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SRNE

ML Maximum Power Point Tracking (MPPT) Series
ML2420-ML2430-ML2440
Solar Charge and Discharge Controller

MPPT Solar Charge Controller

CE RoHS

Model		ML2420	
Battery Voltage	12V		24V
Max. Solar Power	260W		520W
Solar Vmp	17V~75V		36V~75V
Max. Solar Voc		100V	
Max. Charging Current		20A	
Max. Load Power	240W		480W

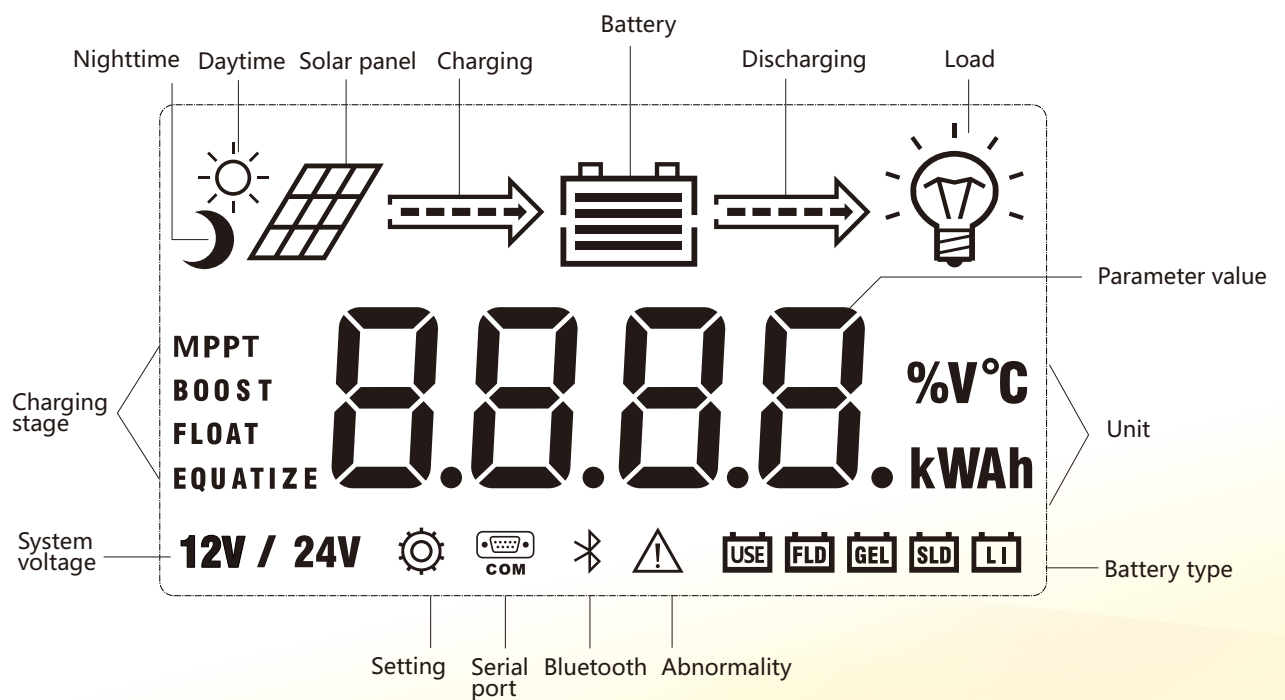MPPT | 12V/24V/36V/48V Auto | INPUT 100V M ax. | 5 years | LCD DISPLA Y | IP32
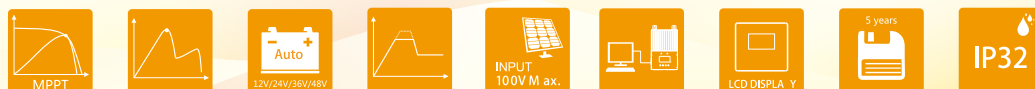
Product Features

• With the advanced dual-peak or multi-peak tracking technology, when the solar panel is shadowed or part of the panel fails resulting in multiple peaks on the I-V curve, the controller is still able to accurately track the maximum power point.

