

PM2000 multi-function meters

Functions and characteristics

PB114325



PM2000 series LED display meter

PB115531



PM2000 LCD display

Functions and characteristics

Introducing EasyLogic PM2000 series, next generation power meter which offers all the measurement capabilities required to monitor an electrical installation in a single 96 x 96 mm unit. PM2000 meters are available in LED and LCD display variants.

■ **PM2100 series:** LED display type: Intuitive navigation with self-guided, three buttons, bright red colour LEDs of 14.2 mm height. Two columns of LEDs, one on each side of the meter's front panel indicates the parameter name chosen for display

■ **PM2200 series:** LCD display type: Monochrome graphical LCD of 128 x 128 resolution with viewable area of 67 x 62.5 mm lets the users read all three phase measured values simultaneously. The bright anti-glare display features large characters and powerful backlighting for easy reading even in extreme lighting conditions and viewing angles. Intuitive menus, multi-language text, icons and graphics create a friendly environment to learn about your electrical network.

Applications

Cost management:

- Electrical installation remote monitoring
- Energy accounting and balancing
- Tenant and sub-billing
- Panel instrumentation
- Energy management

Network management:

- Power quality analysis: THD and individual harmonics up to 15th and 31st order
- Measurement of True PF and Displacement PF
- Recording Min/Max values of instantaneous parameters with date & timestamp
- Optional IO modules comprising either 2 Digital Inputs and 2 Outputs, or 2 Analogue Inputs and 2 Outputs for comprehensive WAGES monitoring
- Calculates % unbalance for voltage & current

Main characteristics:

- Easy to install: Mounts using two clips, no tools are required. Compact meter with 54 mm depth, connectable up to 480 +/-10% AC Volts L-L without voltage transformers for installations compliant with measurement category III, and double insulated.
- Easy to operate: Intuitive navigation with self guided menus and test LED at the front panel used for test and calibration of the meter on site or laboratory. Heart-beat LED indicates normal functioning and communication status if connected to RS-485 network.
- Product standard compliance
 - Active energy Class 1.0 as per IEC 62053-21
 - Active energy Class 0.5S as per IEC 62053-22 (partial compliance for active energy test clause only)
 - Reactive energy Class 1.0 as per IEC 62053-24 (partial compliance for reactive energy test clause only)
- Tested in accordance with IEC 62052-11 standard for
 - 5 A, I-nominal
 - 1 A, I-nominal (field settable).
- Power quality analysis: The PM2000 offers THD measurements and Individual harmonics up to 15th order in PM2x20 variants and up to 31st in PM2x30 variants.
- Load management: Simultaneous display of peak, present, predicted & rising demands of all the four demand parameters (W, VA, VAR, Amps)
- Billing: Tenant billing/utility meter cross check (where local regulations are not applicable).
- Timer: Active load timer, Meter operation timer and Run hours timer. These features help advise maintenance requirements and scheduling.
- Password: Field configurable password for securing set up information and prevent tampering of integrated values.
- Cyber security: Option for disabling RS-485 port through front panel keys against unauthorized access. It helps during installation and trouble shooting of communication network.
- LED display: Auto scaling, 9+3 digits for energy, 4 digits for other parameters.
- LCD display: 5 digits for energy, 5 or 6 digits for other parameters, with auto scaling.
- 12am snap shot: The values from summary page will be stored as snap shot and refreshed by next day 12am.
- Rate counters: 2 configurable counters display values in custom specified units based on energy recorded (e.g., kgCO₂ carbon emission or energy cost).
- Energy preset feature: For retrofit application.

| Commercial reference numbers | |
|------------------------------|-----------|
| Ref. number | Model |
| METSEPM2110 | PM2110 |
| METSEPM2120 | PM2120 |
| METSEPM2130 | PM2130 |
| METSEPM2210 | PM2210 |
| METSEPM2220 | PM2220 |
| METSEPM2230 | PM2230 |
| METSEPM2KDGTLIO22 | PM2K2DIDO |
| METSEPM2KANLGIO22 | PM2K2AIAO |
| METSEPM2KANLGIO11 | PM2K1AIAO |

See your Schneider Electric representative for complete ordering information.

