

PMC-352-C

3-Phase Wireless (LoRa) DIN Rail Energy Meter

3-Phase Wireless (LoRa)

Overview

PMC-352-C 3-Phase LoRa DIN Rail Energy Meter is CET's latest offer for the wireless IoT energy monitoring market using the LoRa technology for its wireless communication capability. Designed in a compact DIN form factor measuring 36x65x90mm, it is perfect for energy and condition monitoring applications in space-limited power distribution board. The PMC-352-C comes standard with 4xNTC Inputs for temperature monitoring and 3xDI for status monitoring. With standard RS-485 and optionally LoRa supporting the Modbus RTU protocol and IEC 62053-21 Class 1 compliance, the PMC-352-C becomes a vital component of an intelligent, distributed and wireless IoT based EMS or Condition Monitoring System.

Typical Applications

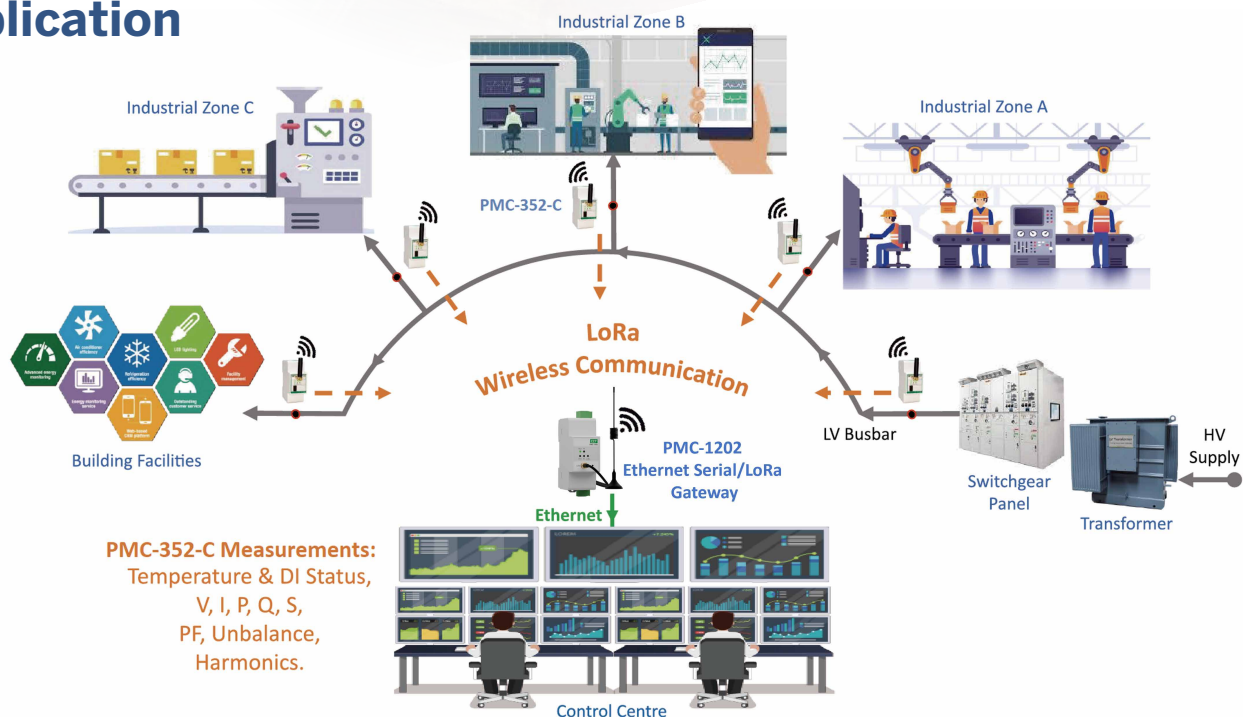
- Industrial, Commercial and Utility Substation Monitoring
- Sub-metering and Cost Allocation
- Wireless Energy & Condition Monitoring of Busbar or Machines
- Building, Factory and Process Automation
- Energy Management and Power Quality Monitoring
- Production Line Energy Management Refinement

Features Summary

Ease of use

- Easy installation with DIN Rail mounting, no tools required
- Simple commissioning and low-deployment cost with Split-Core CT / Rogowski Coil and wireless IoT communication

