Electrical network management

# PowerLogic System

Energy management, revenue metering and power quality monitoring

## Catalogue
## 2013



Schneider Electric

# PM5000 Series
## Functions and characteristics

PB111776


PowerLogic™ PM5000 Series meter

**PowerLogic™ PM5100, PM5300 and PM5500 series**

The PowerLogic™ PM5000 power meter is the ideal fit for cost management applications. It provides the 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 of the electrical network.
In a single 96 x 96 mm unit, with a graphical display, all three phases, neutral and ground can be monitored simultaneously.
The bright, anti-glare display features large characters and powerful backlighting for easy reading even in extreme lighting conditions and viewing angles.
Easy to understand menus, text in 8 selectable languages, icons and graphics create a friendly environment to learn about your electrical network.
Highly accurate devices with global billing certifications.

**Applications**

**Cost management:** Cost saving opportunities becomes clear once you understand how and when your facility uses electricity. These meters are ideal for:
■ **Sub billing / tenant metering:** allows a landlord, property management firm, condominium association, homeowners association, or other multi-tenant property to bill tenants for individual measured utility (electricity) usage. MID approved meters for billing applications across Europe.
■ **Cost allocation:** allocate energy costs between different departments (HVAC, indoor and outdoor lighting, refrigeration, etc), different parts of an industrial process or different cost centres. Cost allocation systems can help you save money by making changes to your operation, better maintaining your equipment, taking advantage of pricing fluctuations, and managing your demand.

**Network management:** Improving reliability of the electrical network is key for success in any business. Monitoring values such as voltage levels, harmonic distortion and voltage unbalance will help you to ensure proper operation and maintenance of your electrical network and equipment. PowerLogic™ PM5000 series meters are the perfect tool for:
■ **Basic Power Quality monitoring:** power quality phenomena can cause undesirable effects such as heating in transformers, capacitors, motors, generators and misoperation of electronic equipment and protection devices.
■ **Min/ Max monitoring (with timestamp):** understanding when electrical parameters, such as voltage, current and power demand, reach maximum and minimum values will give you the insight to correctly maintain your electrical network and assure equipment will not be damaged.
■ **Alarming:** alarms help you to be aware of any abnormal behavior on the electrical network in the moment it happens.
■ **WAGES monitoring:** take advantage of the input metering on PM5000 meters to integrate measurements from 3rd party devices such as water, air, gas, electricity or steam, meters.

**Main characteristics**

**Easy to install**
Mounts using two clips, in standard cut out for DIN 96 x 96mm, no tools required.
Compact meter with 72mm (77mm for PM5500) depth connectable up to 690 VL-L without voltage transformers for installations compliant with category III.

**Easy to operate**
Intuitive navigation with self-guided, language selectable menus, six lines, four concurrent values. Two LEDs on the meter face help the user confirm normal operation with a green LED - heartbeat/communications indicator, and the amber LED - customizable either for alarms or energy pulse outputs.

**Easy circuit breaker monitoring and control**
The PM5300 provides two relay outputs (high performance Form A type) with capability to command most of the circuit breaker coils directly. For Digital Inputs, monitored switches can be wired directly to the meter without external power supply. PM5500 series have 4 status inputs (digital) and 2 digital output (solid state) to use for WAGES monitoring, control and alarm annunciation.

| Commercial reference numbers | |
|---|---|
| PM5100 | METSEPM5100 |
| PM5110 | METSEPM5110 |
| PM5111 | METSEPM5111 |
| PM5310 | METSEPM5310 |
| PM5320 | METSEPM5320 |
| PM5330 | METSEPM5330 |
| PM5331 | METSEPM5331 |
| PM5340 | METSEPM5340 |
| PM5341 | METSEPM5341 |
| PM5560 | METSEPM5560 |
| PM5561 | METSEPM5561 |
| PM5563 | METSEPM5563 |

**Accurate energy measurement for precise cost allocation:**

| | PM5100 | PM5300 | PM5500 |
|---|---|---|---|
| IEC 62053-22 (Active Energy) | Class 0.5S | Class 0.5S | Class 0.2S |
| IEC 62053-24 (Reactive Energy) | Class 2 | Class 2 | Class 1 |

# PM5000 Series
## Functions and characteristics (cont.)


PowerLogic™ PM5500 meter


PowerLogic™ PM5300 meter


PowerLogic™ PM5100 meter

**MID** Certified according to MID Directive, Annex "B" + Annex "D" for legal metrology relevant to active electrical energy meters (see Annex MI-003 of MID). Can be used for fiscal (legal) metrology.

