

4.3 Temperature Sensor

To collect battery temperature data for temperature compensation so the controller can accurately charge the battery. The temperature sensor is connected via interface 6.

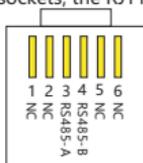
If the external temperature sensor is not connected or damaged, the controller defaults to the internal temperature information.

The controller is shipped with an 80 mm long cable temperature sensor. Should a sensor with a longer cable be required than this needs to be ordered separately.

4.4 RS485(only for MA-60-12/24 and MA-60-12/24/48)

The charger is equipped with a RS485 port with RJ11 sockets, the RJ11 interface is defined as follows:

| Pin No. | Definition |
|---------|------------|
| 1 | NC |
| 2 | NC |
| 3 | RS485-A |
| 4 | RS485-B |
| 5 | NC |
| 6 | NC |



RJ11 for controller

 Protocol applicable to this controller: Modbus Communication Protocol V3.9



The RS485 interface on this charger is not galvanically isolated and can not be grounded. Do not short circuit unused pin (Note NC).

4.5 Option Accessories(only MA-60-12/24 and MA-60-12/24/48 are optional)

4.5.1 Bluetooth Communication

MA-60-12/24 and MA-60-12/24/48 controllers can be connected to the Cyber-BT(bluetooth) via the RJ11 interface.

Bluetooth communication has the following characteristics :

1. Support mobile phone App
2. Realizes wireless monitoring function of PV charge controller
3. Use high performance, ultra-low power consumption Bluetooth dedicated chip
4. Adopt Bluetooth 4.0 and BLE technology



1.This icon in this specification indicates that this solar controller has Bluetooth communication function.

2. Refer to Bluetooth APP instructions for detailed operation of mobile APP.

4.5.2 Wireless Communication for Internet of Things

The controller equipped with the Internet of Things wireless communication capability has the following characteristics:

1. For the wireless Internet of Things communication functionality the controller can be remotely accessed through IoT/GPRS.
2. A variety of options are available for remote monitoring and real-time control through WeChat App /PC program.
3. Real-time monitoring of PV voltage, PV charging current, battery voltage, battery current, load voltage, load current and other system parameters as well as charge controller status.
4. Real-time automatic fault alarm.

 **IoT Please contact our Sales Team for more details about the IoT wireless communication.**

5, Installation



CAUTION: Please read all instructions and precautions in the manual before proceeding with the installation! It is recommended to remove the protective film cover from the LCD screen before operation.

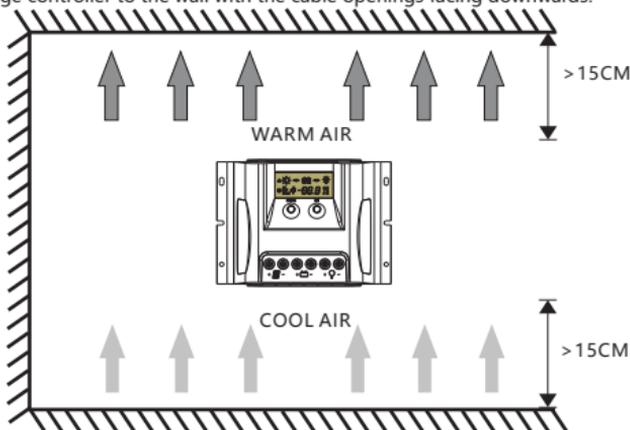
5.1 Installation Notes

- (1) This charge controller must only be used in PV systems in accordance with requirements given in this user manual and the specifications of other system components provided by their manufacturers. No energy source other than a PV generator may be connected to the PV charge controller referred herein.
- (2) PV-modules must always be disconnected prior to the installation and adjustments of the charge controller; Make sure the circuit breaker, fuse or disconnects of battery terminal are turned off.
- (3) Double check whether battery voltage meets the voltage range of Charge Controller.
- (4) Batteries store a large amount of energy, never short circuit a battery under any circumstances. We strongly recommend connecting a protection fuse directly to the battery terminal for protection in case of short circuiting the battery.
- (5) Batteries can produce flammable gases. Avoid provoking any sparks, using fire or any exposed flame close to any batteries, ever. Make sure that the battery room is well ventilated to disperse any gases.
- (6) Only use insulated tools and avoid placing (any) metal objects near/close to batteries.
- (7) Be extremely cautious when working with batteries. Wear eye protection by all means. Have fresh water available to immediately wash and clean any contact with battery acid. Get immediately medical aid in case of any hazard that may occur. Never install/handle with batteries alone.
- (8) Avoid touching or short-circuiting wires or terminals. Be aware that voltages on given system components, terminals or wires can be a multiple of battery voltage. Only use insulated tools, stand on dry ground, and keep your hands always dry and protected by proper (approved) electrician gloves when working on PV-Systems.
- (9) Prevent any water, ever, from penetrating the controller, outdoor installation must avoid any direct sunlight and penetration of any water (e.g. rain) and humidity.
- (10) After installation make sure that all connections are properly tighten, eliminate any electrical loose connections to eliminate by all means any hot electrical connection spots.

