

- ✱ Thank you for selecting the Tracer-CPN MPPT solar charge controller. Please read this manual carefully before using the product and pay attention to the safety information.
- ✱ Do not install this product in humid, salt spray, corrosion, greasy, flammable, explosive, dust accumulative, or other severe environments.

## MPPT Solar Charge Controller

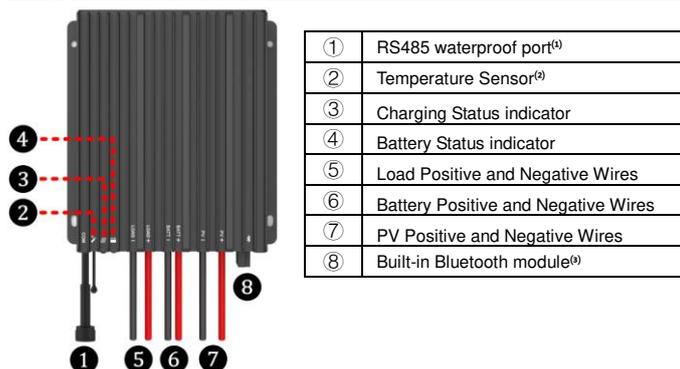
### 1. Overview

The Tracer-CPN solar charge controller adopts the advanced Maximum Power Point Tracking charging technology. Increase the system charging efficiency yet lower the system cost. The controller supports various batteries, such as sealed, gel, flooded, and lithium batteries. Users can view and modify the operational status and parameters. It can be widely used in a solar home system, traffic signal, street light, solar garden lamp, etc.

The features are listed below:

- Supports a variety of battery types, including lithium batteries
- Lithium battery self-activating and low-temperature protection function
- MPPT charging, with maximum DC/DC conversion efficiency of 98%
- PV power limitation function
- Auto enter the voltage stabilization mode to protect the load and battery
- Built-in Bluetooth module (Only Tracer-CPN(BLE) supports)
- Connect the IoT (Internet of Things) modules and Cloud Server to realize remote monitoring
- Real-time energy statistics function
- Standard Modbus protocol, waterproof RS485 port provides a 5VDC power with short-circuit protection
- Silent and low self-consumption design
- IP68 protection level
- Comply with EN/IEC62109 and civilian level EMC (EN61000-6-1/3) standards

### 2. Appearance



(1) The RS485 waterproof port can provide a DC power of 5VDC/200mA, and have the short-circuit protection function. The port is isolation design for Tracer7810CPN/Tracer7810CPN(BLE), and non-isolation design for other series. The pin definition is shown below:

Pin	Definition
1	+5VDC
2	RS485-A
3	RS485-B
4	Power ground



**CAUTION:** When the RS485 port is not working, the waterproof cap must be installed to prevent water from getting in.

- (2) If the temperature sensor is short-circuited or damaged, the controller shall be charging or discharging at the default temperature of 25°C.
- (3) Only the Tracer-CPN (BLE) series are designed with the built-in Bluetooth module; please select as you require.

### 3. Wiring

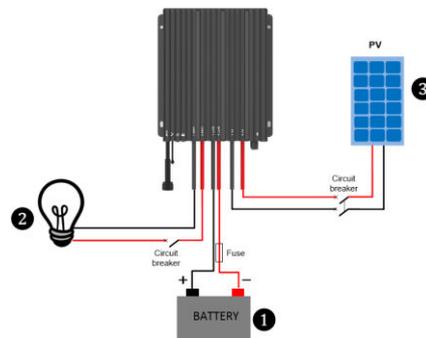
#### ● Connection sequence

- 1) Connect components to the controller in the sequence ①Battery > ②load > ③PV as shown above and pay much attention to the "+" and "-." Please don't connect the fast-acting fuse or circuit breaker during the installation. When disconnecting the system, the order will be reserved.
- 2) The Tracer-CPN/Tracer-CPN (BLE) controllers are common-negative; all the negative terminals can be grounded simultaneously, or anyone can be grounded. However, according to the practical application, the negative terminals of the PV array, battery, and load can also be ungrounded. Still, the grounding terminal on the shell must be grounded. It effectively shields electromagnetic interference from the outside and prevents some electric shock to the human body.

**CAUTION** A common-negative controller for a common-negative system, such as the motorhome, is recommended. The controller may be damaged if a common-positive controller is used and the positive electrode is

grounded in the common-negative system.

- 3) Connect a fast-acting fuse in series with the battery positive (+). The fast-acting fuse must be 1.25 to 2 times the rated controller current. The installed distance is within 150mm.
- 4) After powering the controller, the battery LED indicator on the controller shall flash green. If it's not green, please refer to chapter 10, Troubleshooting.



#### ● Load self-test function

The load is automatically turned ON after powering on the controller for 10s. After the load keeps ON status for 10s, the controller restores to the set working mode.

