

CLASS 0.5S ACCURACY

AS/IEC 62053-22 COMPLIANT

IEC 61557-12 PMD

CAT III

UL FILE E236895

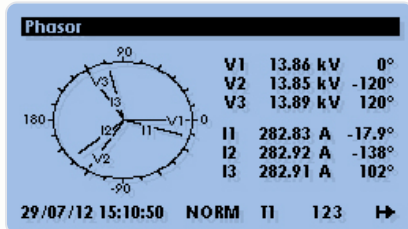
[View the PM135 product page on satec-global.com.au](https://www.satec-global.com.au)

PM135

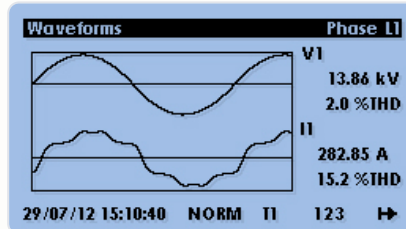
Compact Multi-function Power Meter with Modular I/O and Open Protocols

The PM135 is a compact multi-function power meter designed for metering three-phase AC current circuits. With versatile I/O options, communication ports and open protocols, it is suited to integration in utility substation and industrial SCADA systems as well as commercial energy management.

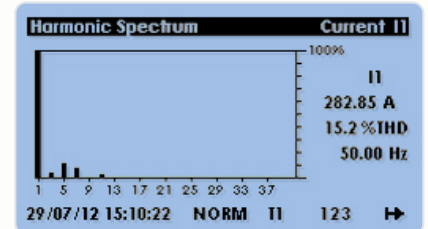
A built-in RS-485 port, optional Ethernet, Profibus or RS-232/422/485 modules and up to 16 digital and analogue I/O points let one meter grow with the site. A backlit LCD with an LED load bar-graph, 25–400 Hz frequency measurement options and dual 4" round or 92×92 mm square mounting make it a flexible retrofit or new-build choice.



Phasor diagram



Real-time waveforms



Harmonic spectrum (PM135EH)

PM135P

Power version offering voltage, current, power and frequency measurements.

PM135E

All PM135P features plus energy measurements, Time-of-Use tariffs and data logging.

PM135EH

All PM135E features plus harmonic analysis to the 40th order.

Main Features

- **Accuracy:** Class 0.5S per AS/IEC 62053-22 and ANSI C12.20
- **Built-in communication:** standard RS-485 port
- **Optional ports:** Ethernet, Profibus DP, RS-232/422/485
- **Open protocols:** Modbus RTU, DNP3.0, IEC 60870-5-101/104
- **Digital and analogue I/O modules:** up to 16 I/O
- **Dual mounting:** 4" round and 92×92 mm square cutouts
- **Broad frequency range:** 25–400 Hz measurement options
- **LED bar-graph:** load shown as a percentage of nominal current
- **Embedded logic controller:** 16 setpoints with 1-cycle response
- **Software:** free PAS configuration software and Expertpower™ cloud platform

Feature Capabilities

Multi-functional 3-Phase Power Meter

- True RMS volts, amps, power, power factor, neutral current, angles and unbalance for voltage and current, frequency, symmetrical components and more
- Ampere and volt demand meter
- 25, 50, 60 and 400 Hz measurements with 3 decimal digit values
- 128 samples per cycle

Harmonic Analyser

PM135EH ONLY

- Individual voltage and current harmonic spectrum and harmonic angles up to the 40th order
- Voltage and current THD, TDD and K-Factor

Real-time Waveform Capture

- Real-time “scope mode” waveform monitoring via PAS software

Programmable Logic Controller

- Embedded programmable controller
- 16 control setpoints with programmable thresholds and delays
- Relay output control
- 1-cycle response time

Billing / TOU Energy Meter

PM135E & PM135EH ONLY

- Accuracy Class 0.5S per AS/IEC 62053-22 and Class 0.2 per IEC 61557-12
- Four-quadrant active and reactive energy polyphase static meter
- Three-phase total and per-phase energy measurements; active, reactive and apparent energy counters
- Time-of-Use: 4 totalisation and tariff energy/demand registers × 8 tariffs, 4 seasons × 4 types of days, 8 tariff changes per day
- Easily programmable tariff calendar schedule
- Automatic daily energy and maximum demand profile log for total energy and tariff registers