5.2 Mounting Location Requirements

Do not subject the PV charge controller to direct sunlight or any other heat sources. Protect the PV charge controller from any dust, dirt and moisture. Mount it flat to a vertical wall. Must be a non-flammable material. Maintain a minimum clearance of 15 cm below and around the controller to ensure unhindered air circulation. Mount the PV charge controller not too far from the batteries (for accurate voltage sensing least lessening).

Mark the position of the PV charge controller fastening holes on the wall, drill 4 holes and insert dowels, fasten the PV charge controller to the wall with the cable openings facing downwards.



5.3 Wiring Specifications

Wiring and installation methods must comply with national and local electrical code/specifications.

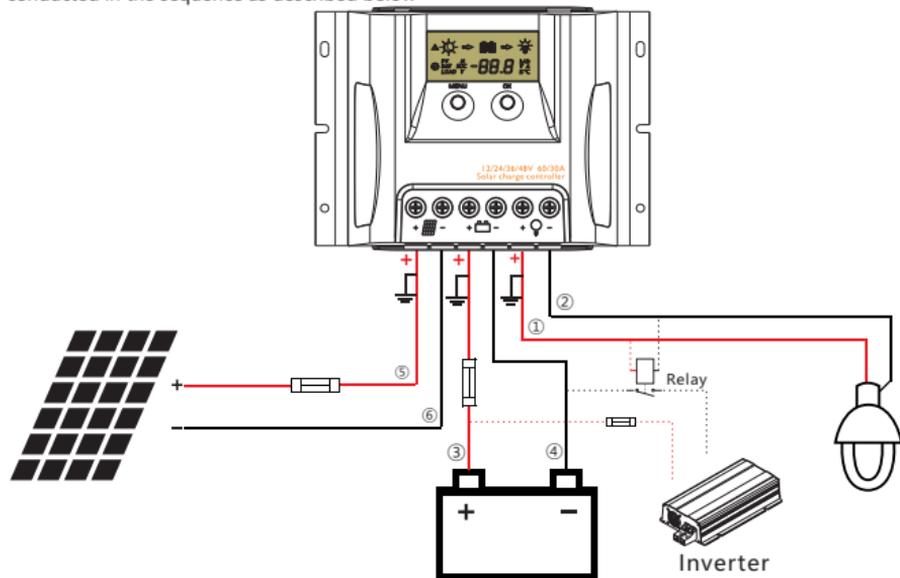
The wiring specifications of the PV system battery must be selected according to rated currents. Please check following table for wiring specifications:

| Model | Rated charging current | Rated discharging current | Solar wire diameter (mm ² /AWG) | Battery wire diameter (mm ² /AWG) | Load wire diameter (mm ² /AWG) |
|-------------------------------|------------------------|---------------------------|--|--|---|
| MA-20-12/24 | 20A | 20A | 5/10 | 5/10 | 5/10 |
| MA-30-12/24 | 30A | 30A | 6/9 | 6/9 | 6/9 |
| MA-40-12/24 | 40A | 40A | 10/8 | 10/8 | 10/8 |
| MA-60-12/24 MA-60-12/24/48 | 60A | 30A | 16/5 | 16/5 | 6/9 |

 The indicated cable/wire sizes are for reference only. If longer runs between the PV array and the controller or between the controller and the battery are required, than larger capacity cables must be used to reduce voltage drop and improve system performance.

5.4 Connection

We strongly recommend connecting a fuse directly to the battery terminal to protect from any short circuit in the battery circuit. PV-modules generate current whenever light shines on them. The generated current is directly proportional to the light intensity. Even low levels of light, will deliver the PV-Modules no load, full voltage. It is thus utterly advisable to protect PV-modules from any incident light during installation; Never touch uninsulated cables (ends), only use electric insulated tools, and make sure that the wire cross section is adequate for the PV module operating currents. Connections must always be conducted in the sequence as described below



WARNING: The PV-module/array can produce open-circuit voltages in excess of 100 Vdc when exposed to sunlight. Pay highest attention to this fact.



WARNING: Risk of explosion! In case the battery's positive and negative terminals or leads get ever in touch, i.e. short-circuited, a fire or explosion hazard might get triggered. Always pay maximum when handling batteries and related circuits.



CAUTION: 1. If no temperature sensor is connected to the controller, the battery temperature value will display the internal temperature.

