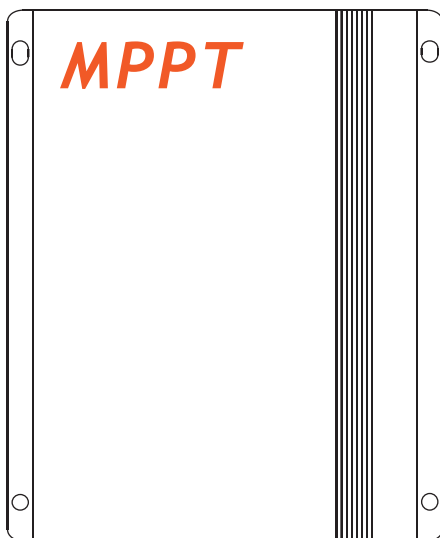


MPPT-DC series MPPT Solar Charge Controller with LED driver built-in

——Constant Current, Boost
(RS485 communication)
12/24V, 10/15/20A



User Manual

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

Solar Charge Controller MPPT-DC series User Manual

Dear Clients,

Thanks for selecting the MPPT-DC series solar charge 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 charge controller is programmable and especially for boost mode LED solar street light system. It includes a 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 Maximum Power Point Tracking (MPPT) technology, tracking efficiency > 99.9%.
- Full digital control technology, charge conversion efficiency up to 97.5%, discharge conversion efficiency up to 96.5%.
- Constant current output with adjustable current (resolution: 0.05A).
- 5-stage adjustable time intervals, dimming adjustable from 0% to 100%.
- Automatic power reduction can be configured when battery voltage is low.
- Solar panel and load over-power limiting function.
- Automatic 12V/24V system voltage recognition.
- Compatible with liquid, gel, and AGM batteries.
- Adjustable equalization voltage, boost charging voltage and float charging voltage.
- Automatic day/night threshold adjustment.
- External temperature sensor with automatic temperature compensation.
- Charge current automatically derates when temperature exceeds the set limit to prevent controller damage.
- 4-stage charging: MPPT, boost, equalization, float.
- RS-485 communication with standard Modbus protocol.
- Communication interface with external power supply function.
- Rugged aluminum enclosure, IP67 rated.
- Excellent EMC and thermal design
- Comprehensive automatic electronic protection functions.

2.Safety 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 generator may be connected to the solar charge controller.

②Batteries store a large amount of energy, never short circuit a battery under all circumstances. We strongly recommend connecting a fuse directly to the battery to protect any short circuit at the battery wiring.

③Batteries can produce flammable gases. Avoid making sparks, fire or any naked flame. Make sure that the battery room is ventilated.

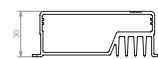
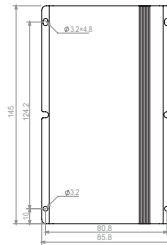
④Avoid touching or short circuiting wires or terminals. Be aware that the voltages on special terminals or wires can be as much as twice the battery voltage. Always use insulated tools, stand on a dry surface, and keep your hands dry when performing this operation.

⑤Keep children away from batteries and the charge controller.

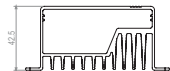
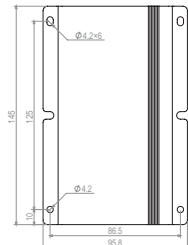
2.2 Liability Exclusion

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, abnormal use, wrong operation, or bad system design.

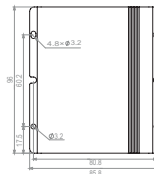
3.Dimensions(Unit: mm)



MPPT1575-DCLI-RS485



MPPT2075-DCLI-RS485

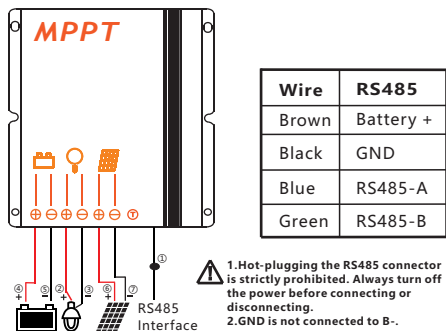


MPPT1050-DCLI-RS485

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4. Installation

4.1 Connection sequence



1. First connect the RS485 well.
 2. Connect the load with the corresponding brown (+) and blue(-) cables, then seal them with tape.
 3. Connect battery with the corresponding red(+) and black(-) cables. Load will be on after 5s.
 4. Connect panel with the corresponding red(+) and black/green(-) cables, the load will be off after 5s, and the controller begins charging.
 5. 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 minimum cable size:
10A: 2.5mm²; 15/20A: 4mm².
 - For on-site testing convenience: Within the first 30 minutes after power-up, charge/discharge mode switching delay is only 5 seconds. After 30 minutes of continuous operation, the switching delay returns to the standard 5 minutes.

