CET


LoRaWAN

# PMC-350-C

## 3-Phase Wireless DIN Rail Energy Meter

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# 3-Phase Wireless

## Overview

**PMC-350-C** 3-Phase DIN Energy Meter is CET's latest offer for the wireless IoT energy metering market using the LoRaWAN technology for its Long-Range wireless communication capability. Housed in a standard DIN form factor measuring 72x70x95mm, it is perfectly suited for extremely space restricting environment. With a standard RS-485 port and Modbus RTU protocol support, IEC 62053-22 Class 0.5S and IEC 62053-21 Class 1 compliance for 5A Input and SCCT/SCCTA Input respectively as well as optional support for LoRaWAN AS923-1/2/3/4, KR920, AU915 or EU868, it becomes a vital component of an intelligent, distributed and IoT based EMS. The PMC-350-C optionally provides 4xDI for Status Monitoring, 2xRO for Control and Alarming or 2xSS Pulse Output for Energy Pulsing as well as 2 or 4xRTD and 1xIresidual Input for Temperature and Leakage Current measurements, respectively.

## Typical Applications

- Industrial, Commercial and Utility Substation Metering
- Sub-metering and Cost Allocation
- Building, Factory and Process Automation
- Energy Management and Power Quality Monitoring
- LoRaWAN Class A/C at AS923-1/2/3/4, KR920, AU915 or EU868

## Features Summary

### Ease of use

- Easy installation with DIN Rail mounting, no tools required
- Support LoRaWAN Class C Node that offers the lowest latency for Server to End-Node communication
- Simple commissioning and low-deployment cost with Split-Core CT and wireless IoT communication

### Basic Measurements

- ULN, ULL per Phase and Average
- Current per Phase and Average with calculated Neutral
- kW, kvar, kVA per Phase and Total
- PF per Phase and Total
- 3-phase Total and per-phase kWh, kvarh Import/Export/Net/Total and kVAh Total
- Frequency
- Device Operating Time (Running Hours)
- Optional Temperature and Residual Current Measurements
- Optional DI for Status Monitoring and Utility Pulse Counting

### Enhanced Measurements

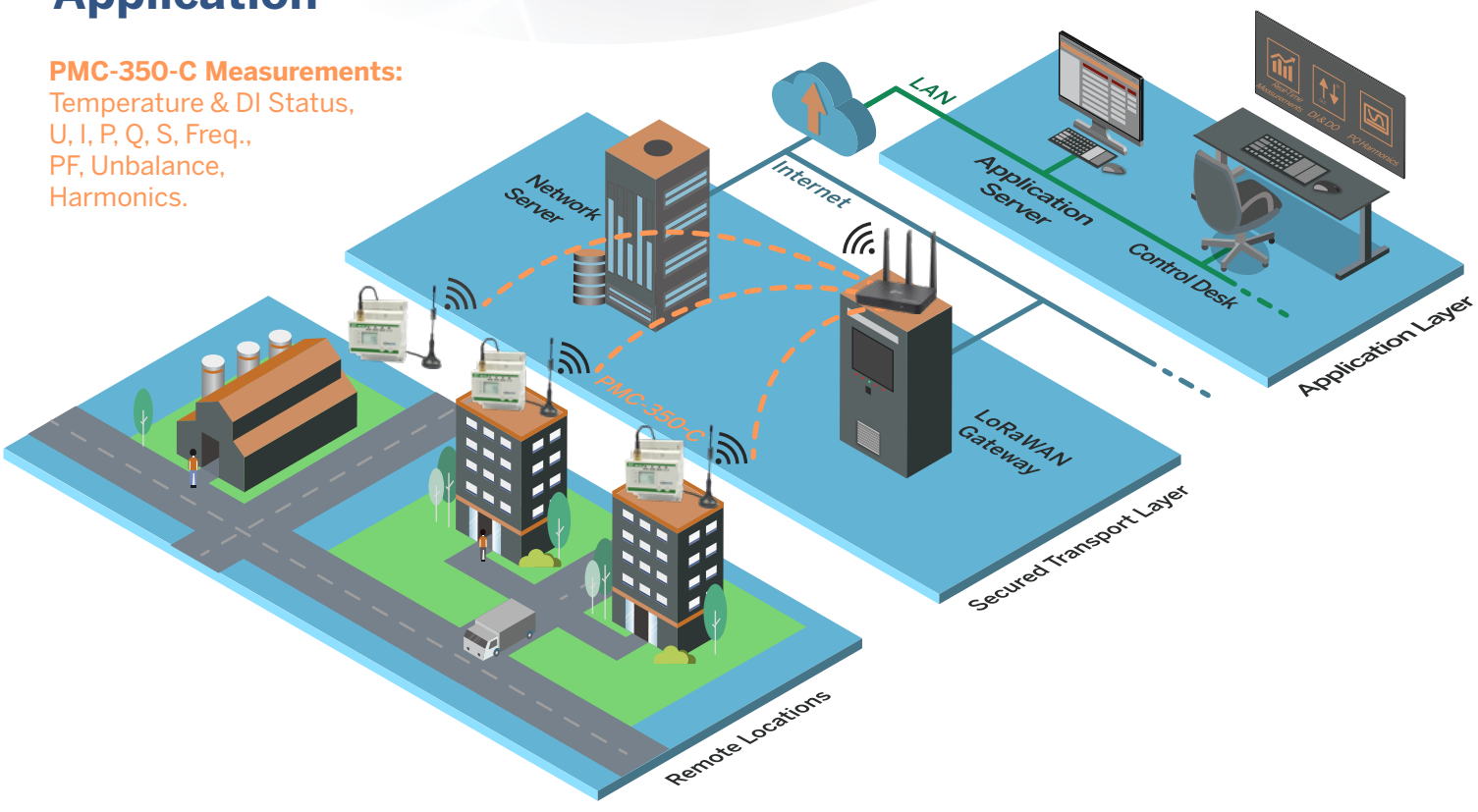
- U and I THD, TOHD, TEHD and Individual Harmonics up to 31st
- Current TDD, TDD Odd, TDD Even, K-Factor and Crest Factor
- U and I Unbalance and Phase Angles
- Fundamental kW and PF
- 3-phase Total and per-phase kvarh Q1-Q4
- Demands, Predicted Demands and Max. Demands for kW/kvar/kVA Total and per phase Current with Timestamp for This Month and Last Month (or Since Last Reset and Before Last Reset)

