

PM172

ADVANCED HIGH ACCURACY POWER METER

Exceeds ANSI C12.20 Class 0.2% / IEC 62053-22 Class 0.2S



PM172 is a high-performance panel mounted power meter with waveform capture capabilities, and other basic power quality monitoring capabilities, such as harmonics, THD, TDD and K-factor calculations.

With over 100 electrical measurements, logging capabilities and breaker contact status inputs, this series is an economical solution for distribution automation for utilities and industrial facilities, widely integrated in panel boards and SCADA systems. It is also a preferred tool for electric generator monitoring.

TOU metering and accuracy above revenue grade requirements set it as a solid choice for commercial and industrial submetering applications.

Event and datalogging, based on programmable setpoints is a differentiating feature of this product. This capability facilitates a wide range of commercial and industrial applications demanding data analysis, as well as corrective action for specific recorded events and general energy management.

The PM172 includes a variety of communication platforms such as serial communication, Ethernet or Profibus DP.

Models

Measurement Features

- PM172P-N** Multi-functional 3-phase power meter functionality (see Features)
- PM172E-N** All the features of the P model plus Revenue Meter (see Features)
- PM172EH-N** All the features of the E model plus harmonic measurement and waveform capture (see Features)

Current Inputs

- 1A** Standard 1A CT
- 5A** Standard 5A CT
- RS5** Remote Split Core for Standard 5A CT
- HACS** High Accuracy Current Sensors

Features

- ➔ 3 voltage and 3 current transformer-isolated AC inputs for direct connection to power line or via potential and current transformers
- ➔ Multi-function 3-phase meter (true RMS, volts, amps, power, power factor, neutral current, voltage and current unbalance, frequency)
- ➔ Embedded harmonic analyzer, voltage and current THD, current TDD and K-Factor
- ➔ Voltage and current harmonic spectrum and angles, up to 50th order
- ➔ Ampere/Volt/THD/TDD demand meter
- ➔ Class 0.2/0.2S (per ANSI / IEC 62053-22) four quadrant energy meter
- ➔ Time-of-Use (TOU), 8 tariff energy/demand registers x 8 tariffs, 4 seasons x 4 types of days, 8 tariff changes per day, easy programmable tariff schedule
- ➔ Automatic daily profile for energy and maximum demand readings (total and tariff registers)
- ➔ Embedded programmable controller; 16 control setpoints; programmable thresholds and delays; relay output control; 1-cycle response time
- ➔ Event recorder for logging internal diagnostics events, control events and I/O operations (PM172E, PM172EH)
- ➔ 16 data recorders; programmable data logs on a periodic basis and on any internal and external trigger (PM172E, PM172EH)
- ➔ Two real-time waveform recorders; simultaneous 6-channel AC recording in a single plot; sampling rate of 32, 64 and 128 samples per cycle; up to 30

seconds of continuous recording at a rate of 32 samples per cycle (PM172EH)

- ➔ Detachable display module with a 3-wire RS-485 interface; up to 1000 meters operation. Selection of one or two displays:
 - ➔ Easy to read 3-row (2x4 characters + 1x6 characters) bright LED display, adjustable update time, auto-scroll option with adjustable page exposition time, auto-return to a default page and LED bar graph showing percent load with respect to user-definable nominal load current
 - ➔ 5.7" large color graphic touch screen, displaying comprehensive information in easy to read screens that allow monitoring complex information at a glance. The touch screen makes the operation and configuration so simple that it completely eliminates the need for employee training.
- ➔ 2 default digital inputs, plus 2 optional digital inputs for monitoring external contacts, and receiving pulses from energy, water and gas meters
- ➔ 2 default relay outputs, plus 2 optional relay outputs for alarms and controls, and for output energy pulses
- ➔ 2 optional optically isolated analog outputs with an internal power supply; options for 0-20mA, 4-20mA, 0-1mA, ±1mA, ±5mA and 0-5mA output
- ➔ 2 optional optically isolated analog inputs with an internal power supply; options for 0-20mA, 4-20mA, 0-1mA, and ±1mA input
- ➔ Optional analog expander providing additional 2 x 8 analog outputs; options for 0-20mA, 4-20mA, 0-1mA, 0-5mA, ±1mA, 0-10V and ±10V

- ➔ 25/50/60/400 Hz operation
- ➔ Precise internal clock with battery backup
- ➔ 1 Mbyte RAM with battery backup for long-term data and waveform recording
- ➔ Two communication ports; communications options available:
 - ➔ COM1:
 - ➔ RS-232/RS-422/RS-485
 - ➔ 56K Dial-up modem
 - ➔ Ethernet 10/100BaseT, ExpertPower™ enabled
 - ➔ Profibus DP
- ➔ 2G Cellular Modem (over RS-232)
- ➔ COM2:
 - ➔ RS-422/RS-485
- ➔ Modbus RTU, Modbus ASCII and Modbus/TCP, DNP3 and DNP3/TCP (level 1 Rev. 2.3), EGD producer communication protocols
- ➔ Password security for setup parameters and resets via the front panel and communications. Recording of tampering attempts to the device event log.
- ➔ Easy field upgrading device firmware through any communication port

