

# SM-US-200

## Electricity Meter Installation Guide V1.0

**Shenzhen Growatt New Energy Technology CO.,LTD**

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## Contents

|  |   |
|--|---|
| IMPORTANT SAFETY INSTRUCTIONS .....                        | 2 |
| Chapter1: Introduction.....                                | 3 |
| Chapter2: Meter Installation.....                          | 3 |
| Chapter2.1: Installation Guidelines.....                   | 3 |
| Chapter2.2: Installing and Connecting the Meter .....      | 4 |
| Chapter2.2.1:To mount the meter.....                       | 4 |
| Chapter2.2.2:To install the CTs: .....                     | 4 |
| Chapter2.2.3:To wire the meter: .....                      | 4 |
| Chapter3: Panel introduction.....                          | 6 |
| Chapter3.1: Meter Status Leds.....                         | 6 |
| Chapter3.1.1:Power Status LED.....                         | 6 |
| Chapter3.1.2:Phase Status LED.....                         | 6 |
| Chapter3.2: Button description.....                        | 6 |
| Chapter4: Meter Technical Specifications.....              | 7 |
| Chapter 5 Dimensions .....                                 | 7 |
| Chapter 5.1:Meter Dimensions (±0.5mm) .....                | 7 |
| Chapter 5.2:Current Transformers Dimensions (±0.5mm) ..... | 8 |
| APPENDIX .....   | 8 |
| Accessories list.....                                      | 8 |
| Specification Revision 1.0 .....                           | 8 |

## **IMPORTANT SAFETY INSTRUCTIONS**

### **SAVE THESE INSTRUCTIONS**

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This manual contains important instructions for Model SM-US-200 that shall be followed during installation and maintenance of the inverter.

## Safety Information

The following safety symbols are used in this document. Familiarize yourself with the symbols and their meaning before installing or operating the system.



**CAUTION** :Risk of Electric Shock, Do Not Remove Cover.No User Serviceable Parts Inside. Refer Servicing To Qualified Service Personnel.

**PRUDENCE** : Le boîtier ne doit en aucun cas être ouvert. Aucun composant interne n'est à entretenir. Reportez-vous à un technicien qualifié pour tout entretien.



**WARNING**:Hazardous voltage is still present 5 minutes after all power sources have been disconnected.

**ATTENTION**:Une tension dangereuse est toujours présente 5 minutes après que toutes les sources d'alimentation ont été débranchées



**INFORMATION** provided that when known and used will ensure optimal operation of the system.

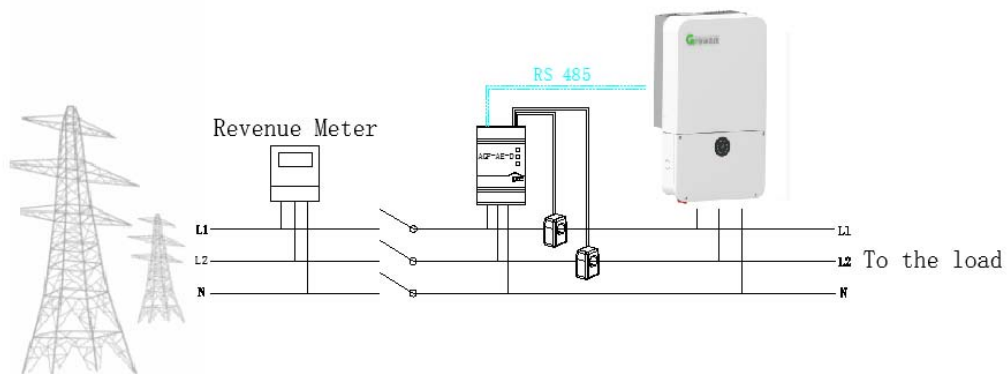
La connaissance et l'utilisation des INFORMATIONS fournies garantissent un fonctionnement optimal du système.

## Servicing Instructions

**Warning** : These servicing instructions are for use by qualified personnel only. To reduce the risk of electric shock, do not perform any servicing other than that specified in the operating instructions

## Chapter1: Introduction

In a single inverter system, the meter is connected directly to the inverter. If your inverter has a built-in revenue grade meter (RGM; the inverter is referred to a revenue grade inverter), you can connect an external meter on the same bus as the RGM.



