

ACCURACY CLASS 0.2S

AS/IEC 62053-22 COMPLIANT

CLASS A ED. 3.1 PQ

IEC 61850 ED. 2

[View the PM175 product page on satec-global.com.au](#)

PM17x PRO

Class A Power Quality Analysis and Class 0.2S Energy Metering

The PM17x PRO Series brings power quality analysis, revenue-grade metering and embedded control together in one panel instrument. It suits substation and industrial automation, utility SCADA and commercial energy management, where one device has to replace several. Class 0.2S accuracy and Class A Ed. 3.1 power quality performance sit in the same enclosure.

Each meter is supplied with a three-row bright LED display or as a transducer version with no display. An extra-wide 10 to 1,000V AC line-to-line input rating and a fourth voltage input (Vref) widen the measurement range. Dual-port Ethernet, RS-485 and USB 2.0 Type C cover communications, with IEC 61850 Ed. 2, DNP3.0 and IEC 60870-5-101/104 support. A fourth current input enables residual and leakage current detection.



PM172 PRO

Power and revenue meter with power quality analysis and data logging

PM174 PRO

Class A Ed. 3.1 analyser reporting to the IEEE 1159 power quality standard

PM175 PRO

Class A Ed. 3.1 analyser reporting to the EN 50160 power quality standard

Main Features

- Class 0.2S four-quadrant active and reactive energy metering to AS/IEC 62053-22 and ANSI C12.20 Class 10
- Class A Ed. 3.1 power quality analyser per IEC 61000-4-30, tested to IEC 62586-1 and IEC 62586-2
- EN 50160 and IEEE 1159 compliance statistics with IEC 61000-4-7 harmonic analysis to the 63rd order
- Extra-wide voltage rating of 10 to 1,000V AC line-to-line plus a fourth voltage input (Vref)
- Four isolated current inputs, the fourth enabling residual and leakage current detection
- Dual-port 10/100 Base-T Ethernet, RS-485 and USB 2.0 Type C with IEC 61850 Ed. 2 support
- 1 µs time synchronisation via IRIG-B or PTP v2 (IEEE 1588)
- 16GB memory for long-term waveform and data recording

Feature Capabilities

Class A Power Quality Recorder

PM174 & PM175 PRO

- Class A Ed. 3.1 measurement methods per IEC 61000-4-30
- EN 50160 compliance statistics and event log (PM175 PRO)
- IEEE 1159 power quality reporting (PM174 PRO)
- Power quality event triggering with programmable limits
- Flicker measurement per IEC 61000-4-15

Event & Data Recording

- 16 data recorders with programmable periodic logs, triggered by any internal or external event
- Event recorder for internal diagnostics, control events and I/O operations
- 32 digital counters for external pulses and internal events
- 16 programmable timers from half a cycle to 24 hours
- 16GB memory for long-term waveform and data recording

Harmonic Analyser

- Harmonics to the 63rd order for volts and amps per IEC 61000-4-7
- THD for volts and amps, TDD, K-factor and interharmonics
- Directional power harmonics and harmonic power factor
- IEEE 519 harmonic analysis
- Phasor diagrams and symmetrical components

Billing & TOU Energy Meter

- Class 0.2S four-quadrant active and reactive polyphase static meter to AS/IEC 62053-22 and ANSI C12.20 Class 0.2
- Time-of-Use with 16 summary totalisation registers plus TOU energy and demand registers
- Accumulation of energy pulses from external wattmeters
- Block and sliding demand with up to 64 energy sources
- Demand meter for amps, volts and harmonic demands

Waveform Recording

- 8 fast waveform recorders with 7-channel simultaneous capture (V1-V3, I1-I4)
- Selectable AC sampling rate of 32, 64, 128 or 256 samples per cycle
- 20 pre-fault cycles retained ahead of each trigger
- Synchronised waveforms from multiple devices in a single plot
- COMTRADE and PQDIF export through PAS software

Embedded Programmable Controller

- 64 control setpoints with OR/AND logic and extensive trigger options
- Programmable thresholds and delays with relay control
- Event-driven data recording
- Cross-triggering between multiple devices over Ethernet for synchronous event capture, across up to sixteen triggering channels

