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YXSMPS ML2420

SRNE 20A MPPT Solar Charge Controller User Manual

Brand: YXSMPS

1. INTRODUCTION

This manual provides detailed instructions for the installation, operation, and maintenance of the SRNE 20A MPPT Solar Charge Controller (Model ML2420). This advanced controller is designed to maximize the energy utilization efficiency of photovoltaic systems, ensuring optimal charging for various battery types.

The ML2420 features advanced dual-peak or multi-peak tracking technology, a built-in maximum power point tracking algorithm, and high energy conversion efficiency. It supports automatic recognition of battery voltage and offers comprehensive protection mechanisms.

2. KEY FEATURES

- **Advanced MPPT Technology:** Utilizes dual-peak or multi-peak tracking for accurate maximum power point tracking, even with partial shading. Achieves up to 99.9% MPPT tracking efficiency.
- **High Conversion Efficiency:** Advanced digital power supply technologies ensure circuit energy conversion efficiency up to 98%.
- **Versatile Battery Compatibility:** Supports various battery types including GEL, Sealed, Open, and Lithium batteries with selectable charging programs.
- **Current Limiting Charging Mode:** Automatically lowers charging power and current to the rated level when solar panel power exceeds a certain threshold.
- **Load Support:** Supports instantaneous large current startup of capacitive loads.
- **Automatic Battery Voltage Recognition:** Automatically identifies 12V/24V battery systems.
- **User-Friendly Interface:** Equipped with an LCD screen and LED fault indicators for easy monitoring of operating data, status, and quick identification of system faults.
- **Data Storage:** Historical data storage function available for up to one year.
- **Communication:** Supports standard Modbus protocol via RS232 and Bluetooth with a mobile application for remote monitoring and parameter modification.
- **Comprehensive Protection:** Built-in over-temperature protection mechanism with automatic current reduction, and TVS lightning protection.

- **Temperature Compensation:** Automatically adjusts charging and discharging parameters to extend battery service life.

3. PRODUCT OVERVIEW AND COMPONENTS



Figure 3.1: Angled view of the SRNE ML2420 MPPT Solar Charge Controller, showing the display and connection terminals.



Figure 3.2: Front view of the controller, highlighting the LCD display and control buttons.



Figure 3.3: Close-up of the front panel, showing the model specifications table and terminal labels for PV, Battery, Load, and RS232.



Figure 3.4: Rear view of the controller, illustrating the integrated heatsink for efficient heat dissipation.

The ML2420 controller comes with the main unit and a user manual. Ensure all components are present upon unboxing.

4. INSTALLATION AND SETUP

4.1 Safety Precautions

- Ensure all power sources (solar panels, battery) are disconnected before installation.
- Use appropriate tools and wear protective gear.
- Install the controller in a well-ventilated area, away from flammable materials and direct sunlight.
- Ensure proper grounding.

4.2 Mounting the Controller

Mount the controller vertically on a non-flammable surface, allowing sufficient clearance around the unit for proper ventilation and heat dissipation. Use the mounting holes provided on the back of the unit (refer to Figure 3.4 for mounting bracket view).

4.3 Wiring Connections

Follow the wiring sequence carefully to prevent damage to the controller or system components. Refer to the wiring diagram below (Figure 4.1) and the terminal labels on the controller (Figure 3.3).

1. **Connect the Battery:** Connect the battery to the "BAT+" and "BAT-" terminals. Ensure correct polarity. The controller will automatically detect the battery voltage (12V or 24V).
2. **Connect the Load:** Connect the DC load to the "LOAD+" and "LOAD-" terminals. Ensure correct polarity.
3. **Connect the Solar Panels (PV):** Connect the solar panel array to the "PV+" and "PV-" terminals. Ensure correct polarity. The maximum open circuit voltage for the PV input is 100Vdc.
4. **Optional Connections:**
 - **Temperature Sensor (Temp):** Connect an external temperature sensor (if included) to the "Temp" terminal for accurate battery temperature compensation.
 - **RS232 Communication:** Connect the RS232 cable to the "RS232" port for PC communication or Bluetooth module connection.

