

MakeSkyBlue 100A-V124

MakeSkyBlue V124 100A MPPT Solar Charge Controller User Manual

Model: 100A-V124

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1. INTRODUCTION

Thank you for choosing the MakeSkyBlue V124 100A MPPT Solar Charge Controller. This device is designed to efficiently manage power from your solar panels to your battery bank, ensuring optimal charging and extending battery life. It features advanced Maximum Power Point Tracking (MPPT) technology, automatic system voltage detection (12V/24V/48V), and compatibility with various battery types including Lithium, LiFePO4, AGM, Gel, and Lead-Acid batteries. This manual provides detailed instructions for safe installation, operation, and maintenance of your solar charge controller.

2. SAFETY INSTRUCTIONS

Please read all instructions and warnings carefully before installation and operation. Failure to follow these instructions may result in electric shock, fire, or severe injury.

- **Installation:** Only qualified personnel should install this device.
- **Ventilation:** Ensure adequate ventilation around the controller to prevent overheating.
- **Wiring:** Use appropriate wire gauges and ensure all connections are tight and secure. Incorrect wiring can cause damage or fire.
- **Battery Safety:** Batteries can produce explosive gases. Install in a well-ventilated area. Avoid sparks and open flames.
- **Reverse Polarity:** Always connect the battery first, then the solar panels. Ensure correct polarity to avoid damage.
- **Voltage:** Verify that the solar panel array's open-circuit voltage (Voc) does not exceed the controller's maximum input voltage (160V).
- **Water Exposure:** Protect the controller from direct water exposure and high humidity.
- **Maintenance:** Disconnect all power sources before performing any maintenance or cleaning.

3. PRODUCT OVERVIEW

The MakeSkyBlue V124 100A MPPT Solar Charge Controller is designed for robust performance in off-grid solar systems. It features a durable metal casing, an intuitive LCD display, and reinforced terminal connectors.

3.1 Key Features

- **Advanced MPPT Technology:** Ensures maximum power harvest from solar panels.
- **Automatic Voltage Detection:** Supports 12V, 24V, and 48V battery systems.
- **Wide Battery Compatibility:** Compatible with Lithium, LiFePO4, AGM, Gel, and Lead-Acid batteries.
- **High PV Input Voltage:** Max 160V PV input.
- **LCD Display:** Provides real-time charging data, system voltage, and operational status.
- **Comprehensive Protections:** Includes over-discharge, reverse polarity, over-temperature, and short circuit protection.
- **Enhanced Terminal Connectors:** For secure and efficient power transfer.

3.2 Components

The package includes the Solar Charge Controller and a User Manual. Please inspect all components upon receipt.

