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REMOTE METER

Model: MT50

INSTRUCTION MANUAL

For use with solar charge controllers PU series, LS series, VS series, PTR series, Tracer MPPT series and other compatible controllers

Remote Meter

MT50

Please note that this remote meter (Model MT50) should only be used with solar charge controllers PUxxxxB(P), LSxxxxB(P), VSxxxxBN, Tracer TRxxxxBN(P), PTRxxxxA(N) and other solar charge controller models released in the future if the user manual states that they are compatible with this MT50 remote meter.

Contents

1 Important Safety Instructions

SAVE THESE INSTRUCTIONS:

This manual contains important safety, installation and operating instructions for the remote meter.

General safety information

■ Please inspect the MT50 thoroughly after it is delivered. If any damage is seen, please notify the shipping company or our company immediately. A photo of the damage may be helpful.

■ Read all instructions and cautions in the manual before starting the installation.

■ Keep the MT50 away from rain, dust, vibrations, corrosive gas and intense electromagnetic interference.

■ Do not allow water to enter the remote meter.

■ There are no user serviceable parts inside the remote meter. Do not disassemble or attempt to repair it.

2 General Information

2.1 Features

The new-generation remote display unit MT50 for PU, LS, VS, Tracer, PTR and other compatible controllers is an associated display device which supports both the latest communication protocol and the voltage standard of solar charge controllers. The product has many useful functions:

■ Automatic identification of the type, model and relevant parameter data of various solar charge controllers

■ Real-time display of the operational data and working status of the connection devices in digital, graphical and textual forms by a large-screen multifunctional LCD;

■ Direct, convenient and rapid operation of six navigation function keys;

■ Both data and power flowing on the same lead, no need for external power;

■ Real-time data monitoring and remote load switchover of the controllers, data browse and modification of device parameters, charge control parameters and load control parameters;

■ Real-time display of failure information of the connected devices;

■ Longer communication distance via RS485.

2.2 Main functions

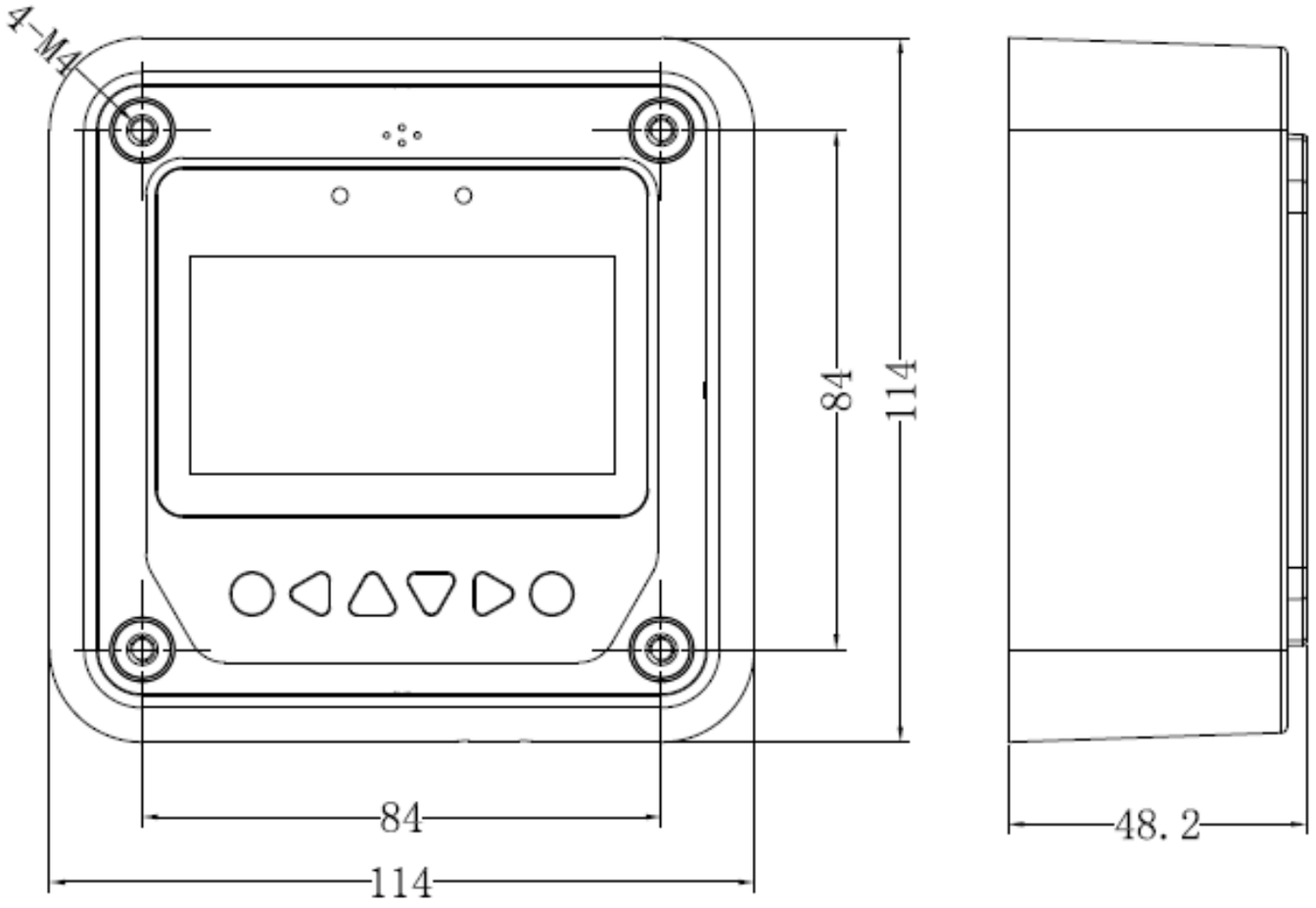
The main functions of the remote meter are the real-time monitoring of the operational data and working status of the connected solar charge controller, browsing and modification of charge/discharge control parameters, setting of device parameters and load control parameters, the restoration of factory defaults, based on LCD display and functional keys operation.

2.3 Recommendations

■ Please note that MT50 can only be used with PUxxxxB(P), LSxxxxB(P), VSxxxxBN, TracerxxxxBN(P), PTRxxxxA(N) controllers. It is not suitable for dual battery controllers DB series. Confirm that you have a compatible controller before purchase and use of the remote meter.

■ Please do not install MT50 in a location with strong electromagnetic interference or risk of contact with water.

3 Installation



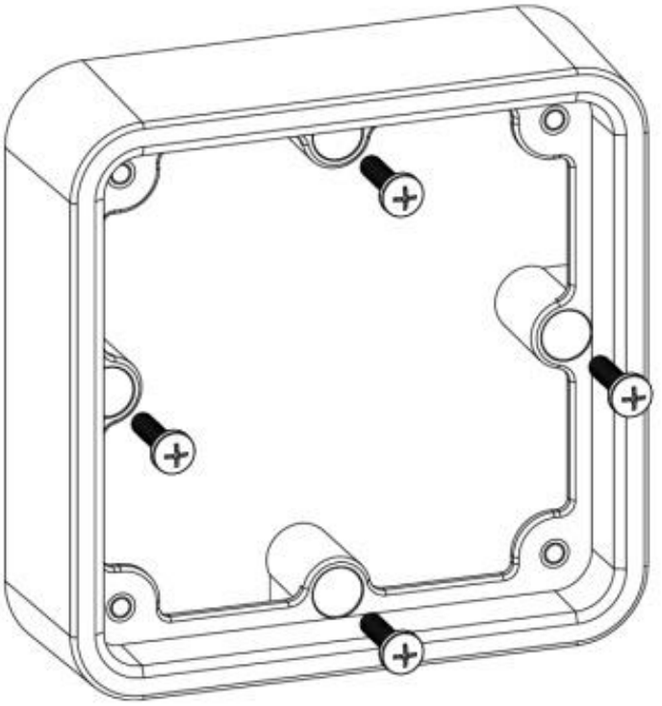
Frame mount dimensions (mm)

Mechanical parameter	Parameter
Overall dimension	114 x 114 x 32.7 mm
Mounting dimension	88.6 x 88.6 mm
Terminal	Φ4.3

Wall installation steps:

Step 1: Locate and drill screw holes based on the frame mounting dimensions of the base, and erect the plastic expansion bolts;

