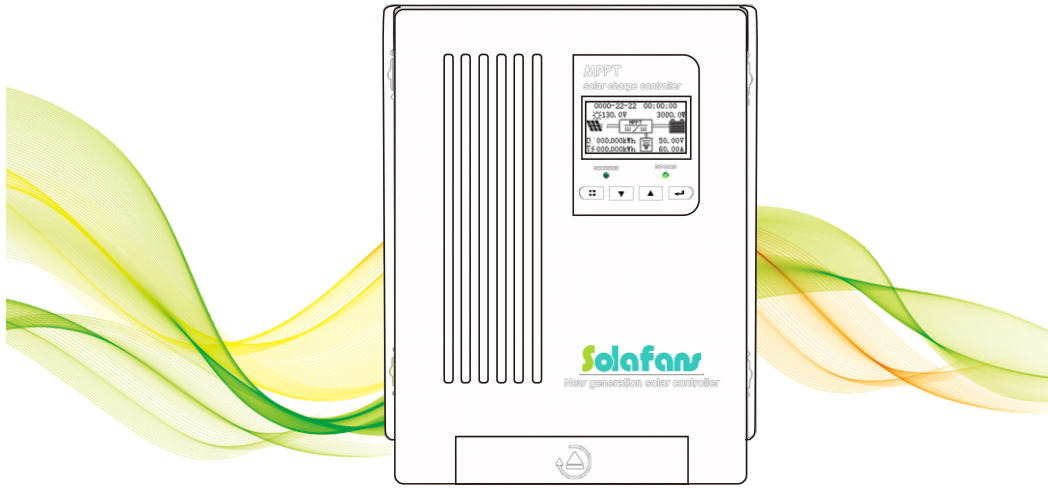
MPPT

solar charging controller



user manual

Product Description

Thank you very much for choosing our MPPT controller. The new generation MPPT which we produce, it is the brand new product developed based on the newest technology which represents the newest high-level photovoltaic development. Excellent performances are listed as below:

- Excellent heat dissipation design and cooling fan of intelligent control;
- Creative maximum power point tracking technology can significantly increase the energy utilization rate of the solar system and can reach transfer efficiency of 97%;
- Quickly scan the entire I-V curve; track the maximum power point within several seconds;
- Three types of lead-acid batteries include sealed, Gel, AGM, Flooded and lithium battery series charging program can be selected;
- Controller protection function: over charge, over discharge, over-load, short circuit self-protection;
- RS485 communication interface realizes multi-machine communication with communication distance of 1km and communication with host computer which enables you to check operating parameters of controller conveniently.

The controller is used in solar off-grid system (independent system) which automatically switches to the mode of charge or discharge. MPPT controller has an advanced tracking algorithm to obtain the maximum power of the solar cell module so as to charge battery; at the same time, its low-voltage disconnect (LVD) function can prevent the damage caused by over-discharge of the battery. The charging process of MPPT controller's battery is optimized which can extend battery Life and improve system performance. Its comprehensive self-test function and electronic protection function can avoid damage caused by installation error and system fault. Although the TY-series MPPT controller is easy to operate and use, it would be better for you to take some time to learn the instructions and specification of this manual in order to use all the functions better improve your PV system.

The features of the maximum power point tracking technology

Our MPPT controller utilizes maximum power point tracking technology to extract the maximum power from the solar array to charge the battery. The maximum power point tracking mode is fully automatic and does not require user to adjust. When the maximum power point of the array changes with ambient conditions, the controller automatically tracks the maximum power point of the array to ensure that the maximum energy of the day is obtained from the solar array.

● Increase current

In most cases, the maximum power point tracking technique will "increase" the charge current of the solar system. Assuming that a system may have 10 amps of current flowing from the solar array into the MPPT controller and 12 amps of current flowing from the MPPT controller into battery. MPPT controller does not generate current! The energy input to the MPPT controller is equal to its output energy. Since the power is the product of voltage and current (volts x amperes), the following situations are true:

(1)MPPT controller input energy = MPPT controller output energy
(2)Input voltage x Input current = Output voltage x Output current

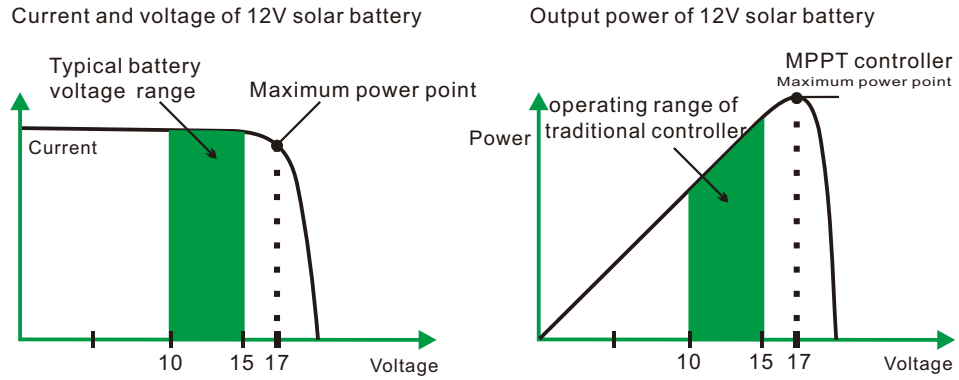
* Assume that the efficiency is 100% and ignore the power loss caused by wire and conversion.

If the maximum power point voltage Vmp of the solar array is larger than the battery voltage, the battery charge current must be proportionally larger than the solar array output current so that the input and output power can be balanced. The greater the difference between the Vmp voltage and the battery voltage, the greater the current boost. Current boost is extremely important in the system because the maximum power point voltage Vmp voltage of the solar panel in the solar power system is usually higher than the battery voltage.

● The advanced condition compared with traditional controller.

The traditional controller directly connects the solar array to the battery when charging. It requires the solar array to operate normally below the Vmp voltage range. Take 12V system as an example. The range of battery voltage is usually 11-15V, but the Vmp voltage of solar array is usually about 16 or 17V.

The diagram below shows curve of current, voltage and output power of off-grid solar battery of typical nominal rated voltage 12V .



Nominal 12V solar cell I-V curve and output power diagram

Maximum power point voltage Vmp of solar PV array is the voltage of maximum output power (Amp x Volts), which is showed in the "knee" of the left diagram of above,the solar PV array I-V curve.

Since the conventional controller does not always operate in the solar PV array Vmp, the energy is wasted which originally can be used to charge battery and supply power to the system load. The greater the difference between the battery voltage and the Vmp of the solar PV array, the more energy will be wasted. The MPPT controller will always operate at the maximum power point which reduces energy waste compared with conventional controllers.

● The limitating factor of the maximum power point tracking controller:

The Vmp of the solar PV array will decrease as the temperature of the array increases. In hot weather, Vmp may be close to or even lower than the battery voltage. In this case, the MPPT controller will have little or no access to energy compared with conventional controllers. However, as long as the nominal voltage of the system PV module is higher than the battery voltage, the Vmp of the PV module will be always higher than the battery voltage. In addition, decrease of the current of the solar array saves wires which enables the MPPT controller also has obvious advantages even in hot weather.

Content

1. Matters needing attention

This manual describes the operation related to the MPPT solar charge controller.

1.1 Effectiveness

This manual is applicable to all models of MPPT solar charge controller of our company

1. 2 Target groups

This manual applies to installers and operators

1. 3 Before installing and operating the controller, please read this manual and keep it carefully.

1. 4 Symbol Description

The followings are descriptions of the type of logo that appears in this manual:

	Warning! If not avoided, it might lead to the machine failure or accident
	Danger ! If not avoided, it might lead to the machine failure or accident
	Attention! In order to operate MPPT controller effectively, please read the controller operating instructions carefully.。

2. Safety instructions

2.1 Safety instructions

	Warning! ● Input voltage range of this controller is large. It will lead to personal injuries if it is not operated cautiously; ● All work on the charge controller must be carried out by a technician; ● The device can not be operated by children or people lack of body sensibility and those who are poor in their minds, lack of experience and knowledge of the operation; ● Keep away from children and make sure children can not touch.
	Warning! High heat shell parts. ● Please install in a well ventilated environment.
	Warning! Radiation is harmful to health ● Do not stay near the solar charge controller within 20cm for a long time.

2. Safety Instructions

2.2 Logo Description

This section shows all instructions displayed on all device labels.

Logo	Instruction:
	Risk of electric shock; The energy stored in the capacitor will remain after five minutes of disconnection, and after the break, do not touch internal components within 5 minutes.
	There is not self-repair parts inside the machine, so do not try to remove the cover; only professional personnel can operate and maintain the equipment; please use the insulation tool to drop risk of harm during operation.
	Beware of high heat shell; The solar charger controller becomes hot during operation. Avoid contact during operation; It is forbidden to place any items on the equipment and to block the fan vents.