Feature Capabilities (continued)

AC Measurement

- Fully isolated AC inputs for direct connection to AC feeders
- Four isolated voltage inputs rated 10 to 1,000V AC line-to-line at 50/60 Hz
- Four isolated current inputs with 1A or 5A CT secondary, HACR, LPCT-D or RS5 options
- Three-phase power meter measuring true RMS volts, amps, powers, power factors, unbalance and neutral current
- Fourth voltage input (Vref) rated 0 to 300V AC/DC

Leakage & Residual Current

- Accurate residual current calculation through a fourth current input monitoring the neutral line
- Alerts and control thresholds configurable in response to detected leakage current

Built-in I/O

- 2 optically isolated digital inputs, 24V DC dry contact, with programmable debounce from 1 ms to 1 second
- 1 solid state relay output with unlatched, latched and pulse operation plus fail-safe alarm notification
- 1 optically isolated analogue input of configurable range (± 1 mA, 0–1mA, 0–20mA, 4–20mA)
- IRIG-B time synchronisation input

Time Synchronisation

- 1 μ s satellite-synchronised clock accuracy via IRIG-B or PTP v2 (IEEE 1588)
- SNTP time synchronisation
- 1 pps synchronisation via digital input
- Internal real-time clock with three-year battery retention

Communications

- RS-485 serial port to 115,200 bps with Modbus RTU/ASCII, DNP3.0 and IEC 60870-5-101
- 2 $\times$ Ethernet 10/100 Base-T ports supporting Modbus/TCP, DNP3.0/TCP, IEC 60870-5-104, PTP and IEC 61850
- Up to 10 non-intrusive simultaneous connections per Ethernet port
- USB 2.0 port (Type C)
- TCP notification client reporting to a remote Modbus/TCP server on event or on a time basis

Software Support & Firmware

- **Power Analysis Software (PAS)** for configuration, data acquisition, waveforms, phasors and harmonics
- **Expertpower™** web platform for energy management with no client software to install
- **eXpertConnect™ App** for mobile connection to the meter covering configuration, readings and diagnostics
- Expertpower client for Modbus/TCP communication with a remote or local stand-alone Expertpower server
- Firmware upgrade over a serial or Ethernet port

Display Options

- Three-row, 7-segment bright LED display of two 4-character rows plus one 6-character row
- Transducer version supplied with no display
- Load bar graph indication

Applications

- Energy management and revenue metering
- SCADA-ready substation automation
- Industrial monitoring
- Renewable energy generation

Specifications

VOLTAGE INPUTS

Operating range *	10–1,000V AC (L–L) @ 50/60 Hz
Input impedance	4MΩ
Burden @ 400V	≤ 0.04VA
Burden @ 120V	< 0.01VA
Isolation	4,000V AC @ 1 min
Wire size	Up to 14 AWG (≤ 2.5 mm ²)

4TH VOLTAGE (VREF) & LPVT

Vref operating range	0–300V AC/DC
LPVT nominal voltage (PM172 PRO only)	0.5–5V
LPVT input impedance **	2MΩ / 50 pF
LPVT interface **	RJ45

CURRENT INPUT OPTIONS

1A / 5A from CT secondary (standard)	Continuous 10A RMS • burden < 0.2VA @ In=1A or 5A • overload withstand 15A RMS continuous, 200A (20 × I _{max}) RMS for ½ second
HACS	0–20mA inputs for solid-core or split-core SATEC High Accuracy Current Sensors
LPCT-D rating	80A / 150 mV @ 50 Hz • 80A / 180 mV @ 60 Hz • RJ45 interface ** • 2MΩ / 50 pF **
LPCT-D max primary	650A
RS5 (5A HACS version)	Nominal input 2.5 mA • maximum current 5 mA at 200% overload • dedicated to HACS CS05S / RS5 (HX0140)

* UL listing covers nominal voltage up to 277/480V AC (L–N/L–L).