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 normally during transport, it will waste 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 Entering Transportation Mode via Open Load

If the controller is connected only to the battery, while the solar panel and load remain disconnected for more than 5 minutes, the controller will automatically enter transportation mode.

After entering transportation mode, the red LED flashes ultra-slowly (0.2s ON / 5s OFF), while the green and yellow LEDs remain off.

4.2.2 Exit the Transportation Mode

With the load properly connected, transportation mode can be exited by pressing the TEST button, or connecting the solar panel for more than 1 second in daylight. The controller will resume normal operation afterwards.

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	Yes
15	Battery	LI
16	BCV	14.4V
17	BVR	14.0V
18	LVD	10.8V
19	LVR	11.8V
20	0°C 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°C Charging Protection(Lithium Battery)

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

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7. Streetlight Function

MPPT-DC series controller with advanced street light control function. The modes of lighting can be based on customer needs.

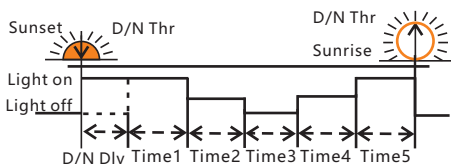
7.1 Dusk to Dawn (D2D)



If "Time1" is set to "D2D", the controller works in dusk to dawn mode.

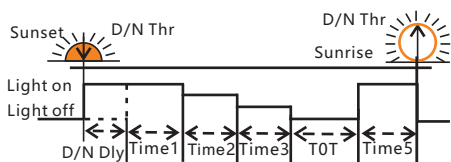
- 1. MPPT-DC series controller is set to D2D mode, the corresponding dimming setting is still valid.
- 2. If "Time1" is set to D2D mode, "Time4" can not be set to TOT mode.

7.2 Five-stage Night Mode



You can set the Time 1-5 and Dim 1-5 with SU10G.

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



If "Time4" of the SU10G is set to "TOT", this mode is TOT mode.

* If Time4 is set to TOT 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
MPPT1050-DCLi-RS485	10.8-11.8V	9.0-15.0V
MPPT1575/2075-DCLi-RS485	10.8-11.8V/21.6-23.6V	9.0-30.0V

8.2 Low 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
MPPT1050-DCLi-RS485	11.4-12.8V	9.6-16.0V
MPPT1575/2075-DCLi-RS485	11.4-12.8V/22.8-25.6V	9.6-31.0V

8.3 Day/Night Threshold, Day/Night Delay

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

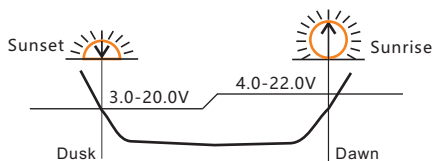
Day/Night threshold setting range:

MPPT1050-DCLi-RS485:3.0-8.0V.

MPPT1575/2075-DCLi-RS485:3.0-20.0V.

In the evening, when the solar panel 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(+2V for non-lithium 24V systems), means the load will disconnect when the solar voltage at 4.0-22.0V.
- 3. The controller has an automatic day/night threshold adjustment function. If the lowest voltage of solar panel 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.

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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 dimming automatically. For every 0.1V drop in battery voltage, the load current decreases in proportion to the set "Dim %" value; the minimum output current is 10% of the set 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).

9.Safety Features

	Solar terminal	Battery terminal	Load terminal
Reverse polarity	Protected	Protected	Protected
Short circuit	Protected ^{*1}	Protected ^{*2}	Switches off immediately
Over current	—	—	Switches off with delay
Reverse Current	Protected	—	—
Over voltage	Max. ^{*3}	Max. ^{*3}	—
Under voltage	—	—	Switches off
Over temp.	The controller cuts off the load if the temperature reaches the set value. ^{*4}		

*1.When the PV doesn't charge, the controller will not be damaged if short-circuit just happened in the solar panel.

Warning: It is forbidden to short-circuit the solar panel during charging. Otherwise, the controller may be damaged.

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

*3.Please refer to "12. Technical Data" for the Max voltage on PV terminal and Max voltage on Battery Terminal data for different models.

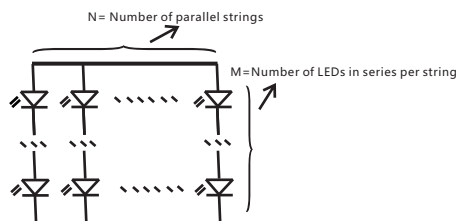
*4.MPPT1050-DCLi-RS485: When the controller temperature exceeds 60°C, the charging power begins to derate. For every 1°C increase in the internal temperature of the controller, the charging current is derated by 4% of the controller's maximum charging current. When the temperature exceeds 85°C, the controller's over-temperature protection activates, shutting off charging and discharging. Charging resumes when the temperature drops to 75°C.

MPPT1575/2075-DCLi-RS485: When the controller temperature exceeds 60°C, the charging power begins to derate. For every 3°C increase in the internal temperature of the controller, the charging current is derated by 10% of the controller's maximum charging current. When the temperature exceeds 85°C, the controller's over-temperature protection activates, shutting off charging and discharging. Charging resumes when the temperature drops to 75°C.