Technical Specifications

ENVIRONMENTAL CONDITIONS		Input Ratings	
Operating temp.	-20°C to +60°C (-4°F to 140°F)	VOLTAGE INPUTS	690VAC L-L, 400VAC L-N
Storage temperature	-25°C to +80°C (-13°F to 176°F)		
Humidity	0 to 95% RH non-condensing	Direct input and input via PT	Up to 828VAC line-to-line, up to 480VAC line-to-neutral
CONSTRUCTION		INPUT IMPEDANCE	
Weight	1.23kg (2.7 lb.)	Input impedance	1MΩ
Dimensions (HxWxD)	127x127x143mm (5x5x5.6")	Burden for 400V	< 0.4 VA
MATERIALS		Burden for 120V	< 0.04 VA
Case enclosure	Plastic PC/ABS blend	Ovvoltage withstand	1kV AC continuous, 2kV AC for 1 sec.
Display body	Plastic PC/ABS blend	Galvanic isolation	3500 VAC
Front panel	Plastic PC	Wire size	Up to 12 AWG (up to 3.5mm²)
PCB	FR4 (UL94-V0)	CURRENT INPUTS	
Terminals	PBT (UL94-V0)	Wire size	12 AWG (up to 3.5 mm²)
Plug-in connectors	Polyamide PA6.6 (UL94-V0)	Galvanic isolation	3500 VAC
Packaging case	Carton and Stratocell® (Polyethylene Foam) brackets	Operating range	5A: Cont. 10A RMS, Burden: < 0.1 VA 1A: Cont. 2A RMS, Burden: < 0.02 VA
Labels	Polyester film (UL94-V0)	Overload withstand	5A: Cont. 15A RMS, 300A for 1 sec 1A: Cont. 6A RMS, 80A for 1 sec
POWER SUPPLY		RELAY OUTPUTS	
120/230 VAC-110/220 VDC Option	→ Rated input 85-264VAC 50/60 Hz, 88-290VDC, Burden 10W → Isolation → Input to output: 3000 VAC → Input to ground: 2000 VAC	2 relays 3A/250 VAC; 3A/30 VDC, 2 contacts (SPST Form A)	Wire size Galvanic isolation
12 VDC Option	Rated input 9.6-19 VDC	10 ms max.	
24 VDC Option	Rated input 19-37 VDC	5 ms max.	Between contacts and coil: 2000 VAC 1 min Between open contacts: 1000 VAC
48 VDC Option	Rated input 37-72 VDC	1 cycle	
Wire size	up to 12 AWG (up to 3.5 mm²)	DIGITAL INPUTS	
		2 Digital Inputs Dry Contacts	Wire size Galvanic isolation Internal power supply Scan time
		14 AWG (up to 1.5 mm²)	
		2000V RMS	
		15V	
		1 ms	

OPTIONAL ANALOG INPUTS

2 Analog Inputs (optically isolated)

- Ranges (upon order)
- ➔ ±1 mA (100% overload)
 - ➔ 0-1 mA (100% overload)
 - ➔ 0-20 mA
 - ➔ 4-20 mA

 Wire size 14 AWG (up to 1.5 mm²)

Isolation 2,000 V RMS

Accuracy 0.5% FS

Scan time 1 cycle

OPTIONAL ANALOG OUTPUTS

2 Analog Outputs (optically isolated)

- Ranges (upon order)
- ➔ 0-20 mA, maximum load 510 Ω
 - ➔ 4-20 mA, maximum load 510 Ω
 - ➔ ±1 mA, maximum load 5 kΩ (100% overload)
 - ➔ 0-1 mA, maximum load 5 kΩ (100% overload)
 - ➔ ±5 mA, maximum load 5 kΩ
 - ➔ 0-5 mA, maximum load 5 kΩ

Isolation 2,000 V RMS

Power supply Internal

Accuracy 0.5% FS

 Wire size 14 AWG (up to 1.5 mm²)

Update time 1 cycle

Communication Ports
COM1 (Optional modules)

- Serial EIA RS-232 optically isolated port
- ➔ Isolation: 2,000 V RMS
 - ➔ Connector type: DB9 female
 - ➔ Baud rate: up to 115.2 kbps
 - ➔ Supported protocols: Modbus RTU and Modbus ASCII, DNP3 (with firmware V25.2.01 & later)