** According to IEC 61869-11.

DIGITAL INPUTS (2 DI)

Type	Dry contacts, internally wetted @ 24V DC
Internal power supply	24V DC
Galvanic isolation	4,000V AC @ 1 min
Scan time	1 ms
Connector	Removable, 5 pins • 5 mm terminal pitch
Wire size	Up to 14 AWG (≤ 1.5 mm ²)

DIGITAL OUTPUT & ANALOGUE INPUT

Relay rating	Solid state relay, 0.15A / 250V AC-DC, 1 contact (SPST Form A)
Galvanic isolation	4,000V AC @ 1 min
Operate / release time	1 ms max / 0.25 ms max
Update time	1 cycle
Analogue input range	Universal –1mA to 20mA, configurable ±1mA, 0–1mA, 0–20mA, 4–20mA
Analogue scan time	1 ms
Connector	Removable, 4 pins (DO), 5 pins (AI)

POWER SUPPLY

Rated input	100–277V AC @ 50/60 Hz • 100–290V DC
Tolerance	±15%
Burden	11VA @ V AC • 6VA @ V DC
Isolation	4,000V AC @ 1 min
Wire size	Up to 14 AWG (≤ 2.5 mm ²)

AUXILIARY POWER SUPPLY (BUILT-IN)

Rated input	9–36V DC (24V)
Output	7W
Galvanic isolation	4,000V AC @ 1 min • 4kV
Terminal pitch	5 mm
Wire size	Up to 14 AWG (1.5 mm ²)

Specifications (continued)

SERIAL COMMUNICATION

Port	RS-485, optically isolated
Baud rate	Up to 115,200 bps
Isolation	4,000V AC @ 1 min
Protocols	Modbus RTU • DNP3 • IEC 60870-5-101

ETHERNET PORTS (DUAL)

Type	2 × transformer-isolated 10/100 Base-T, RJ45
Protocols	Modbus/TCP (502) • DNP3/TCP (20000) • IEC 60870-5-104 (2404) • IEC 61850 (102)
Simultaneous connections	10 per port (5 Modbus/TCP + 5 DNP3/TCP)
Isolation	4,000V AC @ 1 min

USB PORT

Type	USB 2.0, Type C
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IRIG-B

Port	Optically isolated IRIG-B input for GPS time synchronisation
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Recommended cable	51Ω low loss RG58A/U (Belden 8219 or equivalent), BNC connector
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Recommended generator	Masterclock GPS-200A GPS time code generator
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REAL-TIME CLOCK & LOG MEMORY

Clock accuracy	Typical error ±15 seconds per month, under 5 minutes per year @ 25°C
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Battery retention	Three years
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Log memory	16GB for long-term waveform and data recording
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DISPLAY OPTIONS

Standard	Three-row 7-segment LED, two 4-character rows plus one 6-character row
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Transducer version	No display (RPM17x PRO model)
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ENVIRONMENTAL CONDITIONS

Operating temperature	−40°C to +70°C (−40°F to 158°F)
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Display operating temp.	−20°C to +70°C (−4°F to 158°F)
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Storage temperature	−40°C to +85°C (−40°F to 185°F)
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Humidity	0 to 95% RH, non- condensing
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Degree of protection	IP51
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CONSTRUCTION

Weight	1.23 kg (2.7 lb)
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Dimensions [H×W×D]	114 × 127 × 127 mm
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Panel cutout	Dual installation: 4-inch round or 92 × 92 mm square
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MATERIALS

Case enclosure	PC/ABS blend plastic
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Display body	PC/ABS blend plastic
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Front panel	PC plastic
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PCB	FR4 (UL94-V0)
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Terminals	PBT (UL94-V0)
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Plug-in connectors	Polyamide PA6.6 (UL94-V0)
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Labels	Polyester film (UL94-V0)
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Standards Compliance

Power Quality

- IEC 61000-4-30 Ed. 3.1: power quality measurement methods, Class A
- IEC 61000-4-7: general guide on harmonics and interharmonics measurement and instrumentation
- IEC 61000-4-15: flickermeter
- IEC 62586-1: product and performance requirements for power quality meters
- IEC 62586-2: detailed testing procedures verifying classification under IEC 61000-4-30
- EN 50160: voltage characteristics of electricity supplied by public networks
- IEEE 1159: recommended practice for monitoring electric power quality

