※**Thank you for selecting the Tracer BPL series lithium battery MPPT solar charge controller with built-in LED driver. Please read this manual carefully before using the product and pay attention to the safety information.**
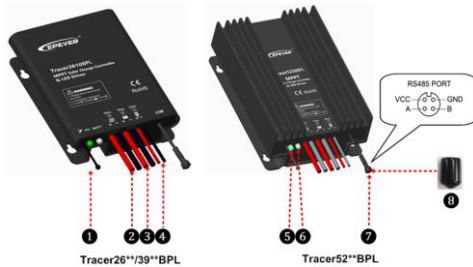
Tracer-BPL Solar Charge Controller

---with built in LED Driver

1. Overview

The Tracer BPL series lithium battery MPPT solar charge controller combines solar charge controller and LED constant current driver into one unit which is ideal for solar LED Lighting, especially when dimmer function is needed. The advanced Maximum Power Point Tracking charging methods enables the system charging and discharging management to obtain the most radical optimization. Increase the system flexibility, yet lower down the system cost. The features are listed below:

• Adopt high quality components of ST,IR and Infineon, make sure product using lifespan
• Wide working environment temperature(-40℃～60℃)
• Apply to lead-acid battery and lithium battery
• Lithium battery self-activating and low temperature protection function
• Maximum conversion efficiency of 98%
• Advanced Maximum Power Point Tracking (MPPT) technology, with tracking efficiency no less than 99.5%
• Ultra-fast tracking speed and guaranteed tracking efficiency
• Accurately recognizing and tracking of multiple power points
• Lithium battery low temperature protection function
• Lithium battery limit current in low temperature
• Digital precision constant current control and the control accuracy are less than ±2%
• Intelligent power mode with 365-day lighting control technology
• Load reduce power automatically
• Maximum output efficiency of 96%
• PV and Load power limitation function
• The output current can be adjusted among the rated power and current range
• Monitoring and setting parameter via Mobile APP, PC Monitor setting software with RS485 communication interface.
• Use of standard Modbus communication protocol for RS485 bus connections, communication protocol compatibility much better
• Connecting the IOT(Internet of Things) module and Cloud Server monitoring software to realize remote monitoring of the multi-machine system
• The RS485 connector can provide power supply
• Aluminum housing for better cooling
• Real-time energy statistics function
• IP67 waterproof degree
• Long lifespan design，five years warranty

2. Product Features

①	Temperature Sensor[1]	⑤	Charging Status LED indicator
②	PV Positive and Negative Wires	⑥	Battery Status LED indicator
③	Battery Positive and Negative Wires	⑦	RS485 waterproof port[2]
④	Load Positive and Negative Wires	⑧	Waterproof cap(Included)

(1)The temperature sensor short-circuited or damaged, the controller will be charging or discharging at the default temperature 25 ºC.
(2)The port can provide the DC power supply of 5VDC/150mA and have the short circuit function.

⚠ **NOTE: When the RS485 communication port is not working, the waterproof cap must be installed to prevent water getting in.**
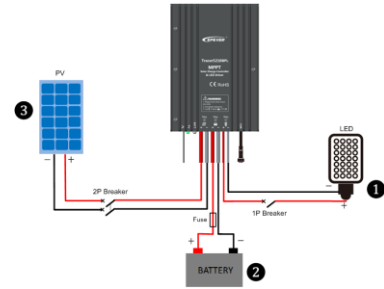
3. Wiring

● **Reference for Serial connection of LED**

System Voltage	Serial connection	Min. Output Voltage	Max. Output Voltage
12V	5～18 LED	15V	60V
24V	10～18 LED	30V	60V

⚠ **NOTE: The above one LED (1W, 3.3V) is calculated. If the user uses the unconventional LED, The actual LED voltage must less than the Max. Load Output Voltage.**

⚡ **WARNING：DO NOT electric shock! The product built-in boost LED driver, the output voltage is higher than the human safety voltage.**

