

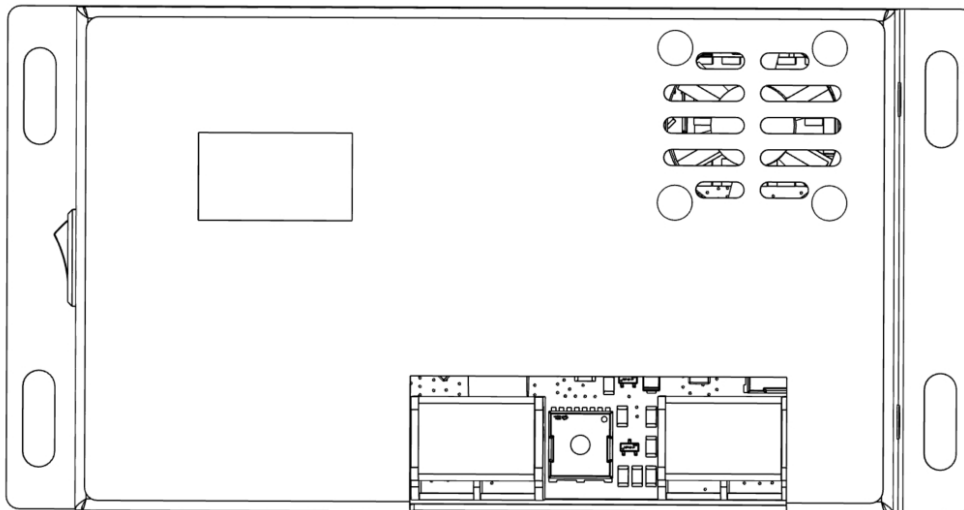
MPPT Solar Charge Controller User Manual

Model H10TA (Boost Type)

Supports battery wide voltage: 36V~90V, compatible with various photovoltaic charging solutions for electric vehicles available in the market

Supports ternary, lead-acid, lithium iron phosphate, gel, and customized batteries


Supports custom bulk orders




Manual Version: V1.1 Changes may occur without prior notice; please contact sales for the latest electronic documentation.


Thank you very much for choosing our products!


Safety Instructions


-  1、 Since the operating voltage of this controller exceeds the safe voltage for the human body, please read the manual carefully and complete safety operation training before operating this controller.


Only operate this controller after completing the safety training.


-  2、 The controller has no components that require maintenance or repair internally; users should not disassemble or repair the controller themselves.


-  3、 Please install the controller indoors to avoid exposure of components and prevent water from entering the interior of the controller.

-  4、 Please install the controller in a well-ventilated area, as the temperature of the heat sink can become very high during operation.

-  5、 It is recommended to install a suitable fuse or circuit breaker outside the controller.

-  6、 Before installing and adjusting the wiring of the controller, be sure to disconnect the photovoltaic array and the fuse or circuit breaker near the battery terminals.

-  7、 After installation, check that all wiring connections are secure to avoid risks from heat accumulation due to loose connections.

 **Warning:** Indicates that this operation is dangerous; safety preparation must be done before proceeding.

 **Note:** Indicates that this operation is destructive.

 **Tip:** Indicates advice and suggestions for the operator.

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1. Product Introduction

1.1 Product Overview

The H10TA controller adopts industry-leading MPPT (Maximum Power Point Tracking) technology to achieve the maximum energy tracking of solar panels, allowing it to

It can quickly and accurately track the maximum power point of solar cells under various conditions, obtaining the maximum energy of the solar panels in real time, significantly improving the efficiency.

Energy utilization efficiency of solar systems. Widely used in off-grid solar photovoltaic systems, managing the operation of solar panels, batteries, and loads, is