2.If a power inverter is used the system, it should be connected to the battery via a DC relay. Do not connect it to the controller's load terminals.

1st step: Connect loads

Connect the load cable with the correct polarity of the right-hand side pair of terminals on the solar charge controller (with the lamp symbol). To avoid the presence of any tension on the cable/wires, please connect these first to the load before connecting them to the charge controller.

2nd step: Connect the battery

Connect the battery cables observing the correct polarity to the center pair of terminals (make sure you identify the battery marking/symbol on the controller casing!) of the PV charge controller. Pay greatest attention to polarity. Never, ever invert the plus+ and minus- poles).

1)Should your system be nominal 12 Vdc, make sure the battery voltage is between the 10.0 and 15.0 Vdc voltage range;

2)for 24 Vdc nominal voltage, the battery voltage should be within the 20.0 to 30.0 Vdc range;

3)for 36 Vdc nominal voltage, the battery voltage should be within the 31.0 to 42.0Vdc;

4)for 48 Vdc nominal voltage, the battery voltage should be within the 42.0 to 62.0Vdc.

If the polarity is correct, the LCD on the controller will begin to display those.

3rd step: Connect the solar module

When connecting the PV-Module make sure to cover it from incident sun light. Double check the PV-Module will not exceed the maximum permissible input current of the Charge Controller (please refer to the section Technical Data). Connect the solar module connection cable to the correct polarity of the left pair of terminals on the solar charge controller (with the solar module symbol).

4th step: Final work

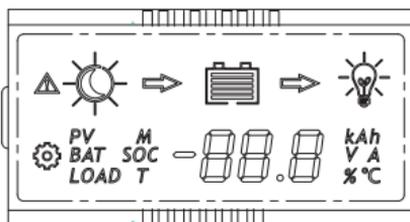
Tighten all cables connected to the controller and remove all the remains around the controller (leaving a void of minimum 15 cm).

5.5 Grounding

Be aware that the positive terminals of controller are interconnected and therefore bear the same electrical potential. If any grounding is required, always do this on the positive wires/terminals.

6, Operation

6.1 LCD Display



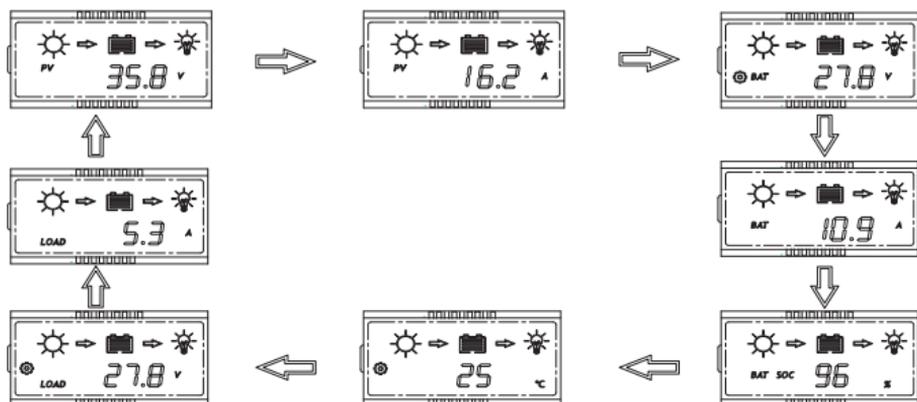
6.1.1 Status Description

| Item | Icon | Status |
|----------|---|---|
| PV array |   | Daytime, not charging |
| |    | Daytime, charging |
| |  | Night |
| | <i>PV</i> | PV voltage, current and ampere hours |
| | <i>PV T</i> | The total charge ampere hours of the solar panel |
| Battery |  | Battery capacity |
| |  <i>BAT</i> | Battery voltage(Programmable LVD) |
| | <i>BAT</i> | Battery current |
| | <i>BAT SOC</i> | Battery state of charge(in %) |
| |  <i>25 °C</i> | Temperature(Clear external Bluetooth Device Password) |
| |  <i>BAT T GEL</i> | Battery type(Programmable) |
| Load |  <i>LOAD</i> | Load voltage(Programmable LVR) * |
| | <i>LOAD</i> | Load current and ampere hours |
| | <i>LOAD T</i> | The total discharge ampere hours of the load |
| |  <i>LOAD M</i> | Load mode(Programmable) |
| |    | The load is on |
| |   | The load is off |
| Fault |  | Fault indication, see 6.1.4 |