MODEL	ML2420/ML2420-C	ML2430/ML2430-C	ML2440/ML2440-C	Can Be Set
PV INPUT				
Max.Voltage of Open Circuit	100Vdc			
MPPT Voltage Range	(Battery voltage+2V) ~ 75V			
Max.PV Input Power	260W / 12V 520W / 24V	400W / 12V 800W / 24V	550W / 12V 1100W / 24V	✓
BATTERY				
Battery Type	Lead-acid / Li-ion / User Defined			✓
Rated Battery Voltage	12/24Vdc			
Battery Voltage Range	9-35Vdc			✓
Rated Charging Current	20A	30A	40A	✓
MPPT Charging Mode	Buck			
LOAD				
Load Type	Resistive load , Capacitive load、 Inductive load			
Rated Load Voltage	Equal to battery voltage 12/24V			
Rated Load Current	20A			
Load Working Mode	Light control,Light control + Time control, Manual control (default), Debugging mode, Normal open			✓
EFFICIENCY				
MPPT Tracking Efficiency	>99%			
Max. Charging Conversion Efficiency	≤98%			
ACCESSORIES				
Standard	BTS temperature sensors/-C, BTS temperature sensors, RS485 8 pole communication cable			
Optional	RM-5 display, BT-1 Bluetooth module, USB to RS232 connection cable, GP-2 IoT module, 6 pole communication cable			✓
GENERAL				
Communication	RS232/-C RS485			✓
Weight	1.4kg (3.09lb)	2kg (4.41lb)		
Dimension	210*151*59.5mm (0.69*0.50*0.20ft)	238*173*72.5mm (0.78*0.57*0.24ft)		
Protection Degree	IP32			
Operating Temperature Range	-35°C-45°C (-31°F-113°F)			

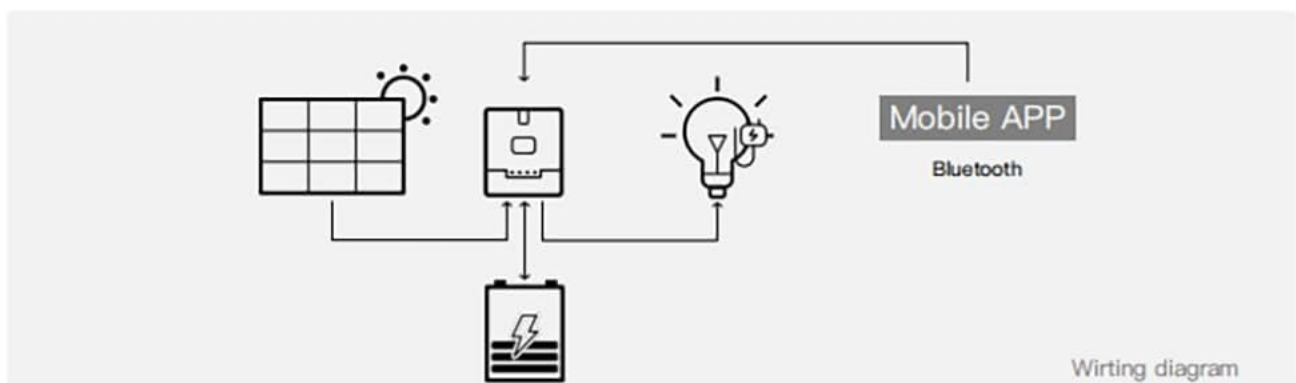


Figure 4.1: Wiring diagram illustrating connections for solar panels, battery, load, and communication ports. Note the mobile app and Bluetooth connectivity.

5. OPERATION

5.1 LCD Display and Buttons

The controller features an LCD screen for displaying real-time system data and status. The buttons below the screen allow navigation through menus and parameter settings.

- **Navigation Buttons:** Use the arrow buttons to scroll through different display screens and menu options.
- **Enter/Confirm Button:** Used to select options or confirm settings.

5.2 Monitoring System Data

The LCD cycles through various parameters such as battery voltage, charging current, load current, PV voltage, and accumulated energy. Refer to the detailed user manual (physical copy) for a complete list of display screens and their meanings.

5.3 Parameter Settings

The controller allows users to modify various parameters to optimize system performance, including:

- **Battery Type:** Select the appropriate battery type (GEL, Sealed, Open, Lithium) to ensure correct charging algorithms.
- **Load Operating Modes:** Configure load control settings (e.g., light control, time control, manual control).
- **Charging and Discharging Parameters:** Adjust voltage thresholds for overcharge, over-discharge, and float charge (advanced users).

