SCADA system, providing industry leading cost management (Class 0.2) and network management (Class S and A PQ data). It is compliant with stringent international standards that guarantee their metering accuracy and power quality measurements. Ideal for 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 EcoStruxure Power Monitoring Expert and PowerSCADA Operation Software.

Main Characteristics

- Precision metering
- PQ compliance reporting and basic PQ analysis
- Used with EcoStruxure™ Power Monitoring Expert software, provides detailed PQ reporting across entire network
- Onboard data and event logging
- Alarming and control
- Excellent quality: ISO 9001 and ISO 14000 certified manufacturing.

Table 4.5: PowerLogic ION7400 Meters

Description	Catalog Number		
	Essential	Standard	Advanced
ION7400 Panel mount meter (integrated display with optical port and 2 energy pulse LEDs)	METSEION7400E METSEION7400E-US ^[9]	METSEION7400 METSEION7400-US ^[9]	METSEION7400A METSEION7400A-US ^[9]
ION7400 Panel mount meter (integrated display with optical port and 2 energy pulse LEDs), 20-60 Vdc control power	METSEION7410E METSEION7410E-US ^[9]	METSEION7410 METSEION7410-US ^[9]	METSEION7410A METSEION7410A-US ^[9]
DIN rail mount - utility meter base	METSEION7403E METSEION7403E-US ^[9]	METSEION7403 METSEION7403-US ^[9]	METSEION7403A METSEION7403A-US ^[9]
DIN rail mount - utility meter base with remote display	METSEION7404E	METSEION7404	METSEION7404A
DIN rail mount - utility meter base, 20-60 Vdc control power	METSEION7413E METSEION7413E-US ^[9]	METSEION7413 METSEION7413-US ^[9]	METSEION7413A METSEION7413A-US ^[9]

Table 4.6: PowerLogic ION7400 Accessories

Description	Catalog Number
Remote display, 3 metre cable, mounting hardware for 30 mm hole (nut and centering pin), mounting hardware for DIN96 cutout (92 x 92 mm) adapter plate	METSEPM89RD96
Digital I/O module (6 digital inputs and 2 relay outputs)	METSEPM89M2600
Analog I/O module (4 analog inputs and 2 analog outputs)	METSEPM89M0024
Display Cable, 10 m	METSECAB10
4-Wire RS 485 option module	METSEPMRS4854W
Fiber-Ethernet option module	METSEPMFIBER
Sealing kit	METSEPM8000SK

^[9] Catalog numbers ending in “-US” are Buy American Act (BAA) compliant. Schneider Electric is committed to supporting growth in America. We offer thousands of American-made products and solutions for energy management and industrial automation to power smart industries and intelligent buildings, future-proof data centers, and build intuitive homes. To learn more, refer to <https://www.se.com/us/en/schneider-in-america/>.



PowerLogic ION7400 showing active alarms.



PowerLogic ION7400 with harmonics display.



PowerLogic ION7400 with phasor display.

Table 4.7: PowerLogic ION7400 Features

Description	ION7400 Essential	ION7400 Standard	ION7400 Advanced
General			
Use on LV and MV systems	■	■	■
Current accuracy (5A Nominal)	0.1 % reading	0.1 % reading	0.1 % reading
Voltage accuracy (90-690 V AC L-L, 50, 60, 400 Hz)	0.1 % reading	0.1 % reading	0.1 % reading
Active energy accuracy	0.2 Class	0.2 Class	0.2 Class
Reactive energy accuracy	2%	2%	2%
Number of samples/cycle or sample frequency	256 ^[10]	256	512
ION programmability	■	■	■
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 - 10 A	0.05 - 10 A	0.05 - 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	31	63
	Via EcoStruxure™ software	—	127
Waveform capture	■ ^[10]	■	■
Detection of voltage swells and sags	■	■	■
Flicker	—	■	■
Fast acquisition	1/2 cycle data	■	■
IEC61000-4-30 Class A/S	—	S	A
EN 50160 compliance checking	—	■	■
IEEE 519 compliance checking	—	■	■
Disturbance Direction Detection	—	■	■
Rapid Voltage Change	—	■	■
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 synchronization (+/- 1 ms)	■	■	■
Data Recorder	10	50	64
Memory Channels	160	800	1024
Storage (in Mbytes)	64	512	512
Display and I/O			
Front panel display 89 mm TFT	■	■	■
Wiring self-test	■	■	■
Pulse output	1	1	1
Digital or analog inputs (max)	27 digital 16 analog	27 digital 16 analog	27 digital 16 analog
Digital or analogue outputs (max, including pulse output)	1 digital 8 relay 8 analog	1 digital 8 relay 8 analog	1 digital 8 relay 8 analog
Communication			
2-Wire RS 485 port	1	1	1
10/100BASE-TX	2	2	2
Serial port (Modbus, ION, DNP3, DLMS/COSEM)	■	■	■
Ethernet port (Modbus/TCP, ION TCP, DNP3 TCP, IEC 61850, DLMS/COSEM ^[11])	■	■	■
USB port (mini type B)	■	■	■
ANSI C12.19 Optical port	■	■	■
Option module with 4-Wire RS-485 port	■	■	■
Option module with Fiber-Ethernet port	■	■	■
Standards			
ANSI C12.20, CLC/TTR50579, EN 50160, IEC 61000-4-7, IEC 6100-4-15, IEC 61000-4-30, IEC 61010-1, IEC 61326, IEC 61557-12, IEC 61850, IEC 62052-11, IEC 62053-22, IEC 62053-23, IEC 62586, and IEEE 519			

[10] Waveform capture is limited to 128 Samples/cycle recording.

[11] All the communication ports may be used simultaneously.



Address power issues before they cause problems

- Monitor harmonics to mitigate excessive heating and premature failure of transformers
- Use trending and alarming to detect fluctuations in current pull of critical equipment to prevent motor failure
- Utilize millisecond time stamping to analyze sequence of events
- Identify root cause by analyzing electrical faults with patented disturbance direction detection
- Identify power quality issues per EN 50160, including frequency inconsistency, voltage fluctuations and unbalance, and harmonic contribution
- Allocate costs for water, air, gas, electricity, and steam (WAGES) across departments, phases of industrial process, or cost centers
- Utilize time-of-use calendar to capture electrical consumption for specific times, including on/off peak and holidays

PowerLogic PM8000 Advanced Power Quality Meters

These compact meters help ensure the reliability and efficiency of your facility by making the management of power quality, availability, and reliability easy. Measure, understand, and act on insightful power and energy data gathered from your entire system.

The best choice for power management

PM8000 meters combine accurate 3-phase energy and power measurements with data logging, power quality analysis, alarming and I/O capabilities not typically available in such compact meters. Four-metered current inputs allow direct measurement of 3-phase currents and neutral current for enhanced view of harmonics. Dual Ethernet ports support daisy-chaining, removing need for an Ethernet switch inside power equipment, while redundant ring topology provides enhanced availability. Modular, field installable I/O provides expandable scalability. Patented ION technology combines convenient, pre-configured functionality with the ability to customize the meter configuration to meet unique requirements. This embedded capability can save the expense and complexity of additional equipment, both today and tomorrow. Plus, simple installation and networking make energy information quickly accessible, while integration with EcoStruxure™ software and your energy management system make it immediately actionable.

Table 4.8: PM8000 Power and Energy Meter Catalog Numbers—Meters

Description	Catalog Number
96 x 96 panel mount meter, AC/DC power	METSEPM8140
	METSEPM8140-US ^[12]
	METSEPM8240
	METSEPM8240-US ^[12]
96 x 96 panel mount meter, LV DC power	METSEPM8340
	METSEPM8340-US ^[12]
	METSEPM8110
	METSEPM8110-US ^[12]
DIN rail mount meter, AC/DC power	METSEPM8210
	METSEPM8210-US ^[12]
	METSEPM8310
	METSEPM8310-US ^[12]
DIN rail mount meter, AC/DC power	METSEPM8143
	METSEPM8143-US ^[12]
	METSEPM8243
	METSEPM8243-US ^[12]
DIN rail mount meter, LV DC power	METSEPM8343
	METSEPM8343-US ^[12]
	METSEPM8113
	METSEPM8113-US ^[12]
DIN rail mount meter, LV DC power	METSEPM8213
	METSEPM8213-US ^[12]
	METSEPM8313
	METSEPM8313-US ^[12]
DIN rail mount meter with remote display, AC/DC power	METSEPM8144
	METSEPM8144-US ^[12]
	METSEPM8244
	METSEPM8244-US ^[12]
DIN rail mount meter with remote display, AC/DC power	METSEPM8344
	METSEPM8344-US ^[12]
	METSEPM8114
	METSEPM8114-US ^[12]
DIN rail mount meter with remote display, LV DC power	METSEPM8214
	METSEPM8214-US ^[12]
	METSEPM8314
	METSEPM8314-US ^[12]

Table 4.9: PM8000 Power and Energy Meter Catalog Numbers—Accessories

Description	Catalog Number
Remote Display, Color LCD, 96 x 96	METSEPM89RD96
I/O module, 2 relay outputs, 6 digital inputs	METSEPM89M2600
I/O module, 2 analog outputs, 4 analog inputs	METSEPM89M0024
Display Cable, 10 meters	METSECAB10
Sealing kit	METSEPM8000SK
Mounting adapter kit (ANSI 4")	METSEPM8000MAK
Replacement hardware kit, PM8000 meter	METSEPM8000HWK
Replacement hardware kit, PM8000 remote display	METSEPM8000RDHWK
4-Wire RS 485 option module	METSEPM8000MRS4854W
Fiber-Ethernet option module	METSEPM8000MFBER
Sealing kit	METSEPM8000SK

[12] Catalog numbers ending in "-US" are Buy American Act (BAA) compliant. Schneider Electric is committed to supporting growth in America. We offer thousands of American-made products and solutions for energy management and industrial automation to power smart industries and intelligent buildings, future-proof data centers, and build intuitive homes. To learn more, refer to <https://www.se.com/us/en/schneider-in-america/>.

Table 4.10: PM8000 Series Features

		PM81xx Essential	PM82xx Standard	PM83xx Advanced
General				
Use on LV, MV, and HV systems		■	■	■
Current accuracy (5A Nominal)		0.1 % reading	0.1 % reading	0.1 % reading
Voltage accuracy		0.1 % reading	0.1 % reading	0.1 % reading
Active energy accuracy		0.2 Class	0.2 Class	0.2 Class
Number of samples/cycle or sample frequency		256 ^[13]	256	512
ION programmability		■	■	■
Instantaneous rms values				
Current, voltage, frequency		■	■	■
Active, reactive, apparent power	Total and per phase	■	■	■
Power factor	Total and per phase	■	■	■
Current measurement range (autoranging)		0.05–10 A	0.05–10 A	0.05–10 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		■	■	■
Synchronization 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	31	63	63
	Via EcoStruxure software	—	127	127
Waveform capture		■ ^[13]	■	■
Detection of voltage swells and sags		■	■	■
Fast acquisition	1/2 cycle data	■	■	■
IEC 61000-4-30 Class A/S		—	S	A
EN 50160 Interharmonic		—	—	■
EN 50160 compliance checking		—	■	■
IEEE 519 compliance checking		—	■	■
Disturbance Direction Detection		—	■	■
Rapid Voltage Change		—	■	■
Customizable data outputs (using logic and math functions)		■	■	■
Data recording				
Min/max of instantaneous values		■	■	■
Event logs		■	■	■
Trending/forecasting		—	■	■
SER (Sequence of event recording)		■	■	■
Time stamping		■	■	■
GPS synchronization (+/- 1 ms)		■	■	■
Data Recorder		10	50	64
Memory Channels		160	800	1024
Storage (in Mbytes)		64	512	512
Display and I/O				
Front panel display		■	■	■
Wiring self-test		■	■	■
Pulse output		1	1	1
Digital or analog inputs (max)		27 digital 16 analog	27 digital 16 analog	27 digital 16 analog
Digital or analog outputs (max, including pulse output)		1 digital 8 relay 8 analog	1 digital 8 relay 8 analog	1 digital 8 relay 8 analog
Communication				
2-Wire RS-485 port		1	1	1
Ethernet ports		2	2	2
Serial port (Modbus, ION, DNP3)		■	■	■
Ethernet port (Modbus/TCP, ION TCP, DNP3 TCP, DHCP, DNS, IPv4, IPv6, IEC 61850)		■	■	■
Ethernet gateway		■	■	■
Alarm notification via email		■	■	■
HTTP/HTTps web server with waveform viewer		■	■	■
SNMP with custom MIB and traps for alarms		■	■	■
SMTP email		■	■	■
PTP and NTP time synchronization		■	■	■
FTP File transfer		■	■	■
Option module with 4-Wire RS-485 port		■	■	■
Option module with Fiber-Ethernet port		■	■	■

4

POWER MONITORING AND CONTROL

[13] Waveform capture is limited to 128 Samples/cycle recording.



PM5000 Series Power Meter

Series PM5000 Power Meters

The PowerLogic™ PM5000 series power meters are the new benchmark in affordable, precision metering. It is the ideal fit for high-end cost management applications, providing measurement capabilities needed to allocate energy usage, perform tenant metering and sub-billing, pin-point energy savings, optimize equipment efficiency and utilization, and perform a high level assessment of the power quality in electrical networks.

All meters provide Modbus serial communications. PM5500 level meters are also capable of simultaneous ModBus TCP and BTL-certified BACnet IP communications over Ethernet.

- Panel instrumentation (OEMs)
- Sub-billing and cost allocation
- Remote monitoring of an electrical installation
- Harmonic monitoring (THD)

Table 4.11: Series PM5000 Power Meters

Description	Catalog No.
Power Meter, Class 0.5 Serial Port	METSEPM5110
Meter, Class 0.5 Alarms TOU Serial Port	METSEPM5330
Power Meter, Class 0.5 Alarms TOU Ethernet Port	METSEPM5340
Power Meter Class 0.2 Serial Port and Dual Ethernet	METSEPM5560
Power Meter without Display Class 0.2 Serial Port and Dual Ethernet	METSEPM5563
Power Meter Class 0.2 Serial Port and Dual Ethernet, LVDC Control Power	METSEPM5580
Power Meter Class 0.2 Serial Port and Dual Ethernet, Waveform Capture, Sag/Swell	METSEPM5650
Remote Display for METSEPM5563	METSEPM5RD
Power Meter with Remote Display Class 0.2 Serial Port and Dual Ethernet	METSEPM5563RD ^[14]

Series PM2000 Power Meters

The PM2000 series meter is a next-generation energy and power meter that offers all the measurement capabilities required to monitor an electrical installation in a single 96 x 96 mm unit. The PM2000 series offers simplicity and reliability for basic energy cost and network management applications at a value price. PM2000 meters are available in LED and LCD display variants:

- LED display type (PM2100 series): Intuitive navigation with self-guided, three buttons, bright red color LEDs of 14.2 mm height. Two columns of LEDs indicate the parameter name chosen for display.
- LCD display type (PM2200 series): Monochrome graphical LCD of 128 x 128 resolution lets users read all three phase values simultaneously. The bright display enables easy reading even in extreme lighting conditions and viewing angles with intuitive menus, multi-language text, icons and graphics.

PM2130 and PM2230 meter models have provisions to attach one input/output expansion module. Choose from: two digital inputs, two digital outputs; two analog inputs, two analog outputs; or two digital inputs, two relay outputs.



