# PMC-53A-E

## *Ethernet Multifunction Meter*



# PMC-53A-E




**PMC-53A-E** Ethernet Multifunction Meter is CET's latest offer for the digital power/energy metering market. Housed in a standard DIN form factor measuring 96x96x83.6mm, it is perfectly suited for industrial, commercial and utility applications requiring direct Ethernet connectivity. The PMC-53A-E features quality construction, multifunction measurements and a large, backlit, Dot-Matrix LCD that is easy to navigate and user friendly. Compliance with the IEC 62053-22 Class 0.2S*/0.5S and ANSI C12.1 Class 0.2, it is a cost-effective replacement for analog instrumentation and is capable of displaying 4 measurements at once. It also optionally provides an I4 input for Neutral Current Measurement, one 0/4-20mA Analog Input for measuring external transducer signals, an Ir Input for Residual Current Measurement, or two Analog Outputs for real-time monitoring, or three RTDs (PT100 sensors not included) for temperature measurement. With a standard 10Base-T/100Base-TX Ethernet Port and an RS-485 port supporting multiple protocols, the PMC-53A-E can be easily integrated into Energy Management Systems as well as Building and Utility Automation Systems.

## Typical Applications

- Industrial, Commercial and Utility Substation Metering
- Building, Factory and Process Automation
- Sub-metering and Cost Allocation
- Retrofit applications with Split-Core Current Transformers and Rogowski Coils*

## Features Summary

### Basic Measurements

- ULN, ULL per Phase and Average with Neutral-to-Ground Voltage (Ung)
- Current per Phase and Average with calculated Neutral
- P, Q, S, PF per Phase and Total
- kWh, kvarh Import/Export/Net/Total and kVAh Total
- Frequency
- Device Operating Time (Running Hours)
- Optional Neutral Current (I4) and Residual Current (Ir) Measurement

### Advanced Measurements

- 1-cycle Real-time U & I Waveform Display @ 1s update
- U and I THD, TOHD, TEHD and Harmonics analysis up to 63rd
- Current TDD, TDD Odd, TDD Even, K-Factor and Crest Factor
- U and I Phase Angle
- Displacement PF
- Fundamental U, I and P per phase
- Total Fundamental P & Total Harmonic P
- U and I Unbalance and Sequence
- ULN, ULL Over/Under Deviation and Frequency Deviation *
- %kvarh Imp./kWh Imp., %kvarh Exp./kWh Imp. for Last Day & Last 30 Days
- Interval Energy for kWh/kvarh Imp./Exp. and kVAh
- Present, Predicted and Max. Demands for ULN, ULL, I per phase and Average as well as P, Q, S Total with Timestamp for This Month & Last Month (or Since Last Reset & Before Last Reset)
- Two TOU schedules, each providing
  - 12 Seasons *
  - 20 Daily Profiles, each with 12 Periods *
  - 90 Holidays or Alternate Days
  - 8 Tariffs, each providing the following information
    - Total and 3-phase kWh/kvarh Imp./Exp., kVAh
    - P, Q, S Max. Demands
- 12 Monthly Logs of kWh, kvarh Imp./Exp./Tot./Net, kVAh and kvarh Q1-Q4 as well as kWh/kvarh Imp./Exp., and kVAh per Tariff

### Ease of use

- Large, backlit, Dot-Matrix LCD display with wide viewing angle
- Intuitive user interface
- LED indicators for Energy Pulsing and Communication activities
- Password protected setup via Front Panel, Web Server or free software
- Easy installation with mounting clips, no tools required

### Carbon Emission Metering ^

- Carbon Emission measurements for This Month & This Year & Total Cumulative
- Configurable Carbon Emission Factor and Associated kWh Imp./-Exp. for both Transmission & Distribution Lines & Load-side Power Generation Equipment
- Storage of up to 12 monthly & 12 annual historical Carbon Emission logs

### SOE Logs

- 100 events time-stamped to ±1ms resolution
- Setup changes, Setpoint, DI status changes and DO operations

