

※Thank you for selecting the Tracer LPLI series 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-LPLI Solar Charge Controller

---with built in LED Driver

### 1. Safety Information

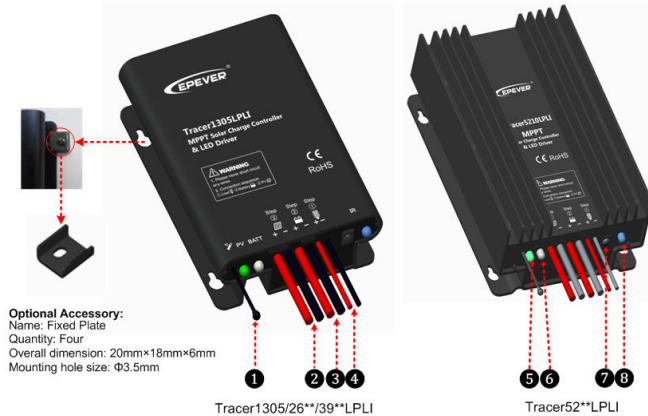
- Read all of the instructions in the manual before installation.
- DO NOT disassemble or attempt to repair the controller.
- Install external fuse or breaker as required.
- Do disconnect the solar module and fuse/ breakers near to battery before installing or moving the controller.
- Power connections must remain tight to avoid excessive heating from a loose connection.
- Only charge batteries that comply with the parameters of controller.
- Battery connection may be wired to one battery or a bank of batteries.
- Risk of electric shock, the PV and load can produce high voltages when the controller is working.

### 2. Overview

The Tracer LPLI series 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:

- Advanced Maximum Power Point Tracking (MPPT) technology, with tracking efficiency no less than 99.5%
- Maximum conversion efficiency of 98%
- Accurately recognizing and tracking of multiple power points
- Ultra-fast tracking speed and guaranteed tracking efficiency
- Adopt high quality components of ST,IR and Infineon, make sure product using lifespan
- Apply to lead-acid battery and lithium battery
- Lithium battery self-activating function
- Lithium battery low temperature protection function
- Charging current limit, with settable current
- Lithium battery limit current in low temperature
- Intelligent power mode with 365-day lighting control technology
- Load reduce power automatically
- Digital precision constant current control and the control accuracy are less than  $\pm 2\%$
- Maximum output efficiency of 96%
- PV and Load power limitation function
- The output current can be adjusted among the rated power and current range
- Real-time energy statistics function
- Monitoring and setting parameter via Mobile APP and RC10 with IR function
- Aluminum housing for better cooling
- Wide working environment temperature(-40°C~60°C)
- IP68 waterproof degree
- Long lifespan design, five years warranty

### 3. Product Features



①	Temperature Sensor	⑤	Charging Status LED indicator
②	PV Positive and Negative Wires	⑥	Battery Status LED indicator
③	Battery Positive and Negative Wires	⑦	Infrared Receiver Module
④	Load Positive and Negative Wires	⑧	Infrared LED

### 4. Wiring

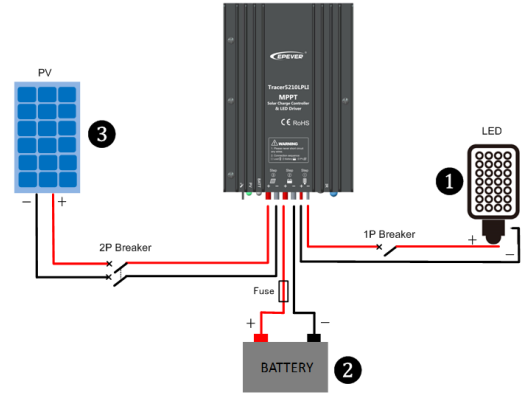
● Reference for Serial connection of LED

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.



**NOET:** The controller can only charge or discharge alone, but it can carry out the discharge process to check the load preferentially.

### ● Load self-test function

The load is ON when the controller power on 10seconds. After 10 seconds it will restore to set working mode.

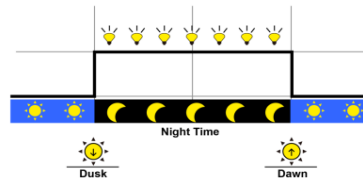
### 5. LED Indicators

Indicator	Color	Status	Instruction	
PV	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 Over voltage	
BATT	Green	On Solid	Normal	
		Slowly Flashing(1Hz)	Full	
		Fast Flashing(4Hz)	Over voltage	
		On Solid	Under voltage	
		Red	On Solid	Over discharged
		Red	Fast Flashing(4Hz)	Battery Overheating
All indicators	Green orange	Flashing two times	Set parameters successfully	

### 6. Load Working Mode

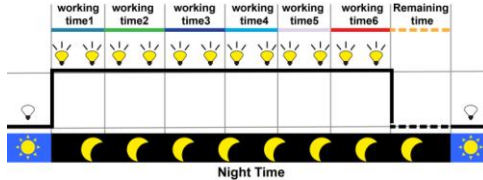
1) Manual Mode

2) Light ON/OFF(Default)

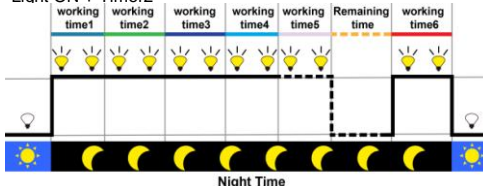


3) Light ON + Timer

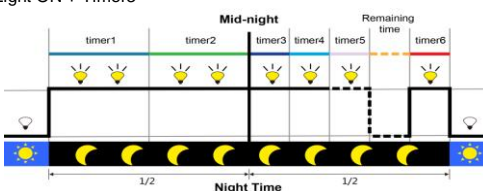
Light ON + Timer1



Light ON + Timer2



Light ON + Timer3



**4) Real-time Control**

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

**5) Intelligent Power Mode**

When the battery voltage is lower than "Under Warning Recover Voltage (UWRV adjustable)", the intelligent power mode is enabled; at this time, the LED current percentage will be automatically reduced in linear with the voltage drop of battery. When the battery voltage is lower than "Under Warning Recover Voltage (WRW adjustable)", a minimum LED current percentage (default 2%, adjustable) will be output. In addition, when the battery voltage is higher than UWRV, the controller will exit the intelligent power mode.



