# GROWATT

# Installation

&

# Operation Manual

Download Manual

Growatt New Energy

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# 1 About the user manual

## 1.1 Manual description

Dear user, thank you very much for using the Shine Master developed and produced by Shenzhen Growatt New Energy Co., Ltd.(Here in after referred to as Growatt).We sincerely hope that this product will meet your needs and expect you give more opinions on the performance and function of the product. The purpose of this manual is to provide users with detailed product information and instructions for installation, operation and maintenance.

## 1.2 Copyright statement

This user manual is copyrighted by Growatt. Any unit or individual may not excerpt or copy part or all of this user's manual without the written permission of the company. It may not be transmitted in any form, including materials and publications. Infringement must be investigated.

The version of this manual is V1.0.Growatt owns the final interpretation right of this user manual. If there is any change in product parameters, appearance, packing, etc. The latest information of the company shall prevail without notice.

## 1.3 Applicable personnel

This manual is intended for professional technicians who install, commission, and maintain Smart Energy Managers and those who perform daily operations. If necessary, refer to Growatt's corresponding user manual or instruction.

## 1.4 Manual usage

Please read this manual carefully before using Smart Energy Manager. At the same time, please keep this manual in a safe place so that operators and maintenance personnel can find out. The contents of the manual will be continuously updated and corrected. It is inevitable that there will be slight inaccuracies and errors in the actual contents. User should refer to the actual product purchased. The latest user manual can be downloaded from  can also be obtained through Growatt's sales or service channels.

## 2.1 The product overview

### 2.1.1 Appearance
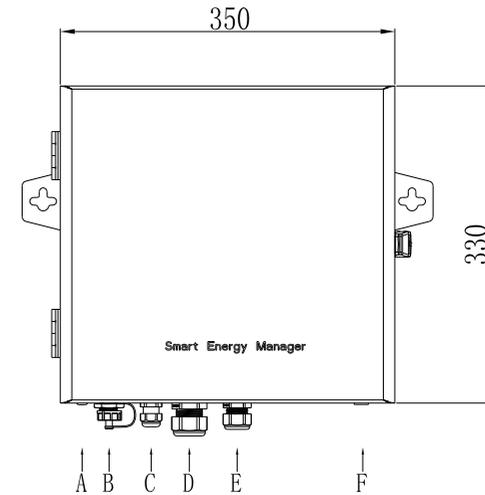


Figure 2-1 Appearance  (Unit: mm)

| Number | Description |
|--------|-------------|
| A | Two antanna interface（optional） |
| B | RJ45 interface |
| C | Rs485 interface |
| D | CT Port |
| E | Voltage sampling interface |
| F | Ground terminal |

## 2.1.2  Internal structure
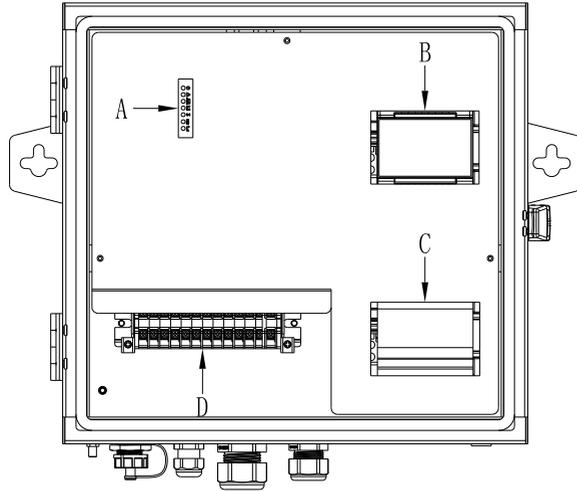


Figure 2-2 Internal structure diagram

| Number | Description |
|--------|-------------|
| A | ShineMaster Status LED |
| B | Meter panel |
| C | Breaker |
| D | Terminal block |

The Smart Energy Manager is mainly composed of ShineMaster, electricity meter, power supply, breaker and terminal block. The functions of each park are as follows:
1.ShineMaster:control core, data communication with inverter and electric meter, realize inverter power adjustment function and remote monitoring function.
2.Electricity meter: Real-time monitoring of voltage, current and function parameters.
3.Power supply: Power supply for ShineMaster.
4.Breaker: control the start and shutdown of the electricity meter and power supply.
5.Wiring terminal block: The place where the user wiring.

## 2.1.2.1 ShineMaster Status LED

There are 7 ShineMaster status LEDs,which can be used to display the running status of ShineMaster.
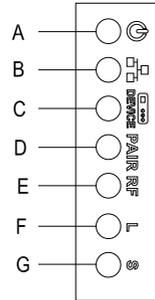


| Number | Name | Description |
|--------|------|-------------|
| A | Power LED | Power indicator light,constant on means power supply is normal. |
| B | Network LED | Network light:<br>1.off means fail to obtain IP address;<br>2.flashing means connecting to the server;<br>3.on means connection to the server successfully. |
| C | Device LED | The number of the LED continuously flashing means the device number connected to the ShineMaster. |
| D | Configuration LED | Flashing when configuration,if successful,the LED will be off(temporarily unavailable). |
| E | RF LED | RF signal indicator(temporarily unavailable). |
| F | 4G LED | 4G signal indicator(temporarily unavailable). |
| G | Status LED | LED flashes when ShineMaster is in a fault condition. |

## 2.1.2.2  Meter panel



Figure 2-3 Meter panel

The panel of the meter can display various power parameters:voltage,current,active energy,active power,power factor,and so on.The display interface and setting parameters can be switched through the 4 buttons on the right side of the panel.For details,see section 3.3.

### 2.1.2.3 Breaker

When the switch is shipped from the factory,it is in the OFF state of the lower dial.After the customer connects all the wires of the Smart Energy Manager,turn the cricuit breaker up,so that the cricuit breaker is in the ON state,and the meter and ShineMaster will start normally.

### 2.1.2.4 Terminal block



| 485B | GND | 485A | Ia1 | Ia2 | Ib1 | Ib2 | Ic1 | Ic2 | L1 | L2 | L3 | N |
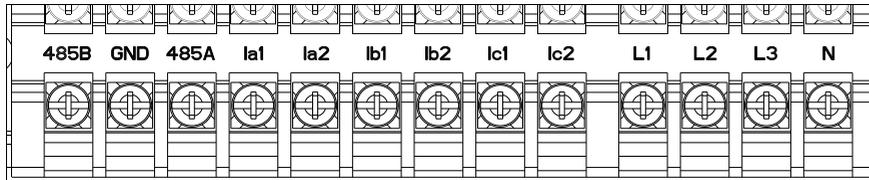
Figure 2-4 Terminal block

The terminal block has a total of 13 wiring ports,from left to right:RS485 interface (485B,GND,485A),current trandformer interface(Ia1,Ia2,Ib1,Ib2,Ic1,Ic2),voltage sampling interface(L1,L2,L3,N).