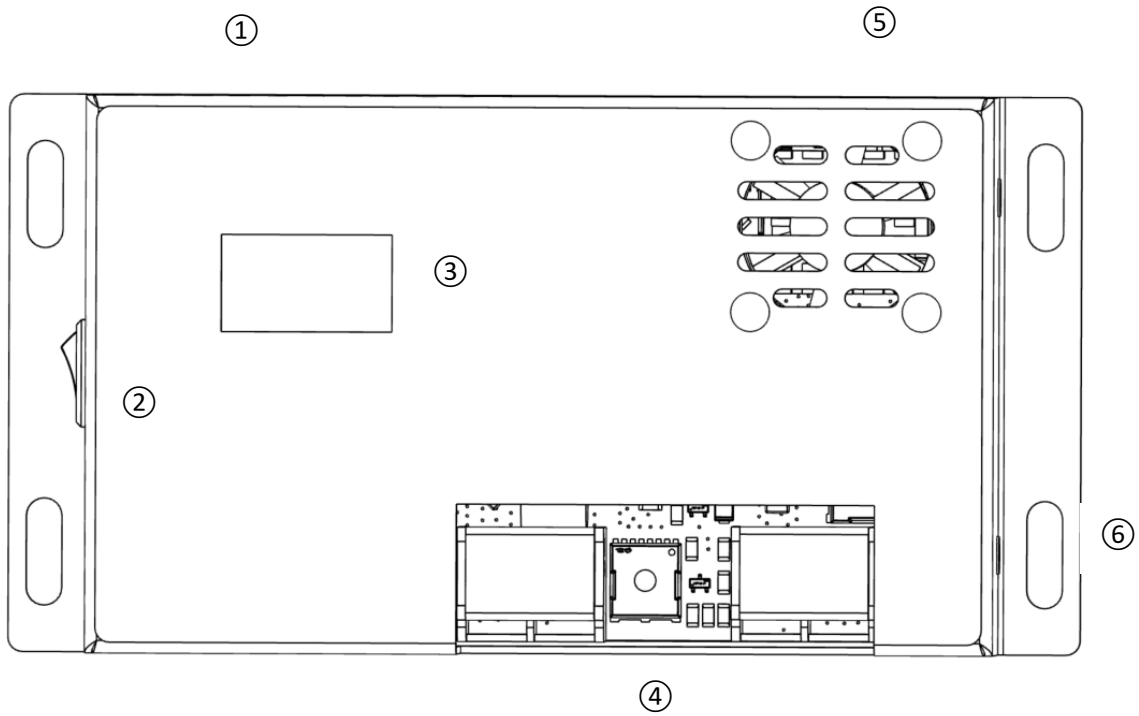
The core control component of the off-grid photovoltaic system. The controller has comprehensive software and hardware fault detection and protection functions, which can maximize the avoidance of Damage to product components due to installation errors and system failures.

1.2 Product Features

- Using MPPT (Maximum Power Point Tracking) technology, the MPPT tracking efficiency can reach 99.9%.
- Supports simultaneous full-power charging and discharging.
- Supports various types of batteries, including sealed, colloidal, open, lithium batteries, and custom types.
- Support for charging current settings.
- Support full configuration settings.
- Support parallel charging.
- Support saving historical data.
- Support RS485 communication with standard Modbus protocol, with a fixed baud rate.
- Support TTL communication with standard Modbus protocol, with a fixed baud rate.
- Support Bluetooth, WIFI, 4G, and Ethernet communication functions (optional).
- Equipped with comprehensive charging and discharging protection mechanisms for over-voltage, over-current, overload, over-temperature, and short-circuit.
- Uses high-quality aluminum heat sinks, air cooling, and high-temperature derating processing to ensure reliable and efficient operation in various working environments.

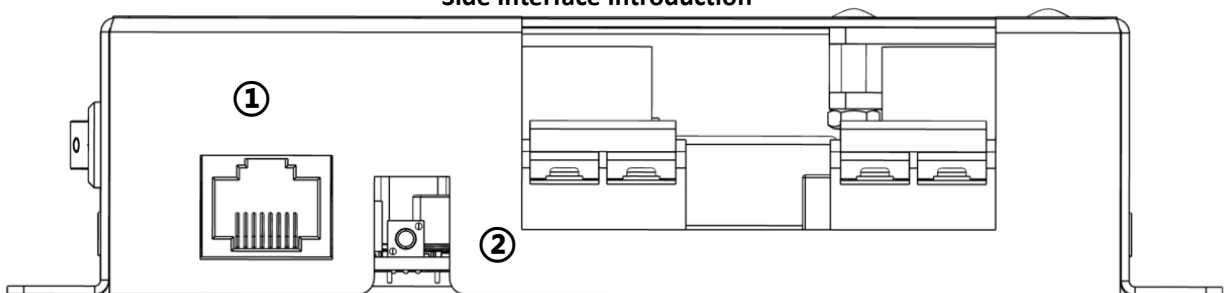
1.3 Appearance and Interface Description

