

User Manual of MPPT Solar Charge Controller

Suitable for 12V/24V batteries

Negative Ground
30A/60A

Maximum PV Voltage(Voc):DC100V



TP-SC24-30N-MPPT
TP-SC24-60N-MPPT

Please keep this handbook in case of need



Important safety instructions (Please keep this handbook for future reference. Please read all instructions and precautions in the manual carefully before installation.)

This manual contains all the safety, installation and operation instructions of this series solar charge controller (hereinafter referred to as "controller"):

- Install the controller in a well ventilated place. The controller's case temperature may be very high during operation. Please don't touch the metal shell directly to prevent burns.
- It is recommended to connect fuse or circuit breakers to the input, load and battery terminals to prevent electric shock hazard during use.
- After installation, check all wiring connections are secure, so as to avoid the danger of heat build-up caused by virtual connection.
- If the controller does not display properly when first use, please cut off the fuse or circuit breaker immediately and check whether the wiring connection is correct or not.
- If the solar system needs to connect the inverter, please connect the inverter directly to the battery, instead of the load terminal of the controller.
- Don't disconnect the battery when the controller is charging. Otherwise, it may damage the DC load.

Operation fault codes description

Code	Description	Code	Description	Code	Description
001	Battery over-voltage	—	—	100	Trigger over-voltage protection
002	PV over-voltage	020	Internal over-temperature	200	Command mode
004	Overcharging	—	—	400	Battery system unrecognized
008	Over-discharging	080	Battery under-voltage	—	—

Table 1

System Voltage and Battery Types

1)The controller identifies the system voltage according to the battery voltage at start-up. And the controller will re-identify the system voltage when power-off and restart. Please ensure the system voltage displayed in controller is consistent with the actual voltage. Otherwise, need to recheck the battery pack voltage.

Note: Please refer to Table 9 for the battery detailed system identification voltage.

2)The controller has set 3 kinds of conventional battery charging parameters (Table 2). To charge other types of batteries, please select "USE", then set up by PC software or APP. The controller can identify 12V/24V ONLY. To charge lithium battery, please select "Lit", then set up on the controller.

Battery type	Constant voltage = C * N (V)	Floating voltage = F * N (V)	1. C = Constant charging parameter. (9 ≤ F < C ≤ 15) 2. F = Floating charging parameter. (9 ≤ F < C ≤ 15) 3. N = Series number of battery. (1 ≤ N ≤ 2) [e.g. N=2, battery system is 24V] 4. Example: If battery system is 24V, then N=2; If battery pack's saturation voltage is 28.4V, then C=28.4/N=14.2V.
Flooded(FLD)	14.6 * N	13.8 * N	
Sealed(SEL)	14.4 * N	13.8 * N	
Gel(GEL)	14.2 * N	13.8 * N	
User (USE)	C * N	F * N	
Li-ion(Lit)	According to the specifications of the selected lithium batteries, charging and protection parameters can be set through the controller. Example: Step1: Enter the setup mode. Step2: Set the battery type to "Lit". Step3: Set the parameters of S05-S10. Step4: Save the setting parameters and exit. Note: Please refer to Table 7.		<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px; margin-right: 5px;"> Cell Specification Nominal Voltage: 3.7V Charge Voltage: 4.2V Cut-off Voltage: 2.7V </div> <div style="margin: 0 5px;">→</div> <div style="border: 1px solid black; padding: 2px;"> Reference Settings S06: 22.2V Nominal Voltage S05: 25.2V Charge Voltage S07: 16.2V Under-volt protection </div> </div>

Table 2

Working status instruction

User can identify the controller current working status according to the flash rule of the light. (When the screen is off.)

Indicator Light	Instruction
The first light is always on(A)	Standby
All lights flashing(ABCD)	Error warning
Three lights turn on sequentially(ABC)	Charging
The fourth light is always on(D)	Load indicators

Table 3 (Tip: A/B/C/D comes from Figure 1)