Event and Data Recording

PM135E & PM135EH ONLY

- Non-volatile memory for timestamped event and data recording: 48 days for 2 daily TOU records, half-hourly writing of 4 parameters and more than 100 events over the whole period
- Event recorder logging internal diagnostic events and setup changes
- Two data recorders with programmable periodic data logs, automatic daily energy log and maximum demand profile

Current Input Options

- 1A or 5A inputs from CT secondary
- 40mA input designed for SATEC **HACS** current sensors (100–3000A options)
- RS5: dedicated input for 5A rated split-core HACS

Voltage Inputs

- Direct measurement: 0–690V AC

Feature Capabilities (continued)

I/O Options

- 4DIOR: 4 digital inputs and 2 relay outputs with 1-cycle update time; unlatched, latched, pulse and KYZ operation; energy pulses; choice of solid state or electromechanical relays
- 12DIOR: 12 digital inputs and 4 relay outputs (with optional Ethernet or additional RS-485 port)
- 4AO: four optically isolated analogue outputs with internal power supply; 0–20mA, 4–20mA, 0–1mA, ±1mA, 0–5mA or ±5mA output; 1-cycle update time
- 8DI: eight digital inputs with 1 ms scan time

Communication

- On-board interface
 - Standard 2-wire RS-485
- Optional interfaces
 - Ethernet (10/100BaseT)
 - Multipurpose RS-232/422/485
 - PROFIBUS DP
- Client functions
 - Modbus/TCP client over Ethernet
 - TCP notification client for sending events or periodic reports to a remote server
 - Expertpower™ client (subscription)
- Protocols
 - Modbus RTU and Modbus/TCP
 - SATEC ASCII
 - DNP3.0 (Level 2)
 - IEC 60870-5-101 and IEC 60870-5-104 (optional)

Applications

- Energy management
- Utility substation and industrial SCADA
- Tariff and TOU energy monitoring
- Renewable energy systems

Display

- 3×2" / 76×49 mm backlit LCD
- Adjustable display brightness and update rate
- Auto-scroll with adjustable page and auto-return to a default page
- LED bar-graph showing load as a percentage of nominal (user-definable) load current

Software Support & Firmware

- SATEC **Power Analysis Software (PAS)** for full configuration and data acquisition, free to download
- **Expertpower™** web-based energy management platform (subscription)
- **eXpertConnect™ App** for convenient mobile access to energy data
- Any third-party software supporting the open protocols
- Firmware easily upgraded through the serial or Ethernet port

Meter Security

- Password protection of meter setups and accumulated data against unauthorised changes

Real-time Clock

- Internal battery-backed clock with typical retention of 36 months

Unique Design

- Pass-through CT connection
- Built-in auxiliary terminal for loose CT wires
- Dual panel mounting: 92×92 mm square or 4" round cutout

Technical Specifications

VOLTAGE INPUTS	
Installation	Category III
Nominal voltage (L-N/L-L)	100/400V AC 230/400V AC 400/690V AC
Operating range (L-N/L-L)	Nominal voltage +25% tolerance
Burden for 120V	< 0.04 VA
Over-voltage withstand	1000V AC continuous, 2000V AC for 1 second
Input impedance	1 MΩ
Wire size	Up to 12 AWG (up to 3.5 mm ²)

CURRENT INPUTS (VIA CT)	
Wire size	12 AWG (up to 3.5 mm ²)
Galvanic isolation	2,500V
5A SECONDARY	
Operating range	Continuous 10A RMS
Burden	< 0.2 VA @ I _n = 5A (12 AWG wire, 1 m long)
Overload withstand	15A RMS continuous, 300A RMS for 1 second (12 AWG wire)
1A SECONDARY	
Operating range	Continuous 2A RMS
Burden	< 0.02 VA @ I _n = 1A (12 AWG wire, 1 m long)
Overload withstand	3A RMS continuous, 80A RMS for 1 second (12 AWG wire)
HACS / RS5 REMOTE SENSORS	
Depends on sensor rating. See the HACS datasheet.	