Front Interface Introduction



Serial Number	Function Description	Remarks
①	Battery type selection, Chinese and English switching, interface toggle switch	See the toggle switch section for details
②	Start Button	Side Boat-Type Switch
③	Display Screen Interface	
④	Battery Interface; Photovoltaic Input Interface	
⑤	Fan Outlet	Do Not Block
⑥	Ground Screw Hole Position	

Side Interface Introduction



Serial Number	Function Description	Remarks
①	RS485 communication interface	The definition of interface pins can be found in other chapters.
②	Settings button	Non-contact battery-free temperature monitoring

Introduction to Maximum Power Point Tracking Technology

The H10TA series Maximum Power Point Tracking (MPPT) system is a type of advanced charging technology that adjusts the operating state of the electrical module, enabling solar cells to output more electrical energy. Due to the solar energy

The nonlinear characteristics of the array indicate that there is a maximum power point of the array on its curve, which traditional controller PWM charging technology cannot achieve.

Charging the battery at this point makes it impossible to obtain the maximum energy from the solar panel, but the solar system with MPPT control technology

A controller can continuously track the maximum power point of the array to obtain the maximum energy for charging the battery. For a 12V system.

For example, the peak voltage (V_{pp}) of a solar cell is around 18V, while the voltage of a battery is about 12V, generally.

The charging controller operates with a solar panel voltage of about 12V while charging, which does not fully utilize its maximum power output.

The MPPT controller can overcome this problem by adjusting the input voltage and current of the solar panels in real time, maximizing the input power.

The purpose of the value. Compared to traditional PWM controllers, MPPT controllers can maximize the power output of solar cells, thus being able to provide

For larger charging currents, generally, MPPT controllers can increase energy utilization efficiency by 20% to 30% compared to PWM controllers.

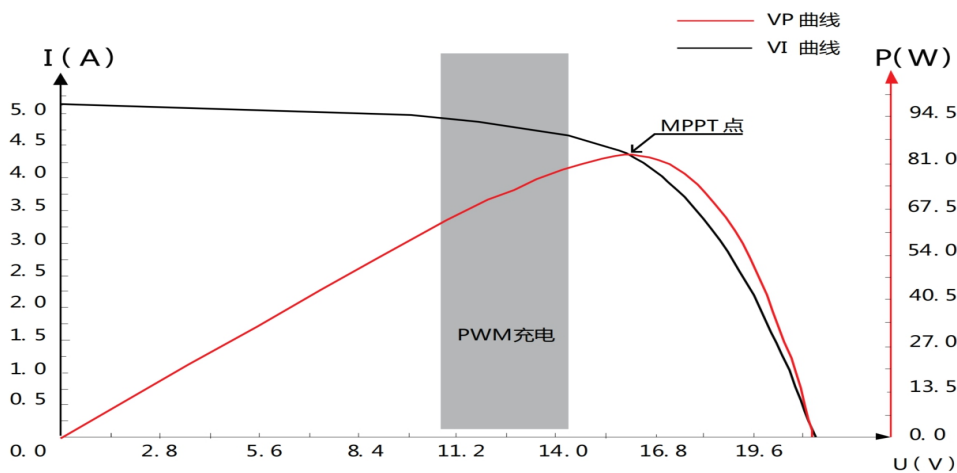


Figure 1-2 Battery Panel Output Characteristic Curve

Due to varying environmental temperatures and lighting conditions, the maximum power point frequently changes. Our company's MPPT controller can adjust according to Parameters are adjusted continuously under different conditions to keep the system close to the maximum operating point at all times. The entire process is fully automated, requiring no user intervention.

How to adjust.