2.3 Safety instructions

● When using this equipment, please keep the following information in mind so as to avoid fire, lightning or other personal injuries:

	Warning! Make sure that the input DC voltage = the specified maximum voltage, the voltage is too high may cause permanent, Damage to the solar controller, the above situation will not be included in the warranty period. This chapter contains important safety and operating instructions. Read and keep this manual for future use.
	Warning! The technician if you want to maintain or clean the solar controller or connect to the circuit, must first follow the relevant steps.

● Before using the solar charge controller, read all instructions and warning signs on the solar charge controller and the corresponding sections of this manual

● Please use the parts recommended or sold by our company

● Make sure the existing lines are in good conditions and wire size are suitable in order to avoid the risk of fire and electric shock; do not operate when solarcontroller is damaged and wiring is qualified;

● Do not disassemble the solar charge controller by yourself. Attempts to repair a solar charge controller may result in further risk of damage or accident and loss of quality of warranty;

● Keep away from flammable and explosive materials in order to avoid fire;

● The installation location should be kept away from moisture or corrosive substances;

● In order to reduce the rate of short circuit, the technician must use the insulation tool to operate the equipment.

3. Included components

3. 1 The following accessories are included after purchasing the equipment

Item	Quantity	Remark
Controller	1	
Screw	4	
Temperature sensor	1	
User Manual	1	

Please contact distributor when you find the missing parts.

3. 2 Check if it is damaged during transportation

After receiving device, please do not rush to sign at first, please open the sealing and check whether there is damage or crack appearance, if there is, please refuse to sign and contact distributor.

3. 3 Charging controller

The label of charging controller is pasted on the side of case, If you find the device does not matched the one you purchase, please contact distributor.

4. Controller Installation

Installation must be done by professional technician.

4. 1 Selection of installation position

Danger:
The case of charging controller will become hot during operation.

- Do not install on the flammable building material;
- Do not install nearby the highly flammable material;
- Do not install in the potentially dangerous explosion area;
- Do not install the charging controller in direct sunlight in order to avoid the loss caused by overheating.

Warning:
The controller has built-in thermal storage module components.

- Do not touch the controller while it is working and the case is open.

4. 1. 1 Size

Model	20A	30A	40A	45A	55A	65A	70A	80A	100A	120A
Size										
N.W.										
G.W.										

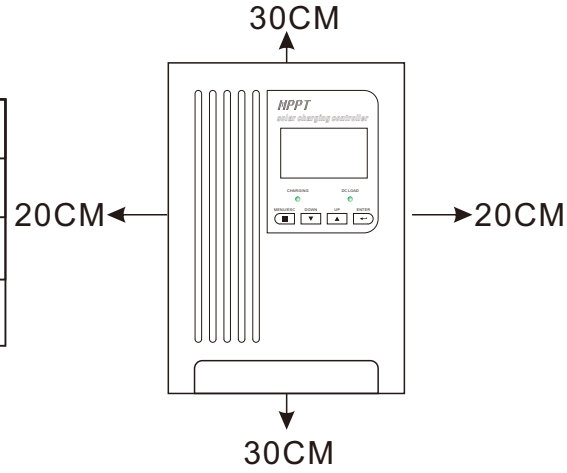
4. 1. 2 Environmental Condition

- Install on solid surface;
- Installation position must be approachable anytime;
- Installation position can be removed anytime;
- Only temperature of -20°C~ 50°C can confirm the best working environment;
- Do not install the charging controller in direct sunlight in order to avoid power damage causedby overheating.

4. 1. 3 Safety Distance

Observe the following safety gap, make sure other equipment or object are not in this range and make sure there is enough room for heat dissipation.

Instruction	Safety Distance
Edge	20CM
Height	30CM
Bottom	30CM



5. MPPT Controller Connection

Danger!
If it is input high voltage and operation is not correct, solar charge controller may lead to life-threatening.

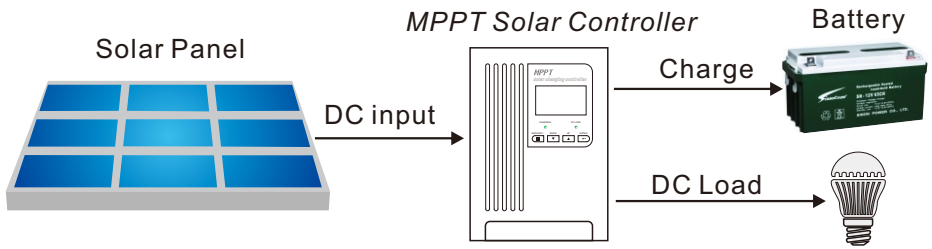
- Disconnecting the solar panels should use a circuit breaker and avoid accidental activation.
- Disconnect the circuit breaker and make sure it can not be connected again;
- Make sure there is no voltage in system.

Warning::
Over-voltage can damage system

- Thunderstorms and lightning will increase the risk of damage to external over-voltage protection areas.

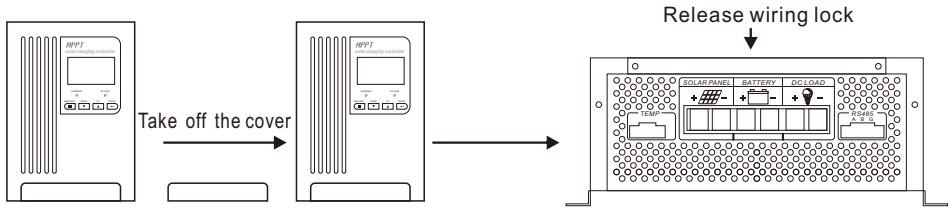
5. MPPT Controller Connection

5. 1 Solar Charging System components



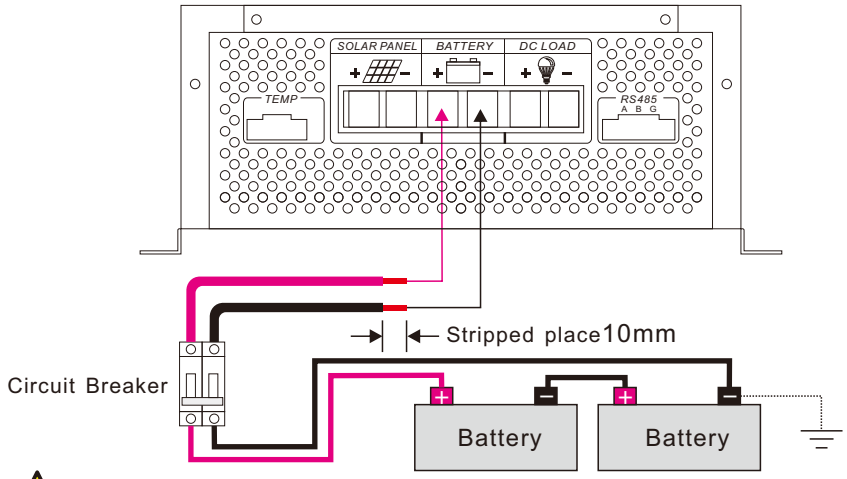
5. 2 Wiring

5. 2.1 Wiring Steps



5. 2.2 Battery Connection

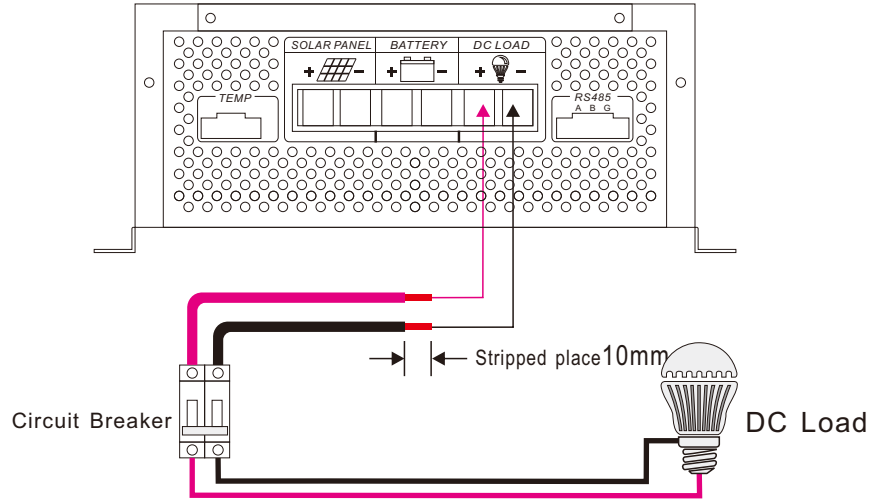
Warning: Short circuit of battery's positive and negative terminals and wires of positive and negative electrode will lead to fire or risk of explosion. Please operate carefully.



Attention: The operation of connecting batteries must be done under the situation that the circuit breaker is disconnected.