PM2000 multi-function meters

Functions and characteristics

PB114317



Rear of PM2000 closed

PB114318



Rear of PM2000 open

PB114321



Rear of PM2000 without I/O module

General

Use on LV and MV systems with onsite programmable PT/CT ratio
Basic metering with THD, Individual Harmonics, RTC and min/max readings

Instantaneous rms values

| | |
|------------------------------------|--|
| Current | Average line current of 3-phase, per-phase, and calculated neutral current |
| Voltage | Average voltage of L-L, L-N parameters, and per-phase |
| Frequency | Any available line |
| Real, reactive, and apparent power | Total and per-phase value |
| Displacement power factor | Average and per-phase signed, four quadrant |
| True Power Factor | Average and per-phase signed, four quadrant |
| % Unbalance | Among the phase for Amps, V L-N, V L-L |

Energy values stored in non-volatile memory

| | |
|---|--|
| Four quadrant measurement for Delivered (Forward or Import) and Received (Reverse or Export) energy | Accumulated energy values for Active, Reactive & Apparent Energy parameters, quadrant basis Net & Total (absolute) values |
| Timer | Accumulated time counters for active load timer, meter operation timer, run hours and power outage counter |
| Old Registers | Facilitates retrieval of last cleared energy values |

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 |
| Demand sync methods | Thermal, Timed, Command Sync, and Clocked Sync |
| Demand calculation mode | Sliding, fixed and rolling block |
| Demand intervals | Settable from 1 to 60 minutes, in the step of 1 minute |

Display

| | |
|------------------------------|--|
| PM2100 series | Bright red colour LED display, 7 segment LED, ~ 14.2 mm height, 3 rows with 4 digits per row, Auto range |
| PM2200 series | Full scape, monochrome graphical LCD of 128 x 128 resolution with viewable area of 67 x 62.5 mm |
| Visualization mode for signs | IEC or IEEE type in LCD display meter |

Communication

| | |
|------------------------------|--|
| RS-485 serial | Channel connection Industry standard Modbus RTU protocol |
| Integration with software | SCADA/ DCS/ PMS/ EMS/ BAS/ BMS software |
| Native Plug and Play support | Schneider Electric energy management system software - StruxureWare Power Monitoring Expert, StruxureWare PowerSCADA Expert along with ION Setup programming support |

Min/Max values

| | |
|--|--|
| Minimum & Maximum value recording of 3-ph average or total | For 8 parameters, viz., V L-L, V L-N, Amps, PF, Hz, W, VA, VAR with date and time stamp, resettable separately through set up mode |
|--|--|

Alarms

| | |
|--|--|
| Alarming with time stamping in PM2x30 meters | A different combination of set point driven alarms and digital alarms with 1s time stamping. The alarms can be programmed and combined to trigger digital outputs, the meter keeps an alarm logs with the active and historical alarms with date and time stamping in 40 registers |
|--|--|

Diagnostics

| | |
|-----------------|--|
| Diagnostic page | Indicates LED/LCD status, sl number, diag pages, OS & RS version |
|-----------------|--|

Lock/ Un-Lock

| | |
|------------------------------------|---|
| Page Lock & Unlock (PM2100 series) | Unique feature to ensures that commonly referred page is restored in 4 minutes of inactive time |
|------------------------------------|---|

Rate 1 counter⁺¹

| | |
|--------------------------------------|---|
| kgCO ₂ emission (example) | Rate counter can be configured to display the CO ₂ emission in kgCO ₂ format based on the kWh measured either in delivered or received direction. |
|--------------------------------------|---|

