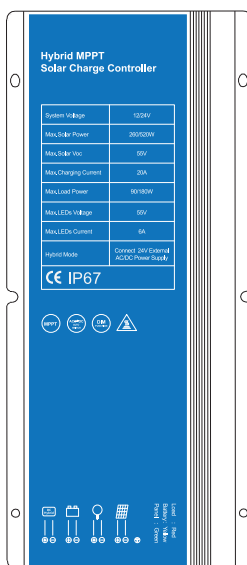


MPPT-DC series

MPPT Solar charge controller with LED driver built-in (Constant Current, Boost) 20A, 260~520W



User Manual

User Manual_MPPT-DC series_OH
CE, RoHS, ISO9001:2015
Subject to change without notice!

Solar charge controller MPPT-DC series User Manual

Thanks for choosing this solar controller. Please take the time to familiarise yourself with this user manual, as this will help you to take full advantage of controller's new features. This manual gives important recommendations for installing, programming and using the controller. Read this manual in full before installing or connecting the solar controller.

1. Functions

This series 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. When battery voltage is low, the controller will transfer to AC/DC converter, to keep the lamp continue lighting.

It comes with some outstanding features, such as:

- Innovative Maximum Power Point Tracking(MPPT) technology, tracking efficiency >99.9%
- High charge conversion efficiency of up to 97.5%, discharge conversion efficiency up to 96.5%
- Solar power generation and municipal power supply complement each other to improve power supply guarantee rate.
- Output constant current (output current can be set)
- 5 stages time and dimming can be adjusted
- Can read parameters and running status
- If battery voltage is low, it can be set to dimming
- Dimming start voltage and percentage can be set
- Battery charging protection
- AGM, Liquid, GEL and Lithium battery for selection
- Automatic temp. compensation (AGM/Liquid/GEL)
- Four stages charge way: MPPT, boost, equalization, float(AGM/Liquid/GEL)
- Transportation mode(Lithium)
- Automatic power balance 365 mode, 365 days can be lit(Lithium)
- When BMS power off because of LVD, it can activate the system(Lithium)
- Charging target voltage and recovery voltage can be set(Lithium)
- Day/Night threshold can adjust automatically
- Remote Unit to configure, with LCD display
- IP67, Strong and durable aluminum case
- Full automatic electronic protect function

2.Safety instructions and liability waiver

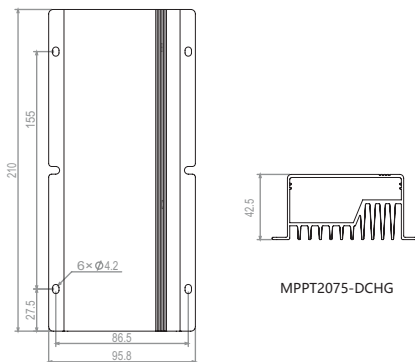
2.1 Safety

- 1.The solar charge controller may only be used in PV systems in accordance with this user manual and with solar panels specifications in line with the requirements of this controller. No energy source other than solar panels may be connected to the solar charge controller.
- 2.Batteries store a large amount of energy; never short-circuit a battery under any circumstances. We strongly recommend connecting an in-line fuse or circuit-breaker on the "+" wire between the battery and controller, no more than 15cm from the battery terminal.
- 3.Batteries can produce flammable gases. Avoid sparks and flames near the batteries. Make sure the battery is installed in a well ventilated area.
- 4.For LI models, only use batteries equipped with a suitable battery management system.
- 5.Avoid touching or short-circuiting any wires or terminals. Be aware that the voltages at certain points in the controller can be several times greater than the battery voltage. Use isolated tools and only perform any work in a dry environment.
- 6.Keep the battery and charge controller out of reach of children.

2.2 Liability

The manufacturer shall not be liable for damages to the controller or battery caused by use other than as instructed in this manual, or if the battery manufacturer's recommendations are neglected. The manufacturer shall not be liable if there has been service or repair carried out by any unauthorised person, unusual use, incorrect setup, or bad system design.