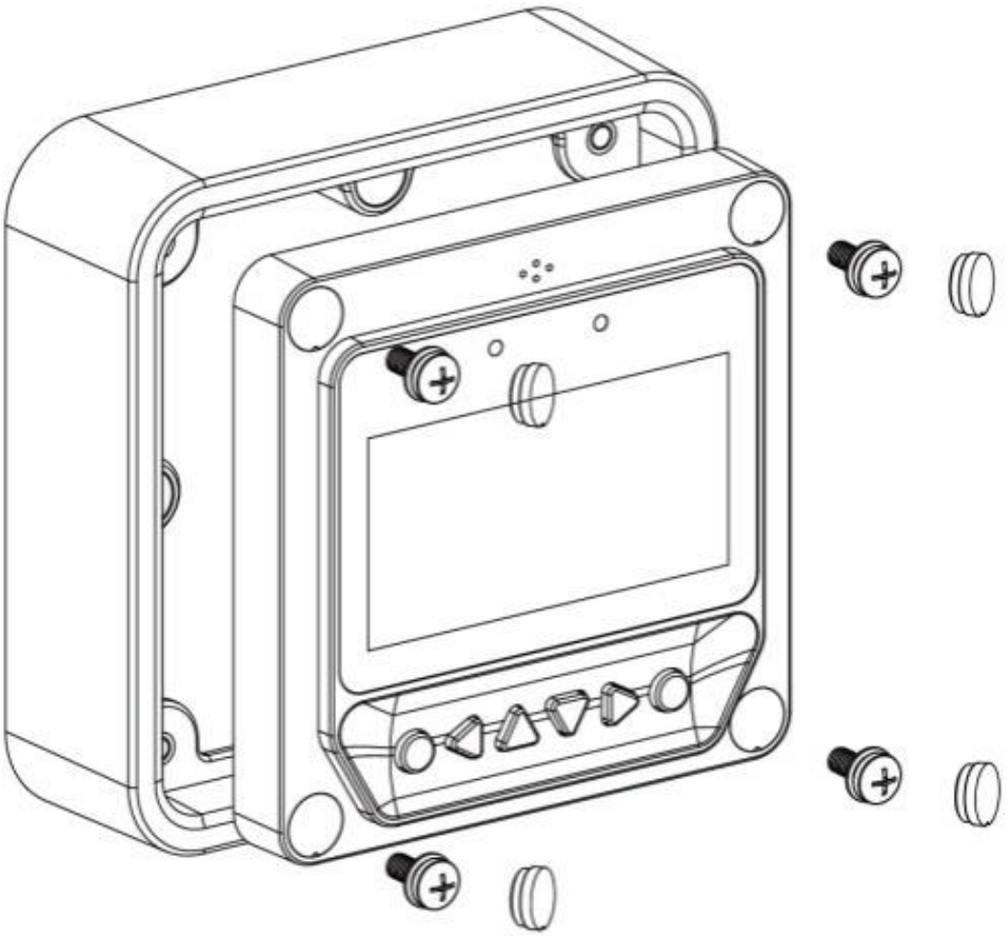
Step 2: Use four ST4.2×32 self-tapping screws to fix the frame;



Frame mounting

Step 3: Use four M4×8 pan head screws to mount MT50 surface onto the frame;

Step 4: Mount the four associated screw plugs into the screw holes.



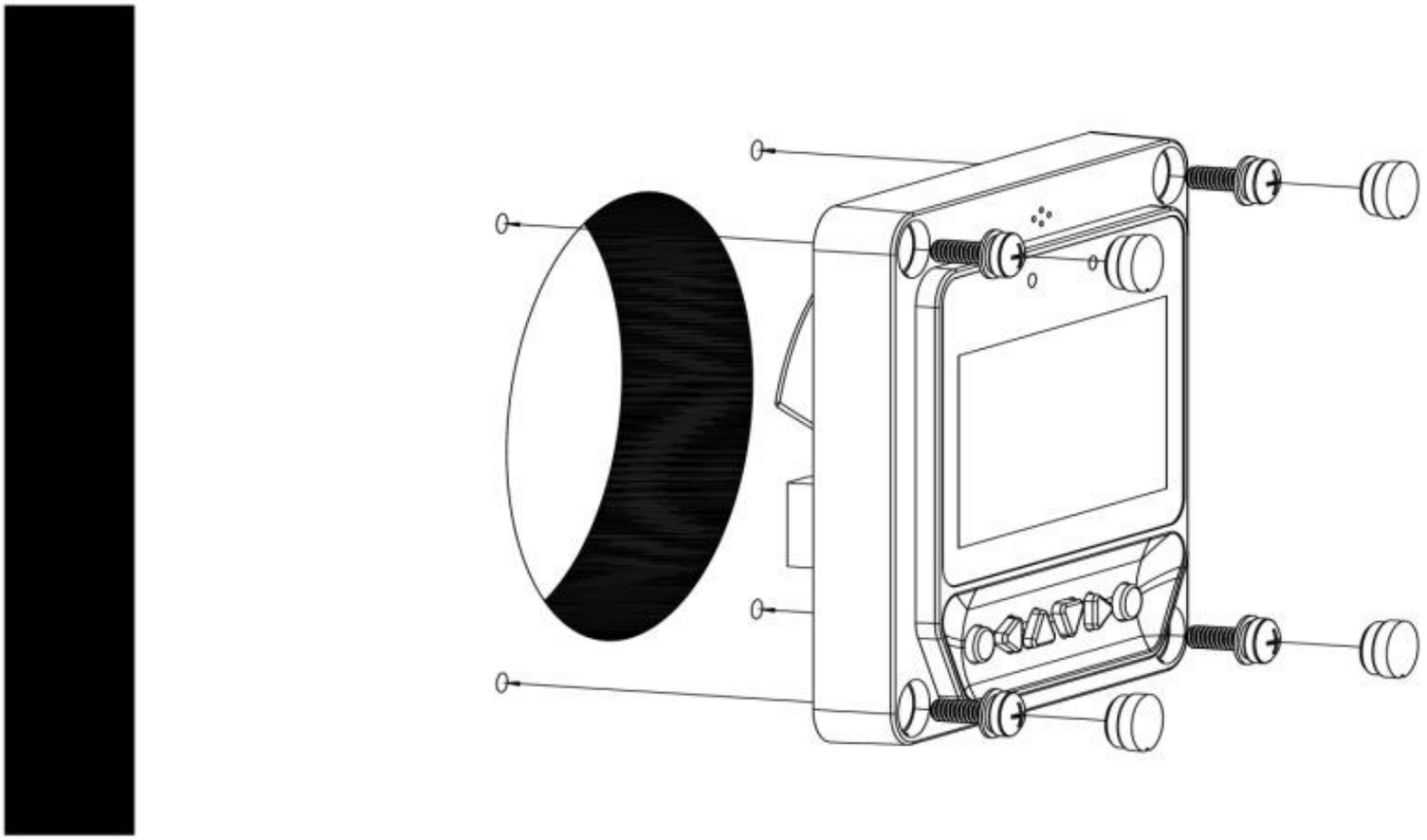
Frame mounting

Steps of surface mounting:

Step 1: Locate and drill screw holes based on the installation size of the remote meter;

Step 2: Use four M4×8 cross recessed pan head screws with M4 nuts to mount MT50 Surface onto the panel (or suitable self-tapping screws);