5. 2.3 DC Load Connection

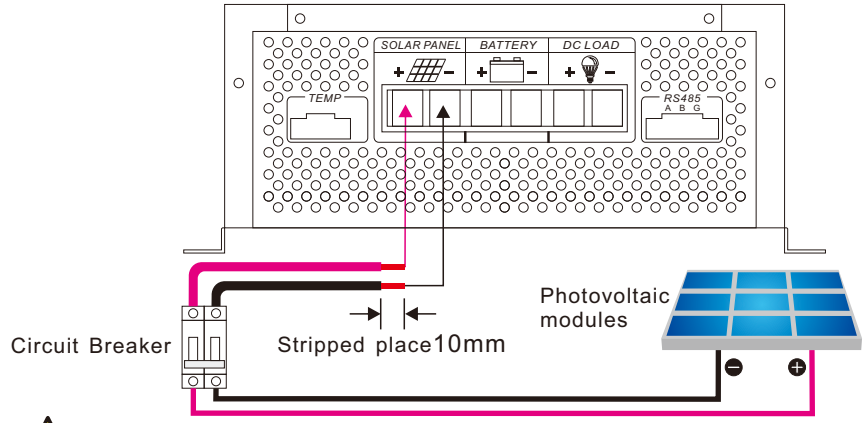
The DC load terminal can be connected to a rated working voltage appliance, which is a DC electric appliance with the same voltage as the battery. The controller supplies electricity based on battery voltage.



5. 2.4 Photovoltaic modules connection

Warning: Electric shock danger! Photovoltaic modules may produce very high voltage, so be careful electric shock when wiring.

Controller can match 12V, 24V, 48V off-grid system solar modules, it's also can use a grid-connected modules that open-circuit voltage does not exceed the specified maximum input voltage. The solar modules voltage in the system must be not lower than the system voltage.



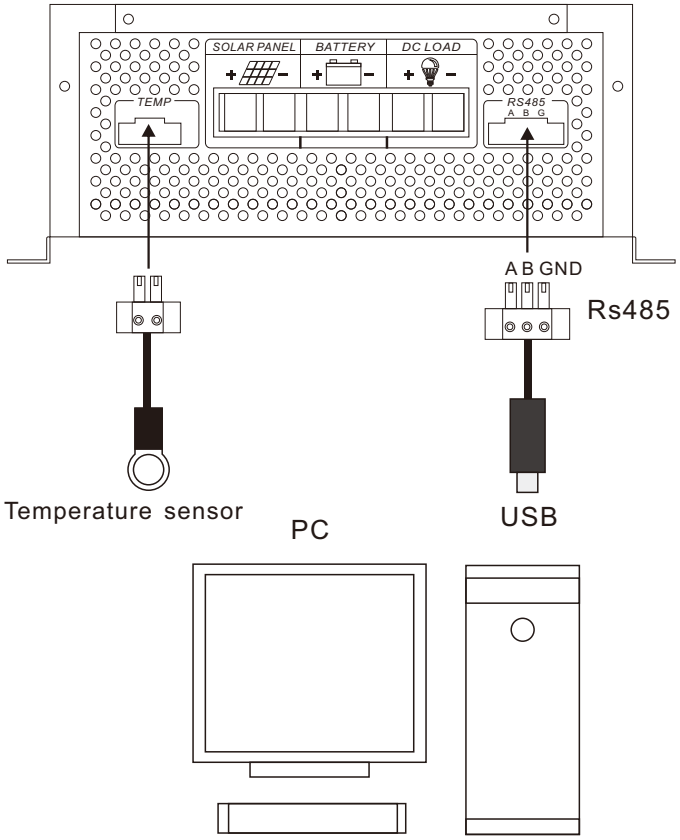
Attention: The operation of connecting photovoltaic modules must be done under the situation that the circuit breaker is disconnected.

5. MPPT Controller Connection

Specifications of cable and miniature circuit breaker：

Specification	20A	30A	40A	45A	55A	65A	70A	80A	100A	120A
Cable	4mm²	6mm²	6mm²	10mm²	10mm²	10mm²	10mm²	16mm²	25mm²	25mm²
2P circuit breaker	32A	32A	32A	63A	63A	80A	80A	100A	125A	125A

5. 2.5 Temperature sensor and MPPT controller connected to PC



Rs485 communication wire is optional accessory

If necessary, install host computer software (need to be purchased separately). Accessories have detailed instructions for use and installation.

5.3 Power trial run

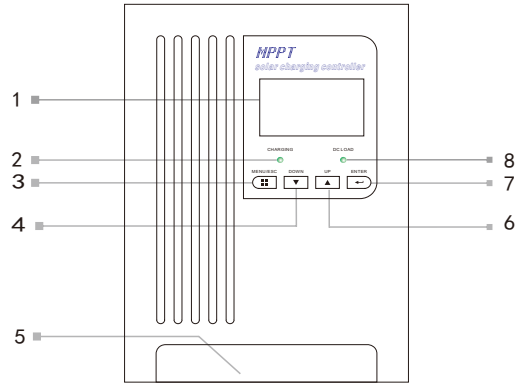
Attention: please make sure that all the positive and negative poles of the DC connection are connected correctly before the trial run,

Proceed as the followings：

1. Make sure that the positive and negative terminals of the cable are fully connected and measure if the open circuit voltage of the PV module is within the operating range of the controller;
2. Turn on the circuit breaker connected with controller and battery;
3. Turn on the circuit breaker connected with controller and solar panel;
4. Then the controller starts to enter the self-test mode; if system conditions are correct, the controller automatically enter the working mode; If the system conditions are not correct, the controller will have fault indications, refer to the chapter of fault elimination.
5. Battery type: the factory setting defaults lead-acid maintenance-free battery, refer to the battery type settings.

6. MPPT controller operating instructions

6.1 Surface show



No	Name	No	Name
1	LCD Display	5	Wiring Cover
2	Charging indicator light	6	Up
3	Function Menu	7	Enter
4	Down	8	DC Load indicator light

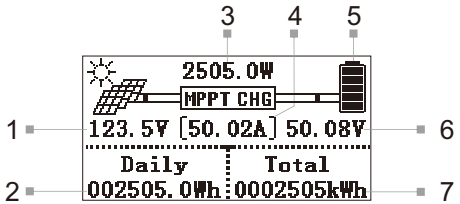
6.2 Indicator Light State Description

Name	State	Description
Charging indicator	Flashing	Maximum power tracking mode charging
	Low Flashing	Float charging mode
	Putout	Stop charging
DC Load indicator light	Lighting	Normal Output
	Flashing	Battery undervoltage indication
	Putout	Stop output

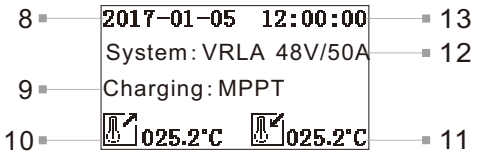
6.MPPT Controller Operating Instruction

6. 3.LCD Display

6. 3.1 Main interface



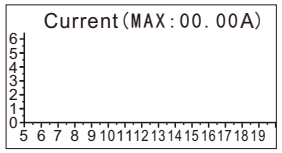
Main interface



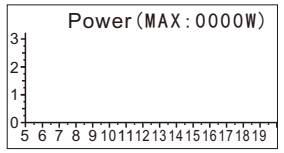
Main interface1

No	Description	No	Description
1	PV module voltage	8	Date
2	Daily power generation(charging volume)	9	Charging state: maximum power tracking, floating charge, stop charging
3	Charging power		
4	Charging current	10	External temperature
5	Battery capacity indication	11	Internal temperature
6	Battery voltage	12	Battery Type / System Voltage Current Level
7	Total power generation(charging volume)	13	Real time

Main interface2



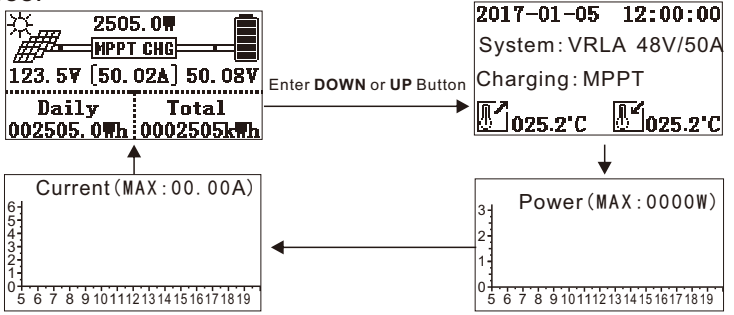
Main interface3



Name	Current Curve (MAX: 00. 00A)	Name	Power Curve (MAX: 0000W)
X	Time (5: 00-20: 00)	X	Time (5: 00-20: 00)
Y	Current (Proportion: 1: 10)	Y	Power (Proportion: 1: 1000)
MAX: 00. 00A (Record the highest charging current value of the day)		MAX: 0000W (Record the highest charging power value of the day)	