RS-422/RS-485 optically isolated port

- ➔ Isolation: 2,000 V RMS
- ➔ Connector type: DB9 female
- ➔ Baud rate: up to 115.2 kbps
- ➔ Supported protocols: Modbus RTU and Modbus ASCII, DNP3 (with firmware V25.2.01 & later)

Ethernet Port

- ➔ Transformer-isolated 10/100BaseT Ethernet port
- ➔ Connector type: RJ45 modular
- ➔ Supported protocols: Modbus/TCP on Port 502, DNP3/TCP on Port 20000 (with firmware V25.2.01 & later)
- ➔ Number of simultaneous connections: 4 (4 Modbus/TCP or 2 Modbus/TCP + 2 DNP3/TCP)

Dial-up Modem

- ➔ Transformer-isolated internal 56K modem
- ➔ Connector type: RJ11
- ➔ Supported protocols: Modbus RTU and Modbus ASCII

COM2

RS-422/RS-485 optically isolated port

Isolation 2,000 V RMS

Connector type Removable, 5 pins

 Wire size Up to 14 AWG (up to 1.5 mm²).

Baud rate Up to 115.2 kbps

 Supported protocols Modbus RTU and Modbus ASCII, DNP3
 (with firmware V25.2.01 and later).

REAL-TIME CLOCK

 Accuracy Typical error 30 seconds per month @
 25°C

LOG MEMORY

 Onboard memory with 1 Mbytes
 battery backup

DISPLAY MODULE

 Display High-brightness seven-segment digital
 LEDs, two 4-digit + one 6-digit
 windows

Keypad 6 push buttons

 Communication EIA RS-485 port with 12V supply
 voltage

Connector type DB15, 15 pins

 Wires size Up to 14 AWG (up to 1.5 mm²)

Distance Up to 1000 m (3200 feet)

Standards Compliance

- ➔ Accuracy Class 0.2S according to IEC 62053-22 (1A/5A versions)
- ➔ UL File no. E236895
- ➔ Directive complied with:
 - ➔ EMC: 89/336/EEC as amended by 92/31/EEC and 93/68/EEC
 - ➔ LVD: 72/23/EEC as amended by 93/68/EEC and 93/465/EEC
- ➔ Harmonized standards to which conformity is declared:
 - ➔ EN55011: 1991
 - ➔ EN50082-1: 1992
 - ➔ EN61010-1: 1993
 - ➔ A2/1995
 - ➔ EN50081-2 Generic Emission Standard - Industrial Environment
 - ➔ EN50082-2 Generic Immunity Standard - Industrial Environment
 - ➔ EN55022: 1994 Class A
 - ➔ EN61000-4-2
 - ➔ ENV50140: 1983
 - ➔ ENV50204: 1995 (900MHz)
 - ➔ ENV50141: 1993
 - ➔ EN61000-4-4: 1995
 - ➔ EN61000-4-8: 1993

Order String

MODELS													
Power Meter		PM172P-N											
Power Meter including Revenue Meter		PM172E-N											
Power Meter including Harmonic Analysis & Waveform capture		PM172EH-N											
PM172-E-N transducer Version. No Screen.		RPM072											
OPTIONS													
VOLTAGE INPUTS													
690V AC Nominal Voltage Input		-											
120V AC Nominal Voltage Input		U											
CURRENT INPUTS													
5 Ampere		5											
1 Ampere		1											
5A split core remote high accuracy current sensor (HACS)		RS5											
High Accuracy Current Sensors (HACS). Requires ordering of 3 HACS		HACS											
CALIBRATION AT FREQUENCY													
25 Hz		25Hz											
50 Hz		50Hz											
60 Hz		60Hz											
400 Hz		400Hz											
POWER SUPPLY													
85-265V AC and 88-290V DC		ACDC											
9.6-19V DC		1DC											
19-37V DC		2DC											
37-72V DC		3DC											
I/O MODULE													
2 Digital Input /2 Digital Output (standard)		-											
Additional 2 Digital Input /2 Digital Output (total 4DI/4DO)		DIO											
2 Analog Outputs: ±1mA		AO1											
2 Analog Outputs: 0-20mA		AO2											
2 Analog Outputs: 0-1mA		AO3											
2 Analog Outputs: 4-20mA		AO4											
2 Analog Outputs: 0-5mA		AO5											
2 Analog Outputs: ±5mA		AO6											
2 Analog Inputs: ±1mA		AI1											
2 Analog Inputs: 0-20mA		AI2											
2 Analog Inputs: 0-1mA		AI3											
2 Analog Inputs: 4-20mA		AI4											
COMMUNICATION													
Standard Communications RS-232/422/485		-											
Dial Up Modem		MOD											
Ethernet (TCP/IP)		ETH											
PROFIBUS		PRO											
2G/3G External Cellular Modem		C3G											