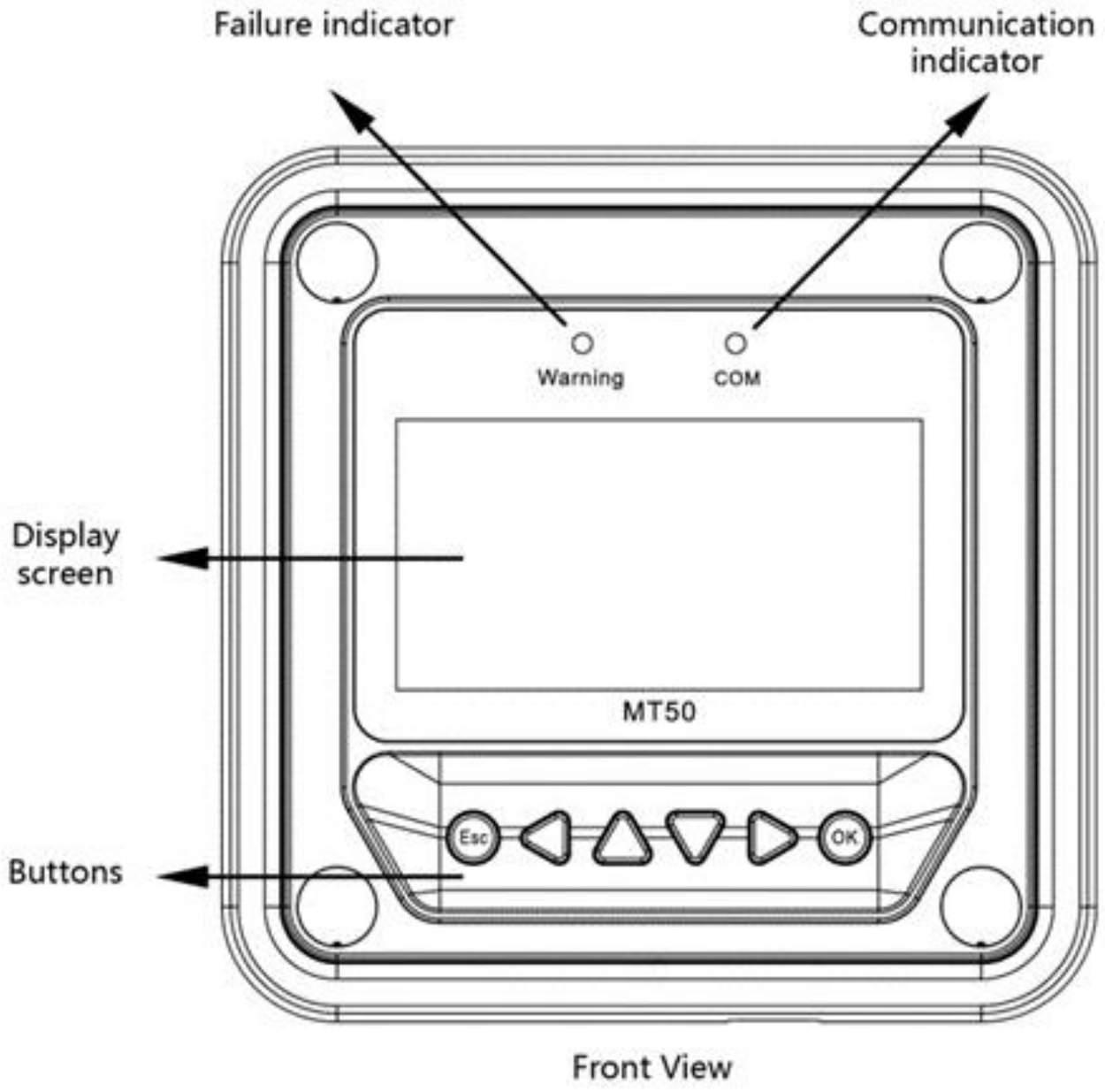
Step 3: Mount the four associated screw plugs into the screw holes.



Surface mounting

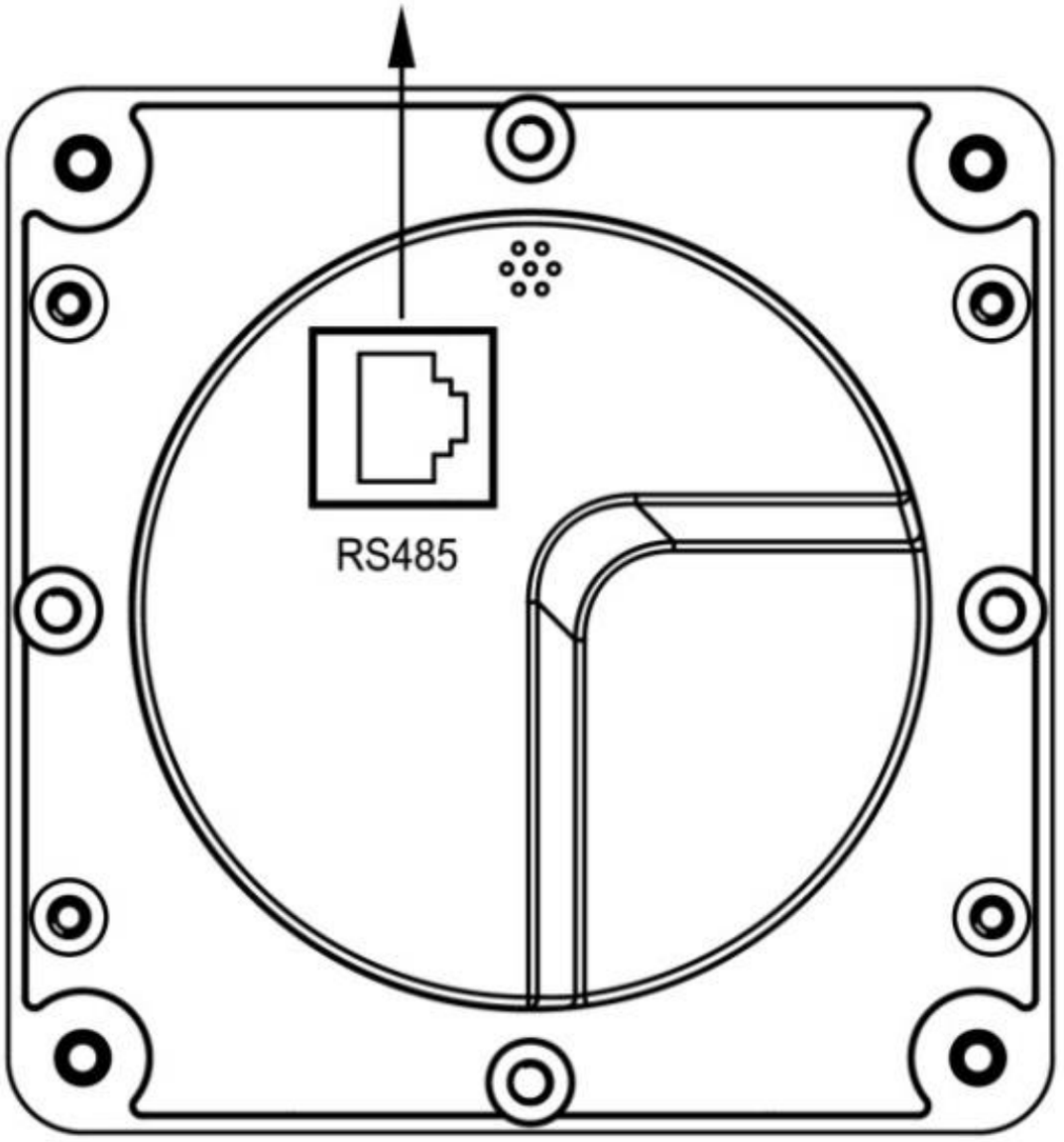
Note: Take full consideration of the plugging/unplugging space of the communication cable and the length of the cable during installation to see if they are appropriate.

4 Product Features



Front View

RS485 communication and power interface



Rear View

Failure indicator

Failure indicator flashes in case of failure of the connected device. For failure information please check the solar charge controller manual.

Communication indicator

Indicate communication status when MT50 is connected to the controller.

Display screen

User monitoring and operation interface.

Buttons

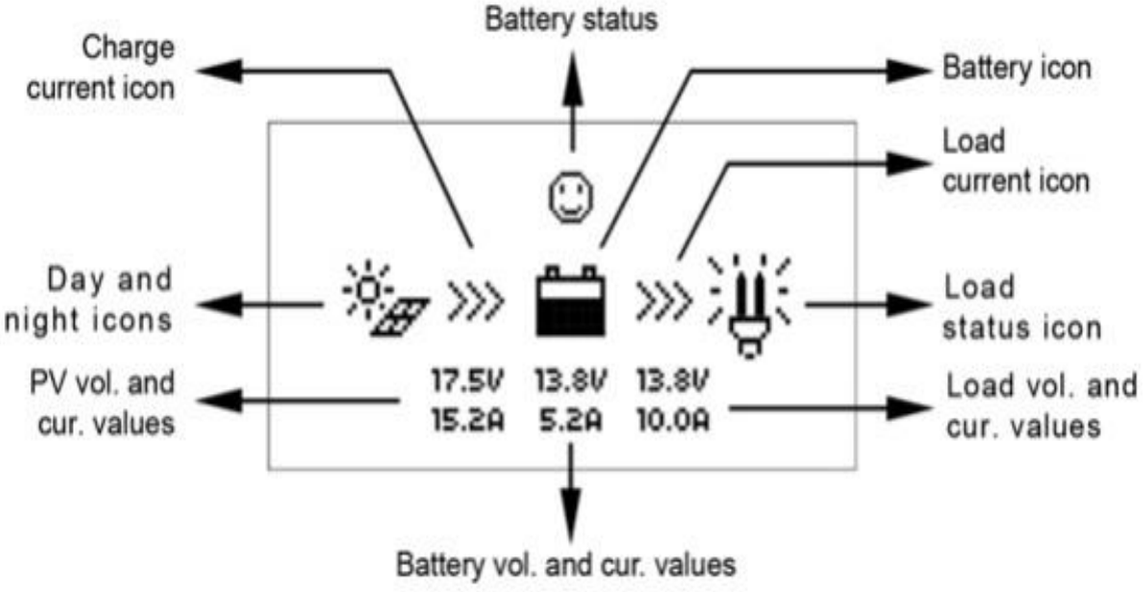
The meter buttons include four navigation buttons and two operational buttons. See specific instructions in the Operations section.

