



- IEC 62053-22 Class 0.5S
- ANSI C12.20 Class 0.2
- True RMS Measurements
- THD with 31 Ind. Harmonics
- K-Factor, Crest Factor and TDD
- Unbalance & Phase Angle
- Demands and Max. Demands
- Max./Min. Logs with Timestamp
- 8MB Non-volatile Log Memory
- Freeze Logs and SOE Logs
- 5xDR Logs @ 16 parameters each
- Multi-Tariff TOU and 9 Setpoints
- Large, Backlit Dot-Matrix LCD
- 1-Cycle Real-Time WF Display
- Optional 40mA SCCT Inputs
- 1xEthernet & 1xRS-485
- Modbus RTU, BACnet MSTP, DNP 3.0
- Modbus TCP, HTTP, SMTP, SNTP, TFTP
- 4xDI, 2xDO, 1xI4, 1xIr and 1xAI
- IP65 Enclosure with No Openings
- Standard Tropicalization
- Industrial Grade Components
- Extended Temperature
- Extended Warranty

*Designed For Reliability*

*Manufactured To Last*



The 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 96x96x88mm, 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 0.5S and ANSI C12.20 Class 0.2 Standards, 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 signal as well as an Ir Input for Residual Current Measurement. With a standard 100BaseT Ethernet Port and a 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 optional Class 0.5 Split-Core CTs

### 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 31<sup>st</sup>
- Current TDD, TDD Odd, TDD Even, K-Factor and Crest Factor
- U and I Unbalance and Phase Angle
- Displacement PF
- Fundamental U, I and P per phase
- Total Fundamental P & Total Harmonic P
- U and I Symmetrical Components
- %kvarh Imp/kWh Imp, %kvarh Exp/kWh Imp for Last Day & Last 30 Days
- 12 Monthly Logs of kWh, kvarh Imp/Exp/Tot/Net, kVAh and kvarh Q1-Q4
- Interval Energy for kWh/kvarh Imp/Exp and kVAh
- Present, Predicted and Maximum 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 in 15-minute interval
  - 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

#### 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 PMC Setup
- Easy installation with mounting clips, no tools required

#### 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

#### SOE Logs

- 100 events time-stamped to  $\pm 1$ ms 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, Frequency, P, Q, S, PF, Unbalance, K-Factor, Crest Factor and THD.
- Configurable for This Month/Last Month or Before/Since 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

#### 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 1145 days (> 3 years) at 15-minute interval for 1 Data Recorder with 16 parameters for HK **BEC2018**

#### Compliant Recording

#### 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

- One 100BaseT Ethernet Port with RJ45 connector
- One optically isolated RS485 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 MSTP, DNP 3.0, HTTP, SMTP, SNMP, 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 MSTP 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 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

#### Digital Outputs

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

#### Pulse Outputs (Optional)

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

#### Analog Inputs (Optional)

- I4 Current Input for Neutral Current measurement
- Ir Input for Residual Current measurement (CT not included)
- 0/4-20mA DC Input with programmable zero and full scales