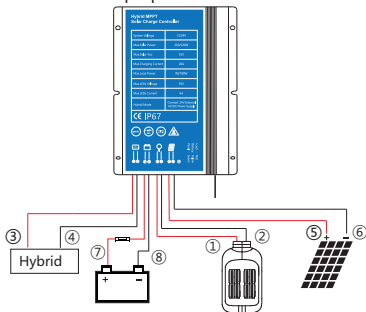
3.Dimensions(Unit: mm)



4. Installation

4.1 Connection sequence

The following diagrams provide an overview of the connections and the proper order.



1. Connect the load first with the corresponding brown(positive) and blue(negative) cables. These connections are optional.
2. Connect battery with the corresponding red(positive) and black(negative) cables. The load will be on after 5s.
3. Connect panel with the corresponding positive and negative cables. If the panel is well, the load will be off after 5s, and the controller should begin charging.
4. Connect AC/DC with the corresponding positive and negative cables.

Hybrid working principle:

The controller will switch to AC/DC converter for power supply when the battery voltage is lower than $LVD + 0.2V(\text{Lithium}) / +0.4V(\text{GEL, Liquid and AGM})$ and lasts for 5s, and the load led light will turn off for about 25s during the conversion. The controller will automatically convert to battery power supply when the controller automatically recognizes that it is daytime or disconnects the AC/DC converter.

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.

4.2.2 Press the "Test" key in transport mode

Press the "Back" and "Backlight" at the same time more than 3s, the remote controller will work in transport mode. Press the "Test" key in the transport mode, the remote controller displays "Transport OK" and will beep a long sound, the controller enters into transport mode.

 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 and the remote control displays "Open CP".

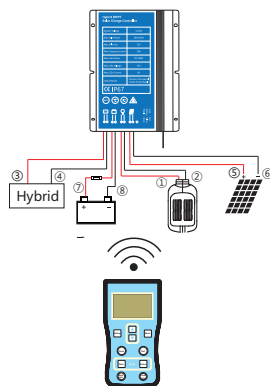
4.2.3 Exit the transportation mode

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

5. Remote controller, Default setting

Settings can be changed using the SG-Unit (optional: purchased separately).

For detailed instructions and settings, please see the SG-Unit manual.



5.1 Test function

Press the "Test" key of the SG-Unit, the controller will turn on the load for 10s. If the load is programmed to be off during daytime, this can verify correct installation and help with troubleshooting.

5.2 Read the running status

Press the "Status" key of the SG-Unit to read the running status of the controller. This will display the current mode of the controller and any measured values.

Num	Name	Name describe	Unit
	Status:	Charge	
1	Batt V	Battery voltage	V
2	Load I	Load current	A
3	Load V	Load voltage	V
4	PV V	PV voltage	V
5	PV I	PV current	A
6	Energy	Total generating capacity	AH
7	OD Times	Over discharge times	Times
8	FC Times	Fully charge times	Times
9	Day1-HV	A day ago highest voltage	V
10	Day1-LV	A day ago lowest voltage	V
11	Day2-HV	Two days ago highest voltage	V
12	Day2-LV	Two days ago lowest voltage	V
13	Day3-HV	Three days ago highest voltage	V
14	Day3-LV	Three days ago lowest voltage	V

5.3 Read the parameters

Press the "Parameter" key of the SG-unit to read the setting parameters of the controller. The table below summarises the load settings; note that many of these settings are only relevant for systems where the load is powered through the controller. These settings (e.g. timer) do not affect the charging function.

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	Yes
15	Dim V	12.5V
16	Dim %	10%
17	Battery	GEL
18	LVD	11.0V
19	LVR	12.0V

6.Starting up the controller

6.1 Self Test

As soon as the controller is powered it starts a self test routine. After this, the LED display will change to normal operation.

6.2 Battery Type

The controller applies to Liquid, Gel, AGM and Lithium battery, the factory default setting is suitable for Gel battery.

The charging target and charging recovery voltage can be set according to customer requirements when the battery type is set to Lithium battery.

6.3 Battery Charging Protection

When the controller detects that the ambient temperature is between -35°C and 55°C, the charging function is normal. When the ambient temperature is lower than -35°C or higher than 55°C, the controller does not charge the battery.

7. Streetlight Function

The controller has advanced day/night time control functions. The load on/off timings can be set based on your needs as shown below.