RJ45 communication and power interface

Communication and power supply socket used for connection to a solar charge controller.

Note: Please use the communication plug which is marked with “MT” to connect MT50

Monitoring screen



Day and night icons

 - Night,  - Day: The threshold voltage is 1V. Higher than 1V is daytime.

Charge current icon

The icon moves if there is charge current.

Battery icon

The estimated battery capacity is shown.

Note: When the battery is over discharged, the icon displayed is “  ”.

Battery status icons

 - Normal voltage,  - Under voltage,  - Over discharge.

Load current icon

The icon moves if there is discharge current.

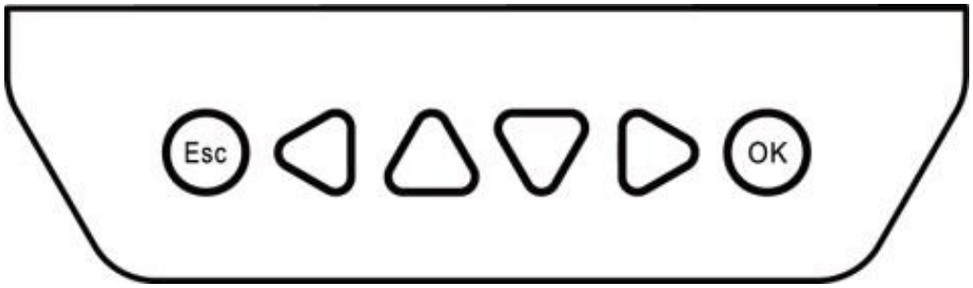
Load status icon

 - Load On,  - Load Off.

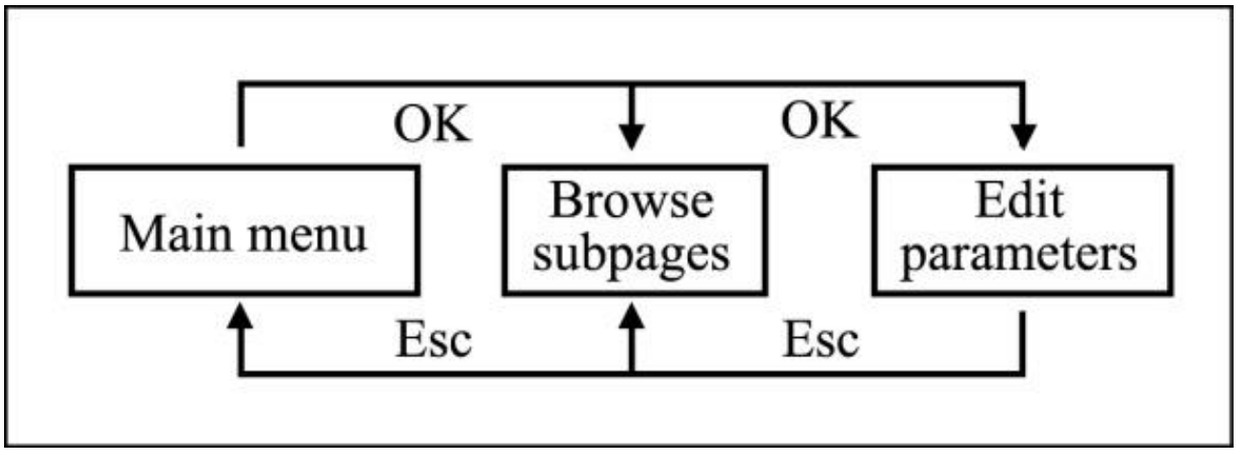
Note: In Manual Mode, pressing the "OK" button will switch the load status between "ON" and "OFF"

5 Operation

5.1 Buttons



The buttons are respectively (from left to right) “ESC”, “Left”, “Up”, “Down”, “Right” and “OK” . Use of these navigation buttons can be shown in the schematic operation diagram below:

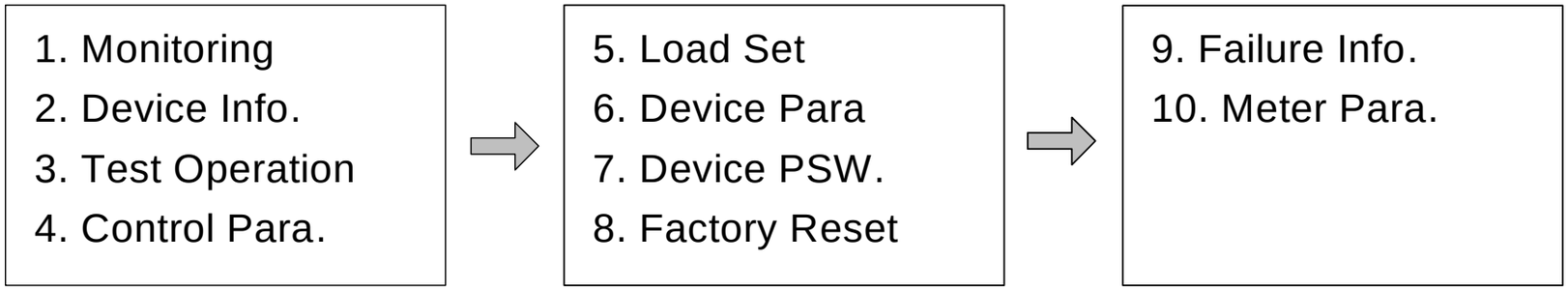


Schematic operation diagram

The default entry page is the browse mode. Press the OK button and input the correct password to enter the modification mode. Use ◁ and ▷ buttons to move the cursor, while △ and ▽ buttons can be used to modify the parameter values when the cursor has selected the parameter; OK and Esc buttons can then be used to respectively confirm or cancel the modification of the parameter.