### Technical Specifications

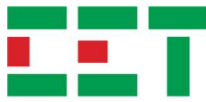
| Voltage Inputs (V1, V2, V3, VN)                |                                              |
|------------------------------------------------|----------------------------------------------|
| Standard Un                                    | 400VLN/690VLL                                |
| Range                                          | 10V to 1.2Un                                 |
| Overload                                       | 1.2xUn continuous, 2xUn for 1s               |
| Burden                                         | <0.02VA per phase                            |
| Measurement Category                           | CAT III up to 600VLL                         |
| Frequency                                      | 45-65Hz                                      |
| Current Inputs (I11, I12, I21, I22, I31, I32)  |                                              |
| Standard                                       | 5A (Optional 1A)                             |
| SCCT Options                                   | 100A/200A/400A/800A/1600A to 40mA Output     |
| Range                                          | 0.1% to 200% In                              |
| Starting Current                               | 0.1% In                                      |
| Overload                                       | 2xIn continuous, 20xIn for 1s                |
| Measurement Category                           | CAT III up to 600VLL                         |
| Burden                                         | <0.15VA per phase @ 5A                       |
| Power Supply (L+, N-, GND)                     |                                              |
| Standard                                       | 95-250VAC/DC, $\pm 10\%$ , 47-440Hz          |
| Optional                                       | 20-60VDC                                     |
| Burden                                         | <3W                                          |
| Overvoltage Category                           | CAT III up to 300VLN                         |
| 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                         |
| Optional SS Pulse Outputs (E1+, E1-, E2+, E2-) |                                              |
| Type                                           | Form A Solid State Relay                     |
| Isolation                                      | Optical                                      |
| Max. Load Voltage                              | 50VDC                                        |
| Max. Forward Current                           | 50mA                                         |
| Optional I4 Input (I41, I42)                   |                                              |
| In                                             | 5A (5A/1A Auto-Scale)                        |
| Range                                          | 0.1% to 120% In                              |
| Starting Current                               | 0.1% In                                      |
| Optional Residual Current Input (-IR, IR)      |                                              |
| In                                             | 0.5mA                                        |
| Range                                          | 2% to 500% In                                |
| CT Type                                        | Solid-Core or Split-Core Residual Current CT |
| Optional Analog Input (AI+, AI-)               |                                              |
| Type                                           | 0-20 / 4-20 mA                               |
| Overload                                       | 24 mA maximum                                |
| Installation Torque                            |                                              |
| Current Inputs                                 | 1.3 N.m                                      |
| Power Supply, Voltage Inputs, RS485 and I/O    | 0.5 N.m                                      |
| Environmental Conditions                       |                                              |
| Operating Temp.                                | -25°C to 70°C                                |
| Storage Temp.                                  | -40°C to 85°C                                |
| Humidity                                       | 5% to 95% non-condensing                     |
| Atmospheric Pressure                           | 70 kPa to 106 kPa                            |
| Mechanical Characteristics                     |                                              |
| Panel Cutout                                   | 92x92 mm (3.62"x3.62")                       |
| Unit Dimensions                                | 96x96x88 mm                                  |
| IP Rating                                      | IP65 (Front Panel), IP30 (Body)              |

### Accuracy

| Parameters       | Accuracy              |                                                  | Resolution |
|------------------|-----------------------|--------------------------------------------------|------------|
| Voltage          | $\pm 0.2\%$           |                                                  | 0.001V     |
| Current          | $\pm 0.2\%$           |                                                  | 0.001A     |
| I4 (measurement) | $\pm 0.2\%$           |                                                  | 0.001A     |
| Ir (measurement) | $\pm 0.5\%$           |                                                  | 0.001A     |
| P, Q, S          | $\pm 0.5\%$           |                                                  | 0.001kX    |
| kWh, kVAh        | 5A/1A Option          | IEC 62053-22 Class 0.5S<br>ANSI C12.20 Class 0.2 | 0.1kXh     |
|                  | SCCT Option           | IEC 62053-21 Class 1                             |            |
| kvarh            | 5A/1A Option          | IEC 62053-24 Class 0.5S<br>IEC 62053-23 Class 2  | 0.1kvarh   |
|                  | SCCT Option           | IEC 62053-24 Class 1<br>IEC 62053-23 Class 2     |            |
| PF               | $\pm 0.5\%$           |                                                  | 0.001      |
| Frequency        | $\pm 0.02\text{Hz}$   |                                                  | 0.01Hz     |
| THD              | IEC 61000-4-7 Class B |                                                  | 0.001%     |
| K-Factor         | IEC 61000-4-7 Class B |                                                  | 0.001      |
| Phase Angle      | $\pm 1^\circ$         |                                                  | 0.1°       |

### Standards of Compliance

| Safety Requirements                                                                                                                                    |                                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| CE LVD 2014 / 35 / EU                                                                                                                                  | EN61010-1: 2010<br>EN61010-2-030: 2010   |
| Electrical Safety in Low Voltage Distribution Systems up to 1000Vac and 1500 Vdc                                                                       | IEC 61557-12: 2018 (PMD)                 |
| Insulation                                                                                                                                             | IEC 62052-11: 2003<br>IEC 62053-22: 2003 |
| AC Voltage: 2kV @ 1 minute<br>Insulation Resistance: >100MΩ<br>Impulse Voltage: 6kV, 1.2/50μs                                                          |                                          |
| Electromagnetic Compatibility<br>CE EMC Directive 2014 / 30 / EU (EN 61326: 2013)                                                                      |                                          |
| Immunity Tests                                                                                                                                         |                                          |
| Electrostatic Discharge                                                                                                                                | EN 61000-4-2: 2009                       |
| Radiated Fields                                                                                                                                        | EN 61000-4-3: 2006+A1: 2008+A2: 2010     |
| Fast Transients                                                                                                                                        | EN 61000-4-4: 2012                       |
| Surges                                                                                                                                                 | EN 61000-4-5: 2014+A1: 2017              |
| Conducted Disturbances                                                                                                                                 | EN 61000-4-6: 2014                       |
| Magnetic Fields                                                                                                                                        | EN 61000-4-8: 2010                       |
| Voltage Dips and Interruptions                                                                                                                         | EN 61000-4-11:2004+A1: 2017              |
| Emission Tests                                                                                                                                         |                                          |
| Limits and Methods of Measurement of Electromagnetic Disturbance Characteristics of Industrial, Scientific and Medical (ISM) Radio-Frequency Equipment | EN 55011: 2016                           |
| Electromagnetic Compatibility of Multimedia Equipment - Emission Requirements                                                                          | EN 55032: 2015                           |
| Limits for Harmonic Current Emissions for Equipment with Rated Current $\leq 16$ A                                                                     | EN 61000-3-2: 2014                       |
| Limitation of Voltage Fluctuations and Flicker in Low-Voltage Supply Systems for Equipment with Rated Current $\leq 16$ A                              | EN 61000-3-3: 2013                       |
| Emission Standard for Industrial Environments                                                                                                          | EN 61000-6-4: 2007+A1: 2011              |
| Mechanical Tests                                                                                                                                       |                                          |
| Spring Hammer Test                                                                                                                                     | IEC 62052-11: 2003                       |
| Vibration Test                                                                                                                                         | IEC 62052-11: 2003                       |
| Shock Test                                                                                                                                             | IEC 62052-11: 2003                       |