● **Connection Order**

1) Connect components to the charge controller in the sequence as shown above and pay much attention to the "+" and "-". Please don't insert the fuse or turn on the breaker during the installation. When disconnecting the system, the order will be reserved.
2) After power on the controller, check the battery LED indicator on the controller, it will be green. If it's not green, please refer to chapter 9.
3) Connecting a fuse in series through battery positive (+) in the circuit and the battery circuit fuse must be 1.25 to 2 times to the rated current. The installed distance is within 150mm.
4) The process of charging and discharging can't operate simultaneously, and the discharge process is prior to charging.
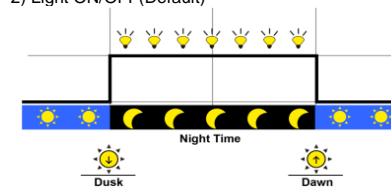

● **Load self-test function**
The load is ON when the controller power on 10seconds. After 10 seconds it will restore to set working mode.
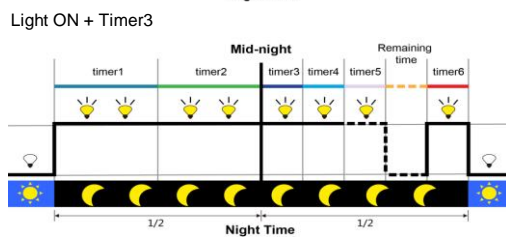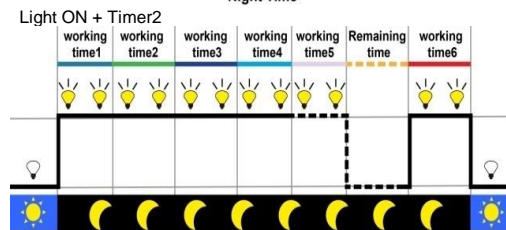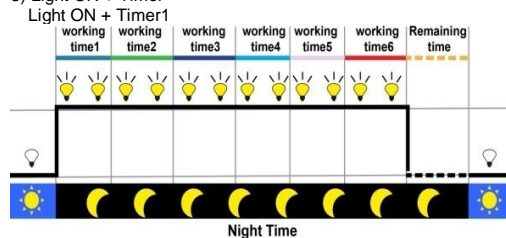
4. LED Indicators

Indicator	Color	Status	Instruction
PV	Green	On Solid	PV connection normal but low voltage(irradiance) from PV, no charging
	Green	OFF	No PV voltage(night time) or PV connection problem
	Green	Slowly Flashing(1Hz)	In charging
	Green	Fast Flashing(4Hz)	PV Over voltage
BATT	Green	On Solid	Normal
	Green	Slowly Flashing(1Hz)	Full
	Green	Fast Flashing(4Hz)	Over voltage
	Orange	On Solid	Under voltage
	Red	On Solid	Over discharged Low temperature
	Red	Fast Flashing(4Hz)	Battery Overheating
All indicators	Orange and green	Flashing two times	Set parameters successfully

5. Load Working Mode

1) Manual Mode
2) Light ON/OFF(Default)

3) Light ON + Timer
   Light ON + Timer1

Light ON + Timer2

Light ON + Timer3

4) Real-time Control
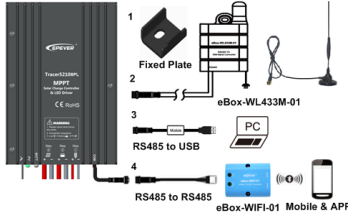   Control the load ON/OFF time through setting real-time clock.
5) Lntelligent Power Mode
After the mode of intelligent power reduction is turned on and the capacity of the storage battery is lower than 50%, the LED load will make adjustment by automatically reducing the power in a linear manner according to the capacity of the storage battery, and mean while the load will operate based on the minimum value between the set value and the value after power reduction. Moreover, the mode of intelligent power reduction will be exited after charging is started on the next day.