### 2.1.2.5 Current transformer

Smart Energy Manager with different system capacity will deliver different type of split current transformers for detecting the current of the gridconnected access points in low voltage distribution system.The specifications are as follows:

| System capacity | Current ratio | Precision degree | Through the number of turns | Outline size (mm) W*H*D | Througu size（mm） a*e |
|---|---|---|---|---|---|
| 50KW | 100A/40mA | 0.5 | 1 | 45*66.5*34.4 | 23.8*24.5 |
| 100KW | 250A/40mA | | | | |

Note：
1.The total power of the inverter or the total power of the load in the whole system cannot exceed the system capacity corresponding to the Smart Energy Manager.
2.Under any conditions,the current flowing through the primary side of the current transformer(CT) must not exceed its maximum detection range.
3.The current transformer should not be operated in a high humidity enviroment.
4.The longest connection distance of the attached CT is 5M.

## 2.2 Operating principle

Note:
The Smart Energy Manager supports both Gridtied inverter and Hybrid/AC Couple inverter,which are collectively to as inverter below.

The Smart Energy Manager works as follows:
1.The inverter converts the direct current generated by the sunlight to the photovoltaic string into alternating current.
2.The energy generated by the inverter can be used for user load,battery charging or output to the grid.
3.The Smart Energy Manager is located between the inverter,the user load and the grid,and detects the voltage and current of the grid connection point.According to the user's needs and settings,the inverter's output power is adjusted in real time to control the final output to the grid.

Photovoltaic grid-connected Export Limitation system block diagram:



A          B          C          D          E
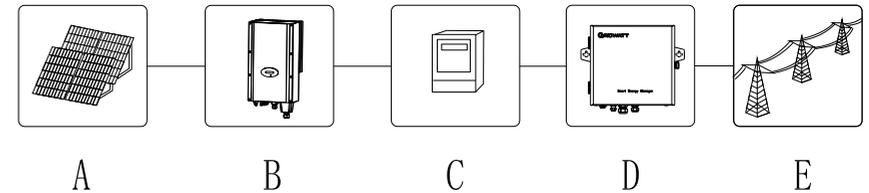
Figure 2-5 Photovoltaic grid-connected Export Limitation system

| Symbol | Description | Symbol | Description |
|---|---|---|---|
| A | Photovoltaic string | B | Grid-tied inverter or Hybrid/AC Coupled inverter with battery |
| C | Load | D | Smart Energy Manager |
| E | Grid | | |

## 2.3 Unpacking

| Number | Description | Quantity |
|---|---|---|
| A | Smart Energy Manager | 1 |
| B | CT | 3 |
| C | Expansion pipe | 2 |
| D | Self-Tapping Screw | 2 |
| E | Key | 1 |

## 2.4 Installation

Refer to the distance between the two wall-hanging holes in the figure below and make two holes in the wall.Insert the plastic expansion tube and lock the self-tapping screw on the plastic expansion tube.Fix the Smart Energy Manager on the wall and complete the installation.

386
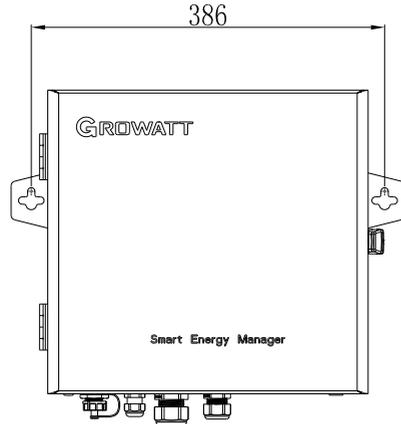


Figure 2-6 Wall-mounting holes（unit：mm）

Note:This product provides a special key for locking the upper cover,and the customer can operate according to the actual situation.

## 2.5 Wiring instructions

Remove the screws of the front cover,and you can see mark of wiring labels on the bottom left.Do the wiring according to figure 2-7.
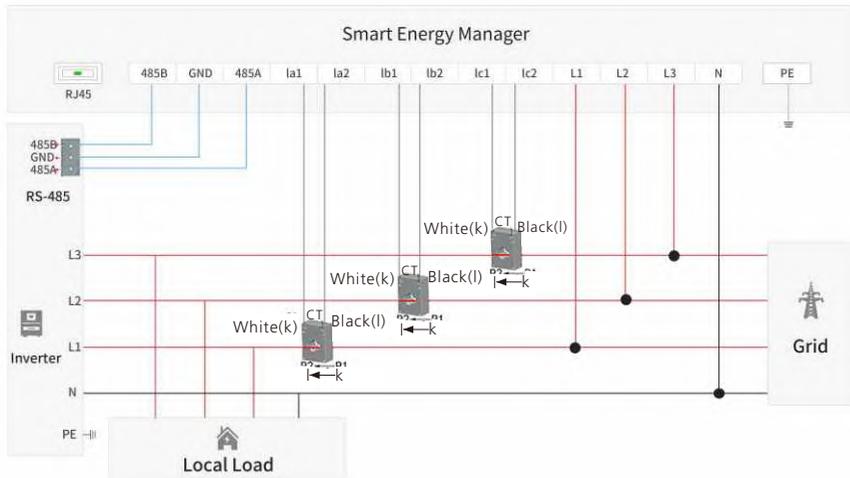


Figure 2-7 Wiring diagram of Export Limitation system

1.Overall wiring
As shown in the figure above,three current transformers and AC voltage sampling lines need to be placed between the load and the grid to detect the power of the grid access point in real time.The Smart Energy Manager is recommended to be installed near the power distribution cabinet and place the CT and AC voltage sampling lines in the power distribution cabinet.

2.RS485 interface
The RS485 interface of the Smart Energy Manager is used to connect the RS485 interface of the inverter.The wiring mode of multiple inverters can refer to the following figure.The note are as follows:

(1)It is recommended to use shielded twisted pair cable for RS485 wire.The shielding layer is connected to the GND pin of RS485 interface of Smart Energy Manager and inverter.

