



PMC-350-C

3-Phase Wireless DIN Energy Meter

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-restricted 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, US915, EU868, IN865 and RU864, it becomes a vital component of an intelligent, distributed and IoT based EMS. The PMC-350-C optionally provides 4xDI for Status Monitoring, 2xDO for Control and Alarming or 2xSS Pulse Output for Energy Pulsing as well as 2 or 4xRTD and 1xResidual 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, EU868, KR920, AU915, US915, IN865 and RU864

Application

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

Features Summary

Ease of use

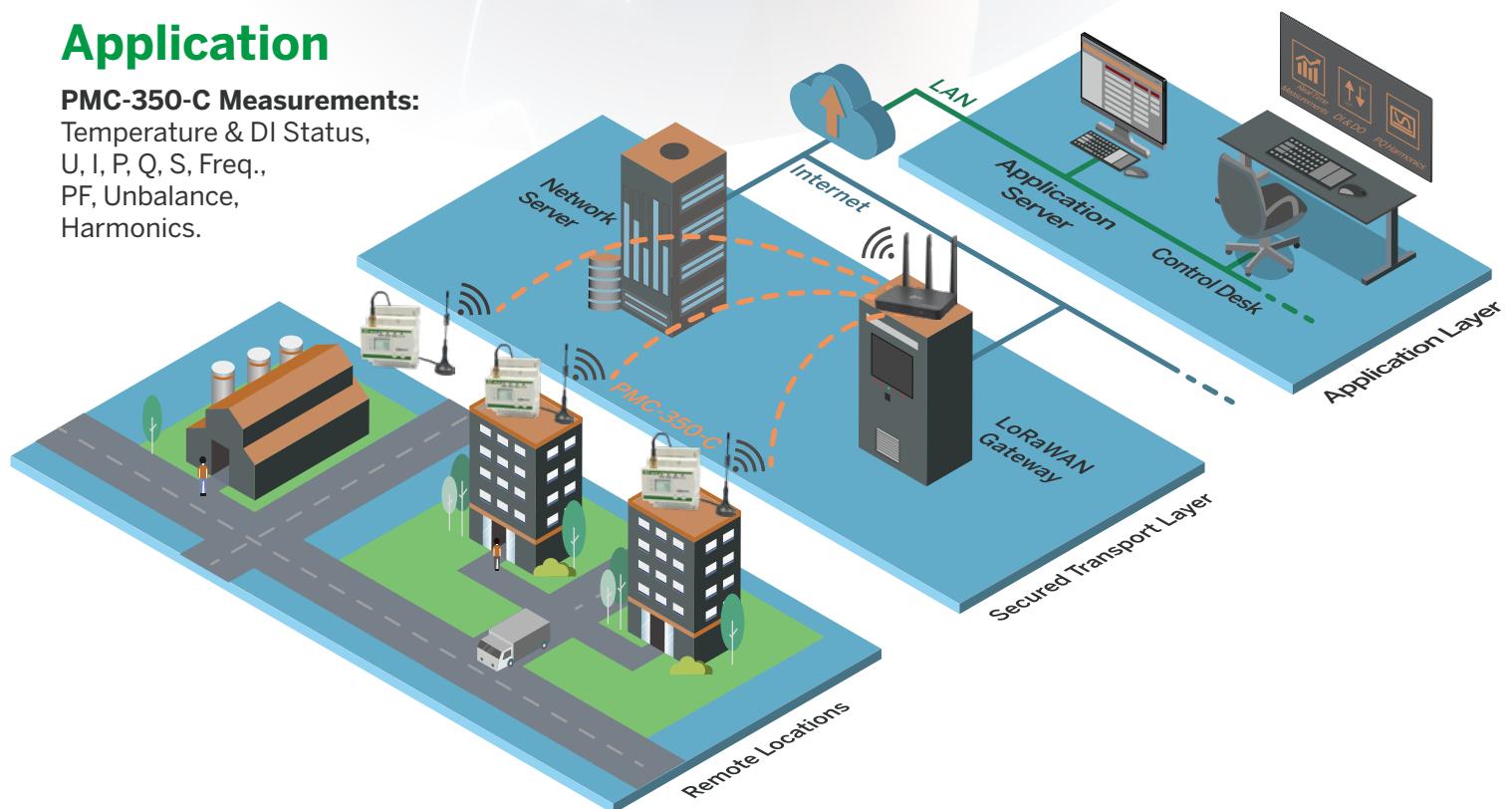
- Easy installation with DIN-Rail mounting, no tools required
- Support LoRaWAN Class C Node that offers the lowest latency for Server to End-Node communication
- Simple commissioning and low-deployment cost with Split-Core Current Transformer/Rogowski Coil and wireless IoT communication