### Max./Min. Log

- Max./Min. Log with Timestamp for Real-time measurements such as Voltage, Current, In, I4, Ir, Freq., P, Q, S, PF, Unbalance, K-Factor, Crest Factor and THD
- Configurable for This Month & Last Month (or Since Last Reset & Before Last Reset)

### Freeze Logs

- 60 Daily Freeze Logs for kWh/kvarh/kVAh Total and P/Q/S Max. Demands
- 36 Monthly Freeze Logs for kWh/kvarh/kVAh Total and P/Q/S Max. Demands with Timestamp

# Ethernet

## Data Recorder (DR)

- 5 Data Recorders of 16 parameters* each for Real-time measurements, Harmonics, Energy, Demand, TOU, Pulse Counters, etc.
- Recording interval from 1 minute to 40 days
- Configurable capacity up to a max. of 1,250* days (> 3 years) at 15-minute interval for 1 Data Recorder with 16 parameters for **HK BEC 2024 Compliant Recording**

## Setpoints

- 9 user programmable setpoints with extensive monitoring parameters including Voltage, Current, Power, PF, Current and Power Demand, Unbalance and THD, etc.
- Configurable thresholds, time delays, DO and Alarm Email triggers

## Diagnostics

- Frequency Out-of-Range, Loss of Voltage/Current
- P Direction per Phase and Total, Possible incorrect CT Polarity
- Incorrect U & I Phase Sequence
- Disconnection of Residual Current Input

## Communications

- 1x10Base-T/100Base-TX Ethernet Port with RJ45 connector
- 1xOptically isolated RS-485 port with baud rate from 1.2kbps to 38.4kbps
- Built-in Web Server for easy data viewing and setup configurations
- Protocol supported: Modbus TCP/RTU, BACnet MS/TP, BACnet/IP#, DNP 3.0, PROFINET#, HTTP, SMTP, SNTP, TFTP and Ethernet Gateway

## Real-Time Clock

- Battery-backed Real-time Clock with 6ppm accuracy (<0.5s per day)

## System Integration

- Supported by CET's PecStar® iEMS
- Easy integration into Building Automation Systems with BACnet MS/TP or Modbus RTU and Utility Substation Automation with DNP 3.0
- The on-board password protected Web Server allows complete access to its data and supports the configuration for most of the Setup parameters via a standard web browser

# Inputs and Outputs

## Digital Outputs

- 2 Form A Mechanical Relays for alarming and general purpose control

## Digital Inputs

- 4 channels, volt free dry contact, 24VDC internally wetted
- 1000Hz sampling for status monitoring with programmable debounce
- Pulse counting with programmable weight for each channel for collecting WAGES (Water, Air, Gas, Electricity, Steam) information
- Tariff switching based on DI status

## Pulse Outputs (Optional)

- 2 Form A Solid State Relays for kWh and kvarh pulsing

# Expansion Module Options

- I4 Current Input + AI (0/4-20mA) + Ir Input (0-0.5mA)
- 2xAO (0/4-20mA) ~
- 3xRTD (PT100 sensors not included) ~

* These features are upgraded in PMC-53A-E with Firmware V2.00.01 or later.

^ The Carbon Emission Metering is available in Firmware V2.00.03 or later.

# The BACnet/IP and PROFINET protocols are available in Firmware V2.00.04 or later.

~ The option is available in Firmware V2.00.03 or later.