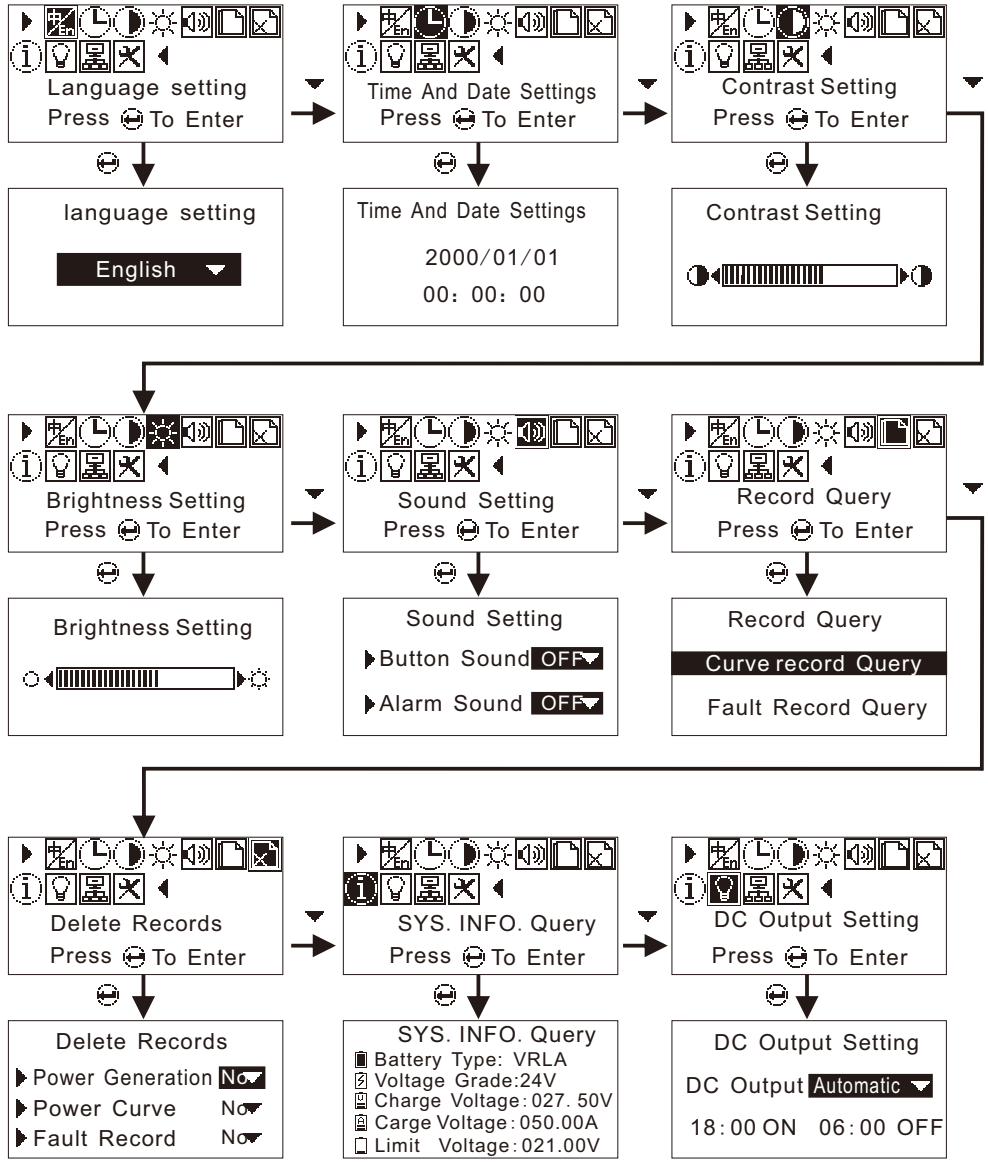
6. 3.2 View the Main Interface

In the default main interface, press DOWN or UP to look through other interfaces.



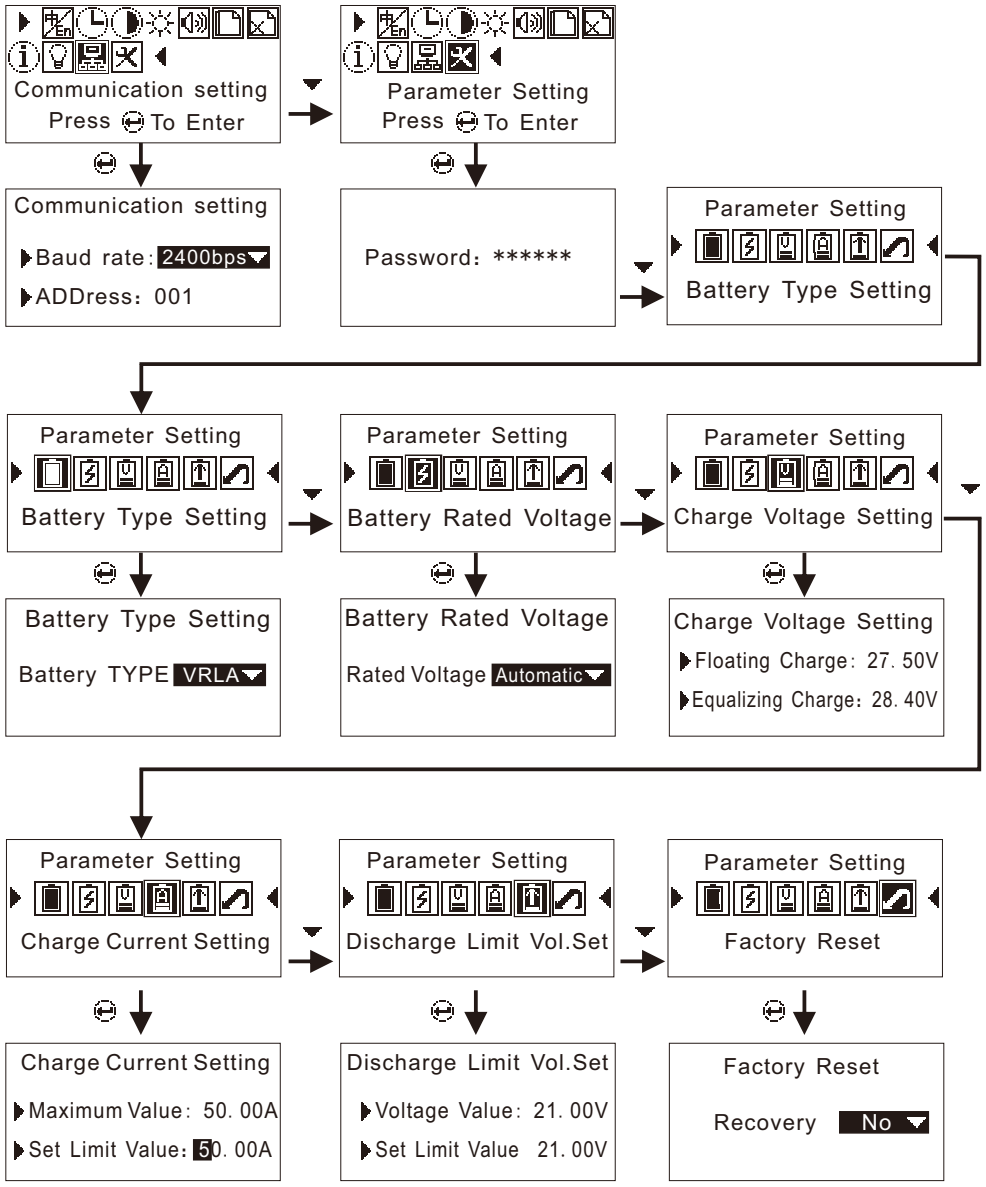
6. 3.4 Main Menu

In the default main interface, press MENU to enter the main menu and press DOWN or UP to view the submenu.



6. MPPT Controller Operating Instruction

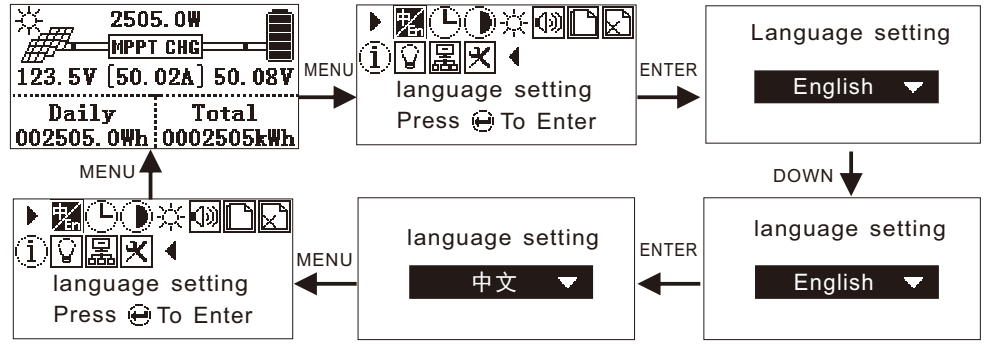
Main Menu



6. 4 Parameter settings

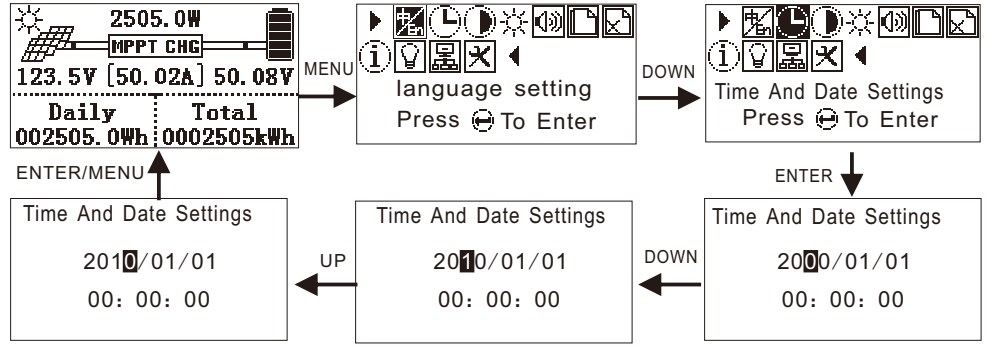
6. 4.1 Language setting

In the default main interface, press MENU to enter the main menu, press ENTER to enter the language setting, press DOWN to select the language and then press the ENTER key to confirm and press MENU to return to the main interface after hearing continuous indicative sound.



