M-Master Central Controller

Installation and Operation Instructions

MDG44-BTW23

Table of Contents

Safety Warning

The product itself and the Installation and Operation Instructions contain operation, personal injury and property loss prevention, and correct and safe operation of the product.Fully understand the following markings or signs, read this document, and observe the following precautions.

⚠CAUTION

Read this safety warning carefully before installation.
The following contents are important for safety. Do observe them.
The meaning of each part is as follows:

⚠ **Warning** It indicates that incorrect handling will result in personal injury or property loss.

⚠ **CAUTION** It is highly likely that the best operation result will not be obtained due to ignoring the contents of precautions.

After installation, have a trial run to confirm that the device runs normally, and hand over the Installation and Operation Instructions to the customer.

Marking description

Marking	Name	
⃠	Prohibition. The specific content to be prohibited will be represented with graphics or words in or near the marking.	
❗	Compulsory requirement. The specific compulsory content will be represented with graphics or words in or near the marking.	
⚠ Warning	Installation entrustment	Please entrust a dealer or professionals with installation. The installation personnel must have relevant professional knowledge. Incorrect operation by yourself will lead to fire, electric shock or injury.
⃠ Warning in Operation	Prohibition	Do not spray flammable spray directly to the data converter. Otherwise, a fire may be caused.
	Prohibition	Do not operate the product with wet hands, or let water enter the product. Otherwise, you may get electric shock.

⚠Warning

- This device must be installed by professional technicians, rather than by the customers. Otherwise, you and others may be injured and the controller may be damaged.
- The device must be wired by professional technicians according to the circuit diagram and in compliance with electrical safety specifications.
- Do not change the use and function of the device without permission.
- Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator & your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Operation Instructions

⚠CAUTION

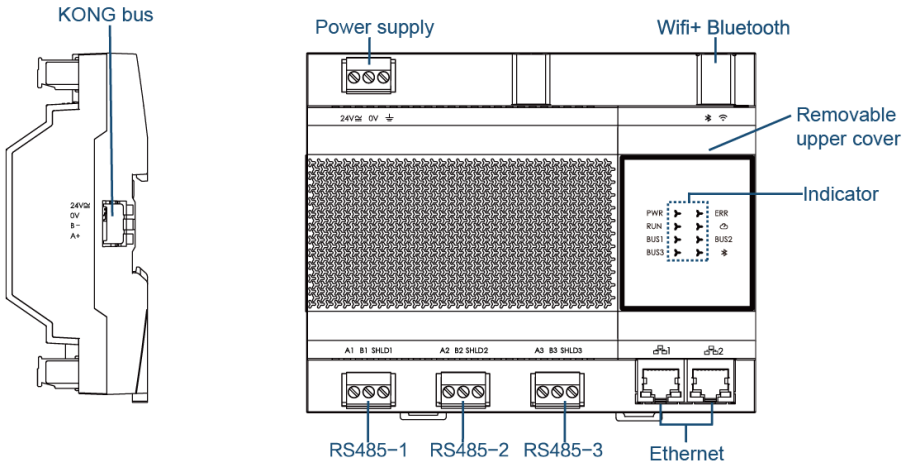
- Do not install the device in places with potential flammable gas leakage. Once flammable gas leaks and stays around the device, a fire may be caused.
- Wire the device based on the current of controller.
- Check the wiring before powering the device on. Do not install the device lively.
- In case of fault, contact professional technicians, but do not remove and repair the device by yourself.
- Do not install the device at the position where children may gather.

- This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.
- However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
  * Reorient or relocate the receiving antenna.
  * Increase the separation between the equipment and receiver.
  * Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
  * Consult the dealer or an experienced radio/TV technician for help.
- This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator & your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Installation Instructions

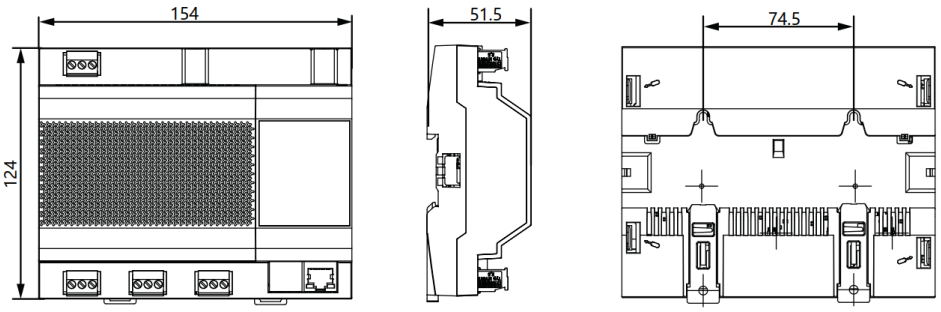
Product Introduction

M-Master is an edge computing gateway, and its product functions are oriented to data and computing services for residential photovoltaic thermal storage systems. Its main function is to monitor, report and flexibly control Midea's solar thermal storage flexible system, which includes Midea's heat pump, Midea's hybrid inverter and related photovoltaic energy storage products. M-Master can complete the construction of the data path of the optical thermal storage and flexible system after simple configuration, and the user-friendly man-machine interface and fast data line access method reduce the threshold and cost of the construction of the optical thermal and flexible Internet of Things. At the same time, users can get full life cycle technical support through OTA upgrades.



Product dimensions

Unit: mm



Operation Instructions

Installation of accessories

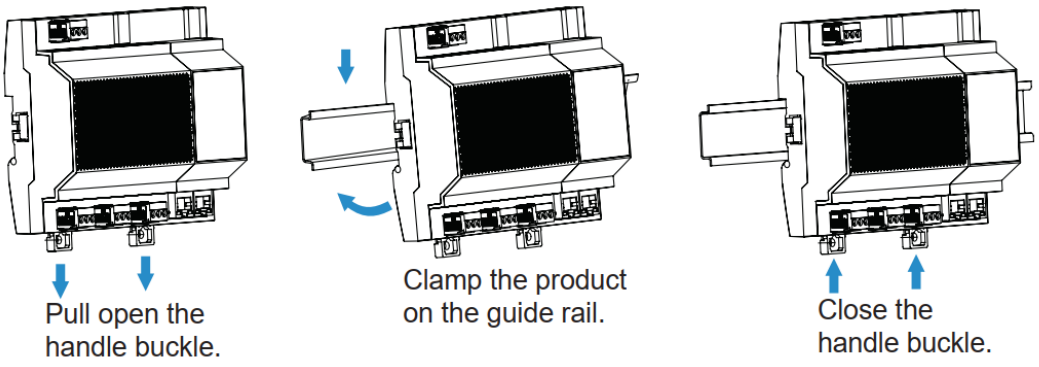
Please confirm whether the following components are complete:

S/N	Name	Quantity	Notes
1	Self-tapping screw	4	ST4*20
2	Plastic expansion pipe	4	For installation of controller on wall
3	3 PIN black terminal	3	For communication
4	3 PIN gray terminal	1	For connection to power supply
5	Sucker antenna	1	Signal enhancement

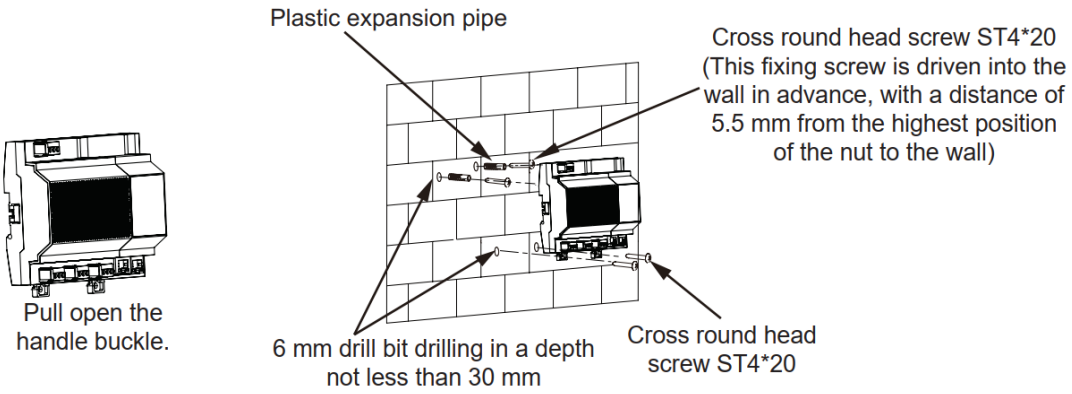
Operation Instructions

Installation method

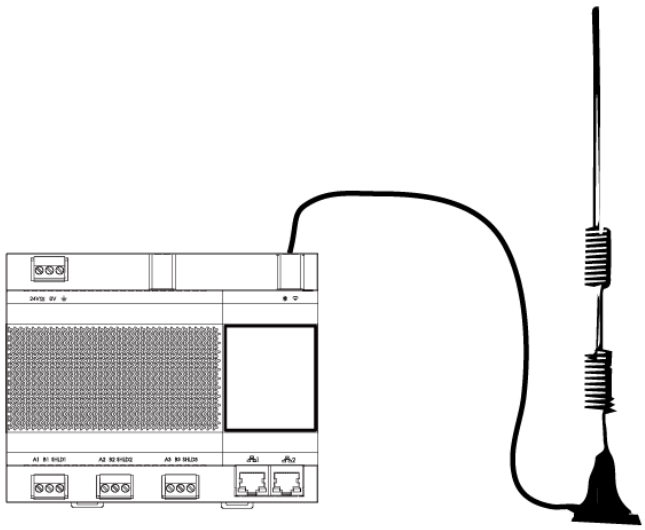
1. Installation on guide rail



2. Installation on wall



3. Antenna installation chart



Note: If the appearance and color of the product are changed, the actual product shall prevail