• A built-in maximum power point tracking algorithm can significantly improve the energy utilization efficiency of photovoltaic systems, and raise the charging efficiency by 15% to 20% compared with the conventional PWM method.

• A combination of multiple tracking algorithms enables accurate tracking of the optimum working point on the I-V curve in an extremely short time.

• The product boasts an optimum MPPT tracking efficiency of up to 99.9%.

• Advanced digital power supply technologies raise the circuit's energy conversion efficiency to as high as 98%.

• Charging program options are available for different types of batteries including gel batteries, sealed batteries, open batteries, lithium batteries, etc.

• The controller features a limited current charging mode. When the solar panel power exceeds a certain level and the charging current is larger than the rated current, the controller will automatically lower the charging power and bring the charging current to the rated level.

• Instantaneous large current startup of capacitive loads is supported.

• Automatic recognition of battery voltage is supported.

• LED fault indicators and an LCD screen which can display abnormality information help users to quickly identify system faults.

• Historical data storage function is available, and data can be stored for up to a year.

• The controller is equipped with an LCD screen with which users can not only check device operating data and statuses, but also modify controller parameters.

• The controller supports standard Modbus protocol, fulfilling the communication needs of various occasions.

• The controller employs a built-in over-temperature protection mechanism. When temperature surpasses the set value, the charging current will decline in linear proportion to the temperature so as to curb the temperature rise of the controller, effectively keeping the controller from being damaged by overheat.

• Featuring a temperature compensation function, the controller can automatically adjust charging and discharging parameters in order to extend the battery's service life.

• TVS lighting protection.

Wiring diagram is as below
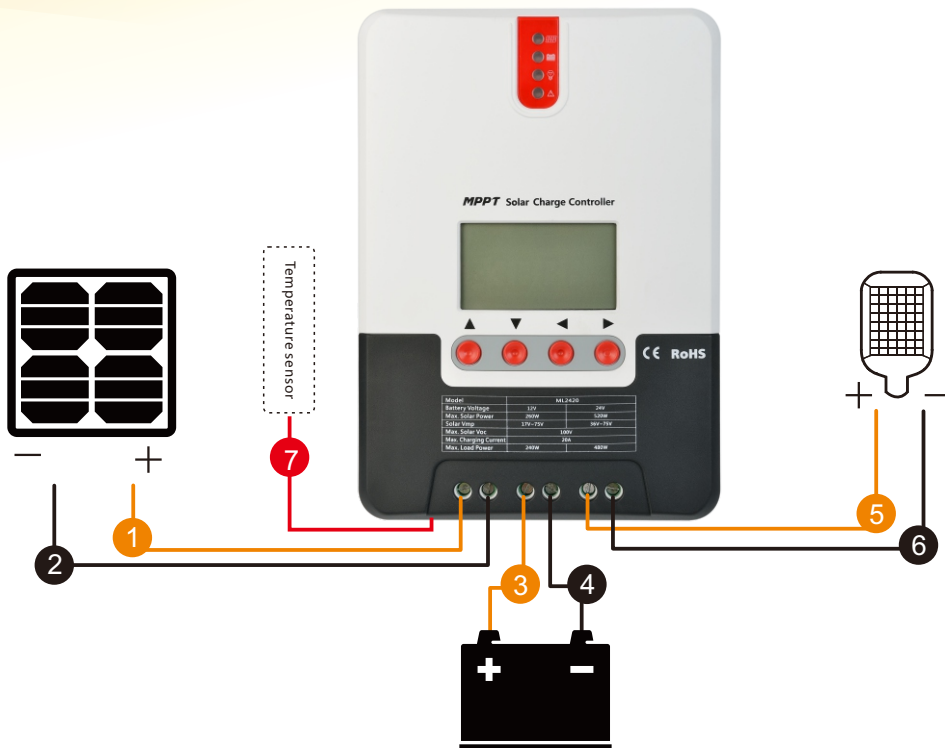
LCD Startup and Main Interface