## Chapter2: Meter Installation

While Installing the meter, the National Electrical Code, ANSI/NFPA 70 and Canadian Electrical Code C22.1. shall be used.

### Chapter2.1: Installation Guidelines

The meter is connected to the inverter using RS485.

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AC wire specifications: 1.3 to 2.0 mm diameter / 22-18 AWG stranded wire, 600 V, type THHN, MTW, or THWN.

RS485 wiring specifications:

- Cable type: Min. 3-wire shielded twisted pair (a 4-wire cable may be used)
- Wire cross-section area: 0.32- 0.81 mm<sup>2</sup>/ 24-18 AWG (a CAT5 cable may be used)



#### NOTE

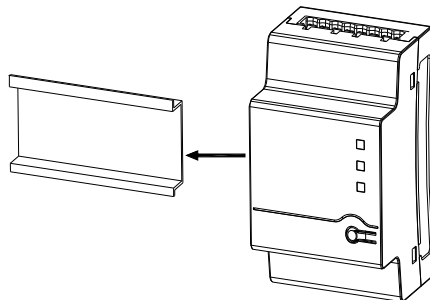
If using a cable longer than 10 m/33 ft in areas where there is a risk of induced voltage surges by lightning, it is recommended to use external surge protection devices. If grounded metal conduit is used for routing the communication wires, there is no need for a lightning protection device.

- The meter is considered “permanently connected equipment” and requires a disconnect means (circuit breaker, switch, or disconnect) and overcurrent protection (fuse or circuit breaker).
- The meter draws 10-30mA, therefore the rating of any switches, disconnects, fuses, and/ or circuit breakers is determined by the wire gauge, the mains voltage, and the current interrupting rating required.
- The switch, disconnect, or circuit breaker must be located near the meter and be easily operated .
- Use circuit breakers or fuses rated for 20A or less.
- Use grouped circuit breakers when monitoring more than one line.
- The circuit breakers or fuses must protect the mains terminals labeled L1 and L2. In the rare cases where neutral has overcurrent protection, the overcurrent protection device must interrupt both neutral and the ungrounded conductors simultaneously.
- The circuit protection / disconnect system must meet all national and local electrical codes.

## Chapter2.2: Installing and Connecting the Meter

### Chapter2.2.1:To mount the meter

- 1.The meter should be mounted in a Power Distribution Box
- 2.Mount the meter on a 35mm DIN rail.



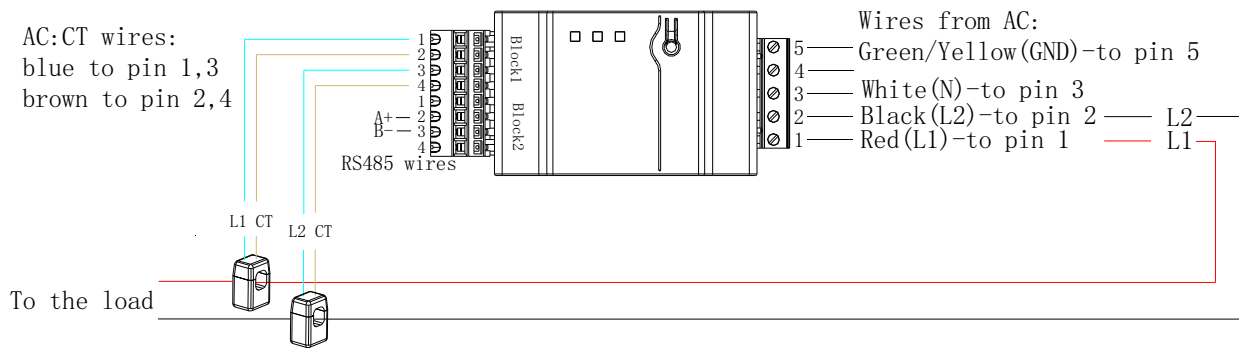
### Chapter2.2.2:To install the CTs:

1. Turn off AC power before clamping on current transformers.
2. Install the CTs around the conductor to be measured. Split-core CTs can be opened for 3installation around a conductor. A nylon cable tie may be secured around the CT to prevent accidental opening.
3. Install the CT with the arrow pointing to the load for consumption or export measurement.