⚠ **NOTE: In the mode of Light ON/OFF and Light ON/Timer, the Load is turned on after 1Min. delay,the delay time can be set.**

6. Accessories(optional) and Software

1 — Fixed Plate
2 — eBox-WL433M-01
3 — RS485 to USB / PC
4 — RS485 to RS485 / eBox-WIFI-01 Mobile & APP

Software
(1)Solar station Monitor
• Download software
www.epsolarpv.com/en/index.php/Technical/download——PC Software for the Solar Charge Controller
(2)Mobile APP software setting
• Download software
www.epsolarpv.com/en/index.php/Technical/download——Andriod APP for the Li-Battery Solar Charge Controller
• IPhone——APP Store——EPEVER
※Specific instructions refer to the list of accessories and software.

7. Protection

Protection	Conditions	Status
PV Reverse Polarity	When the battery is correct connecting, the PV can be reversed.	The controller is not damage
Battery Reverse Polarity	When the PV is not connecting, the battery can be reversed.	
Battery Over Voltage	The battery voltage reaches to the OVD	Stop charging
Battery Over Discharge	The battery voltage reaches to the LVD	stop discharging
Battery Overheating	Temperature sensor is higher than 65℃	Output is OFF
	Temperature sensor is less than 55℃	Output is ON
Lithium battery Low Temperature	Temperature sensor is less than the low temperature value(Default 0℃)	Lithium battery stop charging/discharging
	Temperature sensor is higher than the low temperature value(Default 0℃)	Lithium battery charging
Load Short Circuit	Load current ≥2.5 times rated current One short circuit, the output is OFF 5s; Two short circuit, the output is OFF 10s; Three short circuit, the output is OFF 15s; Four short circuit, the output is OFF 20s; Five short circuit, the output is OFF 25s; Six short circuit, the output is OFF	Output is OFF **Clear the fault:** Restart the controller or wait for one night-day cycle (night time>3 hours).
Lithium battery limit current in low temperature	Limit current temperature T1>T2>T3>T4>T5>T6 Limit current I1>I2>I3>I4>I5>I6	When the temperature is lower than T1, the charging current is I1; when the temperature is lower than T2, the charging current is I2; and so on. However, when the temperature rises gradually from T4 to T1, it is performed at I4.

9. Troubleshooting

Faults	Possible reasons	Troubleshooting
LED Charging indicator turn off during daytime when 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 maybe less than 9V	Measure battery voltage with the multi-meter. Min.9V can start up the controller
Battery LED indicator green fast Flashing	Battery over voltage	Check if battery voltage is higher than OVD, and disconnect the PV
Battery LED indicator red	Battery over discharged①	When the battery voltage is restored to or above LVR point (low voltage reconnect voltage), the load will recover
Battery LED indicator red flashing	Battery Overheating	The controller will automatically turn the system off. But while the temperature decline to be below 50 ºC, the controller will resume.
Powering on normally, the load is off	①The connecting wires are error or virtually connected ②Load mode is not appropriate. ③This controller does not match with the LED light. ④Output short circuit.	① Check the connecting cable. ② Check the load's mode and parameters. ③The voltage of LED light is not within the output voltage range of controller. ④Check the connecting cables and LED light.
The dimming function is invalid	The controller does not match with the LED light light source. This product is a step-up voltage control, If input voltage is lower than the rated voltage, it is not working.	①Replace the LED light ②Reduce system rated voltage grade and replace the product model For example 24V system change to 12V system, and replace the corresponding controller

①When the battery is over discharged, the battery indicator will be red and the load will be off all the time before the voltage is more than the Low Voltage Reconnect Voltage (LVRV). In order to judge the system is normal or not, firstly measuring the battery voltage whether is more than LVRV, if not, restarting the controller to detect the load whether it is normal.
NOTE: The LVRV can be set, but it must pay more attention that it maybe damages the battery if the LVRV is too low.