Operation Instructions

1.Hardware Introduction

1.1 Main parameters

Product model	MDG44-BTW23
Rated voltage	AC 24V ± 20%, 50/60Hz, 12VA DC 24V ± 10%, 8W
Operating environment	-20℃ ~ 60℃
Operating humidity	≤93% (no condensation)
Pollution degree	3
Overvoltage category	Ⅲ

1.2 Performance parameters

Name	Performance
CPU	Quad-core Cortex-A35 64-bit CPU, 1.5GHz
Memory	DDR4 1600 MHz 1 GB
Flash	eMMC 8 GB
Ethernet	10/100 Mbps Daisy-chain topology supported (ring network to be supported only with anti-loopback switch)
WIFI	2.4 GHz WIFI supported 802.11 b/g/n protocol supported
Bluetooth	Bluetooth Low Energy (BLE) supported

⚠CAUTION

- 1. Requirements for power supply selection: The linear transformer must be a safety isolating transformer conforming to IEC61558-2-6; The switching power supply should be of reinforced insulation conforming to IEC 61558-2-16; SELV adapter shall be selected and conform to LVD Directive and EMC Directive;
- 2. The power of recommended power supply is 1.2~2 times that of rated load. When power supply is selected, the sum of the controller power and IO module power fed by the controller expansion port should be calculated;

1.3 Communication interface

Interface	Sign	Application	Technical parameters
Ethernet interface	1 2	Web page device parameter onfiguration Web page device firm-ware upgrade Web page programming Communication support Modbus TCP BACnet IP	● Port: RJ45, shielded ● Rate: 10/100 Mbps ● Daisy-chain topology supported (ringnetwork to be supported only with anti-loop-back switch)
RS485-1	A1 B1 SHLD1	Communication support ●BACnet MS/TP ●Modbus RTU	● Interface type: RS-485 (EIA-485) interface ● With isolation ● Rate: 4800, 9600, 38400 (bps) ● BUS 1 flashes during data transmission ● Software configuration terminal matching resistor ● One bus only supports to turn on terminal matching resistor at both ends.
RS485-2	A2 B2 SHLD2	Communication support ● Modbus RTU	● Interface type: RS-485 (EIA-485) interface ● With isolation ● Rate: 4800, 9600, 38400 (bps) ● BUS 2 flashes during data transmission ● Software configuration terminal matching resistor ● One bus only supports to turn on terminal matching resistor at both ends
RS485-3	A3 B3 SHLD3	Communication support ● Modbus RTU	● Interface type: RS-485 (EIA-485) interface ● With isolation ● Rate: 4800, 9600, 38400 (bps) ● BUS 3 flashes during data transmission ● Software configuration terminal matching resistor ● One bus only supports to

			turn on terminal matching resistor at both ends.
Bluetooth		Quick network configura tion service	Bluetooth Low Energy (BLE) technology

1.4 Indicator

Type	Sign	Status/color	Function description
Power supply	PWR	OFF	Device powered off
		Normally ON in red	Device powered on
Running	RUN	OFF	Abnormal running of main flow
		Normally ON in green	Abnormal running of main flow
		Flashing in green	Device in normal operation
Cloud		OFF	WiFi not connected
		Normally ON in white	WiFi connected
Fault	ERR	OFF	Normal, no fault
		Normally ON in red	Fault
RS485-1 communication	BUS1	OFF	No data transmission
		Flashing in green	Normal communication, with data transmission
RS485-2 communication	BUS2	OFF	No data transmission
		Flashing in green Normal communication, with	Flashing in green Normal communication, with
RS485-3 communication	BUS3	OFF	No data transmission
		Flashing in green	Normal communication, with data transmission
	1 2	Yellow indicator off	No connection
		Green indicator flashing	In network communication
		Green indicator off	No connection
		Green indicator off	No connection

2.Quick Start

This Manual, with the M-Master controller, the heat pump MHC-V5WD2N8-C and the inverter ME-HS5L as examples, provides the process of building an FHPE (Flexibility, Heat Pump, Photovoltaic, and Energy Storage) system, which can be monitored by iEasyEnergy APP.

2.1. Basic information about the device

Item	Factory default
IP address	192.168.100.185
Configuration page address	https://192.168.100.185
Username	admin
Password	123AB@ab
iBuilding server	Overseas server
Timer	15 min
Impedance Matching	All closed
Configuration page language	Subject to the system language (English in case of no matching language)

2.2. Items Required

In order to achieve the above functions, the following items are required:

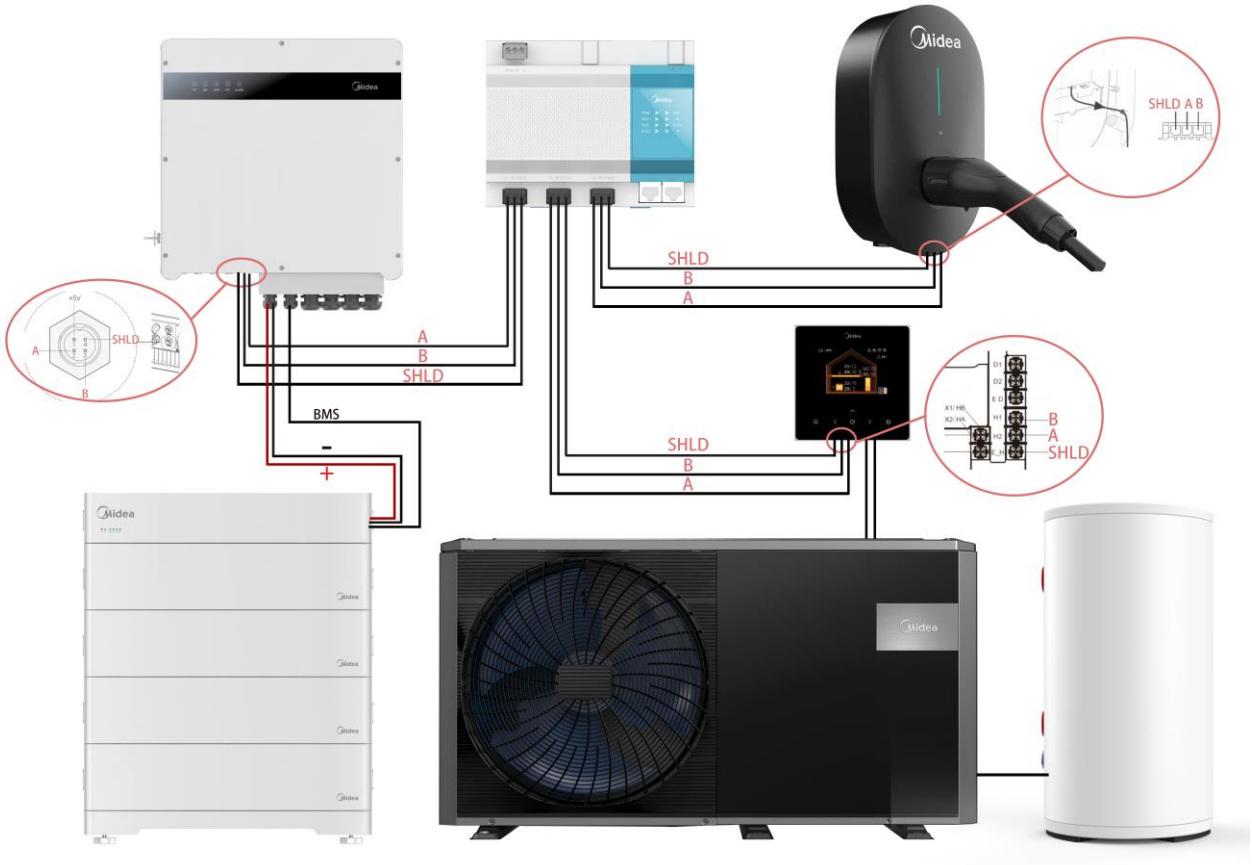
1. M-Master controller
2. Heat pump unit that can operate normally and its wired controller
3. Hybrid inverter and energy storage and PV modules that can operate normally
4. Power supply for normal operation of the M-Master controller (see above)
5. Three-conductor shielded cables for connecting the M-Master controller to the heat pump unit and the hybrid inverter
6. Ethernet cable
7. PC installed with Chrome or Edge browser (for gateway configuration)
8. Internet accessible network (Ethernet or Wifi)

2.3. Steps Overview

1. Connect the communication line
2. Power on
3. Access to LAN
4. Visit the M-Master Configuration page
5. Add devices and check connection status
6. Access to the Internet
7. Bind controllers

