User Manual RM-8 LCD Display Unit

I.Features

◆ LCD graphical main menu, intuitive and simple;
◆ Provide easy view of system's complete operating data and parameter settings in real time;
◆ Simple double button design for aesthetic appearance and convenient operation;
◆ LCD unit can be powered by controller via a communication cable, and no external power supply is required;
◆ Movable installation for strong applicability;
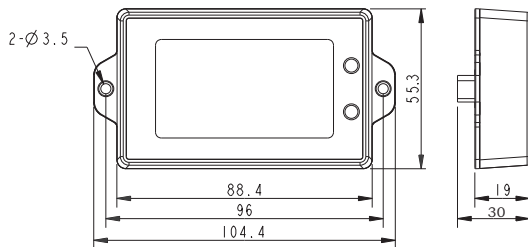◆ Industrial grade design for use in a variety of outdoor environments and running safely for a long time.
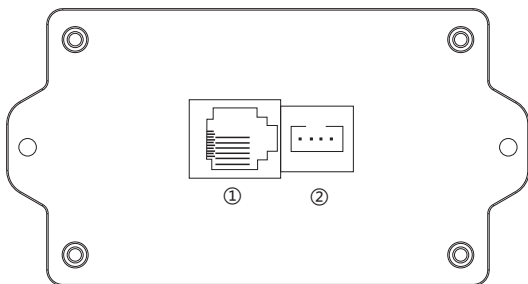
II.Appearance

III.Installation Dimensions

Overall dimensions: 104.4*55.3*30.0mm

Mounting dimensions: 96*3.5mm

IV.Communication Interface

No.	Functions
①	RS232 communication port
②	TTL communication port

V.Button Operations

Buttons	Functions
SELECT	Menu/parameter switching
ENTER	Parameters setting/adjusting

VI.LCD Menu

1. Menu diagram

(Note: for some controllers, part of the following graphics is not displayed)

Solar panel indication
Battery indication
Day indication
Charge indication
Load output indication
Parameters display area
Unit display area
Charging phase indication
MPPT BOOST FLOAT EQUALIZE
12V/24V/36V/48V
System voltage
Communication indication
Settings indication
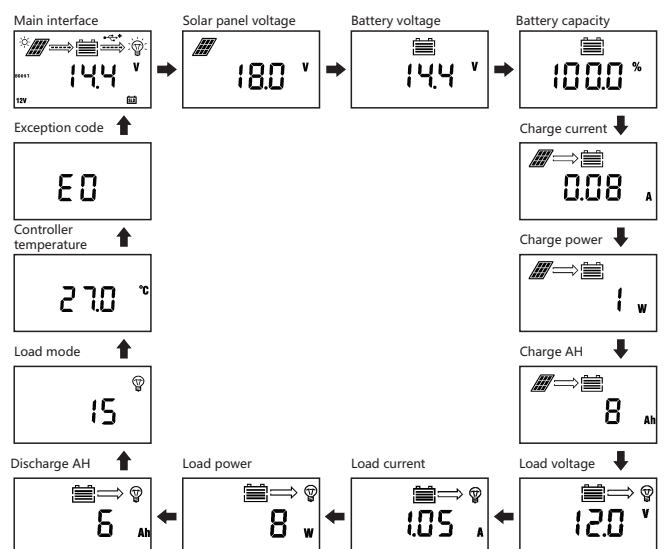Exception indication
Battery type area
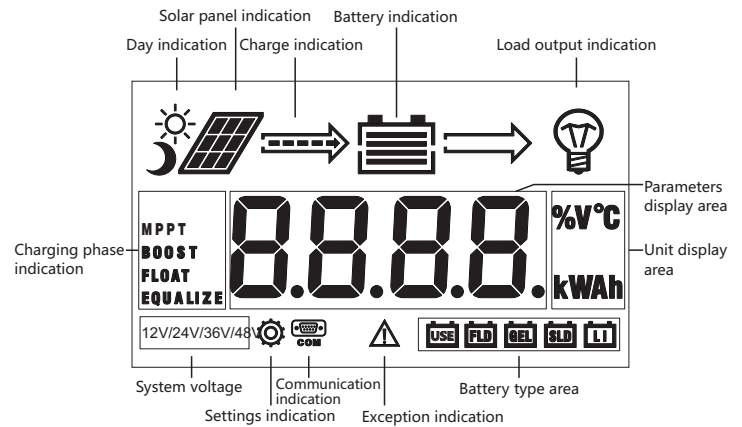
2. Menu viewing