Rate 2 counter⁺¹

| | |
|--------------------------|--|
| Tariff counter (example) | Rate counter can also be configured to calculate the electricity cost based on the energy consumption in customized currency format. |
|--------------------------|--|

12am snap shot

| | |
|------------------------------|---|
| 12am snap shot ⁺¹ | Snap shot of Avg Voltage, Avg Current, Total Active Power & Energy delivered as measured by the meter at 12am. The static page will be refreshed with new values by 12am next day |
|------------------------------|---|

⁺¹ In PM2200 (LCD) series meters

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Functions and characteristics

PB114320



Rear of PM2000 with I/O module

PB114319



Rear of PM2000 with I/O module disconnected

| Electrical characteristics | |
|--|--|
| Type of measurement | True RMS 64 samples per cycle |
| Measurement accuracy | |
| Current, average & per-phase | +/-0.5% |
| Voltage average & per-phase | +/-0.5% |
| Frequency | +/-0.05% |
| Power Factor, average & per-phase | +/- 0.01 |
| Power (W-Active, VA- Apparent) | +/- 0.5% |
| Power (VAR- Reactive) | +/- 1.0% |
| Real/Active Energy (Wh) | Class 0.5S as per IEC 62053-22 and Class 1.0 as per IEC 62053-21 for both CT nominal of 5 A and 1 A ^{*2} |
| Reactive Energy | Class 1.0 as per IEC 62053-24 |
| Apparent Energy | +/-0.5% |
| THD% and Individual Harmonics- V & A | +/- 5% FS for THD & Individual harmonics |
| Input-voltage | |
| VT primary | 999 kV L-L max, secondary voltage depends on VT ratio |
| U nominal | 277 V L-N/480V L-L |
| Measured V with full range | 20-277 V L-N/35 - 480 V L-L, cat III 20-347 V L-N/35 - 600 V L-L, cat II |
| Permanent overload | 750 V AC L-L |
| Impedance | => 5 MΩ |
| Frequency nominal | 50/60 Hz |
| VA burden | < 0.2 VA at 240 V AC L-N |
| Input-current | |
| CT ratings | Primary adjustable 1 A to 32768 A Secondary 1 A or 5 A I-nominal |
| Measured Amps with over range & Crest Factor | 5 mA to 6 A |
| Over current withstand | Continuous 12 A, 10s/hr 50 A, 1s/hr 500 A |
| Impedance | < 0.3 mΩ |
| Frequency nominal | 50/60 Hz |
| VA Burden | < 0.1 VA at 6 A |
| AC control power | |
| Operating range | 44- 277 V AC ±10% (80-277 V AC ±10% with I/O card) |
| Burden | <8 VA/3.3W at 240V AC L-N |
| Frequency | 45 to 65 Hz |
| Ride-through time | 100 ms typical at 230 V AC and maximum burden 100 ms typical at 277 V AC and maximum burden |
| DC control power | |
| Operating range | 44-277 V DC ±10% (100-277 V AC ±10% with I/O card) |
| Burden | <2 W at 240 V DC |
| Ride-through time | 50 ms typical at 125 V DC and maximum burden |
| Real time clock | |
| Ride-through time | 3 years |
| Displays update | |
| Instantaneous | 1s |
| Demand | 15s |
| Harmonics | 5s |
| Wiring configuration | |
| User programmable | 1ph, 2w, L-N 1ph, 2w, L-L 1ph, 3w, L-L with N (2phase) 3ph, 3w, Delta, Ungrounded 3ph, 3w, Delta, Corner Grounded ^{*3} 3ph, 3w, Wye, Ungrounded ^{*3} 3ph, 3w, Wye Grounded ^{*3} 3ph, 3w, Wye, Resistance Grounded ^{*3} 3ph, 4w, Open Delta, Center-Tapped ^{*3} 3ph, 4w, Delta, Center-Tapped ^{*3} 3ph, 4w, Wye, Ungrounded ^{*3} 3ph, 4w, Wye Grounded 3ph, 4w, Wye, Resistance Grounded ^{*3} |