SAMPLING	
Sampling rate	Up to 256 samples per cycle
Waveforms	128 samples per cycle (via communications)

POWER SUPPLY	
120/230V AC-DC OPTION	
Rated input	85–265V AC @ 50/60 Hz 88–290V DC
Burden	9 VA
Isolation	1500V DC
Input to ground	2500V AC
12V DC OPTION	
Rated input	9.5–18V DC
Burden	4 VA
Isolation	1500V DC
24/48V DC OPTION	
Rated input	18.5–58V DC
Burden	4 VA
Isolation	1500V DC
Wire size	Up to 12 AWG (up to 3.5 mm ²)

REAL-TIME CLOCK	
Type	Battery-backed clock
Accuracy	Typical error 7 seconds per month @ 25°C (±2.5 ppm)
Retention time	Typically 36 months

DISPLAY	
Screen	3×2" / 76×49 mm backlit LCD
Load bar-graph	3-colour LED (40–110%)
Keypad	6 push buttons

Technical Specifications (continued)

ELECTROMECHANICAL RELAY (OPTIONAL)	
Contact	Dry contact, 1 contact (SPST Form A)
Rating	5A/250V AC; 5A/30V DC
Isolation, contacts to coil	3000V AC @ 1 min
Isolation, open contacts	750V AC
Operate time	10 ms max
Release time	5 ms max
Update time	1 cycle
Wire size	14 AWG (up to 1.5 mm²)

DIGITAL INPUTS (OPTIONAL)	
Type	Dry contacts internally wetted @ 24V DC, or wet contact @ 250V DC (12DI/4DO only)
Sensitivity	Open @ input resistance > 100 kΩ; closed @ input resistance < 100 Ω
Galvanic isolation	3750V AC @ 1 min
Internal power supply	24V DC (4DI/2DO or 12DI/4DO)
External power supply	250V DC (12DI/4DO only)
Scan time	1 ms
Connector type	Removable, 5 pins
Wire size	14 AWG (up to 1.5 mm²)

SOLID STATE RELAY (OPTIONAL)	
Contact	Dry contact, 1 contact (SPST Form A)
Rating	0.15A/250V AC/DC
Galvanic isolation	3750V AC @ 1 min
Operate time	1 ms max
Release time	0.25 ms max
Update time	1 cycle
Connector type	Removable, 4 pins
Wire size	14 AWG (up to 1.5 mm²)

ANALOGUE OUTPUTS (OPTIONAL)	
Ranges (upon order)	±1 mA, max. load 5 kΩ (100% overload) 0–20 mA, max. load 510 Ω 4–20 mA, max. load 510 Ω 0–1 mA, max. load 5 kΩ (100% overload)
Isolation	2500V AC @ 1 min
Power supply	Internal
Accuracy	0.5% FS
Update time	1 cycle
Connector type	Removable, 5 pins
Wire size	14 AWG (up to 1.5 mm²)

Technical Specifications (continued)

COM1: RS-485 (BUILT IN)

Type	RS-485 optically isolated port
Isolation	3000V AC @ 1 min
Baud rate	Up to 115.2 kbps
Supported protocols	Modbus RTU, DNP3, SATEC ASCII, IEC 60870-5-101
Connector type	Removable, 3 pins
Wire size	Up to 14 AWG (up to 1.5 mm ²)

COM2: ETHERNET (OPTIONAL MODULE)

Independent module or add-on to the 12DIOR module

Type	Transformer-isolated 10/100BaseT Ethernet port
Supported protocols	Modbus/TCP (port 502), IEC 60870-5-104, DNP3/TCP (port 20000)
Simultaneous connections	4 (2 Modbus/TCP + 2 DNP3/TCP)
Connector type	RJ45 modular
Isolation	1,500V DC @ 1 min

ENVIRONMENTAL CONDITIONS

Operating range, unit stand-alone	−30°C to 70°C (−22°F to 158°F)
Operating range, with add-on modules	−30°C to 60°C (−22°F to 140°F)
Storage temperature	−40°C to 85°C (−40°F to 185°F)
Humidity	0 to 95% non-condensing

COM2: PROFIBUS DP, IEC 61158 (OPTIONAL)

Type	RS-485 optically isolated Profibus interface
Connector type	Removable, 5 pins
Baud rate	9600 bit/s to 12 Mbit/s (auto detection)
Data	32 bytes input, 32 bytes output
Supported protocols	PROFIBUS DP

COM2: RS-232/422/485 (OPTIONAL)

Type	RS-232 or RS-422/485 optically isolated port
Isolation	3000V AC @ 1 min
Baud rate	Up to 115.2 kbps
Supported protocols	Modbus RTU, DNP3, SATEC ASCII, IEC 60870-5-101
Connector type	Removable 5 pins (RS-422/485); DB9 (RS-232)
Wire size	Up to 14 AWG (up to 1.5 mm ²)