Application



Basic Measurements

- ULN, ULL per Phase and Average
- Current per Phase and Average with calculated Neutral
- P, Q, S and PF per Phase and Total
- kWh/kvarh Import/Export/Net/Total and kVAh Total
- Frequency and Device Operating Time (Running Hours)

Enhanced Measurements

- U and I THD, TOHD, TEHD and Individual Harmonics up to 31st
- U and I Unbalance and Phase Angles
- Fundamental P and Displacement PF
- kvarh Q1-Q4
- Present Demands for P/Q/S Total and per Phase Current

Setpoints

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

SOE Log

- 16 events time-stamped to ± 1 ms resolution
- Setup changes, Setpoint, DI Status changes, Clear actions, etc.

Standard I/O

- 3xDI for Status Monitoring or Utility Pulse Counting
- 4xNTC Inputs for Temperature Monitoring (sensor not included)

Diagnosis

- 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 1200 to 38,400 bps
- Built-in LoRa with configurable ISM Bands for EU863-870, RU864-870, IN865-867, US902-928, AU915-928, AS920-923 and AS923-925
- Modbus RTU protocol

System Integration

- Supported by our PecStar® iEMS and free configuration Software
- Easy integration into other Automation or SCADA systems via Modbus RTU protocol

DIN Rail Energy Meter

Accuracy

Parameters	Accuracy	Resolution
Voltage	±0.5%	0.0001V
Current	±0.5%	0.0001A
P, Q, S	±1.0%	0.0001kW/kvar/kVA
kWh	IEC 62053-21 Class 1	0.01kWh
kvarh	IEC 62053-23 Class 2	0.01kvarh
PF	±1.0%	0.0001
Frequency	±0.02Hz	0.0001Hz
THD	IEC 61000-4-7 Class II	0.0001%
Temperature	±1°C	0.001°C

Technical Specifications

Voltage Inputs (V1, V2, V3, VN)

Voltage (Un)	277ULN/480ULL
Range	40V to 1.2Un (88V to 550V for Self-Powered option)
Burden	<0.02VA/phase
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	0.2% In
External SCCTs	100A/40mA	5A/2mA
	200A/40mA	
	400A/40mA	
	800A/40mA	
	1600A/40mA	
	SCCT Option (Rogowski Coil)	
Current (In)	40mA	
Range	10%-110% In	
Starting Current	0.4% In	
Burden	<0.25VA per phase	

Power Supply (L/+, N/-)

Standard	60-264VAC/DC, ±10%, 47-440Hz
Optional	88V-550VAC, Self-Powered via Uca (U31)
Burden	<2W

Digital Inputs (DI1, DI2, DI3, DIC)

Type	Dry contact, 12VDC internally wetted
Sampling	1000Hz
Hysteresis	1ms minimum

NTC Temperature Inputs (TC1, TC2, TC3, TC4)

NTC Type	2-Wire Thermistors (sensor not included)
Measurement Range	-20°C to +140°C

Communications

RS-485 (Standard)	Protocol	Modbus RTU
	Baud Rate	1200/2400/4800/9600/19200/38400 bps
LoRa	RF Range	860-930 MHz (Configurable)
	ISM Bands	EU863-870, RU864-870, IN865-867, US902-928, AU915-928, AS920-923, AS923-925
	RF Output Power	18.58 dBm (Maximum)
	Receiver Sensitivity	-124 dBm (Maximum)
	Output Watts	0.03 (Typical)
	FCC Part 15C	Certified by TCB

Environmental Conditions

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

Mechanical Characteristics

Unit Dimensions	36(W)x65(D)x90(H)mm
Mounting	DIN Rail
IP Rating	IP30

Standards of Compliance

Safety Requirements

CE LVD 2014/35/EU	EN 61010-1: 2010 + A1: 2019 EN IEC 61010-2-030: 2021 + A11: 2021
Electrical Safety in Low Voltage Distribution Systems up to 1000VAC and 1500 VDC	IEC 61557-12: 2021 (PMD)
Insulation	EN 61010-1: 2010 + A1: 2019
AC Voltage: 2kV @ 1 minute Insulation resistance: >100MΩ Impulse Voltage: 6kV, 1.2/50μs	