PM2100 Series LED Display Meter



PM2200 Series LCD Display Meter

Table 4.12: PM2000 Series Power Meters and Options

Description	Catalog Number
Meters	
PM2110, THD, LED display, Energy pulse output, Class 1	METSEPM2110
PM2120, 15th Harmonic, LED display, Modbus RS485, Class 1	METSEPM2120
PM2130, 31st Harmonic, LED display, Modbus RS485, Class 0.5S	METSEPM2130
PM2110, THD, LCD display, Energy pulse, Class 1	METSEPM2210
PM2220, 15th Harmonic, LCD display, Modbus RS485, Class 1	METSEPM2220
PM2230, 31st Harmonic, LCD display, Modbus RS485, Class 0.5S	METSEPM2230
Optional Input/Output Modules	
PM2X30 I/O Module - 2 Digital In, 2 Digital Out	METSEPM2KDGTLIO22
PM2X30 I/O Module - 2 Analog In, 2 Analog Out	METSEPM2KANLGIO22
PM2X30 I/O Module - 2 Digital In, 2 Relay Out	METSEPM2K2DI2RO

[14] METSEPM5563RD includes both METSEPM5563 and METSEPM5RD.



EM3500 Series Energy and Power Meter

PowerLogic™ EM3500 Power and Energy Meters

The EM3500 series Energy and Power Meter combines exceptional performance and easy installation to deliver a cost-effective solution for power monitoring applications. The EM3500 series can be installed on standard DIN rail or surface mounted, and has bi-directional monitoring designed expressly for renewable energy applications.

- Pulse output and phase alarms
- Data logging capability in some models
- Modbus and BACnet output options

Table 4.13: Series EM3500 Energy and Power Meters

Description	Catalog Number
Power Meter, DIN-rail, Pulse Output Only, for LVCTs	METSEEM3502
Power Meter, DIN-rail Pulse Output Only, for METSECTR Rope CTs	METSEEM3502A
Power Meter, DIN-rail Modbus Output for LVCTs	METSEEM3550
Power Meter, DIN-rail, Modbus Output, for METSECTR Rope CTs	METSEEM3550A
Power Meter, DIN-rail Modbus Output, Bi-Directional, Logging for LVCTs	METSEEM3555
Power Meter, DIN-rail Modbus Output, Bi-Directional, Logging for METSECTR Rope CTs	METSEEM3555A
Power Meter, DIN-rail, BACnet Output, Logging for LVCTs	METSEEM3560
Power Meter, DIN-rail, BACnet Output, Logging for METSECTR Rope CTs	METSEEM3560A
Power Meter, DIN-rail, BACnet Output, for LVCTs	METSEEM3561
Power Meter, DIN-rail, BACnet Output, for METSECTR Rope CTs	METSEEM3561A

METSECTR Series Rope-Style Current Transformers

The METSECTR series works with the EM3500A, EM4236, and iEM35xx series power and energy meters. These meters have a built in power supply and integrator, so CT connection is fast and simple. The coil opens at the connector junction for fast and easy installation onto an existing cable or bus-bar. The flexible core makes it easy to fit in tight enclosure.

- Agency Approvals cURus, ANSI/IEEE 57.13, CE, RoHS
- Accuracy ±1% from 50 A to 5000 A
- Insulation up to 600 Vac

Table 4.14: METSECTR Series Rope-Style Current Transformers

Description	Catalog Number
Rogowski CT, 300 mm (12"), 600 Vac, 1 kA, U018 equivalent	METSECTR25500U
Rogowski CT, 300 mm (12"), 600 Vac, 2 kA, U018 equivalent	METSECTR30500U
Rogowski CT, 460 mm (18"), 600 Vac, 5 kA, U018 equivalent	METSECTR46500U
Rogowski CT, 600 mm (24"), 600 Vac, 5 kA, U018 equivalent	METSECTR60500U
Rogowski CT, 900 mm (35"), 600 Vac, 5 kA, U018 equivalent	METSECTR90500U

LVCT Series Current Transformers

For retrofit or greenfield, this range of current sensors includes split-core, solid-core, and Rogowski coils, with secondary output of 5 Amperes or 0.333V proportional to primary current for reliable metering.

- UL2808 compliant
- Solid core accuracy ±0.5 of reading from 5% to 120% of rated current
- Split core accuracy 1% from 10% to 100% of rated current
- Leads 22 AWG, 600 Vac, UL 1015 bonded pair, 6 ft. (1.8 m) standard length

Table 4.15: LVCT Series Current Transformers

Description	Catalog Number
Split core	
Low-Voltage CT, Split Core, 50 A, 0.333 V output, 10 mm diameter, 6 ft. lead	METSECTLV1005U
Low-Voltage CT, Split Core, 100 A, 0.333 V output, 16 mm diameter, 6 ft. lead	METSECTLV1010U
Low-Voltage CT, Split Core, 200 A, 0.333 V output, 32 mm diameter, 6 ft. lead	METSECTLV1020U
Low-Voltage CT, Split Core, 100 A, 0.333 V output, 8 ft. lead	METSECTLV2010U
Low-Voltage CT, Split Core, 200 A, 0.333 V output, 8 ft. lead	METSECTLV2020U
Low-Voltage CT, Split Core, 300 A, 0.333 V output, 8 ft. lead	METSECTLV2030U
Low-Voltage CT, Split Core, 400 A, 0.333 V output, 8 ft. lead	METSECTLV2040U
Low-Voltage CT, Split Core, 600 A, 0.333 V output, 8 ft. lead	METSECTLV3060U
Low-Voltage CT, Split Core, 800 A, 0.333 V output, 8 ft. lead	METSECTLV3080U
Low-Voltage CT, Split Core, 800 A, 0.333 V output, 8 ft. lead	METSECTLV4080U
Low-Voltage CT, Split Core, 1000 A, 0.333 V output, 8 ft. lead	METSECTLV4100U
Low-Voltage CT, Split Core, 1200 A, 0.333 V output, 8 ft. lead	METSECTLV4120U
Low-Voltage CT, Split Core, 1600 A, 0.333 V output, 8 ft. lead	METSECTLV4160U
Low-Voltage CT, Split Core, 2000 A, 0.333 V output, 8 ft. lead	METSECTLV4200U
Low-Voltage CT, Split Core, 2400 A, 0.333 V output, 8 ft. lead	METSECTLV4240U
Low Voltage CT, Split Core, 200 A, 5A output, 8 ft. lead	METSECTSP5A2020U
Low Voltage CT, Split Core, 300 A, 5A output, 8 ft. lead	METSECTSP5A2030U
Low Voltage CT, Split Core, 400 A, 5A output, 8 ft. lead	METSECTSP5A2040U
Low Voltage CT, Split Core, 600 A, 5A output, 8 ft. lead	METSECTSP5A3080U
Low Voltage CT, Split Core, Size 3, 800 A, 5A output, 8 ft. lead	METSECTSP5A3080U
Low Voltage CT, Split Core, Size 4, 800 A, 5A output, 8 ft. lead	METSECTSP5A4080U
Low Voltage CT, Split Core, 1200 A, 5A output, 8 ft. lead	METSECTSP5A4120U
Low Voltage CT, Split Core, 1600 A, 5A output, 8 ft. lead	METSECTSP5A4160U
Low Voltage CT, Split Core, 2000 A, 5A output, 8 ft. lead	METSECTSP5A4200U
Low Voltage CT, Split Core, 2400 A, 5A output, 8 ft. lead	METSECTSP5A4240U
Solid core	

Table 4.15 LVCT Series Current Transformers (cont'd.)

Description	Catalog Number
Low-Voltage CT, Solid Core, 50 A, 0.333 V output, 10 mm diameter, 6 ft. lead	METSECTLV10005U
Low-Voltage CT, Solid Core, 100 A, 0.333 V output, 10 mm diameter, 6 ft. lead	METSECTLV10010U
Low-Voltage CT, Solid Core, 200 A, 0.333 V output, 25 mm diameter, 6 ft. lead	METSECTLV25020U
Low-Voltage CT, Solid Core, 400 A, 0.333 V output, 31 mm diameter, 6 ft. lead	METSECTLV31040U

PowerLogic™ EM3570 Power and Energy Meters

The PowerLogic™ EM3570 series energy meters with Ethernet are the new benchmark for affordable and precision metering applications.

Designed for use in both energy management systems and building management systems, the PowerLogic™ EM3570 series DIN rail meters provide the measurement capabilities needed to allocate energy usage, perform sub-billing, pin-point energy savings, optimize equipment efficiency and utilization, and perform a basic assessment of the power quality of the electrical network.

Engineered on the trusted PowerLogic platform, Ethernet-enabled EM3570 DIN rail meters are designed to install easily and integrate seamlessly with existing BACnet/IP and Modbus TCP/IP networks common in today's building and power management systems. With wide range CT compatibility, high reliability, IEC 61557-12 and UL2808 compliance, as well as ASHRAE 90.1 for power and energy logging capability, EM3570 meters support the energy efficiency designs of most buildings and are ideally suited for energy cost management applications.



EM3570 Series Meter with power supply module

Application:

- | | |
|--|---|
| <p>Cost Management</p> <ul style="list-style-type: none"> • Energy monitoring in building automation systems • Renewable energy • Energy management • Commercial sub-metering • Industrial monitoring • Cost allocation | <p>Network Management</p> <ul style="list-style-type: none"> • Track real-time power conditions • Monitor control functions • Provide basic power quality values • Extended data log feature support up to 3 years • Analyze equipment and network status • BACnet/IP and Ethernet TCP/IP protocol support |
|--|---|

Table 4.16: EM3570 Series Features

Features	EM3570 Range			
	METSEEM3570	METSEEM3570A	METSEEM3570X	METSEEM3570AX
Current Input				
0.333V or 1.0V LVCT	•		•	
Rogowski coil		•		•
Accuracy				
Class	CL 0.5S	CL 0.5S	CL 0.5S	CL 0.5S
Display				
Backlit LCD, multilingual, 4 lines, 4 concurrent values	•	•	•	•
Power and energy metering				
3-ph voltage, current, power, demand, energy, frequency, power factor	•	•	•	•
Multi-tariff	4	4	4	4
Input/Output and Relays				
Digital inputs	2	2	2	2
Relay output	1	1	1	1
Alarms and Control				
Alarms	17	17	17	17
Set point response time, seconds	1	1	1	1
Single and multi-condition alarms	•	•	•	•
Memory for data logging	2 GB	2 GB	2 GB	2 GB
Communications				
Ethernet port with Modbus TCP protocol	•	•	•	•
BACnet/IP protocol	•	•	•	•
Onboard web server with web pages	•	•	•	•

Table 4.17: EM3570 Series Meters

Description	Catalog Number
DIN Ethernet power meter, LVCT input with external power supply module	METSEEM3570
DIN Ethernet power meter, Rogowski coil input with external power supply module	METSEEM3570A
DIN Ethernet power meter, LVCT input without external power supply module	METSEEM3570X
DIN Ethernet power meter, Rogowski coil input without external power supply module	METSEEM3570AX
24V DC power supply module for DIN Ethernet meter 600V AC input	METSEEM3570PS
NEMA enclosure accessory for DIN Ethernet meter METSEEM35x Schneider brand	METSEEM3570ENC



PM3000 Series Power Meter

PowerLogic™ PM3000 Power and Energy Meters

PM3000 series power meters are a cost-attractive, feature-rich range of DIN rail-mounted power meters that offers all the measurement capabilities required to monitor an electrical installation. Ideal for power metering and network monitoring applications that seek to improve the availability and reliability of your electrical distribution system, the meters are also fully capable of supporting sub billing and cost allocation applications. Four different models are available. Choose from models that provide Display Only, Display + Pulse Output, Display + Modbus, and Display + Modbus + DI/DO + Logging. All models use 1A/5A CTs.

Table 4.18: PM3000 Features

Available Features	PM3200 Range			
	PM3200	PM3210	PM3250	PM3255
Performance Standard				
IEC61557-12 PMD/Sx/K55/0.5	*	*	*	*
General				
Use on LV and HV systems	*	*	*	*
Number of samples per cycle	32	32	32	32
CT input 1A/5A	*	*	*	*
VT input	*	*	*	*
Multi-tariff	4	4	4	4
Multi-lingual backlit display	*	*	*	*
Instantaneous rms Values				
Current, voltage Per phase and average	*	*	*	*
Active, reactive, apparent power Total and per phase	*	*	*	*
Power factor Total and per phase	*	*	*	*
Energy Values				
Active, reactive and apparent energy; import and export	*	*	*	*
Demand Values				
Current, power (active, reactive, apparent) demand; present	*	*	*	*
Current, power (active, reactive, apparent) demand; peak	*	*	*	*
Power Quality Measurements				
THD Current and voltage		*	*	*
Data Recording				
Min/max of the instantaneous values	*	*	*	*
Power demand logs				*
Energy consumption log (day, week, month)				*
Alarms with time stamping		5	5	15
Digital inputs/digital outputs		0/1		2/2
Communication				
RS-485 port			*	*
Modbus protocol			*	*

Table 4.19: PM3000 Series Power Meters

Description	Catalog Number
PM3200 3PH energy meter, DIN rail mount, 1A or 5A CT, Class 0.5S, no communications	METSEPM3200
PM3250 3PH energy meter, DIN rail mount, 1A or 5A CT, Class 0.5S, Modbus, THD	METSEPM3250
PM3255 3PH energy meter, DIN rail mount, 1A or 5A CT, Class 0.5S, Modbus, THD, two (2) DI, two (2) DO	METSEPM3255

iEM3000 Energy Meters

The economical iEM3000 energy meters are ideal for helping facilities become more energy efficient. These feature-rich meters reduce installation and commissioning costs thanks to their efficient design and include native support for a variety of protocols, including Modbus, BACnet, LON, and M-Bus, for seamless integration into networks. Choose from models supporting a variety of current-sensing methods, including standard 1A/5A current transformers, 0.333 V low-voltage CTs, and METSECTR Rogowski coils. There are also direct connect models with internal current sensors that save installation time. The compact size is ideal for new and retrofit installations. Whether metering for energy awareness, billing, or advanced energy programs requiring full-featured, multi-tariff energy meters, there is an iEM3000 meter that fits the application.

Table 4.20: iEM3000 Features

Function	Acti 9 iEM3000 Series Three-Phase Meters						
Current Input / Accuracy							
63A Direct / Class 1	iEM3100	iEM3110	iEM3135	iEM3150	iEM3155	iEM3165	iEM3175
1A or 5A CT / Class 0.5S	iEM3200	iEM3210	iEM3235	iEM3250	iEM3255	iEM3265	iEM3275
125A Direct / Class 1	iEM3300	iEM3310	iEM3335	iEM3350	iEM3355	iEM3365	iEM3375
0.333V or 1.0V LVCT / Class 0.5S					iEM3455	iEM3465	
Rogowski coil / Class 0.5S					iEM3555	iEM3565	
Protocol							
M-Bus			*				
Modbus				*	*		
BACnet						*	
LonWorks							*
Measurement							
MID compliant		*	*		*	*	*
4 quadrant energy			*		*	*	*



iEM3000 Series Energy Meter

NOTE:

- For meter part number replace “i” in model name with “A9M”. (Example: iEM3150 = A9MEM3150)
- DIN rail housing size is 18mm x 5 width. (iEM33xx is 18mm x 7 width.)
- Digital input is selectable for Tariff control or WAGES
- Digital output is selectable for kWh pulse or kW alarm. (iEM3x10 is kWh pulse only.)

Table 4.20 iEM3000 Features (cont'd.)