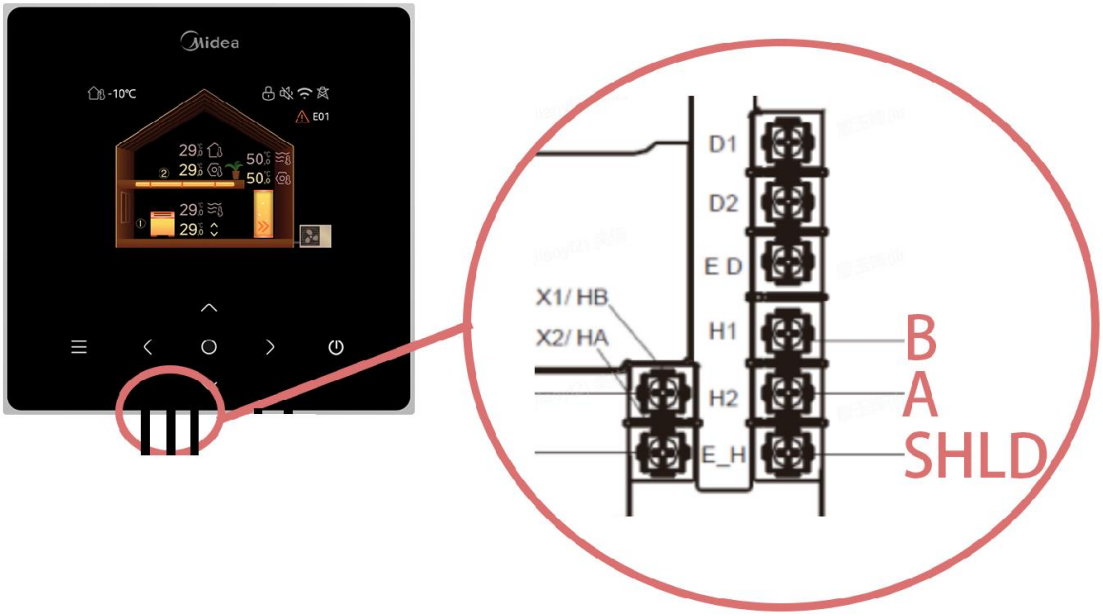
2.3.1. Step 1 Connect the Communication Line

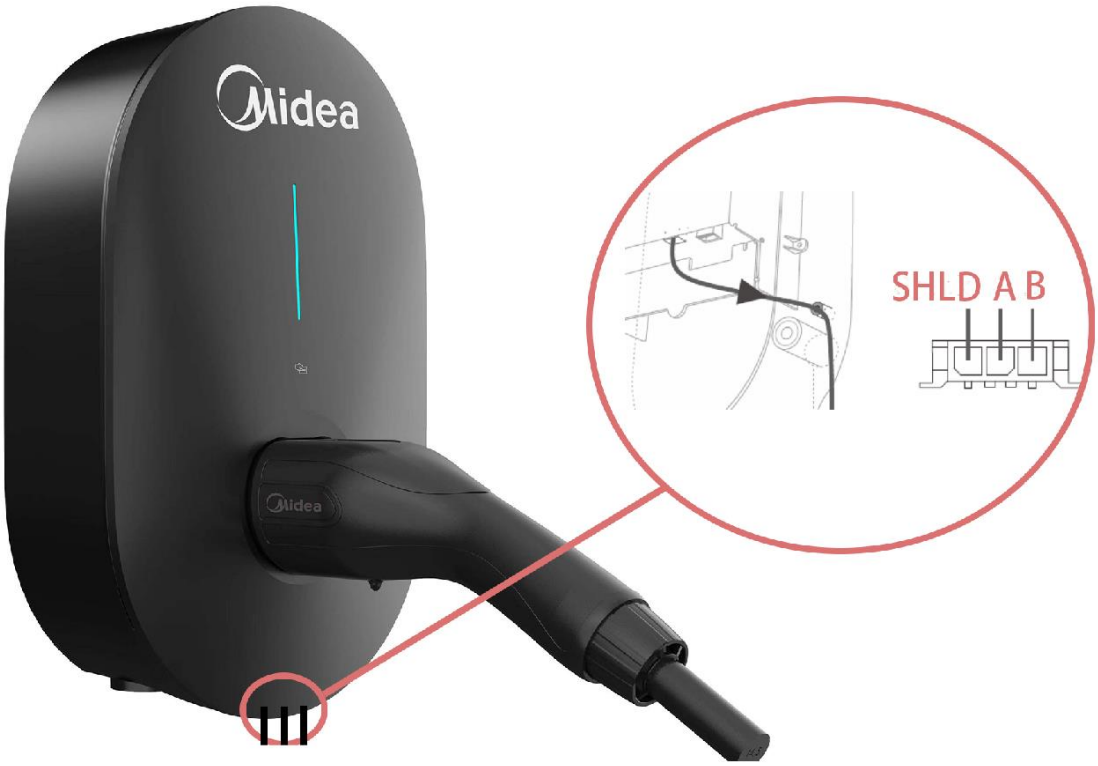
Connect the heat pump unit and the inverter unit to be monitored to the M-Master controller with three-conductor shielded cables. The connecting ports are shown in the topology diagram below. The heat pump unit is connected to the BUS-1 port of the M-Master controller through the wired controller H1H2 and the shielded cable, while the inverter unit is connected to the BUS-2 port through the shielded cable.



The wiring amplification diagram is shown below:

Operation Instructions





Notes:

1. The shielded cables shall be shorter than 500 meters to ensure communication quality.
2. The order of connection of shielded wires is for reference only. If the order is inconsistent with that set out in the actual specification of the inverter unit and the wired controller, the relevant specification shall prevail.

2.3.2. Step 2 Power On

Connect the M-Master controller, the heat pump unit, and the inverter unit to the power supply for normal operation.

Notes:

The effective power supply range of the M-Master controller is:

AC 24V±20% 50/60Hz 12VA

DC 24V-10/+20% 8W

The electrical and cable connection of the heat pump unit and the inverter unit can be found in the relevant specification.

2.3.3. Step 3 Access to LAN

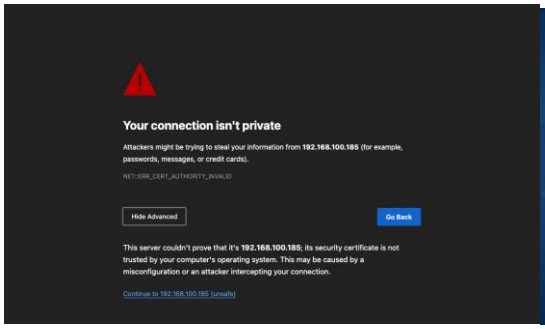
Configure the PC's Ethernet network card with a fixed IP address of 192.168.100.90, and connect the PC to the M-Master controller directly through

an Ethernet cable (or through a switch), so as to set the M-Master controller and the PC both in a LAN allowing mutual access.

2.3.4. Step 4 Visit M-Master Configuration

When the LED "RUN" indicator of the M-Master controller is flashing, visit the Configuration page (https://192.168.100.185) through a browser installed on the PC. Log in with the default username and password on the Login page (see above)

In case of a pop-up SSL certificate error page, click Advanced-Continue to 192.168.100.185 (unsafe), or type “thisisunsafe″ to visit the page

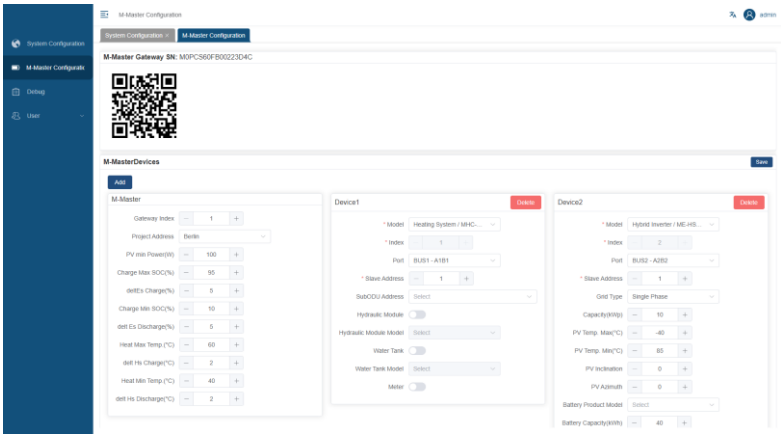


2.3.5. Step 5 Add Devices

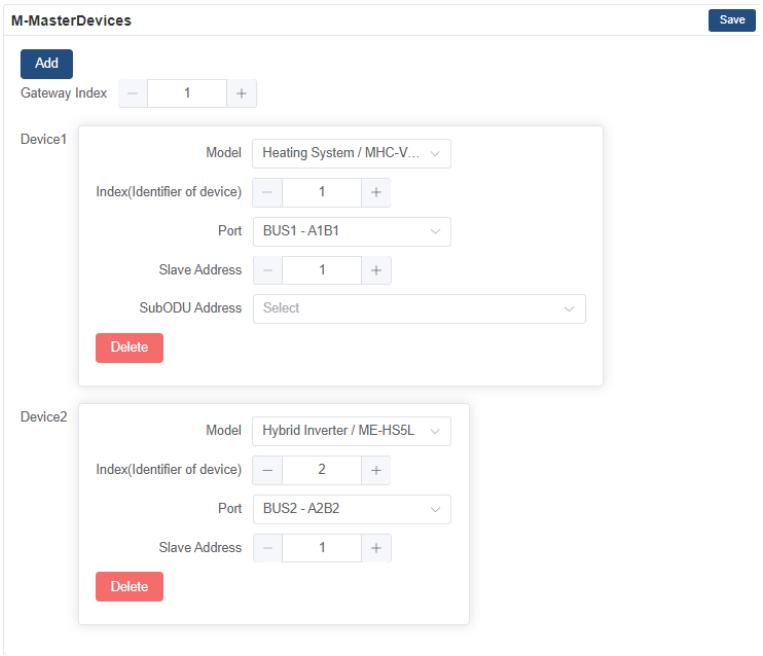
After login, click "M-Master Configuration" to turn to the "M-Master Configuration" page.