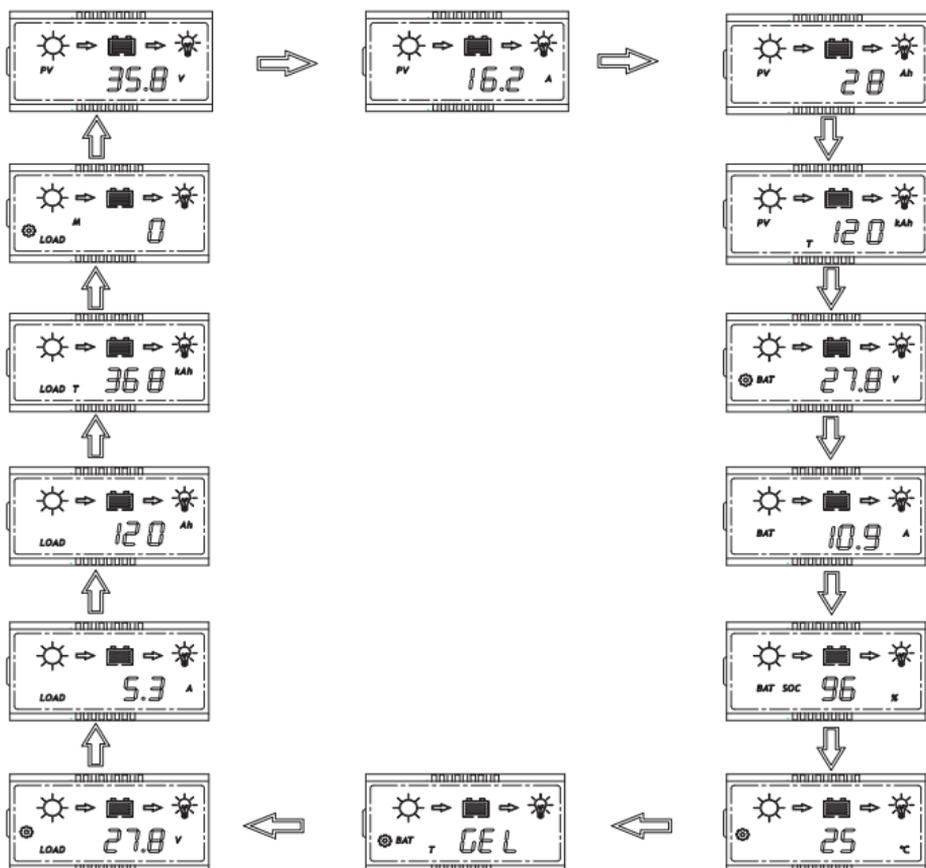
*Max-EU can not set LVR.

 PV array charge ampere hours and load ampere hours are off after power failure.

6.1.2 The interface automatically cycles in the displayed sequence



6.1.3 Press OK to browse the interface



6.1.4 Fault indication

| Status | Icon | Description |
|---|--|--|
| Short circuit |   E1 | Load off, fault icon display, load icon flashes, the LCD screen displays E1 |
| Over current |   E2 | Load off, fault icon display, load icon flashes, the LCD screen displays E2 |
| Low voltage |   E3 | Battery level shows empty, fault icon display, battery frame flashes, the LCD screen displays E3 |
| Over voltage |   E4 | Battery level shows full, fault icon display, battery flashes, the LCD screen displays E4 |
| Over temperature |   E5 | The charge and discharge are off, fault icon display, icon °C flashing, the LCD screen displays E5 |
| Controller does not correctly identify system voltage |  | Controller does not correctly identify system voltage. |

6.2 Key function

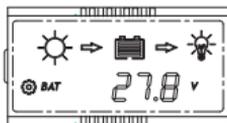


| | |
|-------------------|---|
| Mode | Operating |
| Browse interface | Short press OK |
| Static display | Press the MENU and OK key at the same time for 1s, the LCD screen will lock the interface. Press the MENU and OK key again for 1s, the LCD interface will unlock and start scrolling. |
| Setting parameter | Press the MENU key for 1s to enter the setting mode when the icon  appears on the display interface, and exit automatically after 30s |
| Load On/Off | When the controller is working in street lamp mode, press the MENU key for 3s to turn on the load, press the MENU key again or 1min later the load will be turned off. |

6.3 Parameters setting

When the icon  appears in the display interface, it means that the parameters can be set. Press the **MENU** key for 1s, then icon  flashes, press **OK** to change the parameter.

6.3.1 Low voltage protection(LVD)



When the LCD shows as displayed at left, press the **MENU** key for 1s, the icon  flashes, now you can set the controller's low voltage protection.

1.Lithium Battery(Max50/60(48)-E)

Low voltage protection setting range:

12/24V: 9.0-30.0V (default: 10.6V)

12/24/36/48V: 9.0-60.0V (default: 21.0V).

2.Liquid, Gel and AGM Battery

The low voltage protection of the controller can be divided into two types: battery voltage control and capacity control.