Function	Acti 9 iEM3000 Series Three-Phase Meters					
Demand					[15]	[15]
Peak demand					[15]	[15]
Multi Tariff						
Internal clock			4		4	4
External control			2		4	4
Digital I/O						
Number of inputs/outputs		-1	1/1		1/1	1/1

Measurement parameters

- Total and partial kWh shows consumption behavior
- Four-quadrant metering differentiates energy consumption
- Target green technologies (delivered/received)
- Reduce utility penalties (active/reactive)
- Additional parameters (P, Q, S, 3xl, V, PF, F) to monitor network balance and overload behavior

Smart Alarm

- kW overload alarm helps prevent utility demand charges

Multiple Tariffs

- Save up to four different time slots to manage multiple tariffs (peak/off-peak, workday/weekend)
- Control tariffs via digital inputs, internal clock, or communication

Digital Inputs

- Use the meter as a pulse counter for another meter (WAGES monitoring)
- Manage double-source applications (e.g., utility main plus on-site generator)
- Monitor circuit breaker status or cabinet door opening

Digital Outputs

- Use to trip a light or sound an alarm
- Configure as a pulse output

Table 4.21: iEM3000 Series Energy Meters

Description	Catalog Number
iEM3100 3PH energy meter, DIN rail mount, direct connect 63A, Class 1	A9MEM3100
iEM3110 3PH energy meter, DIN rail mount, direct connect 63A, Class 1, pulse out, MID, one (1) DO	A9MEM3110
iEM3135 3PH energy meter, DIN rail mount, direct connect 63A, Class 1, M-Bus, MID, 4-quadrant energy, one (1) DI, one (1) DO	A9MEM3135
iEM3150 3PH energy meter, DIN rail mount, direct connect 63A, Class 1, Modbus	A9MEM3150
iEM3155 3PH energy meter, DIN rail mount, direct connect 63A, Class 1, Modbus, MID, 4-quadrant energy, one (1) DI, one (1) DO	A9MEM3155
iEM3165 3PH energy meter, DIN rail mount, direct connect 63A, Class 1, BACnet, MID, 4-quadrant energy, one (1) DI, one (1) DO	A9MEM3165
iEM3175 3PH energy meter, DIN rail mount, direct connect 63A, Class 1, LON, MID, 4-quadrant energy, one (1) DI, one (1) DO	A9MEM3175
iEM3200 3PH energy meter, DIN rail mount, 1A or 5A CT, Class 0.5S	A9MEM3200
iEM3210 3PH energy meter, DIN rail mount, 1A or 5A CT, Class 0.5S, pulse out, MID one (1) DO	A9MEM3210
iEM3235 3PH energy meter, DIN rail mount, 1A or 5A CT, Class 0.5S, M-Bus, MID, 4-quadrant energy, one (1) DI, one (1) DO	A9MEM3235
iEM3250 3PH energy meter, DIN rail mount, 1A or 5A CT, Class 0.5S, Modbus	A9MEM3250
iEM3255 3PH energy meter, DIN rail mount, 1A or 5A CT, Class 0.5S, Modbus, MID, 4-quadrant energy, one (1) DI, one (1) DO	A9MEM3255
iEM3265 3PH energy meter, DIN rail mount, 1A or 5A CT, Class 0.5S, BACnet, MID, 4-quadrant energy, one (1) DI, one (1) DO	A9MEM3265
iEM3275 3PH energy meter, DIN rail mount, 1A or 5A CT, Class 0.5S, LON, MID, 4-quadrant energy, one (1) DI, one (1) DO	A9MEM3275
iEM3300 3PH energy meter, DIN rail mount, direct connect 125A, Class 1	A9MEM3300
iEM3310 3PH energy meter, DIN rail mount, direct connect 125A, Class 1, pulse out, MID, one (1) DO	A9MEM3310
iEM3335 3PH energy meter, DIN rail mount, direct connect 125A, Class 1, M-Bus, MID, 4-quadrant energy, one (1) DI, one (1) DO	A9MEM3335
iEM3350 3PH energy meter, DIN rail mount, direct connect 125A, Class 1, Modbus	A9MEM3350
iEM3355 3PH energy meter, DIN rail mount, direct connect 125A, Class 1, Modbus, MID, 4-quadrant energy, one (1) DI, one (1) DO	A9MEM3355
iEM3365 3PH energy meter, DIN rail mount, direct connect 125A, Class 1, BACnet, MID, 4-quadrant energy, one (1) DI, one (1) DO	A9MEM3365
iEM3375 3PH energy meter, DIN rail mount, direct connect 125A, Class 1, LON, MID, 4-quadrant energy, one (1) DI, one (1) DO	A9MEM3375
iEM3455 3PH energy meter, DIN rail mount, LVCT, Class 0.5S, Modbus, MID, 4-quadrant energy, one (1) DI, one (1) DO	A9MEM3455
iEM3465 3PH energy meter, DIN rail mount, LVCT, Class 0.5S, BACnet, MID, 4-quadrant energy, one (1) DI, one (1) DO	A9MEM3465
iEM3555 3PH energy meter, DIN rail mount, Rogowski coil, Class 0.5S, Modbus, MID, 4-quadrant energy, one (1) DI, one (1) DO	A9MEM3555
iEM3565 3PH energy meter, DIN rail mount, Rogowski coil, Class 0.5S, BACnet, MID, 4-quadrant energy, one (1) DI, one (1) DO	A9MEM3565

[15] Available on iEM3455, iEM3465, iEM3555, iEM3565 models only

Power and Energy Meter Selection

Features [16]	PM5600	PM5500	PM5340	PM5330	PM5110	PM2x30	PM2x20	PM2x10	EM3500	PM3000	iEM3000
Inputs, outputs and control power											
3-phase / single-phase	*/*	*/*	*/*	*/*	*/*	*/*	*/*	*/*	*/*	*/*	*/*
Digital in and out / analog in and out	6 / 0	6 / 0	4 / 0	4 / 0	1 / 0	option	option	option	2 or 3 / 0	up to 2/2	up to 1/1
Power supply options	AC/DC	AC/DC/LVDC	AC/DC	AC/DC	AC/DC	AC/DC	AC/DC	AC/DC	AC/DC	AC/DC	AC
Power and energy measurements											
Voltage, current, frequency, power factor	*	*	*	*	*	*	*	*	*	*	*
Power / Demand	*/*	*/*	*/*	*/*	*/*	*/*	*/*	*/*	*/*	*/*	*/-
Energy / time-of-use (energy per shift)	*/*	*/*	*/*	*/*	*/-	*/*	*/*	*/*	-/-	*/*	*/*
IEC / ANSI energy accuracy class (% of reading)	0.2	0.2	0.5	0.5	0.5	0.5	1.0	1.0	0.2	0.5	0.5
Loss compensation	-	-	-	-	-	-	-	-	-	-	-
Power quality analysis											
EN50160 compliance reporting / IEC 61000-4-30 Class A or S	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-
Flicker measurement	-	-	-	-	-	-	-	-	-	-	-
Transient detection duration	-	-	-	-	-	-	-	-	-	-	-
Sag and swell monitoring / disturbance direction detection	*/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-
Harmonic distortion: total/ individual / inter	*/*/-	*/*/-	*/*/-	*/*/-	*/*/-	*/*/-	*/*/-	*/*/-	-/-/-	*/*/-	-/-/-
Waveform capture	yes	-	-	-	-	-	-	-	-	-	-
On-board data and event logging											
Trending / forecasting / billing	-/-/-	-/-/-	-/-/-	-/-/-	-/-/-	-/-/-	-/-/-	-/-/-	-/-/-	-/-/-	-/-/-
Minimum and maximum	*	*	*	*	*	*	*	*	*	*	*
Events and alarms with timestamps	*	*	*	*	*	*	*	*	*	*	*
Timestamp resolution (seconds)	1	1	1	1	1	1	1	1	1	1	1
Time sync: Network / GPS / IRIG-B / DCF77-B	-/-/-/-	-/-/-/-	-/-/-/-	-/-/-/-	-/-/-/-	-/-/-/-	-/-/-/-	-/-/-/-	-/-/-/-	-/-/-/-	-/-/-/-
Setpoints, alarms and control											
Log alarm conditions / call out on alarm	*/*	*/*	*/*	*/-	*/-	*/-	*/-	*/-	-/-	*/-	-/-
Trigger data logging / waveform capture	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-
Trigger relay or digital output	*	*	*	*	*	*	*	*	*	*	*
Special features											
Custom programming	-	-	-	-	-	-	-	-	-	-	-
Downloadable firmware	*	*	*	*	*	*	*	*	*	*	*
Communications											
Ports:											
Ethernet: Copper / Fiber	2/-	2/-	1/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-
Ethernet-to-serial gateway	*	*	-	-	-	-	-	-	-	-	-
Telephone modem	-	-	-	-	-	-	-	-	-	-	-
Modem-to-serial gateway	-	-	-	-	-	-	-	-	-	-	-
Infrared port	-	-	-	-	-	-	-	-	-	-	-
RS485/RS232	*/-	*/-	-/-	*/-	*/-	*/-	*/-	-/-	*/-	*/-	*/-
Misc: Web server / Email / SNMP / XML	*/*/*/-	*/*/*/-	-/-/-/-	-/-/-/-	-/-/-/-	-/-/-/-	-/-/-/-	-/-/-/-	-/-/-/-	-/-/-/-	-/-/-/-
Protocols: Modbus / DNP / MV-90 / DLMS	*/-/-/-	*/-/-/-	*/-/-/-	*/-/-/-	*/-/-/-	*/-/-/-	*/-/-/-	-/-/-/-	*/-/-/-	*/-/-/-	*/-/-/-
Protocols: IEC61850 / Jbus / M-Bus / LON / BACnet	-/-/-/-/*	-/-/-/-/*	-/-/-/-/*	-/-/-/-/-	-/-/-/-/-	-/-/-/-/-	-/-/-/-/-	-/-/-/-/-	-/-/-/-/*	-/-/-/-/-	-/-/*/*/*

[16] Specifications represent maximum capabilities with all options installed. Some options are not available concurrently. This is not a complete feature list, please refer to detailed product specifications.



EM4200 Flex Power Meter



EM4200 System Calibrated with Calibrated Rogowski Coils

PowerLogic™ EM4200 Enercept Meter

Next generation Enercept meters provide a unique solution for measuring energy data. The small form factor enables retrofit installation in existing panels to save wall space, installation time, and material cost.

Designed to simplify the ordering process, the meter is available in two major options:

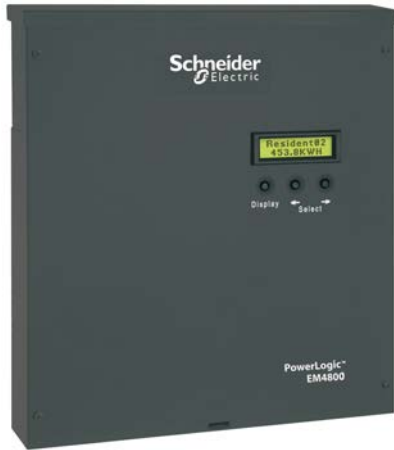
- **System calibrated Enercept** offers the simplest way to order. The meter comes with pre-mounted low voltage (LVCT) or Rogowski coil current transducers, as well as pre-mounted fuse packs. Ordering one part number provides a system calibrated 1% overall accuracy metering system for 100 A, 200 A, 400 A, or 5,000 A range applications.
- **Enercept Flex** offers the flexibility required for many sites where selecting the type and size of current transducer is desired. The Enercept Flex is compatible with the current transducers on . Choose split core or solid core LVCTs from [Table 4.15 LVCT Series Current Transformers, page 4-16](#), or rope style current transducers from [Table 4.14 METSECTR Series Rope-Style Current Transformers, page 4-16](#).

Features

- Uni- and bi-directional metering to support to power generation application
- Data logging
- Modbus™ and BACnet serial communication with auto-protocol and baud rate detection.
- Configurable with or without power
- Compact size for easy in-panel mounting, DIN rail or screw mount options, includes mounting brackets for easy installation
- Seamless integration with EcoStruxure™ Power Management software products.
- Wide 90 to 480 Vac input range
- High reliability with ANSI C12.20 0.2% accuracy, IEC 62053-22 Class 0.2S (EM4236)

Table 4.22: EM4200 Enercept Meter

Description	Catalog Number
Enercept Flex power meter, Class 0.2S, Modbus/BACnet RS485, ANSI wire code, compatible with LVCT and Rogowski coils, order current transducers and fuse packs separately	METSEEM4236
System calibrated Enercept power meter, Modbus/BACnet RS485, ANSI wire code, includes 12-inch length Rogowski coil current transducers for up to 5,000 A and fuse packs	METSEEM4236A12
System calibrated Enercept power meter, Modbus/BACnet RS485, ANSI wire code, includes 18-inch length Rogowski coil current transducers for up to 5,000 A and fuse packs	METSEEM4236A18
System calibrated Enercept power meter, Modbus/BACnet RS485, ANSI wire code, includes LVCT current transducers for up to 100 A and fuse packs	METSEEM4236B101
System calibrated Enercept power meter, Modbus/BACnet RS485, ANSI wire code, includes LVCT current transducers for up to 200 A and fuse packs	METSEEM4236B201
System calibrated Enercept power meter, Modbus/BACnet RS485, ANSI wire code, includes LVCT current transducers for up to 400 A and fuse packs	METSEEM4236B401



Multi Circuit Energy Meters

The PowerLogic™ EM4800 and EM4000 multi-circuit energy meters combine accurate electricity sub-metering with advanced communications technology. They are ideal for multi-tenant or departmental metering and M&V applications within office towers, condominiums, apartment buildings, shopping centers and other multipoint environments, or small footprint retail. This meter is available separately or as part of a Square D integrated power center (IPC) for use in building retrofits or new construction.

Each compact multipoint meter provides energy measurement for up to 24 (1CT) or 12 (2CT) single-phase circuits or 8 (3CT) 3-phase circuits. Select a model to match the desired CT type. The 0.333 V output CT option does not require shorting blocks, making it the ideal choice for retrofit installations.

All meters have an accuracy of Class 0.5%, have onboard interval logging, and feature flexible communication options with an Ethernet port that supports multiple protocols: Modbus™ TCP/IP, HTTP, BACnet/IP, FTP, and SNTP. EM4800 series meters have a V.90 modem while EM4000 series meters provide Modbus RTU over RS-485.

Table 4.23: Multi Circuit Energy Meters

Description	Catalog No.
EM4800 series; Ethernet; modem; compatible with 80mA low-power CTs; 120V control power 60 Hz	METSEEM488016
EM4800 series; Ethernet; modem; compatible with 333mV low-power CTs; 120V control power 60 Hz	METSEEM483316
EM4800 series; Ethernet; modem; compatible with standard 5A CTs; 120V control power 60 Hz	METSEEM480516
EM4000 series; Ethernet; Modbus RTU over RS-485; compatible with 80mA low-power CTs; 120V control power 60 Hz	METSEEM408016
EM4000 series; Ethernet; Modbus RTU over RS-485; compatible with 80mA low-power CTs; 277V control power 60 Hz	METSEEM408036
EM4000 series; Ethernet; Modbus RTU over RS-485; compatible with 333mV low-power CTs; 120V control power 60 Hz	METSEEM403316
EM4000 series; Ethernet; Modbus RTU over RS-485; compatible with 333mV low-power CTs; 277V control power 60 Hz	METSEEM403336
200 A current transformer (CT), 80 mA secondary, solid-core (1 CT)	METSECT80200
400 A current transformer (CT), 80 mA secondary, solid-core (1 CT)	METSECT80400
600 A current transformer (CT), 80 mA secondary, solid-core (1 CT)	METSECT80600
50 A .333 V Split Core Current Transformer with 0.75 in Window Size	ECT075050SC
100 A .333 V Split Core Current Transformer with 0.75 in Window Size	ECT075100SC
150 A .333 V Split Core Current Transformer with 0.75 in Window Size	ECT075150SC
200 A .333 V Split Core Current Transformer with 0.75 in Window Size	ECT075200SC
100 A .333 V Split Core Current Transformer with 1.25 in Window Size	ECT125100SC
150 A .333 V Split Core Current Transformer with 1.25 in Window Size	ECT125150SC
200 A .333 V Split Core Current Transformer with 1.25 in Window Size	ECT125200SC
400 A .333 V Split Core Current Transformer with 1.25 in Window Size	ECT125400SC
200 A .333 V Split Core Current Transformer with 2.00 in Window Size	ECT200200SC
400 A .333 V Split Core Current Transformer with 2.00 in Window Size	ECT200400SC
600 A .333 V Split Core Current Transformer with 2.00 in Window Size	ECT200600SC
600 A .333 V Split Core Current Transformer with 3 x 5 in Window Size	ECT300600SC
800 A .333 V Split Core Current Transformer with 3 x 5 in Window Size	ECT300800SC

PowerLogic™ HDPM6000 High-Density Power Meters

The PowerLogic™ HDPM6000 high-density, multi-circuit busway and panelboard power meters are applicable for cost and network management in large and critical power applications.

