MakeSkyBlue 40A-V123

MakeSkyBlue MPPT Solar Charge Controller (40A-V123) Instruction Manual

For 12V, 24V, and 48V Solar Systems

1. Introduction

This manual provides essential information for the safe and efficient operation of your MakeSkyBlue MPPT Solar Charge Controller, model 40A-V123. This device is designed to optimize power harvesting from your solar panels and efficiently charge your battery bank in 12V, 24V, or 48V solar systems. Please read this manual thoroughly before installation and use.

Figure 1: MakeSkyBlue 40A-V123 MPPT Solar Charge Controller

2. Safety Instructions

Observe the following safety precautions during installation and operation:

- Ensure all wiring is correctly polarized and securely connected to prevent damage to the controller and other components.
- Always connect the battery to the charge controller **first**, and disconnect it **last**.
- Do not connect the solar panel array to the controller without a battery connected.
- Ensure the solar panel array's open circuit voltage (Voc) does not exceed the controller's maximum input

voltage.

- Install the controller in a well-ventilated area, away from flammable materials and direct sunlight.
- Use appropriate circuit breakers or fuses for all connections (solar, battery, load).
- Avoid touching live terminals. Only qualified personnel should perform electrical work.

3. Product Overview

The MakeSkyBlue 40A-V123 MPPT Solar Charge Controller features advanced Maximum Power Point Tracking technology to maximize energy harvest from your solar array. It includes a multi-function LCD for monitoring and parameter adjustment, and supports 12V, 24V, and 48V battery systems with automatic voltage detection.

3.1 Key Features

- Intelligent Maximum Power Point Tracking (MPPT) technology.
- Built-in DSP controller for high performance.
- Three-stage charging algorithm to optimize battery performance and lifespan.
- Multi-function LCD display with backlight for real-time data and error codes.
- Automatic battery voltage detection (12V/24V/48V).
- Compatible with various battery types including Lead-Acid, AGM, and Gel.
- Protection features: limited current, temperature, and overcharging.