①Battery voltage control

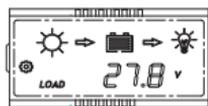
Low voltage protection setting range:

10.8~11.8V/21.6~23.6V/32.4~35.4V/43.2~47.2V(default: 11.2/22.4/33.6/44.8V).

②Battery capacity control

| Display | Low voltage protection range | Low voltage reconnect |
|---------|---|--------------------------|
| S-1 | 11.0~11.6V/22.0~23.2V/33.0~34.8V/44.0~46.4V | 12. 4/24. 8/37. 2/49. 6V |
| S-2 | 11.1~11.7V/22.2~23.4V/33.3~35.1V/44.4~46.8V | 12. 5/25. 0/37. 5/50V |
| S-3 | 11.2~11.8V/22.4~23.6V/33.6~35.4V/44.8~47.2V | 12. 6/25. 2/37. 8/50. 4V |
| S-4 | 11.4~11.9V/22.8~23.8V/34.2~35.7V/45.6~47.6V | 12. 7/25. 4/38. 1/50. 8V |
| S-5 | 11.6~12.0V/23.2~24.0V/34.8~36.0V/46.4~48.0V | 12.8/25.6/38.4/51.2V |

6.3.2 Low voltage reconnect(LVR)



When the LCD shows as displayed at left, press the **MENU** key for 1s, the icon  flashes, you can set the controller's low voltage reconnect.

1.Lithium Battery

Low voltage reconnect setting range is:

12/24V: 9.6-31.0V (default: 12.0V)

12/24/36/48V: 9.6-62.0V (default: 22.4V).

2.Liquid, Gel and AGM Battery

Low voltage reconnect setting range:

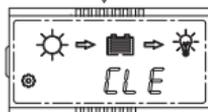
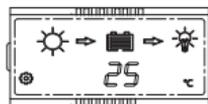
11.4~12.8/22.8~25.6/34.2~38.4/45.6~51.2V(default : 12/24/36/48V).

Max-EU series can not set LVD, its LVD is 0.8/1.6v higher than LVR by default.



The low voltage recovery voltage(LVR) should be higher than the low voltage protection voltage (LVD) at least 0.6/1.2/1.8/2.4V. If it is desired to improve LVD, than LVR must improved first.

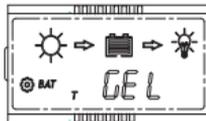
6.3.3 Clear Bluetooth Device Password



When the LCD shows as displayed at left, press the **MENU** key for 1s, the icon  flashes, you can press **OK** to clear the Bluetooth device password set by the mobile app.

 For device passwords, please refer to Bluetooth APP instructions.

6.3.4 Battery type



When the LCD shows as displayed at left, press the **MENU** key for 1s, the icon  flashes, you can set the battery type.

| Display | Battery type |
|---------|--------------|
| GEL | GEL(Default) |
| L19 | Liquid |
| AG- | AGM |
| LI | Lithium |

1.Charging Voltage Parameters(Liquid, GEL, AGM)

When choosing Liquid, GEL or AGM for battery type, the parameters of boost, equalization and float charge voltage can be set by IoT, RS485 or bluetooth APP. The range of parameters is as follows.

The following voltage parameters are 25°C/12V system parameters, 24/36/48V displayed values are multiplied by a factor of 2/3/4.

| Charging stage | Boost | Equalization | Float |
|--------------------------|------------|--------------|------------|
| Charging Voltage Range | 14.0~14.8V | 14.0~15.0V | 13.0~14.5V |
| Default charging voltage | 14.5V | 14.8V | 13.7V |

2.Charging Voltage Parameters(Lithium)

The controllers are suitable for all kinds of lithium batteries. When choosing lithium battery type, the overcharge protection and overcharge recovery voltage of lithium battery can be set by IoT, RS485 or bluetooth APP.

Charge target voltage range: 12/24V: 10.0-32.0V (default:14.4V)
12/24/36/48V: 10.0-64.0V (default:29.4V)

Charge recovery voltage setting range: 12/24V: 9.2-31.8V (default:14.0V)
12/24/36/48V: 9.2-63.8V (default:28.7V)

Note: 1. Max EU cannot be set as a lithium battery controller.

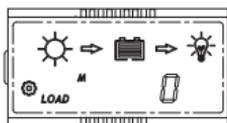
2. (Overcharge Recovery Voltage+1.5V)≥Lithium Overcharge Protection Voltage≥(Overcharge Recovery Voltage+0.2V)

Parameter setting out of range is not supported.



Warning: The required accuracy of BMS shall be at least 0.2V. If tolerance is larger than 0.2V, manufacturer will not assume any liability for any consequent system malfunction.