^{*1} In PM2200 (LCD) series meters

^{*2} For 1 A CT nominal, additional error of ±1% from 50 mA to 150 mA, ±2% for current > 10 mA to < 50 mA. Partial standard compliance for Class 0.5S meter type (energy test clause only)

^{*3} Through communication in PM2100 series meters

PM2000 multi-function meters

Functions and characteristics

| Functions and characteristics | |
|---|---|
| Mechanical characteristics | |
| Weight | ~ 300 gm |
| IP degree of protection | IP54 front side, IP30 meter body as per IEC 60529 |
| Material | Polycarbonate meets UL 94V-0 flammability rating |
| Dimensions W x H x D | 96 x 96 x 54 mm maximum (depth of the meter from housing mounting flange) and 13 mm (protrusion of meter from housing flange). Meter depth with IO module is 74 mm |
| Mounting position | Vertical |
| Panel thickness | 5 mm maximum |
| Environmental characteristics | |
| Operating temperature | Meter -10 to +60 °C |
| Storage temperature | Meter -25 to +70 °C |
| Humidity rating | 5 to 95% RH at 50 °C (non-condensing) |
| Pollution degree | 2 |
| Altitude | 2000 m Category III |
| Product life | >7 years |
| Electromagnetic compatibility^{*4} | |
| Electrostatic discharge | IEC 61000-4-2 |
| Immunity to radiated field | IEC 61000-4-3 |
| Immunity to fast transients | IEC 61000-4-4 |
| Immunity to impulse waves | IEC 61000-4-5 |
| Conducted immunity | IEC 61000-4-6 |
| Immunity to magnetic fields | IEC 61000-4-8 |
| Immunity to voltage dips | IEC 61000-4-11 |
| Emissions | Emissions FCC Part 15 Class A/CE |
| Safety | |
| Europe | CE, as per IEC 61010-1 Ed-3 |
| US and Canada | cULus as per UL61010-1 and CAN/CSA-C22.2 No. 61010-1, for 600V AC |
| Measurement category (Voltage and Current inputs) | CAT III up to 480 V L-L CAT II up to 600 V L-L |
| Overvoltage Category (Control power) | CAT III up to 300 V L-N |
| Dielectric | As per IEC/UL 61010-1 Ed-3 |
| Protective Class | II, Double insulated for user accessible parts |
| Green premium | EOL, REACH, PEP, RoHS complied |
| Other certification | RCM (Australia), EAC (Russia) |
| Communication | |
| RS-485 port | Modbus RTU: 2-Wires, with ground & shield, 4800, 9600, 19200 or 38400 baud, Parity - Even, Odd, None, 1 stop bit if parity is Odd or Even, 2 stop bits if None DLF3000: Firmware update through communication port |
| Pulse Output – POP | Max 40 V DC, 20 mA 20 ms ON time Configurable pulse weight from 1 to 9999000 pulses/k_h (kWh, kVAh, or kVARh) |
| Isolation | 2.5 kV RMS, double insulated |
| Protection features | Password protected for set-up & clearing energy and Min/Max data |
| Display language | English, Spanish, French, Chinese, German, Portugese, Russian |
| Technical publication | Printed installation guide (IG) with the meter in multi language (EN,ES,FR,DE,PT, RU,TR,ZH) |
| Human machine interface | |
| Display type | LED display: 7 segment LED, ~ 14.2 mm height, 3 rows with 4 digits per row 2 columns of LEDs, one on each side of the LED panel to indicate the parameters under measurement LCD display: Monochrome graphical LCD of 128x128 mm resolution with viewable area of 67 x 62.5 mm |
| Keypad | PM2100 series: 3 buttons for navigation & combination of 2 buttons for performing set-up, Lock/unlocking of page, Diagnostic page operation PM2200 series: 4 buttons for intuitive navigation of HMI/ UI pages |
| CAL LED Indicator | Red colour, meter constant is configurable from 1 to 9999000 pulses/k_h (kWh, kVAh, or kVARh) |
| Comm. activity | Green LED (for indicating RS-485 interface or heart beat pulse) |