Accuracy

- Complies with AS/IEC 62053-22:2003, Class 0.2S
- Complies with IEC 62053-24:2014, Class 0.5S
- Meets ANSI C12.20-2015, Class 10 (0.2%)

Environmental

- IEC 60529: degree of protection
- IEC 60068-2-1: cold
- IEC 60068-2-2: dry heat
- IEC 60068-2-30: damp heat
- IEC 60068-2-5: solar radiation

Electromagnetic Immunity

- IEC 62052-11 and CLC/TR 50579: conducted disturbances 2 to 150kHz
- IEEE C62.41 and C37.90.1
- IEC 61000-6-2
- IEC 61000-4-2 level 3: electrostatic discharge
- IEC 61000-4-3 level 3: radiated electromagnetic RF fields
- IEC 61000-4-4 level 3: electrical fast transient
- IEC 61000-4-5 level 3: surge
- IEC 61000-4-6 level 3: conducted radio frequency
- IEC 61000-4-8: power frequency magnetic field
- ANSI/IEEE C37.90.1: fast transient SWC

Electromagnetic Emission

- IEC 61000-6-4: radiated and conducted Class B
- IEC CISPR 22: radiated and conducted Class B
- Emission per EN 55011/22 Class B and FCC Part 15 Class B

Safety & Construction

- IEC 61010, IEC 62052-11 and IEC 61557-12
- UL 61010-1 Edition 3, safety requirements for electrical equipment for measurement, control and laboratory use
- CSA C22.2 No. 61010-1 Edition 3
- AC impulse insulation meets IEC 62052-11: 4,000V AC for 1 minute, 6kV/500Ω @ 1.2/50 μs impulse
- IEC 60068-2-6: vibration (sinusoidal)
- IEC 60068-2-27: shock test
- IEC 60068-2-75: hammer test
- AS 62052-11 †

† Contact SATEC Australia for the current approval status of local Australian designations.

Ordering Information

MODEL – CURRENT – CALIBRATION – PROTOCOL – MODULE – AUX POWER

DESCRIPTION	ORDER CODE
MODEL	
PM172 panel-mount power and revenue meter	PRO-PM172
PM174 panel-mount Class A analyser (IEEE 1159)	PRO-PM174
PM175 panel-mount Class A analyser (EN 50160)	PRO-PM175
Transducer version, supplied with no display	PRO-RPM17x
CURRENT INPUTS	
5 Ampere	5A
1 Ampere	1A
High Accuracy Current Sensors (HACS) , 50/60 Hz. Order 3 × HACS separately	HACS
5A split-core remote HACS, 50/60 Hz only	RS5
LPCT sensor inputs (RJ45) to 650A primary, 80A/150 mV at 50 Hz	LPCT-D
CALIBRATION FREQUENCY	
50 Hz	50HZ
60 Hz	60HZ
COMMUNICATION PROTOCOL	
Modbus, DNP3.0 and IEC 60870-5-101/104 (standard)	—
IEC 61850 Ed. 2 ‡	850
OPTIONAL BUILT-IN MODULE (MAX. 1 PER DEVICE)	
4 relay outputs, 250V / 5A AC	EMR4
4 SSR outputs, 250V / 0.1A AC	SSR4
4 digital inputs (dry contact 24V DC) plus 2 SSR outputs	4DIOS-DRC
4 digital inputs (dry contact 24V DC) plus 2 EMR outputs	4DIOR-DRC
8 digital inputs, dry contact	DI8-DRC
8 digital inputs, 24 / 48 / 125 / 250V DC	DI8-24, 48, 125, 250V
4 analogue outputs, configurable range	4AO
AUXILIARY POWER SUPPLY	
9–36V DC (24V)	AUX-24DC

‡ Confirm the IEC 61850 option code with SATEC Australia when ordering.

PLACE AN ORDER



To place an order or request a quotation for the PM17x PRO Series, contact the SATEC Australia sales team, or scan the QR code.

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DOCUMENT REVISION HISTORY

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