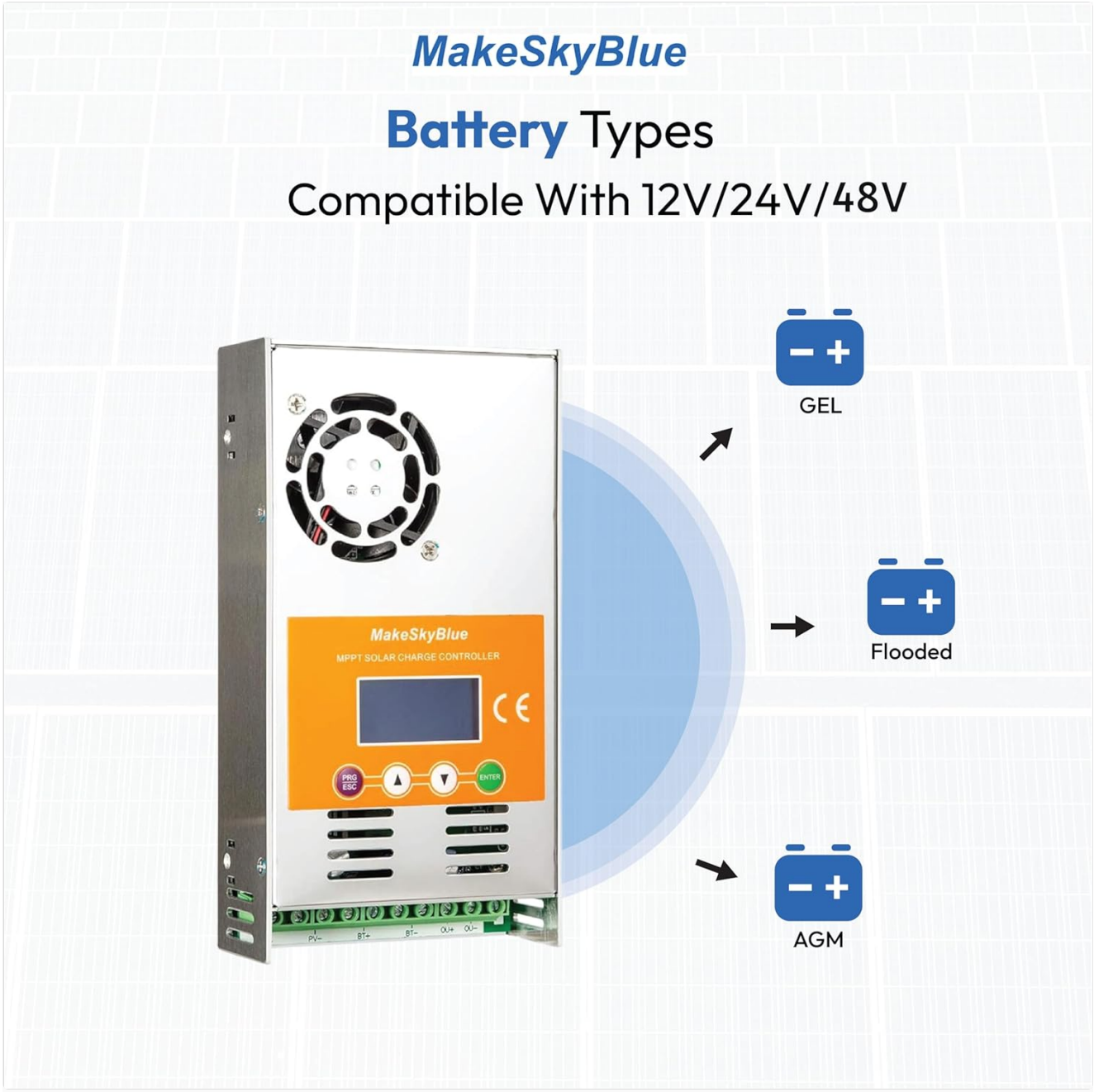


Figure 2: Compatible Battery Types (Gel, Flooded, AGM)

Figure 3: Illustration of Maximum Power Point Tracking (MPPT) vs. PWM

4. Setup and Installation

Follow these steps for proper installation of your MPPT solar charge controller. Refer to the wiring diagram for visual guidance.

4.1 Wiring Diagram

Figure 4: MPPT Charge Controller System Wiring Diagram

4.2 Installation Steps

1. **Mounting:** Mount the controller vertically on a non-flammable surface in a cool, dry, and well-ventilated area. Ensure adequate clearance around the unit for heat dissipation.
2. **Battery Connection:** Connect the battery cables to the controller's BAT+ and BAT- terminals. Ensure correct polarity. The controller will automatically detect the battery voltage (12V, 24V, or 48V).

3. **Solar Panel Connection:** Connect the solar panel array cables to the controller's PV+ and PV- terminals. Ensure correct polarity. The controller will begin charging the battery.
4. **Load Connection (Optional):** If using the load output, connect your DC loads to the OUT+ and OUT- terminals. Ensure the total current draw does not exceed the controller's rated load current.
5. **Verify Connections:** Double-check all connections for tightness and correct polarity before powering on the system.

Important: Always connect the battery first and disconnect it last. Failure to follow this sequence may damage the controller.

5. Operating Instructions

The controller's LCD display provides real-time system status and allows for parameter adjustments. The control buttons are PRG/ESC, Up (▲), Down (▼), and ENTER.

5.1 LCD Display Functions

The LCD cycles through various screens displaying system information. You can manually cycle through screens using the Up/Down buttons or enter parameter settings using PRG/ESC and ENTER.

- **Main Display:** Shows charging status, battery level, and output status.

Figure 5: Main Display showing charge and output status.

- **Cumulative Power Generation:** Displays total energy generated by the solar panels.

Figure 6: Display showing cumulative power generation.

- **PV Voltage and Load Power:** Shows current solar panel voltage and load power consumption.

Figure 7: Display showing PV voltage and load power.

- **Battery Voltage and Load Current:** Displays current battery voltage and load current.

Figure 8: Display showing battery voltage and load current.

- **Accumulated Discharge:** Shows total energy discharged from the battery.

Figure 9: Display showing accumulated discharge.

- **Internal Temperature:** Displays the internal temperature of the controller.

Figure 10: Display showing internal temperature.

5.2 Parameter Adjustment

To enter parameter adjustment mode, press the **PRG/ESC** button. Use the **Up** (▲) and **Down** (▼) buttons to navigate through parameters and adjust values. Press **ENTER** to confirm changes. Press **PRG/ESC** again to exit the setting mode.
Common adjustable parameters include:

- **b00:** Load working mode (e.g., 24H for continuous, or timed modes).

Figure 11: Parameter b00 for load working mode.

- **b01:** Overcharge protection voltage (e.g., 55.2V for 48V system).

Figure 12: Parameter b01 for overcharge protection voltage.

- **b02:** Charging recovery voltage (e.g., 58.0V for 48V system).

Figure 13: Parameter b02 for charging recovery voltage.

- **b03:** Over-discharge protection voltage (e.g., 40.0V for 48V system).

Figure 14: Parameter b03 for over-discharge protection voltage.

- **b04:** Over-discharge recovery voltage.

Figure 15: Parameter b04 for over-discharge recovery voltage.

- **b06:** Battery type setting (e.g., 47.9V for a specific battery type).

Figure 16: Parameter b06 for battery type setting.

Refer to the full product manual (if available from the manufacturer) for a complete list of parameters and their recommended settings for different battery types.