6. 4.2 Time and Date Settings

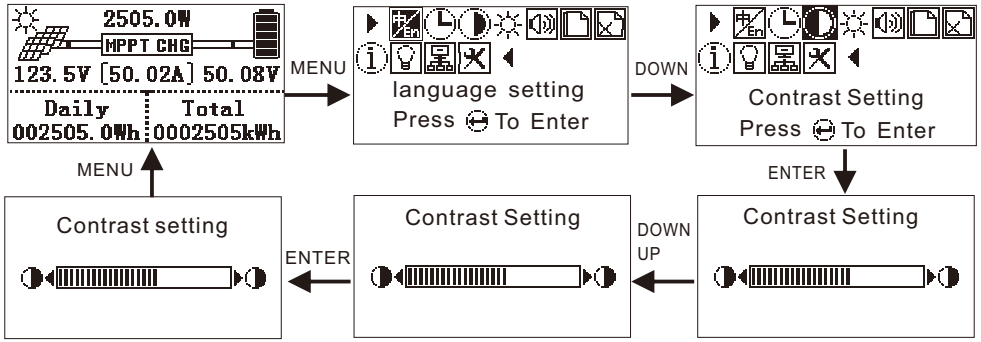
In the default main interface, press MENU to enter the main menu, press DOWN to select the time setting, press ENTER to enter time setting, press UP to move the cursor, press DOWN to modify the value, press ENTER after confirming the modified value and press MENU to return to the main interface after hearing continuous indicative sound.



6. 4.3 Contrast Setting

In the default main interface, press MENU to enter the main menu, press DOWN to select the contrast setting, press ENTER to enter the contrast setting, press DOWNto reduce the contrast, press UP to increase the contrast, press ENTER to confirm and press MENU to return to the upper menu and the main interface after hearing continuous indicative sound .

Contrast Setting

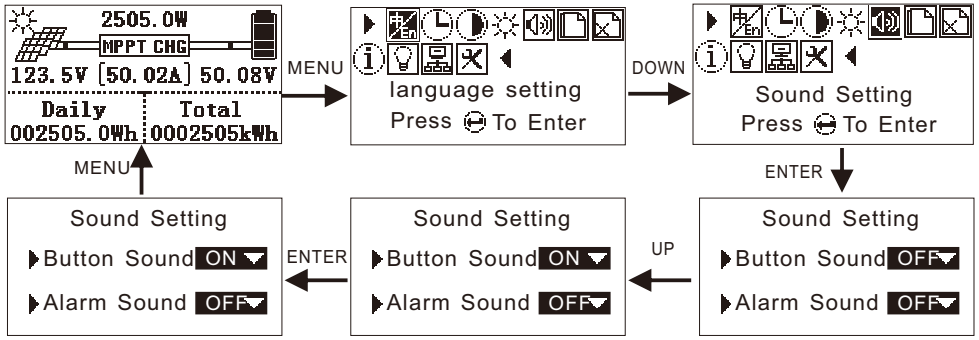


6. 4.4 Brightness Setting

The operations of brightness setting are the same with contrast setting.

6. 4.5 Sound Setting

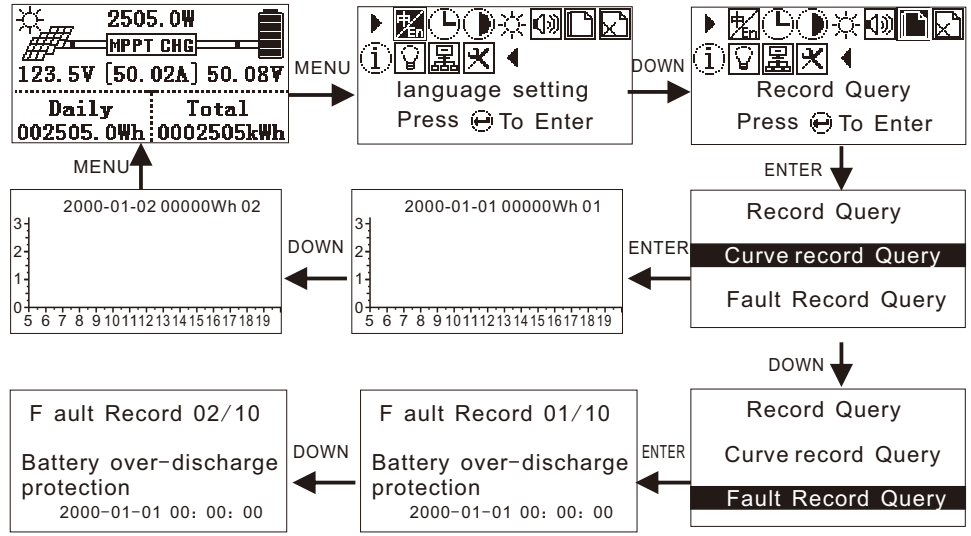
In the default main interface, press MENU to enter the main menu, press DOWN to select the sound setting, press ENTER to enter the sound setting, press DOWN to select the whether the key sound is on or off, press UP to move the cursor to select whether the alarm sound is on or off, press ENTER to confirm and press MENU to return to the main interface after hearing continuous indicative sound.



6. 4.6 Record Query

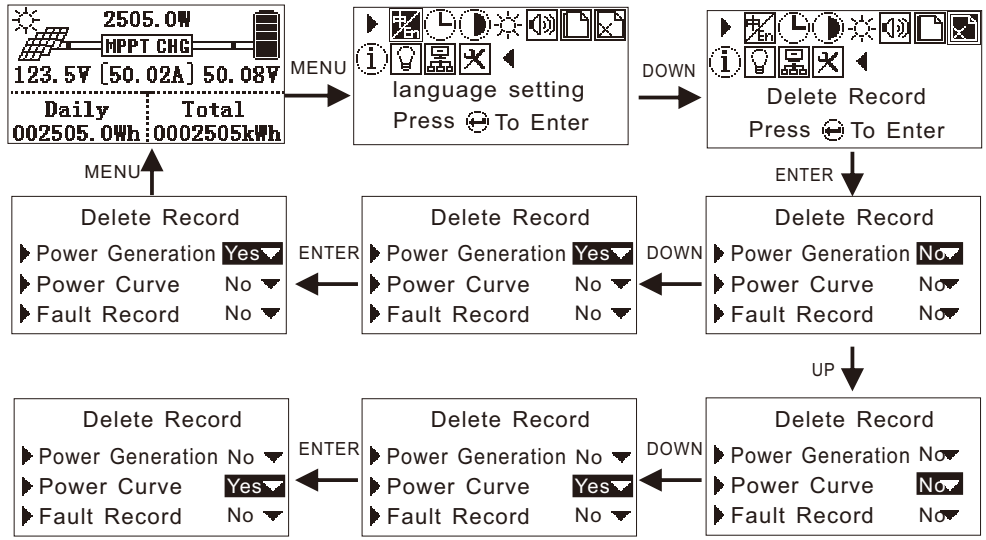
In the default main interface, press MENU to enter the main menu, press DOWN to select record query, press ENTER to enter record query, press DOWN or UP to select the curve record query or fault record query, press ENTER to enter the curve record query or fault record query, press DOWN or UP to check the record and there are 10 records totally. Press MENU to return to the upper and main interface.

Record Query



6. 4.7 Delete Record

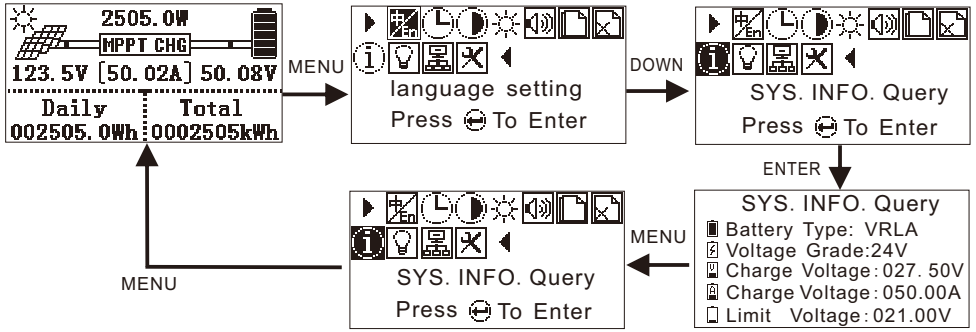
In the default main interface, press MENU to enter the main menu, press DOWN to select the delete record, press ENTER to enter the delete record, press UP to move the cursor, press DOWN to select whether to delete, press ENTER to delete after selecting and press MENU to return to the upper menu and main interface after hearing continuous indicative sound.