(2)The inverter can only be connected to a maxium of 10 units,and the referrence wiring diagram is wired in a daisy-chain topology.（Note:If the "Export Limitation" function is enabled,the inverter can only be connected to a maxium of 3 units.)
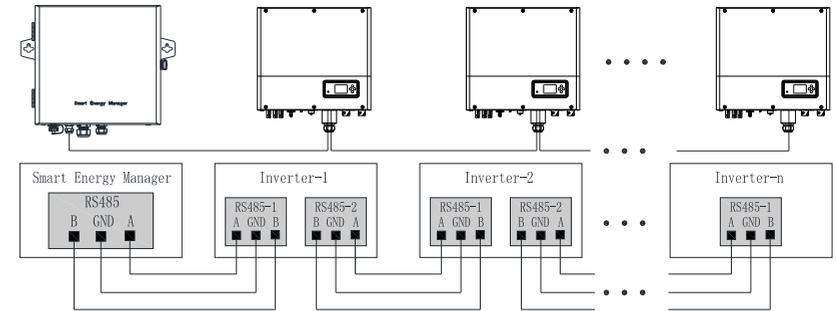


Figure 2-8 RS485 wiring diagram

3. Current transformer interface
There are P1 and P2 silk screens on both sides of the current transformer to distinguish the direction.Refer to Figure 2-7 for wiring.The P1 side is close to the grid and the P2 is close to the inverter and load.The transformer connection is as follows:

(1)White line of current tranformer 1(CT1) on inverter L1 is connected to la1,and black line is connected to la2,

(2)White line of current tranformer 2(CT2) on inverter L2 is connected to lb1,and black line is connected to lb2,

(3) White line of current tranformer 3(CT3) on inverter L3 is connected to lc1,and black line is connected to lc2,

Note:
(1)Before the current transformer is installed,it must be connected to the smart energy manager twice to ensure that there is no open cricuit on the secondary side of the transformer.

(2)If the primary busbar on the site is a cable,it can be installed by the professional electricians.If the busbar is a copper busbar,the electrification operation requires a high degree of proficiency for the operator and requires installation protection measures.

(3)When installing the current transformer,no foreign matter such as impurities or dust may fall into the cut surface of the core to avoid affecting the performance of the transformer.

4. Voltage sampling interface
Refer to Figure 2-7 to connect the voltage sampling line.According to the three-phase four-wires connection mode,L1/L2/L3/N must be connected,otherwise the Smart Energy Manager will not work properly.

5.RJ45 network cable interface
Pull a network cable from a router with a network and plug it directly into the RJ45 port of the Smart Energy Manager.This interface is used for remote monitoring.For details,see Chapter 5.

6.Ground terminal
In order to ensure the reliable operation and personal safety of the Smart Energy Manager,the grounding terminal on the outer casing must be reliably grounded.
Note:The ground terminal should be waterproof.

## 2.6 Cable specification

| Cable location | Cable cross-sectional area(mm2) | |
| --- | --- | --- |
| | Range | Recommended value |
| Rs485 wiring | 1~2.5（16~14AWG） | 1（16AWG） |
| Current transformer wiring | 1~2.5（16~14AWG） | 2.5（14AWG） |
| Voltage sampling wiring | 1~2.5（16~14AWG） | 2.5（14AWG） |
| Ground wire | 2.5~4（14~12AWG） | 4（12AWG） |

# Operation and application 3

## 3.1 System block diagram
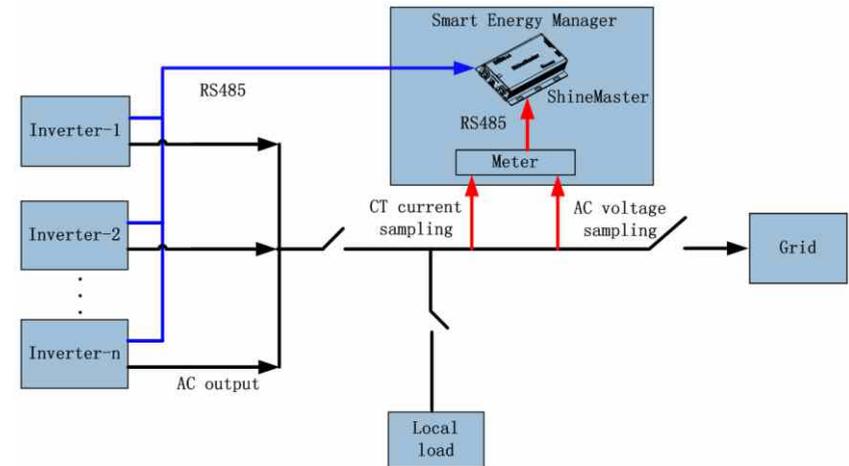


Figure 3-1 Block diagram of the Export Limitation system

1.ShineMaster obtains meter data every 1s and performs Export Limitation regulation for the real-time power of the grid-connected access point.
2.In the Export Limitation system,turn on the Export Limitation function in the ShineMaster built-in interface.

.1.ShineMaster obtains meter data every 1s and performs Export Limitation regulation for the real-time power of the grid-connected access point.
2.In the Export Limitation system,turn on the Export Limitation function in the ShineMaster built-in interface.

Export Limitation adjustment instructions：
A:The inverter with the lowest rated power in the Export Limitation system,
B:The inverter with the highest rated power in the Export Limitation system,
P1:Control power(P1=meter power + Export Limitation power, Export Limitation power can be positive or negatie),
P2:Idle power (P2=inverter rate power-inverter actual output power P)

(1)When -(A rate power*1%)≤ P1 ≤(B rate power*1%),Export Limitation regulation is not triggered.
(2)When the Export Limitation regulation is triggered and P1 ＞ (B rate power*1%),the inverter is required to increase the power output.The system starts to adjust within 10s,and the inverters are sorted according to the idle power P2 from lager to small.If P2 ≥ P1,then only the first inverter can be adjusted.If P2 ＜ P1,the remaining required power(P1 – P2) is assigned to the next inverter,and so on.

For example,there are 20K,60K inverters in the system,60K*1%=600W,and P1＞600W for Export Limitation regulation.

(3) When the Export Limitation regulation is triggered and −(A rate power*1%) > P1,the inverter is required to reduce the power output.The system starts to adjust within 10s,and the inverters are sorted according to the actual power P from large to small.If P⩾ |P1|,then only the first inverter can be adjusted.If P⩾ |P1|,the remaining power to be adjusted (|P1|-P) is assigned to the next inverter,and so on.
For example,there are 20K,60K inverters in the system,20K*1%=200W,P< -200W for Export Limitation regulation.

(4)If there are energy storage mechines in the system,when the meter pewer is negetive,the power flows to the grid.If the energy storage mechines can be charged,the Export Limitation system adjusts energy storage mechines for charging preferentially.If the power to the grid is larger than the charge power of the energy storage mechines,the system will require inverter to reduce the power output.