### Setpoints

- 10 user programmable Setpoints with extensive list of monitoring parameters including Voltage, Current, Power and THD, etc.
- Configurable thresholds, time delays and DO triggers

## Application

**PMC-350-C Measurements:**
Temperature & DI Status,
U, I, P, Q, S, Freq.,
PF, Unbalance,
Harmonics.



# DIN Rail

### Multi-Tariff TOU

- Two TOU schedules, each providing
  - o 12 Seasons
  - o 20 Daily Profiles, each with 12 Periods in 0-60 min configurable interval
  - o 90 Holidays or Alternate Days
  - o 8 Tariffs, each providing the following information
    - o 3-phase Total and per-phase kWh/kvarh Import/Export, kVAh Total
    - o kW/kvar/kVA Max. Demands

### Max./Min. Log

- Max./Min. Log with Timestamp for Real-time measurements such as Voltage, Current, In, Freq., kW, kvar, kVA, PF, Unbalance, K-Factor, Crest Factor and THD
- Configurable for This Month & Last Month or Before & Since Last Reset

### SOE Log

- 100 events time-stamped to ±1ms resolution
- Setup changes, Setpoint, DI status changes, DO operations, Clear Actions, Iresidual and Temperature Alarm, etc.

### Monthly Energy Log

- 12 monthly recording of kWh, kvarh Import/Export/Total/Net, kVAh, kvarh Q1-Q4 as well as kWh/kvarh Import/Export and kVAh per Tariff

### Daily/Monthly Freeze Log

- Daily/Monthly Log with Timestamps for kWh, kvarh, kVAh Total and Max. Demands for kW, kvar, kVA Total
- Available through Modbus and LoRaWAN communications for 60 Daily Freeze records (2 months) and 36 Monthly Freeze records (3 years)

### Data Recorder

- 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

### Diagnostics

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

### Communications

- Optically isolated RS-485 port at 1,200 to 38,400 bps
- Modbus RTU protocol
- Optional LoRaWAN support at AS923-1/2/3/4, KR920, AU915 and EU868 for IoT applications