### Ordering Information

**CET**  
Electric  
Technology

Version 20200331

| Product Code                            | Description                                                                                                                                        |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| PMC-53A-E Ethernet Multifunction Meter  |                                                                                                                                                    |
| Basic Function                          |                                                                                                                                                    |
| E                                       | Dot-Matrix LCD, Monthly & Daily Freeze Log, Data Recorder, 8MB Memory, 1x100BaseT Ethernet Port and 1xRS-485 (Modbus RTU, BACnet MSTP and DNP 3.0) |
| Input Current                           |                                                                                                                                                    |
| 5                                       | 5A/1A Auto-Scaling (Class 0.5S for 5A and Class 1 for 1A)                                                                                          |
| 1                                       | 1A (Class 0.5S)                                                                                                                                    |
| 4 <sup>A</sup>                          | For use with 100A, 200A, 400A, 800A and 1600A to 40mA Split-Core CTs                                                                               |
| Input Voltage                           |                                                                                                                                                    |
| 9                                       | 400V LN/690V LL                                                                                                                                    |
| Power Supply                            |                                                                                                                                                    |
| 2                                       | 95-250 VAC/DC, 47-440Hz                                                                                                                            |
| 3                                       | 20-60VDC                                                                                                                                           |
| Frequency                               |                                                                                                                                                    |
| 5                                       | 45Hz-65Hz                                                                                                                                          |
| I/O                                     |                                                                                                                                                    |
| A                                       | 4xDI + 2xDO (Mechanical Relay)                                                                                                                     |
| B                                       | 4xDI + 2xSS Pulse Output                                                                                                                           |
| Analog Inputs                           |                                                                                                                                                    |
| X                                       | None                                                                                                                                               |
| A**                                     | I4 (5A/1A Auto-Scaling) + AI (0/4-20mA) + Ir (0-0.5mA)                                                                                             |
| Language                                |                                                                                                                                                    |
| E                                       | English                                                                                                                                            |
| PMC-53A - E - 5 - 9 - 2 - 5 - A - X - E | PMC-53A-E-5925AXE (Standard Model)                                                                                                                 |