The PowerLogic HDPM6000 high-density metering system provides the data you need to achieve energy accountability and regulatory compliance. It helps you improve power quality to avoid downtime by monitoring power problems at the circuit level, giving you visibility across your entire electrical infrastructure.

The HDPM6000 multi-circuit power metering system is modular, scalable, and adaptable to almost any situation. It is the perfect high-density metering solution for main circuits and branch circuits in any type of electrical panel or busway system.

Applications

Ideal for large building applications such as data centers, industrial facilities, infrastructure, and other similar environments.



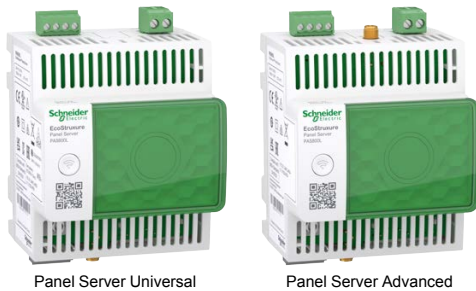
<p>Market Solutions</p> <p>Markets that benefit from a solution with PowerLogic™ HDPM6000 include:</p> <ul style="list-style-type: none"> • Data centers • Industrial facilities • Healthcare facilities • Manufacturing 	<p>Competitive advantages</p> <ul style="list-style-type: none"> • Asset management <ul style="list-style-type: none"> – Identify increased harmonics in the rack servers to detect a potential disruption – Total harmonics distortion – Waveform capture • Display and web page visualization <ul style="list-style-type: none"> – Optional touchscreen display accesses meter data – User-friendly web interface allows configuration of branch circuits and commissioning of meter system • Data logging and software monitoring <ul style="list-style-type: none"> – Data logging and on-board memory storage – EcoStruxure™ PME and Power Operation integration • Busway solution <ul style="list-style-type: none"> – Modular distributed architecture meets data center requirements in an all-in-one solution
<p>Benefits</p> <ul style="list-style-type: none"> • Modular platform approach provides scalability and minimizes integration costs, start up time, and operational expenses. • Provides power quality metrics down to the branch circuit, allowing users to effectively monitor circuit loads, manage power consumption, allocate energy costs and maximize uptime across their facilities. • Makes energy and power quality data immediately actionable and relevant to operational and sustainability goals. 	<p>Power management solutions</p> <p>Schneider Electric provides innovative power management solutions to increase your energy efficiency and cost savings. Maximize electrical network reliability and availability, and optimize electrical asset performance.</p>

HDPM6000 Head Unit and Modules
Table 4.24: Technical specifications

Features	
Web interface	For configuration and live data access
Supported protocols	Modbus TCP/IP, SNMP, BACnet IP HTTPS, IPV6 are supported
Data storage	Min. 8 GB SD card to store log data and waveform captures provided
Alarms	On-board user-configurable alarms and alerts
Power quality analytics	Waveform capture (natively with Head Unit, Busway, Strip 24 Circuit modules- optional with Retrofit and Strip 21 Circuit modules), voltage THD (Head Unit only), current THD, voltage imbalance (Head Unit only), current imbalance, current Total Demand Distortion (Head Unit only)
Electrical Characteristics	
Measurement voltage	Per UL 61010-1: up to 277 Vac L-N/480 Vac L-L Per IEC 61010-1: up to 277 Vac L-N/480 Vac L-L Single phase 2-wire plus ground, 3-wire plus ground or 4-wire plus ground
Specified accuracy range	108 Vac L-N/187 Vac L-L to 332 Vac L-N/576 Vac L-L
Maximum continuous overvoltage at voltage measurement inputs	580 Vac L-L
Input frequencies	50/60 Hz
24 Vdc power supply	The HDPM6000 Head Unit needs to be powered with a 24 Vdc power supply. The input voltage for the power supplies available in the HDPM catalogue are: 100...240 Vac or 264...575 Vac to 24 Vdc output. The HDPM6000 branch circuit modules receive the 24 Vdc from the Head Unit via the bus port CAT6 cable.
Measurement category	CAT III
CT support	UL2808, 20-4000 A with internal burden resistor and 250 mV signal (no shorting blocks required)
CT options	Solid-core or split-core type current transformers with a maximum voltage of 480 V
Supported Protocols	
Maximum number of concurrent Modbus TCP connections	25
Environmental Characteristics	
Operating temperature	-20...60 °C (-4...140 °F)
Storage temperature	-40...85 °C (-40...185 °F) - for IO and EIM Module: -20...70 °C (-4...158 °F)
Relative humidity	5...90% non-condensing
Maximum operating altitude	2,000 m (6,562 ft)
Non-operating altitude	15,000 m (49,213 ft)
Noise level	< 65 dba at 6 ft (72 in) from the HDPM6000
Mounting location	Not suitable for wet locations, for indoor use only
Pollution degree (Head Unit)	2
Measurement Accuracy	
The HDPM6000 Head Unit Real Energy (kWh) meets the accuracy limits of ANSI C12.20 Class 0.5 and IEC 62053-22 Class 0.5S according to the following tests:	
Measurement type	IEC 62053-22 2021 ANSI C12.20-2015
	IEC 62053-22 2021 Class 0.5 ANSI C12.20-2015 Class 0.5
Variation of current	IEC 62052-11:2020, 9.4.12 N/A
Equality of circuits	N/A Test 7
Variation of voltage	IEC 62052-11:2020, 9.4.3 Test 5
Variation of frequency	IEC 62052-11:2020, 9.4.6 Test 6
Variation of ambient temperature	IEC 62052-11:2020, 9.4.4 Test 19
Load performance	N/A Test 3
Variation of PF	N/A Test 4

Table 4.25: Waveform Capture Specifications

Modules	Frequency (Hz)	Number of samples per cycle	Number of cycles per current and voltage waveform	Portion of waveform capture that is pre-event
HDPM6000, HDPM6000R, HDPM6000S, HDPM6000S24	50	160	12.8	2/3
	60	133.3	15.3	2/3
HDPM6000B	50	160	6.4	1/2
	60	133.3	7.6	1/2



Panel Server Universal

Panel Server Advanced



EcoStruxure™ Panel Server

IoT for an intelligent power network. The EcoStruxure™ Panel Server is the next generation of gateway, providing a seamless connection of wired or unwired smart IoT devices to your edge control software or cloud-based applications and analytics. It is a foundational enabler for Schneider Electric EcoStruxure™ solutions.

Electrical safety

Panel Server is an integral part of Schneider Electric's continuous thermal monitoring application, helping reduce the risk of electrical fires, and helping to increase people and assets protection. Implement the thermal monitoring of your electrical panel by connecting thermal and heat sensors to your Panel Server.

Power availability

Electrical distribution monitoring and power event analysis help avoid unplanned downtime caused by electrical failure. Panel Server collects real-time data and alarms, presenting information through embedded web pages, making it available to edge control software or cloud-based applications and analytics for electrical system diagnostics. Use embedded web pages for first-level monitoring or monitor from your edge or cloud control system.

Optimize energy efficiency

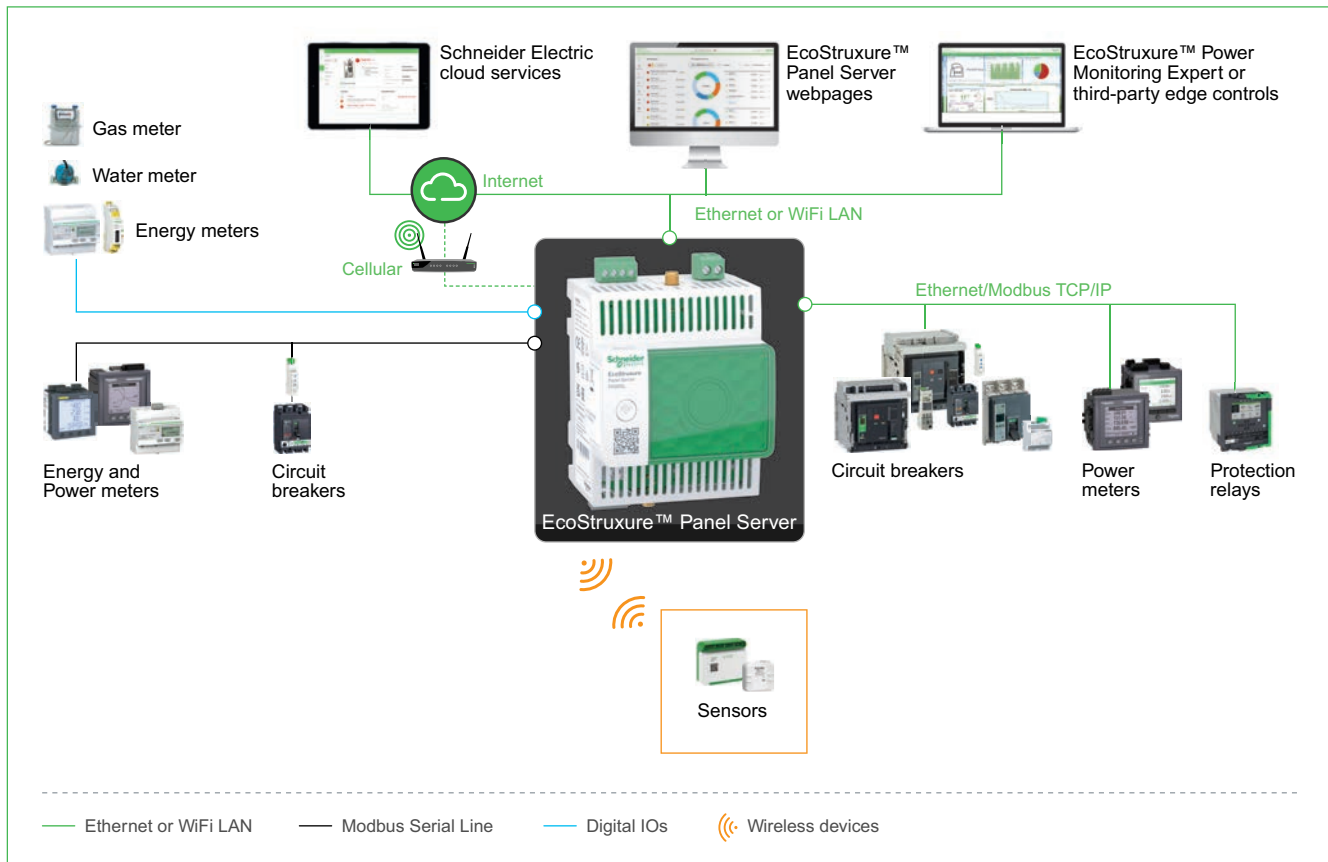
Improve your facility's energy efficiency and reduce energy consumption with energy usage analysis and performance tracking. Panel Server collects and shares energy data to help achieve your energy conservation initiatives. It is part of an energy data management system certified for compliance with ISO 50001, 50002, 50006 requirements.

Cybersecurity

Guarding your electrical assets and systems against cyber attacks is vital. Discover the enhanced cybersecurity benefits of Panel Server and its IEC62443-4-1 compliant development lifecycle. Explore its cybersecurity features through a dedicated guide, and discover how Panel Server empowers you to retrieve security logs, providing valuable insights into system security and activity.

EcoStruxure Panel Server gives you access to the information you need to help protect, maximize and optimize your power system.

Architecture Overview





PS600L



PS800L

Panel Server Universal

Panel Server Universal is designed to retrieve data from wired or wireless devices. For sensitive installations, the Wired-by-Design models only support wired protocols.

Functions

- Connect to your monitoring & control software such as EcoStruxure Power Monitoring Expert, EcoStruxure Power Operation, or to your Building Management System.
- Connect to Schneider Electric cloud applications such as EcoStruxure Energy Hub or Asset Advisor.
- Ease of commissioning with EcoStruxure Power Commission software or directly through the Panel Server web pages, enabling device plug-and-play and auto-discovery features.
- Ease of operation with user friendly embedded web pages, and data contextualization for more relevant analytics.

Table 4.26: EcoStruxure Panel Server Universal

Description	Catalog Number
Panel Server Universal with 110...277 V AC/ DC power supply	PAS600
Panel Server Universal with 24 V DC power supply	PAS600L
Wired by Design Panel Server Universal with 24 V DC Power	PAS600LWD
Wired by Design Panel Server Universal with PoE power supply	PAS600PWD

Refer to [EcoStruxure Panel Server](#) on www.se.com/us for complete information.

Panel Server Advanced

Panel Server Advanced has Data Logger and Local Energy Server capabilities. It embodies the first step into energy monitoring. Follow, analyze and compare your loads consumption to enable energy savings.

Functions

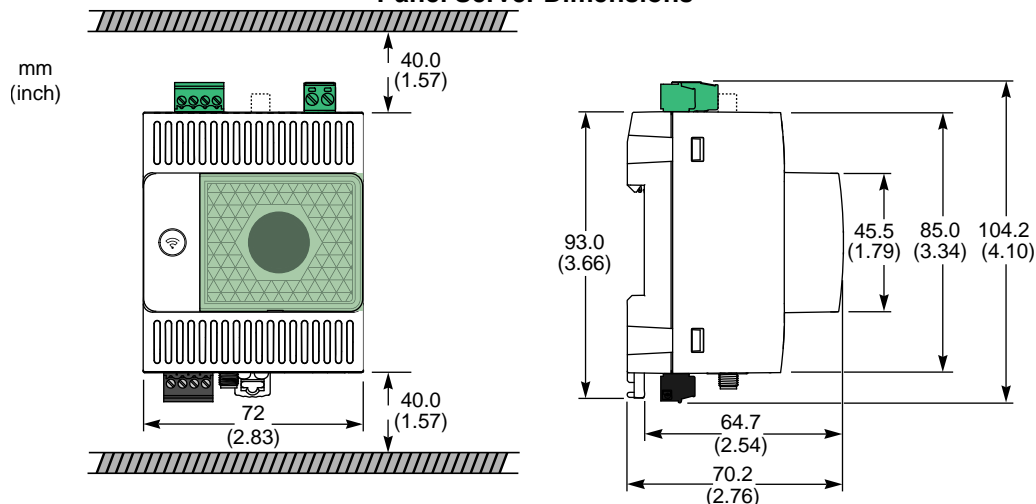
- An all-in-one gateway to retrieve data from both your wireless IEEE 802.15.4 devices and Modbus devices.
- Monitor up to three years history data and analyze your energy consumption directly through the Panel Server Advanced embedded web pages.
- Connect to your monitoring and control software such as EcoStruxure™ Power Monitoring Expert, EcoStruxure™ Power Operation or to your Building Management System.
- Connect to Schneider Electric cloud applications such as EcoStruxure™ Energy Hub or Asset Advisor.
- Ease of commissioning with EcoStruxure™ Power Commission software or directly through the Panel Server web pages, enabling device plug-and-play and auto-discovery features.
- Ease of operation with user friendly embedded web pages, and data contextualizing for more relevant analytics.