# Accuracy

| Parameters | Accuracy | | | Resolution |
|---|---|---|---|---|
| | 5A/1A Input | | SCCT/ RC Input | |
| | Class 0.2S | Class 0.5S | | |
| Voltage | ±0.1% | ±0.2% | ±0.5% | 0.001V |
| Current | ±0.1% | ±0.2% | ±0.5% | 0.001A |
| I4 Input | ±0.1% | ±0.2% | ±0.5% | 0.001A |
| P, Q, S | ±0.2% | ±0.5% | ±1% | 0.001kX |
| kWh, kVAh | IEC 62053-22 Class 0.2S/ IEC 62053-22 Class 0.5S ANSI C12.1 Class 0.2 | | IEC 62053-21 Class 1 | 0.1kXh |
| kvarh | IEC 62053-24 Class 0.5S IEC 62053-23 Class 2 | | IEC 62053-24 Class 1 IEC 62053-23 Class 2 | 0.1kvarh |
| Frequency | ±0.01Hz | ±0.02Hz | ±0.02Hz | 0.01Hz |
| PF | ±0.2% | ±0.5% | ±1% | 0.001 |
| Ir Input | ±0.5% | | | 0.001A |
| THD | IEC 61000-4-7 Class II | | | 0.001% |
| K-Factor | IEC 61000-4-7 Class II | | | 0.001 |
| Phase Angle | ±1° | | | 0.1° |

# Technical Specifications

| Voltage Inputs (V1, V2, V3, VN) | |
|---|---|
| Standard Un | 400VLN/690VLL |
| Range | 10V to 2xUn |
| Overload | 2xUn continuous, 5xUn for 1s |
| Burden | <0.02VA per phase |
| Measurement Category | CAT III 600V |
| Frequency | 45-65Hz |

| Current Inputs (-I11, I12, -I21, I22, -I31, I32, Optional -I41, I42) | |
|---|---|
| Standard In | 5A (Optional 1A) |
| Burden | <0.15VA per phase @ 5A |
| Range | 0.1% to 200% In |
| Starting Current | 0.1% In |
| Overload | 2xIn continuous, 20xIn for 1s |
| SCCT Options | 100A/200A/400A/800A/1600A to 40mA |
| Rogowski Coil Options | 400A/1200A/2500A/5000A to 40mA |

| Power Supply (L/+, N/-) | |
|---|---|
| Standard | 60-250VAC, ±10%, 47-440Hz<br>24-250VDC, ±10% |
| Burden | <4W |
| Overvoltage Category | OVC III up to 300VLN |

# Multifunction Meter

| Digital Inputs (DI1, DI2, DI3, DI4, DIC) | |
|---|---|
| Type | Dry contact, 24VDC internally wetted |
| Sampling | 1000Hz |
| Hysteresis | 1ms minimum |

| Digital Outputs (DO11, DO12, DO21, DO22) | |
|---|---|
| Type | Form A Mechanical Relay |
| Loading | 5A @ 250VAC or 30VDC |
| Load Type | Resistive |

| Optional SS Pulse Outputs (E1+, E1-, E2+, E2-) | |
|---|---|
| Type | Form A Solid State Relay |
| Isolation | Optical |
| Load Type | Resistive |
| Output | Optocoupler output as ON-OFF |
| Max. Load Voltage | 50VDC |
| Max. Forward Current | 50mA |

| Optional Residual Current Input (-IR, IR) | |
|---|---|
| In | 0.5mA |
| Range | 2% to 200% In |
| CT Type | Solid-Core or Split-Core Residual CT |

| Optional Analog Input (AI+, AI-) | |
|---|---|
| Type | 0-20/4-20 mA DC |
| Overload | 24 mA DC maximum |

| Optional Analog Outputs (AO1+, AO1-, AO2+, AO2-) | |
|---|---|
| Type | 0-20 / 4-20 mA DC |
| Loading | 500Ω maximum |
| Overload | 24mA DC maximum |

| RTD Inputs (TC11, TC12, TC21, TC22, TC31, TC32) | |
|---|---|
| Type | Platinum Resistor PT100 (Sensor Not Included) |
| Range | -50°C to 200°C |
| Cable Length | 3000mm |
| Protective Tube Length | 30mm |

| Tightening Installation Torque | |
|---|---|
| Current Inputs | 7.1 kgf.cm/M3.5/6.28 lb-in/0.7 N.m |
| Power Supply, Voltage Inputs, RS-485 and I/O | 4 kgf.cm/M3/3.54 lb-in/0.4 N.m |