Description of energy storage monitoring mode:
The energy storage mechine monitoring mode is a spontaneous self-use mode when the energy storage mechine is operated in parallel with multiple mechines,and the energy storage mechines + inverter is working in patallel.The adjustment strategy is as follows:
(1):The meter power is negetive when the system power flows to the grid.If the energy storage mechine can be charged at this time,the system adjusts the energy storage mechine for charging.
(2):The meter power is positive when the system power flows to the load.The system adjusts the energy storage mechine for power output to the system,and reduces the power output from the grid.
(3):The inverter is in a normal power generation state during the entire adjustment process,that is ,the system dose not adjust the output power of the inverter.

Note:
(1):When triggering Export Limitation regulation and energy storage monitoring mode,the Smart Energy Manager intelligently distributes power according to the actual operating condition  of the inverter.The actual adjustment process and the above instructions may vary slightly.
(2):Selecting "NONE" is the normal monitoring mode.This mode only responses for obtaining and uploading all data in the system.

## 3.2 ShineMaster operation

### 3.2.1 Visit the ShineMaster built-in page

ShineMaster's built-in pages can be accessed through both static IP and dynamic IP access.And the paramerets of ShineMaster can be setted and modified.

### 3.2.1.1 Computer directly connected to ShineMaster's built-in page(static IP)

Connect the PC directly to the ShineMaster via the RJ45 cable.The computer IP is modified to 192.168.0.XXX(XXX is 2~253),and the default IP of ShineMaster is:192.168.0.254.You can access the ShineMaster built-in page by entering 192.168.0.254 on your computer browser.Conputer IP settings can refer to the following form:

| ID address | 192.168.0.5 |
| --- | --- |
| Subnet mask | 255.255.255.0 |
| Default gateway | 192.168.0.1 |

Note:
Do not need to set the DNS server address.If the 4G communication functioin is enable,you can only log in to the built-in page via dynamic IP.

### 3.2.1.2 Accessing the ShineMaster's built-in page through the router(Dynamic IP)

1.Connect the PC and ShineMaster to the same router so that they are on the san LAN.
Note:The router must have DHCP enabled.
2.Check the IP address of  ShineMaster.
Take the TP_LINK router as an example:
Enter the management page of the router;click"DHCP Server-> Client List";find the same client name as the serial number SN of the collector;this IP is the IP address assigned to the ShineMaster by the router.Ratio: ShineMaster serial number SN is: AEA3745001,the query result is as shown below:

| ID | Client name | MAC address | IP address | Valid time |
| --- | --- | --- | --- | --- |
| 1 | AEA3745001 | 00-47-8F-60-BF-34 | 192.168.100.101 | 01:30:32 |

Figure 3-2 Dynamic IP diagram by therouter

3.Enter the ShineMaster IP address 192.168.100.101 into the ShineMaster built-in page in your browser.

### 3.2.2 Log in

1. After the user successfully accesses the ShineMaster built-in page,you need to log in to modify or set the parameters.As shown below:



2.Enter the user name and password,the default login user name:admin,password:admin,fill in and click on "login" to enter the ShineMaster system page.
3.The system page mainly contains following 5 columns:
A.Datalogger State, B.ExportLimit & Datalogger setting, C.Network Setting, D.System Management, E.Device State

### 3.2.3 ShineMaster Datalogger State

Click on the "datalogger state" section on the left side of the page to view information such as ShineMaster "System Status Information", "Serial Number", "Server Address", "Number of Connected Device".The operator can know the running information of ShineMaster from this column.

| Datalogger information | |
|---|---|
| Connection status | Offline |
| SN | ZMD0933004 |
| Server IP | server-cn.growatt.com |
| Server port | 5279 |
| Datalogger location IP | 0.0.0.0 |
| Time | 5 |
| Datalogger MAC | 00:47:1F:B3:66:79 |
| Hardware version | V1.0 |
| Firmware version | 1.0.5.9 |
| Datalogger type | ShineMaster |
| Device number | 0 |
| Offline data number | 3 |
| Export limit enable | Enable |
| Export limit power (kW) | 0 |
| Baudrate | RS485_1: 9600;RS485_2: 9600 |

### 3.2.4 ShineMaster ExportLimit & Datalogger setting

Click the "ExportLimit & Datalogger setting" section on the left side of the page to perform Export Limitation function,add and delete decive,and modify the baud rate.

#### 3.2.4.1 Add device

1. Add one divice at a time
Select the RS485 channel in the first drop-down list of "Add or Remove Devive": "RS485_1



(2)Select the type of PV device to be monitored in the second drop-down list: "INVERTER"



Device types parameter information:
INVERTER:GROWATT Inverter;
SDM120: EASTRON single phase meter;
SDM630: EASTRON three phase four wire meter;
CHNT_DDSU:ZT single phase meter;
CHNT_DTSU:ZT three phase four wire meter;

(3)Fill in the communication address of the inverter in the third column.



(4)Select "Add" and click Save.
(5)After successfully saving,enter the "Device Status" page to confirm whether the devive is added successfully.

| Address | Device type | Device SN | Device state | Channel |
|---|---|---|---|---|
| 001 | INVERTER | | Suspend | RS485_1 |
| 019 | INVERTER | S123S456S7S6S7S8 | Suspend | RS485_1 |
| 020 | INVERTER | | Suspend | RS485_1 |
| 004 | CHNT_DDSU666 | | Suspend | RS485_2 |

The "Device State" in the above figure shows "normal",which means that the inverter or the meter is connected to the ShineMaster and is in normal communication.

2.Add multiple devices at once.
When there are multiple devices in a certain type and the addresses are consecutive,they can be added onece on the system.
As shown below:Add 10 inverters with addresses 1~10 on RS485_1.

| Export limit & Datalogger setting | |
|---|---|
| Meter channel | RS485_2 ∨ |
| Meter address | 2 |
| Monitor mode | ⦿NONE ○ Export limitation ○ Storage Parallel ☐ |
| Reactive power regulation | ○ On ⦿ Off |
| Add or delete devices | RS485_1 ∨ INVERTER ∨ 1-10 ⦿ Add ○ Del |
| SCADA to Vietnam | ○ On ⦿ Off |
| Update firmware | ○ Yes ⦿ No |
| Reboot | ○ Yes ⦿ No |
| | Save    Cancel |

### 3.2.4.2 Remove device

1.Delete one device at a time.
(1)Select the monitering method for monitoring PV devices in the first drop-down list of "Add or Remove Devices".
(2)In the second drop-down list,select the type of PV plant being monitored.
(3)Fill in the PV device communication address in the thrid drop-down list.
(4)Select "Del" and click Save to finish removing of device.
(5)After successfully saving,enter the "Device State" page to confirm whether the device is successfully deleted.