Add devices on the "M-Master Devices" page

- Set Gateway Index to 1
- Click Add to add the first device, select the Model MHC-V5 (7/9/12/14/16) WD2N8-C in Heating System, and set Index to 1, Port to BUS1-A1B1, and Slave Address to 1, with no operation for SubODU Address
- Click Add to add the second device, select the Model ME-HS5L in Hybrid Inverter, and set Index to 2, Port to BUS2-A2B2, and Slave Address to 1
- Click Save to save the current configuration parameters



Operation Instructions

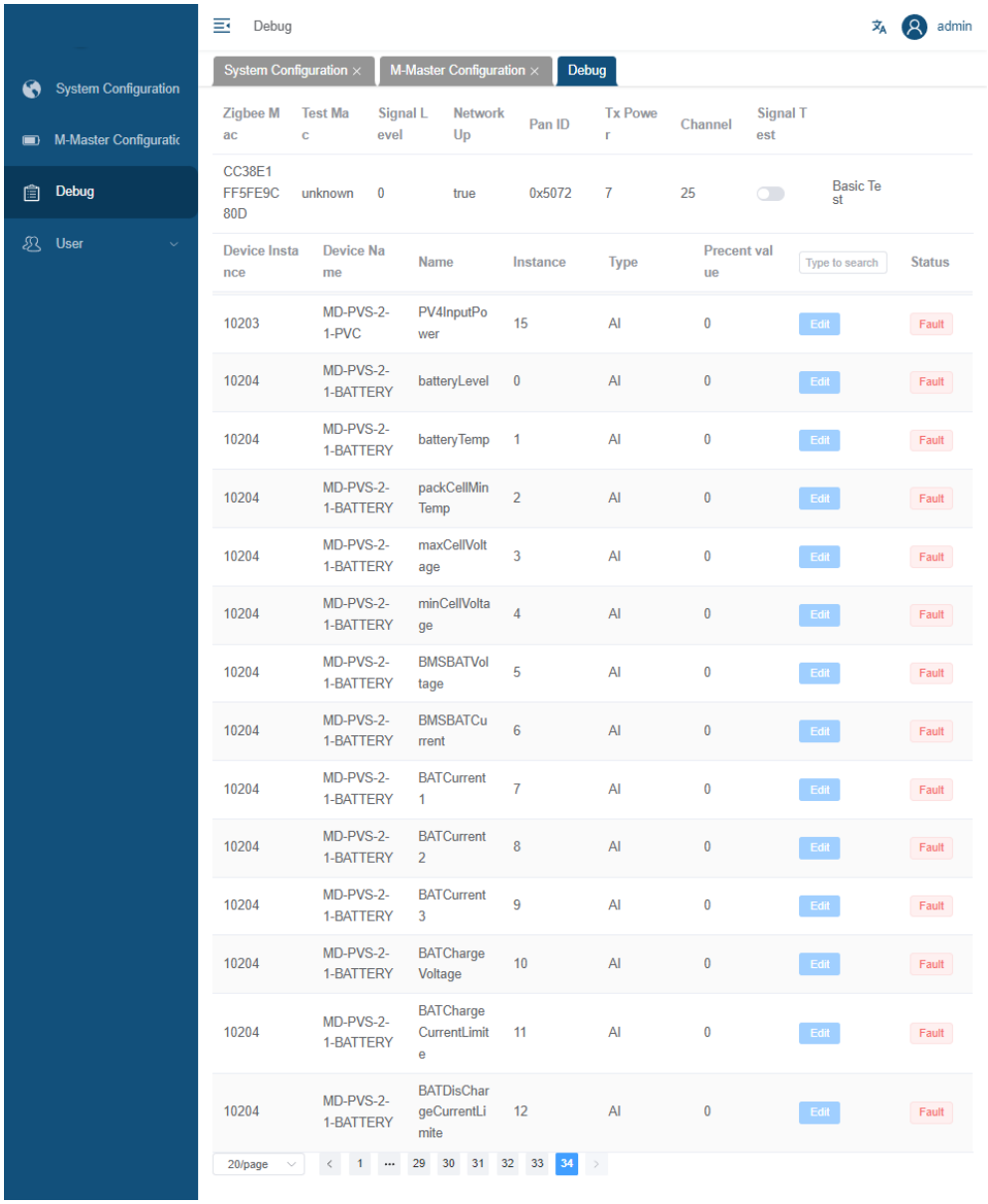


Click "Debug" to enter the "Debug" page.

The communication status and current values of the added devices can be viewed on this page.

- When the Status in the rightmost column is Fault, it indicates that the device communication is abnormal.
- When the Status changes to Normal, it indicates that the device communication is normal.
- The current status of the corresponding device can be viewed in the Precent Value column.

Note: After you configure the devices and click Save, the system initialization will start again. Check the device communication status after about 2 to 3 min when the system communication becomes stable.

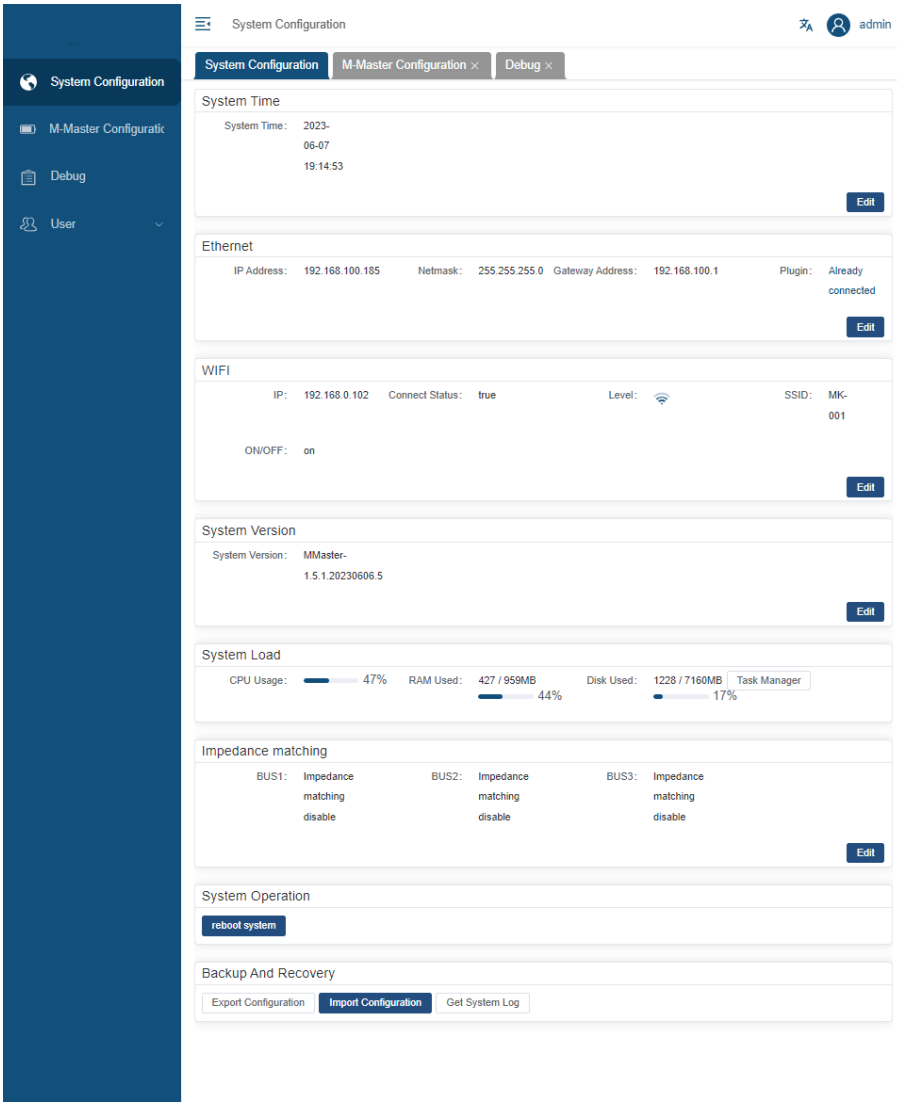


2.3.6. Step 6 Access the Internet

Click "System Configuration" to enter the "System Configuration" page to access the devices to the network.

In case of Wifi access, click Edit on the WIFI page to enter the searched Wifi list. Select the SSID to be connected and enter the password to connect.

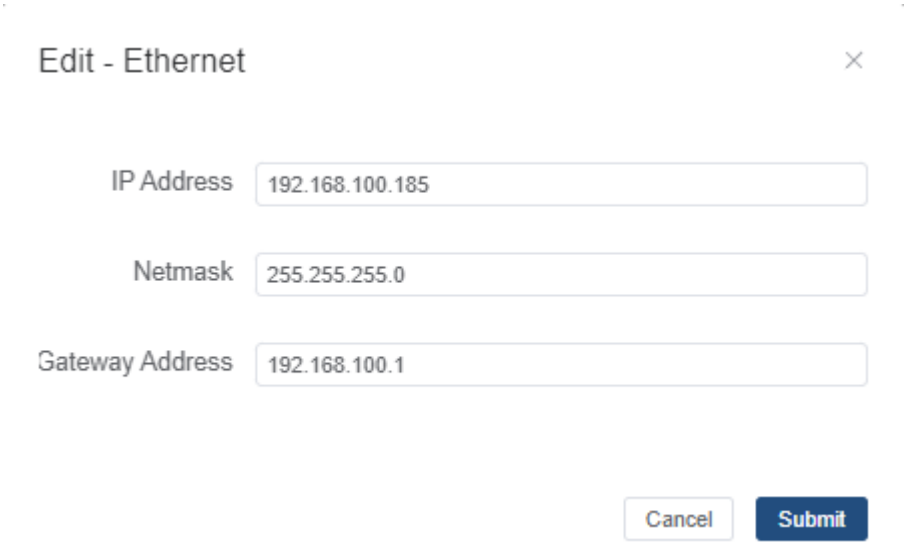
Operation Instructions



Click "System Configuration" to enter the "System Configuration" page to access the devices to the network.