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

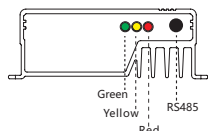
The following connection methods are for the LED lights(Vf: 2.9V-3.4V; I: 300mA, Power: 1W)



Model	Output Voltage	Load current	LED chips connection
MPPT1050-DCLi-RS485	20-45V	0.15-3.0A	M=7-14 N=1-10
MPPT1575/2075-DCLi-RS485	20-55V	0.15-6.0A	M=7-18 N=1-20

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11 LED indications and Faults & Alarms



11.1 LED Display Explanation

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

11.2 Faults & 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 > (BCV+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	solar panel fault or reverse connection	Check panels and connection wires

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12. Technical Data

	Item	MPPT1050-DCLi-RS485	
Battery Parameters	System Voltage	12V	
	Max Charging Current	10A	
	Max Voltage On Battery Terminal	25V	
	Battery Type	Liquid, Gel, AGM and Lithium(Programmable, default: Lithium)	
	Liquid, Gel and AGM	MPPT Charging Voltage	<14.5V@25°C
		Boost Charge Voltage	14.5V@25°C
		Equalization Charge Voltage	14.8V@25°C(Liquid, AGM)
		Float Charge Voltage	13.7V@25°C
		Low Voltage Disconnect	10.8-11.8V(Programmable)
		Reconnect Voltage	11.4-12.8V(Programmable)
		Overcharge Protection	15.5V/31.0V
		Temperature Compensation	-4.17mV/K per cell(Boost, Equalization),-3.33mV/K per cell(Float)
	Lithium	Boost Charging Voltage	10.0-17.0V(Programmable,default:14.4V)
		Boost Voltage Reconnect Voltage	9.2-16.8V(Programmable,default:14.0V)
		Low Voltage Disconnect	9.0-15.0V(Programmable,default:10.8V)
Low Voltage Reconnect		9.6-16.0V (Programmable,default:11.8V)	
0°C Charging Protection		Yes, Slow, No(Programmable)	
Panel Parameters	Max Voltage On PV terminal	45V *1	
	Max Input Power	120W-150W	
	Dusk/Dawn Detect Voltage	3.0-8.0V(Programmable)	
	Day/Night Delay Time	0-30min(Programmable)	
	MPPT Tracking Range	(Battery Voltage +1.0V)-Voc*0.9 *2	
Load Parameters	Output Power	1-60W	
	Output Voltage	20-45V	
	Current Setting Range	0.15-3.0A(Programmable)	
	Min Current	100mA(Dimming)	
	Current Precision	±2%	
	Dimming	0-100%(Programmable)	
	Voltage Of Start Dimming	11.8-12.5V(Gel,AGM and Liquid);10.0-17.0V(Lithium)	
	Dimming Percentage	1-20%(Programmable)	
System Parameters	Max Tracking Efficiency	>99.9%	
	Max Charge Conversion	97.5%	
	Max Discharge Conversion Efficiency	96.5%	
	Self Consumption	6-25mA	
	Dimensions	96*85.8*23.1mm	
	Net Weight	360g	
	Ambient Temperature	-35- +60°C	
	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.

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	Item	MPPT1575-DCLi-RS485	MPPT2075-DCLi-RS485
Battery Parameters	System Voltage	12V/24V automatic recognition	
	Max Charging Current	15A	20A
	Max Volt On Battery Terminal	35V	
	Battery Type	Liquid, Gel, AGM and Lithium(Programmable, default: Lithium)	
	Liquid, Gel and AGM	MPPT Charging Voltage	<14.5/29.0V@25°C
		Boost Charge Voltage	14.5/29.0V@25°C
		Equalization Charge Voltage	14.8/29.6V@25°C(Liquid, AGM)
		Float Charge Voltage	13.7/27.4V@25°C
		Low Voltage Disconnect	10.8-11.8V/21.6-23.6V(Programmable)
		Reconnect Voltage	11.4-12.8V/22.8-25.6V(Programmable)
		Overcharge Protection	15.5V/31.0V
		Temperature Compensation	-4.17mV/K per cell(Boost, Equalization),-3.33mV/K per cell(Float)
	Lithium	Boost Charging Voltage	10.0-32.0V(Programmable,default:14.4V)
		Boost Voltage Reconnect Voltage	9.2-31.8V(Programmable,default:14.0V)
		Low Voltage Disconnect	9.0-30.0V(Programmable,default:10.8V)
		Low Voltage Reconnect	9.6-31.0V (Programmable,default:11.8V)
		0°C 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 Voltage	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 Discharge Conversion Efficiency	96.5%	
	Self Consumption	7-10mA	
	Dimensions	145*85.8*30mm	145*95.8*42.5mm
	Net Weight	600g	720g
	Ambient Temperature	-35-+60°C	
	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.