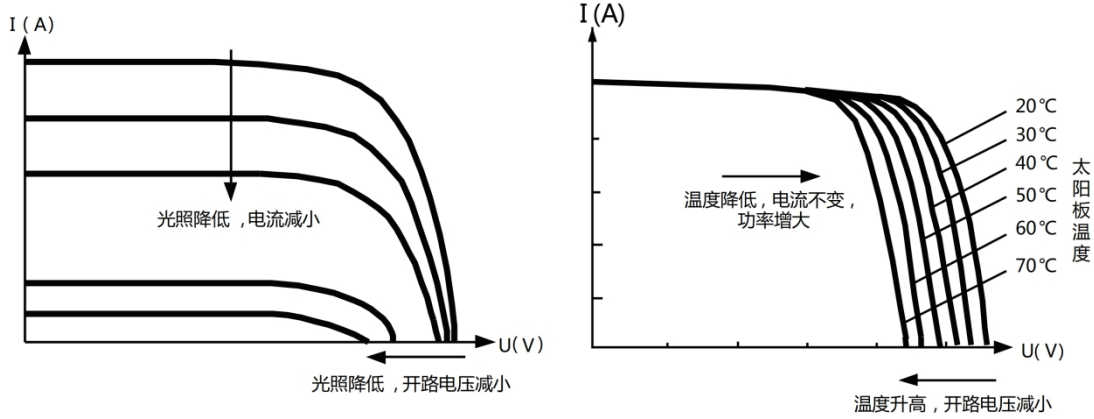


Figure 1-3 Relationship between Battery Panel Output Characteristics and Illumination

Figure 1-4 Relationship between Battery Panel Output Characteristics and Temperature

2. Technical Parameters

Product Model	H10TA
Static Power Consumption	≤30mA
Battery Type	Ternary/Lithium Iron/Lead Acid/Colloidal/Other Batteries (User can independently configure according to the host computer)
Battery Voltage	(Lithium Iron, Lead Acid, Ternary, Other)
System Mode	Boost
Rated battery charging current	10A
Maximum PV input current	12A
Maximum solar panel power	450W
Max: PV open-circuit voltage (Voc)	16V~60V
Recommended PV power point voltage (Vmp)	16V~52V (recommended)
Maximum system voltage	100V (±2%) overvoltage will damage the system
MPPT tracking efficiency	>99.9%
MPPT tracking speed	<1ms
Charging conversion efficiency	94%~99%
Charging operating mode	Trickle charge / Constant current / Constant voltage / Float charge / Full charge automatic cut-off / Hysteresis automatic recharging (fully automatic management)
Temperature Protection	√
Short Circuit Protection	√
TTL Communication	√
RS485 Communication	√
External 12V Power Supply (<150mA)	√

Display Screen	√
Supports SOC Display	√
Charging Power Can Be Set	√
Battery Model Series Can Be Configured	√
Supports Bluetooth (optional expansion)	√
Supports Ethernet (optional expansion)	√
Auto save settings	√
Supported baud rates	4800/9600/14400/19200/38400/56000/57600, default 9600 (change requires PC configuration)
Backlight function	Default backlight always on (backlight time adjustable, set to 0 to keep backlight always on)
Protection features	PV over-voltage protection, PV reverse polarity protection, PV short-circuit protection, night reverse charging protection, input power limit protection, over-temperature protection, Load short-circuit protection, load over-load protection, battery over-voltage/over-discharge protection, battery reverse polarity protection
Working environment temperature range	-35°C~65°C (Under well-ventilated conditions, no derating within 45°C)
Protection level	IP32
Cooling method	Natural cooling, air cooling
Dimensions	Length x Width x Height 78x150x34mm
Weight	0.37kg
Lithium iron phosphate battery supported	36V~90V
Lithium-ion ternary battery support	36V~90V
Lead-acid/gel battery support	36V~90V
Other batteries	Users can set the undervoltage and overvoltage points themselves (set from the host computer 36V~90V)

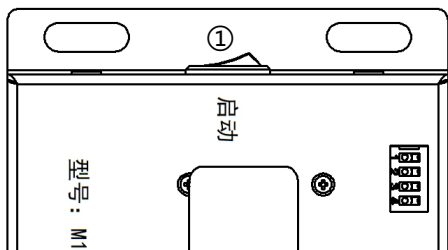
3. Switch and power-on/power-off instructions

3.1 Switch usage instructions (please choose the battery type carefully from the front; switch up for 1, switch down for 0)

Battery Type	Switch 1	Switch 2	Switch 3	Dial 4	Instructions	Fully charged return
Lithium iron phosphate	1	0	0	0	Lithium iron phosphate 48V, over-voltage protection point: 54.0V, under-voltage protection point: 42.0V, 15 series	51.0V
	1	0	1	0	Lithium iron phosphate 60V, over-voltage protection point: 72.0V, under-voltage protection point: 56.0V, 20 series	68.0V
	1	0	0	1	Lithium iron phosphate 72V, over-voltage protection point: 82.8V, under-voltage protection	78.2V