Table 4.27: EcoStruxure Panel Server Advanced

Description	Catalog Number
Panel Server Advanced with 24 V DC power supply	PAS800L
Panel Server Advanced with PoE power supply	PAS800P
Panel Server Advanced with 110...277 V AC/DC power supply	PAS800

Refer to [EcoStruxure Panel Server](#) on www.se.com/us for complete information.

Panel Server Dimensions



Approximate Dimensions for Universal and Advanced Panel Server

Engineered Solutions

Schneider Electric provides an engineered solution approach to your specific power system applications. Our total solutions for power monitoring and power system controls allow greater safety, reliability, and energy efficiency of your power systems. As a long standing industry leader in Power Monitoring and Control Systems, we understand your power system requirements and needs.

All of our Engineered Solutions are tailored to your specific system requirements. Schneider Electric is your total solution provider.

The Basics of a Comprehensive Power and Energy Management System

Measure: Gather energy and power data throughout your facility. Stand-alone or embedded meters measure, collect, and deliver essential data from key distribution points across your entire electrical network.

Understand: Turn data into actionable information. Power management software brings intelligent analytics and visualization to power and energy data.

Act: Use actionable information to make intelligent decisions and operational shifts to create change or correct issues.

The Benefits of Power and Energy Management

- Reduce energy and operational costs
- Improve power and equipment reliability
- Optimize operations
- Increase system capacity
- Minimize expensive downtime
- Meet sustainability goals
- Improve productivity

Power System Control Applications

Automated solutions for increased Reliability and Energy Efficiency: Schneider Electric engineers provide Power System Control Applications with automated solutions for addressing your system reliability and efficiency control needs. Our offer covers Automatic Throwover Schemes, Load Shedding/Peak Shaving, and Load Preservation and Microgrids.

- **Automatic Throwover Systems** – Automatic selection of available utility or generator sources to maintain service continuity to connected loads.
- **Load Shedding/Peak Shaving** – Control peak demand levels or ensure service continuity to critical load or operate breakers in accordance with user specified sequences and time delays such as bringing large motors online across several billing kw demand periods to avoid demand penalties.
- **Load Preservation** – Fast acting sophisticated control systems designed to stabilize critical power systems to the greatest extent possible by monitoring frequency and power sources from utility plus generator capacity versus total circuit load.

Power System Engineering

The Square D™ Power System Engineering team offers a wide range of engineering services to improve the safety, efficiency and reliability of your power distribution system. The team is comprised of registered professional engineers, safety trained and equipped, to perform a variety of engineering functions.

Power System Studies

The Square D Power System Engineering Team provides expertise for a variety of electrical power system studies. Some of the more common system studies include:

- Short-circuit analysis
- Time-current coordination
- Motor starting/voltage drop
- Motor starting/torque-speed
- Safe motor re-energization
- Harmonic analysis
- Transient analysis
- Power factor correction analysis
- Other system specific analysis

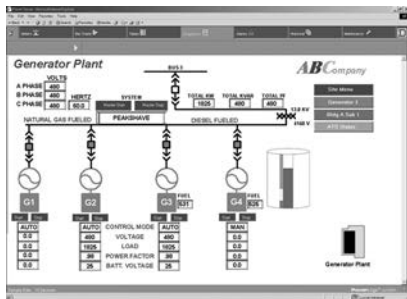
Arc Flash Analysis

Square D offers on-site services to perform arc flash analysis for a facility, complex, office, or campus. An Arc flash analysis is used to determine:

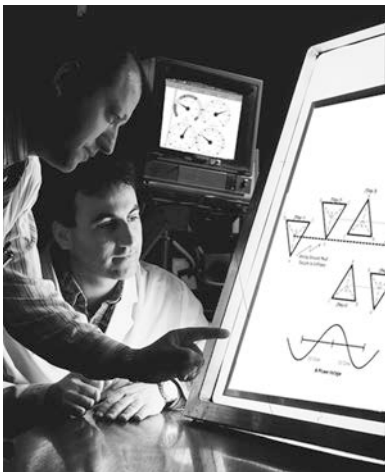
- Flash Protection Boundary
- Incident Energy Value
- Hazard/Risk Category
- Appropriate Personal Protective Equipment (PPE)
- Low cost arc flash reduction methods

Features of Square D arc flash analysis include:

- Time current coordination analysis showing both existing and recommended over/current device settings
- Short-circuit study to ensure adequacy of equipment
- Onsite verification and documentation of equipment
- Arc flash labels (populated with the results of the arc flash analysis)
- Arc flash label affixation
- NFPA 70E—Safe Workplace Practices Training provided by OSHA authorized outreach instructors
- Recommendations and solutions to reduce potential arc flash hazards



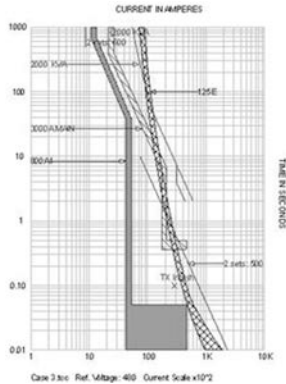
PowerLogic Engineers provide graphic solutions for realtime monitoring of power systems.



Power Quality Studies

Square D offers onsite power quality engineering studies and solutions to eliminate process disruptions, power system shutdowns, and equipment damage due to electrical power system disturbances. A power quality study is used to:

- Determine compliance with the IEEE 519-Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems guidelines
- Identify most cost-effective solution to power quality problems
- Solve process disruptions due to power disturbances
- Reduce economic effects of poor power quality
- Identify disturbances originating on electric utility system and improvements to reduce the number and severity



Power System Assessment

Square D offers engineering services to meet a variety of power system needs:

- Basic codes and standards compliance
- Protective coordination assessment
- Maintenance program review
- Recommendations for power system optimization
- Power quality troubleshooting and analysis
- Power factor and harmonics analysis
- Electrical safety hazards
- Short-circuit withstand overview
- Single-line documentation of power system
- Power monitoring recommendations
- Loading measurements

Power System Design Services

Schneider Electric Engineering Services offers three levels of design services based on the customer need:

- Design Assurance
- Design Assistance
- Primary Design Agent

Other areas of expertise include:

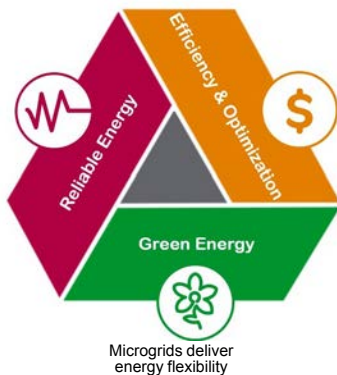
- New equipment installation
- Existing equipment modification
- Protection Control Automation
- Ground Fault Systems
- Generator Control Systems

Square D professional engineers - safety trained and equipped - will listen to your concerns and goals, define the problem or enhancement, and engineer the solution that best satisfies your needs.

For additional information on power system engineering services and pricing, contact your nearest Square D/Schneider Electric office.

Advanced Microgrid Solutions and Distributed Energy Resource Management

With our custom solutions and proven expertise, we deliver advanced microgrids that offer the advantages of grid independence – without forfeiting the benefits of being part of the central grid. Our flexible microgrid architecture features a scalable set of grid components designed to efficiently manage your entire energy infrastructure, including distributed generation, energy storage, and load demand, while giving you the ability to easily adapt the system to your changing needs. **Learn more at www.schneider-electric.us/en/work/solutions/microgrids/**



Total Energy Control

Schneider Electric Certified Energy Managers (CEM's) work on-site with knowledgeable plant personnel to develop a long-term, comprehensive, "Energy Action Plan", that serves as the blueprint for energy savings. Unlike performance contracts or one-time energy audits, the Total Energy ControlSM program offers a strategic partnership for energy-intensive industrials who want to improve energy efficiency.

Total Energy Control

- **Utility Analysis:** evaluating both the commodity supply side and the demand side areas of the operation.
- **Demand Side Usage:** profiling facility loads and consumption patterns.
- **Opportunity Identification / Prioritization:** projects that make sense today and those that should be considered in the future as energy prices change.
- **Project Implementation:** Client can choose which projects to implement or Square D can provide turn-key implementation.
- **Supply Management:** forecasting and making adjustments to reflect current conditions.
- **On-Going Accountability:** accountable along with you for the ongoing success of your energy plan.



EcoStruxure™ Service Plans (ESP) for Power Management

EcoStruxure™ Service Plans (ESP) is a personalized service contract for your connected and non-connected assets. It provides both onsite and off-site asset management, monitoring, diagnostics, and preventive and predictive maintenance services.

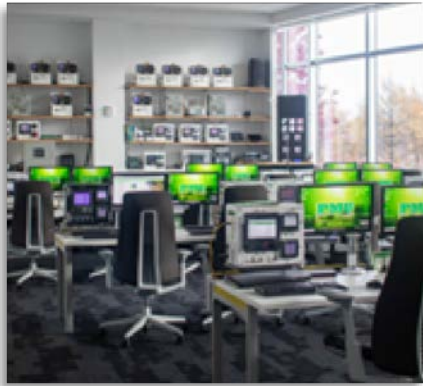
ESP for Power Management is designed to provide maintenance, support, and improved services for your Schneider EPMS. Now you can easily manage your electrical system and keep your operations running smoothly without the need for extra time or the manpower to do it.

Table 4.28: ESP Plan Features

The table below identifies the three levels and what features would be included or can be added. Multi-year plans available at a discount.

Package Features	Prime			Ultra	
	PrimeLite	Prime	PrimeOS	Ultra0	Ultra1 Ultra2 Ultra3
Support					
Basic Product Support	•	•	•	•	•
Remote Access Troubleshooting	•	•	•	•	•
24/7 support	•	•	•	•	•
Direct Access to L2 Digital Service Engineers	•	•	•	•	•
Customer Success Resource	N/A	•	•	•	•
Designated Digital Service Engineer	N/A	N/A	N/A	•	•
Maintenance					
Software Assurance <i>License cost for service packs and new software releases^[17]</i>	N/A	•	•	•	•
Remote Maintenance <i>Hours per year</i>	N/A	Up to 4	Up to 4	Up to 8	Up to 8
Onsite Maintenance <i>Days</i>	Available at discount	Available at discount	2 per year	Available at discount	# of days per quarter ^[18]
Optimize					
Self-Help Web Portal	•	•	•	•	•
Exclusive Access to Webinars	•	•	•	•	•
Exclusive Access to Power Monitoring & Energy Management Online School	•	•	•	•	•
Power Advisor Electrical Health & Data Quality Report with Consultation Meeting ^[19] <i>Frequency</i>	N/A	Bi-annual	Bi-annual	Quarterly	Quarterly
PMU Factory Training Discount (Visit http://www.pmutraining.com/)	N/A	10%	10%	15%	15%
Transform					
eMaintenance <i>Remote PME Maintenance</i>	Available at discount				
eService <i>Expert Design, Customization, and Upgrade Services</i>					
Cybersecurity Assessment					
Managed System Studies					

[17] Installation and SQL license not included.
 [18] ULTRA1 = 1 Day, ULTRA2 = 2 Days, ULTRA3 = 3 Days
 [19] Requires client assistance with metering hierarchy.



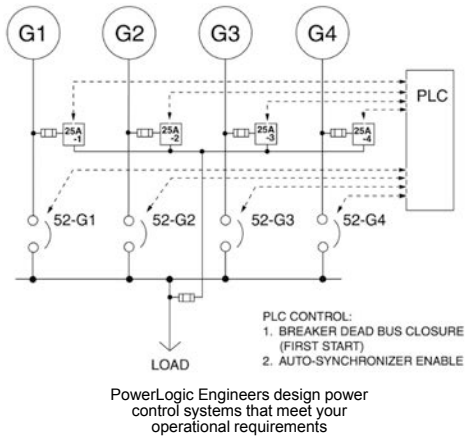
Power Management University (PMU)

PMU is the U.S.-based education team dedicated to providing best in class training on the various energy management software and related products that Schneider Electric™ has to offer. We offer a variety of courses to help our end-users make the most out of their energy management software and hardware investments. The table below identifies some of the training options available through PMU.

- Visit <https://www.pmutraining.com/> to learn more or
- Email pmu@se.com with any questions.

Table 4.29: PMU Training Options

PMU Factory Training Courses Perfect for sites that have minimal staff that need training on their EPMS. PMU Factory Training Courses are instructor-led events with pre-defined agendas and are available for registration by anyone interested. They are hosted at regular intervals throughout the year with both Classroom (CR) and Virtual Instructor-led (VILT) options available for most courses. Below is the list of PMU Factory Training Courses available. Click on each course name to learn more.		
Course Name	Duration	Part Number (CR) = Classroom (VILT) = Virtual Instructor-led
PowerLogic™ and ION Metering Hardware — Installation and Troubleshooting	2 Days	(CR) 3000PMU2DAY
EcoStruxure™ Power Monitoring Expert – Operator Training	3 Days	(CR) 3000PMU3DAY (VILT) 3000PMUWEB3DAY
EcoStruxure™ Power Monitoring Expert – (PME) Advanced Operator Training	3 Days	(CR) 3000PMU3DAY (VILT) 3000PMUWEB3DAY
EcoStruxure™ Power Monitoring Expert – ION Architecture Programming using Designer	4 Days	(CR) 3000PMU4DAY (VILT) 3000PMUWEB4DAY
EcoStruxure™ Power Monitoring Expert – Energy Billing Module Deployment	1 Day	(VILT) 3000PMUWEB1DAY
EcoStruxure™ Power Monitoring Expert – Vista Graphics and User Diagrams	1 Day	(VILT) 3000PMUWEB1DAY
EcoStruxure™ Power Monitoring Expert – TGML Graphics and User Diagrams	1 Day	(VILT) 3000PMUWEB1DAY
PMU Private Training Events Perfect for sites that have complex systems or multiple staff members that need training on their Schneider Electric EPMS. PMU Private Training sessions are instructor-led events that are designed for your specific solution. With both on-site (at the customer facility) and virtual options available, PMU Private Training Events allow you to choose the date, duration, and topics that are relevant to your system and staff. Below is the list of PMU Private Training sessions part numbers. Contact your sales representative or Email pmu@se.com to learn more.		
Location	Part Number	Description
On-site	3000PMUSITE1C	1 Day On-site Private Training Event, up to 10 people, 5X8, Standard Content
	3000PMUSITE2C	2 Day On-site Private Training Event, up to 10 people, 5X8, Standard Content
	3000PMUSITE3C	3 Day On-site Private Training Event, up to 10 people, 5X8, Standard Content
	3000PMUSITE4C	4 Day On-site Private Training Event, up to 10 people, 5X8, Standard Content
	3000PMUCSITEVID	Daily Videography Service Adder for Private On-site Training Events, quantity as needed
	3000PMUCSITE	2nd Instructor for larger Private On-site Training Events, Class Size 11-20 students
Virtual	3000PMUCDVILT1DAY	1 Day Virtual Private Training Event, up to 10 people, 5X8, Standard Content
	3000PMUCDVILT2DAY	2 Day Virtual Private Training Event, up to 10 people, 5X8, Standard Content
	3000PMUCDVILT3DAY	3 Day Virtual Private Training Event, up to 10 people, 5X8, Standard Content
	3000PMUCDVILT4DAY	4 Day Virtual Private Training Event, up to 10 people, 5X8, Standard Content
	3000PMUCVILTVID	Daily Videography Service Adder for Private VILT Events, quantity as needed
N/A	3000PMUCSITEPREP	1 Day of Custom Content Creation, quantity as needed



System Integration System Design and Engineering

Our Power Solutions specialists can work with you to design or upgrade your existing system to best achieve your energy and power management objectives and informational needs. With expertise in electrical systems, communications, and automatic control systems, we can integrate, install, and commission your system for optimal performance.