In case of Ethernet access, click Edit on the "Ethernet" page for configuration.

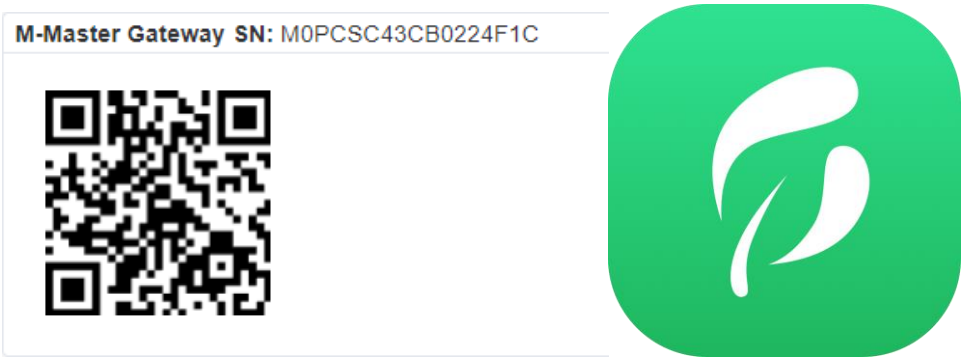
Note: The controller does not support DHCP mode. A fixed IP address is required for Ethernet access.

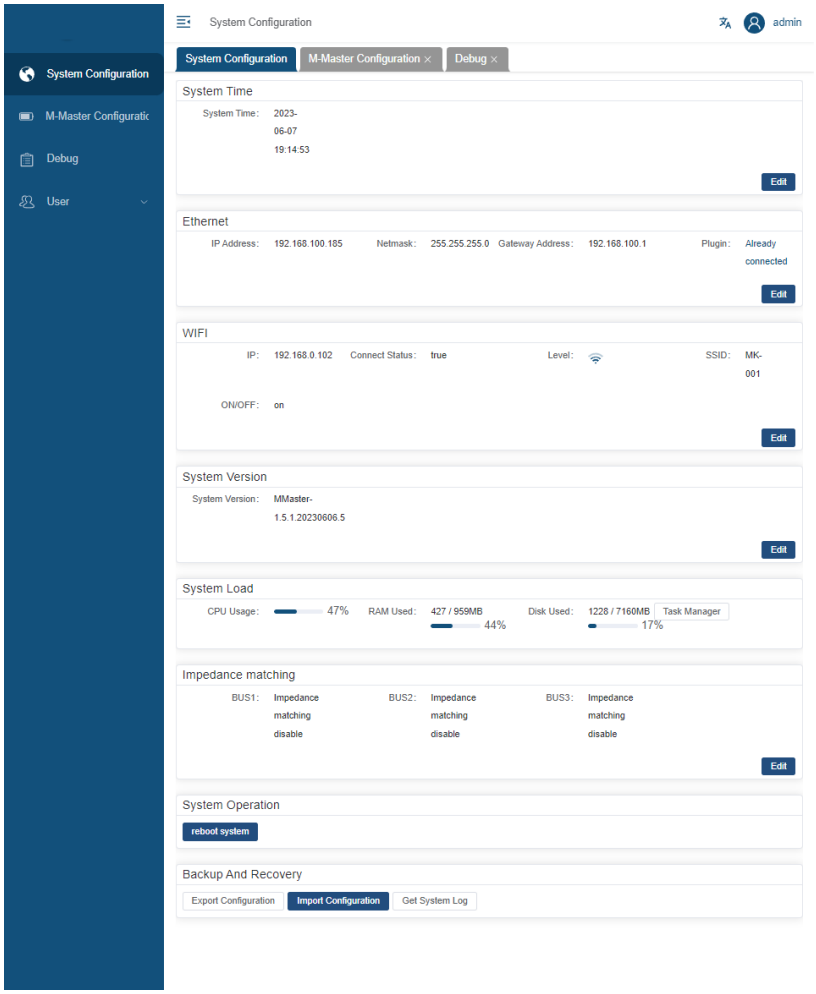


2.3.7. Step 7 Bind Controllers

Bind the gateway with the iEasyEnergy APP by scanning the QR code through the "M-Master Configuration" of the APP.

Please refer to iEasyEnergy instructions for how to use the APP.





3.Function Details

3.1. System Configuration

The following parameters of the device can be configured on the System Configuration page

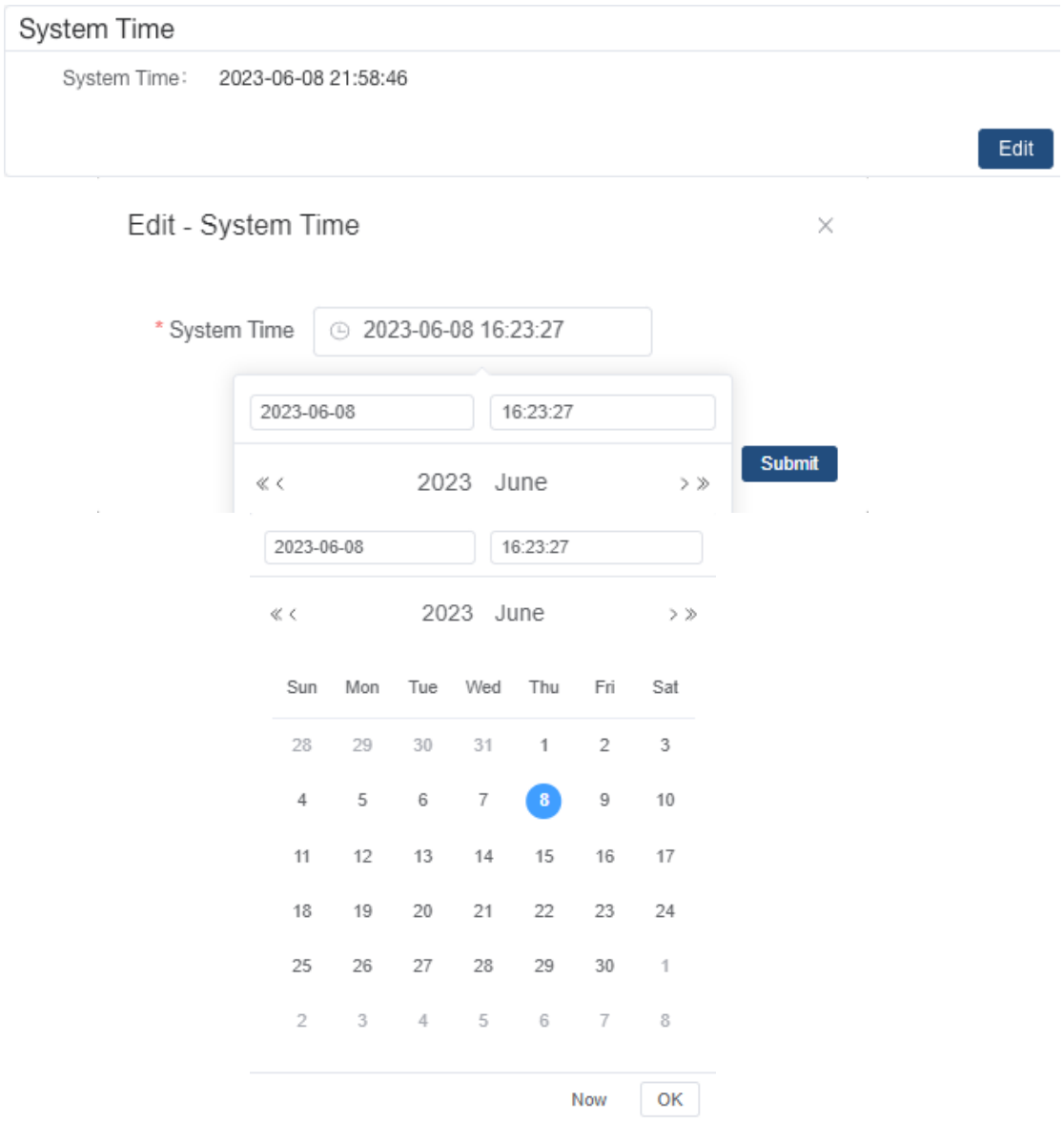
1. System time
2. Ethernet
3. WIFI
4. System version and local upgrade
5. System load and task manager
6. Impedance matching
7. System reboot
8. Backup and recovery

3.1.1. System Time

The current system time can be viewed on the System Time page, with a display format of YYYY-MM-DDHH: mm: ss

Click Edit to configure the date and time. Click "Now" to quickly synchronize the time of the controller with the current time on the PC.

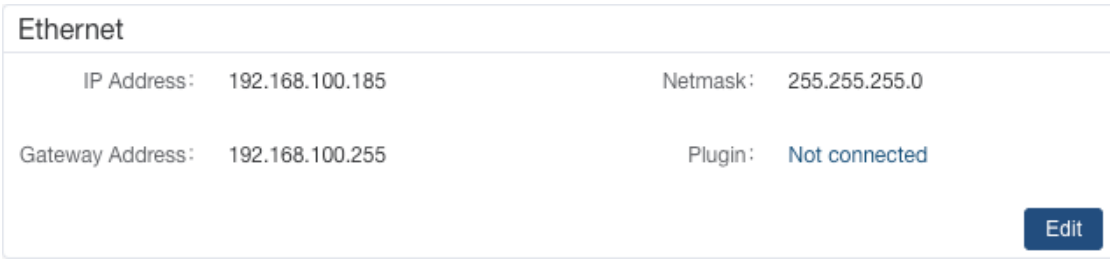
After configuration, click Submit to submit the current configuration parameters to the controller.

