Tycon TPSC2440NMPPT

Tycon TPSC2440NMPPT Solar MPPT Battery Charging Controller User Manual

Model: TPSC2440NMPPT

1. Introduction

The Tycon TPSC2440NMPPT is an advanced Maximum Power Point Tracking (MPPT) solar charge controller designed for efficient battery charging from solar panels. It automatically adjusts to 12V or 24V battery systems and supports various battery types including Flooded, AGM, GEL, and Lithium, with a customizable USER setting. This controller features an integral LCD display for monitoring key system parameters.

2. Safety Instructions

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

- Ensure all wiring is correctly polarized and securely connected.
- Do not disassemble or attempt to repair the controller. Refer to qualified service personnel.
- Install the controller in a well-ventilated area, away from flammable materials and corrosive gases.
- Always disconnect the battery and solar panel before installing or moving the controller.
- Wear appropriate personal protective equipment (PPE) during installation.
- The controller is designed for indoor use or protected outdoor environments (IP32 rating). Avoid direct exposure to water.

3. Product Overview

The TPSC2440NMPPT controller is equipped with several features to optimize solar charging and battery management:

- **MPPT Technology:** Maximizes power harvest from solar panels.
- **Auto-Ranging Voltage:** Compatible with 12V or 24V battery arrays.

- **Multimode Load Operation:** Offers 5 selectable modes for load control.
- **Soft Start Load Output:** Powers high capacitive loads safely.
- **Automatic Battery Equalization:** Performs 30-day equalization for optimal battery health.
- **Conformal Coated Electronics:** Provides environmental protection.
- **TVS Lightning Protection:** Enhances durability against electrical surges.
- **Integral LCD Display:** Shows Battery Voltage, Capacity, Charging Capacity, Temperature, Load Current, and Solar Current.

Figure 1: Front view of the Tycon TPSC2440NMPPT Solar MPPT Battery Charging Controller, showing the LCD display and connection terminals.

4. Setup and Installation

Follow these steps for proper installation:

1. **Mounting:** Choose a suitable location for mounting the controller. Ensure good ventilation and protection from direct sunlight and moisture.
2. **Battery Connection:** Connect the battery to the controller's battery terminals first. Ensure correct polarity (+ to + and - to -). The controller will automatically detect the battery voltage (12V or 24V).
3. **Solar Panel Connection:** Connect the solar panel array to the controller's solar input terminals. Observe correct polarity. Ensure the open-circuit voltage of the solar array does not exceed the controller's maximum input voltage (110V at 25°C).
4. **Load Connection (Optional):** If using the load output, connect your DC loads to the controller's load terminals. Do not exceed the rated load current (20A Max).
5. **Temperature Sensor:** Connect the included battery temperature probe cable to the designated port on the controller. Place the sensor near the battery for accurate temperature compensation.
6. **Power On:** Once all connections are secure, the controller will power on and begin operation.

5. Operating Instructions

The integral LCD display provides real-time information about your solar charging system. Use the buttons (if present, assuming standard UP/DOWN/SET) to navigate through the display menus and adjust settings.

5.1 LCD Display Information

- **Battery Voltage:** Current voltage of the connected battery.
- **Battery Capacity:** Estimated state of charge.
- **Charging Capacity:** Current power being delivered to the battery.
- **Battery Temperature:** Temperature measured by the external probe.
- **Load Current:** Current being drawn by connected DC loads.
- **Solar Current:** Current being generated by the solar panels.

5.2 Battery Type Settings

The controller supports Flooded, AGM, GEL, and Lithium battery types. A USER setting allows for custom charge parameters. Refer to the on-screen menu for selecting and configuring the battery type.

5.3 Load Operation Modes

The controller offers 5 selectable load operation modes. Consult the device's menu for details on each mode and how to select them, typically involving timed operation or dusk-to-dawn control.

6. Maintenance

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

- **Inspect Connections:** Periodically check all wiring connections for tightness and corrosion.
- **Clean Controller:** Keep the controller clean and free of dust. Use a dry cloth for cleaning. Do not use liquids.
- **Battery Health:** Monitor battery voltage and capacity on the LCD. Ensure batteries are properly maintained according to their manufacturer's guidelines.
- **Ventilation:** Ensure the installation area remains well-ventilated to prevent overheating.

7. Troubleshooting

Problem	Possible Cause	Solution
No display/No power	Loose battery connection; Battery voltage too low; Blown fuse (external, if applicable).	Check battery connections and polarity. Charge battery if voltage is below operating threshold. Check and replace any external fuses.
No solar charging	Solar panel not connected; Incorrect polarity; Insufficient sunlight; Damaged solar panel/wiring.	Verify solar panel connections and polarity. Ensure panels are receiving adequate sunlight. Inspect panels and wiring for damage.
Load not working	Load disconnected; Overload; Short circuit; Battery voltage too low.	Check load connections. Reduce load if exceeding 20A. Check for short circuits. Ensure battery is sufficiently charged.
Inaccurate readings	Loose connections; Faulty sensor.	Check all wiring connections. Ensure temperature sensor is properly connected and placed.

8. Specifications

Model: TPSC2440NMPPT

Auto Voltage: 12V/24V (System)

Ampere: 40A

Rated Load Current: 20A Max

Maximum Capacitive Load: 10,000uF

Max Solar Input Voltage: 110V (25°C), 90V (25°C)

Max Power Point Range: 2VDC to 75VDC (Battery Volts)

Conversion Efficiency: 96% Typ.

MPPT Tracking Efficiency: 99%

Self-Consumption: 1W

Temperature Compensation: -3.0mV/°C/Cell

Max Wire Size: 8 AWG

Voltage and Current Accuracy: +/-2%

Grounding: Negative Ground

Environmental Protection: IP32

Product Dimensions: 12 x 9 x 6 inches

Item Weight: 5.16 pounds

Display Type: LCD