**Direct metering of neutral current**
The PM5500 has a fourth CT for measuring neutral current. In demanding IT applications, where loads are non-linear (i.e. switching power supplies on computers/servers), measuring neutral current is essential to avoid overload and resulting outage. In addition, the PM5500 provides a calculated ground current value, not available in meters with 3 CTs.

**Power Quality analysis**
The PM5000 offers Total Harmonic Distortion (THD/thd), Total Demand Distortion (TDD) measurements and individual harmonics (odd) magnitudes and angles for voltage and current:

| | PM5100 | PM5300 | PM5500 |
|---|---|---|---|
| **Individual Harmonics** | magnitudes up to 15th | magnitudes up to 31st | magnitudes & angles up to 63rd |

These types of power quality parameters help to identify the source of harmonics that can harm transformers, capacitors, generators, motors and electronic equipment.

**Load management**
Peak demands with time stamping are provided. Predicted demand values can be used in combination with alarms for basic load shedding applications.

**Alarming with time stamping**
A different combination of set point driven alarms and digital alarms with 1s time stamping are available in the PM5000 family:

| | PM5100 | PM5300 | PM5500 |
|---|---|---|---|
| **Set point driven alarms** | 29 | 29 | 29 |
| **Unary** | 4 | 4 | 4 |
| **Digital** | 2 | 2 | 4 |
| **Boolean / Logic** | – | – | 10 |
| **Custom defined** | – | – | 5 |

Alarms can be visualized as Active (the ones that have picked up and did not drop out yet) or Historical (the ones that happened in the past).
Alarms can be programmed and combined to trigger digital outputs and mechanical relays (PM5300).
The PM5000 series keeps an alarm log with the active and historical alarms with date and time stamping.

**Load timer**
A load timer can be set to count load running hours based on a minimum current withdraw, adjustable to monitor and advise maintenance requirements on the load.

**High Performance and accuracy**
IEC 61557-12 Performance measuring and monitoring devices (PMD)
Defines the performance expectation based on classes. It defines the allowable error in the class for real and reactive power and energy, frequency, current, voltage, power factor, voltage unbalance, voltage and current harmonics (odds), voltage THD, current THD, as well as ratings for temperature, relative humidity, altitude, start-up current and safety. It makes compliant meters readings comparable - they will measure the same values when connected to the same load.

Meets IEC 61557-12 PMD/S/K70/0.5 for PM5100 and PM5300

Meets IEC 61557-12 PMD/S/K70/0.2 for PM5500

**Legal billing compliance**
MID compliance is compulsory for billing applications across Europe.
In addition to billing applications, for facility managers responsible for energy cost MID means same level of quality as a billing meter.