Nighttime Daytime Solar panel Charging Battery Discharging Load

MPPT
BOOST
FLOAT
EQUATIZE

Charging stage

System voltage

12V / 24V

Parameter value

Unit

%V°C
kWAh

Battery type

USE FLD GEL SLD LI

Setting Serial port Bluetooth Abnormality

Product Operation and Display

LED Indicators

○ ▦	▦ PV array indicator	Indicating the controller's current charging mode.
○ 🔋	🔋 BAT indicator	Indicating the battery's current state.
○ 💡	💡 LOAD indicator	Indicating the loads' On/ Off and state.
○ ⚠	⚠ ERROR indicator	Indicating whether the controller is functioning normally.

➢ **PV array indicator:**

No.	Graph	Indicator state	Charging state
①	‾‾‾‾‾ BULK	Steady on	MPPT charging
②	⎍⎍⎍ ACCEPTANCE	Slow flashing (a cycle of 2s with on and off each lasting for 1s)	Boost charging
③	⌐⌐⌐ FLOAT	Single flashing (a cycle of 2s with on and off lasting respectively for 0.1s and 1.9s)	Floating charging
④	⎍⎍⎍⎍⎍ EQUALIZE	Quick flashing (a cycle of 0.2s with on and off each lasting for 0.1s)	Equalizing charging
⑤	⎏⎏ ⎏⎏ ⎏⎏ CURRENT-LIMITED	Double flashing (a cycle of 2s with on for 0.1s, off for 0.1s, on again for 0.1s, and off again for 1.7s)	Current-limited charging
⑥		Off	No charging

➢ **BAT indicator:**

Indicator state	Battery state
Steady on	Normal battery voltage
Slow flashing (a cycle of 2s with on and off each lasting for 1s)	Battery over-discharged
Quick flashing (a cycle of 0.2s with on and off each lasting for 0.1s)	Battery over-voltage

➢ **LOAD indicator:**

Indicator state	Battery state
Off	Load turned off
Quick flashing (a cycle of 0.2s with on and off each lasting for 0.1s)	Load overloaded/ short-circuited
Steady on	Load functioning normally

➢ **ERROR indicator:**

Indicator state	Battery state
Off	System operating normally
Steady on	System malfunctioning