EMC Compatibility

CE EMC Directive 2014/30/EU (EN IEC 61326: 2021)

Immunity Tests

Electrostatic Discharge	EN 61000-4-2: 2009
Radiated Fields	EN 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 Wave	EN 61000-4-12: 2017
Immunity Standard for Industrial Environment	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 + A11: 2020 + A2: 2021
Electromagnetic Compatibility of Multimedia Equipment - Emission Requirements	EN 55032: 2015 + A11: 2020 + A1: 2020
Limits for Harmonic Current Emissions for Equipment with Rated Current ≤ 16 A	EN IEC 61000-3-2: 2019 + A1: 2021
Limitation of Voltage Fluctuations and Flicker in Low-Voltage Supply Systems for Equipment with Rated Current ≤ 16 A	EN 61000-3-3: 2013 + A1: 2019 + A2: 2021
Emission Standard for Residential, Commercial and Light-Industrial Environments	EN 61000-6-4: 2007 + A1: 2011

Mechanical Tests

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

Accessories

Split-Core CT

Model	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-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	

- 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) Each PMC-352-C may be equipped with 3 pcs of SCCT.

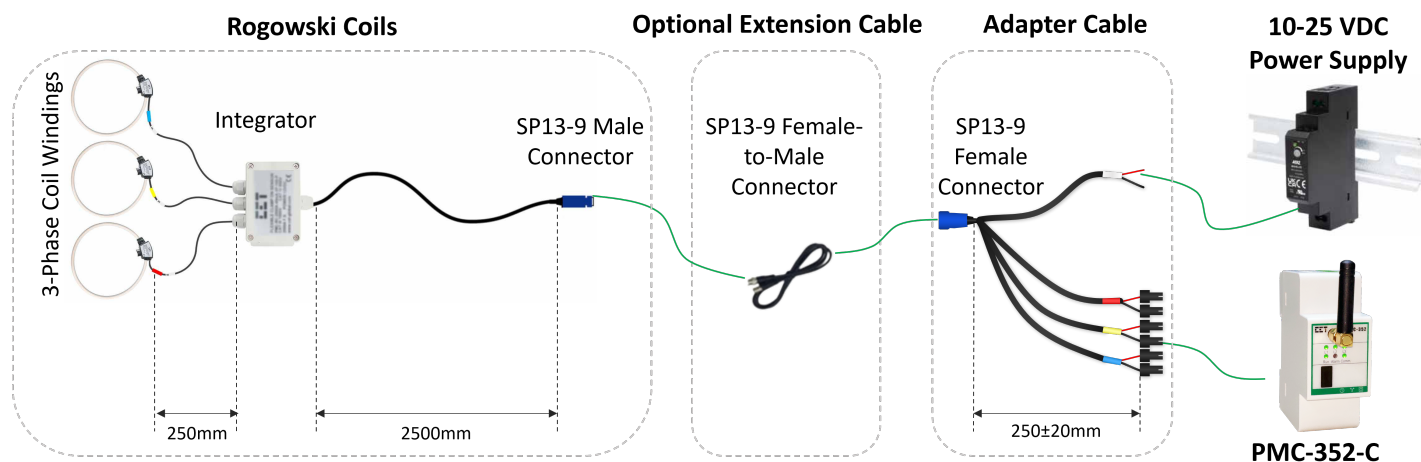
3-phase Rogowski Coil for Current Input (I1, I2, I3)

Model	Specification	Accuracy	Aperture	Cable Length
PMC-RC-400A-40mA-3P-100-PY-W-P	400A/40mA, 3-phase Rogowski Coil with Adapter Cable (Pluggable Connector) and Power Supply	$\pm 0.5\%$ (5%-110%) In @25 °C	100mm	0.25m (coil winding to integrator) + 2.5m (integrator to SP13-9 male connector) + 0.25m Adapter Cable
PMC-RC-1200A-40mA-3P-150-PY-W-P	1200A/40mA, 3-phase Rogowski Coil with Adapter Cable (Pluggable Connector) and Power Supply		150mm	
PMC-RC-2500A-40mA-3P-200-PY-W-P	2500A/40mA, 3-phase Rogowski Coil with Adapter Cable (Pluggable Connector) and Power Supply		200mm	
PMC-RC-5000A-40mA-3P-350-PY-W-P	5000A/40mA, 3-phase Rogowski Coil with Adapter Cable (Pluggable Connector) and Power Supply		350mm	

- 1) The Rogowski Coil comes standard with its power supply and adapter cable. The 5m/10m extension cable can be ordered separately if required.
- 2) There are a few factors that can affect the Rogowski Coil's measuring accuracy, such as the positioning and alignment, conductor size and proximity and so on.