| Environmental Conditions | |
|---|---|
| Operating Temperature | -25°C to 70°C |
| Storage Temperature | -40°C to 85°C |
| Humidity | 5% to 95% non-condensing |
| Atmospheric Pressure | 80 kPa to 106 kPa |
| Altitude | < 2000m |
| Pollution Degree | 2 |
| Location/Mounting | For indoor use only |

| Mechanical Characteristics | |
|---|---|
| Panel Cutout | 92x92mm (3.62"x3.62") |
| Unit Dimensions | 96x96x83.6mm |
| IP Rating | IP65 (Front Panel), IP30 (Body) |

## Standards of Compliance

| Safety Requirements | |
|---|---|
| CE LVD 2014/35/EU | EN 61010-1: 2010 +A1: 2019<br>EN IEC 61010-2-030: 2021 +A11: 2021 |
| cULus Listed | UL 61010-1, Ed.3, Rev 06/06/2023<br>CAN/CSA C22.2 NO. 61010-1, Ed.3<br>UL 61010-2-030, Ed.2<br>CSA C22.2 NO. 61010-2-030: 18, Ed.2 |
| Electrical Safety in Low Voltage Distribution Systems up to 1000 Vac and 1500Vdc | IEC 61557-12: 2021 (PMD) |
| Insulation<br>AC Voltage: 3.6kV @ 1 minute<br>Insulation Resistance: >100MΩ<br>Impulse Voltage: 6kV, 1.2/50μs | EN 61010-1: 2010 +A1: 2019<br>IEC 62052-31: 2015 |

| CE EMC Directive 2014/30/EU (EN IEC 61326-1: 2021 + EN IEC 61326-2-3: 2021) | |
|---|---|
| **Immunity Tests** | |
| Electrostatic Discharge | EN 61000-4-2: 2009 |
| Radiated Fields | EN IEC 61000-4-3: 2020 |
| Fast Transients | EN 61000-4-4: 2012 |
| Surges | EN 61000-4-5: 2014 +A1: 2017 |
| Conducted Disturbances | EN 61000-4-6: 2014 +AC: 2015 |
| Magnetic Fields | EN 61000-4-8: 2010 |
| Voltage Dips and Interruptions | EN IEC 61000-4-11: 2020 |
| Ring Waves | EN 61000-4-12: 2017 |
| Immunity Standard for Industrial Environments | EN IEC 61000-6-2: 2019 |
| **Emission Tests** | |
| Limits and Methods of Measurement of Electromagnetic Disturbance Characteristics of Industrial, Scientific and Medical (ISM) Radio-Frequency Equipment | EN 55011: 2016 +A1: 2017<br>+A11: 2020 +A2: 2021 |
| Electromagnetic Compatibility of Multimedia Equipment-Emission Requirements | EN 55032: 2015<br>+A11: 2020 +A1: 2020 |
| Limits for Harmonic Current Emissions for Equipment with Rated Current ⩽16A | EN IEC 61000-3-2: 2019 +A1: 2021 |
| Limitation of Voltage Fluctuations and Flicker in Low-Voltage Supply Systems for Equipment with Rated Current ⩽16A | EN 61000-3-3: 2013<br>+A1: 2019 +A2: 2021 |
| Emission Standard for Industrial Environments | EN IEC 61000-6-4: 2019 |
| Radiated Emissions | FCC 47CFR Part 15 Subpart B Class B<br>ANSI C63.4: 2014 |
| Conducted Emissions | FCC 47CFR Part 15 Subpart B Class B<br>ANSI C63.4: 2014 |

| Mechanical Tests | |
|---|---|
| Spring Hammer Test | IEC 62052-31: 2015 |
| Vibration Test | IEC 62052-11: 2020 |
| Shock Test | IEC 62052-11: 2020 |

| BACnet Conformance Certificate | |
|---|---|
| BTL Listing | Certificate No.: BTL-31239 |