- System Design and Bill of Material Recommendations
- Power Monitoring and Control
- WAGES (Water, Air, Gas, Electric, Steam)
- Enterprise web-based monitoring
- Specification development, drawings, documentation
- Enclosure panel design and build
- Metering Connection Verification/Testing
- Power distribution automation
- On-Site Installation Assistance, Component Configuration & Startup
- Turn-key project management
- Third Party Device and communication interfaces
- Configured Workstations, User Software Interfaces
- Interactive Graphic Design to mimic facility layout, one-lines, equipment status
- Custom Software, Reports & Applications – Billing and Event Notification



PowerLogic™ Engineers specialize in the design and setup of Emergency Power Supply Systems (EPSS).

For additional information, contact your nearest Square D / Schneider Electric office.



Factory Assembled Equipment

Square D™ PowerLogic™ Factory Assembled Equipment offers a wide range of designs for metering, communications, and control applications to simplify retrofit installations. Our equipment is designed to order as a free-standing or wallmounted system. With PowerLogic™ Factory Assembled Equipment, you'll receive professionally crafted, factory tested, pre-wired equipment that will greatly improve the speed of your system startup. All backed by the Square D™ quality standard of excellence.

- Assemblies include meters & devices wired to terminal blocks, disconnects, and shorting blocks or test switches
- Tailored to any system voltage :
 - 208/120 V, 480/277 V & 600/347 V Wye
 - 240 V, 480 V & 600 V Delta
 - Utilization of PT's required for higher voltage levels
- Wall mountable and easy to install using concealed holes in the back of the enclosure.
- Complete with necessary documentation and mounting hardware for quick and easy installation
- Carbon steel construction, with industry standard ANSI 61 gray powder coat finish
- Equipped with concealed hinged door, and universal pad-lockable latch.
- Custom engraved nameplates available for all units.

Table 4.30: Industrial Enclosure Types 12 & 4, UL & CUL 508A Listed

Available Meter Types	Digital Inputs	Digital Outputs	Analog Inputs	Analog Outputs
PM5563RD	Up to 4 / Meter	Up to 2 / Meter	N/A	N/A
PM8244	Up to 15 / Meter	Up to 5 / Meter	Up to 4 / Meter	Up to 2 / Meter

- Supports Single or Multiple Voltage Sources for Indoor (Types 1 and 12) & Outdoor (Type 4) applications
- Available with 1–4 meters per panel. Serial & Ethernet Communications are options for all units
- EGX & ION RTU Communication Enclosures with 1–4 devices per panel also available



Light Industrial Enclosure Type 1, UL & CUL 508A Listed

- Available for the following meter types: PM8244, PM5563RD, and ION6200
- Supports Single Voltage Source only for Indoor (Type 1) applications.
- Available with 1–12 meters per panel. Serial Communications are standard for all units.
- No Digital or Analog I/O is available for this option.

Service Entrance/Utility Socket Enclosure Type 3R, UL & CUL 508A Listed

- Available for ION8650 only, with up to 3 Digital Inputs and 4 Digital Outputs.
- Supports Single Voltage Source only for Indoor & Outdoor (Type 3R) applications.
- Units are Ring Type with removable cover.
- Available with 1 meter per panel. Serial & Ethernet Communications options available.
- Supports Form 9S, 35S, 36S, 39S and 76S configurations for ION8600 and forms 9S and 36S for E5600.
- Options available for remote mounted CTs
- Options available for integrated, bar type CTs
- Optional Test Switch.

Additional engineered to order products are available for a wide variety of design solutions.

- Switchgear Transfer Control Panels
- Generator Control Panels
- Load Shed Control Panels
- Sequence of Events Recording (SER) Panels
- Control System Mimic Panels
- Lighting Control Interface Panels
- Programmable Logic Controller (PLC) Control Panels (Hot Standby, Relay Control, Data Concentration etc. ...)
- Emergency Power Supply Systems (EPSS) Control Panels
- Water, Air, Gas, Electrical, and Steam (WAGES) Monitoring Panels
- Input Status Monitoring & Alarming Panels
- Remote Annunciator Control Panels
- Remote Operator Control Panels
- Serial, Ethernet, and Cellular Wireless Systems
- Server Rack and Network Equipment (Servers, Switches, UPS's) for Energy Management Systems.
- Industrialized PC's, Touch Screens (Magelis), and Human Machine Interfaces (HMI's) with Custom System Graphics.
- Designed to fit any environment – Indoor (Type 1 & 12) & Outdoor (Type 3R & 4) applications

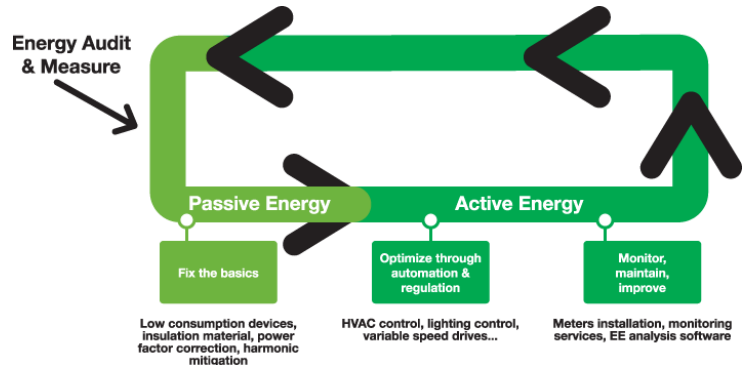
For additional information and pricing please contact your local PowerLogic sales specialist or PowerLogic Inside Sales Support at 615-287-3535. Equipment pricing and literature available for download on our website at www.powerlogic.com/products/enclosures.

To better serve you please have the following information on hand when calling.

- Enclosure type (Indoor or Outdoor) and Environment details (Corrosive or Non-Corrosive)
- Power System Voltage Level and Type (Direct Current (DC) or Alternating Current (AC))
- Digital & Analog Input and Output requirements
- Device Type and Quantity per enclosure
- Ethernet and Serial Communication Requirements
- For Drawout Retrofits, need existing cradle type (i.e. GE, Westinghouse, etc.)

Reactive Power Compensation and Harmonic Mitigation Solutions

How can reactive power compensation and harmonic mitigation solutions be part of your energy efficiency programs?



Power factor is a measure of how efficiently you are using electricity. In an electric power system, a load with low power factor draws more current than a load with a high power factor for the same amount of real power transferred. Utility customers with a low power factor could realize an increase or penalty in their electric bill. Over time, these penalties may reach into thousands of dollars, depending upon the utility's rate structure.

Harmonics may disrupt normal operation of other devices and increase operating costs. Symptoms of problematic harmonic levels include overheating of transformers, motors and cables, thermal tripping of protective devices, logic faults of digital devices and drives. Harmonics can cause vibrations and noise in electrical machines (motors, transformers, reactors). The life span of many devices can be reduced by elevated operating temperature.

As a leader in the field of power quality, Schneider Electric offers the products and services needed to ensure that the most reliable and cost effective solution is applied within your facility. We can help you select the right solution for your application, for greenfield or brownfield projects. Please visit us at <https://www.se.com/us/powerandenergy>.

Table 4.31: Descriptions, Applications, and Features

Product Description	Application	Product Features
PowerLogic™ PFC Capacitor Bank Detuned	Power Factor Correction	Suited for centralized power factor correction in applications containing harmonic energies that would otherwise damage standard automatic capacitor banks
PowerLogic™ PFC Capacitor Bank Fast	Power Factor Correction	Contains enhanced technology utilizing solid state switching elements that replace standard electromechanical contactors. Provides quicker response to load fluctuations with transient free capacitor switching.
EasyLogic™/PowerLogic™ PFC Capacitor Bank Hybrid	Power Factor Correction and Harmonic Filtering	Provides instantaneous and infinitely variable reactive power compensation for industrial networks containing highly transient or unstable loads, as well as system compensation for large AC motor inrush current. It integrates conventional power factor correction systems and the latest IGBT-based solutions to provide ultra rapid response and infinitely variable KVAR control.
PowerLogic™ PFV+	Power Factor Correction	Provides reactive current compensation for specific and high performance systems. It can eliminate leading or lagging power factor, reduce voltage fluctuations, enhance equipment operating life, and improve system power capacity.
PowerLogic™ PCS+ and PCSn	Power Factor Correction and Harmonic Filtering	It is a flexible, high performance, cost-effective solution to stabilize electrical networks by providing harmonic mitigation, power factor correction, and load balancing. It monitors a distorted electrical signal and determines the frequency and magnitude of harmonics in the signal. It cancels the harmonic content with the dynamic injection of opposing phase current in the distribution system or individual load.

PowerLogic™ PFC Smart Cap Banks

Your load variation

Variable or unstable load

Load sensitive to transient switching

Automatic compensation

Network harmonic pollution level

TDDI	<20%
THD(U)	<7%

Choose
VarSet Detuned

480 V - 60 Hz
from 50 to 1000 kVAR

Automatic and transient-free compensation

TDDI	< 8%
THD(U)	<5%

Choose
VarSet Fast

480 V - 60 Hz
from 450 kvar to 1200 kvar

EcoStruxure
Innovation At Every Level

EcoStruxure™ Power ready

- Seamless integration thanks to embedded Modbus communication
- Remote equipment follow up & control
- Remote troubleshooting
- Enable analytics & mobile benefits of EcoStruxure™ Power



Environment

- Installation: Indoor
- Ambient temperature: 15°F to 114.8°F (-10°C to 46°C)
- Humidity: Up to 95%
- Maximum altitude: 6500 feet (2000 m)

Standards

- cCSAus approved
- CSA 22.2 No. 190
- UL810, UL508a

Environmental Certifications

- Produced in 14001 certified plants, product environmental profile available

PowerLogic™ PFC Smart Cap Banks

The PowerLogic™ PFC Smart Capacitor Bank Detuned automatic capacitor banks provide power factor correction in electrical distribution networks with moderate levels of harmonic content. The series capacitor and reactor combination is tuned below the first dominant harmonic order (usually the 5th). This prevents resonance and harmonic amplification.

Table 4.32: General Characteristics

Electrical Characteristics	
Rated voltage	480 V / 60 Hz
Capacitance tolerance	-5%, +10%
Connection type	Three-phase
Power losses	< 6 W / kVAR
Maximum permissible over current	1.3 x In
Maximum permissible over voltage	1.1 x Un, 8 h every 24 h
Enclosure	
Degree of protection	NEMA 1/NEMA 1 Gasket
Color	RAL 7035
Degree of mechanical resistance	IK10
Controller	
PowerLogic™ PFC	PowerLogic™ PFC controller with embedded Modbus communication
Head circuit breaker protection	
Without incoming circuit breaker	<ul style="list-style-type: none"> • Lug connection • LV PFC Bank must be protected by a circuit breaker or by a fused disconnector from upstream switchboard.
With incoming circuit breaker	PowerPac™ with rotary handle up to 200 kVAR, toggle switch above 200 kVAR
Step	
Capacitors type	<ul style="list-style-type: none"> • PowerLogic™ PFC Capacitor 575 V for network voltage 480 V • Maximum overcurrent: 1.8 x In • 3 ph overpressure disconnection system • Discharge resistor 50 V - 1mn
Contactors	Dedicated to capacitor switching
Detuned reactor	<ul style="list-style-type: none"> • PowerLogic™ PFC DR • Overheating protection by thermostat
Circuit breaker protection	PowerPac™
Temperature control	
Double control	By thermostat and by controller
Communication	
Modbus	RS-485
Installation	
Customer connection	Top Entry
Auxiliary transformer	120 V included - no need for additional supply
CT not included	<ul style="list-style-type: none"> • 5 VA - secondary 1 or 5 A • To be installed upstream of the load and capacitor bank
GenSet contact	Available for disconnection with generator
Alarm contact	Available for remote warning signal

Options available on request:

- Fixed stages (by controller programming)
- Custom staging ratios
- Bottom cable entry
- Icc level up to 100 kA

PowerLogic™ PFC

Low Voltage Capacitor Bank – Detuned (Network 480V / 60Hz – Tuning order 4.2)

Table 4.33: Network voltage 480 V - 60 Hz

References	Power (kVAR)	Smallest Step	Resolution	Electrical Steps	Physical Steps	Breaking Capacity	Main Circuit Breaker	Enclosure Type	Enclosure Size (H x W x D) mm	Max. Weight (kg/lbs)
With incoming Circuit Breaker										
VA050B40140	050	25	2x25	2	2	65 kA	HLM36100	VAF3P	1300 x 1300 x 400 (51.2 x 51.2 x 15.7) in.	265/585
VA075B40140	075	25	25 + 50	3	2		HLM36125			
VA100B40140	100	25	2x25 + 50	4	3		JLM36175			
VA125B40140	125	25	25 + 2x50	5	3		JLM36200			
VA150B40140	150	25	2x25 + 2x50	6	4		LLM36600U31X			
VA175B40140	175	25	25 + 3x50	7	4		LLM36600U31x			
VA200B40140	200	50	4x50	4	4		LLM36600U31X			
VA250B40140	250	50	50 + 2x100	5	3		LJM36600U31X	VAF1P	2200 x 1000 x 600 (86.6 x 39.4 x 23.6) in.	435 / 959
VA300B40140	300	100	3x100	3	3		LJM36600U31X			
VA350B40140	350	50	50 + 3x100	7	4		PJF36080U31A			
VA400B40140	400	100	4x100	4	4		PJF36100U31A			
VA450B40140	450	50	50 + 4x100	9	5		PJF36100U31A			
VA500B40140	500	100	5x100	5	5		PJF36120U31A			
VA550B40140	550	50	50 + 5x100	11	6		PJF36120U31A	VAF4P	2200 x 1800 x 600 (86.6 x 70.9 x 23.6) in.	750 / 1653
VA600B40140	600	100	6x100	6	6		PJF36120CU31A			
VA650B40140	650	50	50 + 6x100	13	7		PJF36120CU31A			
VA700B40140	700	100	7x100	7	7		RKF36160CU31A			
VA750B40140	750	50	50 + 7x100	15	8		RKF36160CU31A			
VA800B40140	800	100	8x100	8	8		RKF36160CU31A			
VA900B40140	900	100	9x100	9	9		RKF36160CU31A	VAF5P	2200 x 2000 x 600 (86.6 x 78.7 x 23.6) in.	845 / 1862
VAX00B40140	1000	100	10x100	10	10	RLF36200CU31A				

References	Power (kVAR)	Smallest Step	Resolution	Electrical Steps	Physical Steps	Short-time Withstand Current	Recommended Upstream Protection	Enclosure Type	Enclosure Size (H x W x D) mm	Max. Weight (kg/lbs)
With Main Lug										
VA050M40140	050	25	2x25	2	2	25 kA/ 3 cycles	HML36100	VAF3P	1300 x 1300 x 400 (51.2 x 51.2 x 15.7) in.	265 / 585
VA075M40140	075	25	25 + 50	3	2		HLM36125			
VA100M40140	100	25	2x25 + 50	4	3		JLM36175			
VA125M40140	125	25	25 + 2x50	5	3		JLM36200			
VA150M40140	150	25	2x25 + 2x50	6	4		LLM36600U31X			
VA175M40140	175	25	2 + 3x50	7	4		LLM36600U31X			
VA200M40140	200	50	4x50	4	4	LLM36600U31X	VAF1P	2200 x 1000 x 600 (86.6 x 39.4 x 23.6) in.	400 / 882	
VA250M40140	250	50	50 + 2x100	5	3	LJM36600U31X				
VA300M40140	300	100	3x100	3	3	LLM36600U31X				
VA350M40140	350	50	50 + 3x100	7	4	PJF36080U31A				
VA400M40140	400	100	4x100	4	4	PJF36100U31A				
VA450M40140	450	50	50 + 4x100	9	5	PJF36100U31A				
VA500M40140	500	100	5x100	5	5	PJF36120U31A	VAF4P	2200 x 1800 x 600 (86.6 x 39.4 x 23.6) in.	570 / 1256	
VA550M40140	550	50	50 + 5x100	11	6	PJF36120U31A				
VA600M40140	600	100	6x100	6	6	PJF36120CU31A				
VA650M40140	650	50	50 + 6x100	13	7	PJF36120CU31A				
VA700M40140	700	100	7x100	7	7	RKF36160CU31A				
VA750M40140	750	50	50 + 7x100	15	8	RKF36160CU31A				
VA800M40140	800	100	8x100	8	8	RKF36160CU31	VAF5P	2200 x 2000 x 600 (86.6 x 78.7 x 23.6) in.	810 / 1785	
VA900M40140	900	100	9x100	9	9	RKF36160CU31A				
VA900M40140	900	100	9x100	9	9	RKF36160CU31				
VAX00M40140	1000	100	10x100	10	10	RLF36200CU31A				

4

POWER MONITORING AND CONTROL



AccuSine PFV+ Electronic VAR Control

AccuSine PFV+ is a very simple and effective means to eliminate leading or lagging power factor, reduce voltage fluctuations, enhance equipment operating life, and improve system power capacity. AccuSine PFV+ offers many features in one package that others require multiple models to accomplish.