Basic Measurements

- ULN, ULL per Phase and Average
- Current per Phase and Average with calculated Neutral
- P, Q, S 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 P and PF
- 3-phase Total and per-phase kvarh Q1-Q4
- Demands, Predicted Demands and Max. Demands for P/Q/S Total and per Phase Current with Timestamp for This Month and Last Month (or Since Last Reset and Before Last Reset)



DIN Energy Meter



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

Multi-Tariff TOU

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

Max./Min. Log

- Max./Min. Log with Timestamp for Real-time measurements such as Voltage, Current, In, Freq., P, Q, S, 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 $\pm 1\text{ms}$ 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 P, Q, S 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.
- Configurable recording interval from 1 minute to 40 days

Diagnostics

- Frequency Out-of-Range, Loss of Voltage/Current
- P 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 with configurable Frequency Bands at AS923-1/2/3/4, EU868, KR920, AU915, US915, IN865 and RU864 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
- Equipped with a supercapacitor with the ride-through capability for Emergency Data Push when voltage phase loss is detected

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

System Integration

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

Accuracy

Parameters		Accuracy	Resolution
-		SCCT/SCCTA	5A CT Input
Voltage		±0.5%	±0.2%
Current		±0.5%	±0.2%
P, Q, S		±1.0%	±0.5%
kWh, kVAh	IEC 62053-21: 2020 Class 1	IEC 62053-22: 2020 Class 0.5S	0.01kXh
kvarh	IEC 62053-23: 2020 Class 2	IEC 62053-23: 2020 Class 2	0.01kvarh
	IEC 62053-24: 2020 Class 1	IEC 62053-24: 2020 Class 0.5S	
PF		±1.0%	±0.5%
Frequency		±0.02Hz	
In (Cal.)		±1.0%	
THD		IEC 61000-4-7 Class II	
Iresidual		±1.0%	
Temperature		±1°C	

Technical Specifications

Voltage Inputs (V1, V2, V3, VN)		
Voltage (Un)	277VLN/480VLL	
Range	20-277VLN/35-480VLL	
Burden	<2W/phase	
Input Impedance	5MΩ	
Permanent Overload	750VAC L-L	
Frequency	45-65Hz	
Current Inputs (·I11, I12, ·I21, I22, ·I31, I32)		
Optional (In)	5A	
Range	5mA-6A	
-	SCCT Option (Split-Core CT)	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
-	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	95-250VAC/DC, ±10%, 47-440Hz, OVC III 300V	
Optional 1	95-480VAC/DC, ±10%, 47-440Hz	
Optional 2	20-60VDC	
Burden	<2W	
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 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	

Optional Residual Current Inputs (-IR, IR)		
Range		20mA-2000mA
Communications		
RS-485 (Standard)	Protocol	Modbus RTU
	Baud Rate	1200/2400/4800/9600/19200/38400 bps
LoRaWAN (Optional)	-	LoRaWAN™ Specification 1.0.4 Class A/C Compliance
	Power Output	Max 19.32 dBm ERP
ISM Bands (Optional) Applicable to the Regions Right:	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
	US915	USA, Canada, Mexico
	EU868	Europe, United Arab Emirates, Belarus, etc.
	IN865	India
	RU864	Russia
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