# Accessories

## 1A/0.5mA Residual Current Sensor

| | |
|---|---|
| CT517203 | Phase Current Range: 0-160A<br>Aperture=Ø46mm, Accuracy: Class 0.5 |
| CT517403 | Phase Current Range: 0-400A<br>Aperture=Ø80mm, Accuracy: Class 0.5 |
| CT519703 | Phase Current Range: 0-630A<br>Aperture=220x50mm, Accuracy: Class 0.5 |
| CT517603 | Phase Current Range: 0-1000A<br>Aperture=Ø120mm, Accuracy: Class 0.5 |



Solid-Core Current Sensor

| | |
|---|---|
| CT553203 | Phase Current Range: 0-160A<br>Aperture=Ø48mm, Accuracy: Class 3 |
| CT553303 | Phase Current Range: 0-225A<br>Aperture=Ø68mm, Accuracy: Class 3 |



Split-Core Current Sensor

## 1-Phase Split-Core CTs

| | |
|---|---|
| PMC-SCCT-100A-40mA-16-A | L=2m, Aperture=Ø16mm, Accuracy: Class 0.5 |
| PMC-SCCT-200A-40mA-24-A | L=2m, Aperture=Ø24mm, Accuracy: Class 0.5 |
| PMC-SCCT-400A-40mA-35-A | L=2m, Aperture=Ø35mm, Accuracy: Class 0.5 |
| PMC-SCCT-800A-40mA-A | L=2m, Aperture=80x50mm, Accuracy: Class 0.5 |
| PMC-SCCT-1600A-40mA-A | L=2m, Aperture=130x55mm, Accuracy: Class 0.5 |



100A/200A/ 400A SCCT



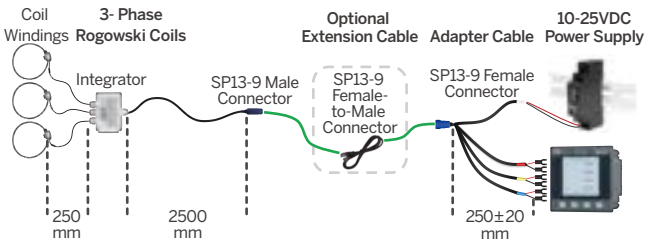
800A SCCT



1600A SCCT

## Rogowski Coil

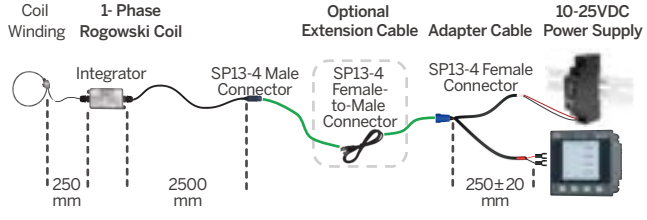
| | |
|---|---|
| PMC-RC-400A-40mA-3P-100-PY-W-F | 3-phase 400A/40mA Rogowski Coil, Aperture=Ø100mm |
| PMC-RC-1200A-40mA-3P-150-PY-W-F | 3-phase 1200A/40mA Rogowski Coil, Aperture=Ø150mm |
| PMC-RC-2500A-40mA-3P-200-PY-W-F | 3-phase 2500A/40mA Rogowski Coil, Aperture=Ø200mm |
| PMC-RC-5000A-40mA-3P-350-PY-W-F | 3-phase 5000A/40mA Rogowski Coil, Aperture=Ø350mm |




L=0.25m (coil winding to integrator) + 2.5m (integrator to SP13-9 male connector) + 0.25m Adapter Cable + 5m/10m (optional) Extension Cable