AccuSine PFV+ can help you solve:

- Power factor
- Imbalance (specifically important for motor applications)
- Voltage stability (such as localized photovoltaic networks)
- Flicker
- AccuSine PFV+ integrates with EcoStruxure™ Power's edge control power management and control software and analytics services that scale to your demands and adapt to your needs.

AccuSine PFV+ Sizing

For proper sizing of AccuSine units, contact the Schneider Electric sales office or visit us at <https://www.se.com/us/powerandenergy>. To expedite the product selection process, please have a single line diagram and/or details of the application including sizes of transformers, non-linear and linear loads, and any existing filters and capacitors.

Table 4.34: AccuSine PFV+ Selection

PF Correction and Load Balancing (380-480V models 50/60Hz)							
Rated Current (A)	KVAR Rating @ Voltage	Catalog Number	Rating	Enclosure Style	Cable Entry	Frame	Weight lb (kg)
60 ^[1]	39.5 @ 380 41.6 @ 400 43.1 @ 415 49.9 @ 480	EVCP060D5IP00	IP00 (chassis)	Wall Mount	Bottom	1	194 (88)
		EVCP060D5N2	UL Type 2	Floor Standing	Top or Bottom	2	611 (277)
		EVCP060D5IP31	IP31				642 (291)
		EVCP060D5N12	UL Type 12				
		EVCP060D5IP54	IP54				
120 ^[2]	79.0 @ 380 83.1 @ 400 86.3 @ 415 99.8 @ 480	EVCP120D5IP00	IP00 (chassis)	Wall Mount	Bottom	3	249 (113)
		EVCP120D5N2	UL Type 2	Floor Standing	Top or Bottom	4	615 (279)
		EVCP120D5IP31	IP31				646 (293)
		EVCP120D5N12	UL Type 12				
		EVCP120D5IP54	IP54				
200 ^[3]	131.6 @ 380 138.6 @ 400 143.8 @ 415 166.3 @ 480	EVCP200D5IP00	IP00 (chassis)	Wall Mount	Bottom	5	377 (171)
		EVCP200D5N1	UL Type N1	Floor Standing	Top or Bottom	6	800 (363)
		EVCP200D5N2	UL Type 2				846 (384)
		EVCP200D5IP31	IP31				887 (402)
		EVCP200D5N12	UL Type 12				
300 ^[4]	197.5 @ 380 207.8 @ 400 215.6 @ 415 249.4 @ 480	EVCP300D5IP00	IP00 (chassis)	Wall Mount	Bottom	7	463 (210)
		EVCP300D5N1	UL Type N1	Floor Standing	Top or Bottom	8	887 (402)
		EVCP300D5N2	UL Type 2				930 (422)
		EVCP300D5IP31	IP31				961 (436)
		EVCP300D5N12	UL Type 12				
		EVCP300D5IP54	IP54				

Table 4.35: PowerLogic™ PCS+ and AccuSine PFV + Exterior Dimensions

Frame Size	Exterior Dimensions		
	Height in (mm)	Width in (mm)	Depth in (mm)
1	51.18 (1300)	16.57 (421)	13.74 (349)
2	82.68 (2100)	31.50 (800)	19.69 (500)
3	55.12 (1400)	16.57 (421)	15.12 (384)
4	82.68 (2100)	31.50 (800)	19.69 (500)
5	52.09 (1323)	22.91 (582)	17.24 (438)
6	82.68 (2100)	35.43 (900)	23.62 (600)
7	61.42 (1560)	22.91 (582)	17.24 (438)
8	82.68 (2100)	35.43 (900)	23.62 (600)
9	82.68 (2100)	51.18 (1300)	19.69 (500)
10	82.68 (2100)	55.12 (1400)	23.62 (600)
11	78.74 (2000)	31.50 (800)	23.62 (600)

AccuSine+ Wall Mount Conversion Kit

- Converts IP00 (UL Type Open) to IP20 (UL Type 1) wall mounted enclosed assemblies.
- Includes HMI mounting plate and cable entry enclosure for mounting on the bottom of the IP00 assemblies.

Table 4.36: AccuSine+ Wall Mount Kits

Wall Mount Kit Reference	Assembled Dimensions — IP20				IP20 Assembly Weight lb (kg)	Cable Entry Enclosure Weight lb (kg)
	Unit Rating (A)	Height in (mm)	Width in (mm)	Depth in (mm)		
PCSPWMKIT60A	60	60.24 (1530)	16.57 (421)	13.7 (349)	214.51 (97.3)	19.18 (8.7)
PCSPWMKIT120A	120	64.17 (1630)	16.57 (421)	15.12 (384)	269 (122)	20.5 (9.3)
PCSPWMKIT300A	200	64.64 (1642)	22.64 (575)	17.13 (435)	396.83 (180)	19 (8.6)
PCSPWMKIT300A	300	74 (1882)	22.64 (575)	17.13 (435)	481.93 (218.6)	19 (8.6)

[1] 60 A IP20/UL Type 1 configuration requires ordering two items: EVCP060D5IP00 and PCSPWMKIT60A; adds 9.12 in (232 mm) to length and 19.18 lb (8.7 kg).
 [2] 120 A IP20/UL Type 1 configuration requires ordering two items: EVCP120D5IP00 and PCSPWMKIT120A; adds 9.13 in (232 mm) to length and 20.5 lb (9.3 kg).
 [3] 200 A IP20/UL Type 1 configuration requires ordering two items: EVCP200D5IP00 and PCSPWMKIT300A; adds 10.75 in (273 mm) to length and 19 lb (8.6 kg).
 [4] 300 A IP20/UL Type 1 configuration requires ordering two items: EVCP300D5IP00 and PCSPWMKIT300A; adds 10.75 in (273 mm) to length and 19 lb (8.6 kg).

AccuSine Current Transformers

Split-Core Design

Construction

Directional silicon steel is used for the flexible core. Secondary windings are of copper. Unit is encapsulated in silicone rubber, which protects against moisture, dirt, oil, and corona.

Table 4.37: Specifications

Description		Specification
Insulation Level		0.72 kV BIL 10 kV Full Wave
Frequency		50-400 Hz
Thermal Factor		1.25 at 30 °C; 1.0 at 55 °C
Operating Temp Range		-45 °C to +55 °C
Altitude		Up to 4000 Meters
Accuracy (Primary rating)	200 through 300	4 %
	400 through 500	3 %
	600 through 800	2 %
	1000 through 6000	1 %
Secondary Leads		3.65 m with spade connectors
Color		Transformer (red) - Leads (yellow)
Remains flexible from -45° to +200 °C		



Twisting motion opens to CT diameter of round CT and smaller distance of rectangular CT.
NOTE: Open split-core with a twisting motion only.

Table 4.38: Round Split-Core Design

Reference Number by Secondary Current		Maximum load (A)	Inside diameter (ID) in (mm) - A	Burden Capacity (Ω)		Weight lb (kg)
5 A	1 A			5 A	1 A	
PCSPCTFCL50054	PCSPCTFCL50014	500	4 (101.6)	0.120	2.0	3.35 (1.6)
PCSPCTFCL100054	PCSPCTFCL100014	1000	4 (101.6)	0.200	10.0	3.53 (1.6)
PCSPCTFCL150054	—	1500	4 (101.6)	0.375	15.0	3.53 (1.6)
PCSPCTFCL160054	—	1600	4 (101.6)	0.375	15.0	3.53 (1.6)
PCSPCTFCL50056	—	500	6 (152.4)	0.120	2.0	4.19 (1.9)
—	PCSPCTFCL100016	1000	6 (152.4)	0.200	10.0	4.19 (1.9)
PCSPCTFCL120056	—	1200	6 (152.4)	0.200	15.0	4.19 (1.9)
PCSPCTFCL150056	PCSPCTFCL150016	1500	6 (152.4)	0.375	15.0	4.19 (1.9)
PCSPCTFCL200056	PCSPCTFCL200016	2000	6 (152.4)	1.000	18.0	4.19 (1.9)
PCSPCTFCL250056	—	2500	6 (152.4)	1.400	20.0	4.19 (1.9)
PCSPCTFCL300056	—	3000	6 (152.4)	1.800	20.0	4.19 (1.9)
—	PCSPCTFCL200018	2000	8 (203.2)	1.000	18.0	5.51 (2.5)
PCSPCTFCL250058	—	2500	8 (203.2)	1.400	20.0	5.51 (2.5)
PCSPCTFCL400058	—	4000	8 (203.2)	1.800	20.0	5.51 (2.5)
PCSPCTFCL500058	—	5000	8 (203.2)	1.800	20.0	5.51 (2.5)
PCSPCTFCL2500511	—	2500	11 (279.4)	1.400	20.0	7.5 (3.4)



Twisting motion opens to CT diameter of round CT and smaller distance of rectangular CT.
NOTE: Open split-core with a twisting motion only.

Table 4.39: Rectangular Split-Core Design

Reference Number by Secondary Current		Maximum load (A)	Inside diameter (ID) in (mm)		Burden Capacity (Ω)		Weight lb (kg)
5 A	1 A		A	B	5 Amp	1 Amp	
PCSPCTFCL5005R	PCSPCTFCL5001R	500	2.74 (69.8)	6.6 (168.2)	0.12	2.0	4.19 (1.9)
PCSPCTFCL10005R	PCSPCTFCL10001R	1000	2.74 (69.8)	6.6 (168.2)	0.2	10.0	4.19 (1.9)
PCSPCTFCL12005R	PCSPCTFCL12001R	1200	2.74 (69.8)	6.6 (168.2)	0.2	15.0	4.19 (1.9)
PCSPCTFCL15005R	PCSPCTFCL15001R	1500	2.74 (69.8)	6.6 (168.2)	0.375	15.0	4.19 (1.9)
PCSPCTFCL16005R	PCSPCTFCL16001R	1600	2.74 (69.8)	6.6 (168.2)	0.375	15.0	4.19 (1.9)
PCSPCTFCL20005R	—	2000	2.74 (69.8)	6.6 (168.2)	1	18.0	4.19 (1.9)
PCSPCTFCL30005R	—	3000	2.74 (69.8)	6.6 (168.2)	1.8	20.0	4.19 (1.9)
PCSPCTFCL25005R411	PCSPCTFCL25001R411	2500	4 (101.6)	11 (279.4)	1.4	20.0	6.17 (2.8)
PCSPCTFCL30005R411	—	3000	4 (101.6)	11 (279.4)	1.8	20.0	6.17 (2.8)
PCSPCTFCL40005R411	—	4000	4 (101.6)	11 (279.4)	1.8	20.0	6.17 (2.8)
PCSPCTFCL50005R411	—	5000	4 (101.6)	11 (279.4)	1.8	20.0	6.17 (2.8)

Round Solid-Core Design

Table 4.40: Specifications



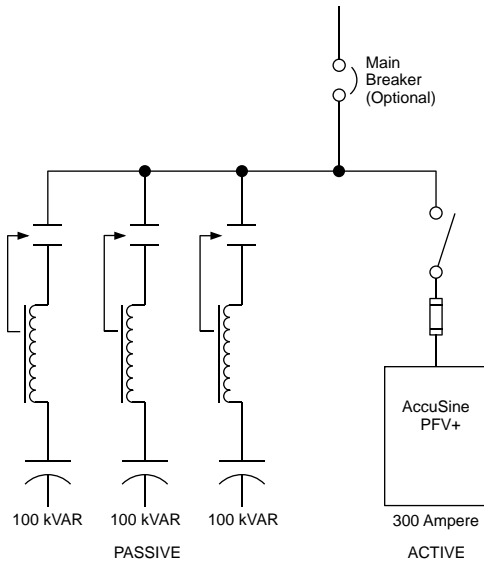
Description	Specification
Frequency	50-400 Hz
Class	0.6 kV, 10 kV BIL Full Wave
Flexible Leads	UL 1015, 105 °C; CSA approved; 16 AWG (1.31 mm ²), 609.6 mm
Weight	Approximately 0.68 kg
Accuracy	1 %

Table 4.41: Round Solid-Core Design

Reference Number by secondary current		Maximum load (Amps)	Burden Capacity (Ω)	
5 Amps	1 Amp		5 Amp	1 Amp
—	PCSPCT7RL2011	200	0.5	5.0
PCSPCT7RL3015	PCSPCT7RL3011	300	0.5	5.0
PCSPCT7RL4015	PCSPCT7RL4011	400	0.6	7.5
PCSPCT7RL5015	PCSPCT7RL5011	500	1.0	10.0
PCSPCT7RL6015	PCSPCT7RL6011	600	1.2	12.5
PCSPCT7RL7515	PCSPCT7RL7511	750	1.2	12.5
PCSPCT7RL8015	PCSPCT7RL8011	800	1.4	20.0
PCSPCT7RL1025	PCSPCT7RL1021	1000	1.4	25.0
PCSPCT7RL1225	PCSPCT7RL1221	1200	1.4	15.0
PCSPCT7RL1525	PCSPCT7RL1521	1500	1.6	20.0
PCSPCT7RL1625	PCSPCT7RL1621	1600	2.0	25.0

VarSet Hybrid

Rebranded!