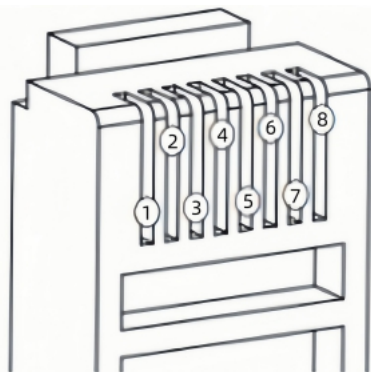
					point: 64.4V, 23 series	
Three-element battery	0	1	0	0	ternary 48V, over-voltage protection point: 54.6V, under-voltage protection point: 39.0V, 13 series	53.3V
	0	1	1	0	ternary 60V, over-voltage protection point: 71.4V, under-voltage protection point: 51.0V, 17 series	69.7V
	0	1	0	1	ternary 72V, over-voltage protection point: 84.0V, under-voltage protection point: 60.0V, 20 series	82.0V
lead-acid	1	1	0	0	lead-acid 48V, over-voltage protection point: 57.6V, under-voltage protection point: 40.0V, 04 series	53.6V
	1	1	1	0	lead-acid 60V, over-voltage protection point: 72.0V, under-voltage protection point: 50.0V, 05 series	66.0V
	1	1	0	1	Lead-acid 72V, over-voltage protection point: 86.4V, under-voltage protection point: 60.0V, 06 series	79.2V
Colloidal	0	0	0	0	Colloidal 48V, over-voltage protection point: 55.2V, under-voltage protection point: 42.0V, 04 series	52.0V
	0	0	1	0	Colloidal 60V, over-voltage protection point: 69.0V, under-voltage protection point: 52.5V, 05 series	65.0V
	0	0	0	1	Colloidal 72V, over-voltage protection point: 82.8V, under-voltage protection point: 63.0V, 06 series	78.0V
Custom	0	0	1	1	Custom mode, over-voltage point, under-voltage point, recharge point, executed according to customer settings	Custom

3.2 Equipment Startup Switch Usage Instructions



① To start the device, switch to the left to enable

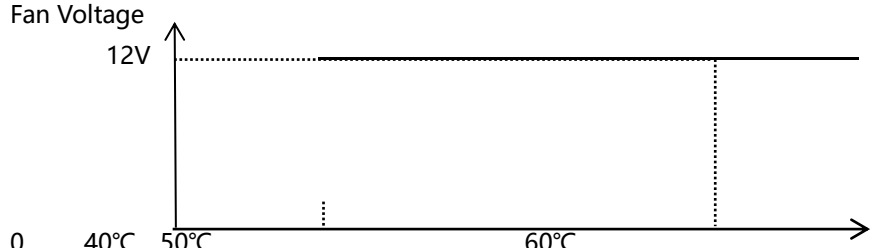
4. TTL Communication, RS485 Communication, External 12V Output Interface Pin



Serial Number	Definition
①	485-A
②	485-B
③	12V
④	GND
⑤	Unused
⑥	Unused
⑦	TTL-TXD
⑧	TTL-RXD

Note: The maximum current provided is 300mA at 12V; exceeding this may damage the interface.

5. Fan Temperature Control

Serial Number	Fan Startup Logic Diagram
During PV Charging	

6. Common Issues and Solutions

Phenomenon	Processing Method
Indicator light and LCD screen do not light up	Check if the connection of the battery and solar panel is correct
There is voltage from the solar panel, but no voltage output from the battery	Disconnect the battery to check if it has voltage
Battery type and series cannot be modified during MPPT operation	Changing the battery type will alter the over-voltage and under-voltage protection points!
Charging power does not reach the rated value	The system employs current limiting and constant temperature control; Check if the system has reset the charging power; Is the voltage difference between the PV model and the battery model too large?
Photovoltaic voltage fluctuations; battery voltage fluctuations	Under-voltage or over-voltage
Other issues or difficult-to-solve anomalies	Go to the settings interface to start restoring factory settings. After setting to factory defaults, reconfigure the relevant parameters according to the system configuration. Proceed with caution!
No response when the battery is connected	Check if the battery's positive and negative terminals are reversed
No response when the photovoltaic is connected	Check if the photovoltaic's positive and negative terminals are reversed
Fan not turning	<ol style="list-style-type: none"> 1、 Check if there are foreign objects blocking the fan and clean the air ducts regularly in a timely manner. 2、 Contact after-sales service for fan replacement if the foreign object removal fan still does not turn. 3、 Is the system itself in a low temperature state?