Key Operations

▲	Up	Page up; increase the parameter value in setting
▼	Down	Page down; decrease the parameter value in setting
◄	Return	Return to previous menu (exit without saving)
►	Set	Enter into sub-menu; set/ save Turn on/ off loads (in manual mode)
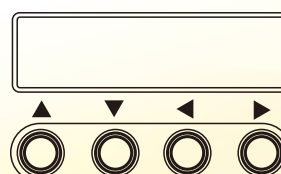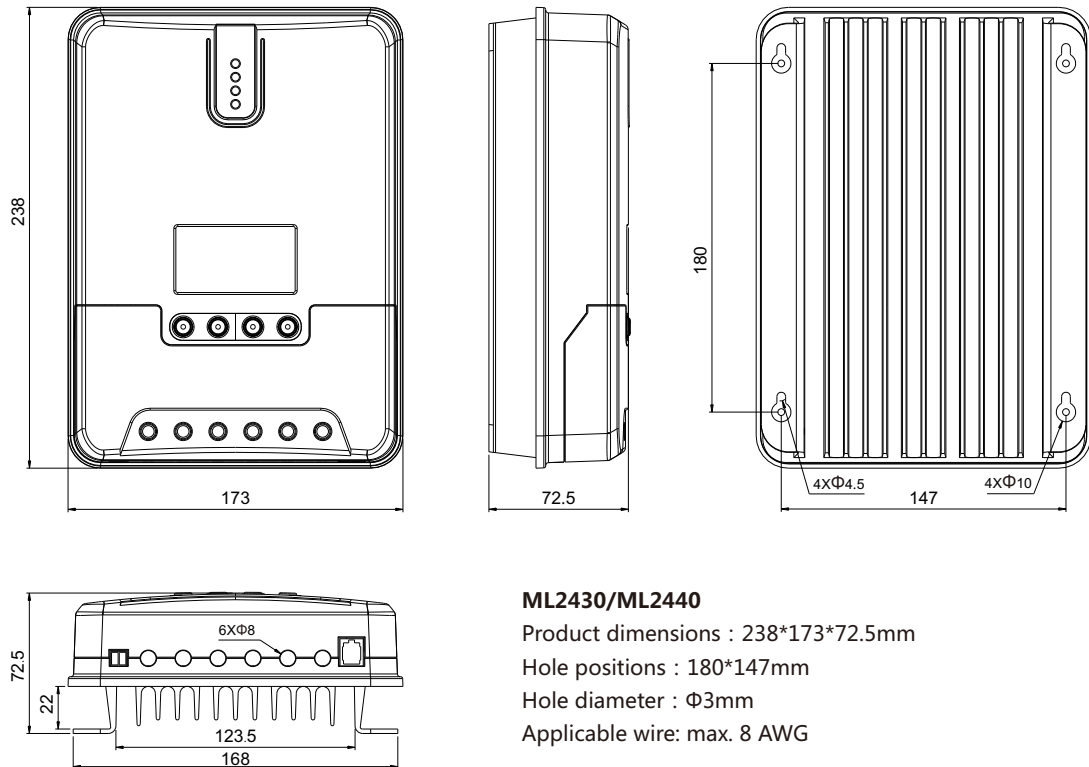
ML2430/ML2440

