



Manuals.plus /

› Sunthesis /

› Sunthesis MPPT Solar Charge Controller MPJ40 User Manual

Sunthesis MPJ40

Sunthesis MPPT Solar Charge Controller MPJ40 User Manual

Model: MPJ40 | Brand: Sunthesis

1. INTRODUCTION

This manual provides detailed instructions for the installation, operation, and maintenance of your Sunthesis MPPT Solar Charge Controller, model MPJ40. This device is designed to efficiently manage power flow from solar panels to batteries, ensuring optimal charging and system protection. It automatically detects 12V or 24V DC system voltages and supports various battery types, including AGM, Gel, Sealed, Flooded, and Lithium batteries.

The MPJ40 controller incorporates advanced Maximum Power Point Tracking (MPPT) technology for high efficiency and features a comprehensive protection system to safeguard your solar power setup.



Home solar power systems



Base station power supply



Rv power supply system



Farm power system



Ship power generation system



Street lamp power supply system

Image 1.1: The Sunthesis MPPT Solar Charge Controller is suitable for various applications, including home solar power systems, RV power supply, farm power systems, ship power generation, base station power supply, and street lamp power supply systems.

2. KEY FEATURES

- **Advanced MPPT Technology:** Utilizes a new Maximum Power Point Tracking algorithm for high tracking efficiency (up to 99.5%) and conversion rate (up to 98%). This ensures maximum power output from solar panels, even in varying weather conditions.



Image 2.1: This graph demonstrates the superior Maximum Power Point Tracking (MPPT) efficiency of the Sunthesis controller, achieving up to 99.5% tracking efficiency and 98% peak conversion efficiency, outperforming other controllers by optimizing power output from solar panels.

- Comprehensive Protection System:** Features multiple safety mechanisms including PV array short circuit, PV overvoltage, PV overcurrent, load overload, load short circuit, temperature protection, battery overvoltage/overdischarge protection, and reverse polarity protection.



Image 2.2: This diagram highlights the 7 intelligent protection features integrated into the controller: Temperature protection, Under voltage protection, Short circuit protection, Overload protection, Anti-charge protection, Reverse connect protection, and Self-recovery, ensuring robust system safety.

- **Intelligent 4-Stage Charging:** Supports Bulk Charge, Boost Charge, Float Charge, and Equalization Charge stages. Includes a lithium battery activation function to recover deeply discharged lithium batteries.
- **Automatic System Voltage Detection:** Automatically identifies 12V or 24V DC system voltage.
- **LCD Display:** Provides clear real-time display of PV and battery status.
- **Load Terminal:** Dedicated terminal for DC power connection, allowing monitoring and setting of load timer modes.
- **Built-in Bluetooth Module:** Enables wireless connection to the Sunthysis Scontroller APP for monitoring and parameter settings via a mobile device.
- **Dual USB Output Ports:** Two integrated USB ports for convenient charging of mobile devices.



Image 2.3: This image shows the Sunthysis controller featuring built-in Bluetooth for convenient, installation-free connectivity and two USB output ports for charging external devices.

3. SAFETY INFORMATION

Please read all instructions carefully before installation and operation. Failure to follow these instructions may result in serious injury, damage to the controller, or damage to other components of your solar system.

- Ensure all wiring is correctly polarized. Reverse polarity can damage the controller and battery.
- Always connect the battery to the controller first, then the solar panels, and finally the load. Disconnect in the reverse order.
- Do not exceed the maximum input voltage of 100V from the solar panels.
- Ensure adequate ventilation around the controller to prevent overheating.
- Use appropriate circuit breakers or fuses for all connections to protect against overcurrent.
- Avoid short-circuiting the battery terminals or solar panel terminals.
- Keep the controller away from water, flammable gases, and corrosive substances.
- Only qualified personnel should perform installation and maintenance.

4. PRODUCT COMPONENTS AND OVERVIEW

The Sunthysis MPPT Solar Charge Controller MPJ40 features a robust design with clearly labeled components for ease of use.



Image 4.1: This image displays the front panel of the Sunthesis MPPT Solar Charge Controller, featuring an LCD screen for status display, navigation buttons for settings, and two USB output ports on the side. The top section shows the Sunthesis logo and a decorative circuit pattern.

Front Panel:

- **LCD Display:** Shows real-time system status, parameters, and error codes.
- **Navigation Buttons:** Used to browse menus and adjust settings.
- **USB Output Ports:** Two 5V USB ports for charging external devices.

Bottom Panel:

- **PV Input Terminals:** Connect to solar panels.
- **Battery Terminals:** Connect to the battery bank.
- **Load Output Terminals:** Connect to DC loads.

5. INSTALLATION AND SETUP

Follow these steps for safe and correct installation of your MPPT solar charge controller.

5.1 Mounting the Controller

- Choose a dry, well-ventilated location, away from direct sunlight and heat sources.
- Mount the controller vertically on a non-flammable surface, ensuring sufficient clearance (at least 15cm) above and below for proper airflow.
- Use appropriate screws to secure the controller to the mounting surface.

5.2 Wiring Connections (Connection Order is Crucial)

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 LCD should power on.
2. **Connect the Solar Panels:** Connect the positive and negative wires from your solar panel array to the PV input terminals on the controller. Ensure correct polarity.
3. **Connect the DC Load (Optional):** Connect your DC loads to the load output terminals on the controller. Ensure correct polarity.

Disconnection Order: To disconnect the system, always follow the reverse order: disconnect the load, then the solar panels, and finally the battery.