**The current transformer is packed together with the meter.**

### Chapter2.2.3:To wire the meter:

If you are connecting the meter to the inverter, Refer to the connection diagram below



### NOTE

- Clamp the CT connected to L1 CT around the wire connected to ØL1.
- Clamp the CT connected to L2 CT around the wire connected to ØL2.

1. Verify that power is OFF before making connections.
2. Insert a grounding cable through the appropriate conduit and the knockout that was opened and connect it from Pin 5 of the 5-pin terminal block to the grounding terminal
3. Connect the AC side wires (meter input) using the 5-pin terminal block:
  - a. Insert the wires through the appropriate conduit and the knockout that was opened.
  - b. Loosen the appropriate screws on the 5-pin terminal block.
  - c. Connect each AC wire to the appropriate screw terminal (pins 1, 2). Verify that the lines match the symbols printed on the meter front label.
  - d. Connect ground to pin 5 and neutral to pin 3.
  - e. Tighten the screws making sure the wires are fully inserted and cannot be pulled out easily.
  - f. Insert the 5-pin terminal block into the socket on the meter making sure it is fully seated in the meter.
4. Connect the CT wires to the 4-pin terminal block(block1):
  - a. Insert the wires through the appropriate conduit and the knockout that was opened.
  - b. Connect the blue and brown wires according to the dots printed on the label: blue to pins 1/3, brown to pins 2/4.
  - c. Insert the 4-pin terminal block into the socket on the meter making sure it is fully seated in the meter
5. Connect the RS485 twisted pair cable to the 4-pin terminal block o(block2):
  - a. Insert the wires through the appropriate conduit and the knockout that was opened.
  - b. Connect the wires to the A+ and B- terminals, and connect the shield to the G terminal.
  - c. Insert the 4-pin terminal block into the socket on the meter making sure it is fully seated in the meter
6. Return the terminal block end-stops to the sides of the meter.



### NOTE

If the meter is used for two-phase two-wire system (no neutral), please connect L2 and N line at the 5-pin terminal block:

## Chapter3: Panel introduction

### Chapter3.1: Meter Status Leds

The three status LEDs on the front of the meter can help indicate correct measurements and operation. At normal startup - when power is first applied, all the LEDs light up sequentially for 1 sec.

#### Chapter3.1.1:Power Status LED

| LED | LED Color | Function                  | Indication       | Troubleshooting   |
|-----|-----------|---------------------------|------------------|---|
| RUN | Green     | Flashing ON/OFF(for 1sec) | Work normally    | /   |
|     | Red       | ON for >3sec              | Internal error   | Contact Support   |
|     | Yellow    | Flashing ON/OFF(for 1sec) | No communication | Check that the communication wires are connected correctly. |

#### Chapter3.1.2:Phase Status LED

| LED   | LED Color | Function                  | Indication                            | Troubleshooting  |
|-------|-----------|---------------------------|---------------------------------------|--|
| L1/L2 | Green     | ON for >3sec              | No Current                            |  |
|       |           | Flashing ON/OFF(for 1sec) | Positive power                        |  |
|       | Red       | Flashing ON/OFF(for 1sec) | Negative power                        | check for reversed CTs, swapped CT wires, or CTs not matched with the lines. |
|       |           | Flashing with green LED   | High voltage > 130V                   | Check the line voltages and the meter rating.                                |
|       |           | Flashing with yellow LED  | Low voltage < 70V                     |  |
|       | Yellow    | Flashing ON/OFF(for 1sec) | Break fault < 30V                     |  |
|       |           | ON for >3sec              | Frequency is below 45Hz or above 70Hz | Check for the presence of high noise.  |

### Chapter3.2: Button description

When the software version of the meter needs to be updated, Refer to the following steps:

1. communicate with the meter by RS 485;
2. Open the programming software, load the new software to update,
3. Press the "reset" button for 3sec, the meter will restart
4. Wait for the program to be completed