Product dimensions : 238*173*72.5mm

Hole positions : 180*147mm

Hole diameter : Φ3mm

Applicable wire: max. 8 AWG
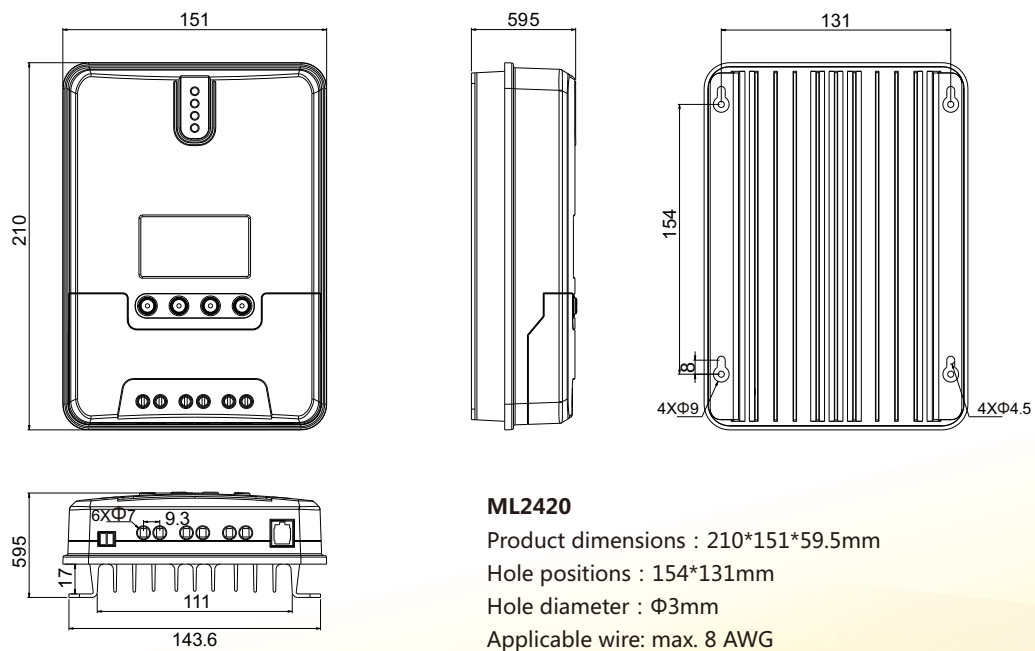
ML2420

Product dimensions : 210*151*59.5mm

Hole positions : 154*131mm

Hole diameter : Φ3mm

Applicable wire: max. 8 AWG

Product Specification Parameters

1. Electric Parameters

Parameter	Value		
Model	ML2420	ML2430	ML2440
System voltage	12V/24VAuto		
No-load loss	0.7 W to 1.2W		
Battery voltage	9V to 35V		
Max. solar input voltage	100V(25℃) 90V(-25℃)		
Max. power point voltage range	Battery Voltage+2V to 75V		
Rated charging current	20A	30A	40A
Rated load current	20A		
Max. capacitive load capacity	10000uF		
Max. photovoltaic system input power	260W/12V 520W/24V	400W/12V 800W/24V	520W/12V 1040W/24V
Conversion efficiency	≤98%		
MPPT tracking efficiency	＞99%		
Temperature compensation factor	-3mv/℃/2V (default)		
Operating temperature	-35℃ to +45℃		
Protection degree	IP32		
Weight	1.4Kg	2Kg	2Kg
Communication method	RS232		
Altitude	≤ 3000m		
Product dimensions	210*151*59.5mm	238*173*72.5mm	238*173*72.5mm

2. Battery Type Default Parameters (parameters set in monitor software)

Voltage to set Battery type	Sealed lead-acid battery	Gel lead-acid battery	Open lead-acid battery	User (self-customized)
Over-voltage cut-off voltage	16.0V	16.0V	16.0V	9～17V
Equalizing voltage	14.6V	——	14.8V	9～17V
Boost voltage	14.4V	14.2V	14.6V	9～17V
Floating charging voltage	13.8V	13.8V	13.8V	9～17V
Boost return voltage	13.2V	13.2V	13.2V	9～17V
Low-voltage cut-off return voltage	12.6V	12.6V	12.6V	9～17V
Under-voltage warning return voltage	12.2V	12.2V	12.2V	9～17V
Under-voltage warning voltage	12.0V	12.0V	12.0V	9～17V
Low-voltage cut-off voltage	11.1V	11.1V	11.1V	9～17V
Discharging limit voltage	10.6V	10.6V	10.6V	9～17V
Over-discharge time delay	5s	5s	5s	1～30s
Equalizing charging duration	120minutes	——	120minutes	0～600minutes
Equalizing charging interval	30days	0days	30days	0～250D (0 means the equalizing charging function is disabled)
Boost charging duration	120minutes	120minutes	120minutes	10～600minutes

Parameters cross-reference table for different types of batteries

When selecting User, the battery type is to be self-customized, and in this case, the default system voltage parameters are consistent with those of the sealed lead-acid battery. When modifying battery charging and discharging parameters, the following rule must be followed:
• Over-voltage cut-off voltage＞ Charging limit voltage ≥ Equalizing voltage ≥ Boost voltage ≥ Floating charging voltage ＞ Boost return voltage;
• Over-voltage cut-off voltage ＞ Over-voltage cut-off return voltage;
• Low-voltage cut-off return voltage ＞ Low-voltage cut-off voltage ≥ Discharging limit voltage;
• Under-voltage warning return voltage ＞ Under-voltage warning voltage ≥ Discharging limit voltage;
• Boost return voltage ＞ Low-voltage cut-off return voltage.