**Note**: The Red, Yellow and Blue wire of 3-phase Rogowski coil correspond to A/B/C phase respectively.

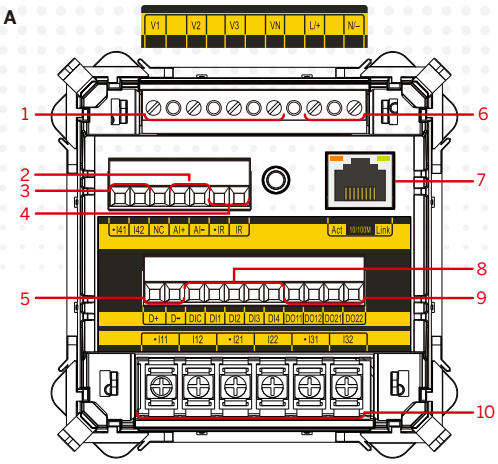
| | |
|---|---|
| PMC-RC-400A-40mA-1P-100-PY-W-N | 1-phase 400A/40mA Rogowski Coil, Aperture=Ø100mm |
| PMC-RC-1200A-40mA-1P-150-PY-W-N | 1-phase 1200A/40mA Rogowski Coil, Aperture=Ø150mm |
| PMC-RC-2500A-40mA-1P-200-PY-W-N | 1-phase 2500A/40mA Rogowski Coil, Aperture=Ø200mm |
| PMC-RC-5000A-40mA-1P-350-PY-W-N | 1-phase 5000A/40mA Rogowski Coil, Aperture=Ø350mm |




L=0.25m (coil winding to integrator) + 2.5m (integrator to SP13-4 male connector) + 0.25m Adapter Cable + 5m/10m (optional) Extension Cable

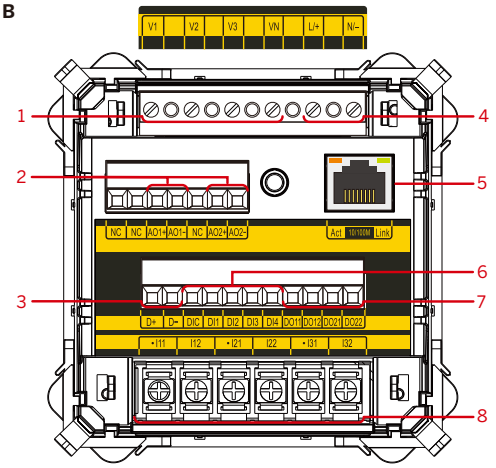
# Rear Terminals

**Expansion A**



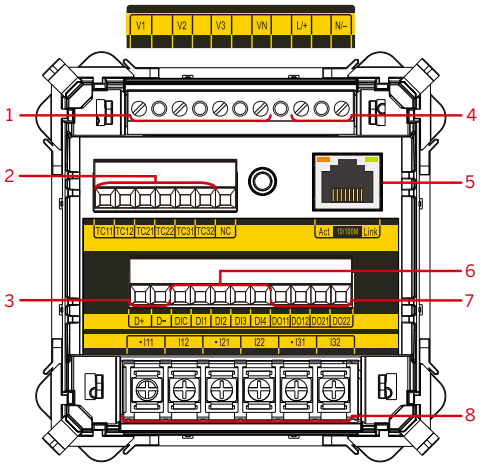

1 4xVoltage Input
2 Expansion A: Analog Input
3 Expansion A: I4 Input
4 Expansion A: IR Input
5 RS-485 Port
6 Power Supply
7 10Base-T/100Base-TX Ethernet Port
8 Digital Inputs
9 Digital Outputs
10 3xCurrent Input

**Expansion B**




1 4xVoltage Input
2 Expansion B: 2x Analog Output
3 RS-485 Port
4 Power Supply
5 10Base-T/100Base-TX Ethernet Port
6 4x Digital Input
7 2x Digital Output
8 3x Current Input

**Expansion C**




1 4xVoltage Input
2 Expansion C: 3x RTD
3 RS-485 Port
4 Power Supply
5 10Base-T/100Base-TX Ethernet Port
6 4x Digital Input
7 2x Digital Output
8 3x Current Input

