Eastron

SEM5 Series

Three-phase energy meter

User Manual V1.0

1. Product overview

SEM5 series developed by Eastron is a new generation of DIN-rail AC meter equipped with both Wi-Fi and Lora wireless communication. The meter support multi-functional parameter measurement, which can measure and display the characteristics of 1p2w, 3p4w and 3p3w power supply, such as voltage, frequency, current, power, active and reactive energy, power factor, etc. It is applicable to photovoltaic energy management, intelligent buildings, industrial equipment, and other various applications for energy monitoring.

SEM5 is is designed in compact size with only 2 DIN Module width (about 36mm). All terminals of the SEM5 utilize spring-loaded terminals and RJ connectors, enabling rapid plug-and-play installation. This streamlined design simplifies wiring connections,significantly reduces deployment time, and lowers maintenance costs, while ensuring enhanced operational safety and user convenience.

1.1 Product List

① ② ③ ④

Sequence	Quantity	Description
1	1	SEM5 Energy Meter
2	1	Current Transformer
3	1	External Antenna
4	1	User Manual

2. Specifications ⚠

2.1 Electrical Characteristics

Meter Type	3-Ph CT connected
Metering	Bi-directional measurement
Type of power supply	Self-powered
Self-consumption	<3W
Active power	Class 1
Reactive power	Class 2
Frequency	±0.1%
Current	±0.2%
Voltage	± 0.2%
Power factor	0.01
Rated Voltage	3x230V(L-N) / 400V(L-L)
Working Voltage Range	100-277V ac L-N, 208-480V ac L-L
Frequency range	50/60Hz
Current Input	40mA
Current capacity	3x120A / 40mA CT, RJ12 current input port

2.2 Communication Parameters

Wireless technology	LoRa
Operation Frequency	433/490/868/915 MHz
Max RF Output Power	22 dBm
Wireless Connection	Wi-Fi
Operation Frequency	2400 - 2483.5 MHz
Max RF Output Power	20.5 dBm

2.3 Mechanical Property

Protection Class	IP20
Dimensions (WxHxD)	36x70x90.5mm
Installation Type	DIN Rail Mounting
Material of Meter Case	PC, Self-extinguishing UL 94 V-0
Meter Case Color	Grayish white
Mechanical Environment	M2
Connection Terminal Type	Voltage: Spring Terminal Current: RJ12

2.4 Environmental Characteristics

Working Temperature	-25°C - +55°C
Storage Temperature	-40°C - +70°C
Humidity	≤95%(Non-condensing)
Pollution Degree	II
Altitute	2000 meters
Vibration	10Hz to 50Hz, IEC 60068-2-6

2.5 Electromagnetic Compatibility

Electrostatic Discharge	IEC 61000-4-2
Immunity to Radiated Fields	IEC 61000-4-3
Immunity to Fast Transients	IEC61000-4-4
Immunity to Impulse Waves	IEC61000-4-5
Conducted Immunity	IEC 61000-4-6
Immunity to Magnetic Fields	IEC 61000-4-8
Immunity to Voltage Dips	IEC 61000-4-11
Radiated Emissions	EN55032 Class B
Conducted Emissions	EN55032 Class B
Harmonics	IEC 61000-3-2

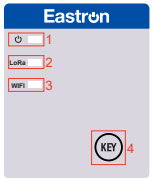
2.6 Safety

Measurement Category	Per IEC61010-1, CAT III
Installation Category	CAT III
Insulation Class	II

3. Packaging Information

Name	Material	Size	Color
EPE Bottom	White EPE	235x205x75mm	White
Folding Box	E Corrugated board	236x206x76mm	Brown

4. Key and Displays



1: Power Indicator
Red power LED.
- Steady Illumination: Lights up continuously when voltage is present (power supply is on but no current flow).
- Flashing: Blinks when current is detected (active load operation).

2: LoRa Indicator
Green LED for LoRa pairing and connection status checking:
- Unpaired: LED OFF
- Pairing Mode: LED blinks at 1s interval
- Network-Joined: LED steady green

3: Wi-Fi Indicator
Blue LED For Wi-Fi network connection:
- Not connected: LED OFF
- Connecting the router but not connected to the server: LED blinks at 1s interval
- Connected with both router and server: LED steady blue

4: LoRa Pairing Button
- Short Press: meter for LoRa pairing
- Long press: unbind LoRa device

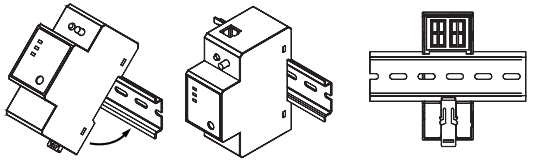
5. Installation

Step 1: Select a 35mm-wide DIN rail, Pull down the back-end clip on the meter to unlock the mounting mechanism.

