

PM174

IEEE1159 ADVANCED POWER QUALITY ANALYZER



The PM174 is a compact, multi-function, three-phase AC powermeter and power quality analyzer specially designed to meet the requirements of users ranging from electrical panel builders to substation operators.

Selection of bright 3-row LED or 5.7" touch screen graphic color display provides easy local meter readings. The display module is freely detachable and can be located at a distance of up to 1000 meters from the device.

Two communication ports allow local and remote automatic meter readings and setup through the supplemental communication or user data acquisition software. Different communication options are available for remote communications with the meter including TCP/IP, Profibus and public telephone lines.

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
- Inter-harmonics THD
- Ampere/Volt/THD/TDD demand meter
- Class 0.2S
- 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; 1/2-cycle response time
- Event recorder for logging internal diagnostics events, control events and I/O operations
- 16 data recorders; programmable data logs on a periodic basis and on any internal and external trigger
- Two waveform recorders; simultaneous 6-channel AC recording in a single plot; sampling rate of 32, 64 and 128 samples per cycle; 20 pre-fault cycles; up to 30 seconds of continuous recording at a rate of 32 samples per cycle

- IEEE 1159 Power Quality recorder (compliance statistics, harmonics survey statistics, onboard power quality analyzer; programmable thresholds and hysteresis; ready-for-use reports)
- Real-time waveform capture and monitoring; simultaneous 6-channel 4-cycle capture at 128 samples per cycle
- 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. The PM174-TFT has full speed USB port.
- 2 standard plus 2 optional digital inputs for monitoring external contacts, and receiving pulses from energy, water and gas meters
- 2 standard 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, ± 1 mA, ± 5 mA and 0-5mA output
- 2 optional optically isolated analog inputs with an internal power supply; options for 0-20mA, 4-20mA, 0-1mA, and ± 1 mA input
- Optional analog expander providing additional 2 x 8 analog outputs; options for 0-20mA, 4-20mA, 0-1mA, ± 1 mA, 0-10V and ± 10 V
- 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) 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

Operating temp.	-20°C to +60°C (-4°F to 140°F)
Storage temperature	-25°C to +80°C (-13°F to 176°F)
Humidity	0 to 95% RH non-condensing

CONSTRUCTION

Weight	1.23kg (2.7 lb.)
Dimensions (HxWxD)	127x127x143mm (5x5x5.6")

MATERIALS

Case enclosure	Plastic PC/ABS blend
Display body	Plastic PC/ABS blend
Front panel	Plastic PC
PCB	FR4 (UL94-V0)
Terminals	PBT (UL94-V0)
Plug-in connectors	Polyamide PA6.6 (UL94-V0)
Packaging case	Carton and Stratocell® (Polyethylene Foam) brackets
Labels	Polyester film (UL94-V0)

POWER SUPPLY

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
12 VDC Option	Rated input 9.6-19 VDC
24 VDC Option	Rated input 19-37 VDC
48 VDC Option	Rated input 37-72 VDC
Wire size	up to 12 AWG (up to 3.5 mm ²)

Input Ratings

VOLTAGE INPUTS

Operating range	690VAC L-L, 400VAC L-N
Direct input and input via PT	Up to 828VAC line-to-line, up to 480VAC line-to-neutral
Input impedance	1MΩ
Burden for 400V	< 0.4 VA
Burden for 120V	< 0.04 VA

Overvoltage withstand	1kV AC continuous, 2kV AC for 1 sec.
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Galvanic isolation	3500 VAC
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Wire size	Up to 12 AWG (up to 3.5mm ²)
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CURRENT INPUTS

Wire size	12 AWG (up to 3.5 mm ²)
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Galvanic isolation	3500 VAC
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Operating range	5A: Cont. 10A RMS, Burden: < 0.1 VA 1A: Cont. 2A RMS, Burden: < 0.02 VA
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Overload withstand	5A: Cont. 15A RMS, 300A for 1 sec 1A: Cont. 6A RMS, 80A for 1 sec
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RELAY OUTPUTS

2 relays 3A/250 VAC; 3A/30 VDC, 2 contacts (SPST Form A)	
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Wire size	14 AWG (up to 1.5 mm ²)
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Galvanic isolation	→ Between contacts and coil: 2000 VAC 1 min → Between open contacts: 1000 VAC
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Operate time	10 ms max.
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Release time	5 ms max.
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Update time	1 cycle
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DIGITAL INPUTS

2 Digital Inputs Dry Contacts	
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Wire size	14 AWG (up to 1.5 mm ²)
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Galvanic isolation	2000V RMS
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Internal power supply	15V
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Scan time	1 ms
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OPTIONAL ANALOG INPUTS

2 Analog Inputs (optically isolated)	
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Ranges (upon order)	→ ±1 mA (100% overload) → 0-1 mA (100% overload) → 0-20 mA → 4-20 mA
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Wire size	14 AWG (up to 1.5 mm ²)
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Isolation	2,000 V RMS
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Accuracy	0.5% FS
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Scan time	1 cycle
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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 k Ω (100% overload)
 - 0-1 mA, maximum load 5 k Ω (100% overload)
 - ± 5 mA, maximum load 5 k Ω
 - 0-5 mA, maximum load 5 k Ω

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

PM174 Power Quality Analyzer	PM174
PM174 with 5.7" touchscreen graphic color display	PM174-TFT
Transducer version	RPM074

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
Digital Fault Recorder version with 100A Split Core HACS for 5A measurement and 100A transient recording	DFR

CALIBRATION AT FREQUENCY

50 Hz	50Hz
60 Hz	60Hz

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: ± 1 mA	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: ± 5 mA	AO6
2 Analog Inputs: ± 1 mA	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 GPRS External Modem	GPRS