| Export limit & Datalogger setting | |
|---|---|
| Meter channel | RS485_2 ∨ |
| Meter address | 2 |
| Monitor mode | ⦿NONE ○ Export limitation ○ Storage Parallel ☐ |
| Reactive power regulation | ○ On  f |
| Add or delete devices | RS485_1 ∨ INVERTER ∨ 1 ○ Add ⦿ Del |
| SCADA to Vietnam | ○ On ⦿ Off |
| Update firmware | ○ Yes ⦿ No |
| Reboot | ○ Yes ⦿ No |
| | Save    Cancel |

2.Delete multiple devices at once
You can delete certain types of deveces in an address range continuously, but the types of devices must be the same.
As shown below:Delete the inverter with an address range of 1~10.

| Export limit & Datalogger setting | |
|---|---|
| Meter channel | RS485_2 ∨ |
| Meter address | 2 |
| Monitor mode | ⦿NONE ○ Export limitation ○ Storage Parallel ☐ |
| Reactive power regulation | ○ On ⦿ Off |
| Add or delete devices | RS485_1 ∨ INVERTER ∨ 1-10 ○ Add ⦿ Del |
| SCADA to Vietnam | ○ On ⦿ Off |
| Update firmware | ○ Yes ⦿ No |
| Reboot | ○ Yes ⦿ No |
| | Save    Cancel |

Add and remove device notes:
(1)The second option:device type:All of Growatt's inverter products: PCS,HPS,MAX,MIN,MTLP-US,SPC3000,SPC2000,SPH&SPA and other inverter models are selected as "INVERTER" in this item.

(2)When you need to delete a device,all the options should be the same with the moment you add this device like: 485 channel,device type,address,if you are not sure about this, you can cherk the device status first.

(3)When one address is occupied,you cannot just overwrite by adding the news device,you have to delete the old device and then use this address.

### 3.2.4.3 Export Limitation function setting

The Export Limitation function is not enabled by default at the factory.To use the Export Limitation feature,you can modify it through the configuration page.
1.Turn on Export Limitation function.The steps are as follows:
(1)Select "Export Limitation" in the "Monitering mode" column;
(2)In the "MeterChannel" column,select the 485 channel "RS485_2" that connects the meter;(Default)
(3)Enter the 485 communication address of the meter in the "MeterAddress" column: 2;(Defanlt)
(4)Enter the maximum power allowed to be delivered to the grid or allowed to be taken from the grid in the "Export Limitation Power(KW)" field.The default is 0;

Note:If you enter -100,the user is allowed to obtain a maximum of 100KW power from the grid.If the load exceeds 100KW,the inverter will rise output power.If enter 100,the system will allow to export 100KW to the grid.When the output of the grid exceeding 100KW,the system will limit the inverter power output.

(5)Select "ON" in the "Fallback activated" column to enable the Export Limitation failsafe function.When "OFF" is selected, "Active Power" and "Fallback activates after" will be invalid.

Note:If the "Fallback activated" column is "ON".When the communication between the inverter and the Smart Energy Manager fails,the inverter is not contctrolled by the Smart Energy Manager.When the communication failsafe time exceeds the "Fallback activates after" set value,the inverter will alarm and enter the Export Limitation failsafe state.The maximum output power of the inverter is limited to "Active Power" set value.

(6)In the "Active Power" column,you can enter 0~100,whicn means that when the Export Limitation function fails,all inverters participating in the Export Limitation adjustment limit the maximum output power by this percentage.。

Note:One inverter is rated at 20KW and "10" is entered in this column.When the Export Limitation function fails,the maximum output power of the inverter is limited to 20KW*10% = 2KW.

(7)Enter 10~5000s in the "Fallback activates after" field.When the inverter and Smart Energy Manager have a communication failure and exceed this set time,the inverters will alarm and enter the Export Limitation failsafe state.

| Export limit & Datalogger setting | |
|---|---|
| Meter channel | RS485_2 ∨ |
| Meter address | 2 |
| Monitor mode | ○ NONE ● Export limitation ○ Storage Parallel ☐ |
| Export limit power (kW) | 0 (XX:Export, -XX:Import) |
| Fallback activated | ● On ○ Off |
| Active power | 10 % (0 ~ 100)% |
| Fallback activates after | 120 s (120 ~ 5000) seconds |
| Reactive power regulation | ○ On ● Off |
| Add or delete devices | RS485_1 ∨ INVERTER ∨ 1-10 ○ Add ● Del |
| SCADA to Vietnam | ○ On ● Off |
| Update firmware | ○ Yes ● No |
| Reboot | ○ Yes ● No |
| | Save    Cancel |

The Export Limitation function is enabled in the above   figure:
Setting the meter which is 2 in the RS485_2 address as the Export Limitation meter,"Active Power" is set to 0 and this general recommended setting is 0.The inverter connected to the Smart Energy Manager's RS485 interface will actually be connected to the ShineMaster's RS485_1 channel and will participate in the Export Limitation regulation.

2.Turn off the Export Limitation function
The Export Limitation function is not enabled by default at the factory.If the Export Limitation function is enabled during installation and then you need to turn it off,simply select OFF in the "Export Limitation Function" field.Other options may be modified.Click "Save" to turn off the Export Limitation function of the entire system.
As shown below:

| Export limit & Datalogger setting | |
|---|---|
| Meter channel | RS485_2 ∨ |
| Meter address | 2 |
| Monitor mode | ● NONE ○ Export limitation ○ Storage Parallel ☐ |
| Reactive power regulation | ○ On ● Off |
| Add or delete devices | RS485_1 ∨ INVERTER ∨ 1-10 ○ Add ● Del |
| SCADA to Vietnam | ○ On ● Off |
| Update firmware | ○ Yes ● No |
| Reboot | ○ Yes ● No |
| | Save    Cancel |

Note:
Please select the "Energy Storage Monitoring" mode when  the field application needs to enable the energy storage machine parallel or the spontaneous self-use function of energy storage mechine + inverter.