MID ready compliance, EN50470-1/3 – Class C

# PM5000 Series
## Functions and characteristics (cont.)

| General | PM5100 | PM5300 | PM5500 |
|---|---|---|---|
| Use on LV and MV systems | | ■ | |
| Basic metering with THD and min/max readings | | ■ | |
| **Instantaneous rms values** | | | |
| Current per phase, neutral and ground (PM5500) | | ■ | |
| Voltage Total, per phase L-L and L-N | | ■ | |
| Frequency | | ■ | |
| Real, reactive, and apparent power Total and per phase | | Signed, Four Quadrant | |
| True Power Factor Total and per phase | | Signed, Four Quadrant | |
| Displacement PF Total and per phase | | Signed, Four Quadrant | |
| % Unbalanced I, VL-N, VL-L | | ■ | |
| Direct monitoring of neutral current | | | ■ |
| **Energy values*** | | | |
| Accumulated Active, Reactive and Apparent Energy | | Received/Delivered; Net and absolute; Time Counters | |
| **Demand values*** | | | |
| Current average | | Present, Last, Predicted, Peak, and Peak Date Time | |
| Active power | | Present, Last, Predicted, Peak, and Peak Date Time | |
| Reactive power | | Present, Last, Predicted, Peak, and Peak Date Time | |
| Apparent power | | Present, Last, Predicted, Peak, and Peak Date Time | |
| Peak demand with time stamping D/T for current and powers | | ■ | |
| Demand calculation Sliding, fixed and rolling block, thermal methods | | ■ | |
| Synchronization of the measurement window to input, communication command or internal clock | | ■ | |
| Settable Demand intervals | | ■ | |
| Demand calculation for Pulse input (WAGES) | | | ■ |
| **Other measurements*** | | | |
| I/O timer | | ■ | |
| Operating timer | | ■ | |
| Load timer | | ■ | |
| Alarm counters and alarm logs | | ■ | |
| **Power quality measurements** | | | |
| THD, thd (Total Harmonic Distortion) I, VLN, VLL per phase | | I,VLN, VLL | |
| TDD (Total Demand Distortion) | | ■ | |
| Individual harmonics (odds) | 15th | 31st | 63rd |
| Neutral Current metering with ground current calculation | | | ■ |
| **Data recording** | | | |
| Min/max of instantaneous values, plus phase identification* | | ■ | |
| Alarms with 1s timestamping* | | ■ | |
| Data logging | | 2 fixed parameters kWh and kVAh with configurable interval and duration (e.g. 2 parameters for 60 days at 15 minutes interval) | Up to 14 selectable parameters with configurable interval and duration (e.g. 6 parameters for 90 days at 15 minutes interval) |
| Memory capacity | | 256 kB | 1.1 MB |
| Min/max log | ■ | ■ | ■ |
| Maintenance, alarm and event logs | | ■ | ■ |
| Customizable data logs | | | ■ |
| **Inputs/Outputs/Relays** | | | |
| Digital inputs | | 2 (SI1, SI2) | 4 (SI1, SI2, SI3, SI4) with WAGES support |
| Digital outputs | 1 (kWh only) | 2 (configurable) | |
| Form A Relay outputs | | 2 | |
| Timestamp resolution in seconds | | 1 | |
| Whetting voltage | | ■ | |