Accessing and modifying parameters typically involves pressing and holding a button to enter the settings menu, then using navigation buttons to select and adjust values.

5.4 Communication (RS232 & Bluetooth)

The ML2420 supports communication via RS232 and Bluetooth (with an optional module). This allows for remote monitoring, data logging, and parameter configuration using a PC or mobile application.

- **RS232:** Connect to a computer using a compatible cable and software for detailed system analysis and control.
- **Bluetooth:** Pair with a mobile device running the dedicated application for convenient monitoring and adjustments.

6. MAINTENANCE

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

- **Cleanliness:** Periodically clean the controller's exterior with a dry cloth. Ensure ventilation openings and the heatsink (Figure 3.4) are free from dust and debris. Do not use liquid cleaners.
- **Connection Checks:** Annually inspect all wiring connections for tightness and corrosion. Loose connections can lead to power loss or overheating.
- **Environmental Conditions:** Ensure the operating environment remains within the specified temperature range (-35°C to 45°C) and humidity levels.
- **Firmware Updates:** Check the manufacturer's website for any available firmware updates that may improve performance or add features.

7. TROUBLESHOOTING

The controller is equipped with LED fault indicators and an LCD screen to help identify system abnormalities. Refer to the following common issues:

Problem	Possible Cause	Solution
No display on LCD / Controller not powering on	Battery not connected or low voltage; reversed battery polarity; loose connections.	Check battery connections and voltage. Ensure correct polarity. Tighten all terminals.
No charging from PV	PV panels not connected; reversed PV polarity; insufficient sunlight; PV voltage too low/high.	Check PV connections and polarity. Ensure adequate sunlight. Verify PV voltage is within specifications (Max 100Vdc).
Load not working	Load disconnected; reversed load polarity; load overcurrent; battery low voltage protection.	Check load connections and polarity. Reduce load. Allow battery to charge. Check load operating mode settings.
Over-temperature warning	Poor ventilation; high ambient temperature; excessive load.	Improve ventilation around the controller. Reduce load if possible. Ensure ambient temperature is within limits.

For specific error codes displayed on the LCD, refer to the comprehensive troubleshooting guide in the full product manual or contact technical support.

8. SPECIFICATIONS

The following table provides detailed technical specifications for the SRNE ML2420 MPPT Solar Charge Controller.

NEW
BEST QUALITY

ML series

Solar Charge Controller

ML2420/2430/2440/-C

- 12/24V
- 100V
- IP32
- Mobile APP

For off-grid application

- Can be connected to both PV, battery and load
- Multiple load operating modes to meet diverse needs

User-Friendly

- Easy to install and simple to use
- Natural cooling, absolutely quiet

Safety

- Complete charge and discharge protection mechanism
- High quality components for stable operation

All-in-One

- Supports multiple battery types
- Highly integrated, helps you save space and wire

Efficient

- MPPT with up to 99.9% efficiency
- Support solar panel 2 in series/more in parallel

Intelligent

- Supports RS232, RS485, (RV-C protocols)
- Supports Bluetooth with mobile APP

Figure 8.1: Comprehensive specifications table for ML series controllers, including ML2420, ML2430, and ML2440 models.

Parameter	Specification (ML2420)
Rated Battery Voltage	12V/24Vdc Auto Identify
Battery Voltage Range	9-35Vdc
Rated Charging Current	20A
Rated Load Current	20A
Max. PV Open Circuit Voltage	100Vdc
Max. PV Input Power (12V)	260W

Parameter	Specification (ML2420)
Max. PV Input Power (24V)	520W
MPPT Tracking Efficiency	>99%
Conversion Efficiency	≤98%
Communication	RS232
Operating Temperature Range	-35°C to 45°C (-31°F to 113°F)
Protection Degree	IP32
Dimensions (L*W*H)	210*151*59.5mm (0.69*0.50*0.20ft)
Weight	1.4kg (3.09lbs)

9. WARRANTY AND SUPPORT

Warranty information for the SRNE ML2420 MPPT Solar Charge Controller is typically provided with the product packaging or can be found on the manufacturer's official website. Please retain your proof of purchase for warranty claims.

For technical support, troubleshooting assistance, or inquiries regarding product operation, please refer to the contact information provided in your product's physical manual or visit the YXSMPS (SRNE) official support channels.