6.3.5 Load mode



When the LCD shows as displayed at left, press the **MENU** key for 1s, the icon  flashes, you can set the load mode.

| Display | Load mode |
|-----------------|---|
| 0 | Always on Mode: The load output is always switched on. |
| 1 | Dusk to Dawn Mode: The load output is switched on between sunset and sunrise. |
| 2 3 4 5 6 7 8 9 | Evening Mode: The load output will be switched on for 2~9hours after sunset. |
| USE | Manual Mode: The load output can be switched on and off manually by pressing MENU shortly. |

1.Always on Mode

When the controller is set to always On mode, no matter the charging or discharging state, the load is always powered on (except in protection state).

2. Street lamp Function

When the load is set to Dusk to Dawn or Evening mode, the Day/Night threshold voltage and the Day/Night delay time can be set by IoT, RS485 or bluetooth APP, and the load can be turned on or off by the test function during the day charging process.

2.1 Day/Night threshold voltage

The controller recognizes day and night based on the solar array open circuit voltage.

This day/night threshold voltage can be modified according to local light conditions and the solar array used. **Max-EU defaults to 5.0/10.0V.**

Day/Night threshold setting range: 3.0~10/6.0~20/9.0~30.0/12~40V(Default: 8/16/24/32V)

2.2 Day/Night delay time

In the evening, when the solar array open circuit voltage reaches the setting day/night detect voltage, you can adjust the day/night delay time to make the load turn on a little bit later.

Day/Night delay time setting range: 0~30min(Default: 0min)

2.3 Test Function

When the controller is working in Dusk to Dawn or Evening mode, press the **MENU** key for 3s to turn on the load. Press the **MENU** key again or the load turns off automatically after 1 minute.

If the controller is operating in always on mode, the test function does not work.

3. User-definde Mode

①If the load mode is selected "**USE**", then you can switch on and off the load output manually by pressing **MENU** shortly.

②The default switching state of the load in manual mode can be changed by IoT, RS485 or bluetooth APP. At the same time, the output to the load can be turned on or off.



1.If the controller turns off the load due to low voltage protection, overcurrent protection, short-circuit protection or over temperature protection, the load will turn on automatically when the controller recovers from protection state.

2.Please note: Pushing the MENU button can still activate the function of the key, even during of the above four kinds protection states.

6.4 USB interface(Max-EU)

Max-EU series have two USB interfaces, maximum output of single USB is 5V 1.5A, maximum output of two USB is 5V 2A, for charging mobile phones and other smart devices.

The USB stops output only when the controller is in low voltage protection.

7, Troubleshooting, Protections and maintenance

7.1 Troubleshooting

| Faults | Reason | Troubleshooting |
|--|---|--|
|   E1 | Short Circuit | Switch off all loads, remove short circuit, load will be reconnected after 1 minute automatically |
|   E2 | Over Current | Reduce the load, the controller will resume work after 1minute. |
|   E3 | Battery voltage is too low | Load will be reconnected when battery is recharged |
|   E4 | Battery voltage is too high | Check if other sources overcharge the battery. If not, controller is damaged. |
|  °C E5 | Over temperature | After the temperature decreases, the controller will work normally |
|  | Battery voltage is abnormal at start-up | Charge or discharge the battery so that the battery voltage is within the normal operating range (10~15V or 20~30V or 31~42 or 42~62V) |
| Battery can't be charged during daytime | PV panel fault or reverse connection | Check panels and connection wires |

7.2 Protection

| Protection | Description |
|-----------------------------------|--|
| Charging over current | The controller will limit charging current on battery to the rated level. |
| PV Short Circuit | When PV short circuit occurs, the controller will stop charging. Remove it to resume normal operation. |
| PV Reverse Polarity | Fully protection against PV reverse polarity, no damage to the controller. Correct the connection to resume normal operation. |
| Battery Reverse Polarity | Fully protection against battery reverse polarity, no damage to the controller. Correct the connection to resume normal operation. |
| Battery Over voltage | Should there are other energy sources to charge the battery, when the battery voltage exceeds 15.8 / 31.3 / 46.8 / 62.3V(Overcharge protection voltage of lithium battery equals target voltage plus 0.2V), the controller will stop charging to protect the battery from overcharging damage. |
| Battery Over discharge | When battery voltage drops to the low voltage disconnect setting, the controller will stop discharging to protect the battery from over discharging damage. |
| Load Over Current Protection | If the load current exceeds the maximum load current rating 1.25 times, the controller will disconnect the load. |
| Load Short Circuit Protection | Once the load short circuit happens , the load short circuit protection will trigger automatically. |
| Over Temperature Protection | The controller detects the internal temperature through internal sensor, when the temperature exceeds the setting value, the charging current will decrease, and consequently, the controllers temperature; Should controllers temperature rise and approach over temperature protection threshold, the controller will stop its operation and resume after temperature lowers/returns to an acceptable level. |
| Damaged Remote Temperature Sensor | Should the temperature sensor be short-circuited or damaged, the controller will be charging or discharging at the internal temperature automatically to prevent the battery damaged from overcharging or over discharged. |

Two or more errors at the same time can damage the controller, so you must troubleshoot the existing fault .