### 3.2.4.4 Reactive power adjustinng setting（This feature is temporarily unavailable）

The factory default is not to enable the reactive power adjustment function.If you want to use the reactive power adjustment function,you can modify it through the configuration page.
1.Turn on the reactive power adjustment function. The steps are as follows:
(1)Select "ON" in the "ReactivePower Adjustment Enable" column;
(2) In the "MeterChannel" column,select the 485 channel "RS485_2" that connects the meter;(Default)
(3) Enter the 485 communication address of the meter in the "MeterAddress" column: 2;(Defanlt)
(4)Select the application scenario:NO_1,NO_2;
(5)Choose whether to enable reactive power priority.When reactive power priority is enbled,the rated reactive output power of the inverter increases.The specific increase depends on different inverters.
(6)Setting the systen PF(Target PF value).(Can only be set in NO_2 scene)

Note:
(1):Application scenario NO_1,indicating the application is as follows:
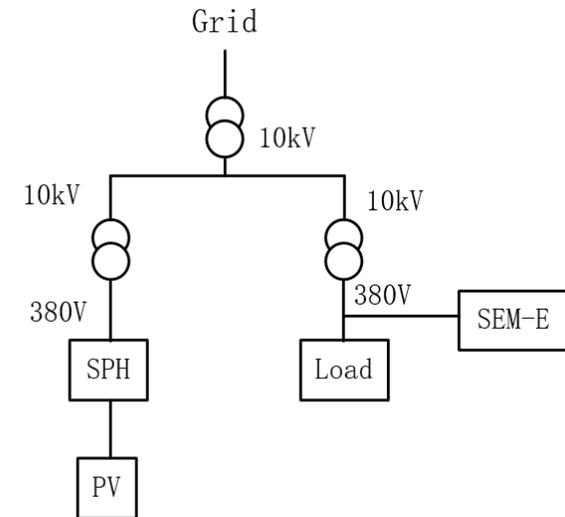


The Smart Energy Manager is connnected to the load.The meter shows the reactive power and PF of the load.

(2) :Application scenario NO_2,indicating the application is as follows:
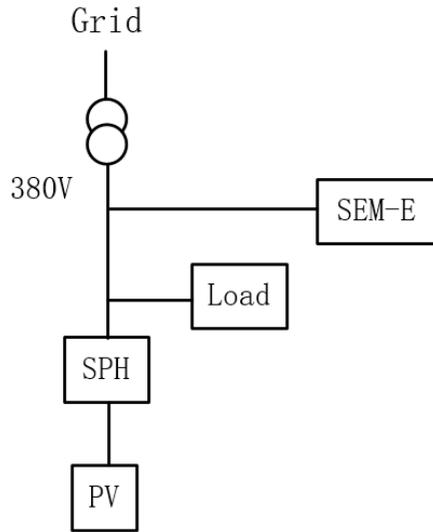


The Smart Energy Manager is connnected to the grid(Line voltage is less than 540V).The meter shows the reactive power and PF of the grid.

System reactive power compensation principle:The Smart Energy Manager obtains the reactive power of the meter and controls the inverter to output corresponding inductive and capactive compensate for the reactive power consumed on the load side.

### 3.2.5 ShineMaster network settings

When you need to use the remote monitoring function of ShineMaster,you need to set up your network.Under normal circumstances,the network parameters have been set at the factory,and can be run according to the default configuration .

#### 3.2.5.1  Collector network IP settings (default)

Click on the "Network Setting" section on the left side of the page to set up the network.
1.ShineMaster's Default setting of the DHCP function is "ON",it will automatically get IP address from router



2.If you need to set ShineMaster to a fixed IP,you need to set it as follows:

(1)Select "OFF" in the "DHCP Enble" column to disable the DHCP function.
(2)Set parameters such as IP,gateway,subnet mask,DNS,ect.,and then click "Save".As shown below:
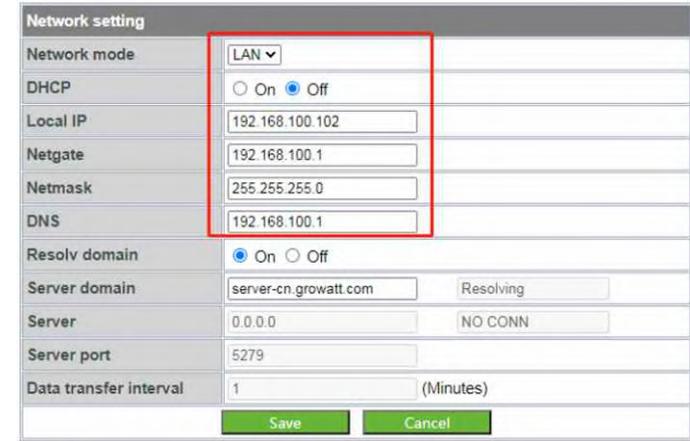


#### 3.2.5.2  Server address setting (default)

There are two ways to access the server: fill in the IP address and fill in the domain name address. You can only enable one of the two methods, please choose according to the actual use. The default setting at the factory is to connect to the server by domain name address.
1. Access the server by domain address
In the "ResolvDomain" column, select "ON", then the "Server IP" column will be grayed out. Set the domain name to : server-cn.growatt.com .As shown below:
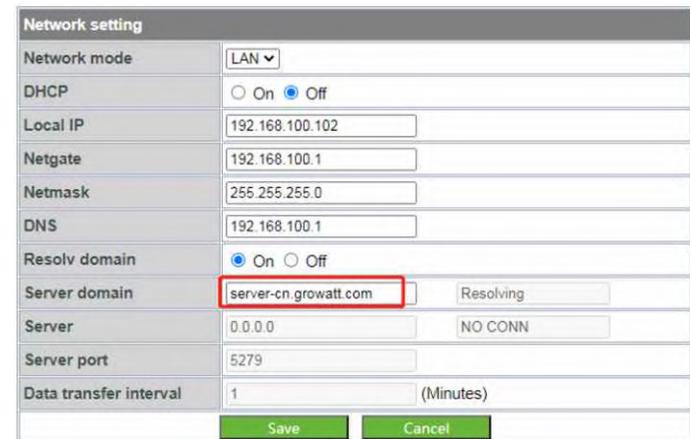
2. Access the server by IP address
Select "OFF" in the "ResolvDomain" column, and the "Server Domain" column will be grayed out. Set the IP address to 120.77.127.135 .As shown below:

| Network setting | |
| --- | --- |
| Network mode | LAN ∨ |
| DHCP | ○ On ● Off |
| Local IP | 192.168.100.102 |
| Netgate | 192.168.100.1 |
| Netmask | 255.255.255.0 |
| DNS | 192.168.100.1 |
| Resolv domain | ○ On ● Off |
| Server domain | server-cn.growatt.com    Resolving |
| Server | 120.77.127.135    NO CONN |
| Server port | 5279 |
| Data transfer interval | 1    (Minutes) |
| | Save    Cancel |

Note:
(1):If the connection is a Growatt server, the columns "Server Port" and "Data Transfer Interval" are fixed and should not be modified by the user.
(2):Non-special circumstances shall not use the fixed IP of the server to connect to the server. By default, the connection of the domain name is used.