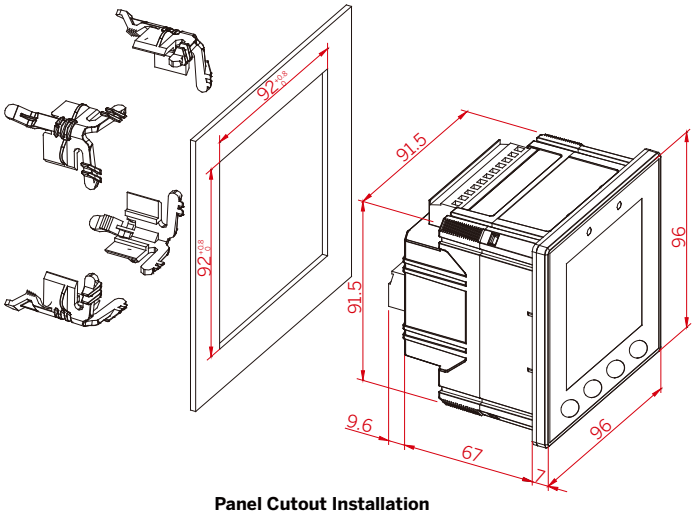
# Ordering Information

| Product Code | | | | | | | | | | | | Description |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PMC-53A-E Ethernet Multifunction Meter** | | | | | | | | | | | | |
| Basic Function | | E | | | | | | | | | | Dot-Matrix LCD, Monthly & Daily Freeze Log, Data Recorder, 16MB Memory, 1x10Base-T/100Base-TX Ethernet Port and 1xRS-485 (Modbus RTU, BACnet MS/TP and DNP 3.0) |
| Input Current | | | 5 | | | | | | | | | 5A (5A/1A Auto-Scaling) |
| | | | 1 | | | | | | | | | 1A |
| | | | 4 | | | | | | | | | For use with 100A, 200A, 400A, 800A and 1600A to 40mA Split-Core CTs and 400A, 1200A, 2500A, 5000A to 40mA Rogowski Coils |
| Input Voltage | | | | 9 | | | | | | | | 400VLN/690VLL |
| Power Supply | | | | | 2 | | | | | | | 60-250 VAC ±10%, 47-440Hz, 24-250 VDC ±10% |
| Frequency | | | | | | 5 | | | | | | 45Hz-65Hz |
| I/O | | | | | | | A | | | | | 4xDI + 2xDO (Mechanical Relay) |
| | | | | | | | B | | | | | 4xDI + 2xSS Pulse Output |
| Expansion | | | | | | | | X | | | | None |
| | | | | | | | | A*^ | | | | I4 +AI (0/4-20mA) +Ir (0-0.5mA) |
| | | | | | | | | B* | | | | 2xAO (0/4-20mA) |
| | | | | | | | | C* | | | | 3xRTD (PT100 sensors not included) |
| Language | | | | | | | | | E | | | English |
| Accuracy# | | | | | | | | | | 2* | | Class 0,2S for Active Energy |
| | | | | | | | | | | “” | | Class 0,5S for Active Energy |
| PMC-53A | - | E | - | 5 | 9 | 2 | 5 | A | X | E | 2 | PMC-53A-E-5925AXE2 (Class 0,2S Standard Model) |
| | - | E | - | 5 | 9 | 2 | 5 | A | X | E | | PMC-53A-E-5925AXE (Class 0,5S Standard Model) |

* Additional charges apply
^ I4 specifications of Analog Input Option A are consistent with those of the selected Input Current Option.
# The Accuracy Option represents for the accuracy of main unit. The Accuracy Option "2" is only available to Input Current Option "5" (for 5A Input) and "1". For Input Current option "4", the accuracy of main unit is Class 0,5S, excluding the accuracy of the externally connected SCCTs and Rogowski Coils.

# Dimensions and Installation

(Unit: mm)




**Panel Cutout Installation**

Email: sales@cet-global.com
Website: www.cet-global.com

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Your Local Representative

V2.3 17.07.2026