**Stored in non-volatile memory*

# PM5000 Series
## Functions and characteristics (cont.)

| Electrical characteristics* | | | PM5100 | PM5300 | PM5500 |
|---|---|---|---|---|---|
| Type of measurement: True rms on three-phase (3P, 3P + N), zero blind | | | 64 samples per cycle | | 128 samples per cycle |
| Measurement accuracy | IEC 61557-12 | | PMD/S/K70/0.5 | | PMD/[SD\|SS]/K70/0.2 |
| | IEC 62053-22 Active Energy | | Class 0.5S | | Class 0.2S |
| | IEC 62053-24 Reactive Energy | | Class 2S | | Class 1S |
| | Active Energy | | ±0.5% | | ±0.2% |
| | Reactive Energy | | ±2% | | ±1% |
| | Active Power | | Class 0.5 as per IEC 61557-12 | | Class 0.2 as per IEC 61557-12 |
| | Apparent Power | | Class 0.5 as per IEC 61557-12 | | |
| | Current, Phase | | Class 0.5 as per IEC 61557-12 | | ±0.15% |
| | Voltage, L-N | | Class 0.5 as per IEC 61557-12 | | ±0.1% |
| | Frequency | | ±0.05% | | |
| | MID Directive EN50470-1, EN50470-3 | | Annex B and Annex D (Optional model references) Class C | | |
| Input-voltage (up to 1.0 MV AC max, with voltage transformer) | Nominal Measured Voltage range | | 20 V L-N / 35 V L-L to 400 V L-N /690 V L-L absolute range 35 V L-L to 760 V L-L | | 20 V L-N / 20 V L-L to 400 V L-N /690 V L-L absolute range 20 V L-L to 828 V L-L |
| | Impedance | | 5 MΩ | | |
| | F nom | | 50 or 60 Hz ±5% | | 50 or 60 Hz ±10% |
| Input-current (configurable for 1 or 5 A secondary CTs) | I nom | | 5 A | | |
| | Measured Amps with over range and Crest Factor | | 5 mA to 8.5 A | | Starting current: 5m A Operating range: 50 mA to 10 A |
| | Withstand | | Continuous 20 A,10 sec/hr 50 A | | |
| | Impedance | | < 0.3 mΩ | | |
| | F nom | | 50 or 60 Hz ±5% | | 50 or 60 Hz ±10% |
| | Burden | | < 0.024 VA at 10 A | | |
| AC control power | Operating range | | 100- 415 V AC L-L ±10% CAT III 300V class per IEC 61010 | | 100-480 V AC ±10% CAT III 600V class per IEC 61010 |
| | Burden | | <5 W,11 VA at 415V L-L | | <5W/16.0 VA at 480 V AC |
| | Frequency | | 45 to 65 Hz | | |
| | Ride-through time | | 80 mS typical at 120V AC and maximum burden. 100 mS typical at 230 V AC and maximum burden 100 mS typical at 415 V AC and maximum burden | | 35 ms typical at 120 V L-N and maximum burden 129 ms typical at 230 V L-N and maximum burden |
| DC control power | Operating range | | 125-250 V DC ±20% | | |
| | Burden | | <4 W at 250 V DC | | typical 3.1W at 125 V DC, max. 5W |
| | Ride-through time | | 50 mS typical at 125 V DC and maximum burden | | |
| Outputs | Mechanical | Max output frequency | | 0.5 Hz maximum (1 second ON / 1 second OFF - minimum times) | |
| | | Switching current | | 250 V AC at 8.0 Amps, 25 k cycles, resistive 30 V DC at 2.0 Amps, 75 k cycles, resistive 30 V DC at 5.0 Amps, 12.5 k cycles, resistive | |
| | | Isolation | | 2.5 kV rms | |
| | Digital outputs | | 1 | 2 | 2 |
| | | Max load voltage | 40 V DC (AC not available) | | 30 V AC / 60 V DC |
| | | Max load current | 20 mA | | 125 mA |
| | | On Resistance | 50 Ω max | | 8 Ω |
| | | Meter constant | from 1 to 9,999,999 pulses per kWh | | |
| | | Pulse width for Digital Output | 50% duty cycle | | |
| | | Pulse frequency for Digital Output | 25 Hz max. | | |
| | | Leakage current | 0.03 micro Amps | | 1 micro Amps |
| | | Isolation | 5 kV rms | | 2.5 kV rms |
| | Optical outputs | | | | |
| | | Pulse width (LED) | 200 ms | | |
| | | Pulse frequency | 50 Hz. max. | | 2.5 kHz. max |
| | | Meter constant | from 1 to 9,999,999 pulses per k_h | | |

# PM5000 Series
## Functions and characteristics (cont.)

| Electrical characteristics* (cont'd) | | PM5100 | PM5300 | PM5500 |
|---|---|---|---|---|
| Status Inputs | ON Voltage | | 18.5 to 38 V DC | 30 V AC / 60 V DC max |
| | OFF Voltage | | 0 to 4 V DC | |
| | Input Resistance | | 110 k Ω | 100 k Ω |
| | Maximum Frequency | | 2 Hz (T ON min = T OFF min = 250 ms) | 25 Hz (T ON min = T OFF min = 20 ms) |
| | Response Time | | 20 ms | 10 ms |
| | Opto Isolation | | 5 kV rms | 2.5 kV rms |
| | Whetting output | | 24 V DC/ 8mA max | |
| | Input Burden | | 2 mA @ 24 V AC/DC | |
| **Mechanical characteristics** | | | | |
| Weight | | 380 g | 430 g | 450 g |
| IP degree of protection (IEC 60529) | | IP52 front display, IP30 meter body | | |
| Dimensions W x H x D [protrusion from cabinet] | | 96 x 96 x 72mm (77mm for PM5500) (depth of meter from housing mounting flange) [13mm] | | |
| Mounting position | | Vertical | | |
| Panel thickness | | 6 mm maximum | | |
| **Environmental characteristics** | | | | |
| Operating temperature | Meter | -25 °C to 70 °C | | |
| | Display (Display functions to -25° with reduced performance) | -25 °C to +70 °C | | |
| Storage temp. | | -40 °C to +85 °C | | |
| Humidity range | | 5 to 95 % RH at 50 °C (non-condensing) | | |
| Polution degree | | 2 | | |
| Altitude | | 2000 m CAT III / 3000 m CAT II | | 3000 m max. CAT III |

| Electromagnetic compatibility | |
|---|---|
| Harmonic current emissions | IEC 61000-3-2 |
| Flicker emissions | IEC 61000-3-3 |
| Electrostatic discharge | IEC 61000-4-2 |
| Immunity to radiated fields | IEC 61000-4-3 |
| Immunity to fast transients | IEC 61000-4-4 |
| Immunity to surge | IEC 61000-4-5 |
| Conducted immunity 150kHz to 80MHz | IEC 61000-4-6 |
| Immunity to magnetic fields | IEC 61000-4-8 |
| Immunity to voltage dips | IEC 61000-4-11 |
| Radiated emissions | FCC part 15, EN 55022 Class B |
| Conducted emissions | FCC part 15, EN 55022 Class B |