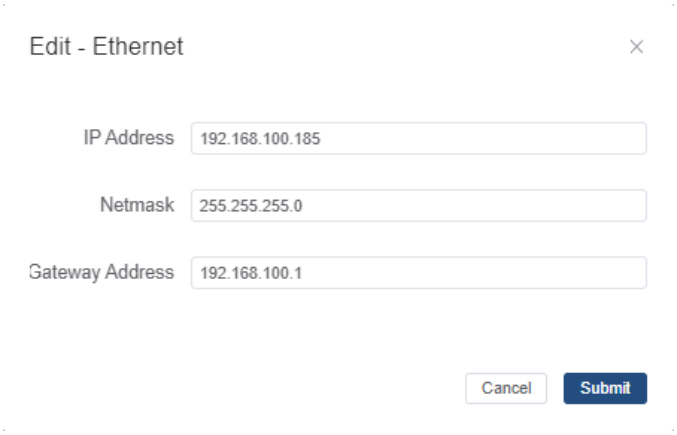


3.1.2. Ethernet

The configuration parameters such as IP Address, Netmask, and Gateway Address of the current controller, as well as the plugin status of the current Ethernet port, can be viewed on the Ethernet page.

If the time is synchronized with the system time, click "Edit" to configure IP Address, Netmask, and Gateway Address in the Edit window. Click "Submit" to submit the configuration parameters. When the setting is successful, the webpage will be automatically redirected to a new page in 10s.

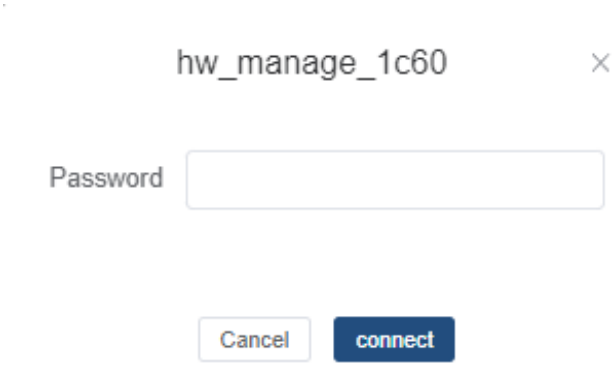


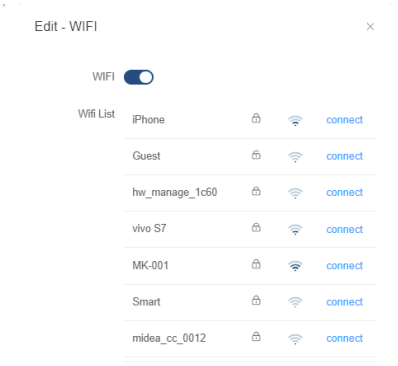


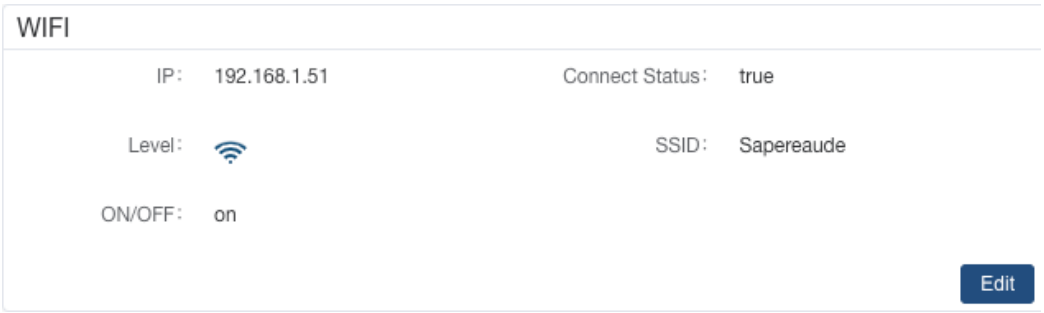
3.1.3. WIFI

The current enable/disable status and connection status on the WIFI module can be viewed on the WIFI page. Click "Edit" to switch WIFI status and view the searched WIFI list. Click SSID to be connected, enter the password, and click "connect".

The system will remember the last WIFI hotspot and connect automatically







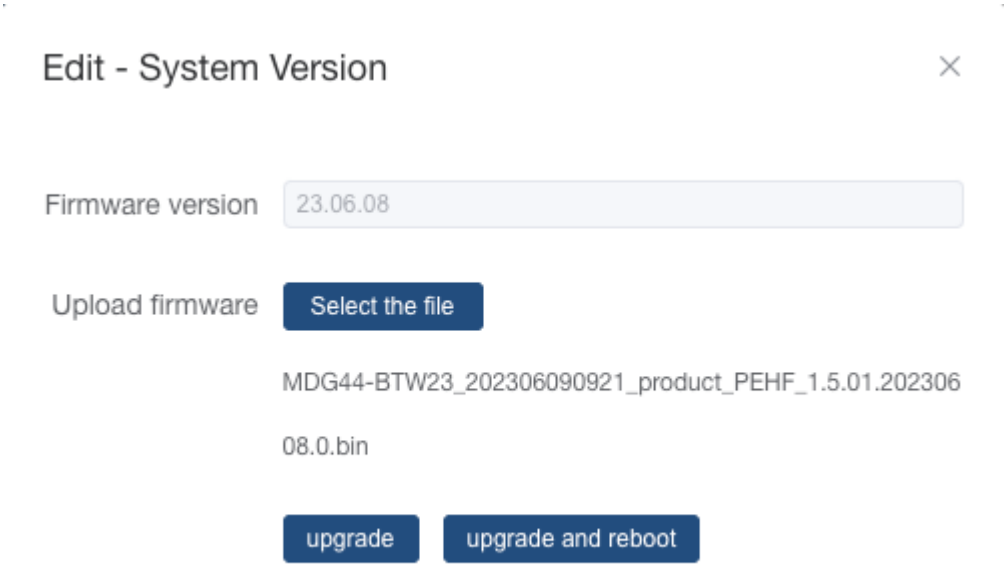
3.1.4. System Upgrade

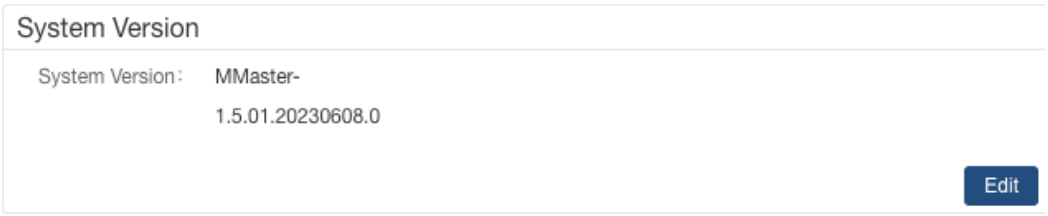
The version of the current system can be viewed on the "System Version" page. Click "Edit" to upgrade the system.

In the pop-up dialog box, click "Select the file" to select the upgrade file. A prompt pops up when the upgrade file is correct.