Maximum Power Point Tracking ML Series

ML4860 Solar Charge and Discharge Controller

SRNE

MPPT Solar Charge Controller

Model		ML4860		
Battery Voltage	12V	24V	36V	48V
Max.Solar Power	800W	1600W	2400W	3200W
Solar Vmp	17V~120V	36V~120V	55V~120V	70V~120V
Max.Solar Voc	150V			
Max.Charging Current	60A			
Max.Load Power	240W	480W	720W	960W

CE RoHS

MPPT · 12V/24V/36V/48V · Auto · Pmax 0.5s · INPUT 150V Max. · LCD DISPLAY · 5 years · IP32

Features

● With the advanced dual-peak or multi-peak tracking technology, when the solar panel is shadowed or part of the panel fails resulting in multiple peaks on the I-V curve, the controller is still able to accurately track the maximum power point.
● A built-in maximum power point tracking algorithm can significantly improve the energy utilization efficiency of photovoltaic systems, and raise the charging efficiency by 15% to 20% compared with the conventional PWM method.
● A combination of multiple tracking algorithms enables accurate tracking of the optimum working point on the I-V curve in an extremely short time.
● The product boasts an optimum MPPT tracking efficiency of up to 99.9%.
● Advanced digital power supply technologies raise the circuit's energy conversion efficiency to as high as 98%.
● Different charging program options including those for gel batteries, sealed batteries and open batteries, customized ones, etc. are available.
● The controller features a limited current charging mode. When the solar panel power exceeds a certain level and the charging current is larger than the rated current, the controller will automatically lower the charging power and bring the charging current to the rated level.
● Instantaneous large current startup of capacitive loads is supported.
● Automatic recognition of battery voltage is supported.
● LED fault indicators and an LCD screen which can display abnormality information help users to quickly identify system faults.
● Historical data storage function is available, and data can be stored for up to a year.
● The controller is equipped with an LCD screen with which users can not only check device operating data and statuses, but also modify controller parameters.
● The controller supports standard Modbus protocol, fulfilling the communication needs of various occasions.
● All communications are electrically isolated, so users can rest assured in usage.
● The controller employs a built-in over-temperature protection mechanism. When temperature surpasses the set value, the charging current will decline in linear proportion to the temperature and discharging will be halted so as to curb the temperature rise of the controller, effectively keeping the controller from being damaged by overheat.
● With the help of an external battery voltage sampling function, battery voltage sampling is exempted from the effect of line loss, making control more precise.
● Featuring a temperature compensation function, the controller can automatically adjust charging and discharging parameters in order to extend the battery's service life.
● The controller also features a battery over-temperature protection function, and when the external battery temperature exceeds the set value, charging and discharging will be shut off so as to protect components from being damaged by overheat.
● TVS lighting protection

Appearance picture is as below
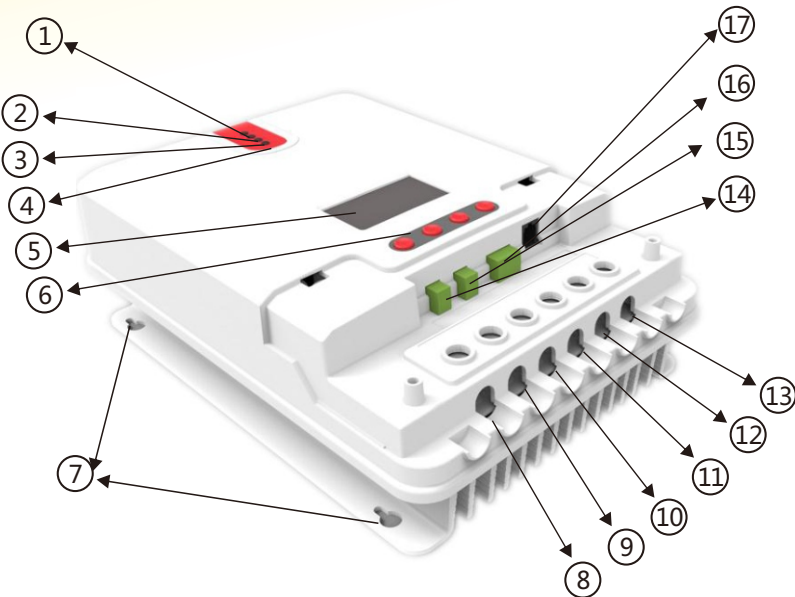
No.	Item	No.	Item
j	Charging indicator	s	Battery "-" interface
k	Battery indicator	⑪	Load "-" interface
l	Load indicator	⑫	Battery "+" interface
m	Abnormality indicator	⑬	Load "+" interface
n	LCD screen	⑭	External temperature sampling interface
o	Operating keys	⑮	Battery voltage compensation interface
p	Installation hole	⑯	RS485 communication interface
q	Solar panel "+" interface	⑰	RS232 communication interface
r	Solar panel "-" interface		