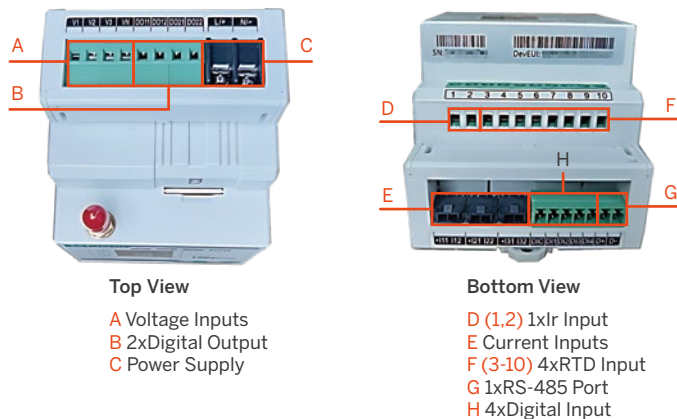
Standards of Compliance

Safety Requirements	
CE LVD 2014/35/EU	EN 61010-1: 2010 EN 61010-2-030: 2010
Electrical Safety in Low Voltage Distribution Systems up to 1000Vac and 1500 Vdc	IEC 61557-12: 2021 (PMD)
Insulation AC Voltage: 2kV @ 1 minute Insulation Resistance: >100MΩ Impulse Voltage: 6kV, 1.2/50µs	IEC 62052-31: 2015
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
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 ETSI EN 300 220-2 V3.1.1: 2017
Audio/Video, Information and Communication Technology Equipment-Part 1: Safety Requirements	IEC 62368-1: 2018

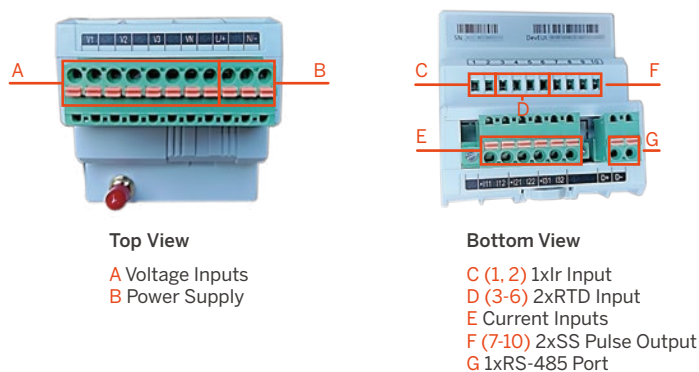
Emission Tests	
Limits and Methods of Measurement of Electromagnetic Disturbance Characteristics of Industrial, Scientific and Medical (ISM) Radio-Frequency Equipment	EN 55011: 2016
Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipment	EN 55032: 2015
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
Mechanical Tests	
Spring Hammer Test	IEC 62052-31: 2015
Vibration Test	IEC 62052-11: 2020
Shock Test	IEC 62052-11: 2020

Terminals Diagram

PMC-350-C SCCT/SCCTA Models
(4xDI+2xDO+4xRTD+1xI_r+1xRS-485)



PMC-350-C 5A Current Input Model
(2xRTD+1xI_r+2xSS Pulse Output+1xRS-485)



Accessories

DIN Panel Mounting Adapter

PMC-PMA-4 IP67 Panel Mounting Adapter for 4P DIN-Rail Mounting devices



1A/0.5mA Residual Current Sensor

CT517203 Phase Current Range: 0-160A
Aperture=Ø46mm, Accuracy: Class 0.5

CT517403 Phase Current Range: 0-400A
Aperture=Ø80mm, Accuracy: Class 0.5

CT519703 Phase Current Range: 0-630A
Aperture=220x50mm, Accuracy: Class 0.5

CT517603 Phase Current Range: 0-1000A
Aperture=Ø120mm, Accuracy: Class 0.5



Solid-Core Current Sensor

CT553203 Phase Current Range: 0-160A
Aperture=Ø48mm, Accuracy: Class 3

CT553303 Phase Current Range: 0-225A
Aperture=Ø68mm, Accuracy: Class 3



Split-Core Current Sensor

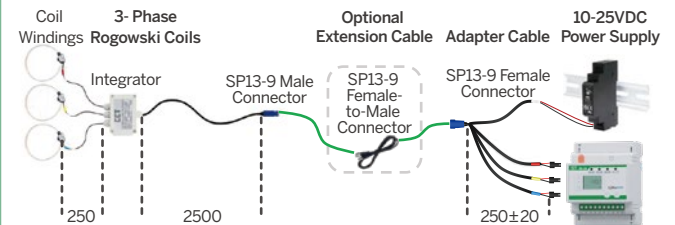
Rogowski Coil

PMC-RC-400A-40mA-3P-100-PY-W-P 3-phase 400A/40mA Rogowski Coil, Aperture=Ø100mm

PMC-RC-1200A-40mA-3P-150-PY-W-P 3-phase 1200A/40mA Rogowski Coil, Aperture=Ø150mm