Click "upgrade", the system will be automatically upgraded after the next reboot

Click "upgrade and reboot" to upgrade and reboot the system immediately



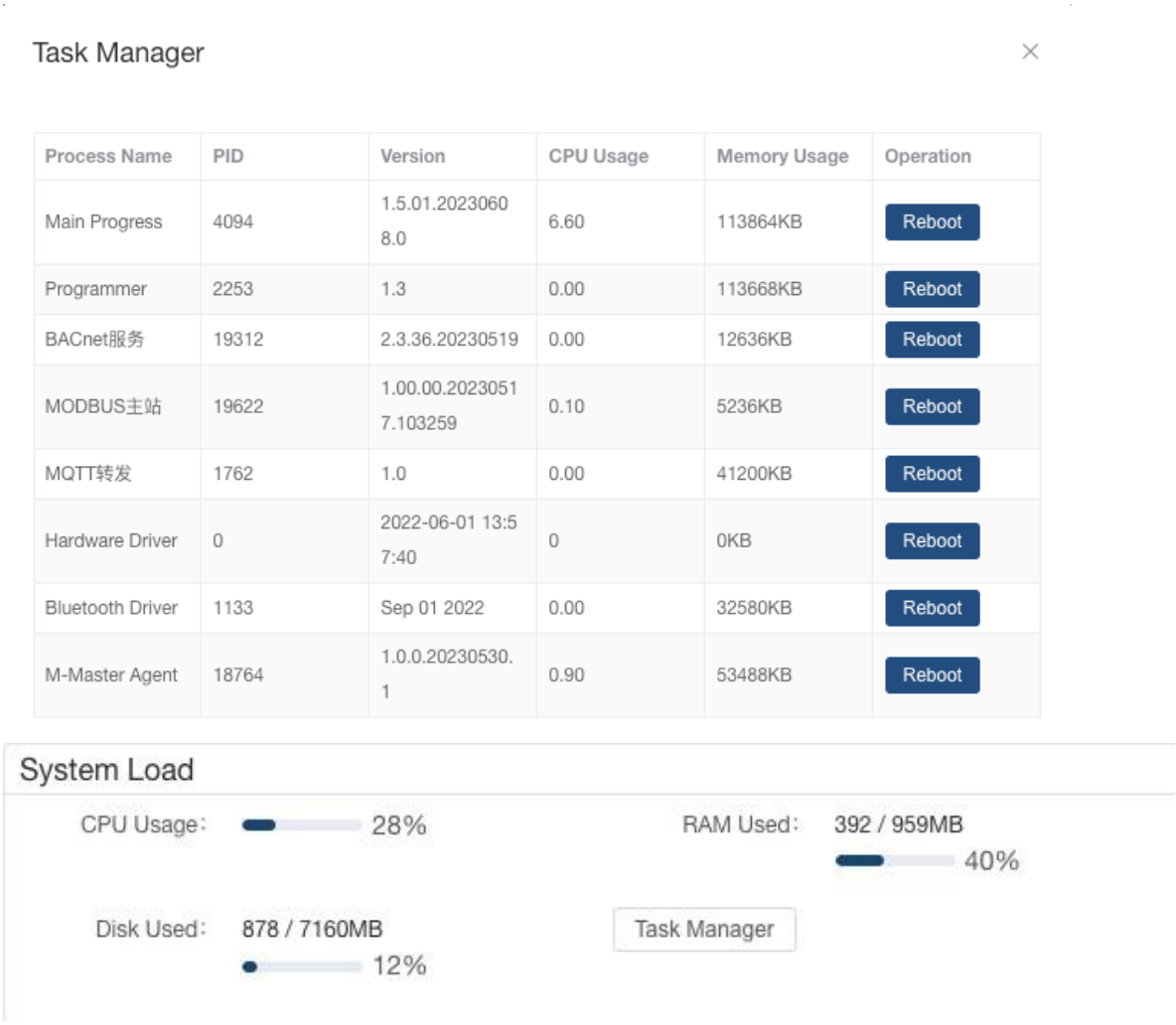


Note: Do not power off the controller during the upgrade.

3.1.5. System Load

The operating status of the system can be veiwed on the "System Load" page. Click "Edit" to view the detailed status of the process, and click "Reboot" to reboot the process.

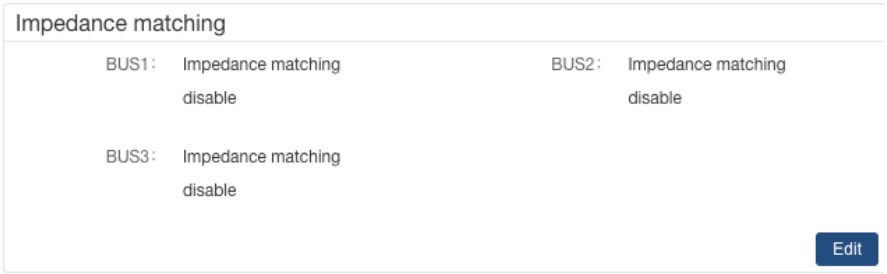
Note: Unauthorized reboot may lead to abnormal operation of the system, so related operations can be made only under the guidance of technical personnel.

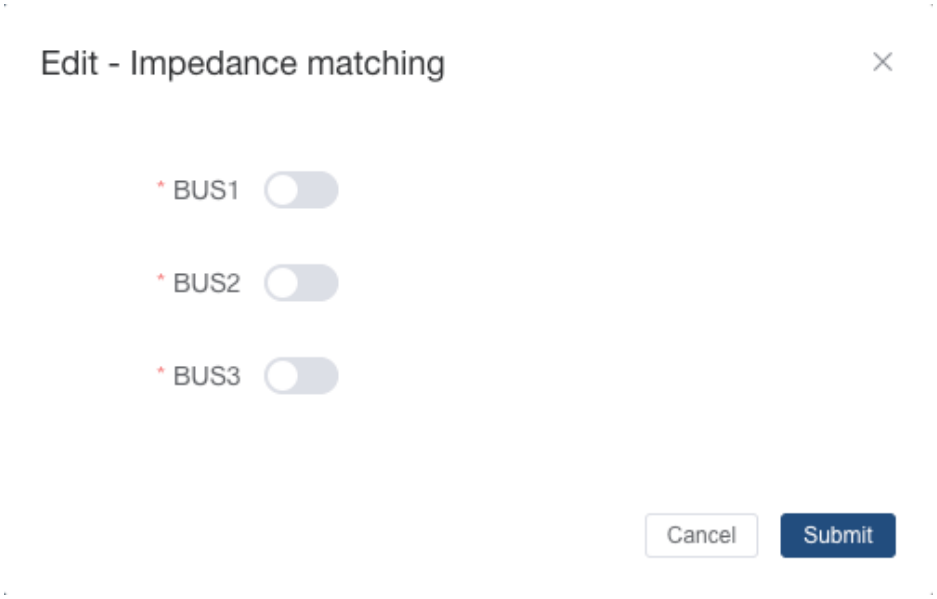


3.1.6. Impedance Matching

The enable/disable of impedance matching of three buses can be viewed on the "Impedance Matching" page. By default, it is disabled. Click "Edit" to configure the status. The status configured is still valid when the system is rebooted after a power failure.

Note: This operation may affect the stability of communication and thus please take this operation with caution.

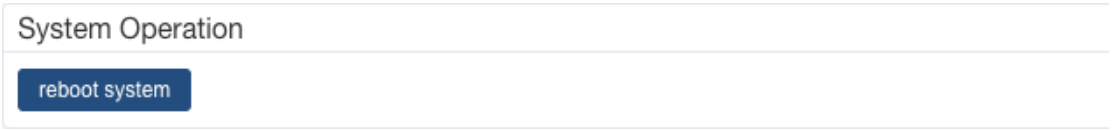




3.1.7. System Operation

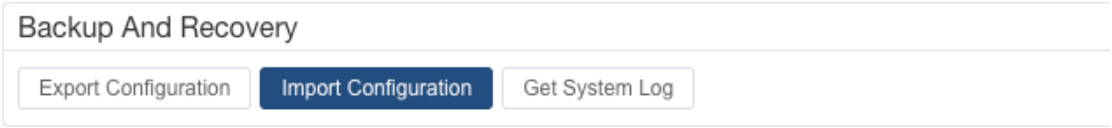
This module can allow a quick soft reboot of the system.

Note: The system will stop operating during reboot.



3.1.8. Backup and Recovery

The system configuration can be quickly exported and recovered on this page, so related operations can be made only under the guidance of technical personnel.



3.2. M-Master Configuration

On the "M-Master Configuration" page, the device connected to the gateway can be configured as follows:

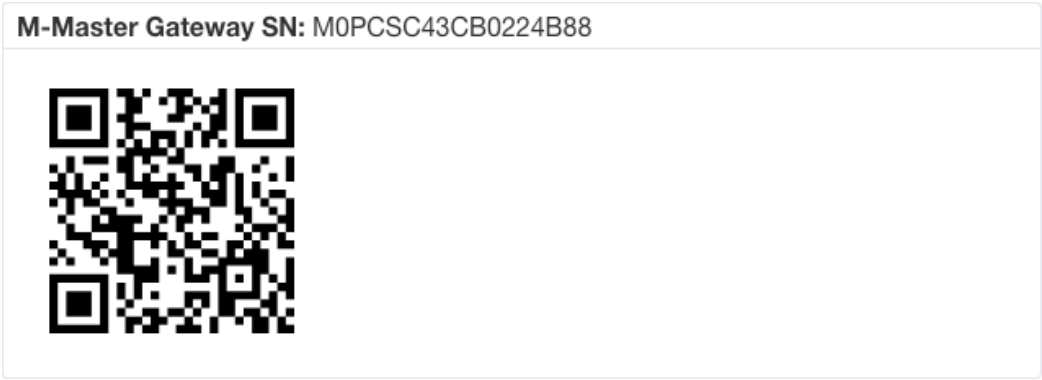
1. View the controller SN
2. Add and modify the configuration of the device connected
3. Modify the report serve and timer

3.2.1. Gateway SN

Gateway SN is an identifier of M-Master,

which is unique.

The gateway SN can be viewed here and the SN can be quickly obtained and identified through the QR code.



Note：This QR code is only used as a demonstration and is not a real controller QR code

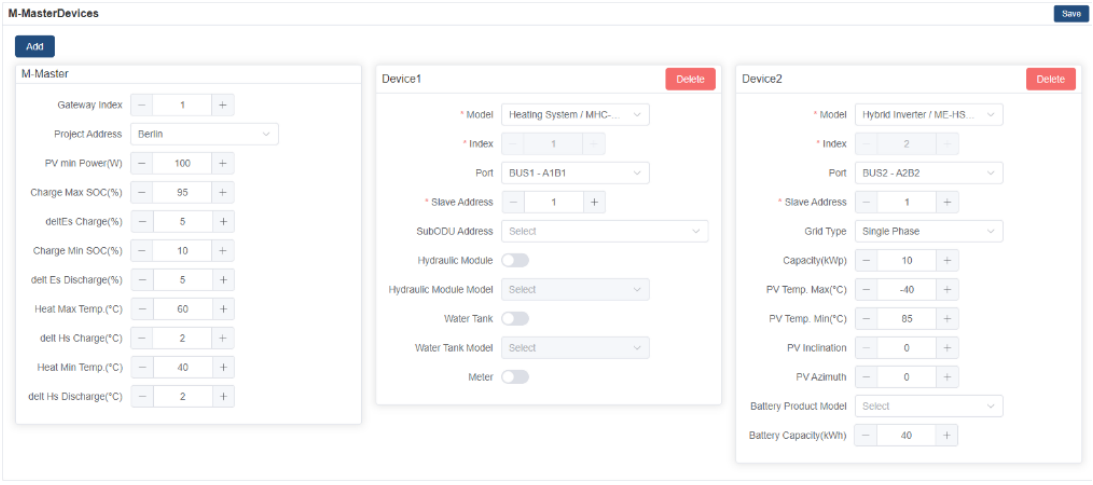
3.2.2. M-Master Devices

Gateway Index" and connected devices can be configured on the M-MasterDevices page. The default Gateway Index is 1. If multiple controllers are required at the same time, configure these controllers with different Gateway Indexes to ensure the normal operation of the system.