8. Product Installation

8.1 Installation Precautions

- Be very careful when installing the battery; protective goggles should be worn during the installation of open lead-acid batteries. If contact with the battery acid occurs, please rinse with clean water immediately.
- Avoid placing metal objects near the battery to prevent short circuits.
- Charging the battery may produce acidic gases; ensure that the surrounding environment is well-ventilated.
- Storage batteries may produce flammable gases; please keep away from sparks.
- Avoid direct sunlight and rain penetration during outdoor installation.
- The virtual connection points and corroded wires may cause significant heat, melting the wire insulation, burning surrounding materials, and even starting a fire. Therefore, it is essential to ensure that all connections are tightly secured and the wires are It is best to secure everything with cable ties to avoid loose connections caused by the wires shaking during mobile applications.
- When connecting the system, the output voltage of the components may exceed the safe voltage for humans. When operating, be sure to use insulated tools and ensure that your hands are dry.
- The terminal for the battery on the controller can be connected to a single battery or to a group of batteries. The subsequent instructions in the manual are for use with a single battery, but Similarly applicable to a system of batteries.
- Please adhere to the safety recommendations of the battery manufacturer.
- Ground the controller's grounding terminal
- When installing, do not reverse the connection of the battery, as it can cause irreversible damage.

8.2 Installation Steps

The wiring and installation methods must comply with national and local electrical code requirements. The wiring specifications must be selected according to the rated current, generally based on $5A/mm^2$.

Step 1: Choose Installation Location

Avoid installing the controller in direct sunlight, high temperatures, and areas prone to water ingress, and ensure that there is good ventilation around the controller.

Step 2: Fix the Hanging Screws

Mark the installation location according to the dimensions of the controller, drill two appropriately sized installation holes at the marked spots, and securely fix the screws in the two installation holes.

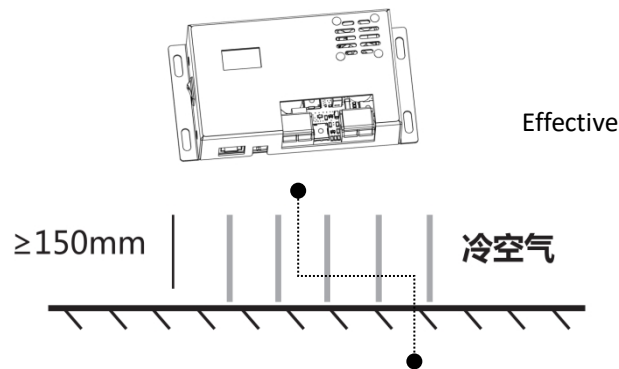
Step 3: Secure the Controller

Align the fixing holes of the controller with the two previously fixed screws and hang it up, then secure the two screws at the bottom.

Step 4: Secure the Ground Wire

Lock one wire onto the screw on the side of the controller, and effectively connect the other end of the wire to the ground (it can be buried with a metal block) to direct leakage current, static electricity, and lightning strikes into the ground.





9. Protection Function

- Equipment Overtemperature Protection

When the internal temperature of the controller exceeds the set value, it will automatically reduce the charging power or even shut down during charging, thereby further slowing the rise in the internal temperature of the controller.

- Battery Overtemperature Protection

Thermal protection for the battery requires an external battery temperature sampling sensor. When the battery temperature is detected to be too high, charging will stop, and when the battery temperature decreases to

When the temperature is 5 degrees lower than the set value, it will automatically resume charging after 2 seconds.

- Input Overpower Protection

When the power of the solar panel exceeds the rated power, the controller will limit the charging power within the rated power range to prevent excessive current from damaging the controller.

The device enters limited current charging.

- Excessive voltage at the photovoltaic input terminal

The input voltage of the photovoltaic array is too high, and the controller will automatically disconnect the photovoltaic input.

- Photovoltaic input reverse connection protection

When the polarity of the photovoltaic array is reversed, the controller will not be damaged and will continue to operate normally after correcting the wiring error.

- Nighttime anti-reverse charge protection

Prevents the battery from discharging through the solar cells at night. Special note: There is no reverse connection protection function for the battery.