### I/O Options

- 4xDI + 2xDO (Mechanical Relay)
- 4xDI + 2xSS Pulse Output
- 4xRTD + 1xIresidual Input*
- 2xRTD + 1xIresidual Input + 2xSS Pulse Output*

* PT100 sensor & Residual CT not included

### Autonomous Data Push with the LoRaWAN option

- DevEUI (End-Device Identifier), AppEUI (Application Identifier) and AppKey (AES-128 key) for OTAA activation
- User selectable Auto-Push Data Packages of Real-time measurements, 3-phase Total and per-phase Energy, Demands, Harmonics, Max./Min. Logs, Freeze Logs, I/O and Setpoint status can be autonomously pushed to the LoRaWAN Network Server in configurable interval

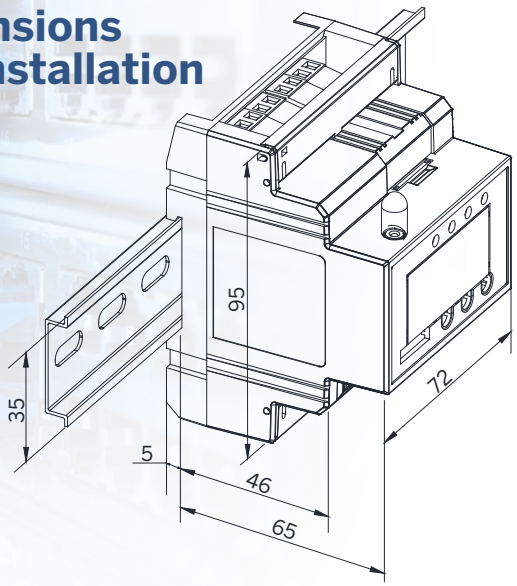
* Not all measurements are available via the wireless LoRaWAN option.

### System Integration

- Supported by our PecStar® iEMS and PMC Setup
- Easy integration into other Automation or SCADA systems via Modbus RTU protocol or IoT based Energy Management System via LoRaWAN

## Dimensions and Installation

Unit: mm



# Energy Meter

## Accuracy

| Parameters | Accuracy | | Resolution |
|---|---|---|---|
| - | SCCT/SCCTA | 5A CT Input | - |
| Voltage | ±0.5% | ±0.2% | 0.01V |
| Current | ±0.5% | ±0.2% | 0.001A |
| kW, kvar, kVA | ±1.0% | ±0.5% | 0.001kX |
| kWh, kVAh | IEC 62053-21: 2020 Class 1 | IEC 62053-22: 2020 Class 0.5S | 0.01kXh |
| kvarh | IEC 62053-23: 2020 Class 2<br>IEC 62053-24: 2020 Class 1 | IEC 62053-23: 2020 Class 2<br>IEC 62053-24: 2020 Class 0.5S | 0.01kvarh |
| PF | ±1.0% | ±0.5% | 0.001 |
| Frequency | ±0.02Hz | | 0.01Hz |
| In (Cal.) | ±1.0% | | 0.001A |
| THD | IEC 61000-4-7 Class II | | 0.001% |
| Iresidual | ±1.0% | | 0.1mA |
| Temperature | ±1°C | | 0.1°C |

## Standards of Compliance

| Safety Requirements | |
|---|---|
| CE LVD 2014/35/EU | EN 61010-1: 2010<br>EN 61010-2-030: 2010 |
| Electrical Safety in Low Voltage Distribution Systems up to 1000Vac and 1500 Vdc | IEC 61557-12: 2018 (PMD) |
| **Insulation**<br>AC Voltage: 2kV @ 1 minute<br>Insulation Resistance: >100MΩ<br>Impulse Voltage: 6kV, 1.2/50μs | IEC 62052-31: 2015 |

## EMC Compatibility

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 |
| Ring Wave | EN 61000-4-12: 2017 |

| Emission Tests | |
|---|---|
| Limits and Methods of Measurement of Electromagnetic Disturbance Characteristics of Industrial, Scientific and Medical (ISM) Radio-Frequency Equipment | EN 55011: 2016 |
| Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipment | EN 55032: 2015 |
| Limits for Harmonic Current Emissions for Equipment with Rated Current ≤16 A | EN 61000-3-2: 2014 |
| Limitation of Voltage Fluctuations and Flicker in Low-Voltage Supply Systems for Equipment with Rated Current ≤16 A | EN 61000-3-3: 2013 |
| Emission Standard for Residential, Commercial and Light-Industrial Environments | EN 61000-6-4: 2007+A1: 2011 |