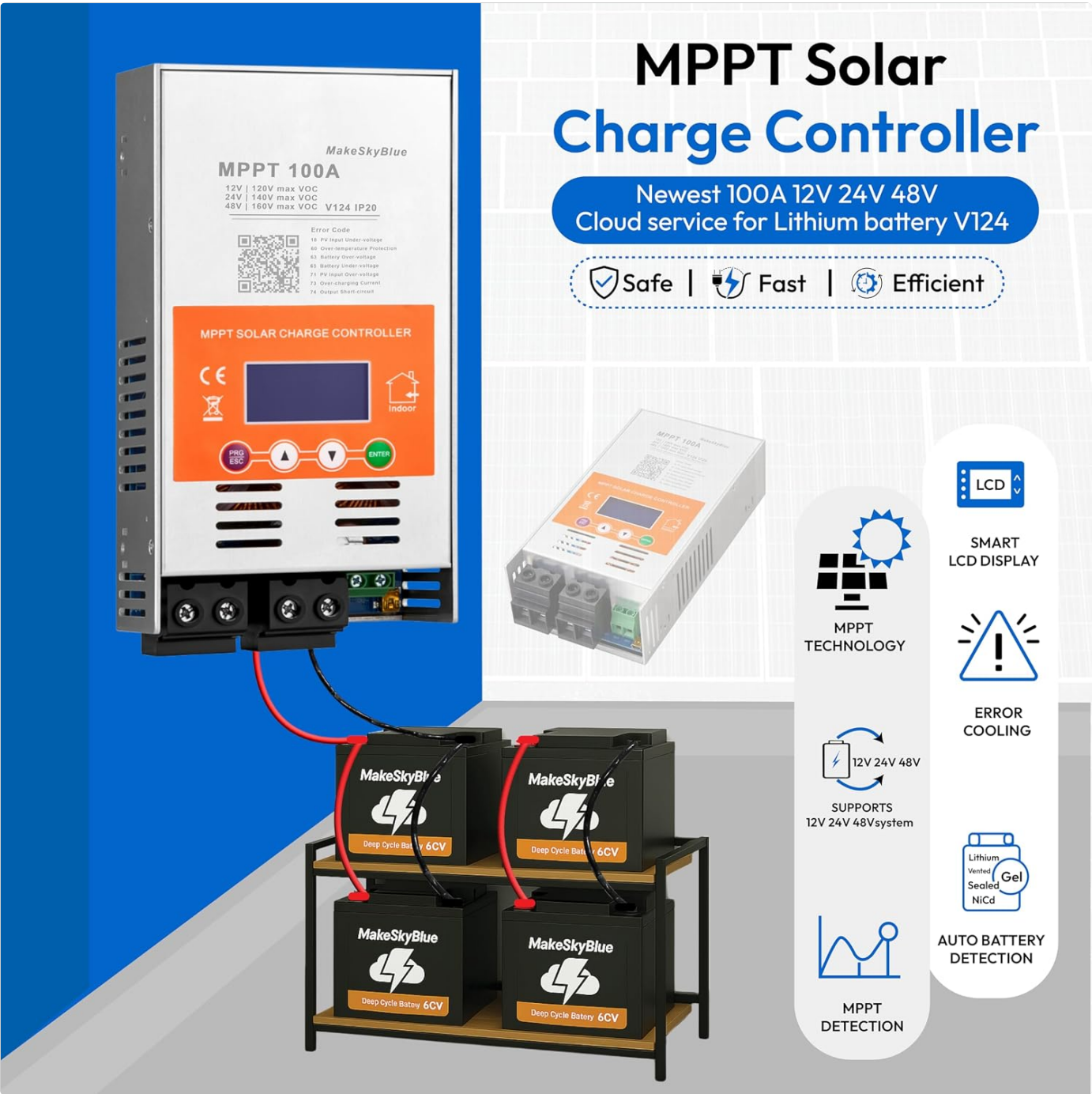


Figure 1: Front view of the MakeSkyBlue V124 100A MPPT Solar Charge Controller, showing the LCD display and control buttons.