PMC-RC-2500A-40mA-3P-200-PY-W-P 3-phase 2500A/40mA Rogowski Coil, Aperture=Ø200mm

PMC-RC-5000A-40mA-3P-300-PY-W-P 3-phase 5000A/40mA Rogowski Coil, Aperture=Ø300mm



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

Temperature Sensor

WZPT-1031 1xThermistor Sensor (PT100) with 3m cable and 2-pin connector



1-Phase Split-Core CTs

PMC-SCCT-5A-2mA-16-A L=2m, Aperture=Ø16mm, Accuracy: Class 1

PMC-SCCT-50A-40mA-16-A L=2m, Aperture=Ø16mm, Accuracy: Class 1

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



5A/50A/100A/200A/400A SCCT

PMC-SCCT-800A-40mA-A L=2m, Aperture=80x50mm, Accuracy: Class 0.5



800A SCCT

PMC-SCCT-1600A-40mA-A L=2m, Aperture=130x55mm, Accuracy: Class 0.5



1600A SCCT

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) and 400A/40mA, 1200A/40mA, 2500A/40mA, 5000A/40mA, (Rogowski Coils not included)							
		SCCTA		2mA Input for use with 5A/2mA SCCT (SCCTs not included)							
Input Voltage				5		277VLN/480VLL + 20% (1P2W ULN, 1P2W ULL, 1P3W, 3P3W, 3P4W, Demo)					
Power Supply				2		95-250 VAC/VDC, 47-440Hz					
				3*		20-60 VDC					
				4^		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 + 1xResidual Input		
							X#		2xRTD + 1xResidual Input + 2xSS Pulse Output		
Expansion Communication*								N		None	
								A		LoRaWAN @ US915/AU915/KR920/AS923-1/AS923-2/AS923-3/AS923-4 with Internal Antenna	
								B&		LoRaWAN @ RU864/IN865/EU868/US915/AU915/KR920/AS923-1/AS923-2/AS923-3/AS923-4 with External Antenna	
Language										E	English
PMC-350	-	C	SCCT	5	2	5	N	N	B	E	PMC-350-CSCCT525NNBE (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.

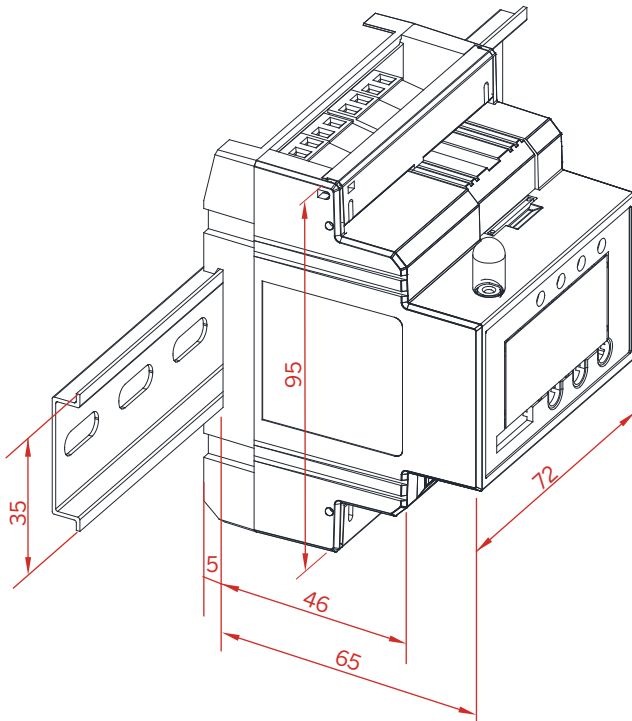
^ Power Supply "4" is only available with Expansion 1 "N" + Expansion 2 "X". Input Current options and Expansion Communication options are unrestricted.

Expansion 2 "X" is only available with Power Supply "4" + Expansion 1 "N". Input Current options and Expansion Communication options are unrestricted.

& Expansion 2 "T" + Expansion Communication "B" is equipped with a supercapacitor with the ride-through capability to allow data push to the upstream station when the voltage phase Loss.

Dimensions & Installation

Unit: mm



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Your Local Representative

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