| RED (Radio Equipment Directive) | |
|---|---|
| Assessment of Electronic and Electrical Equipment Related to Human Exposure Restrictions for Electromagnetic Fields (0Hz-300 GHz) | EN/IEC 62311: 2020 |
| Short Range Devices (SRD) Operating in the Frequency Range 25 MHz to 1000MHz | ETSI EN 300 220-1 V3.1.1: 2017<br>ETSI EN 300 220-2 V3.1.1: 2017 |
| Audio/Video, Information and Communication Technology Equipment-Part 1: Safety Requirements | IEC 62368-1: 2018 |

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

## Technical Specifications

| Voltage Inputs (V1, V2, V3, VN) | |
|---|---|
| Voltage (Un) | 277ULN/480ULL |
| Range | 20-277V L-N/35-480V L-L |
| Burden | <2W/phase |
| Input Impedance | 5MΩ |
| Permanent Overload | 750VAC L-L |
| Frequency | 45-65Hz |

| Current Inputs (·I11, I12, ·I21, I22, ·I31, I32) | | |
|---|---|---|
| - | SCCT Option | SCCTA Option |
| Current (In) | 40mA | 2mA |
| Range | 0.15%-100% In | 0.1%-120% In |
| Starting Current | 0.15% In | 0.1% In |
| Burden | <0.25VA per phase | <0.25VA per phase |
| External SCCTs | 50A, 100A, 200A, 400A, 800A, 1600A/40mA | 5A/2mA |
| Optional (In) | 5A | |
| Range | 5mA-6A | |

| Power Supply (L/+, N/-) | |
|---|---|
| Standard | 95-250VAC/DC, ±10%, 47-440Hz |
| Optional | 95-480VAC/DC, ±10%, 47-440Hz |
| Burden | <2W |
| Overvoltage Category | OVC III up to 300ULN |

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

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

| Optional RTD Temperature Inputs (TC1, TC2, TC3, TC4) | |
|---|---|
| RTD Type | 2-Wire PT100 (sensor not included) |
| PT100 | -40°C to +200°C |
| Alarm Range | +45°C to +140°C |

| Optional Residual Current Inputs (·IR, IR) | |
|---|---|
| Range | 20mA-2000mA |

| Optional Solid State Energy Pulse Output (E1+, E1-, E2+, E2-) Selectable kWh/kvarh | |
|---|---|
| Pulse Constant | 10/100/1000/3200 imp/kxh |
| Isolation | Optical |
| Max. Load Voltage | 80V |
| Max. Forward Current | 50mA |
| Pulse Width | 80±20ms |

| Communications | | |
|---|---|---|
| RS-485 (Standard) | Protocol | Modbus RTU |
| | Baud Rate | 1200/2400/4800/9600/19200/38400 bps |
| LoRaWAN (Optional) | - | LoRaWAN™ Specification 1.0.2 Class A/C Compliance |
| ISM Bands (Optional) Applicable to the following Regions: | AS923-1 | Australia, New Zealand, Malaysia, Hong Kong, Singapore, Taiwan, Thailand, Cambodia, etc. |
| | AS923-2 | Vietnam, Indonesia |
| | AS923-3 | Denmark, Norway, Saudi Arabia, etc. |
| | AS923-4 | Israel |
| | KR920 | South Korea |
| | AU915 | Australia, New Zealand, Argentina, Anguilla, Brazil |
| | EU868 | Europe, United Arab Emirates, etc. |

| Environmental Conditions | |
|---|---|
| Operating Temp. | -25°C to +70°C |
| Storage Temp. | -40°C to +85°C |
| Humidity | 5% to 95% non-condensing |
| Atmospheric pressure | 70kPa to 106kPa |
| Pollution Degree | 2 |

| Mechanical Characteristics | |
|---|---|
| Unit Dimensions | 72x70x95mm |
| Mounting | DIN Rail or optional Panel Mount |
| Panel Cutout | 78x67mm |
| IP Rating | IP30 |