^{*4}as per IEC 61326-1 standard (Class A Emission)

PM2000 multi-function meters

Functions and characteristics

PB115529



Rear of PM2200 with I/O module

DID0580



Digital I/O module

PB115540



Analogue I/O module

Electrical characteristics of IO modules

Status Inputs (Digital Inputs)

| | |
|--------------------------|---|
| Voltage ratings | 18.5 to 36 V DC, OFF 0 to 4 V DC |
| Input resistance | 110 k Ω |
| Max Frequency | 2 Hz (T ON min = T OFF min = 250 ms) |
| Detect Time | 20 ms |
| Update time | 1 s |
| Isolation | 2.5 kV RMS |
| Application | Integration of Breaker status or other non-electrical devices like steam, water, gas meter through pulse inputs |
| Display support | Available on PM2230 (LCD type). In PM2130 meter, data is available through communication only. |
| Set up and configuration | Through set-up software |

Digital Outputs

| | |
|--------------------------|---|
| Voltage ratings | 40 V DC max, 20mA max |
| On Resistance | 50 Ω max |
| Meter constant | Configurable from 1 to 9999000 k_h (kWh, kVARh, kVAh) |
| Pulse width | 20 ms |
| Pulse frequency | 25 Hz |
| Leakage current | 1 micro Amps |
| Isolation | 2.5 kV RMS |
| Alarm conditions | 14 set point driven alarms, 4 Unary alarms, 2 Digital inputs status |
| Application | Pulse output: configurable for energies upper / lower limit: configurable for 9 parameters with 14 set point: V L-L, V L-N, Amps, F, V-THD, W-tot, VA-tot, VAR-tot, PF-avg |
| Display support | Available on PM2230 (LCD type). In PM2130 meter, data is available through communication only |
| Set up and Configuration | Through set-up software |

Analogue inputs

| | |
|--------------------------|---|
| Measurement scale | 4-20 mA |
| Input impedance | =<300 Ω |
| Max source impedance | >500 Ω |
| Update rate | 1 s |
| Accuracy | 1% of Full scale at ambient temp 0.1%/K for de-rating |
| Voltage ratings | Typical 12 V (max 30 V) |
| Power Consumption | <1.5 Watts |
| Isolation | 2.5 kV RMS |
| Application | Configurable for inputs from flow rates, RPM, fluid level, oil pressure, temperature measurement devices or transducers with option of 81 different Uni code selection. Configuration via set up software |
| Display | Available on PM2230 (LCD type). In PM2130 meter, data is available through communication only |
| Set up and configuration | Through set up software |

Analogue outputs

| | |
|------------------------|---|
| Scale | 4-20 mA |
| Load impedance | =<600 Ω |
| Update rate | 1s |
| Accuracy | 1% of Full scale at ambient temp |
| Voltage ratings | Typical 12 V (max 30 V) |
| Power Consumption | <1.5 Watts |
| Isolation | 2.5 kV RMS |
| Application | Analogue outputs can be associated to 40 different instantaneous parameters |
| Display | Available on PM2230 (LCD type). In PM2130 meter, data is available through communication only |
| Set-up & configuration | Through set-up software |

Mechanical characteristics

| | |
|----------------------|--|
| Mechanical dimension | 90.5 mm W x 53 mm H x 14.67 mm D (without connector) |
| Weight | 50 g |