6. Maintenance

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

- **Cleaning:** Periodically clean the controller's exterior, especially the cooling fins and fan openings, to prevent dust buildup and ensure proper heat dissipation. Use a dry cloth.
- **Connection Check:** Annually inspect all wiring connections for tightness and corrosion. Loose connections can cause overheating and power loss.
- **Ventilation:** Ensure the installation area remains well-ventilated and free from obstructions.
- **Battery Inspection:** Regularly check your battery bank for signs of damage, corrosion, or electrolyte levels (for flooded batteries).

7. Troubleshooting

The LCD display can show error codes to indicate specific issues. If an error occurs, note the code and refer to the manufacturer's documentation for detailed troubleshooting steps. General troubleshooting tips include:

- **No Display/No Power:** Check battery connections and ensure the battery has sufficient voltage.
- **No Charging:** Verify solar panel connections, ensure sufficient sunlight, and check for any shading on the panels. Confirm PV array voltage is within the controller's operating range.
- **Overcharging/Undercharging:** Check battery type settings and charging parameters (b01, b02). Ensure the battery is healthy.
- **Load Not Working:** Check load connections, ensure the load output is enabled (b00 setting), and verify the load current does not exceed the controller's rating. Check for over-discharge protection (b03).
- **Over-temperature Error:** Ensure adequate ventilation around the controller. Clean any dust from cooling fins.

If the issue persists, contact MakeSkyBlue customer support.

8. Specifications

Key technical specifications for the MakeSkyBlue 40A-V123 MPPT Solar Charge Controller:

Feature	Specification
Model	40A-V123
System Voltage	12V / 24V / 48V Auto
Maximum PV Array Power (12V Battery)	≤ 720W
Maximum PV Array Power (24V Battery)	≤ 1440W
Maximum PV Array Power (48V Battery)	≤ 2800W
PV Array Open Circuit Voltage (Voc) (12V Battery)	20V - 80V
PV Array Open Circuit Voltage (Voc) (24V Battery)	37V - 105V
PV Array Open Circuit Voltage (Voc) (48V Battery)	72V - 160V
Limited Current Protection	61A
Temperature Protection	>75°C
Fan-on Temperature	>45°C
Fan-off Temperature	<40°C
Overcharging Protection Voltage (12V Battery)	15V
Overcharging Protection Voltage (24V Battery)	30V
Overcharging Protection Voltage (48V Battery)	60V
Operating Temperature	Up to 45°C
Display Type	LCD
Item Weight	2.87 pounds (1300 Grams)

Feature	Specification
Package Dimensions	9.84 x 7.87 x 2.76 inches
UPC	634769632563

8.1 Product Dimensions

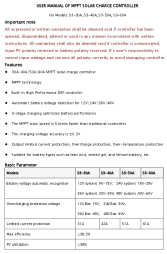
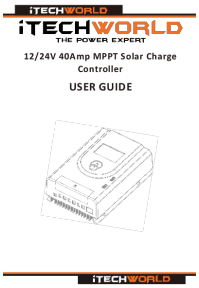
Figure 17: Product Dimensions (approx. 21.65cm H x 14.96cm W x 8.66cm D)

9. Warranty and Support

For warranty information, technical support, or service inquiries, please contact MakeSkyBlue directly through their official channels. Keep your purchase receipt as proof of purchase.

You can visit the MakeSkyBlue Store on Amazon for more information.

Related Documents - 40A-V123

	[MakeSkyBlue S3 Series MPPT Solar Charge Controller V117 User Manual] Detailed user manual for the MakeSkyBlue S3 Series MPPT Solar Charge Controller (Models S3-30A, S3-40A, S3-50A, S3-60A, V117). Covers features, installation, requirements, troubleshooting, and settings for efficient solar energy management.
	[MPPT Solar Charge Controller User Manual for S3 Series] Comprehensive user manual for MakeSkyBlue S3 series MPPT solar charge controllers (S3-30A, S3-40A, S3-50A, S3-60A). Covers features, specifications, installation, operation, troubleshooting, and battery charging reference.
	[MPK Series MPPT Solar Charge Controller User Manual] Comprehensive user manual for the Rayfey MPK Series MPPT Solar Charge Controller, detailing installation, operation, functions, safety, technical specifications, and after-sales service.
	[iTechworld 40A MPPT Solar Charge Controller User Guide] Comprehensive user guide for the iTechworld 40A MPPT Solar Charge Controller, covering safety precautions, installation, operation, specifications, troubleshooting, and warranty information.
	[Y&H BL912 MPPT Solar Charge Controller Wiring Tutorial] A comprehensive guide on wiring the Y&H BL912 MPPT Solar Charge Controller, covering battery connection, solar panel connection, and load connection with detailed instructions and safety precautions.

ECO-WORTHY 400W Solar Panel Kit Installation and User Manual

This manual provides instructions for the installation, connection, testing, maintenance, and troubleshooting of the ECO-WORTHY 400W Solar Panel Kit, including a 40A MPPT charge controller.