# Ordering Information

| Product Code | | | | | | | | | | | Description |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PMC-350 3-Phase LoRaWAN DIN Energy Meter | | | | | | | | | | | |
| Basic Function | | C | | | | | | | | | Multifunction Measurements, LCD Display, 1xRS-485 |
| Input Current | | | 5~ | | | | | | | | 5A (Class 0.5S) |
| | | | SCCT | | | | | | | | 40mA Input for use with 50A/40mA, 100A/40mA, 200A/40mA, 400A/40mA, 800A/40mA or 1600A/40mA SCCTs (SCCTs not included) |
| | | | SCCTA | | | | | | | | 2mA Input for use with 5A/2mA SCCT (SCCTs not included) |
| Input Voltage | | | | 5 | | | | | | | 277ULN/480ULL + 20% (1P2W ULN, 1P2W ULL, 1P3W, 3P3W, 3P4W, Demo) |
| Power Supply | | | | | 2 | | | | | | 95-250 VAC/VDC, 47-440Hz |
| | | | | | 4ˆ | | | | | | 95-480 VAC/VDC, 47-440Hz |
| Frequency | | | | | | 5 | | | | | 45-65Hz |
| Expansion 1* | | | | | | | N | | | | None |
| | | | | | | | A | | | | 4xDI + 2xDO (Mechanical Relay) |
| | | | | | | | B | | | | 4xDI + 2xSS Pulse Output |
| Expansion 2* | | | | | | | | N | | | None |
| | | | | | | | | T | | | 4xRTD + 1xIresidual Input |
| | | | | | | | | X# | | | 2xRTD + 1xIresidual Input + 2xSS Pulse Output |
| Expansion Communication* | | | | | | | | | N | | None |
| | | | | | | | | | 1 | | LoRaWAN @ EU868 with External Antenna |
| | | | | | | | | | 4 | | LoRaWAN @ AU915 with Internal Antenna |
| | | | | | | | | | 5 | | LoRaWAN @ AU915 with External Antenna |
| | | | | | | | | | 6 | | LoRaWAN @ AS923-1/2/3/4 with Internal Antenna |
| | | | | | | | | | 7 | | LoRaWAN @ AS923-1/2/3/4 with External Antenna |
| | | | | | | | | | 9 | | LoRaWAN @ KR920 with External Antenna |
| Language | | | | | | | | | | E | English |
| PMC-350 | - | C | SCCT | 5 | 2 | 5 | N | N | 7 | E | PMC-350-CSCCT525NN7E (Standard Model) |

* Additional charges apply.
~ Input Current "5" is only available with Power Supply "4" + Expansion 1 "N"+ Expansion 2 "X". Expansion Communication options are unrestricted.
ˆ Power Supply "4" is only available with Expansion 1 "N" + Expansion 2 "X". Input Current options and Expansion Communication options are unrestricted.
# Expansion 2 "X" is only available with Power Supply "4"+ Expansion 1 "N". Input Current options and Expansion Communication options are unrestricted.