7.3 Maintenance

For best system performance, the following inspections and maintenance tasks are recommended to be carried out for at least two times a year.

- Make sure no block on air-flow around the controller. Clear up any dirt and fragments on radiator.
- Check all the naked wires to make sure insulation is not damaged. Repair or replace some wires if necessary.
- Tighten all terminal screws to the indicated torque; Inspect for loose, broken, or burnt cable/wire connections.
- Check and confirm that LCD is consistent with required. Pay attention to any troubleshooting or error indication. Take corrective action if necessary.
- Make sure all system components are effectively and tightly connected to ground.
- Check all terminals for any corrosion signs, damaged insulation, increased temperature or carbonization/discolored signs.
- Check for any dirt, nesting insects and any corrosion signs. Implement corrections actions as early as possible.



WARNING: Risk of electric shock!

Make sure that all the power is turned off before above operations, and then follow the corresponding inspections and operations.

8, Technical Data

| | Item | MA-20-12/24 | MA-30-12/24 | MA-40-12/24 |
|--------------------|---------------------------|---|-------------|-------------|
| Battery Parameters | System Voltage | 12V/24V automatical recognition | | |
| | Max Charging Current | 20A | 30A | 40A |
| | Fast Voltage | <14.5/29.0V@25°C | | |
| | Boost Voltage | 14.5/29.0V @25°C | | |
| | Equalization Voltage | 14.8/29.6V @25°C (Liquid, AGM) | | |
| | Float Voltage | 13.7/27.4V @25°C | | |
| | Low Volt. Disconnect | 10.8~11.8V/21.6~23.6V, SOC1~5 (default: 11.2/22.4V) | | |
| | Reconnect Voltage | 11.6~12.8V/23.2~25.6V (default: 12.0/24.0V) | | |
| | Overcharge Protect | 15.5/31.0V | | |
| | Max volt on Bat. terminal | 35V | | |
| | Temp. Compensation | -4.17mV/K per cell (Boost, Equalization), -3.33mV/K per cell (Float) | | |
| | Battery Type | Liquid, Gel, AGM (default: Gel) | | |
| Panel Parameters | Max volt on PV terminal | 55V | | |
| | Dusk/Dawn detect volt. | 5.0/10.0V | | |
| Load | Output Current | 20A | 30A | 40A |
| | USB interface | 5V, 2A | | |
| | Load mode | Always on, Dusk to Dawn, Evening, Manual | | |
| System Parameters | Dimensions | 189 * 96 * 53mm | | |
| | Weight | 420g | | |
| | Self consumption | 5mA | | |
| | Grounding | Common positive | | |
| | Power terminals | 8AWG(10mm ²) | | |
| | Ambient temperature | -20 ~ +50°C | | |
| | Storage temperature | -25 ~ +80°C | | |
| | Ambient humidity | 0 ~ 100%RH | | |
| | Protection degree | IP32 | | |
| | Max Altitude | 4000m | | |

* Around oblique line value separately on behalf of 12V and 24V system's value.