Menu identification: The LCD screen will automatically identify whether the controller is designed with a load;
If it is identified that the controller is not designed with a load, the load related menu will not be displayed;
If it is identified that the controller is designed with a load, the load related menu will be displayed;

2.1 Menu of controller with no load

Main interface
Solar panel voltage
Battery voltage
Battery capacity
Charge current
Charge power
Charge AH
Controller temperature
Error code

2.2 Menu of controller with a load

Main interface
Solar panel voltage
Battery voltage
Battery capacity
Exception code
Controller temperature
Load mode
Discharge AH
Load power
Load current
Load voltage
Charge current
Charge power
Charge AH
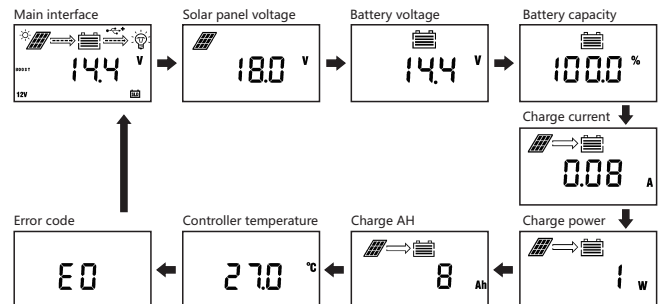
VII.System Parameter Settings

1. Methods
In any menu, press and hold "ENTER" to enter the "Parameter Settings" menu:
① Press the "ENTER" button to adjust parameter value;
② Press the "SELECT" button to switch between different setting items;
③ Press and hold the "ENTER" button for 2 seconds to save what has been set and exit setting mode;
④ Select the "FLD/GEL/SLD/LI" battery type and press the "SELECT" button to switch between "System voltage" and "Battery type";
⑤ After selecting "USE" to define the battery type, press "SELECT" button to switch between "system voltage", "Equalizing charge voltage", "Boost charge voltage", "Floating charge voltage", "Over-discharge return voltage" and "Over-discharge voltage" to change some common parameters.

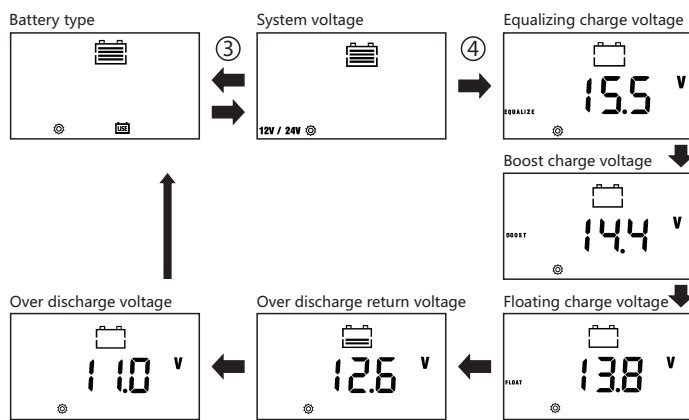## 2. Load mode settings (Controller with a load)
In the menu with load mode displayed, press and hold "ENTER" to go to load mode settings. At this time, press "ENTER" to adjust the load mode, and press and hold "ENTER" to save the current mode and exit the settings interface.

Note:
①For safety considerations, after changing "System Voltage", it is required to power up again to take effect!
②Care should be taken when the user defines parameters to their needs, and incorrect parameters may make the system fail to work properly.

3. USE menu

Battery type → ③ → System voltage → ④ → Equalizing charge voltage 15.5 V → Boost charge voltage 14.4 V → Floating charge voltage 13.8 V → Over discharge return voltage 12.6 V → Over discharge voltage 11.0 V →

No.	Display	Setting items	Parameters range	Remarks
1	USE	Battery type	USE	User-defined battery type
2	12V/24/36V/48V	System voltage	12V/24/36V/48V	"12V/24/36V/48V" light up at the same time, indicating automatic identification
3	EQUALIZE	Equalizing charge voltage	9.0 ~ 17.0V	
4	BOOST	Boost charge voltage	9.0 ~ 17.0V	
5	FLOAT	Floating charge voltage	9.0 ~ 17.0V	
6	(icon)	Over discharge return voltage	9.0 ~ 17.0V	
7	(icon)	Over discharge voltage	9.0 ~ 17.0V	

4. Menu auto page turning, backlight settings

Press and hold "SELECT" for 2 seconds to set menu auto page turning;
Press and hold "SELECT" for 5 seconds to set menu auto page turn and backlight steady on;
Menu auto page turning: each page stays for 3 seconds, and the setting will not be saved when power off.
If any button is pressed, it will exit the auto page turning mode.