6. MPPT Controller Operating Instruction

6. 4.8 System Information Query

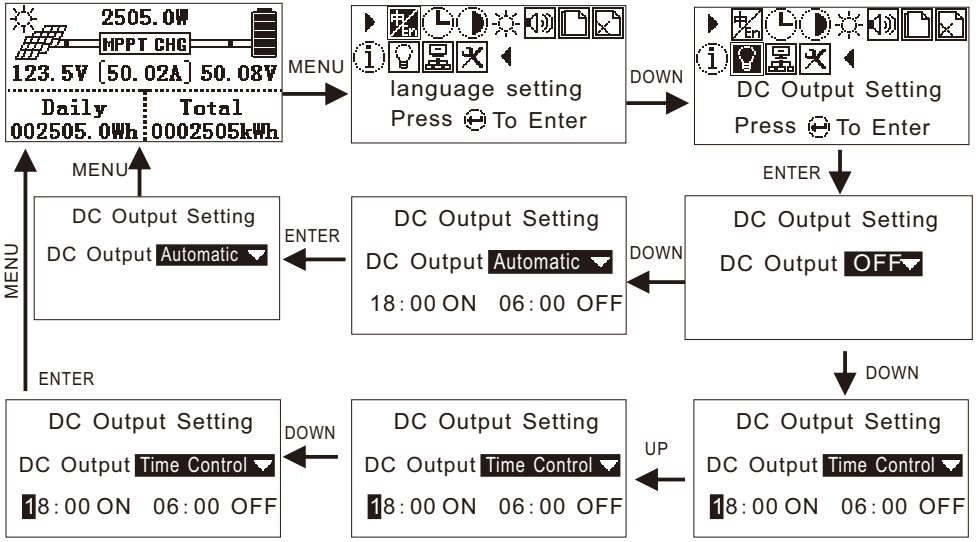
In the default main interface, press MENU to enter the main menu, press DOWN to select the system information, press ENTER to enter the system information, press MENU to return to the main interface.



6. 4.9 DC Output Setting

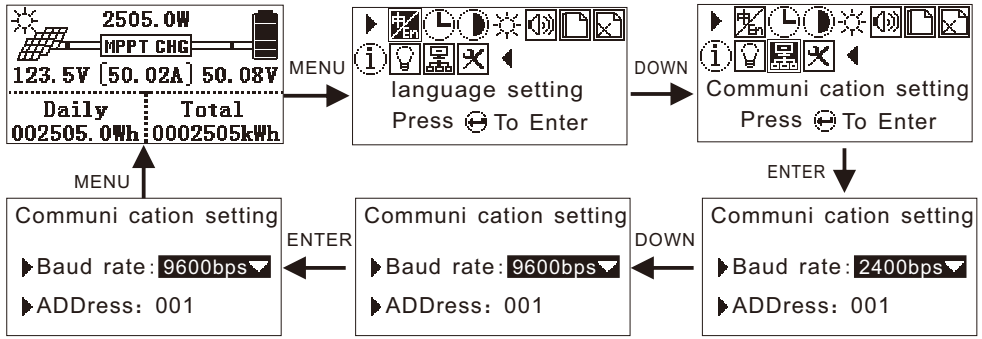
In the default main interface, press MENU to enter the main menu, press DOWN to select the DC output setting, press ENTER to enter the DC output setting, press DOWN to select OFF, Automatic and Time Control. When selecting OFF or Automatic, press ENTER. When selecting Time Control, please set the time period of opening and closing DC Output. Press DOWN to select Time Control and press UP to move the cursor. Press DOWN to input time value. Press ENTER to confirm and press MENU to return to upper menu and main interface after hearing continuous indicative sound.

Note: The key OFF refers to directly turn off the DC output. Automatic refers to turn on the DC output after the MPPT controller connects battery. Except battery undervoltage, Time Control refers to turn on or off the DC output according to the time period set.



6. 4.10 Communication settings

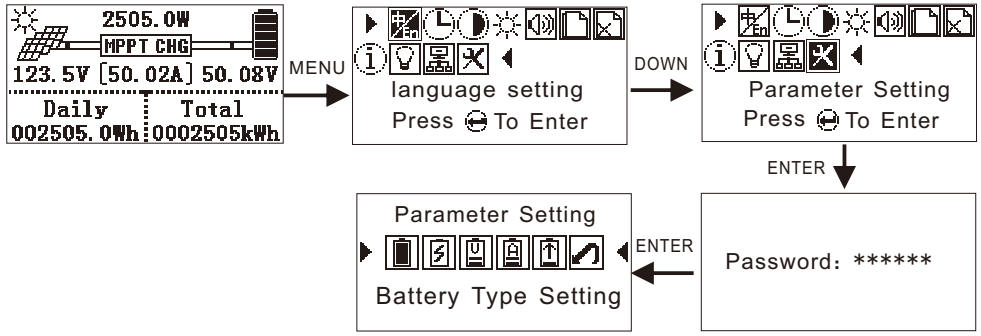
In the default main interface, press MENU to enter the main menu, press DOWN to select the correspondence setting, press ENTER to enter the correspondence setting, press UP to select the baud rate setting or the local address setting, press DOWN to set Baud rate and the local address value, press ENTER to confirm and press MENU to return to the upper menu and main interface after hearing continuous indicative sound.



6. 4.11 Operating Parameter Setting

Note: The operating parameter setting must be operated by qualified technicians. The MPPT controller will not work or suffer from damage of battery due to wrong operation.

In the default main interface, press MENU to enter the main menu, press DOWN to select the operating parameter setting, press ENTER to enter the password prompt interface, enter the password and then press ENTER to enter the operating parameter setting.



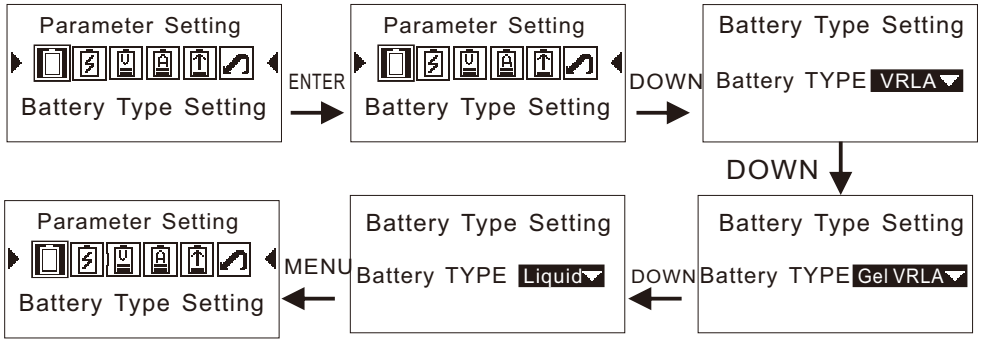
Note: Before setting the operating parameters, you must disconnect the circuit breaker which connects the PV module with the MPPT controller, set 5 parameters: battery type, rated voltage setting, charging voltage setting, charging current setting, discharging lower limit setting, check if parameters displayed on the system information are corresponding and then turned on the PV module circuit breaker.

6. MPPT Controller Operating Instruction

6. 4.11.1 Battery type setting

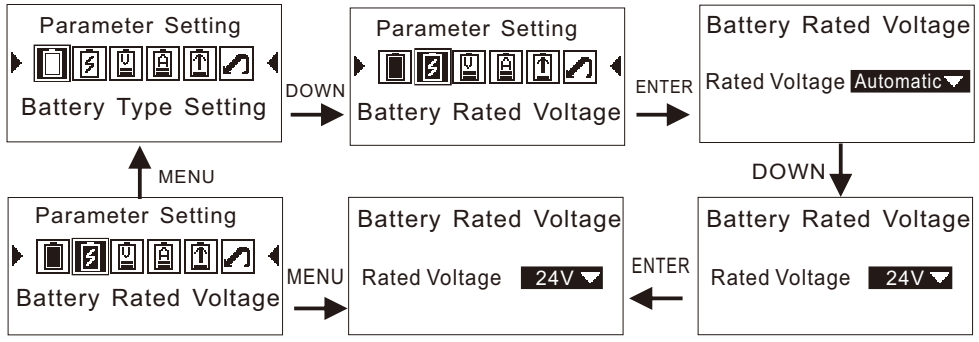
In the operating parameters interface, press ENTER to enter the battery type setting, press DOWN to select battery type (Maintenance-free lead acid battery, Gel battery, liquid battery, lithium series battery), press ENTER to confirm and press MENU to return to upper menu after hearing continuous indicative sound.

i Factory setting defaults to maintenance-free lead acid.