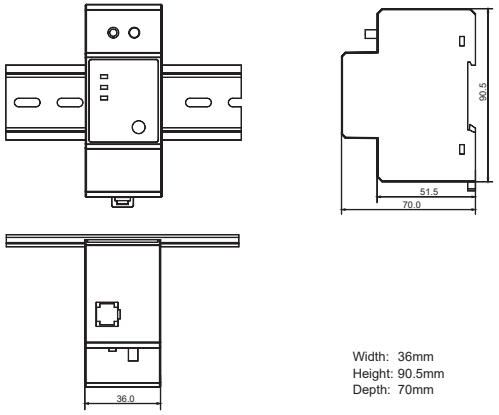
Step 2: Align Upper Slot with DIN Rail. Position the upper slot of the meter's DIN rail groove onto the DIN rail, ensuring full contact (see Figure 1)

Step 3: Following the direction indicated in Figure 1, engage the lower slot of the DIN rail groove onto the DIN rail until audibly seated (see Figure 2)

Step 4: Push up the back-end clip to lock the meter firmly onto the DIN rail (see Figure 3).

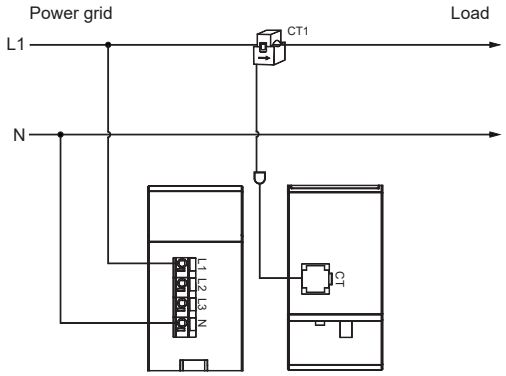


6. Dimension

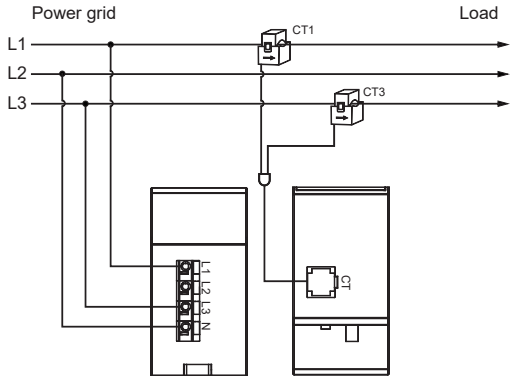


Width: 36mm
Height: 90.5mm
Depth: 70mm

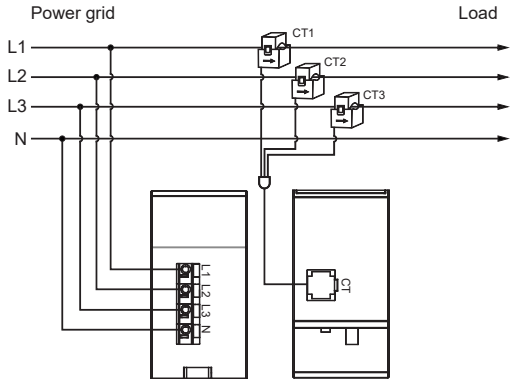
7. Wiring ⚠



1P2W 1CT



3P3W 2CT



3P4W 3CT

8. Operation

8.1 Communication Operations

8.1.1 Pairing Mode

- Short-press the button to activate pairing mode, which lasts up to 60 seconds.
- During pairing mode, the LoRa status LED blinks at 1-second intervals. It turns steady on once pairing is complete.
- Pairing mode exits automatically upon successful pairing. If pairing fails, short-press the button again to exit manually.
- Long-press the button for 5 seconds to reset pairing status and unbind devices. During reset:
  - The LoRa and Wi-Fi status LEDs blink at 500ms intervals.
  - The LoRa LED turns off after reset completes.

8.1.2 Pairing Procedure

- Ensure the device is in pairing state. Short-press the meter's button to enter pairing mode.
- Observe the LoRa LED:
  - 1-second blinking: Pairing in progress.
  - Steady on: Pairing successful with active communication.

8.1.3 Unbinding Procedure

After unbinding, the LoRa LED blinks at 1-second intervals.
- Long-press the button for 5 seconds until the LoRa and Wi-Fi LEDs blink at 500ms intervals, then release.
- Wait until the LoRa LED stops blinking and turns off to confirm unbinding completion.

Note: Unbinding: click Unbinding on Shinephone's meter detail page and long press the meter button for 5s to reset LoRa.