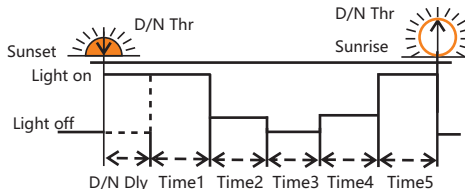
7.1 Dusk to Dawn (D2D)



If "Time1" is set to "D2D", the controller works in dusk to dawn mode. The load will turn on while the sun is down, as determined by the solar panel voltage.

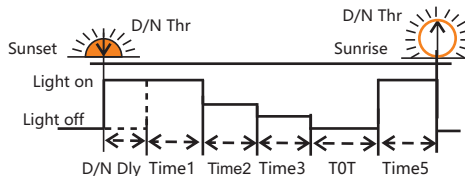
- 1.The dimming setting will still be active in this mode.
2. If "Time1" is set to D2D mode then "Time4" can not be set to T0T mode.

7.2 Five-stage Night Mode



Time 1-5 and Dim 1-5 can be set individually to give variable load power throughout the night.

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



If "Time4" is set to "T0T" then the controller will determine Time4 based on Time5 and previous data on the time of sunrise.

* while this setting is applied, Time1 cannot 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.

Lithium Battery: 9.0~30.0V

Liquid, Gel and AGM Battery: 10.8~11.8V/21.6~23.6V.

8.2 Low Voltage Reconnect(LVR)

If the low voltage disconnect is triggered, the controller will restore load connection only when the battery voltage increases above the LVR voltage.

Lithium Battery: 9.6~31.0V.

Liquid, Gel and AGM Battery: 11.4~12.8V/22.8~25.6V.

LVR should be at least 0.6V/1.2V higher than LVD.

8.3 Day/Night Threshold, Day/Night Delay

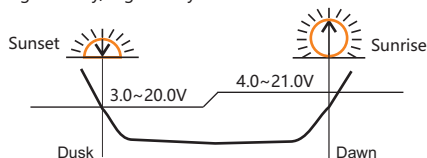
The controller recognizes day and night based on the solar array open circuit voltage. This day/night threshold can be modified according to local light conditions and the solar array used.

Lithium Battery: 3.0~20.0V

Liquid, Gel and AGM Battery: 3.0-8.0V/6.0-16.0V.

The actual time of turning on/off can be delayed from the time the threshold was reached using the Day/Night delay setting (D/N Dly).

Range for Day/Night delay time: 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 will automatically adjust the day/night threshold if the lowest solar voltage is higher than the D/N Thr. The load will have no output the first night, then 24 hours later the controller will automatically adjust the setting to give output the following night.

8.4 Auto Dimming

8.4.1 Auto Dimming mode

The "Dim Auto" item of SG-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).
3. When the battery type is Liquid, Gel or AGM battery, "Dim V" setting range is 11.8~12.5V/23.6~25.0V.

8.4.2 365mode(Lithium Battery)

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.Faults & Alarms

9.1 Loads are not powered

Status	Reason	Troubleshooting
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. Wait 1 minute.
Over temp. protection	Controller temp. is too high	Controller will turn the system off until temperature is below 60°C.

9.2 High voltage at battery terminal

Status	Reason	Troubleshooting
Over voltage protection	Battery over voltage	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.

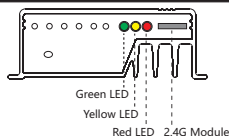
9.3 Battery is empty after a short time

Status	Reason	Troubleshooting
Low voltage protection	Battery has low capacity	Change battery

9.4 Battery not charging

Status	Reason	Troubleshooting
Can not be charged	PV panel fault or reverse connection	Check panels and connection wires

10.LED indicators



Lithium Battery:

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
Red LED	Fast flash(0.1/0.1s)	Low voltage protection
	Off	Work normal
	On	The output power is 0.
	Slow flash(0.2/5s)	Open circuit protection or transport mode. *
	Fast lash(0.5/0.5s)	Over temp. protection (Internal temperature)
	Flash(2/2s)	Over temp. protection (External temperature)
	Fast flash(0.1/0.1s)	Short circuit * Over current protection

Liquid, Gel or AGM Battery:

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

*1.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.