### 4. LED Indicators

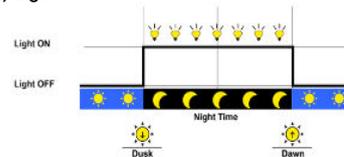
Indicator	Color	Status	Instruction	
	Green	On Solid	PV connection normal but low voltage(irradiance) from PV, no charging	
		OFF	No PV voltage(night time) or PV connection problem	
		Slowly Flashing(1Hz)	In charging	
		Fast Flashing(4Hz)	PV overvoltage	
	Green	On Solid	Battery normal	
		Slowly Flashing(1Hz)	Battery full	
		Fast Flashing(4Hz)	Battery overvoltage	
		Orange	On Solid	Battery under voltage
			On Solid	Battery over-discharged
Red	On Solid	Battery overheating		
	Fast Flashing(4Hz)	Lithium battery low temperature		
Charging indicator(green) and battery indicator(orange) flashing simultaneously			System voltage error✱	

✱When connecting with a lithium battery, the controller does not recognize the system voltage automatically.

### 5. Load Working Mode

#### 1) Manual Mode (Default ON)

##### 2) Light ON/OFF

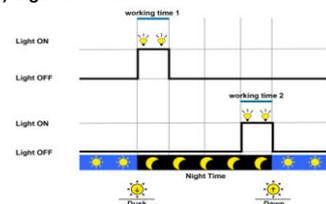


**Turn-On voltage (Adjustable):**  
5V (12Vsystem), delay10min.

**Turn-Off voltage (Adjustable):**  
6V (12Vsystem), delay10min.

**Note: 24V system voltage×2**

##### 3) Light ON+ Timer



#### 4) Real-time Control

Control the load ON/OFF time by setting a real-time clock.



In the Light ON/OFF and Light ON/Timer modes, the Load is turned on after 10 minutes.

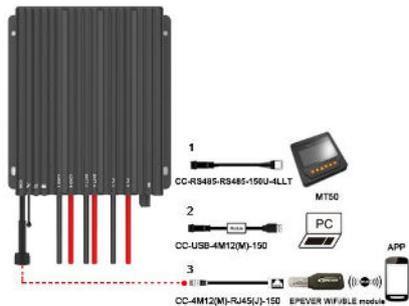
### 6. Accessories (optional) and Software

#### 1) PC Software

[www.epever.com](http://www.epever.com)——Solar Station Monitor

#### 2) APP Software

Please contact your business personnel or after-sales engineer to get the latest APP. For detailed operations to monitor the controller through the APP, please refer to the WiFi module or Bluetooth module user manual.



**Note: Only the Tracer-CPN series support the external Bluetooth module, the Tracer-CPN (BLE) series are designed with a built-in Bluetooth module. The controller is designed with waterproof function, but the WiFi/BLE module is not waterproof. Please take waterproof measures when using the WiFi/BLE module.**

## 7. Protection

### • PV Over Current

The controller will limit the battery charging current to the rated charge current. Therefore an oversized solar array may not work at peak power.

### • PV Short Circuit

The controller will stop charging when the PV input is short-circuited or the short-circuit occurs at the low-power charging. Clear faults to resume work.

	The controller may be damaged when the PV input is short-circuited on a high-power.
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### • PV Reverse Polarity

The PV can be reverse connected with a controller when:

- ① Only the PV is connected to the controller. ② The battery is correct connected, and the PV open-circuit voltage is lower than 85V.

	The controller will be damaged when the PV array is reverse connected, and the PV array's actual power exceeds 1.5 times the rated charge power!
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### • Battery Reverse Polarity

The battery can be reverse connected when the PV is disconnected or reverse connected. Correct the wire connection to resume work.

	The controller will be damaged when the PV connection is correct and the battery connection is reversed!
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### • Battery Over Voltage

When the battery voltage exceeds the Over Voltage Disconnect Voltage, the controller will stop charging the battery to protect the battery from being overcharged.

### • Battery Over Discharge

When the battery voltage is lower than the Low Voltage Disconnect Voltage, the controller will stop discharging the battery to protect the battery from being over-discharged.

### • Battery Overheating

The controller detects the environment temperature by the external temperature sensor. If the environment temperature exceeds 65°C, the controller will stop working and recover below 55°C.

### • Lithium Battery Low Temperature

When the battery temperature is lower than the low-temperature protection value, the Lithium battery charging/discharging is stopped. It resumes work when the battery temperature exceeds the low-temperature protection value.