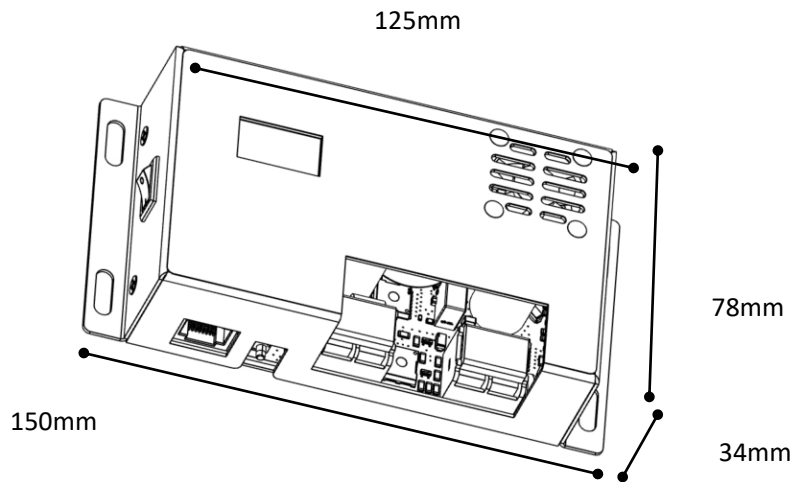
10. System Maintenance

To ensure the controller maintains optimal performance over time, it is recommended to regularly check the following items.

- If any abnormal faults or error messages are detected, corrective measures should be taken promptly.
- Check for corrosion, insulation damage, high temperature or burning/discoloration signs on the terminal connections, and deformation of the casing; repair or replace as needed.
- Inspect wires for exposure, damage, or deteriorating insulation performance, and repair or replace them promptly.
- Check for dirt, nesting insects, and corrosion phenomena, and clean them up promptly.

Warning: Risk of electric shock! Ensure that all power sources to the controller have been disconnected before performing the above operations for any checks or actions! Do not operate without professional supervision.

11. Product dimension diagram



12. Communication protocol

12.1 Basic

Transmission mode	RTU	Protocol Standard/Function Code	0x02 Read one or more input states	Bit-wise reading
Baud rate	Default is 9600bps	This communication protocol is based on <standard MODBUS protocol>, where the master continuously requests data from the slave, the slave receives the request command and responds with data.	0x03 Read holding registers	Read by 16-bit words
Check bit	No parity		Read a register 0x04	Read by 16-bit words
Data Bit	8bit		0x05 Write Single Coil Status	Bitwise Write
Stop Bit	1bit		0x06 Write Single Holding Register	Write in 16-bit Words
Frame Interval	Not less than 3.5 Byte Times		0x10 Write multiple keep registers	Write in 16-bit Words
Frame length	200 bytes		When the communication module detects errors other than CRC code errors, it must send a message back to the host, with the highest bit of the function code set to 1; 01 Illegal function code, 02 Illegal data address 03 Illegal data value 04 Service failure	
Maximum slave response time	350 byte time			
Minimum host polling interval	400 byte time			

12.2 Information address

The register address table, read corresponding function code 0x03, set corresponding function code 0x06. The addresses in the table below are the same as those in the actual information frame and do not require any offset or other conversion.

Address (Decimal)	Meaning	Byte	Read/W rite	Example	Explanation
40000	Device Model	2	R	31021	H10PA
40001	Software Version	2	R	10	V1.0
40002	Hardware Version	2	R	10	V1.0
40003	Maximum Power Support	2	R	450	450W
40004	Maximum Input and Output Current	2	R	1210	PV:12A, BAT:10A
40005	Photovoltaic Radiator Temperature	2	R	25	Current System Temperature 25 Degrees Celsius
40006	PV NTC Status	2	R	0	0~7
40007	Reserved	2	R	Unused	Reserved
40008	Reserved	2	R	Unused	Reserved
40009	Reserved	2	R	Unused	Reserved
40010	Charging phase	2	R	3	1: Trickle 2: Constant current 3: Constant voltage
40011	Charging state	2	R	1	0: Not charged, 1: Charging
40012	Full charge state	2	R	1	0: Not fully charged, 1: Fully charged
40013	Current load state	2	R	1	1: Starting up, 0: Shutting down
40014	BOOST heat sink temperature	2	R	50	50°C (accuracy 1°C)
40015	Reserved	2	R	Unused	Reserved
40016	Reserved	2	R	Unused	Reserved
40017	Reserved	2	R	Unused	Reserved
40018	Reserved	2	R	Unused	Reserved
40019	Reserved	2	R	Unused	Reserved
40020	Photovoltaic input voltage	2	R	2498	24.98V (accuracy 0.01V)
40021	Photovoltaic input current	2	R	275	2.75A (accuracy 0.01A)
40022	Photovoltaic input power	2	R	100	100W (accuracy 1W)
40023	Photovoltaic Radiator Temperature	2	R	20	20 (accuracy 1°C)
40024	Photovoltaic fault code	2	R	0	See Fault Table 1
40025	Battery output voltage	2	R	5556	55.56V (accuracy 0.01V)
40026	Battery output current	2	R	12	None
40027	Battery output power	2	R	100	None
40028	Battery radiator temperature	2	R	25	25°C (accuracy 1°C)
40029	Battery fault code	2	R	See fault table 2	See fault table 2
40030	Reserved	2	R	Unused	Reserved
40031	Reserved	2	R	Unused	Reserved
40032	Fan startup status	2	R	0	0: Off 1: On
40033	Historical system charging WH number high	2	R	H+L (unit WH)	Historical total power generation WH
40034	Historical system charging WH is low	2	R		
40035	Current SOC value	2	R	982	98.2%
40036	Reserved	2	R	Unused	Reserved