*Electrical Characteristics still under verification at time of printing of the catalogue, may be subject to change.

# PM5000 Series
## Functions and characteristics (cont.)

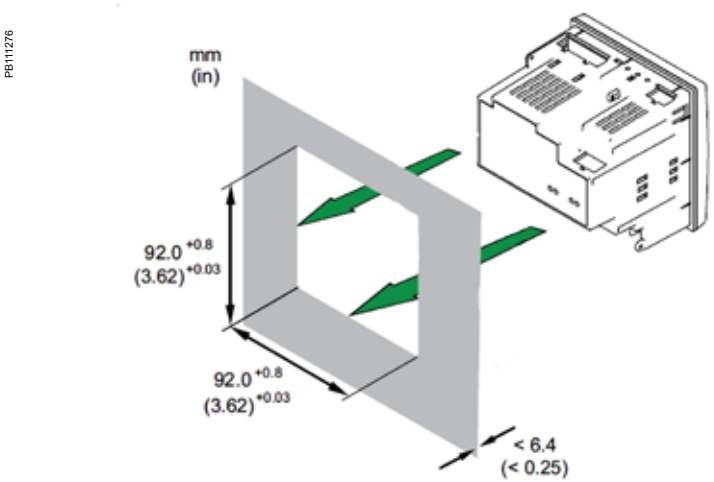
| Safety | PM5100 | PM5300 | PM5500 |
|---|---|---|---|
| Europe | CE, as per IEC 61010-1 Ed. 3 and IEC 62052-11 | | |
| U.S. and Canada | cULus as per UL61010-1 (3rd Edition) | | |
| Measurement category (Voltage and Current inputs) | CAT III up to 277 V L-N / 480 V L-L ; CAT II up to 400 V L-N / 690 V L-L | | CAT III up to 400 V L-N / 690 V L-L |
| Dielectric | As per IEC/UL 61010-1 Ed. 3 | | |
| Protective Class | II, Double insulated for user accessible parts | | |
| **Communication** | | | |
| RS 485 port Modbus RTU, Modbus ASCII (7 or 8 bit), JBUS | 2-Wire, 9600,19200 or 38400 baud, Parity - Even, Odd, None, 1 stop bit if parity Odd or Even, 2 stop bits if None; (Optional in PM51x and PM53x) | | |
| Ethernet port: 10/100 Mbps; Modbus TCP/IP | | 1 Optional | 2 (for daisy chain only, one IP address) |
| Firmware and language file update | Meter firmware update via the communication ports | | |
| Isolation | 2.5 kVrms, double insulated | | |
| **Human machine interface** | | | |
| Display type | Monochrome Graphics LCD | | |
| Resolution | 128 x 128 | | |
| Backlight | White LED | | |
| Viewable area (W x H) | 67 x 62.5 mm | | |
| Keypad | 4-button | | |
| Indicator Heartbeat / Comm activity | Green LED | | |
| Energy pulse output / Active alarm indication (configurable) | Optical, amber LED | | |
| Wavelength | 590 to 635 nm | | |
| Maximum pulse rate | 2.5 kHz | | |