Optional Extension Cable for Rogowski Coil

Model	Specification
SP13-F-M-5	5m extension cable with SP13-9 female-to-male connectors connecting 3-phase Rogowski Coil and Converter
SP13-F-M-10	10m extension cable with SP13-9 female-to-male connectors connecting 3-phase Rogowski Coil and Converter



NTC Thermistors

Model	Specification
NTC-100, 0.4	1xNTC Sensor with PC-ABS enclosure, thermally conductive silicone pad and 0.4m cable
NTC-100, 1	1xNTC Sensor with PC-ABS enclosure, thermally conductive silicone pad and 1m cable
NTC -1041, 0.3	1x NTC Sensor with black insulated metal protective sleeve, a Pluggable Connector and 0.3m cable
NTC -1041, 1.5	1x NTC Sensor with black insulated metal protective sleeve, a Pluggable Connector and 1.5m cable
NTC -1041, 3.5	1x NTC Sensor with black insulated metal protective sleeve, a Pluggable Connector and 3.5m cable
NTC-1041, M6, 2	1xNTC Sensor with a Ø6mm Ring Connector and 2m cable
NTC-1041, M10, 1	1xNTC Sensor with a Ø10mm Ring Connector and 1m cable
NTC-1041, M10, 2	1xNTC Sensor with a Ø10mm Ring Connector and 2m cable
NTC-1043, M10, 1	3x NTC Sensor as one set, each with heat shrink sleeve (Brown, Black and Grey respectively), Ø10mm Ring Connector, Pluggable Connector and 1m cable
NTC-1044, M10, 1	4x NTC Sensor as one set, each with heat shrink sleeve (Brown,Black, Grey and Blue respectively), Ø10mm Ring Connector, Pluggable Connector and 1m cable
NTC-1043, 3	3xNTC Sensor as one set, each with insulated metal protective sleeve (Yellow, Green and Red), Pluggable Connector and 3m cable
NTC-1044, 2	4xNTC Sensor as one set, each with insulated metal protective sleeve (Yellow, Green, Red and Black), Pluggable Connector and 2m cable

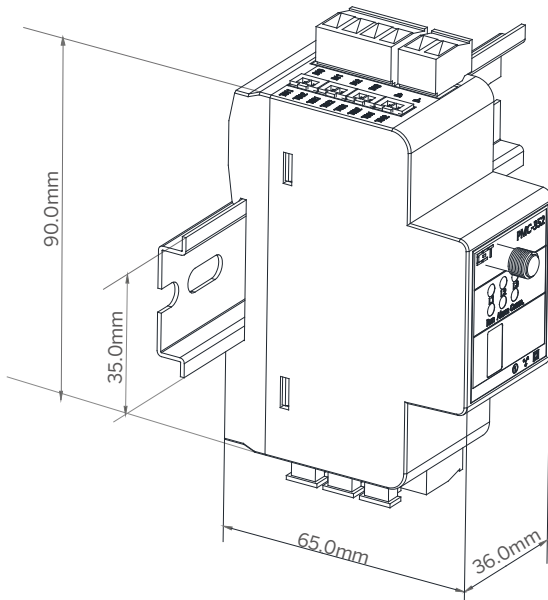
Ordering Information

Product Code	Description
PMC-352 3-Phase Wireless (LoRa) DIN Rail Energy Meter	
Basic Function	C
	Multifunction Measurements, 1xRS-485
Input Current	A
	B
Input Voltage	3
Power Supply	2
	N*
Frequency	5
I/O	A
Expansion Communication*	N
	7*
Language	E
PMC-352	- C A 3 2 5 A N E
	PMC-352-CA325ANE (Standard Model)

* Additional charges apply.

^ The Self-Powered option is only supported for 3-phase power system. If the PMC-352-C is used in a single-phase application, Power Supply option 2 should be selected.

Dimensions



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