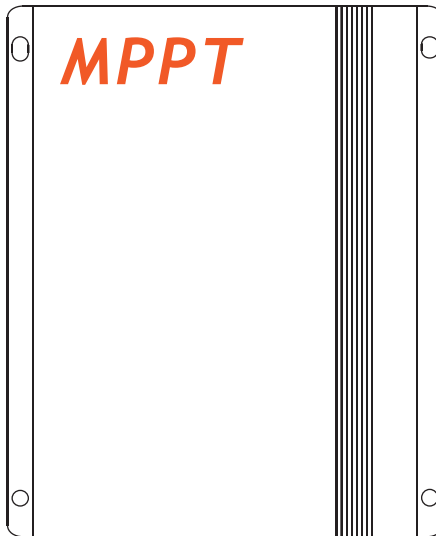# Lumiax
MPPT your solar life

MPPT-DC series
MPPT Solar charge controller
with LED driver built-in
(Constant Current, Boost)
15/20A, 150~560W

MPPT

User Manual

Solar charge controller MPPT-DC series User Manual

Dear Clients,

Thanks for selecting the **MPPT-DC** series solar controller. Please take the time to read this user manual, this will help you to take advantage of controller's new features. This manual gives important recommendations for installing, programming, using and so on. Read it carefully in your own interest please.

1.Description of Function

MPPT-DC series intelligent MPPT solar controller is programmable and especially for boost mode LED solar street light system. It includes constant current driver function. The charging efficiency is about 20% higher than the traditional PWM controller, which can drop the cost of the whole system.

■ Innovative Max Power Point Tracking(MPPT) technology, tracking efficiency >99.9%
■ Full digital technology, high charge conversion efficiency up to 97%, discharge conversion efficiency up to 96%.
■ Can output constant current (output current can be set).
■ 5 stages time and dimming can be adjusted
■ If battery voltage is low, it can be set to dimming
■ Dimming start voltage and percentage can be set
■ Transportation mode
■ When BMS power off because of LVD, it can activate the system
■ Low temperature charging protection
■ Charging target voltage and recovery voltage can be set
■ Day/Night threshold can adjust automatically
■ Based RS-485 standard Modbus protocol
■ IP67, Strong and durable aluminum case
■ Full automatic electronic protect function

2.Safty Instruction and Waiver of Liability

2.1 Safety

①The solar charge controller may only be used in PV systems in accordance with this user manual and the specs of other module manufacturers. No energy source other than solar gen. may be connected to the solar charge controller.
②Batteries store a large amount of energy, never short circuit a bat. under all circumstances. We strongly recommend connecting a fuse directly to the battery to protect any short circuit at the bat. wiring.
③Batteries can produce flammable gases. Avoid making sparks, fire or any naked flame. Make sure that the bat. room is ventilated.
④Avoid touching or short circuiting wires or terminals. Be aware that the voltages on special terminals or wires can be as much as twice the battery voltage. Use isolated tools, stand on dry ground, and keep your hands dry.
⑤Keep children away from batteries and the charge controller.
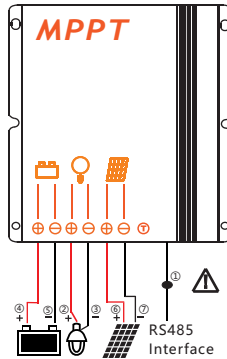
2.2 Liability Exclusion

The manufacturer shall not be liable for damages, especially on the battery, caused by use other than as intended or as mentioned in this manual or if the recommendations of the battery manufacturer are neglected. The manufacturer shall not be liable if there has been service or repair carried out by any unauthorized person, unusual use, wrong installation, or bad system

3.Dimensions(Unit: mm)

MPPT1575-DC Li   MPPT2075-DC Li
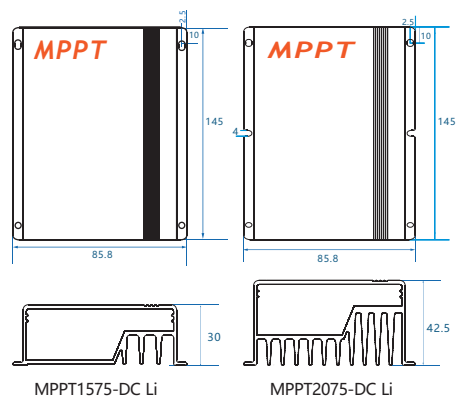
4.Installation

4.1 Connection sequence

Wire	RS485
Brown	Battery +
Black	GND
Blue	RS485-A
Green	RS485-B

1. The connectors with electricity are prohibited to connect together!
2. GND is not connected to B-.

1.First connect the Rs485 well.
2.Connect the load with the corresponding brown (+) and blue(-) cables, then seal them with tape.
2.Connect battery with the corresponding red(+) and black(-) cables. Load will be on after 5s.
3.Connect panel with the corresponding red(+) and black/green(-) cables, the load will be off after 5s, and the controller begins charging.
4.Refer to **11.LED indications and Faults & Alarms** to confirm the LED display status.