Product Detail
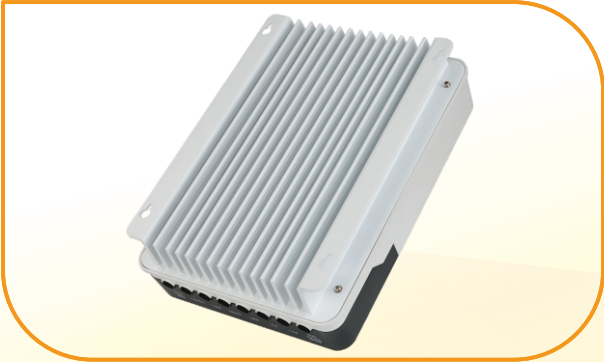
Wiring diagram is as below

Remove the two screws on the solar charge controller panel, and then start wiring. For installation security, we recommend the following wiring sequence. However, wiring without following this order will not damage the solar charge controller.
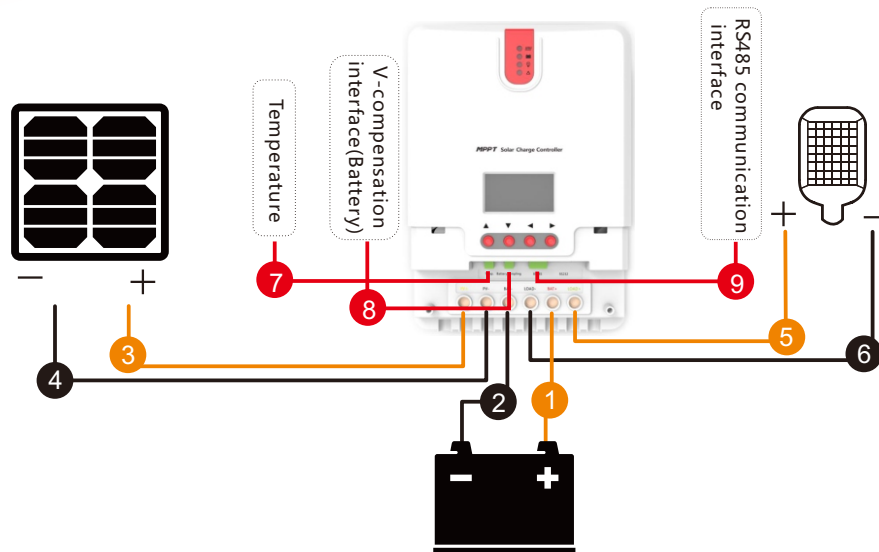
① **External temperature sampling interface connection**

② **Battery voltage sampling line connection**

③ **Communication cable connection**

④ **Connect power line**

⚡ Warning: Risk of electric shock! We strongly recommend access insurance or circuit breaker at photovoltaic array end, load end and battery end, to prevent electric shock from occurring during wiring or misoperation. Before wiring, ensure that insurance or circuit breaker is disconnected.

⚡ Warning: High pressure danger! Photovoltaic array may generate very high open circuit voltage. Before wire connection, disconnect the breaker or insurance. Be careful in the process of wiring.

⚡ Warning: Risk of explosion. Short circuit of battery positive and negative terminals and wires connected to them will cause fire or explosion. Please be careful during operation.

Please connect battery first, then connect load, and finally connect the solar panel, please follow the connection mode of "+" first and then "-".

⑤ **Power On**

Tip: ML series solar charge controller only starts the solar charge controller via wiring at the battery end, but ML - LI can start the solar charge controller via power of PV array,. This applies to starting the solar charge controller and activating lithium battery when lithium battery BMS is in the protection state and cannot export electricity externally.