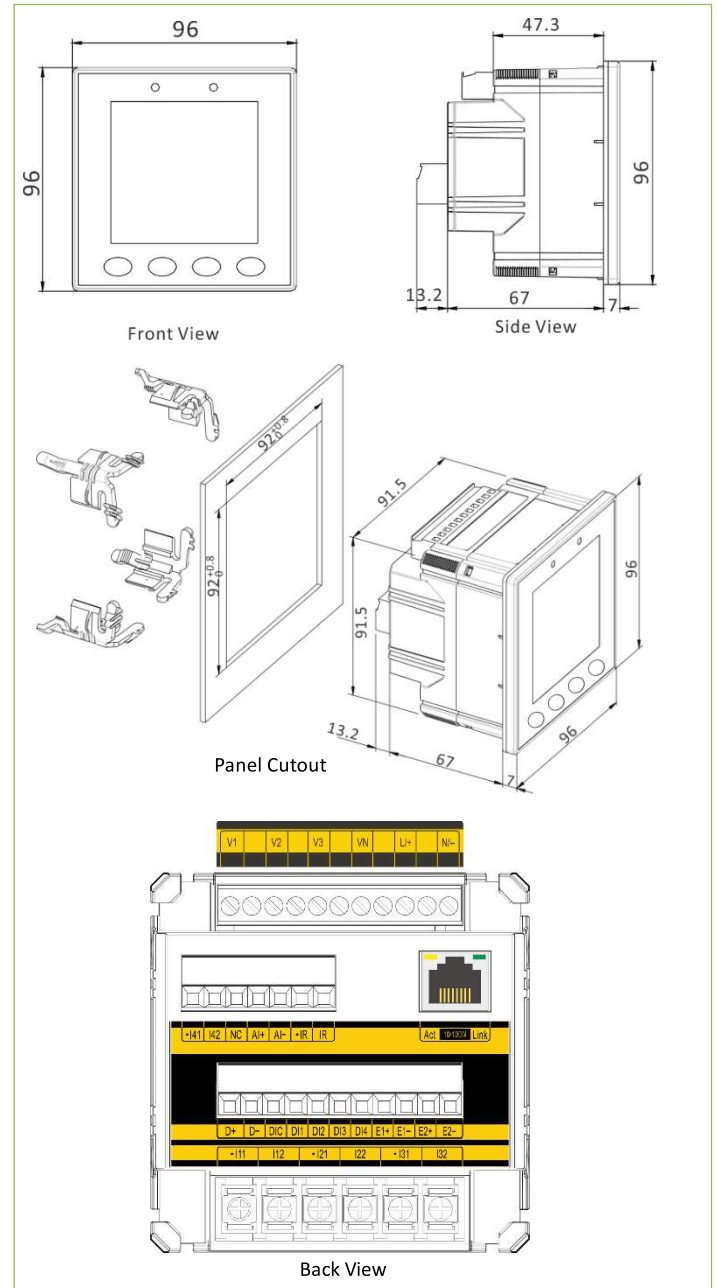
\* Additional charges apply

<sup>A</sup> The Analog Inputs Option A is not available for the Input Current Option 4

### Accessories

| Residual Current CT       |                                                                                                                                                                                                                                                      |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Load Current (Solid-Core) | 160A (CT517203, $\phi=46\text{mm}$ )<br>400A (CT517403, $\phi=80\text{mm}$ )<br>630A (CT519703, 220x50mm)<br>1000A (CT517603, $\phi=120\text{mm}$ )                                                                                                  |
| Load Current (Split-Core) | 160A (CT553203, $\phi=48\text{mm}$ )<br>225A (CT553303, $\phi=68\text{mm}$ )                                                                                                                                                                         |
| Primary Input             | 1A (Residual Current)                                                                                                                                                                                                                                |
| Secondary Output          | 0.5mA                                                                                                                                                                                                                                                |
| Range                     | 2-500%                                                                                                                                                                                                                                               |
| Overload                  | 44A (Residual Current)                                                                                                                                                                                                                               |
| Accuracy                  | Class 0.5 (Solid-Core), Class 3 (Split-Core)                                                                                                                                                                                                         |
| Frequency                 | 50 / 60Hz                                                                                                                                                                                                                                            |
| Dielectric Strength       | 3kV rms @ 1 minute                                                                                                                                                                                                                                   |
| Operating Temperature     | -25°C to +70°C (Solid-Core)<br>-12°C to +45°C (Split-Core)                                                                                                                                                                                           |
| Storage Temperature       | -40°C to +85°C (Solid-Core)<br>-25°C to +70°C (Split-Core)                                                                                                                                                                                           |
| Split-Core CT             |                                                                                                                                                                                                                                                      |
| Models                    | 100A (PMC-SCCT-100A-40mA-16-A, $\phi=16\text{mm}$ )<br>200A (PMC-SCCT-200A-40mA-24-A, $\phi=24\text{mm}$ )<br>400A (PMC-SCCT-400A-40mA-35-A, $\phi=35\text{mm}$ )<br>800A (PMC-SCCT-800A-40mA-A, 80x50mm)<br>1600A (PMC-SCCT-1600A-40mA-A, 130x55mm) |
| Primary Input             | 100A/200A/400A/800A/1600A                                                                                                                                                                                                                            |
| Secondary Output          | 40mA                                                                                                                                                                                                                                                 |
| Range                     | 0.15%-120%In                                                                                                                                                                                                                                         |
| Accuracy                  | Class 0.5                                                                                                                                                                                                                                            |
| Frequency                 | 50 / 60Hz                                                                                                                                                                                                                                            |
| Operating Temperature     | -20°C to +50°C                                                                                                                                                                                                                                       |

### Device View and Dimensions



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