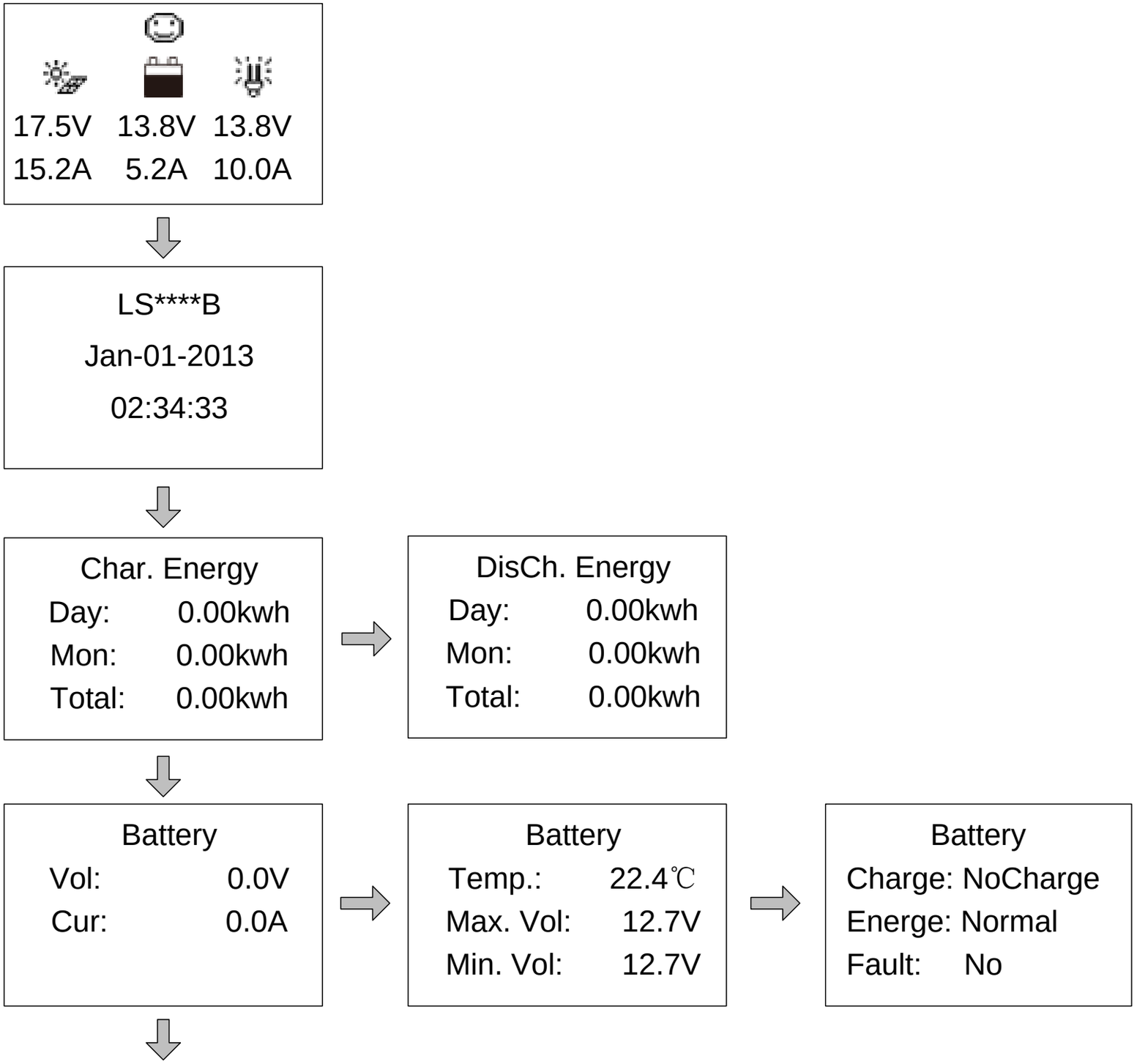
5.2 Main menu

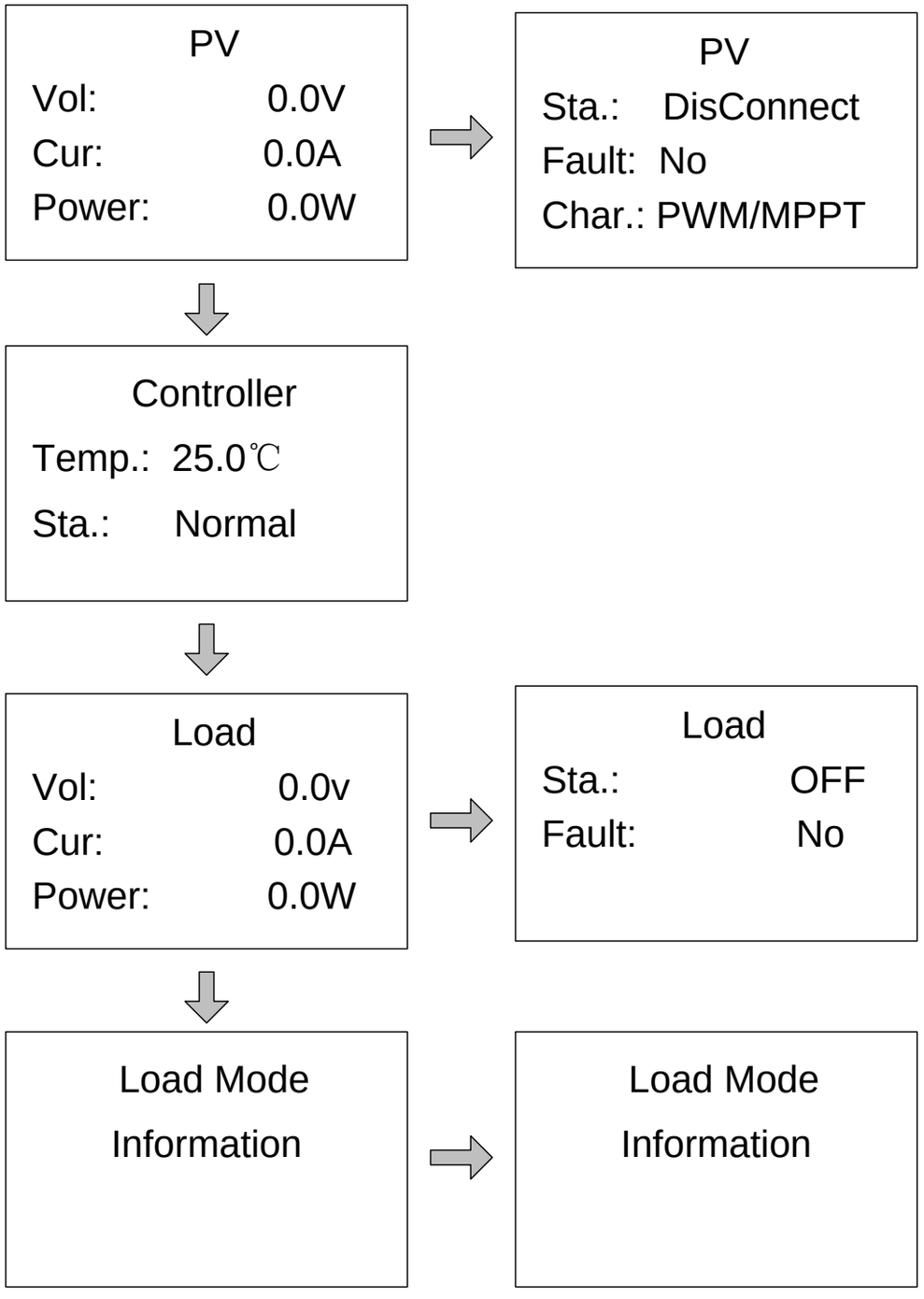
Enter the Main Menu by pressing Esc. △ and ▽ buttons are used to move the cursor to select the menu items; OK and Esc buttons are respectively used to enter or exit the corresponding sections of the menu.



5.3 Real-time monitoring

There are 14 pages under real-time monitoring. Please note as below:

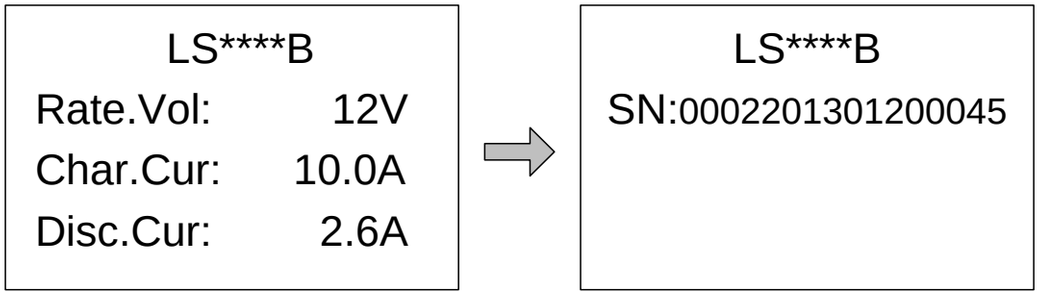




Operational tips: Move between rows by pressing △ or ▽ buttons. Move along a row by pressing ◁ or ▷ buttons.

5.4 Device information

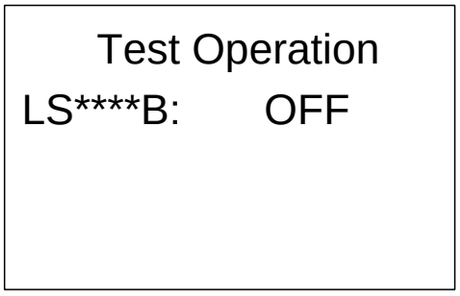
The product model, parameters and SN code of the controllers are displayed below:



Operational tips: △ and ▽ buttons are respectively used to turn the browse page upward and downward.