10. Disclaimer

This warranty does not apply under the following conditions:
• Damage from improper use or use in an unsuitable environment.
• PV or load current, voltage or power exceeding the rated value of controller.
• The controller is working temperature exceed the limit working environment temperature.
• User disassembly or attempted repair the controller without permission.
• The controller is damaged due to natural elements such as lighting.
• The controller is damaged during transportation and shipment.

8. Technical Specifications

Item	Tracer2606BPL	Tracer3906BPL	Tracer5206BPL	Tracer2610BPL	Tracer3910BPL	Tracer5210BPL
Nominal system voltage	12/24VDC Auto(Lithium battery do not automatic identification system voltage)					
Battery input voltage range	9～32VDC					
Rated charge current★	10A	15A	20A	10A	15A	20A
Rated charge power	130W/12V;260W/24V	195W/12V;390W/24V	260W/12V;520W/24V	130W/12V;260W/24V	195W/12V;390W/24V	260W/12V;520W/24V
Max. PV open circuit voltage①	58V(at minimum operating environment temperature ） 46V(at 25℃ environment temperature)			95V(at minimum operating environment temperature ） 92V(at 25℃ environment temperature)		
MPP Voltage range	（Battery voltage+2V)～36V			（Battery voltage+2V)～72V		
Max. output current	3.3A	4.5A	6.6A	3.3A	4.5A	6.6A
Max. output power	100W	130W	200W	100W	130W	200W
Output voltage range	（Max. battery voltage+2V)～58V			（Max. battery voltage+2V)～80V		
Load open circuit voltage	58V			80V		
Load over voltage protection	63V			100V		
Maximum output efficiency	96%					
Output current control accuracy	≤2%					
Battery Type	**Lead-acid battery:** Sealed(Default) / Gel / Flooded/User; **Lithium battery:**LiFePO4/ Li-NiCoMn/User					
Lead-acid — Equalize Charging Voltage	Sealed :14.6V/Gel：No / Flooded:14.8V/User:9-17V (×2/24V)					
Lead-acid — Boost Charging Voltage	Sealed :14.4V/Gel：14.2V/Flooded:14.6V/User:9-17V (×2/24V)					
Lead-acid — Float Charging Voltage	Sealed/Gel/Flooded:13.8V/User:9-17V (×2/24V)					
Lead-acid — Low Voltage Reconnect Voltage	Sealed/Gel/Flooded:12.6V/User:9-17V (×2/24V)					
Lead-acid — Low Voltage Disconnect Voltage	Sealed/Gel/Flooded:11.1V/User:9-17V (×2/24V)					
Lithium — Boost Charging Voltage	LiFePO4:14.5V/ Li-NiCoMn:12.5V / User:9-17V (×2/24V)					
Lithium — Low Voltage Reconnect Voltage	LiFePO4:12.8V/ Li-NiCoMn:10.5V / User:9-17V (×2/24V)					
Lithium — Low Voltage Disconnect Voltage	LiFePO4:11.1V/ Li-NiCoMn:9.3V / User:9-17V (×2/24V)					
Self-consumption	≤15mA/12V;≤22mA/24V					
Temperature compensation coefficient	-3mV/℃/2V(Lithium battery don't have temperature compensation coefficient)					
Communication	RS485					
Working environment temperature	-40℃～+60℃					
Enclosure	IP67					
Overall dimension	124×89×30mm	150×93.5×32.7mm	153×105×52.1mm	124×89×30mm	150×93.5×32.7mm	153×105×52.1mm
Mounting hole size	Φ3.5mm					
Mounting dimension	88×76mm	120×83mm	120×94mm	88×76mm	120×83mm	120×94mm
Power cable	PV/BAT:14AWG(2.5mm²);LOAD:18AWG(1.0mm²)			PV/BAT:12AWG(4mm²);LOAD:16AWG(1.5mm²)		
Net weight	0.54kg	0.73kg	1.18kg	0.54kg	0.73kg	1.18kg

★The controller has the limit charge current function, the current can be set via the APP software and RC10.   Any changes without prior notice!   Version number：V2.0