Suitable for battery types

Easy to set for lithium battery

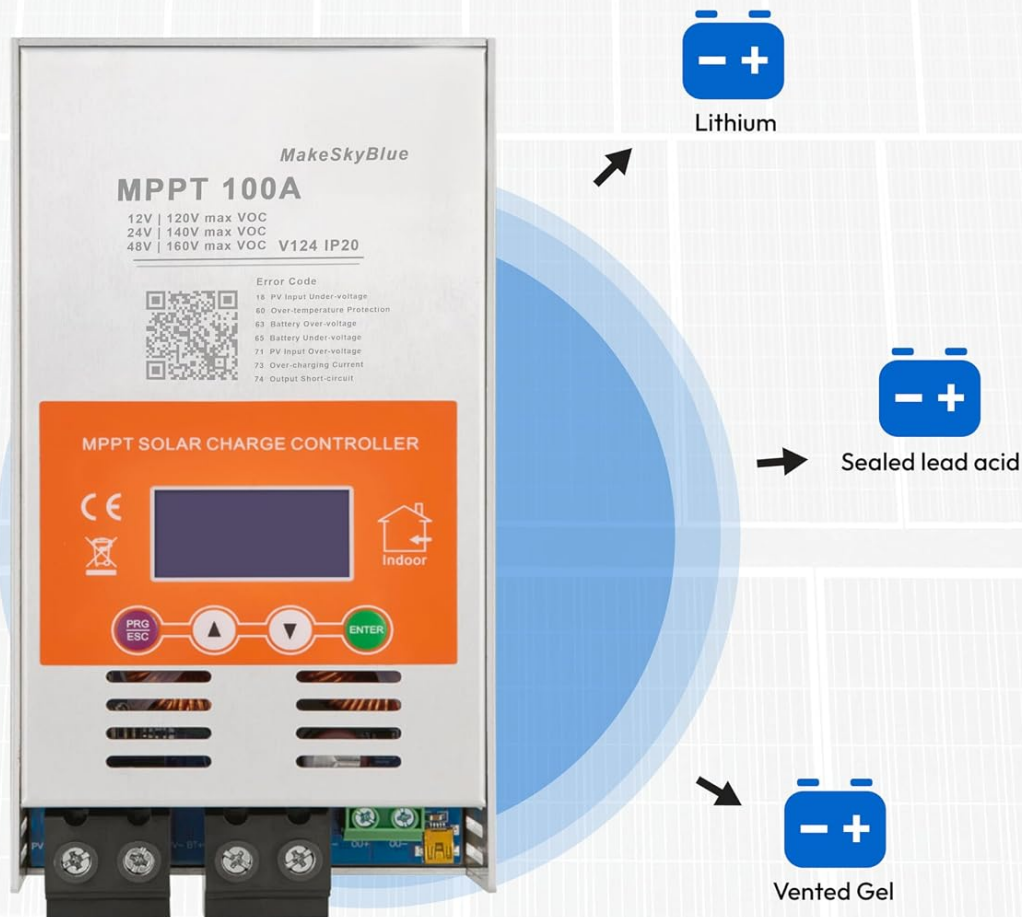


Figure 2: The solar charge controller connected to a battery bank, illustrating a typical setup.

4. SPECIFICATIONS

Feature	Specification
Model	100A-V124
Rated Current	100A
System Voltage	12V/24V/48V Auto
Max PV Input Voltage	160V
Battery Compatibility	Lithium, LiFePO4, AGM, Gel, Lead-Acid
Display Type	LCD

Feature	Specification
Product Dimensions	4.52 x 1.96 x 8.46 inches
Item Weight	2.87 pounds
Material	Metal

5. SETUP & INSTALLATION

Proper installation is crucial for the safe and efficient operation of your solar charge controller. Follow these steps carefully.

5.1 Site Selection

- Install the controller indoors, away from direct sunlight, high temperatures, and water.
- Ensure the mounting surface is strong enough to support the controller's weight.
- Allow at least 6 inches (15 cm) of clearance around the controller for proper ventilation.

5.2 Wiring Sequence

Important: Always connect the battery first, then the solar panels, and finally the load (if applicable). Disconnect in the reverse order.

1. **Connect the Battery:** Connect the positive and negative terminals of the battery to the corresponding battery terminals on the controller. Ensure correct polarity. The controller will automatically detect the battery voltage.
2. **Connect the Solar Panels:** Connect the positive and negative terminals of your solar panel array to the corresponding PV input terminals on the controller. Ensure correct polarity.
3. **Connect the Load (Optional):** If your controller has load terminals, connect your DC load to these terminals. Ensure correct polarity.



Figure 3: A typical wiring diagram showing connections from solar panels to the charge controller, then to batteries and DC loads.

Note on PV Over-Voltage Protection: The controller has PV over-voltage protection. If the PV open-circuit voltage (Voc) exceeds 180V, the controller may be damaged. Ensure your solar array voltage is within the specified limits.

6. OPERATING INSTRUCTIONS

Once installed, the controller will begin operating automatically. The LCD display provides essential information and allows for configuration.

6.1 LCD Display and Buttons

The LCD screen displays real-time data such as battery voltage, charging current, PV voltage, and various operational statuses. Use the buttons below the screen to navigate menus and adjust settings.

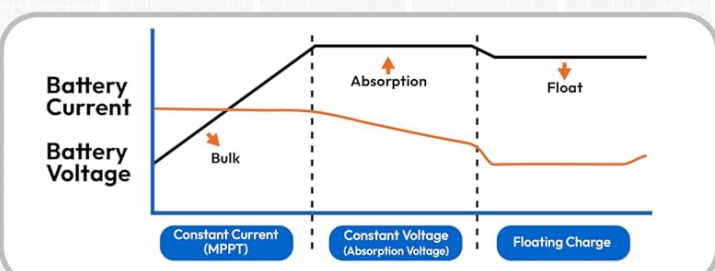
- **PROG (Program):** Enters/exits programming mode.
- **ESC (Escape):** Exits current menu or cancels an action.
- **UP/DOWN Arrows:** Navigate through menu options or adjust values.
- **ENTER:** Confirms selection or enters a submenu.

6.2 Battery Type Selection

The controller supports various battery types. It is crucial to select the correct battery type for optimal charging and battery longevity.



3 Stage Smart MPPT Solar Charge Controller



Recognition Automatically DC 12V/24V/48V



Figure 4: The controller is compatible with Lithium, Sealed Lead Acid, and Vented Gel batteries. Refer to the manual for specific settings for each type.