6. 4.11.2 Battery rated voltage setting

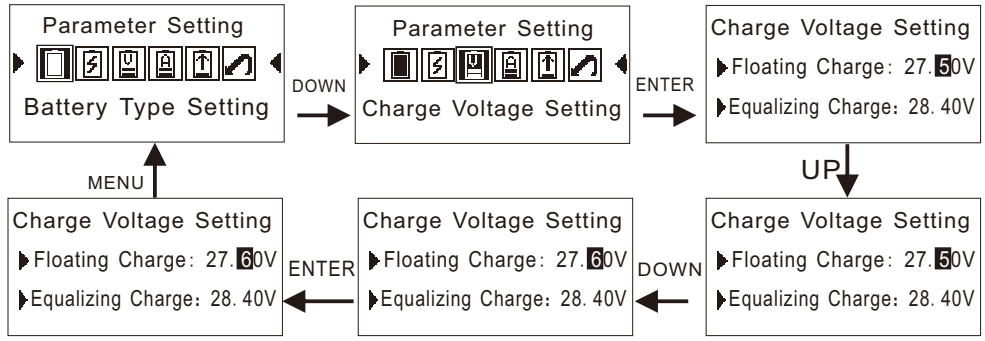
In the operating parameters interface, press DOWN to select rated voltage setting, press ENTER to enter rated voltage setting interface, press DOWN to select voltage level (Automatically identify, 12V, 24V, 36V, 48V), press ENTER to confirm and press MENU to return to upper menu after hearing continuous indicative sound.



i Factory setting defaults to automatically identify the level of rated voltage which can only identify lead acid battery but lithium series battery are not included. When automatically identify the level of rated voltage, charging voltage and discharging lower limit voltage setting are not available. Charging voltage and discharging lower limit voltage setting are only available for manual setting.

6. 4.11.3 Charging voltage setting

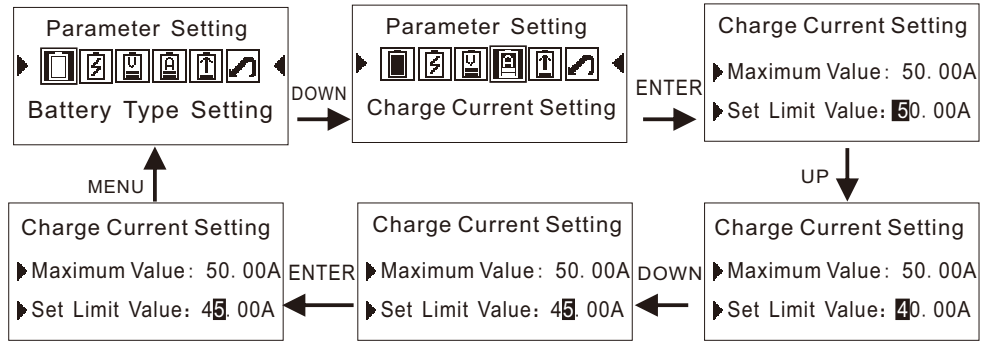
In the operating parameters interface, press DOWN to select charging voltage setting, press ENTER to enter rated voltage setting interface, press UP to move cursor, press DOWN to input numeral, press ENTER to confirm and save and press MENU to return to upper menu after hearing continuous indicative sound.



i Lithium battery series only have float (constant voltage) charging mode. Equalized charging mode can be only used for lead acid battery.

6. 4.11.4 Charging current setting

In the operating parameters interface, press DOWN to select charging current setting, press ENTER to enter charging current setting interface, press UP to move cursor, press DOWN to input value, press ENTER to confirm and save and press MENU to return to upper menu after hearing continuous indicative sound.

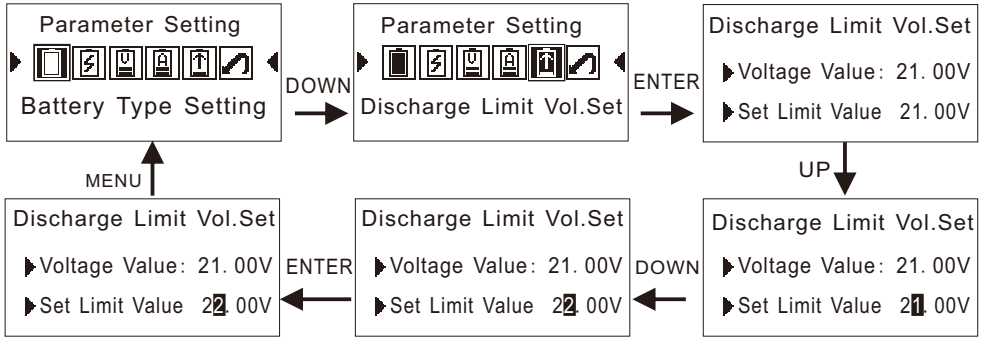


i The setting point of charging current can not be greater than the current maximum value.

6. MPPT Controller Operating Instruction

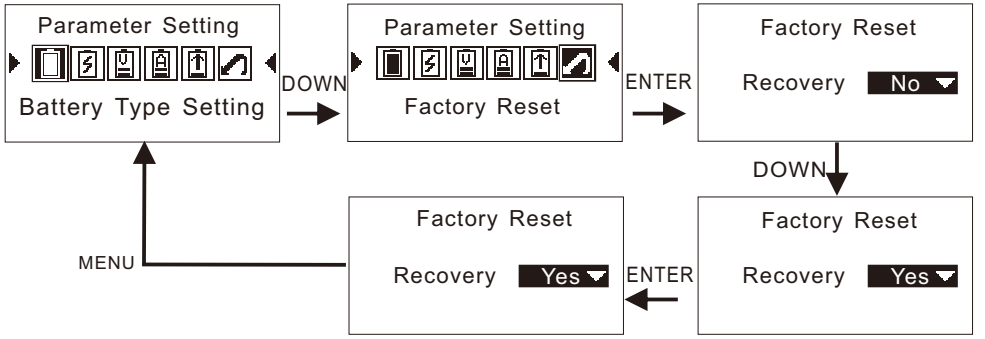
6.4.11.5 Discharge limited setting

In the operating parameters interface, press DOWN to select discharging limitation setting, press ENTER to enter discharging limitation setting interface, press UP to move cursor, press DOWN to input value, press ENTER to confirm and save and press MENU to return to upper menu after hearing continuous indicative sound.



6.4.11.6 Restore Factory Setting

In the operating parameters interface, press DOWN to select factory reset, press ENTER to enter factory reset interface, press DOWN to select whether to restore factory setting, press ENTER to confirm and save and press MENU to return to upper menu after hearing continuous indicative sound.



i When MPPT solar controller can not operate normally due to fault of operating parameter setting, please restore the operating parameters to factory setting.

6. 4.11.7 Password

Press DOWN for 3 times and then UP for 3 times and press ENTER to enter operating parameters setting interface.

7. Technical Parameters

Parameters \ Specification	20A	30A	40A	45A	55A	65A	70A	80A	100A	120A
Charging mode	MPPT automatic maximum power point tracking									
Charging method	3 stages: Constant charge(MPPT), Equalizing charge, floating charge									
The voltage range of system identification 12V\24V\48V\60V\72V\96V	12V system（DC9V~DC15V）:24V system（DC18V~30V) Auto									
	48V system（DC36V~DC60V）:96V system（DC72~120V) Auto									
	60V system（DC45V~DC75V）:72V system（DC54V~90V) Manual set									
Soft-startup time	≤ 10s									
Dynamic response recovery time	≤ 500us									
Static power	≤ 2W									
MPPT efficiency	≥ 96.50%									
PV modules utilization rate	≤ 99.00%									
MPPT working voltage range	12V system：DC18V~150V				24V system：DC36V~150V					
	48V system：DC65V~150V				60V system：DC75V~180V					
	72V system：DC90V~180V				96V system：DC130V~180V					
Under voltage input protection point	12V system DC16V				24V system DC30V					
	48V system DC60V				60V system DC75V					
	72V system DC90V				96V system DC120V					
Under voltage input recovery point	12V system DC18V				24V system DC34V					
	48V system DC65V				60V system DC80V					
	72V system DC96V				96V system DC130V					
Input voltage limit	12V/24V/48V:DC170V				60V/72V/96V:DC225V					
Input over voltage proection	12V/24V/48V:DC175V				60V/72V/96V:DC230V					
Input over voltage recovery	12V/24V/48V:DC170V				60V/72V/96V:DC225V					
Output characteristic	The DC load output voltge is same as battery voltage									
Selectable battery type (The default battery is Lead acid battery)	1, VRLA (Lead acid battery/鉛酸蓄電池). 2, Gel VRLA (Gel battery/ゲルバッテリー). 3, Liquid (Lead acid liquid battery/えきたいでんち). 4, Li-ion (Lithium/Lifepo4 battery/リチウム電池)									
PV maximum input power	20A	30A	40A	45A	55A	65A	70A	80A	100A	120A
12V system	280W	410W	550W	610W	750W	890W	960W	1100W	1375W	1650W
24V system	550W	820W	1100W	1220W	1500W	1780W	1920W	2200W	2750W	3300W
48V system	1100W	1640W	2200W	2440W	3000W	3560W	3840W	4400W	5500W	6600W
60V system				3050W	3750W	4450W	4800W	5500W	6875W	8250W
72V system				3660W	4500W	5340W	5760W	6600W	8250W	9900W
96V system				4500W	5500W	6500W	7700W	8800W	11000W	13200W