Click "Add" to add new devices.

For different devices, it is necessary to configure their Model, Index (used to identify different devices), Port (for which a 485 circuit is connected, and consistent with the item code), and Slave Address (1 by default, and adjustable according to the specific settings of the heating system or inverter).

For parallel heat pump units, it is also necessary to configure an additional slave address.



3.2.2.1 Device settings：M-Master

Parameter name	Function
Gateway Index	Gateway serial number, please ensure that it is different for each gateway if there are multiple gateways in the same project. This parameter affects the SN of the reported device. Please do not modify it arbitrarily after setting it.

Project Address	Project Address
PV min Power	The minimum power generation of photovoltaic modules is measured in watts (W)
Charge Max SOC	(Advanced configuration) Battery cut-off charging SOC, measured in percentage (%)
deltEs Charge	(Advanced configuration) Battery charging hysteresis, measured in percentage (%)
Charge Min SOC	(Advanced configuration) Battery discharge and charge SOC, measured in percentage (%)
delt Es Discharge	(Advanced configuration) Battery discharge hysteresis, measured in percentage (%)
Heat Max Temp	The maximum temperature for heating the hot water, measured in degrees Celsius (° C).
delt Hs Charge	(Advanced configuration) Hysteresis for heating the hot water, measured in degrees Celsius (° C)
Heat Min Temp.	(Advanced configuration) The minimum temperature for releasing heat from the hot water, measured in degrees Celsius (° C)
delt Hs Discharge	(Advanced configuration) Hysteresis for releasing heat from the hot water, measured in degrees Celsius (° C)
Advanced	Enable advanced configuration

3.2.2.2 Device settings：Heat pump

Parameter name	Function
Model	Heat pump model, please fill in according to the actual situation. If none applies, please select MD-HP
Index	Device serial number, this parameter affects the SN reported by the device. To maintain device uniqueness, this parameter cannot be changed after it is saved
Port	RS485 interface number that the device is connected to
Slave Address	The device's slave address
SubODU Address	If there are parallel slaves, please select the address of the connected slave
Hydraulic Module	Is the hydraulic module connected
Hydraulic Module Model	The model of the hydraulic module
Water Tank	Is the water tank connected
Water Tank Model	The model of the water tank
Meter	Is the electricity meter connected

3.2.2.3 Device settings：Hybrid inverter

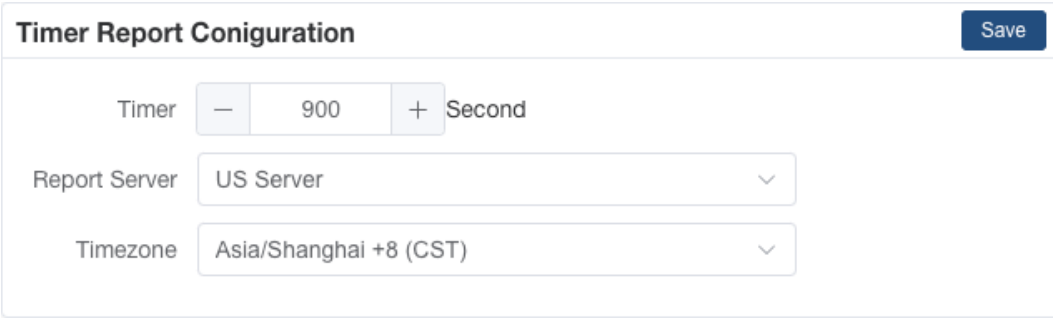
Parameter name	Function
Model	The model of the inverter, please provide based on the actual

	situation
Index	The equipment serial number, this parameter affects the SN of the reported device. To maintain the uniqueness of the device, this parameter cannot be changed after it is saved
Port	The RS485 interface number that the device is connected to.
Slave Address	The slave address of the device
Grid Type	If there are multiple slave devices connected in parallel, please select the address of the slave device that is connected
Capacity(kWp)	The installed capacity of the photovoltaic system
PV Temp. Max(° C)	The maximum operating temperature of a photovoltaic panel
PV Temp. Min(° C)	The minimum operating temperature of a photovoltaic panel
PV Inclination	The angle between a photovoltaic panel installed facing south and the horizontal ground surface
PV Azimuth	The angle between the direction of a photovoltaic panel facing east or west and the direction of true south, with 0 degrees being directly facing south. A negative angle is used for east-facing panels, while a positive angle is used for west-facing panels
Battery Product Model	Model number of the battery
Battery Capacity(kWh)	Capacity of the battery

3.2.3. Report Configuration

The timer, report server, and timezone can be configured on the Report Configuration page.

The timer and report server will affect the quality and validity of the data reported, so related operations can be made only under the guidance of technical personnel.



3.3. Debug

The data captured in real time can be viewed on the Debug page, and the Status indicates the communication quality of the data. If the Status is Fault as

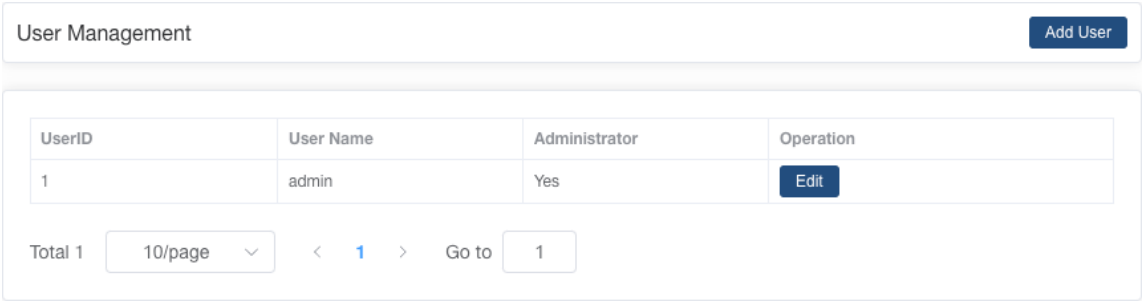
shown in the right figure, it indicates that the data communication is abnormal. In such case, please check the normal operation of the device and the connection of the communication line.

The data writing is also allowed on the Debug page, but this operation may directly affect the operating status of the units and thus can be made only with authorization and for the purpose of debugging.

Device Instance	Device Name	Name	Instance	Type	Precent value	Type to search	Status
10100	MD-HP-SYSTEM-1-1	onOffStatus	0	BV	0	Edit	Fault
10100	MD-HP-SYSTEM-1-1	waterFlowTempAreaOnOff1	1	BV	0	Edit	Fault
10100	MD-HP-SYSTEM-1-1	dhwOnOff	2	BV	0	Edit	Fault
10100	MD-HP-SYSTEM-1-1	waterFlowTempAreaOnOff2	3	BV	0	Edit	Fault
10100	MD-HP-SYSTEM-1-1	modeSetting	4	AV	0	Edit	Fault
10100	MD-HP-SYSTEM-1-1	waterTempSettingArea2	5	AV	0	Edit	Fault
10100	MD-HP-SYSTEM-1-1	waterTempSettingArea1	6	AV	0	Edit	Fault
10100	MD-HP-SYSTEM-1-1	roomTempSetting	7	AV	0	Edit	Fault
10100	MD-HP-SYSTEM-1-1	waterTankTempSetting	8	AV	0	Edit	Fault
10100	MD-HP-SYSTEM-1-1	curveSettingEnableArea2	9	BV	0	Edit	Fault
10100	MD-HP-SYSTEM-1-1	curveSetting	10	BV	0	Edit	Fault

3.4. User Management

Users who log in to the management background can be synthetically managed on the User Management page)



3.5. Environmental Protection List

Hazardous substances / Component name	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent chrome (Cr (VI))	Polybrominated Biphenyl (PBB)	Polybrominated Diphenyl Ethers (PBDE)
PCBA module	×	○	×	○	○	○
Connecting wire	×	○	○	○	○	○
Fasteners such as screws and washers	×	○	○	○	○	○
Rubber parts	○	○	○	○	○	○
Other metal parts	○	○	○	○	○	○
Other plastic parts	○	○	○	○	○	○
Printed parts	○	○	○	○	○	○

○: It indicates that the content of the hazardous substance in all homogeneous materials of this part is lower than the limit specified in GB/T 26572.

×: It indicates that the content of the hazardous substance in at least one homogeneous material of the component is higher than the limit specified in GB/T 26572. However, under the existing technical conditions, it is extremely difficult to make the product parts completely free from the harmful substances mentioned above. The design will be gradually improved with the technical progress.

TEL400-8899-315
Manufacturer: GD Midea Heating & Ventilating Equipment Co.,Ltd.
Origin: Building A, Industrial Park, Penglai Road, Beijiao Community Residents Committee, Beijiao Town, Shunde District, Foshan City, Guangdong Province
Version: KONG-EM21IU-004A V.B
All the contents in this document have been carefully checked. If there is any misprint or misunderstanding, please consult the Company. Note: In case of any technical improvement of the product, such improvement will be compiled into the new manual without prior notice. If the appearance and color of the product are changed, the actual product shall prevail.