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

**7. Setting Operation**


There are three methods that it can realize controller load modes and parameters through IR function:

- 1) IR Remote Control—RC10
- 2) Super Parameter Programmer—FC-01  
This method can realize one-key setting operation which is suitable for bulk quantity products setting or applied in the projects.
- 3) Mobile APP+eBox-WIFI&IR-01/02  
Real-time monitoring and setting the parameters

**Note: Please refer to the user manual of handheld device**

**8. 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 (Default 35℃)	Temperature sensor is less than the low temperature value	Lithium battery stop charging
	Temperature sensor is higher than the low temperature value	Lithium battery charging
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.

Load Short Circuit	Load current $\geq 2.5$ 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 <b>Clear the fault:</b> Restart the controller or wait for one night-day cycle (night time > 3 hours).
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**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 8.5V	Measure battery voltage with the multi-meter. Min.8.5V 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 discharged <sup>①</sup>	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℃, 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 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
Parameter settings fail	Infrared communication error	Refer to handheld the user device manual

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. Technical Specifications**

Item	Tracer1305LPLI	Tracer2606LPLI	Tracer3906LPLI	Tracer5206LPLI	Tracer2610LPLI	Tracer3910LPLI	Tracer5210LPLI
Nominal system voltage	12VDC	12/24VDC					
Battery input voltage range	8.5~16VDC	8.5~32VDC					
Rated charge current★	10A/12V	10A	15A	20A	10A	15A	20A
Rated charge power	130W/12V	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 voltage	48V(Min. Temp.) 45V(25℃)	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	3.3A	4.5A	6.6A	3.3A	4.5A	6.6A
Max. output power	100W	100W	130W	200W	100W	130W	200W
Output voltage range	( Max. battery voltage+2V)~46V	( Max. battery voltage+2V)~58V			( Max. battery voltage+2V)~80V		
Load open circuit voltage	46V	58V			80V		
Load over voltage protection	50V	63V			100V		
Maximum output efficiency	96%						
Output current control accuracy	$\leq 2\%$						
Battery Type	<b>Lead-acid battery:</b> Sealed(default)/Gel/Flooded/User; <b>Lithium battery:</b> LiFePO4/Li-NiCoMn/User						
Lead-acid	Equalization Voltage	Sealed:14.6V; Flooded:14.8V;User:9-17V (24Vsystem×2)					
	Boost Voltage	Sealed:14.4V;Gel:14.2V;Flooded:14.6V;User:9-17V(24Vsystem×2)					
	Float Voltage	Sealed/Gel/Flooded:13.8V;User:9-17V(24Vsystem×2)					
	Low Voltage Reconnect Voltage	Sealed/Gel/Flooded:12.6V;User:9-17V(24Vsystem×2)					
	Low Voltage Disconnect Voltage	Sealed/Gel/Flooded:11.1V;User:9-17V(24Vsystem×2)					
Lithium	Boost Charging Voltage	LiFePO4(4s):14.5V/Li-NiCoMn(3s):12.5V/User:9-17V(24Vsystem×2)					
	Low Voltage Reconnect Voltage	LiFePO4(4s):12.8V/Li-NiCoMn(3s):10.5V/User:9-17V(24Vsystem×2)					
	Low Voltage Disconnect Voltage	LiFePO4(4s):11.1V/Li-NiCoMn(3s):9.3V/User:9-17V(24Vsystem×2)					
Self-consumption	$\leq 15\text{mA}/12\text{V}; \leq 22\text{mA}/24\text{V}$						
Communication	IR communication						
Working environment Tem.	$-40^{\circ}\text{C} \sim +60^{\circ}\text{C}$						
Enclosure	IP68(1.5m,72h)						
Overall dimension	124x89x30mm	150x93.5x32.7mm	153x105x52.1mm	124x89x30mm	150x93.5x32.7mm	153x105x52.1mm	153x105x52.1mm
Mounting hole size	$\Phi 3.5\text{mm}$						
Mounting dimension	88x76mm	120x83mm	120x94mm	88x76mm	120x83mm	120x94mm	120x94mm
Power cable	PV/BAT:14AWG(2.5mm <sup>2</sup> ) LOAD:18AWG(1.0mm <sup>2</sup> )		PV/BAT:12AWG(4mm <sup>2</sup> ) LOAD:16AWG(1.5mm <sup>2</sup> )		PV/BAT:14AWG(2.5mm <sup>2</sup> ) LOAD:18AWG(1.0mm <sup>2</sup> )		PV/BAT:12AWG(4mm <sup>2</sup> ) LOAD:16AWG(1.5mm <sup>2</sup> )
Net weight	0.52kg	0.52kg	0.71kg	1.18kg	0.52kg	0.71kg	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: V1.2