40037	Today's power generation	2	R	855	855 WH
40038	MPPT working mode	2	R	0	0 (mppt mode)
40039	Reserved	2	R/W	Unused	Reserved
40040	Maximum voltage for photovoltaic connection	2	R	300	60.0V
40041	Minimum Voltage for Photovoltaic Access	2	R	130	16.0V
40042	Maximum Charging Power Set by User	2	R/W	100	100W (Limits the Maximum Charging Power of Photovoltaics)
40043	Reserved	2	R/W	Unused	Reserved
40044	Photovoltaic Stop Working Temperature Setting	2	R/W	70	70°C
40045	Current Photovoltaic Fan Start Temperature	2	R	40	40°C Fan Start
40046	Device Communication Address	2	R/W	01	Communication Address: 01H (01~255)
40047	Battery charging maximum voltage setting	2	R	5400	54V (system automatically distributes according to the dial code)
40048	Battery discharge minimum voltage setting	2	R	4200	42V (system automatically distributes according to the dial code)
40049	Reserved	2	R/W	Unused	Reserved
40050	Reserved	2	R/W	Unused	Reserved
40051	Reserved	2	R/W	Unused	Reserved
40052	Reserved	2	R/W	Unused	Reserved
40053	Reserved	2	R/W	Unused	Reserved
40054	Reserved	2	R/W	Unused	Reserved
40055	Set battery type	2	R	0	0: Lithium Nickel Cobalt Manganese (NCM), see Functional Table 1
40056	Set battery series	2	R	13	Lithium Nickel Cobalt Manganese, 13 series
40057	Power on	2	R/W	1	0: Disable power generation, 1: Start power generation (default)
40058	Reserved	2	R	0	Reserved
40059	Baud rate	2	R/W	0	1:9600(default) 0~7(4800~115200)
40060	Backlight time	2	R/W	60	200S (default)
40061	Reserved	2	R/W	Unused	Reserved
40062	Reserved	2	R/W	Unused	Reserved
40063	User-defined battery overvoltage value	2	R/W	800	80.0V
40064	User-defined battery undervoltage value	2	R/W	450	45.0V
40065	Reserved	2	R/W	100	Reserved
40066	Reserved	2	R/W	Unused	Reserved
40067	Reserved	2	R/W	Unused	Reserved
40068	Reserved	2	R/W	Unused	Reserved
40069	Reserved	2	R/W	Unused	Reserved
40070	Reserved	2	R/W	Unused	Reserved

13. Detailed Table of Attachments

13.1 Function Table

NMC	Nickel Manganese Cobalt Lithium Battery	0
LFP	Lithium Iron Phosphate Battery	1
PAB	Lead Acid Battery	2
GEL	Gel Battery	3
OTH	Custom	5
ERR	Incorrect Configuration	8

13.2 Fault Table

Solar Panel Overvoltage	1	Solar Panel Short Circuit	128
Solar Panel Undervoltage	2	Photovoltaic Voltage Too High Compared to Battery Voltage	256
System Over Temperature	4		
Temperature Sensor Fault	8		
Solar Panel Overcurrent	16		
Solar Panel Over Power	32		
Current sensor failure	64		

14. Application wiring diagram