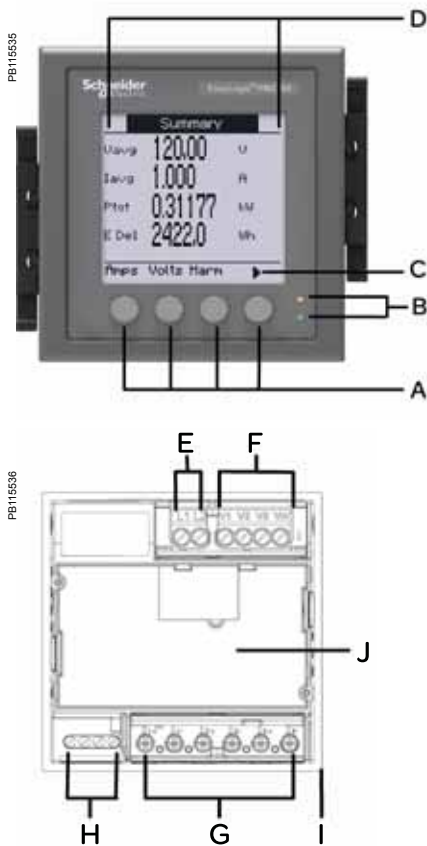
* as per IEC 61326-1

| Feature set summary | PM2110 | PM2120 | PM2130 | PM2210 | PM2220 | PM2230 |
|--|------------------------|---|--------------------------|---------------------------------------|---|------------|
| Accuracy Class for Wh | 1.0 | | 0.5S | 1.0 | | 0.5S |
| Accuracy Class for VARh | | | | 1.0 | | |
| Accuracy for VAh | | | +/- 0.5% | | | |
| Amps, per-phase, average and calculated neutral current | | | ■ | | | |
| Voltage, V L-N, V L-L, per-phase and average | | | ■ | | | |
| Power Factor | True PF | True PF Displacement PF ⁺³ | | True PF | True PF Displacement PF | |
| Frequency, any available phase | | | ■ | | | |
| Power: W, VA, VAR: per-http://69.195.124.174/~pilatfa7/temp/ | | | ■ | | | |
| 3-phase unbalance % | Current | Current Voltage ⁺³ | | Current | Current Voltage | |
| Demand parameters (Present, Last, Predicted and Peak for W, VA, VAR, Amps) | ■ | ■ | | ■ | ■ | |
| Date and Time stamp for peak demand | (no timestamp) | | | (no timestamp) | | |
| Energy: Wh, VAh, VARh (4 quadrant) Delivered (Import or Forward), Received (Export or Reverse) | Delivered, Received | Delivered, Received Total ⁺³ , Net ⁺³ , Last cleared ⁺³ | | Delivered, Received, Total, Net | Delivered, Received Total, Net, Last cleared ⁺³ | |
| Active load timer, meter operating timer, run hours and power outage counter | | Through com | | | ■ | |
| THD: Voltage L-N or L-L, Amps per phase | | | ■ | | | |
| Individual harmonics for Voltage, Current, per-phase | | Up to 15th ⁺³ | Up to 31st ⁺³ | | Up to 15th | Up to 31st |
| Min/ Max with real time clock For avg or total of V L-L, V L-N, Amps, PF, Hz, W, VA, VAR parameters with date and time stamp of occurrence | | Through com | | | ■ | |
| Communication | Pulse Output | RS-485 | | Pulse Output | RS-485 | |
| Expandable Analogue IO modules (2 inputs & 2 outputs) ⁺⁵ | | ■ | | | ■ | |
| Expandable Digital IO modules (2 inputs & 2 outputs) ⁺⁵ | | ■ | | | ■ | |
| Customizable data logging up to 2 parameters. Option to select Power (W,VA,VAR) Bi-directional energy (+/-Wh, +/- VAh, +/- VARh), Demand (W, VA,VAR) with configurable interval and duration (e.g. 2 parameters for 60 days at 15 minutes interval) | | ■ | | | ■ | |
| Alarms: 14 set point driven alarms from 9 parameters (V L-L, V L-N, Amps, F, V-THD, W-tot, VA-tot, VAR-tot, PF-avg), 4 Unary alarms (meter power up, meter reset, meter diagnostic, phase reversal) and 2 digital inputs status (with DI/DO card only) | | ■ | | | ■ | |
| 12 am snap shot of Avg Voltage, Avg Current, Total active power & Energy delivered as measured every day at 12am | | | | ■ | | |
| Rate counters: 2 configurable counters to display values in customer specified units base on energy measured (e.g., kgCO ₂ emission or energy cost) | | | | ■ | | |