VIII.Load Control (Controller with a load)

Method of controlling load on/off
First, the controller load mode needs to be set to "Manual Mode" before it can be manually controlled;
In any menu in a non-setting mode, press "ENTER" to control the on/off of the load.

IX.Exception Code Display

LCD error code	Description	Execution result
EO	No exception	System is normal

E1	Battery over-discharge	Turn off load output for controller with a load
E2	Battery over voltage	Turn off charging
E3	Battery under-voltage warning	The battery voltage is lower than the under-voltage warning threshold. Only reminder is given. The system is normal.
E6	Controller internal over temperature	MPPT controller starts linear power charging; PWM controller turns off charging
E8	Solar panel input power excessive	MPPT controller charges with rated current; PWM controller turns off charging
E10	Solar panel over voltage	Turn off charging, and it will automatically recover when voltage is below the set value
E18	BMS over-current protection	Turn off charging
E15	No battery or lithium battery feed detected ①	As long as the solar panel voltage meets the charging conditions, the system setting is that the lithium battery terminal has a voltage output, and the lead acid battery will not have a voltage output if not connected to the battery terminal.
E13	Solar panel reverse polarity ①	Turn off charging
E20	Battery reverse polarity ①	Turn off charging and turn off load output
E7	Battery temperature is higher than charge upper limit temperature ①	Turn off charging, and it will automatically recover when the temperature is below a certain value
E19	Battery temperature is lower than charge lower limit temperature ①	Turn off charging, and it will automatically recover when the temperature is above a certain value
Controller designed with a load		
E4	Load short circuit	Turn off load output, and it will automatically recover when short-circuit is removed.
E5	Load over current	Turn off load output, and it will automatically recover after a certain period of time.
E16	Battery temperature is higher than discharge upper limit temperature ①	Turn off load output, and it will automatically recover when the temperature is below a certain value
E17	Battery temperature is lower than discharge lower limit temperature ①	Turn off load output, and it will automatically recover when the temperature is above a certain value

Notice: For the descriptions marked with ①, not all of the controllers have the above error codes. For details, please refer to the corresponding controller manual.

X.Common Problems and Handling Methods

Phenomenon	Handling methods
LCD screen is not lit	Please check if the battery and solar panel are properly connected.
Solar panel has voltage, battery terminal has no voltage output, but the code E1 is displayed	If it is not lithium battery set in the system, when the battery is not connected, there is no voltage output at both ends of the battery, and this will return to normal as the battery is connected.
Battery icon flashes slowly, battery voltage is normal or fully charged, but the over-discharge code E1 is displayed	Check if it is set to the corresponding system voltage. For example, the controller with 24V battery is set to 12V or the controller is not restarted as system voltage has been set. Because: After the system voltage is changed, the controller needs to be restarted to take effect! !
The load indication icon flashes and the code E4 is displayed (controller with load)	1. Check if the load is short-circuited. After short-circuit is removed, the load will automatically return to normal. 2. After short circuit is removed, E4 battery voltage normal is always displayed, and automatic recovery fails. It may reach the maximum number of times for recovery in one day. The limit is automatically removed the next day, or restart the controller to remove the limit.
Controller does not charge	Check wiring, check whether the solar panel voltage exceeds the rated value and whether the battery is over-voltage, and check LCD error codes for internal over-temperature, external over-temperature, external lithium battery low temperature, lead-acid battery open circuit, charge disable set in the system, etc.
Controller is normal but no data is displayed on the screen, and the communication and warning icons are flashing	Communication is faulty, check the communication cable

XI.Technical Parameters

Items	Values
Model	RM-8
Applicable models of controller	MC24 series, MC48 series, ML series, MT2410N10, etc
Input voltage	9-30V
Standby power consumption	6mA (backlight is off)
Operating power consumption	28mA (backlight is on)
Communication Baud rate	9600bps
Communication mode	TTL (3.3V level)
Communication interface	TTL- white 4P port, RS232- black Rj11
Connecting cable length	TTL communication line 1.5m, RS232 communication line 2m
Operating temperature	-35℃ ~ +65℃
IP rating	IP32
Weight	90g
Altitude	≤ 3000M
Dimensions	104.5*55.3*30.0mm