| | Item | MA-50-12/24 | MA-60-12/24 | |
|------------------------|----------------------------|---|---|--|
| Battery Parameters | Max Charging Current | 50A | 60A | |
| | System Voltage | 12/24V automatic recognition | | |
| | Max volt on Bat. terminal | 35V | | |
| | Battery Type | Gel, AGM, Liquid, Lithium (default: Gel) | | |
| | Liquid, Gel and AGM | Fast Charging Voltage | before boost or equalization charging stage | |
| | | Boost Voltage | 14~14.8/28~29.6V @25°C(default: 14.5/29V) | |
| | | Equalization Voltage | 14~15.0/28~30V@25°C(default: 14.8/29.6V)(Liquid, AGM) | |
| | | Float Voltage | 13~14.5/26~39V @25°C(default: 13.7/27.4V) | |
| | | Low Volt. Disconnect | 10.8~11.8V/21.6~23.6V(default: 11.2/22.4V) | |
| | | Reconnect Voltage | 11.4~12.8V/22.8~25.6V (default: 12.0/24.0V) | |
| | | Overcharge Protect | 15.8/31.3V | |
| | Lithium | Temp. Compensation | -4.17mV/K per cell (Boost, Equalization), -3.33mV/K per cell (Float) | |
| | | Charging target voltage | 10.0~32.0V(Lithium, default: 14.4V) | |
| | | Charging recovery voltage | 9.2~31.8V(Lithium, default: 14.0V) | |
| Low voltage disconnect | | 9.0~30.0V(Lithium, default: 10.6V) | | |
| | Low voltage reconnect | 9.6~31.0V(Lithium, default: 12.0V) | | |
| Panel Parameters | Max volt on PV terminal *1 | 55V | | |
| | Day/Night threshold | Lithium: 3.0~20.0V(Programmable) Gel, AGM and Liquid: 3.0~10.0/6.0~20.0V(Programmable) | | |
| | Day/Night delay Time | 0~30min | | |
| Load | Output Current | 30A | | |
| | Load mode | Always on(Default) , Street lamp, User-defind Mode | | |
| System Parameters | Dimensions | 138*187.5*62.5mm | | |
| | Weight | 720g | | |
| | Self consumption | 10mA | | |
| | Communication | RS485(RJ11 interface) | | |
| | Optional | IoT, Cyber-BT | | |
| | Grounding | Common Positive | | |
| | Power terminals | 6AWG(16mm ²) | | |
| | Ambient temperature | -20 ~ +55°C | | |
| | Storage temperature | -25 ~ +80°C | | |
| | Ambient humidity | 0 ~ 100%RH | | |
| | Protection degree | IP32 | | |
| Max Altitude | 4000m | | | |

*1. Maximum solar panel voltage at minimum ambient operating temperature.

*2. Around oblique line value separately on behalf of 12V and 24V system's value.

| | Item | MA-50-12/24/48 | MA-60-12/24/48 | |
|---------------------------|----------------------------|---|--|--|
| Battery Parameters | Max Charging Current | 50A | 60A | |
| | System Voltage | 12/24/36/48V automatic recognition | | |
| | Max volt on Bat. terminal | 65V | | |
| | Battery Type | Gel, AGM, Liquid, Lithium (default: Gel) | | |
| | Liquid, Gel and AGM | Fast Charging Voltage | before boost or equalization charging stage | |
| | | Boost Voltage | 14~14.8/28~29.6/42~44.4/56~59.2V@25°C (default:14.5/29/43.5/58V) | |
| | | Equalization Voltage | 14~15/28~30/42~45/56~60V@25°C (default:14.8/29.6/44.4/59.2V)(Liquid, AGM) | |
| | | Float Voltage | 13~14.5/26~29/39~43.5/52~58V@25°C (default:13.7/27.4/41.1/54.8V) | |
| | | Low Volt. Disconnect | 10.8~11.8/21.6~23.6/32.4~35.4/43.2~47.2V (default:11.2/22.4/33.6/44.8V) | |
| | | Reconnect Voltage | 11.4~12.8/22.8~25.6/34.2~38.4/45.6~51.2V (default:12/24/36/48V) | |
| | | Overcharge Protect | 15.8/31.3/46.8/62.3V | |
| | Temp. Compensation | -4.17mV/K per cell (Boost, Equalization), -3.33mV/K per cell (Float) | | |
| | Lithium | Charging target voltage | 10.0~64.0V(Lithium, default: 29.4V) | |
| Charging recovery voltage | | 9.2~63.8V(Lithium, default: 28.7V) | | |
| Low voltage disconnect | | 9.0~60.0V(Lithium, default: 21.0V) | | |
| Low voltage reconnect | | 9.6~62.0V(Lithium, default: 22.4V) | | |
| Panel Parameters | Max volt on PV terminal *1 | 100V | | |
| | Day/Night threshold | Lithium: 3.0~40.0V Gel, AGM and Liquid: 3~10/6~20/9~30/12~40V | | |
| | Day/Night delay Time | 0~30min | | |
| Load | Output Current | 30A | | |
| | Load mode | Always on(Default) , Street lamp, User-defind Mode | | |
| System Parameters | Dimensions | 138*187.5*88.5mm | | |
| | Weight | 1.1Kg | | |
| | Self consumption | 10mA (12/24V); 7mA (36/48V) | | |
| | Communication | RS485(RJ11 interface) | | |
| | Optional | Cyber-BT | | |
| | Grounding | Common Positive | | |
| | Power terminals | 6AWG(16mm ²) | | |
| | Ambient temperature | -20 ~ +55°C | | |
| | Storage temperature | -25 ~ +80°C | | |
| | Ambient humidity | 0 ~ 100%RH | | |
| | Protection degree | IP32 | | |
| Max Altitude | 4000m | | | |

*1. Maximum solar panel voltage at minimum ambient operating temperature.

*2. Around oblique line value separately on behalf of 12V, 24V, 36V and 48V system's value.