*2.Detailed fault information can be read by SG-Unit remote controller.

11.Safety Features

	Solar	Battery	Load
Reverse polarity	Protected *	Protected	Protected
Short circuit	Protected	Protected *	Switches off immediately
Over current	—	—	Switches off with delay
Reverse Current	Protected	—	—
Over voltage	Max.45V *	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.

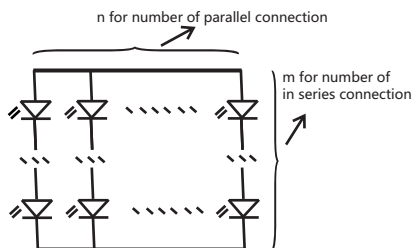
*2.The voltage of solar panel can not exceed 45V for a long time.

*3.When the temperature detected by the external temperature probe is higher than 55°C, the controller turns off the charging and the blinking rate for red LED is 2S/2S.When the temperature of external probe is lower than 50°C, the controller recovers the charging and the red led stops blinking. When the internal temperature of the controller exceeds 75°C,the controller turns off the discharging and the blinking rate for red LED is 0.5S/0.5S.When the internal temperature of the controller is lower than 65°C, the controller recovers the discharging and the red led stops blinking.

12.Recommended connection of LED

Following connect ways is for the LED lights

(Vf: 2.9V~3.4V; I: 300mA, Power: 1W)



Lithium Battery:

Output Voltage	Load current	LED chips connection
20~55V	0.15~6.0A	M=7~18 N=1~20

Liquid, Gel or AGM Battery:

System Voltage	Output Voltage	Load current	LED chips connection
12V	20~55V	0.15~6.0A	M=7~18 N=1~20
24V	30~55V		M=10~18 N=1~20

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13. Technical Data

	Item	MPPT2075-DCHG	
Battery Parameters	Battery Type	Liquid, GEL and AGM	Lithium
	System Voltage	12V/24V automatical recognition	--
	Max Charging Current	20A	
	MPPT Charging Voltage	before boost, equalization or CVT voltage	
	Boost Voltage	14.5/29.0V @25°C	--
	Equalization Voltage	14.8/29.6V @25°C(Liquid, AGM)	--
	Float Voltage	13.7/27.4V @25°C	--
	Charging target volt.	--	10.0~32.0V(Programmable)
	Charging recovery volt.	--	9.2~31.8V(Programmable)
	Low Volt. Disconnect	10.8~11.8V/21.6~23.6V(Programmable)	9.0~30.0V(Programmable)
	Reconnect Voltage	11.4~12.8V/22.8~25.6V(Programmable)	9.6~31.0V(Programmable)
	Overcharge Protect	15.5/31.0V	--
	0°C Charging protection	--	Yes, No, Slow (Programmable)
	Max volt on Bat. terminal	35V	
	Temp. Compensation	-4.17mV/K per cell (Boost, Equalization) , -3.33mV/K per cell (Float)	--
Panel Parameters	Max volt on PV terminal	55V ^{*1}	
	Max input power	260W/520W	70W*#(3~8)
	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}	
AC/DC	Max input Power	150W/24V	
Load Parameters	Output Power	10~90W/20~180W	5~(22.5W*#(4~8))
	Current setting range	0.15~6.0A (Programmable)	
	Min current	100mA (Dimming)	
	Output Voltage	20~55V/30~55V	20~55V
	Current precision	±2%	
	Auto Dimming	--	Yes, No, 365(Programmable)
	Dimming	0~100% (Programmable)	
	Voltage of start dimming	11.8~12.5V/23.6~25.0V(Programmable)	10.0~CVT(Programmable)
System Parameters	Dimming percentage	1~20% (Programmable)	
	Max tracking efficiency	>99.9%	
	Max charge conversion	97.5%	
	Max LED driver efficiency	96.5%	
	Self consumption	8~16mA	
	Dimensions	210 * 95.8 * 42.5mm	
	Ambient temperature	-35~+60°C	
	Ambient humidity	0~100%RH	
	Protection degree	IP67	
	Max Altitude	4000m	

*1.This value represents the max. voltage of the solar panel at the min. operating ambient temperature.

*2.Voc means the open circuit voltage of the solar panel.