### 3.2.6 Configuration page operation precautions

1.If you add a device, the interface will not be reflashed after clicking Save. Please restart the ShineMaster and click "Device State" to check whether the last operation was successful.
2.When configuring the parameters of the corresponding function, simply configure the parameters of the corresponding function as described above. Other parameters that are not related to the required configuration function should remain unchanged.

## 3.3 Meter operation
### 3.3.1 Displayed function
There are four buttons on the right of the monitor, they are "ESC（←）V/A","↑（Alt）MD/PH/HZ"，"↓（Shift）P" and "ENTER（→）E" from top to bottom. There are two ways to touch the button, long press(press more than two seconds) and short press(press for less than one second).

| NO. | Button | Feature | Viewable content(Short press) |
| --- | --- | --- | --- |
| 1 | U/I ESC | Short press: display voltage and current,← Long press: ESC | Phase voltage, line voltage, phase current, neutral current, voltage harmonics, current harmonics |
| 2 | M | Short press: display power factor and frequency,↑ Long press: Alt | Phase (total) frequency, total power factor, phase (total) maximum current demand |
| 3 | P | Short press: display power,↓ Long press: Shift | Phase (total) active power, phase (total) reactive power, phase (total) apparent power |
| 4 | E | Short press: display energy,→ Long press: Enter | Total active power, total reactive power, forward active power, reverse active power, forward reactive power, reverse reactive power |

Figure 3-3 meter button and display feature

### 3.3.2 Programming operation

The default communication address of the meter is 02, the default baud rate is 9600 and the default current ratio is 100A/40mA for 50KW system, 250A/40mA for 100KW system. If the meter and the inverter cannot communicate normally, please confirm whether the communication address and baud rate are set correctly. Enter the setting menu (default password is 1000) for long pressing [E] ,and then short press [M] and [P] to findthe option that needs setting.If the corresponding setting option is flashing, you can set by short pressing [M] and [M] Otherwise, you need to short press [E] first. When finished, long press to confirm, then short press several times to exit the setting menu.
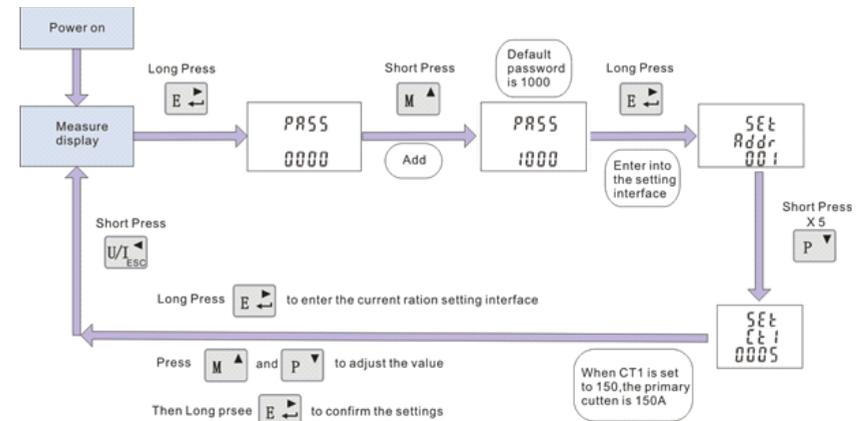


Figure 3-4 Setting examples for current ratio

# 4 Wiring and Export Limitation verification

Before verifying, confirm that the inverter and the meter in the ShineMaster built-in page are connected, or log in the monitoring server to confirm that the inverter and the meter are online.

## 4.1 Wiring verification

Method 1:After completing the wiring, turn off all inverters, and all inverters output power is 0.At this time, if the load power is 20kW,the combined phase active power of the meter should be displayed as +20KW.This shows that the sampling point and CT wiring of the meter are correct.

Method 2:After the wiring is completed, the load is disconnected and the load power is 0.At this time, set "Export Power(KW)" to 10KW.If the inverter has enough illumination to output 10KW,the combined phase active power of the meter should be displayed as -10KW.This shows the sampling point and CT wiring of the meter are correct.

## 4.2 Export Limitation verification

After the wiring is completed, the Export Limitation function can be verified by observing the inverter power change.
Method: After setting "Export Power (KW)" to 0KW, disconnect the load. If the power of the inverter drop significantly to 0KW after 60s (the power displayed on the LCD screen or LED of the inverter becomes smaller),the Export Limitation function is normal.

# Remote monitoring(optional) 5

The Smart Energy Manager can implement functions such as Export Limitation and Self-consumption locally. When ShineMaster is required to upload the monitored data to the Growatt server (ShineServer), ShineMaster needs to be added to the server. Access through domain names to view historical data, current data, data charts, historical data charts and so on.

1. Enter the server domain name on the computer browser and go to the ShineServer login page. If you are logging in for the first time, please register your username first. Enter the domain name access page as shown in Figure 5-1.

The server domain name of the Chinese user is: http://server-cn.growatt.com
The server domain name of the international user is:http://server.growatt.com
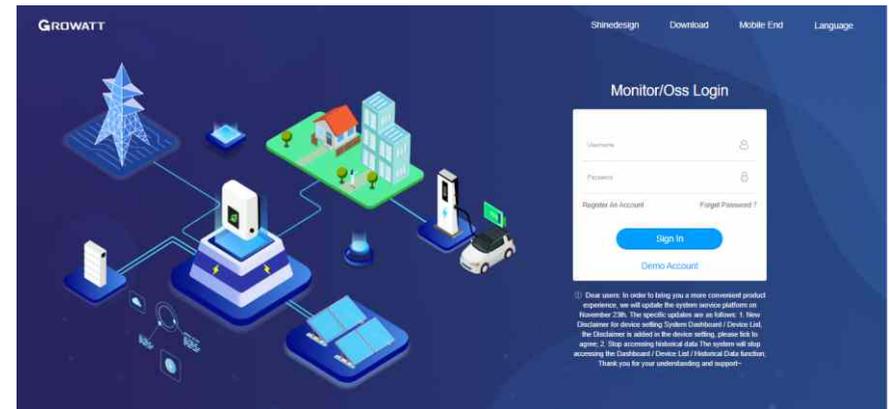


Figure 5-1 Shine Server login page

2. Register the user name, enter the user information according to the prompt, and fill in the information, click "Register".

Figure 5-2 Shine Server register page

Note: "Collector SN" and "Collector CC" can be seen at the nameplate or accessory bag on the Smart Energy Manager, as well as the built-in page of ShineMaster. Refer to the figure below.