## 8. Technical Specifications

Item	Model	Tracer5206CPN/Tracer5206CPN(BLE)	Tracer7810CPN/Tracer7810CPN(BLE)
Rated system voltage		12/24VDC Auto( Lithium battery cannot automatically identify system voltage)	
Battery work voltage range		8 ~ 32VDC	
Rated charge/discharge current		20A	30A
Rated charge power		260W/12V; 520W/24V	390W/12V; 780W/24V
Max. PV open circuit voltage		60V (at minimum operating environment temperature) 46V (at 25°C environment temperature )	100V (at minimum operating environment temperature) 92V (at 25°C environment temperature )
MPP Voltage range		(Battery voltage +2V) ~ 36V	(Battery voltage +2V) ~ 72V
Battery Type		<b>Lead-acid battery:</b> Sealed(Default) / Gel / Flooded/User; <b>Lithium battery:</b> LiFePO4/ Li-NiCoMn/User	
Lead-acid	Equalize Charging Voltage	Sealed: 14.6V, Gel: No, Flooded: 14.8V, User: 9-17V (X2/24V)	
	Boost Charging Voltage	Sealed: 14.4V, Gel: 14.2V, Flooded: 14.6V, User: 9-17V (X2/24V)	
	Float Charging Voltage	Sealed/Gel/Flooded: 13.8V, User: 9-17V (X2/24V)	
	Low Voltage Reconnect Voltage	Sealed/Gel/Flooded: 12.6V, User: 9-17V (X2/24V)	
Lithium	Low Voltage Disconnect Voltage	Sealed/Gel/Flooded: 11.1V, User: 9-17V (X2/24V)	
	Boost Charging Voltage	LiFePO4: 14.5V, Li-NiCoMn: 12.5V, User: 9-17V (X2/24V)	
	Low Voltage Reconnect Voltage	LiFePO4: 12.8V, Li-NiCoMn: 10.5V, User: 9-17V (X2/24V)	
	Low Voltage Disconnect Voltage	LiFePO4: 11.1V, Li-NiCoMn: 9.3V, User: 9-17V (X2/24V)	
Self-consumption		≤10mA(12V); ≤7mA(24V)	≤15mA(12V); ≤9mA(24V)
Temperature compensation coefficient		-3mV/°C/2V (Lithium batteries don't have temperature compensation coefficient)	
Communication		RS485/BLE	
Work temperature		-40°C ~ +50°C (Above 45°C, please operate in derating)	
Enclosure		IP68	
Dimension (L x W x H)		Tracer5206CPN: 147mm x 130mm x 50mm Tracer5206CPN(BLE): 157mm x 130mm x 50mm	Tracer7810CPN: 155mm x 141mm x 51.5mm Tracer7810CPN(BLE): 165mm x 141mm x 51.5mm
Mounting hole size		Φ4.5mm	
Mounting size (L x W)		121mm x 120mm	
Power cable (PV/BAT/LOAD)		PV:11AWG, BAT/LOAD: 10AWG	PV:11AWG, BAT/LOAD: 10AWG
Net weight		1.30kg	1.59kg

Any changes without prior notice! Version number: V1.2

- Load Overload**  
 If the load current exceeds 1.05 times the rated load current, the controller will disconnect the load after a delay time. Overloading must be cleared by reducing the load and restarting the controller.
- Load Short Circuit**  
 The load will be switched off when the short circuit ( $\geq 4$  times rated load current) happens. The controller will automatically attempt to reconnect the load five times. Suppose short circuit protection still exists after the fifth attempt. In that case, the user has to clear the short circuit, restart the controller or wait for one night-day cycle (night time > 3 hours).
- Temperature Sensor Breakdown**  
 When the temperature sensor is short-circuited or damaged, the controller will charge or discharge at 25°C by default to avoid damage to the battery caused by overcharge or over-discharge.
- High-voltage Transients**  
 The controller is protected against small high-voltage transients. In lightning-prone areas, additional external arrester is recommended.

## 9. Troubleshooting

Faults	Possible reasons	Troubleshooting
Charging LED is off during the daytime, and sunshine falls on PV modules properly	PV array disconnection	Confirm that PV and battery wire connections are correct and tight
No LED indicator	Battery voltage may be less than 8.5V	Measure battery voltage with the multi-meter. A minimum of 8.5V can start up the controller
Battery LED flashes green quickly	Battery over voltage	Check if the battery voltage exceeds the OVD, and disconnect the PV
Battery LED is red ON solid	Battery over-discharged	The load will recover when the battery voltage is restored to or above the LVR (low voltage reconnect voltage).
Battery LED flashes red	Battery Overheating	The controller will resume when the battery temperature declines to 50°C or below.
The load has no output	Load Overload <sup>①</sup>	①Please reduce the number of electric equipment. ②Restart the controller. ③wait for one night-day cycle (night time > 3 hours).
	Load Short Circuit <sup>①</sup>	①Check carefully the loads' connection and clear the fault. ②Restart the controller. ③wait for one night-day cycle (night time > 3 hours).

**①When the load is overloaded or short-circuited, the load will automatically restore output five times, respectively, delaying 5S, 10S, 15S, 20S, and 25S.**

## 10. Disclaimer

This warranty does not apply to the following conditions:

- Damage from improper use or use in an unsuitable environment.
- PV or load current, voltage, or power exceeds the rated value of the controller.
- The actual working temperature exceeds the limited working environment temperature.
- The user disassembly or attempted to repair the controller without permission.
- The controller is damaged due to natural elements such as lighting.
- The controller is damaged during transportation and shipment.