CONSTRUCTION

Weight	0.70 kg (1.54 lb)
Dimensions (H×W×D)	114×114×109 mm (4.5×4.5×4.3")
Panel cutout	92×92 mm square or 4" round
MATERIALS	
Case enclosure	PC/ABS plastic blend
Front panel	PC plastic
PCB	FR4 (UL94-V0)
Terminals	PBT (UL94-V0)
Plug-in connectors	Polyamide PA6.6 (UL94-V0)
Labels	Polyester film (UL94-V0)
Packaging	Carton and Stratocell® (polyethylene foam) brackets

Standards Compliance

Accuracy

- Complies with AS/IEC 62053-22, Class 0.5S
- Meets ANSI C12.20-1998, Class 10 0.5%
- Complies with IEC 61557-12 (PMD):
 - Total apparent power: 0.2%
 - Total active energy: 0.5/0.2%
 - Total reactive energy: 0.5%
 - Frequency: 0.05%
 - Current: 0.2%
 - Neutral current: 0.2%
 - Voltage: 0.2%
 - Power factor: 0.2%
 - THDV, THDI: 1%

Electromagnetic Immunity

- Complies with 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: Electric 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
- Meets ANSI/IEEE C37.90.1: Fast Transient SWC

Electromagnetic Emission

- Complies with IEC 61000-6-4: Radiated/Conducted Class A
- Complies with IEC CISPR 22: Radiated/Conducted Class A

Safety

- UL File no. E236895
- Meets IEC 61010-1:2006

AC and Impulse Insulation

- Complies with IEC 62052-11: 2500V AC for 1 minute
- 6 kV/500 Ω @ 1.2/50 μ s impulse

Ordering Information

MODEL	CURRENT	CAL. FREQ.	RESOLUTION	POWER	PROTOCOL	MOUNTING	TEST
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MODELS	CODE
Power version	PM135P
Energy version	PM135E
Energy and harmonic version	PM135EH

CURRENT INPUTS	CODE
5 Ampere	5
1 Ampere	1
5A split-core remote high accuracy current sensor (HACS), 50/60 Hz only	RS5
High Accuracy Current Sensors (HACS), 50/60 Hz only; requires ordering of 3 HACS	HACS

CALIBRATION AT FREQUENCY	CODE
25 Hz*	25HZ
50 Hz	50HZ
60 Hz	60HZ
400 Hz*	400HZ

DISPLAY RESOLUTION	CODE
Low resolution 1A, 1V	—
High resolution 0.01A, 0.1V	H

POWER SUPPLY	CODE
85–265V AC and 85–290V DC	ACDC
9.5–18V DC	1DC
18.5–58V DC (24V DC, 48V DC)	23DC

COMMUNICATION PROTOCOL	CODE
Modbus and DNP3.0	—
Modbus and IEC 60870-5-101/104**	870

MOUNTING	CODE
Panel mount (standard)	—
DIN rail mounting	DIN

TESTING AND CERTIFICATE	CODE
Full functional test, calibration at various workloads and detailed test report	—
All of the above plus ISO 17025 and ILAC certified calibration certificate	CC

Notes

- * Supported by 1A and 5A models only.
** IEC 60870-5-104 requires Ethernet.

Ordering Information (continued)

EXPANSION MODULE: ANALOGUE OUTPUTS	CODE
4 analogue outputs: $\pm 1\text{mA}$	AO1
4 analogue outputs: 0–20mA	AO2
4 analogue outputs: 0–1mA	AO3
4 analogue outputs: 4–20mA	AO4
4 analogue outputs: 0–5mA	AO7
4 analogue outputs: $\pm 5\text{mA}$	AO8

EXPANSION MODULE: COMMUNICATION PORTS	CODE
Ethernet (TCP/IP)	ETH
PROFIBUS	PRO
RS-232/422/485	RS232

EXPANSION MODULE: DIGITAL I/O	CODE
4 digital inputs (dry contact) / 2 relay outputs 250V/5A AC	DIOR
4 digital inputs (dry contact) / 2 SSR outputs 250V/0.1A AC	DIOS
8 digital inputs (dry contact)	8DI
12 digital inputs / 4 relay outputs 250V/5A AC	12DIOR

12DIOR: DIGITAL INPUT RATING	CODE
Dry contact	DRC
48V	48V
125V	125V
250V	250V

12DIOR: COMMUNICATION PORT	CODE
None	–
RS-485	485
Ethernet	ETH

Notes

Maximum of 1 expansion module per instrument. Modules can be ordered separately.

12DIOR order string example: 12DIOR-DRC-ETH.



Place an order

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Document Revision History

VERSION	DATE
TBV1.0	28 September 2026