6. OPERATION

6.1 LCD Display

The LCD display provides real-time information about the system's status. It typically shows:

- Battery voltage and charge status
- Solar panel voltage and current
- Load current and status
- System voltage (12V/24V)
- Temperature
- Error codes (if any)

6.2 Button Functions

The buttons below the LCD are used for navigation and setting adjustments:

- **Up/Down Buttons:** Navigate through display screens or increase/decrease parameter values.

- **Enter Button:** Confirm selections or enter setting modes.

6.3 Load Control

The controller allows you to manage the connected DC load. You can typically set:

- **Load ON/OFF:** Manually turn the load on or off.
- **Load Timer Mode:** Set specific hours for the load to operate (e.g., dusk to dawn, fixed hours).

7. APP MONITORING AND SETTINGS (BLUETOOTH)

The Sunthysis MPPT Solar Charge Controller features a built-in Bluetooth module, allowing you to monitor and configure the system wirelessly via the 'Sunthysis Scontroller' mobile application.



Image 7.1: This image displays two mobile phone screens showing the 'Sunthysis Scontroller' application interface. The left screen illustrates detailed battery settings and parameters, while the right screen shows real-time monitoring of power generation, battery status, and load information, demonstrating the app's comprehensive monitoring and setting capabilities.

7.1 Connecting via Bluetooth

1. Download the 'Sunthysis Scontroller' APP from your mobile device's app store.

2. Ensure Bluetooth is enabled on your mobile device.
3. Open the APP and search for available devices. Select your MPJ40 controller from the list.
4. Once connected, you can access real-time data and settings.

7.2 APP Functions

- **Real-time Monitoring:** View current PV voltage, battery voltage, charging current, load current, and system temperature.
- **Parameter Setting:** Adjust various charging parameters, battery type, load control modes, and other system settings.
- **Historical Data:** Access logs of system performance over time.

8. BATTERY TYPES AND CHARGING

The MPJ40 controller supports various battery types and employs an intelligent 4-stage charging process to optimize battery life and performance.

ONE CONTROLLER FOR VARIOUS BATTERIES

4 STAGE CHARGING

Bulk Charge → Boost Charge → Float Charge → Equalization Charge

SUNTHYS

MPJ40

12V 24V

PV → 88.88 W

BAT → 88.88 W

LOAD → 88.88 A H

Lithium Battery Activation

Automatic identification of 12V/24V systems without operation

LI SLD FLD GEL AGM

Image 8.1: This diagram illustrates the 4-stage charging process (Bulk, Boost, Float, Equalization) and highlights the controller's compatibility with various battery types including Lithium (LI), Sealed (SLD), Flooded (FLD), Gel (GEL), and AGM, along with its

8.1 Supported Battery Types

The controller is compatible with the following battery chemistries:

- AGM (Absorbent Glass Mat)
- Gel
- Sealed Lead-Acid
- Flooded Lead-Acid
- Lithium (LiFePO4, Li-ion, etc.)

The battery type can be selected and configured via the controller's buttons or the 'Sunthesis Scontroller' APP.

8.2 4-Stage Charging Process

1. **Bulk Charge:** Charges the battery at maximum current until it reaches a set voltage.
2. **Boost Charge:** Continues charging at a constant voltage to ensure the battery is fully charged.
3. **Float Charge:** Maintains the battery at a lower voltage to compensate for self-discharge and keep it fully charged.
4. **Equalization Charge (for certain battery types):** Periodically overcharges the battery to balance cell voltages and prevent sulfation.

The controller also includes a **Lithium Battery Activation** function, which can wake up lithium batteries that have entered a sleep state due to over-discharge.

9. TROUBLESHOOTING

If you encounter issues with your Sunthesis MPPT Solar Charge Controller, refer to the following common problems and solutions:

Problem	Possible Cause	Solution
Controller not powering on	Battery not connected or low voltage; reverse polarity.	Check battery connections and voltage. Ensure correct polarity.
No charging from solar panels	Solar panels not connected; low sunlight; PV overvoltage/undervoltage.	Check PV connections and polarity. Verify sunlight conditions. Check PV voltage within limits.
Load not working	Load disconnected; load overload; short circuit; low battery voltage.	Check load connections. Reduce load. Check for short circuits. Charge battery.
Bluetooth connection issues	Bluetooth off on phone; APP not installed; controller too far.	Enable Bluetooth. Install 'Sunthesis Scontroller' APP. Move closer to controller.
Error code displayed	Specific system fault (e.g., overvoltage, overcurrent, temperature).	Refer to the APP or controller's internal error code list for specific meaning and resolution. Address the underlying issue.

10. SPECIFICATIONS

Technical specifications for the Sunthesis MPPT Solar Charge Controller MPJ40:

- **Model:** MPJ40
- **System Voltage:** 12V/24V Auto

- **Max Charge Current:** 40A
- **Max PV Input Voltage:** 100V
- **Max PV Input Power:** 520W (12V System) / 1040W (24V System)
- **Tracking Efficiency:** Up to 99.5%
- **Conversion Efficiency:** Up to 98%
- **Battery Types:** AGM, Gel, Sealed, Flooded, Lithium
- **Communication:** Built-in Bluetooth
- **USB Output:** 2 x 5V ports
- **Dimensions:** Approximately 24.4 x 19.6 x 10.7 cm
- **Weight:** Approximately 1.49 kg
- **Part Number:** MPJ40
- **UPC:** 850046253027

11. WARRANTY AND SUPPORT

Sunthysis products are manufactured to high-quality standards. For warranty information or technical support, please refer to the warranty card included with your product or contact Sunthysis customer service through their official website or the retailer where the product was purchased. Please have your model number (MPJ40) and purchase details ready when contacting support.