5.5 Test operation

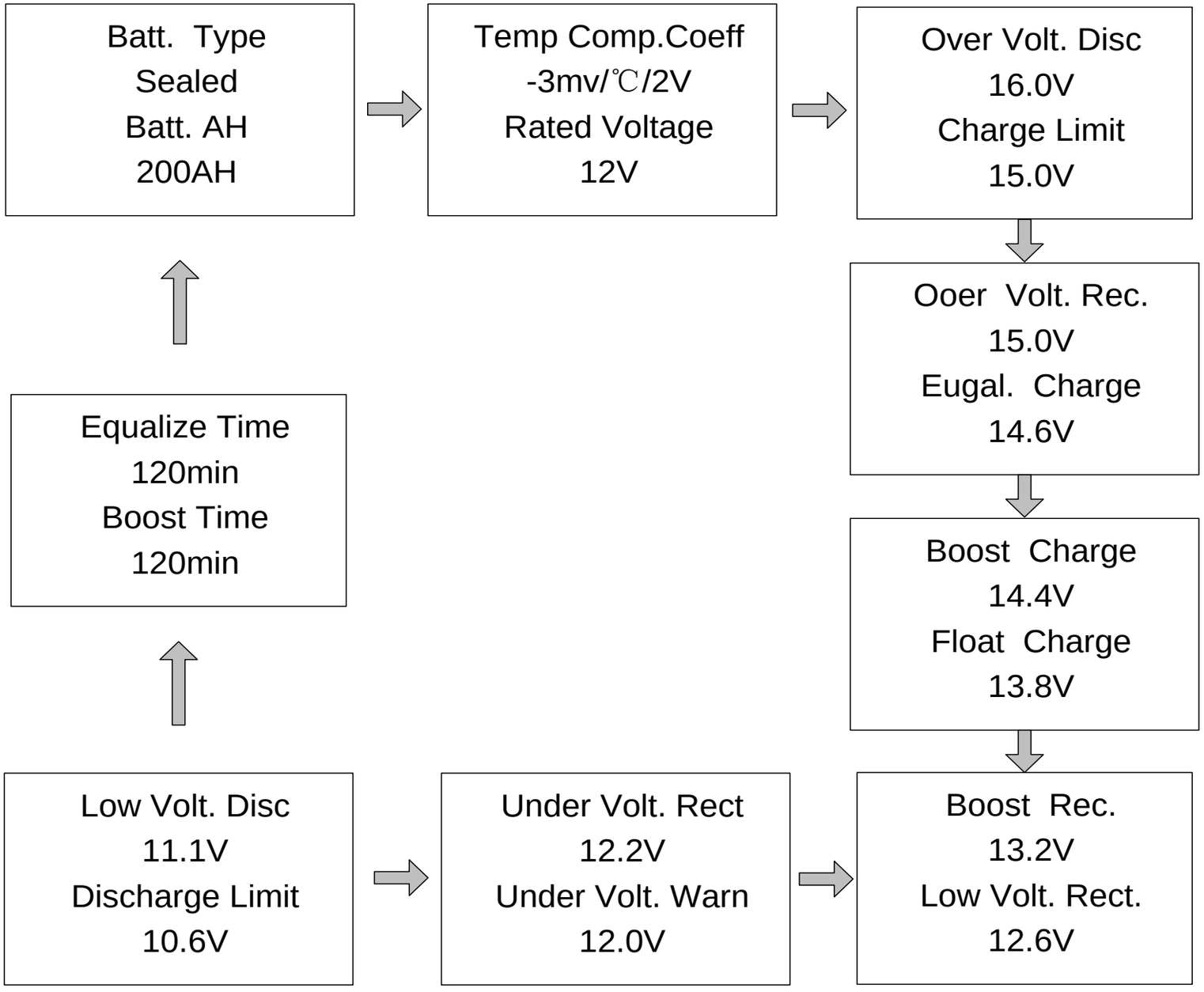
Load switch test operation can be conducted on the connected solar charge controller to see if the load output is normal. The test operation does not affect the working settings under the actual load, which means that the solar controller will exit from the test mode when exiting the operational interface of the test.



Operational tips: enter the page and input the correct password; use △ and ▽ buttons to modify the On/Off status values; use OK and Esc buttons respectively to confirm or cancel the test operation.

5.6 Control parameters

Browse and modification operations are conducted over the control parameters of the solar charge controller. See the range for parameter modification in the control parameters table, and the section of control parameters in the diagram below:



Control parameters table

Parameters	Default	Range
Battery type	Sealed	Sealed/Gel/Flooded/User
Battery Ah	200Ah	1~9999Ah
Temperature compensation coefficient	-3mv/℃/2V	0~-9mv
Rated voltage	Auto	Auto/12V/24V/36V/48V

Battery voltage parameters

(Parameters for 12V system at 25℃, please use x 2 for 24V, x 3 for 36V, and x 4 for 48V system)

Battery charging setting	Sealed	Gel	Flooded	User
Over voltage disconnect voltage	16.0V	16.0V	16.0V	9~17V
Charging limit voltage	15.0V	15.0V	15.0V	9~17V
Over voltage reconnect voltage	15.0V	15.0V	15.0V	9~17V
Equalize charging voltage	14.6V	——	14.8V	9~17V
Boost charging voltage	14.4V	14.2V	14.6V	9~17V
Float charging voltage	13.8V	13.8V	13.8V	9~17V
Boost reconnect charging voltage	13.2V	13.2V	13.2V	9~17V
Low voltage reconnect voltage	12.6V	12.6V	12.6V	9~17V
Under voltage warning reconnect voltage	12.2V	12.2V	12.2V	9~17V
Under voltage warning voltage	12.0V	12.0V	12.0V	9~17V
Low voltage disconnect voltage	11.1V	11.1V	11.1V	9~17V
Discharging limit voltage	10.6V	10.6V	10.6V	9~17V
Equalize duration	120min	——	120min	0~180min
Boost duration	120min	120min	120min	10~180min.

Notes:

1. When the battery type is sealed, gel or flooded, the adjusting range of equalize duration is 0 to180 mins and boost duration is 10 to180 mins.

2. The following rules must be observed when modifying the parameter values for the user battery type (factory default value is the same as sealed type):

a) Over Voltage Disconnect Voltage > Charging Limit Voltage ≥ Equalize Charging Voltage ≥ Boost Charging Voltage ≥ Float Charging Voltage > Boost Reconnect Charging Voltage.

b) Over Voltage Disconnect Voltage > Over Voltage Reconnect Voltage

c) Low Voltage Reconnect Voltage > Low Voltage Disconnect Voltage ≥ Discharging Limit Voltage.

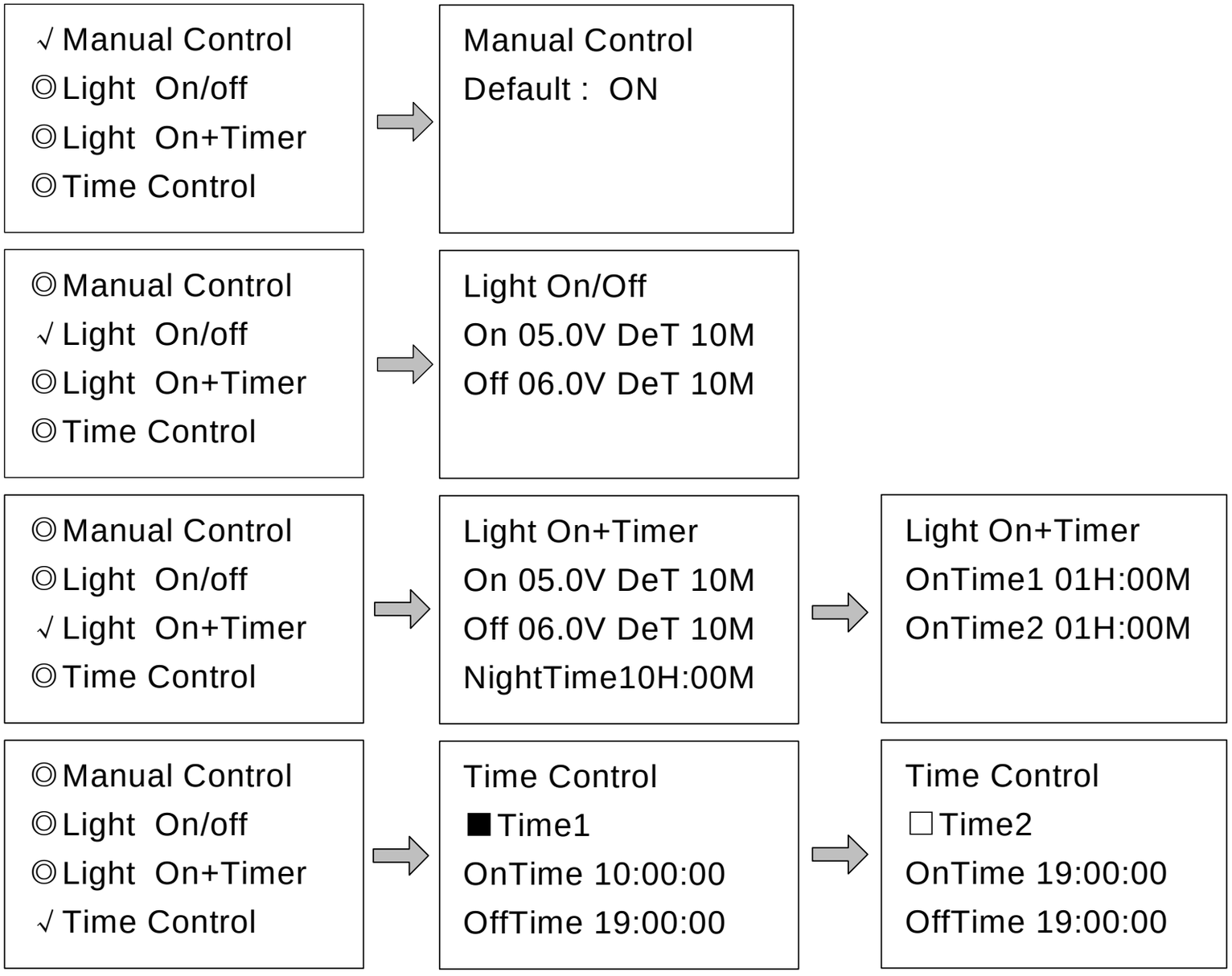
d) Under Voltage Warning Reconnect Voltage > Under Voltage Warning Voltage ≥ Discharging Limit Voltage.

e) Boost Reconnect Charging voltage > Low Voltage Disconnect Voltage.