⁺³ Through communication only

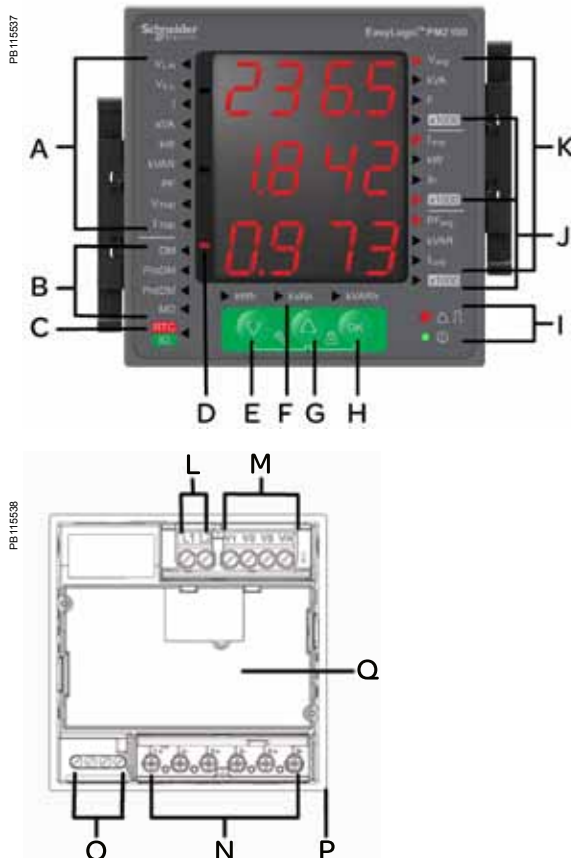
⁺⁵ Any one IO module can be used at a time with PM2130 or PM2230 meter. The control power range with IO module shall be 90 to 300V AC L-N or DC.

PM2000 LCD display legend description



- A Menu selection buttons
- B LED indicators
- C Navigation or menu selections:
 - ▲ Exit screen and go up one level
 - ▲ Move cursor up list of options
 - ▼ Move cursor down, display more options
 - ◀ Move cursor one character to the left
 - ▶ Scroll right and display more menu items
 - + Show next item in list or increase the highlighted value
 - Show previous item in list
- D Maintenance & alarm notification area
- E Control power
- F Voltage inputs
- G Current inputs
- H RS-485 / POP
- I Gasket
- J I/O slot (for PM2x30 only)