Technical Parameters

Specification / Parameters	20A	30A	40A	45A	55A	65A	70A	80A	100A	120A
Floating charge voltage (Lead acid battery)	12V system: 13.80V (or Customizable)									
	24V system: 27.60V (or Customizable)									
	48V system: 55.20V (or Customizable)									
	60V system: 69.00V (or Customizable)									
	72V system: 82.80V (or Customizable)									
	96V system: 110.4V (or Customizable)									
Equalized charge voltage (Lead acid battery)	12V system: 14.50V (or Customizable)									
	24V system: 29.00V (or Customizable)									
	48V system: 58.00V (or Customizable)									
	60V system: 72.500 (or Customizable)									
	72V system: 87.00V (or Customizable)									
	96V system: 116.0V (or Customizable)									
Rated current	20A	30A	40A	45A	55A	65A	70A	80A	100A	120A
Current-limiting protection	22A	32A	42A	47A	57A	67A	72A	82A	102A	122A
Output voltage accuracy	≤ ±1.5%									
LCD display	Reference LCD display instructions for details									
LED display	Charging status, DC output on or off status indication									
PC host computer (communication port)	Rs485 (Selection)									
Low voltage input protection	Reference input characteristic									
High voltage input protection	Reference input characteristic									
Input polarity reverse protection	yes									
Output polarity reverse protection	yes									
Short circuit protection	After 5 trials start, it enters the protected state, reboot recovery									
Overtemperature protection	When the temperature reaches 85℃, it will stop working									
Temperature protection	When the temperature is over 80℃, it will reduce output power									
Other parameters										
Noise	≤ 50dB									
Heat dissipation	Forced air cooling, fan speed is adjusted by temperature, when the internal temperature is low, the fan runs slowly or stops, when the controller stops working, the fan stops running									
Components	The components are imported and in line with EU standards. The rated temperature of all selected electrolytic capacitors are not less than 105℃									
Smell	No peculiar smell and harmful to health odors									
Environmental requirement	Meet 2002/95/EC requirements; No cadmium, cyanide and fluoride									

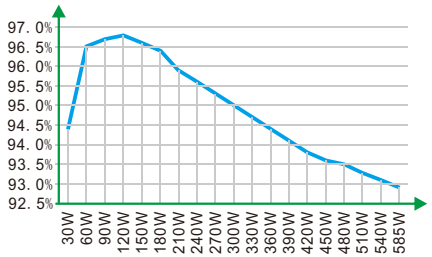
Technical Parameters

Specification / Parameters	20A	30A	40A	45A	55A	65A	70A	80A	100A	120A
Size	The details are on the random label									
Gross weight（kg）	The details are on the random label									
Net weight（kg）	The details are on the random label									
IP Grade	IP21									
Humidity	0~90%RH (Not condensation)									
Altitude	0~3000m									
Environment temperature	-20℃ ~+40℃									
Storage temperature	-40℃ ~+70℃									
Atmospheric pressure	70~106kpa									
Proposed configuration of photovoltaic modules										
System voltage	PV module operation voltage（Recommended value）									
12V system	18V~~150V (Recommend 30V PV modules connection in one series or 36V PV modules connection in one series)									
24V system	36V~~150V (Recommend 30V PV modules connection in two series or 36V PV modules connection in two series)									
48V system	72V~~150V (Recommend 30V PV modules connection in three series or 36V PV modules connection in three series)									
60V system	72V~~180V (Recommend 30V PV modules connection in four series or 36V PV modules connection in four series)									
72V system	90V~~180V (Recommend 30V PV modules connection in five series or 36V PV modules connection in four series)									
96V system	120V~~180V (Recommend 30V PV modules connection in six series or 36V PV modules connection in five series)									

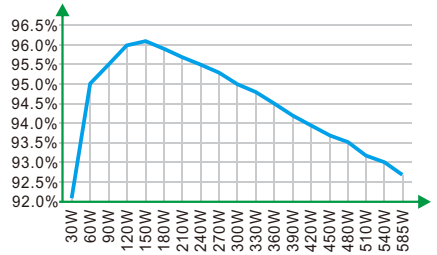
Technical Parameters

Photovoltaic power-Conversion efficiency curve

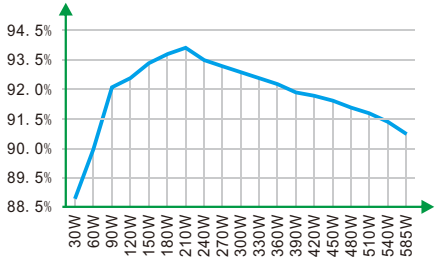
(1) Maximum power point voltage of PV module17V/System voltage 12V



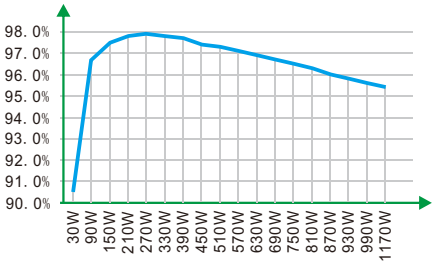
(2) Maximum power point voltage of PV module 34V/System voltage 12V



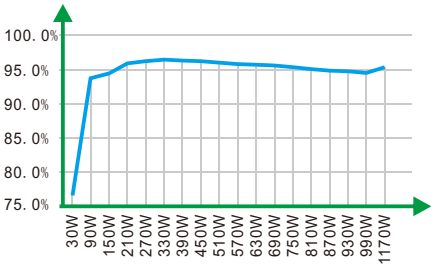
(3) Maximum power point voltage of PV module 68V/System voltage 12V



(4) Maximum power point voltage of PV module 34V/System voltage 24V



(5) Maximum power point voltage of PV module 68V/System voltage 24V



8.Maintenance & Cleaning

8. 1 Fuse Replacement

Fuse blown due to excessively high temperature or other faults needs the correct replacement: pull out the broken fuse from the joint, install the new fuse, check if it is connected correctly and then install equipment.(Fuse is near the connecting box)

8.2 Clean fan vent & heat sink

Please regularly clean fan vent and internal heat sink with dry or slightly wet cloth. Please pay attention that washing liquid or corrosive solvent are banned for cleaning and liquid is not allowed to flow into machine to make sure that the air vents are not blocked.

9. Fault Elimination

When the controller works abnormally, please check conditions listed as below

Fault Situation	Fault Elimination
When controller is electrified for the first time, fault prompts: battery voltage is out of normal range	1. Check whether the battery voltage is in the range of system voltage identification (See technical parameters for system voltage identification range) 2. Manually set rated battery voltage level (See the rated battery voltage setting in the operating parameters setting)
Fault indication: over temperature protection	1.Check whether the cooling fan is damaged and ventilation vents are blocked by debris; MPPT controller should be installed in a ventilated environment 2.Reasonable PV module configuration can improve conversion efficiency and reduce temperature rise (technical parameters PV module configuration)
Fault indication: battery over discharging protection	The battery is out of power
Fault indication: can not test external temperature sensor	1 Check whether it is connected to the external temperature sensor. 2 check whether the sensor contact is bad
Charging indicative light and displays of charging current and charging power are off and on	1 Check whether PV module voltage is in the MPPT operating voltage range. 2 Check whether the charging voltage parameters shown on system are correct. 3 Correct the charging voltage parameters or restore the factory settings to restart dynamic MPPT controller. 4 Check whether the fuse is broken and the circuit breaker is disconnected.
Charging indicative light is off and on alternatively; charging current appears alternatively	This situation generally appears in cloudy day or evening when the light is insufficient which is a normal phenomenon
No power curve and current curve display	Check whether the time and date of the MPPT controller are consistent with the time you are in. (see time and date set)

If the problem is still on the table, please contact customer service personnel:
Please provide the following information: equipment: type, order number, serial number (the label on the back plate); a detailed description of the problem (such as the use of the type system, problems occurred occasionally or frequently, indicating light, display etc.).

10. Quality Warranty

During the warranty period, our company will repair for free or replace with new products

Evidence

During the quality warranty period, our company requires customers to provide invoices and date of purchased products.

At the same time the trademark on the product should be clearly visible, otherwise we have the right not to guarantee quality.

Condition

- The rejected products shall be disposed of by our company
- The customer shall allow reasonable time to repair the faulty equipment

Exemption From Liability

In the following cases, our company will be not responsible for repair:

- The whole machine or spare parts are beyond the warranty period
- Transport damage
- Incorrect installation or modification
- Operating in a very harsh environment described beyond this manual
- Failure or damage to the machine caused by the service, repair, alteration or removal of our company
- Abnormal natural environmental damage

If customers ask for amendment service due to problems caused by faults listed above, our company can provide compensable amendment service after judgment of our service constitute.

Note

The change of product size and parameter is subject to the newest information of our company without further notice.