1. Press the **PROG** button to enter the settings menu.
2. Use the **UP/DOWN** arrows to navigate to the "Battery Type" setting.
3. Press **ENTER** to select, then use **UP/DOWN** to choose your battery type (e.g., Lithium, LiFePO4, AGM, Gel, Lead-Acid).
4. Press **ENTER** to confirm, then **ESC** to exit the menu.

6.3 Charging Stages

The controller utilizes a 3-stage smart charging process to optimize battery charging:

- **Bulk Charge:** Delivers maximum current to rapidly charge the battery.
- **Absorption Charge:** Maintains a constant voltage to fully charge the battery.
- **Float Charge:** Reduces voltage to a lower level to maintain the battery at full charge.

Temperature protection



Temperature protection: 75 °C / 167 °F

- Fan-on temperature: > 45 °C / 113 °F
- Fan-off temperature: < 40 °C / 104 °F

Figure 5: Illustration of the 3-stage smart charging process (Bulk, Absorption, Float) and automatic DC 12V/24V/48V system recognition.

7. MAINTENANCE

Regular maintenance ensures the longevity and optimal performance of your solar charge controller.

- **Check Connections:** Periodically inspect all wiring connections for tightness and corrosion. Tighten any loose connections.
- **Clean the Controller:** Keep the controller clean and free of dust and debris. Use a dry cloth for cleaning. Ensure ventilation openings are not blocked.
- **Monitor Performance:** Regularly check the LCD display for normal operation and any error codes.
- **Battery Inspection:** Inspect batteries for any signs of damage, swelling, or leaks. Ensure battery terminals are clean.
- **Temperature Monitoring:** The controller includes temperature protection. Ensure the fan operates correctly when needed. Fan-on temperature is $>45^{\circ}\text{C}$ (113°F), and fan-off temperature is $<40^{\circ}\text{C}$ (104°F).

Overcharging Protection Voltage



12V system (1200W) 24V system (2400W)48V system (4800W)

PV Reverse Polarity Protection
Yes (When $V_{oc} < 100\text{V}$ only)

PV Over-voltage Protection
Yes (When $V_{oc} > 180\text{V}$,
the controller will be burnt.)

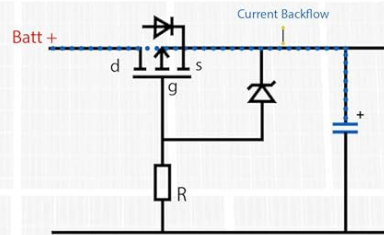


Figure 6: The controller features temperature protection with specified fan operation thresholds.

8. TROUBLESHOOTING

This section provides solutions to common issues you might encounter.

Problem	Possible Cause	Solution
Controller not turning on	Battery not connected or low voltage; reverse polarity.	Ensure battery is connected correctly and has sufficient voltage. Check polarity.
No charging from PV	PV panels not connected; insufficient sunlight; PV voltage too low/high.	Check PV connections and polarity. Ensure adequate sunlight. Verify PV voltage is within range (Max 160V).
Battery not fully charged	Incorrect battery type setting; insufficient PV power; battery degradation.	Verify battery type setting. Check PV array size. Test battery health.
Error Code on Display	Specific system fault (e.g., over-voltage, over-current, over-temperature).	Refer to the controller's internal error code list (if available on device label or separate documentation) for specific actions. Generally, disconnect power, inspect, and reconnect.

Overcharging Protection Voltage



12V system (15V) -24V system (30V) -48V system (60V)



Figure 7: The controller provides overcharging protection for 12V, 24V, and 48V systems, safeguarding your batteries.

9. WARRANTY & SUPPORT

MakeSkyBlue products are designed for reliability and performance. For warranty information, technical support, or service inquiries, please contact your retailer or visit the official MakeSkyBlue website. Please have your model number (100A-V124) and purchase date available when contacting support.

Official Product Video: Learn more about the MPPT efficiency and performance of MakeSkyBlue solar charge controllers.

Your browser does not support the video tag.

Video 1: "Super Fast Tracking, Real PV Input, Stable Output Demo" by MakeSkyBlue. This video demonstrates the advanced MPPT efficiency and stable output of the solar charge controller in a laboratory setting, showcasing its ability to precisely track the maximum power point under various conditions.