■ Make sure the wire length between battery and controller is as short as possible.
■ Recommended mini wire size: 10A: 2.5mm²; 15/20A: 4mm².
■ For easy installation and testing, in the first 30minutes, charging and discharging conversion requires only 5s. After 30 minutes, charging and discharging conversion takes time of 5 minutes.

Solar charge controller MPPT-DC series User Manual

4.2 Transportation mode(Lithium Battery)

The controller is generally integrated with the lithium battery in the lithium battery pack for transport, if the controller works normal during transport, it will waste of energy and increase the transport risk. If the controller is set to transport mode, the load has no output, then the power consumption is reduced by about 60%, to avoid lithium battery voltage too low.

4.2.1 Open circuit protection

If the controller is only connected with the battery, but not connected with solar and load, the controller will enter transportation mode after 5 minutes.

✎ If the controller enters transport mode, the red LED will slow flash(0.2s on/5s off), the green and yellow led will be off.

4.2.2 Exit the transportation mode

When the load is properly connected, connect the solar panel more than 1s during daytime , the transport mode will terminate and the controller will work normally.

5.Default setting

When MPPT-DC series controller is connected to the system, you can setting the controller with Rs485 interface.

Num	Name	MPPT-DC
1	Time1	4H
2	Dim1	100%
3	Time2	0H
4	Dim2	100%
5	Time3	0H
6	Dim3	100%
7	Time4	0H
8	Dim4	0%
9	Time5	0H
10	Dim5	100%
11	D/N Thr	5.0V
12	D/N Dly	0min
13	Load I	0.3A
14	Dim Auto	365
15	Battery	LI
16	CVT	12.6V
17	CVR	12.4V
18	LVD	9.0V
19	LVR	9.8V
20	0℃ Chg	Yes

6.Starting up the controller

6.1 Self Test

As soon as the controller is connected to battery, it starts self test. Then the display changes to normal operation.

6.2 Battery Type

MPPT-DC series controller applies to Lithium,GEL,Liquid and AGM rechargeable battery. For Lithium battery the charging target and charging recovery voltage can be set according to customer requirements.

6.3 0℃ Charging Protection(Lithium Battery)

"0℃ Chg" can be set to "Yes", "Slow" or "No". When the controller detects that the ambient temperature is higher than 0℃, the charging function is normal. when the ambient temperature is low than 0℃, if the "0℃ Chg" is set to "Yes", the charging function is normal, else if the "0℃ Chg" is set to "slow", the max charging current is 20% of the rated current, else if the "0℃ Chg" is set to "No", the controller does not charge the battery. The user can select the appropriate charging method.

7. Streetlight Function

MPPT-DC series controller with advanced street light control function. The modes of lighting can be based on customer needs.
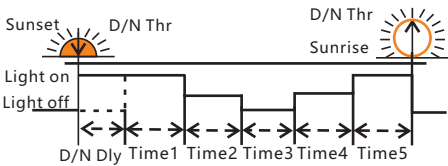
7.1 Dusk to Dawn (D2D)
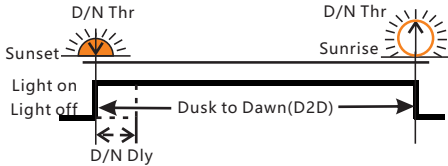
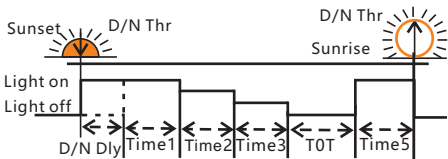If "Time1" is set to "D2D", the controller works in dusk to dawn mode.

✎ 1.MPPT-DC series controller is set to D2D mode, the corresponding dimming setting is still valid.
2. If "Time1" is set to D2D mode, "Time4" can not be set to T0T mode.

7.2 Five-stage Night Mode

You can set the Time 1-5 and Dim 1-5 with S-Unit.

7.3T0T mode(can set the load on time before morning coming)

If "Time4" of the S-Unit is set to "T0T", this mode is T0T mode.

* If Time4 is set to T0T mode, Time1 can not set to D2D mode.