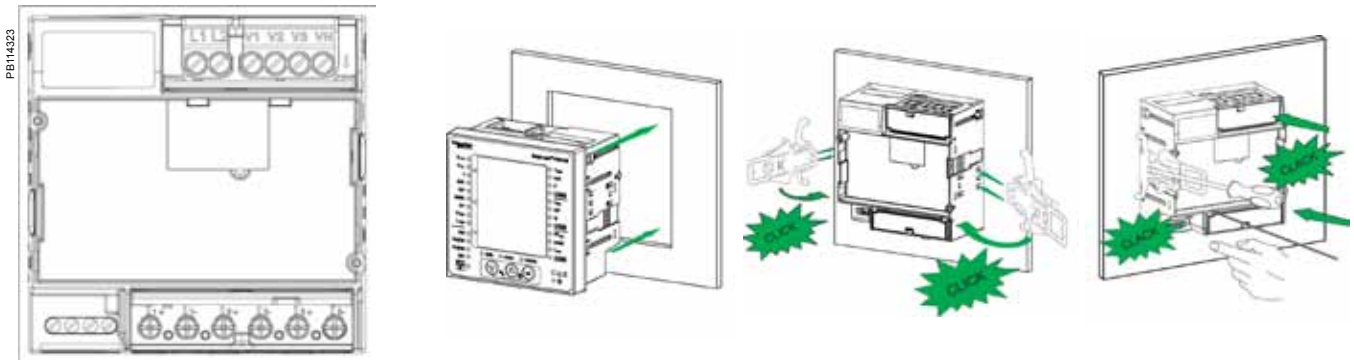
PM2000 LED display legend description



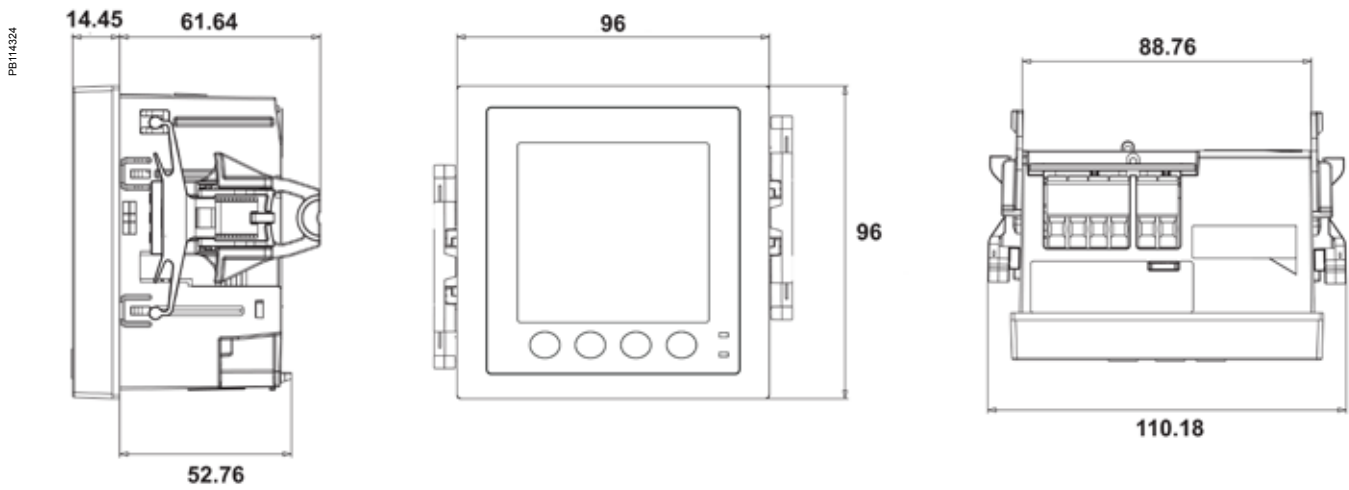
- A Phase measurements (VL-N, VL-L, I, kVA, kW, kVAR, PF, VTHD%, ITHD%)
- B Demand measurements (DM, PrsDM, Prd, DM, MD)
- C RTC Date & time
- D Negative indicator
- E Navigation key to navigate down
- F Energy readings Apparent energy, Active energy, Reactive energy
- G Navigation key to navigate up
- H OK Enter key
- I Energy pulsing LED (red) Heartbeat / communications LED (green)
- J x 1000 indicator
- K System measurements Vavg, kVA, F, Iavg, kW, In, PFavg, kVAR, Iunb
- L Control power L1, L2
- M Input voltage terminals V1, V2, V3, VN
- N Input current terminals I1+, I1-, I2+, I2-, I3+, I3-
- O RS-485 communications / POP terminals
- P Gasket
- Q I/O card slot (for PM2130 only)

PM2000 meter rear view

LED meter installation



PM2000 multi-function meter mechanical dimensions



PM2000 I/O module mechanical dimensions