| | PM5100 | | PM5300 | | | | PM5500 | |
|---|---|---|---|---|---|---|---|---|
| **Features and Options** | **PM5100** | **PM5110** | **PM5310** | **PM5320** | **PM5330** | **PM5340** | **PM5560** | **PM5563** |
| **Installation** | | | | | | | | |
| Fast installation, panel mount with integrated display | ■ | ■ | ■ | ■ | ■ | ■ | ■ | – |
| Fast installation, DIN rail mountable | – | – | – | – | – | – | – | ■ |
| **Accuracy Display** | | | | | | | | |
| **Display** | **Cl 0.5** | **Cl 0.5** | **Cl 0.5** | **Cl 0.5** | **Cl 0.5** | **Cl 0.5** | **Cl 0.2** | **Cl 0.2** |
| Backlit LCD, multilingual, bar graphs, 6 lines, 4 concurrent values | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| **Power and energy metering** | | | | | | | | |
| 3-phase voltage, current, power, demand, energy, frequency, power factor | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| Multi-tariff | – | – | 4 | 4 | 4 | 4 | 8 | 8 |
| **Power quality analysis** | | | | | | | | |
| THD, thd, TDD | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| Harmonics, individual (odd) up to | 15th | 15th | 31st | 31st | 31st | 31st | 63rd | 63rd |
| **I/Os and relays** | | | | | | | | |
| I/Os | 1DO | 1DO | 2DI/2DO | 2DI/2DO | 2DI/2DO | 2DI/2DO | 4DI/2DO | 4DI/2DO |
| Relays | 0 | 0 | 0 | 0 | 2 | √2 | 0 | 0 |
| **Alarms and control** | | | | | | | | |
| Alarms | 33 | 33 | 35 | 35 | 35 | 35 | 52 | 52 |
| Set point response time, seconds | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Single and multi-condition alarms | – | – | ■ | ■ | ■ | ■ | ■ | ■ |
| Boolean alarm logic | – | – | – | – | – | – | ■ | ■ |
| **Communications** | | | | | | | | |
| Serial ports with modbus protocol | – | 1 | 1 | – | 1 | – | 1 | 1 |
| Ethernet port with Modbus TCP protocol | – | – | – | 1 | – | 1 | 2** | 2** |
| **MID ready compliance, EN50470-1/3, Annex B and Annex D Class C** | | **PM5111** | | | **PM5331** | **PM5341** | **PM5561** | |

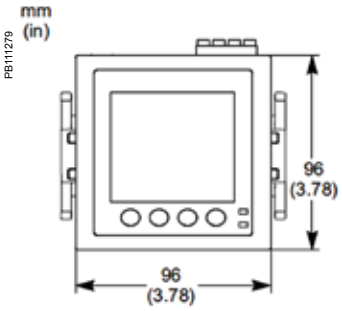
** 2 Ethernet ports for daisy chain, one IP address.

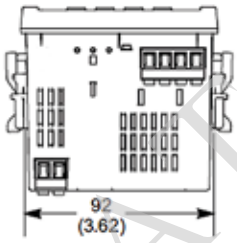
# PM5000 Series
## Dimensions and connection

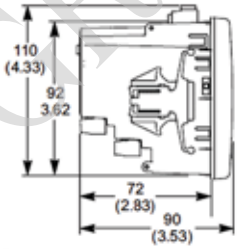
### PM5000 Series meter flush mounting



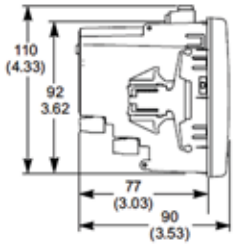

### PM5000 Series meter dimensions



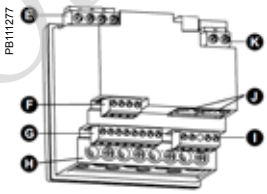



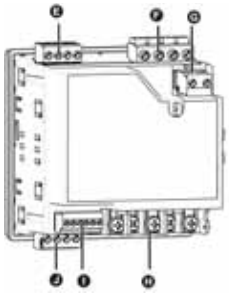

PM5100 / PM5300




PM5500


PM5500




**PM5000 meter parts**
**A** Menu selection buttons
**B** LED indicators
**C** Navigation or menu selections
**D** Maintenance and alarm notification area

**PM5500 meter parts**
**E** Voltage inputs
**F** RS-485 comms
**G** Digital inputs
**H** Current inputs
**I** Digital outputs
**J** Ethernet ports
**K** Control power

**PM5100 / PM5300 meter parts**
**E** Relay output (PM5300 only)
**F** Voltage inputs
**G** Control power
**H** Current inputs
**I** Status inputs/digital outputs
**J** Communications port: Ethernet (PM5300 only) or RS-485)

*Please see the **Installation Guide** for accurate and complete information on the installation of this product.*

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