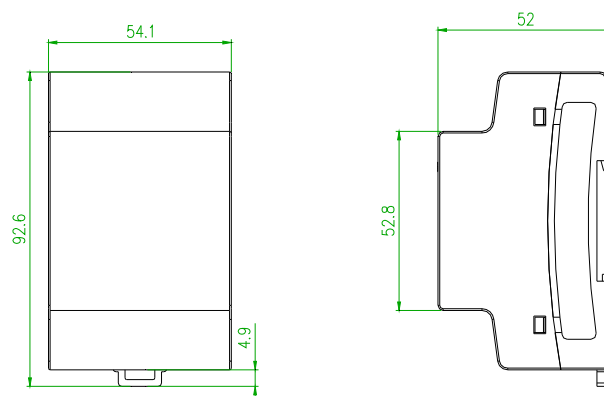
## Chapter4: Meter Technical Specifications

| Meter Electrical Service                |                |                         | Units |
|---|----------------|-------------------------|-------|
|   | SM-US-200      |                         |       |
| Rated Voltage-Line to N                 | 120            |                         | V     |
| Rated Voltage-Line to Line              | 208/240        |                         | V     |
| Extended Voltage Range                  | 88%~110%       |                         |       |
| AC Frequency                            | 60             |                         | Hz    |
| Grids Supported                         | L1/L2/N/PE     |                         |       |
| Power Consumption                       | 1.2            |                         | W     |
| Communication                           |                |                         |       |
| Meter Communication Interfaces          | RS 485         |                         |       |
| Response Time                           | ≤1             |                         | S     |
| Meter Accuracy                          |                |                         |       |
| Rated RMS current                       | 100            | 200                     | A     |
| 1%-100% of CT Current                   | ±0.5           | ±1                      | %     |
| Current Transformers                    |                |                         |       |
| Number of Supplied Current Transformers | 2              |                         |       |
| Dimensions                              | I.D:15 O.D:35  | 70.5×54.5×39<br>(H×W×D) | mm    |
| Standard Compliance                     |                |                         |       |
| Safety                                  | UL1741         |                         |       |
| Installation Specifications             |                |                         |       |
| Dimensions(H×W×D)                       | 54.1×87.8×52   |                         | mm    |
| Weight                                  | 0.2            |                         | kg    |
| Operating Temperature Range             | -30~55         |                         | °C    |
| Relative Humidity (noncondensing)       | 5 - 90         |                         | %     |
| Mounting Type                           | DIN-Rail, 35mm |                         |       |

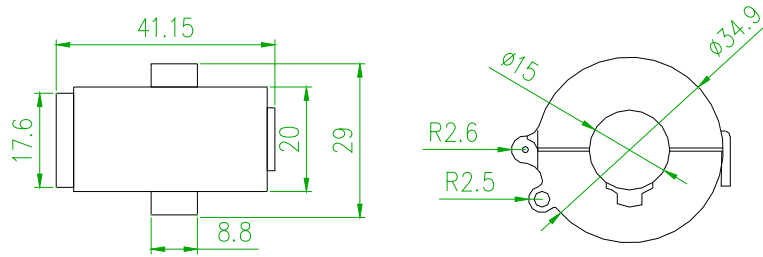
The meter is intended to be installed in a power distribution box in the end use. The acceptance of the application is to be evaluated in the end product

## Chapter 5 Dimensions

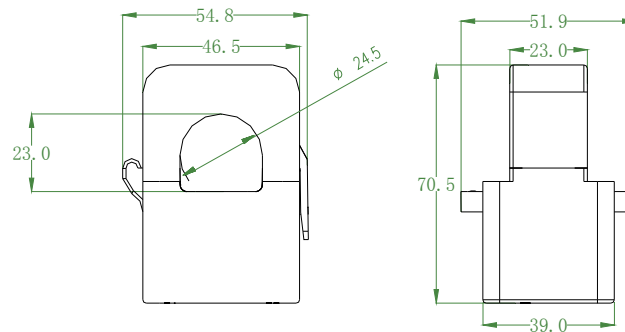
### Chapter 5.1: Meter Dimensions (±0.5mm)



## Chapter 5.2: Current Transformers Dimensions ( $\pm 0.5\text{mm}$ )



**100A CT**



**200A CT**

## APPENDIX

### Accessories list

| Item                | Quantity |
|---------------------|----------|
| Current Transformer | 2        |
| Plug component      | 3        |

### Specification Revision 1.0

Contents subject to change with notice to contract customers.