8.LVD, LVR, Threshold, Dimming

8.1 Low Voltage Disconnect (LVD)

When the battery voltage drops below the LVD voltage, the controller will disconnect the load to prevent deep discharge of the battery. If this occurs, the battery should be well charged before resuming use.

	Gel, Liquid and AGM	Lithium
MPPT1575/2075 -DCLi-485	10.8~11.8/21.6~23.6V	9.0V~30.0V

8.2Low Voltage Reconnect (LVR)

If the controller goes into low voltage disconnect, it will restore only when the battery being recharged to the recovery voltage.

|	Gel, Liquid and AGM	Lithium
MPPT1575/2075 -DCLi-485	11.4~12.8/22.8~25.6V	9.6V~31.0V

8.3 Day/Night Threshold, Day/Night Delay

The controller recognizes day and night based on the solar array open circuit voltage. This day/night threshold can be modified according to local light conditions and the solar array used.

Day/Night threshold setting range: 3.0~20.0V.

In the evening, when the solar array open circuit voltage reaches the setting day/night threshold, you can adjust the day/night delay time to make the load turn on a little later.

Day/Night delay time setting range: 0~30min.
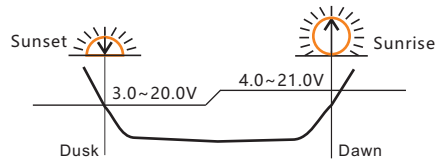
✎ 1. Day/Night threshold voltage should be set around 0.22 times of open circuit voltage.

2.Day/Night threshold voltage of load disconnect is 1V higher than the setting data, means the load will disconnect when the solar voltage at 4.0~21.0V.

3.The controller has an automatic day/night threshold adjustment function. If the lowest voltage of solar array is higher than the setting day/night threshold, the load has no output in first night, 24 hours later the controller can automatically adjust the day/night threshold to meet the requirements of lighting at night.

8.4 Auto Dimming

8.4.1 Auto Dimming mode

The "Dim Auto" item of S-Unit is set to "Yes", set "Dim V" and "Dim %" at the same time, press the "Send" key to set up the controller. when the battery voltage is lower than the voltage of "Dim V" , it starts to dimming automatically. Battery voltage reduces per 0.1V, load current decreased according to the set of "Dim %", the minimum output current is 10% of the setting current.

✎ 1.If the controller is set to "Dim" or "Auto Dim", the minimum output current can be as low as 100mA.

2. Dimming voltage should not be greater than the voltage of "CVT" (Charging voltage target).

8.4.2 365mode

365 mode is based on the battery power (charge power, discharge power) energy control. If the battery charge more during the day, then discharge more at night. The controller can calculate the dimming ratio according to the charging power and the remaining power of battery, so as to avoid the load shutdown due to the low battery voltage.

✎ When using the 365 mode, the system should be designed to meet the requirements of three rainy days.

9.Safety Features

	Solar terminal	Battery terminal	Load terminal
Reverse polarity	Protected *1	Protected	Protected
Short circuit	Protected*2	Protected *1	Switches off immediately
Over current	——	——	Switches off with delay
Reverse Current	Protected	——	——
Over voltage	Max.55V *3	Max. 35V	——
Under voltage	——	——	Switches off
Over temp.	The controller cuts off the load if the temperature reaches the set value.		

*1.Battery must be protected by fuse, otherwise battery will be damaged.

*2.When the PV doesn't charge, the controller will not be damaged if short-circuit just happened in the PV array.
Warning: It is forbidden to short-circuit the PV array during charging .Otherwise, the controller may be damaged.

*3.The voltage of solar panel can not exceed 55V for a long time.

✎ **Warning: The combination of different error conditions may cause damage to the controller.**
Always remove the error before you continue connecting the controller.

10.Recommended connection of LED
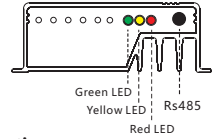
Following connect ways is for the LED lights
(Vf: 2.9V~3.4V; I: 300mA, Power: 1W)

n for number of parallel connection

m for number of in series connection
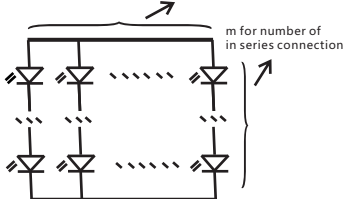
Model	Output Voltage	Load current	LED chips connection
MPPT1575/ 2075-DC Li	20~55V	0.15~6.0A	M=7~18 N=1~20