Topology (Typical)

Main Features:

- Ultra fast reactive current compensation for transient or cyclical loads
- Infinitely variable control
- Instantaneous response for inrush support
- Independently compensates each phase
- Heavy duty dry capacitors provide no risk of fluid leakage, no environmental pollution, and no need for drip pans
- Detuned iron core reactors prevent resonance
- IGBT based power electronic technology
- Stepless power factor correction
- Best-in-class harmonic cancellation up to 50th harmonic and less than 3% THDi
- Energy efficient 3-level IGBT inverter technology
- All major components from Schneider Electric

Power quality issues like harmonics and reactive power can cause problems including equipment damage and reduced reliability. In industrial networks, highly fluctuating loads like spot welders can cause voltage fluctuations and/or flicker that can lead to process malfunctions. The detrimental effects are increased operating expenses, expensive downtime, overheating equipment or poor quality on manufactured parts.

VarSet Hybrid systems provide instantaneous and infinitely variable power factor correction for industrial networks containing highly transient or unstable loads, as well as system compensation for large AC motor inrush current.

The VarSet Hybrid system integrates conventional power factor correction systems and the latest IGBT-based solutions to provide ultra rapid response and infinitely variable kVAR control never before seen in a power factor correction product. Specifically designed for the instantaneous support required by welding equipment, the VarSet Hybrid eliminates voltage sags and voltage flicker while increasing system capacity, providing energy savings and improving weld quality. It also provides current inrush support for applications such as large horsepower motor starting. The VarSet Hybrid is comprised of a Detuned Capacitor Bank with either an Active Harmonic Filter or an Electronic Var Compensator.

Active Harmonic Filters (AHF) are static power electronic products that employ digital logic and IGBT semiconductors to synthesize a current waveform that is injected into the electrical network to cancel harmonic currents caused by nonlinear loads. AHF employ current transformers to measure the load current to determine the content of harmonic current present. By injecting the synthesized current, network harmonic currents are greatly mitigated, thus reducing the heating effects of harmonic current and reducing voltage distortion.

AHF also have the ability to correct for poor displacement power factor (DPF) and provide for mains current balancing. DPF correction can be provided for either leading (capacitive) or lagging (inductive) loads. Mains current balancing is achieved by measuring the negative sequence current present and injecting the inverse negative sequence current to balance the current for the upstream network.

An Electronic Var Compensator (EVC) is a power electronic device consisting of insulated gate bipolar transistors (IGBT) that switch into the AC lines to modulate the output to correct the displaced reactive current (leading or lagging) and balance the current for the power source (also known as negative sequence current).

Detuned Capacitor Banks are automatic capacitor banks made of several capacitor steps controlled by a power factor (PF) controller. They are able to adjust PF to any value between 0.8 lagging and unity. When the PF differs from the target setting for more than 1 second, the capacitor switching modules switch stages as needed to bring the PF as close as possible to the target PF. Switching can be accomplished by electro-mechanical contactors or solid state switches.

The VarSet Hybrid is a custom solution that is engineered to order. Your local Schneider Electric representative can help you select the correct hybrid solution for your specific needs. To learn more, visit us at <https://www.se.com/us/powerandenergy>.



AccuSine PCS+ Active Harmonic Filter (AHF)

AccuSine PCS+ Active Harmonic Filter (AHF) injects harmonic current to cancel harmonic current in the electrical distribution system. This reduced harmonic level results in improved electrical network reliability and reduced operating cost. AccuSine PCS+ is simple to size, install, set up and operate. In addition, AccuSine PCS+ eliminates the complex harmonic compliance limit calculations and removes nuisance harmonics from the electrical network.

The Problem: Power electronic devices that have rapid and frequent load variations have become abundant today due to their many process control related and energy saving benefits. However, they also bring a few major drawbacks to electrical distribution systems; harmonics and rapid change of reactive power requirement. Harmonics may disrupt normal operation of other devices and increase operating costs. Symptoms of problematic harmonic levels include overheating of transformers, motors, drives, cables, thermal tripping of protective devices and logic faults of digital devices. In addition, the life span of many devices can be reduced by elevated operating temperature.

The Solution: The AccuSine PCS+ AHF provides the simplest and most effective means to mitigate harmonics, to reduce process related voltage fluctuations. The AccuSine PCS+ AHF actively injects opposite harmonics current on the source side of the load. In addition, it:

- Decreases harmonic related overheating of cables, switchgear and transformers
- Reduces downtime caused by nuisance thermal tripping of protective devices
- Increases electrical network reliability and reduces operating costs
- Corrects to the 51st harmonic, reduce harmonics level to meet IEEE 519, IEC 61000 3-4, and UK G5/4-1 standards.
- Compensates entire network or specific loads depending on installation point

Standard Features:

- Real-time dynamic current injection for harmonic cancellation and VAR compensation (lead or lag power factor)
- Load balancing capability
- Parallel connection allows for easy retrofit and installation of multiple units for large networks
- Response to load fluctuations within 2 cycles for harmonics, 1/4 cycle for power factor or load balancing
- Full color touch screen HMI (Human Machine Interface)
- UL Type 1, UL Type 2, UL Type 12, IP31, and IP54 enclosures
- Seismic rated per ICC IBC and ASCE 7
- UL, CE, ABS, and CSA certified
- AccuSine PCS+ integrates with EcoStruxure™ Power's edge control power management and control software and analytics services that scale to your demands and adapt to your needs.

AccuSine PCS+ Sizing: For proper sizing of AccuSine units, contact your local Schneider Electric representative or visit us at <https://www.se.com/us/powerandenergy>. To expedite the product selection process, please have a single line diagram and/or details of the application including sizes of transformers, non-linear and linear loads, and any existing filters and capacitors.

Table 4.42: PCS+ Active Harmonic Filter Selection

AccuSine PCS+ (380–480 V, 50/60 Hz)							
Rated Current	KVAR Rating @ Voltage	Catalog Number	Enclosure			Frame	Weight lb (kg)
			Rating	Style	Cable Entry		
60[5]	39.5 @ 380 41.6 @ 400 43.1 @ 415 49.9 @ 480	PCSP060D5IP00	IP00 (chassis)	Wall Mount	Bottom	1	194 (88)
		PCSP060D5N2	UL Type 2	Floor Standing	Top or Bottom	2	611 (277)
		PCSP060D5IP31	IP31				
		PCSP060D5N12	UL Type 12				
		PCSP060D5IP54	IP54				
PCSP120D5IP00	IP00 (chassis)	Wall Mount	Bottom	3	249 (113)		
120[6]	79.0 @ 380 83.1 @ 400 86.3 @ 415 99.8 @ 480	PCSP120D5N2	UL Type 2	Floor Standing	Top or Bottom	4	615 (279)
		PCSCP120D5IP31	IP31				
		PCSP120D5N12	UL Type 12				
		PCSP120D5IP54	IP54				
		PCSP200D5IP00	IP00 (chassis)	Wall Mount	Bottom	5	377 (171)
200[7]	131.6 @ 380 138.6 @ 400 143.8 @ 415 166.3 @ 480	PCSP200D5N1	UL Type N1	Floor Standing	Top or Bottom	6	846 (384)
		PCSP200D5N2	UL Type 2				
		PCSP200D5IP31	IP31				
		PCSP200D5N12	UL Type 12				
		PCSP200D5IP54	IP54	Wall Mount	Bottom	7	463 (210)
PCSP300D5IP00	IP00 (chassis)						
PCSP300D5N1	UL Type N1						
PCSP300D5N2	UL Type 2						
PCSP300D5IP31	IP31						
300[8]	197.5 @ 380 207.8 @ 400 215.6 @ 415 249.4 @ 480	PCSP300D5N12	UL Type 12	Floor Standing	Top or Bottom	8	930 (422)
		PCSP300D5IP54	IP54				
		PCSP300D5IP00	IP00 (chassis)				
		PCSP300D5N1	UL Type N1				
		PCSP300D5N2	UL Type 2	Wall Mount	Bottom	11	887 (402)
PCSP300D5IP31	IP31						
PCSP300D5N12	UL Type 12						
PCSP300D5IP54	IP54						
PCSP300D5IP00	IP00 (chassis)						

[5] 60 A IP20/UL Type 1 configuration requires ordering two items: PCSP060D5IP00 and PCSPWMKIT60A; adds 9.13 in (232 mm) to IP00 length and 19.18 lb (8.7 kg).
 [6] 120 A IP20/UL Type 1 configuration requires ordering two items: PCSP120D5IP00 and PCSPWMKIT120A; adds 9.13 in (232 mm) to IP00 length and 20.5 lb (9.3 kg).
 [7] 200 A IP20/UL Type 1 configuration requires ordering two items: PCSP200D5IP00 and PCSPWMKIT300A; adds 10.75 in (273 mm) to IP00 length and 19 lb (8.6 kg).
 [8] 300 A IP20/UL Type 1 configuration requires ordering two items: PCSP300D5IP00 and PCSPWMKIT300A; adds 10.75 in (273 mm) to IP00 length and 19 lb (8.6 kg).

New!

AccuSine PCSn Active Harmonic Filter (AHF)

Part of the AccuSine+ family, the AccuSine PCSn is the ideal solution for harmonic mitigation in commercial buildings, light industry, and other less-harsh environments. In addition to 3-phase mitigation, AccuSine PCSn can compensate for neutral harmonic currents, typically present in building and commercial environments where single-phase non-linear loads are present.



- Configurable: One solution for multiple needs, AccuSine PCSn can be configured for Harmonic Mitigation + PF Improvement + Mains Load Balancing.
- Best-in-class performance to reduce THDi < 3%: Built on award winning AccuSine+ technology, this guarantees a harmonic-free system, improving system reliability, and increasing operational efficiency and uptime.
- Power Factor (cosφ), THDi, and THDv setpoint features provide system-level visibility and control, ensuring that you comply with utility code, and that your system is running at optimal efficiency.
- Harmonic mitigation eliminates harmonic current in the neutral. In a 3-phase system, unbalanced loads introduce a current in the neutral. Applying the mains load balancing function reduces the neutral current to zero, resulting in a perfectly stable system.
- Smart commissioning: Automatic CT polarity detection and correction, intelligent paralleling algorithm saves you time through unit self-identification, system view allows commissioning of the entire system from any one unit.
- Simple Scalability: Add more AccuSine modules as your harmonic mitigation needs change with your load requirements, easily integrating new modules through intelligent paralleling capabilities.
- With conventional power quality solutions you need high capital investment, incur large operating costs and may find it difficult to comply with IEEE 519 guidelines. The PCSn is the perfect alternative to conventional solutions like Harmonic Mitigation Transformers, Isolation Transformers, Passive Filters, Dual winding transformers.
- AccuSine PCSn integrates with EcoStruxure™ Power's edge control power management and control software and analytics services that scale to your demands and adapt to your needs.
- CE and cULus certified.

AccuSine PCSn Sizing: For proper sizing of AccuSine units, contact your local Schneider Electric representative or visit us at <https://www.se.com/us/powerandenergy>. To expedite the product selection process, please have a single line diagram and/or details of the application including sizes of transformers, non-linear and linear loads, and any existing filters and capacitors.

Table 4.43: AccuSine PCSn Commercial References

AccuSine PCSn 208–415 V, 50/60 Hz, UL Type 1, Wall Mount								
Catalog Number	Rated Current (A)	Neutral Rated Current (A)	Rated kVAR @ 208 V	Unit Type	Breaker Rating Required (A) ^[9]	Exterior Dimensions (H x W x D)	Mass	Cable Entry
PCSN020Y4N1	20 A	60 A	7.02	Main	25 A	57 in x 17.5 in x 10.5 in	163 lb	Bottom
PCSN030Y4N1	30 A	90 A	10.8	Main	40 A		163 lb	
PCSN050Y4N1	50 A	150 A	18.0	Main	63 A		163 lb	
PCSN060Y4N1	60 A	180 A	21.6	Main	80 A		196 lb	
PCSN060Y4N1E	60 A	180 A	21.6	Expansion	80 A		196 lb	

NOTE: All dimensions are indicative. Please refer to the dimensions in the installation manual and engineering drawings for design purposes.

^[9] Applicable for TN-C, TN-S, TN-C-S grounding systems. For detailed information please refer to the AccuSine PCSn installation manual.

New!

PowerLogic™ AccuSine™ EVC+

Unlock the potential with true energy efficiency! PowerLogic AccuSine EVC+ is fast, stepless, modular, and can be wall-mounted. It can be configured for Power Factor Correction and Harmonic Mitigation, among others uses.

Electrical networks are changing dramatically

Tomorrow's power quality problems cannot be solved with yesterday's solutions. Traditional, capacitor-based, power factor correction solutions are not designed to support our customers' ambition towards Electricity 4.0 and Net Zero with fast-changing loads, hypersensitive electronics and distributed energy resources (DER).

EVC+ provides stepless VAR compensation to achieve perfect Power Factor (within 1 kVAR) and responds to load changes within 25µs.

Not your typical power factor correction system

In addition to providing superior performance for power factor correction for leading and lagging VAR control, PowerLogic AccuSine EVC+ can mitigate harmonics currents commonly seen in commercial and industrial applications (5th, 7th, 11th, and 13th).

Multiple units can be paralleled for faster commissioning (configure entire system from one unit) and to provide more VAR compensation.

Improve energy efficiency, increase savings immediately

Onboard wizard, automatic CT calibration for simple commissioning. Modular design to help ensure uptime and equipment reliability. On-target, stepless correction that complies with utility regulations.

Thermal reliability

- Dynamic cooling for optimized efficiency
- Withstand up to +122 °F without derating
- Maximum ambient temperature +127 °F

Reliable and robust

- Connectivity-ready
- Cybersecure
- Seismically tested to 2.47g
- Built-in EMC filter
- THDv ≤ 15% withstand

Certifications and Compliance

- US and CSA
- DNV and ABS
- HCAI (OSHDP)



Table 4.44: Electronic VAR Compensator / Static VAR Generator

Network Rated Voltage	Installation	Standards	Certifications	Enclosure Mounting	Enclosure Degree of Protection	Reactive Power Ratings (50/60 Hz)	Catalog Number		
208–480 Vac	Indoor	UL 508 CSA C22.2 No 14 ISO 9001 IEEE 519-2014 IEC 62477-1 IEC 61439-1	CE cULus RCM	Tray mounted	IP00	75 kvar 380 Vac 75 kvar 480 Vac 47 kvar 240 Vac 41 kvar 208 Vac	EVCP075D5CH00		
						100 kvar 380 Vac 100 kvar 480 Vac 63 kvar 240 Vac 55 kvar 208 Vac	EVCP100D5CH00		
				Wall Mounted	UL Type 1	75 kvar 380 Vac 75 kvar 480 Vac 47 kvar 240 Vac 41 kvar 208 Vac	EVCP075D5W01		
						100 kvar 380 Vac 100 kvar 480 Vac 63 kvar 240 Vac 55 kvar 208 Vac	EVCP100D5W01		
			Wall Mounted	UL Type 2	75 kvar 380 Vac 75 kvar 480 Vac 47 kvar 240 Vac 41 kvar 208 Vac	EVCP075D5W02			
					100 kvar 380 Vac 100 kvar 480 Vac 63 kvar 240 Vac 55 kvar 208 Vac	EVCP100D5W02			
			Wall Mounted	IP21	CE cULus RCM DNV ABS	Tray mounted	IP00	100 kvar 380 Vac 100 kvar 480 Vac 63 kvar 240 Vac 55 kvar 208 Vac	EVCM100D5CH00
						Wall Mounted	IP21	100 kvar 380 Vac 100 kvar 480 Vac 63 kvar 240 Vac 55 kvar 208 Vac	EVCM100D5W21

Visit [PowerLogic AccuSine EVC Plus](http://www.se.com/us) online at www.se.com/us for the most current product listings and documentation.