3.After the registration is completed,it will automatically jump to the main interface of Shine Server.Click "Sales Maintain"→ "After-sales Inquiry" to view real-time data of "data Collector", "Inverter List" and "Smart Meter List".
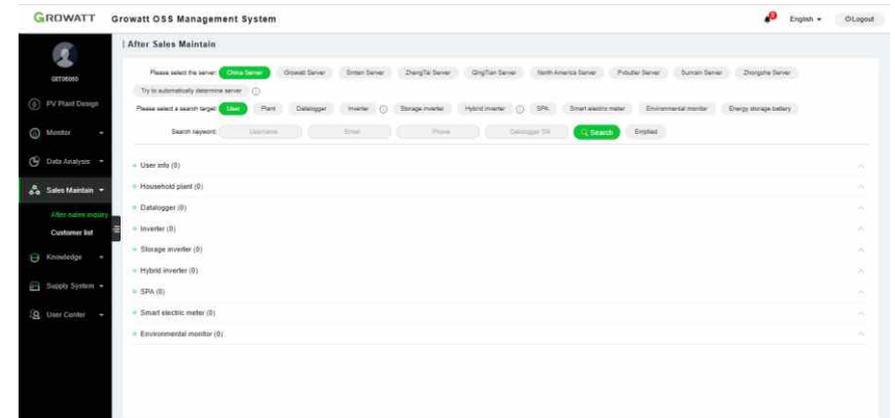


Figure 5-3 Shine Server main interface

# 6 Export Limitation and Self consumption

In the "Dashboard" section of the monitoring(Shineserver and Shinephone) home page, when the Export Limitation function is turned on, it is displayed as an Export Limitation interface; when the Export Limitation function is turned off, it is display as a Self-consumption interface.

The monitoring page can display data such as power generation, power consumption, power supply back to the grid,and power consumption of the grid, and support remote monitoring and parameter setting.

1. Export Limitation page

When the Export Limitation function is turned on, the page will identify "Export Limitation is turned on" and display the power fed back to the grid and the power taken by the grid. The interfaces of Shineserver and Shinephone are as follows:
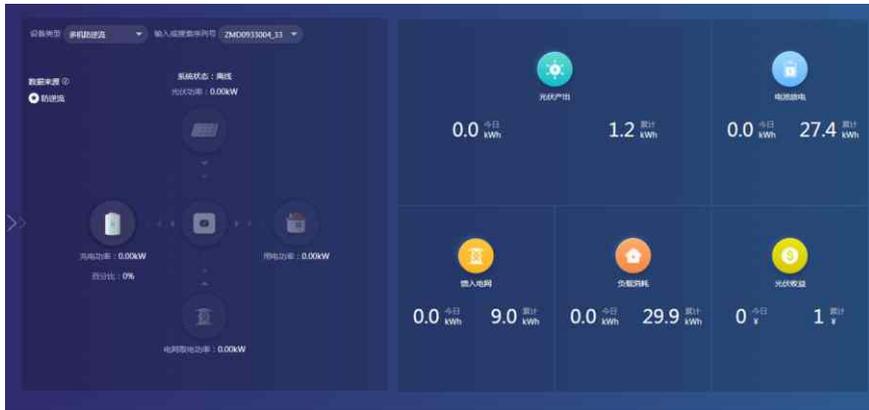


2. Self-consumption page

When the Export Limitation function is turned off, the page no longer identifies Export Limitation data and displays the system status of Self-consumption. The interfaces of Shineserver and Shinephone are as shown below:

# Common malfunctions 7

| Fault description | Fault performance | Troubleshooting method |
|---|---|---|
| After adding ShineMaster to the server, it has not been online for a long time. | ShineMaster's network LED is flashing for a long time. | 1.Ensure that the ShineMaster and the router network cable are connected properly.<br>2.The router needs to enable DHCP and the network is normal.<br>3.The router cannot block port 5279.<br>4.Refer to section 3.2.5.2.The international user website is server-cn.growatt.com |
| ShineMaster is online, the inverter is not online for a long time | ShineMaster's Device LED is off or the number of periodic flashes is not equal to the number of machines | 1.ShineMaster and inverter RS485 communication wiring is abnormal.<br>2.The device is not added to the ShineMaster built-in page.<br>3.The RS485 address of the added device is different from the actual RS485 address of the inverter. Adding the RS485 channel of the device is different from the actual RS485 channel of the inverter. Refer to section 3.2.4.2. |
| ShineMaster is online, smart meter is not online for a long time. | ShineMaster's Device LCD is off or the number of periodic flashes is not equal to the number of machines | 1.ShineMaster and inverter RS485 communication wiring is abnormal.<br>2.The device is not added to the ShineMaster built-in page.<br>3.The RS485 address of the added device is different from the actual RS485 address of the inverter. Adding the RS485 channel of the device is different from the actual RS485 channel of the inverter. |
| Export Limitation failure | The meter display data dose not match the Export Limitation effect | 1.The abnormality of the RS485 connection between ShineMaster and the inverter or meter.<br>2.The actual communication address of the inverter or meter is different from the added address.<br>Current transfromer wiring is misaligned or reversed. |
| The meter detection power value does not match the actual value | The power displayed by the meter is too much wrong with the actual value | 1.Current transfromer wiring is misaligned or reversed.<br>2.Meter current ratio setting error. |

| Smart Energy Manager | | |
|---|---|---|
| System capacity / Specification | 50KW | 100KW |
| **Input voltage data** | | |
| Normal input voltage/ range | 230/400Vac 173~480Vac | |
| Normal input frequency/ range | 50/60Hz 45-55Hz/55-65Hz | |
| AC grid connection type | 3W/N/PE | |
| **Input current and CT data** | | |
| Maximum detection current (CT primary current) | 100A | 250A |
| Maximum input current (CT secondary current) | 40mA | |
| Current detection accuracy (CT) | 0.5 | |
| **Interfaces** | | |
| RS485 | Yes | |
| Ethernet | Yes | |
| Interver maximum connection number | 10PCS | |
| Maximum communication distance | RS485 shielded twisted pair cable : 500m Ethernet cable : 100m | |
| **General data** | | |
| Dimensions(W/H/D) | 350*330*107mm | |
| Weight | 6KG | |
| Operating temperature range | −25°C - +60°C | |
| Protection degree | IP65 | |
| Relative humidity | 0~100% | |
| Location | Indoor | |
| Altitude | 2000m | |
| Terminal type | U shape terminal | |
| **Certification** | | |
| Safety | CE | |

Note:
1.The total power of the inverter or the total power of the load in the whole system cannot exceed the system capacity corresponding to the Smart Energy Manager.

Growatt New Energy provides customers with a full range of technical support.Users can contact the nearest Growatt New Energy office or customer service point,or they can contact the company's customer service center directly.