11LED indications and Faults & Alarms

Green LED
Yellow LED   Rs485
Red LED

11.1LED Display Explanation

LED	Status	Function
Green LED	On	Solar panel is correctly connected, but not charged
	Fast flash(0.1/0.1s)	MPPT charging
	Slow flash(0.5/2s)	Charging
Yellow LED	Off	Over voltage protection
	On	Battery is normal
	Slow flash(0.5/2s)	Battery voltage is low
	Fast flash(0.1/0.1s)	Low voltage protection
Red LED	Off	Work normal
	On	The output power is 0.
	Slow flash(0.2/5s)	Open circuit protection or transport mode. *1
	Flash(0.5/0.5s)	Over temperature protection
	Fast flash(0.1/0.1s)	Short circuit or *2 Over current protection

*If the controller is in transport mode, the red LED is super slow flash(0.2s on/5s off), the green and yellow led is off.

11.2Faults & Alarms

Fault	Status	Reason	Remedy
Loads are not powered	Low volt. protection	Battery capacity is low	Load will be reconnected when battery is recharged
	Overcurrent, short circuit protection	Loads are over current or short circuit	Switch off all loads, remove short circuit, load will be reconnected after 1 minute automatically
	Over temp. protection	Controller temp. Is too high	Load reconnects after temp. reduces
High voltage at battery terminal	Over voltage protection	High battery voltage > (CVT+0.2V)	Check if other sources overcharge the battery. If not,controller is damaged.
		Battery wires or battery fuse damaged, battery has high resistance.	Check battery wires, fuse and battery.
Battery is empty after a short time	Low voltage protection	Battery has low capacity	Change battery
Battery can't be charged	Can not be charged	PV panel fault or reverse connection	Check panels and connection wires

12.Technical Data

Item			MPPT1575-DCLi-485	MPPT2075-DCLi-485
Battery Parameters	System Voltage		12V/24V automatical recognization	
	Max Charging Current		15A	20A
	Max volt on Bat. Terminal		35V	
	Battery Type		Liquid, Gel, AGM and Lithium (Programmable, default: Lithium)	
	Liquid, Gel and AGM	MPPT Charging Voltage	<14.5/29.0V@25℃	
		Boost Voltage	14.5/29.0V @25℃	
		Equalization Voltage	14.8/29.6V @25℃ (Liquid, AGM)	
		Float Voltage	13.7/27.4V @25℃	
		Low Volt. Disconnect	10.8~11.8V/21.6~23.6V (Programmable)	
		Reconnect Voltage	11.4~12.8V/22.8~25.6V (Programmable)	
		Overcharge Protect	15.5/31.0V	
		Temp. Compensation	-4.17mV/K per cell (Boost, Equalization), -3.33mV/K per cell (Float)	
	Lithium	Charging voltage target	10.0~32.0V(Programmable, default: 12.6V)	
		Charging voltage recovery	9.2~31.8V(Programmable, default: 12.4V)	
		Low voltage disconnect	9.0~30.0V(Programmable, default: 9.0V)	
		Low voltage reconnect	9.6~31.0V (Programmable, default: 9.8V)	
		0℃ Charging protection	Yes, Slow, No(Programmable)	
Panel Parameters	Max volt on PV terminal		55V **1**	
	Max input power		200W/400W	260W/520W
	Dusk/Dawn detect volt.		3.0~20.0V (Programmable)	
	Day/Night delay time		0~30min (Programmable)	
	MPPT tracking range		(Battery Voltage +1.0V) ~Voc*0.9 **2**	
Load Parameters	Output Power		10~90W/20~180W	
	Output Voltage		20~55V/30~55V	
	Current setting range		0.15~6.0A (Programmable)	
	Min current		100mA (Dimming)	
	Current precision		±2%	
	Dimming		0~100% (Programmable)	
	Voltage of start dimming		11.8~12.5V/23.6~25.0V(Gel,AGM and Liquid); 10.0~32.0V(Lithium)	
	Dimming percentage		1~20% (Programmable)	
System Parameters	Max tracking efficiency		>99.9%	
	Max charge conversion		97.5%	
	Max LED driver efficiency		96.5%	
	Self consumption		6mA	
	Dimensions		85.8 * 145 * 30mm	85.8 * 145 * 42.5mm
	Weight		600g	720g
	Ambient temperature		-35~+60℃	
	Ambient humidity		0~100%RH	
	Protection degree		IP67	
	Max Altitude		4000m	

*1.This value represents the maximum voltage of the solar panel at the minimum operating ambient temperature.
*2.Voc means the open circuit voltage of the solar panel.
*3.Around oblique line value separately on behalf of 12V and 24V system's value.