NOTE: Please refer to the battery user manual or contact the battery supplier / manufacturer for details on charging voltages and specific requirements.

5.7 Load setting

The load setting page can be used to set the four load working modes of the connected solar charge controller (Manual, Light on/off, Light on+timer, Time control):



Manual control

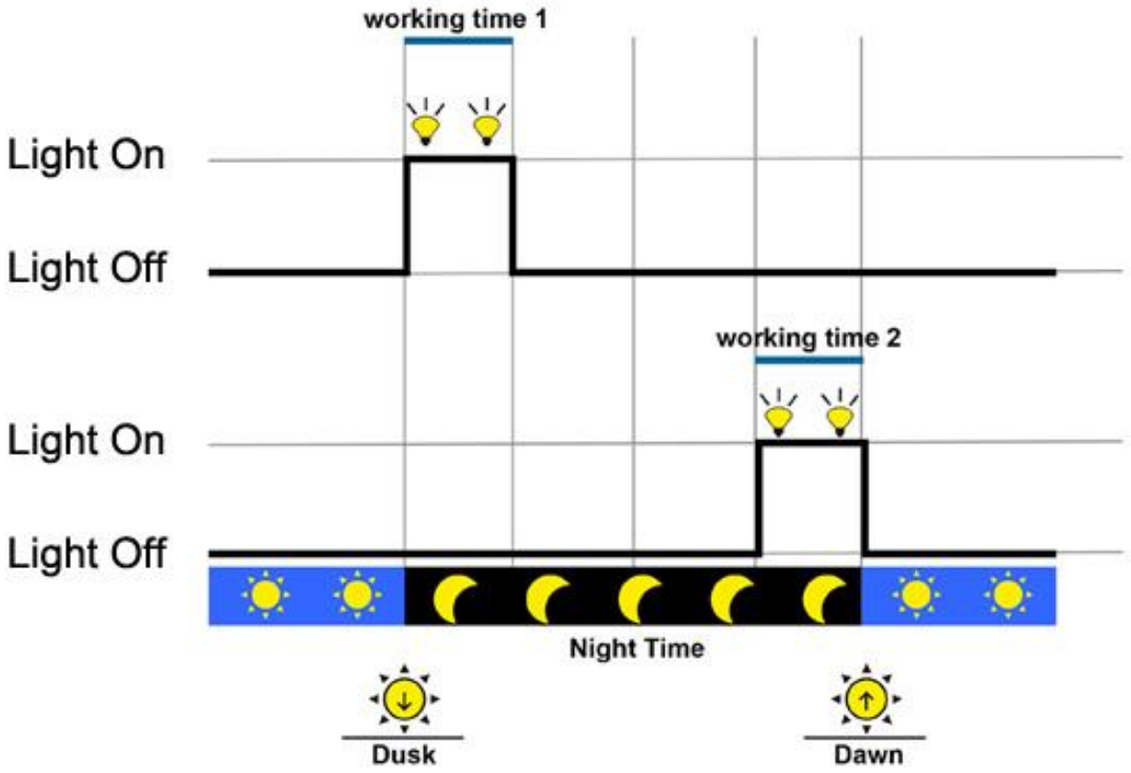
Mode	Notes
On	Load is on all the time (if the battery has enough charge and no abnormal conditions occur)
Off	Load is Off all the time

Light On/Off

Light On voltage (Night threshold)	When the input voltage of the solar module is lower than Light On voltage, it automatically turns on the load output (if the battery has enough charge and no abnormal conditions occur)
Light Off voltage (Day threshold)	When the input voltage of the solar module is higher than Light Off voltage, it automatically turns off the load output
Delay time	The delay time for load on/off actions. If during this period the Light On/Off voltage threshold criteria are met, a corresponding load on/off action will happen at the end of this period (the time adjustment range: 0~99 mins)

Light On + timer

Working time 1 （T1）	Load working period (the load is on), after the light control turns on the load	When the working time is set to “0”, the load will not work for this period. The real working time of T2 depends on the Night time, and the length of T1 and T2.
Working time 2 （T2）	Load working period (the load is on), before the light control is due to turn off the load	
Night time	Total reference night time length (≥3h) to calculate when Working time 2 should start	

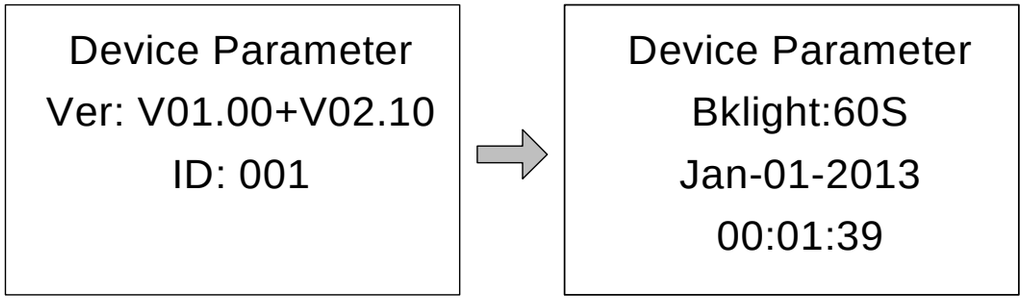


Time control

Working time 1 （T1）	Control the on/off time of load through the real-time clock mode.	Working time 1 is the compulsory load working time interval. Working time 2 is optional.
Working time 2 （T2）	Second working period (dual timer function of the load) through the real-time clock mode.	

5.8 Device parameters

The software version information and device data of the solar charge controller can be checked via the page of device parameters. Data like device ID, device LCD backlight time and device clock can be checked and modified. The pages of device parameter are shown below:

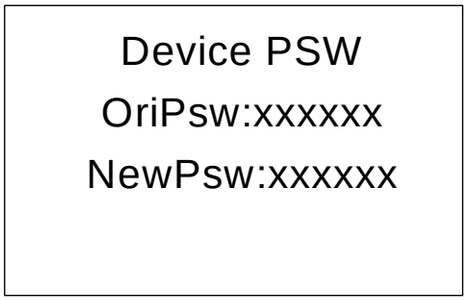


Note: the bigger the ID value of the connected device, the longer the meter communication identification interval (the maximum interval <6 mins).

Type	Notes
Ver	Solar charger controller software and hardware version numbers.
ID	Solar charger controller communication ID numbers.
Bklight	Solar charger controller LCD backlight working time.
Month-Day-Year H:M:S	Solar charger controller internal clock.

5.9 Device password

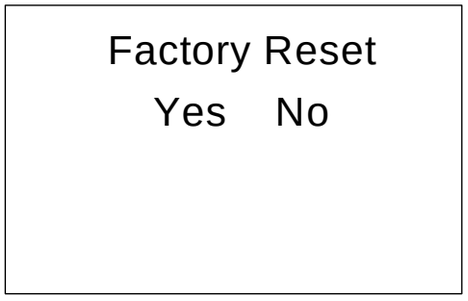
The password of the solar charge controller can be modified via the page of device password. The password is a 6-digit figure which is required before entering the modification mode of “Control parameter”, “Load setting”, “Device parameter”, “Device password”, “Factory reset” pages. The page of device password in the diagram is shown below:



Note: the solar charge controller default password is “000000”

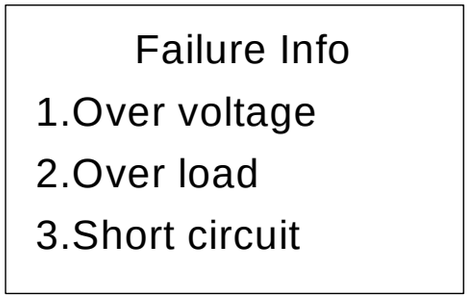
5.10 Factory reset

The default parameter values of the solar charge controller can be restored via the Factory reset page. The “Control parameter”, “Load setting”, “Charge mode” and “Device password” of the devices will be restored to the factory defaults if ‘Yes’ is chosen (the factory default password of the devices is “000000”).