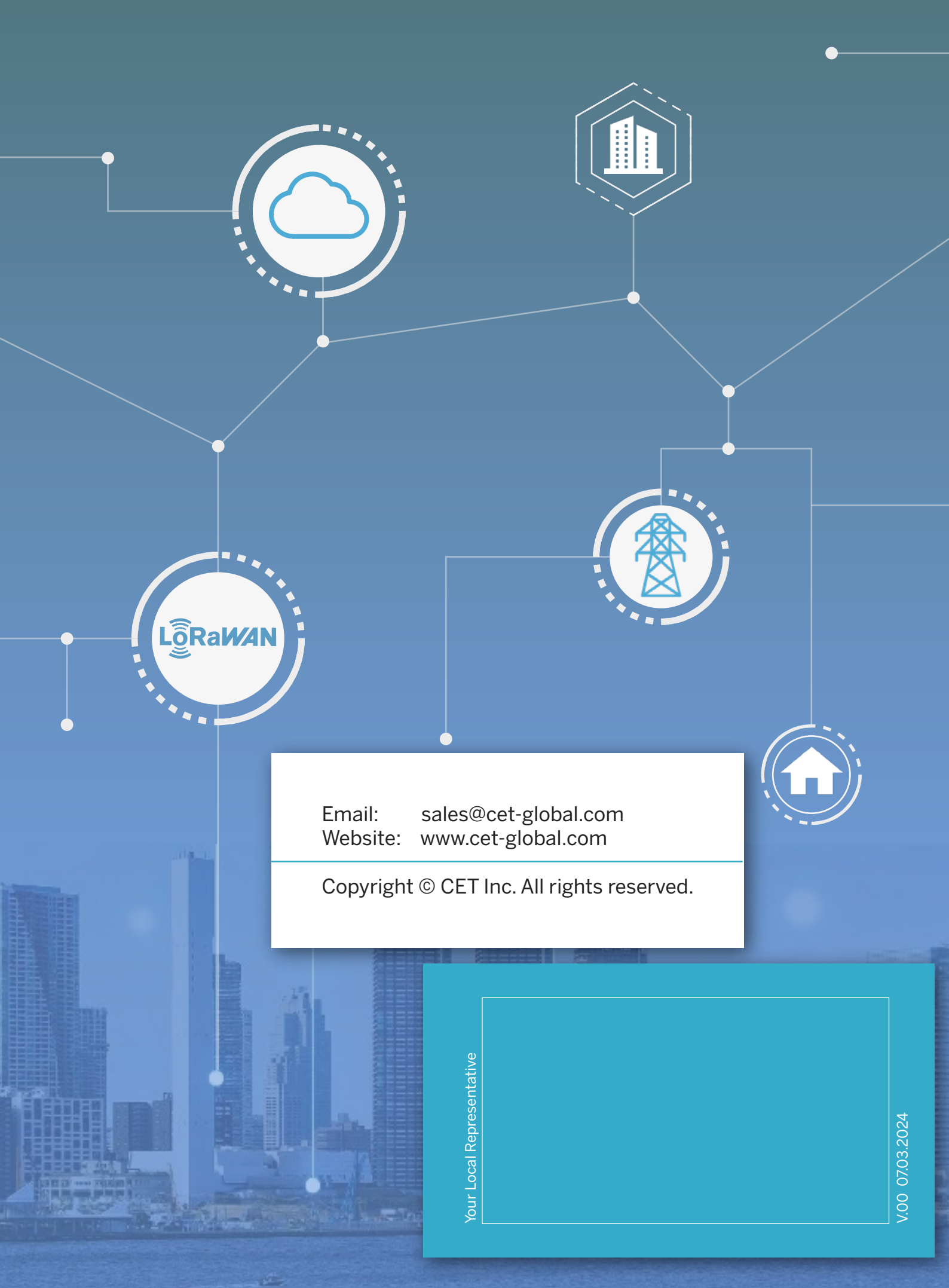
# Accessories

## External Split Core CTs

| Part Number | Specification | Accuracy | Aperture | Cable Length |
|---|---|---|---|---|
| PMC-SCCT-5A-2mA-16-A | 5A/2mA, 1-phase Split-Core CT with Pluggable Connector | 1.0 | Ø16mm | 2m |
| PMC-SCCT-50A-40mA-16-A | 50A, 1-phase Split-Core CT with Pluggable Connector | 1.0 | Ø16mm | 2m |
| PMC-SCCT-100A-40mA-16-A | 100A, 1-phase Split-Core CT with Pluggable Connector | 0.5 | Ø16mm | 2m |
| PMC-SCCT-200A-40mA-24-A | 200A, 1-phase Split-Core CT with Pluggable Connector | 0.5 | Ø24mm | 2m |
| PMC-SCCT-400A-40mA-35-A | 400A, 1-phase Split-Core CT with Pluggable Connector | 0.5 | Ø35mm | 2m |
| PMC-SCCT-800A-40mA-A | 800A, 1-phase Split-Core CT | 0.5 | 80x50mm | See Note 2 |
| PMC-SCCT-1600A-40mA-A | 1600A, 1-phase Split-Core CT | 0.5 | 130x55mm | See Note 2 |

| Product Name | Part Number | Specification |
|---|---|---|
| **DIN Panel Mounting Adapter** | PMC-PMA-4 | Panel Mounting Adapter for 4P DIN Rail Mounting devices |

1) Please refer to Cable Length for details and contact the factory in advance for special requirements.
2) The PMC-SCCT-800A-40mA-A and PMC-SCCT-1600A-40mA-A come with PMC-BCC-350-2, which is a 2m cable with 2-Pin Black Pluggable Connector.
3) One PMC-350-C can be equipped with 3 pcs of SCCT.
4) "PMC-PMA-4" is only applicable for the PMC-350-C with Internal Antenna.

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Your Local Representative

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