When all the power line connections are firm and reliable, recheck whether the wiring is correct, and whether positive and negative ends are connected reversely. After confirmation, connect battery fuse or circuit breaker, observe whether LED indicator is lit, and whether LCD screen displays content. If there is no display, disconnect the fuse or circuit breaker immediately and recheck whether the circuit connection is correct.

If battery is powered on normally, connect the solar panel. If solar charge controller charging indicators are on normally or flashing, start battery charging.

When battery and photovoltaic is well connected, then connect load fuse or circuit breaker. At this time, you can use manual mode to test whether the load On and Off is normal. See load working mode and operation.

⚡ Warning: When the solar charge controller is under normal charging state, disconnecting battery connection will affect solar charge controller DC load. In a severe case, the load can be damaged.

⚡ Warning: Within 10 minutes after solar charge controller charging stops, battery reverse polarity operation may damage internal components of the solar charge controller.

⚠ Attention:

1) Battery insurance installation site should be as close as possible to the battery end. Recommended installation distance shall be no more than 150 mm.

2) When solar charge controller is not connected to a remote temperature sensor, battery temperature is a fixed value of 25 ℃.

3) If the inverter is connected in the system, please connect inverter directly with battery, and do not connect solar charge controller with the load end.

⑥ **Close wiring cover**

Product Specification Parameter

Parameter	Value
Model	ML4860
System voltage	12V/24V/36V/48V Auto
No-load loss	0.7 W to 1.2W
Battery voltage	9V to 70V
Max. solar input voltage	150V (25°C), 145V (-25°C)
Max. power point voltage range	Battery voltage +2V to 120V
Rated charging current	60A
Rated load current	20A
Max. capacitive load capacity	10000uF
Max. photovoltaic system input power	800W/12V; 1600W/24V; 2400W/36V; 3200W/48V
Conversion efficiency	≤ 98%
MPPT tracking efficiency	> 99%
Temperature compensation factor	-3mv/°C/2V (default)
Operating temperature	-35°C to +45°C
Waterproof level	IP32
Weight	3.6kg
Communication method	RS232 RS485
Altitude	≤ 3000m
Product dimensions	285*205*93mm

MPPT Solar Charge Controller

MC4885N15/MC48100N15/MC4885N25/MC48100N25

Product Accessories

RM-7 display, USB to TTL cable, BTS temperature sensor.

Product Characteristics

30% higher than PWM mode.	MPPT tracking efficiency is up to 99.9%.
PV short-circuit protection, charge over-current protection.	Built-in temperature detection.
Rs485 Modbus protocol Built-in bluetooth module.	Lead-acid batteries, colloidal batteries, open-ended batteries, lithium batteries.
12/24V/36/48 identification.	Current-limiting charging mode.
Historical data storage.	

Product Parameters

Model	SR-MC4885N15	SR-MC48100N15	SR-MC4885N25	SR-MC48100N25
System voltage	12V/24/36/48V			
Static power consumption	0.54W			
Maximum input voltage of solar energy (25℃)	150V		250V	
Voltage Range at MPP (Maximum Power Point)	Battery voltage +2~ 120V		Battery voltage +2~ 180V	
Charging current	85A	100A	85A	100A
Solar panel power (12V battery)	1100W	1300W	1100W	1300W
Solar panel power (24V battery)	2200W	2600W	2200W	2600W
Solar panel power (48V battery)	4400W	5200W	4400W	5200W
Support battery type	Lead-acid batteries, colloidal batteries, open-ended batteries, lithium batteries			
Temperature compensation coefficient	-3mV/℃/2V			
Operating temperature range	-35℃-60℃			
Humidity	95%, no condensation			
Protection grade	Ip32			
Weight	5.7kg			
Communication mode	TTL(3.3V)/RS485/Bluetooth Module			
Product Dimensions	314*227*121（mm）			
Terminal blocks	35mm2/2AWG			