5.11 Failure information

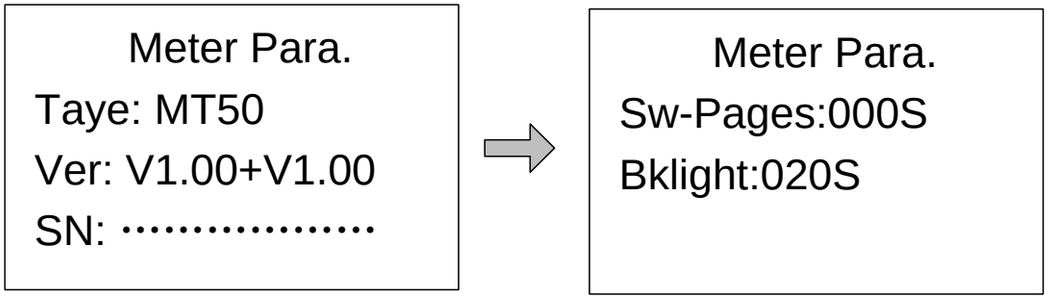
The current failure information of the solar charge controller can be checked via the Failure information page (max. 15 failure messages could be displayed). When the failures of solar charge controller are resolved, the corresponding failure information will also be automatically removed.



Failure information	Details
Load MOS-Short	The MOSFET of the load driver is short.
Load Circuit	The load circuit is short.
Load O. cur.	The load circuit is over current.
Input O. cur.	PV input current is over rate.
RPP Short	The MOSFET of reverse polarity protection is short.
RPP Break	The MOSFET of reverse polarity protection is broken.
Char.MOS-Short	The MOSFET of the charge driver is short.
Input O. Cur.	Input current is over rate.
Disc.O.O.Ctrl.	Discharge operation is out of control.
Ctrler O.Temp.	The controller is over heated.
Comm. Timeout	The communication has timed out.

5.12 Meter parameters

The meter model, software and hardware version, and SN NO. can be checked via the Meter parameter page. Meter functions such as “Switch pages” timer and “Backlight” can also be modified.



Note: When the setup is completed, the auto switch page will require ten minutes to take effect.

Parameters	Default	Range	Details
Sw-Pages	0	0~120 secs	Set the timer to automatically switch back to the previous page
Bklight	20	0~999 secs	LCD backlight time

6 Technical Specifications

Electrical parameters

Self-consumption	Backlight ON <23mA
	Backlight OFF <15mA

Mechanical parameters

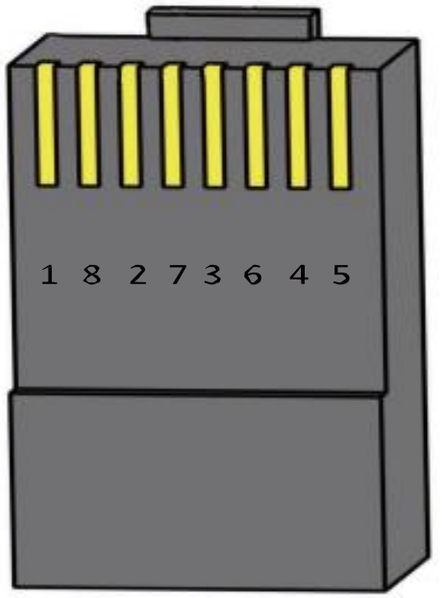
Main meter unit dimensions	98 × 98 mm
Frame dimensions	114 × 114 mm
Connector type	RJ45
Meter cable length	Standard 5m, Max 50m
Meter weight	Simple package: 0.23 Kg Standard package: 0.32 Kg

Environmental parameters

Ambient temperature	-20℃~+70℃

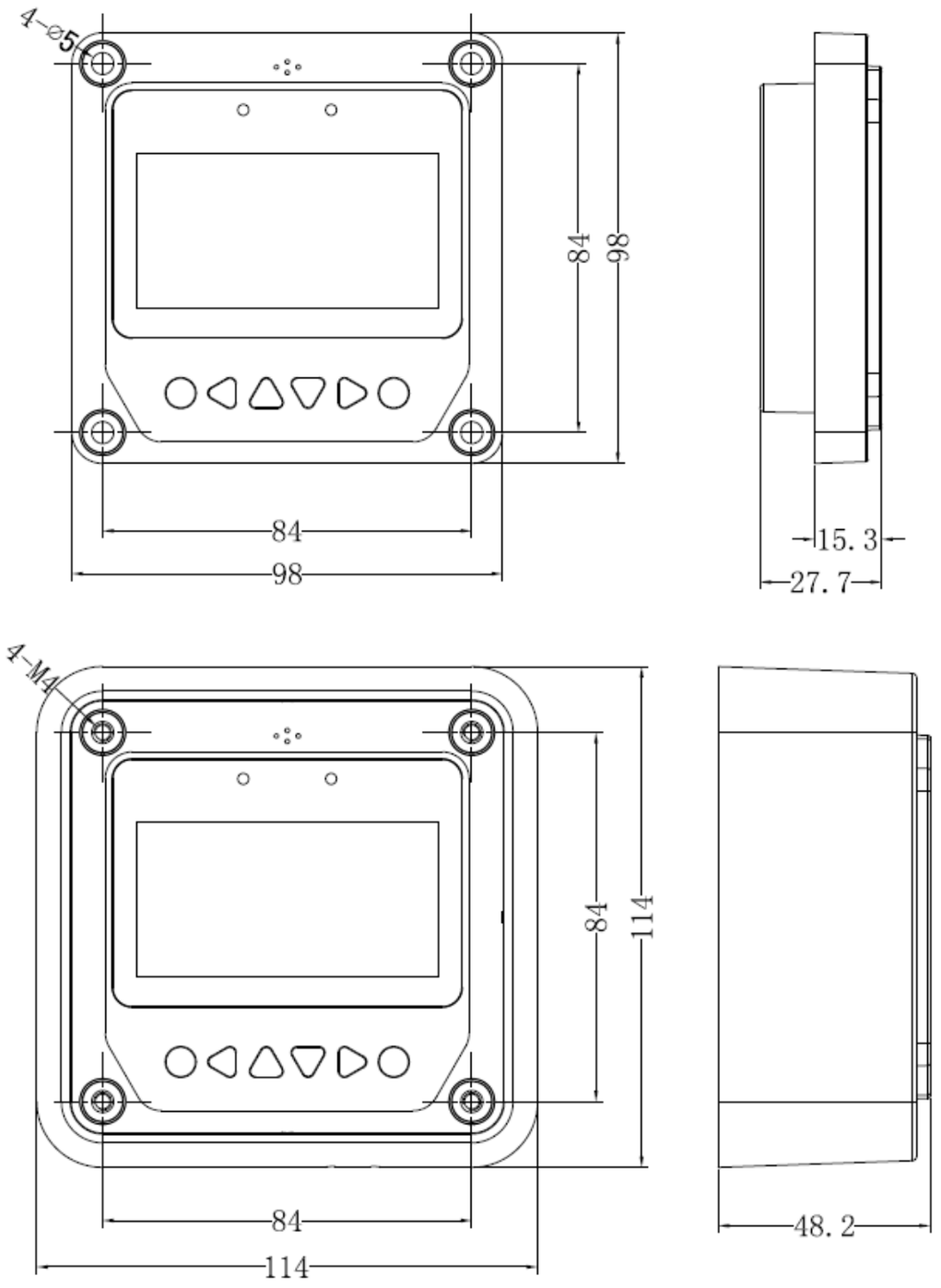
Definitions of interface pins

Pin No.	Definition
1	Power+5~12V input
2	Power+5~12V input
3	RS485-B
4	RS485-B
5	RS485-A
6	RS485-A
7	GND
8	GND



Data cable pin definitions

Remote meter dimensions (mm)



Changes to this manual can be made without prior notice. Version number: v8.0

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