9. Maintenance and Troubleshooting

Possible Issues	Possible Cause	Solution
No display after power on	Power supply not connected to the device	Verify that the Live (L) and Neutral (N) terminals are connected to the correct power supply phases. Critical Note: Reversed L/N wiring may cause equiperment damage or safety hazards.
Upper computer can not communicate with the device	Communication parameters are incorrect	Ensure the device's communication address matches the network configuration (e.g., Modbus slave ID).
		Confirm the baud rate (e.g., 9600, 115200) aligns with the host/controller settings.
		Verify the parity bit (e.g., none, even, odd) matches the protocol requirements (RS-485/Modbus).
	Communication link affected	Inspect for disconnected cables or loose connectors. Use a multimeter to test continuity.
		Verify the implementation of communication protection measures (e.g., EMC shielding, surge suppression,etc.).
		Ensure no duplicate addresses or conflicting baud rates exist on the same communication bus.
Inaccurate measurement data	Inaccurate voltage measurement	Check that the voltage signal is correctly connected to the device.
		Check that the voltage measurement signal is within the measurement range of the device.
		Check that the data format is correctly converted.
	Inaccurate current measurement	Check that the current signal is correctly connected to the device.
		Check that the current measurement signal is within the measurement range of the device.
		Check that the data format is correctly converted.

10. Risk Information

Information for Your Own Safety

This manual does not contain all of the safety measures operating the equipment (module, device) for different conditions and requirements. However, it does contain information which you must know for your own safety and to avoid damages. These information are highlighted by a warning triangle indicating the degree of potential danger.

Warning

This means that failure to observe the instruction can result in death, serious injury or considerable material damage.

Caution

This means hazard of electric shock and failure to take the necessary safety precautions will result in death, serious injury or considerable material damage.

Qualified personnel

Operation of the equipment (module, device) described in this manual may only be performed by qualified personnel. Qualified personnel in this manual means person who are authorized to commission, start up, ground and label devices, systems and circuits according to safety and Regulatory standards.

Proper handling

The prerequisites for perfect, reliable operation of the product are proper transport, proper storage, installation and proper operation and maintenance.
When operating electrical equipment, parts of this equipment automatically carry dangerous voltages. Improper handling can therefore result in serious injuries or material damage.

- Use only insulating tools.
- Do not connect while circuit is live (hot).
- Place the meter only in dry surroundings.
- Do not mount the meter in an explosive area or expose the meter to dust, mildew and insects.
- Make sure the wires are suitable for the maximum current of this meter.
- Make sure the AC wires are connected correctly before activating the current / voltage to the meter.
- Do not touch the meter connecting clamps directly with metal, blank wire and your bare hands as you may get electrical shock.
- Make sure the protection cover is placed after installation.
- Installation, maintenance and reparation should only be done by qualified personnel.
- Never break the seals and open the front cover as this might influence the function of the meter, and will cause no warranty.
- Do not drop, or allow strong physical impact on the meter as the high precisely components inside may be damaged.
- Designed to be mounted inside of switchboards or cabinet on DIN RAIL.
- This device must have a suitable sized Circuit Breaker feeding the Multi Function Energy Meter so it does not exceed the maximum rated current.
- The supply wiring of this device shall be suitable sized cable to match the installed circuit breaker.
- A Disconnection Device (Circuit Breaker) should be installed close to the Multi Function Energy Meter.
- The Disconnection Device shall be marked as the Disconnection Device for the Multi Function Energy Meter.

Declaration of Conformity

Object of the declaration: Three Phase Multi-function Energy Meter

Model: SEM5 Series, including:
SEM5, SEM5-1, SEM5-2, SEM5-3, SEM5-5

Manufacturer: Zhejiang Eastron Electronic Co., Ltd

Address: No.52 Dongjin Road, Nanhu District, Jiaxing, Zhejiang, China

This Declaration of Conformity is issued under the sole responsibility of the manufacturer.

The object of the declaration described above are in conformity with the relevant
Union harmonization legislation:

2014/35/EU The Low Voltage Directive
2014/30/EU The Electromagnetic Compatibility Directive

Conformity is shown by compliance with the applicable requirements of the following documents:
Reference & Date Title

EN 61010-1:2010+A1:2019
EN IEC 61010-2-030:2021+A11:2021
Safety requirements for electrical equipment for measurement, control and laboratory

EN IEC 61326-1: 2021
EN IEC 61326-2-3: 2021
Electrical equipment for measurement, control and laboratory use-EMC requirements

Signed for and on behalf of: Zhejiang Eastron Electronic Co., Ltd

Disclaimer

We have checked the contents of this publication and every effort has been made to ensure that the descriptions are as accurate as possible.
However, deviations from the description cannot be completely ruled out, so that no liability can be accepted for any errors contained in the information given.
The data in this manual is checked regularly and the necessary corrections are included in subsequent editions. We are grateful for any improvements that you suggest.

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