1. Characteristics

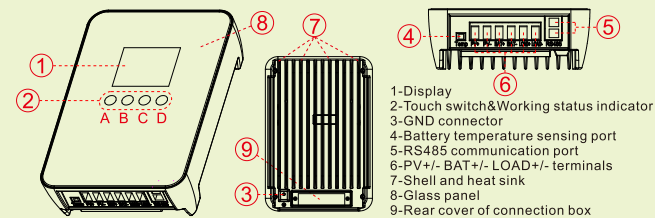


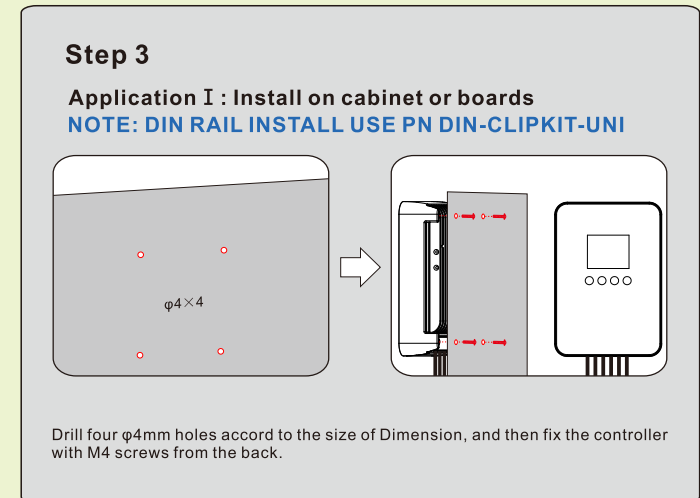
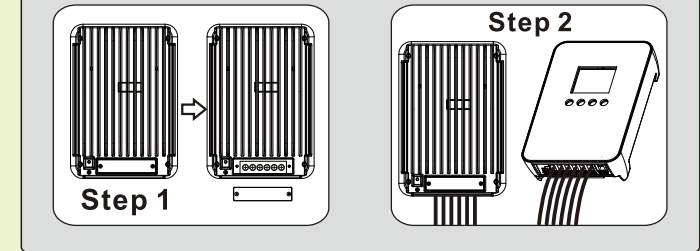
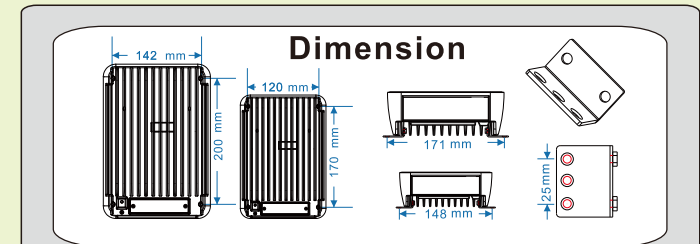
Figure 1

2. Product List

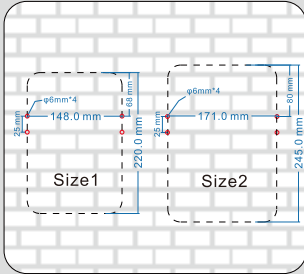
	Description	Quantity
Product	MPPT controller	1 unit
	Suspension hanger	2 pcs
Installation accessories package	Temperature sensing cable	1 pcs
	M4 screws (for mounting backboard)	2 pcs
	M4 screw (for controller)	4 pcs
	Plastic expansion particles	2 pcs
	User manual	1 pcs
Information pack	Operational instructions	1 pcs
	TP-SC-USB-RS485 PC interface cable	
Optional	TP-SC-WIFI external wifi adapter	

Table 4 (If there are any parts missing, please contact dealer.)

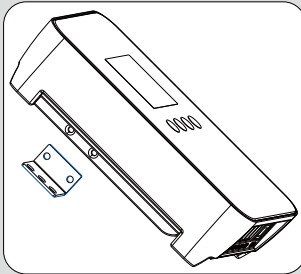
3. Installation Instructions



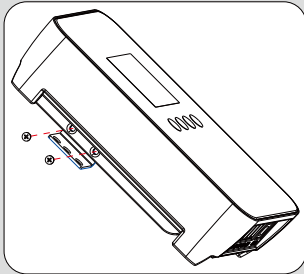
Application II: Mounting installation



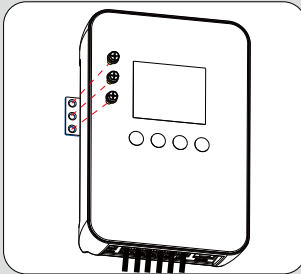
1. Measure and mark the distance on the wall, drill $\phi 6\text{mm}$ holes and insert plastic expansion particles and tighten.



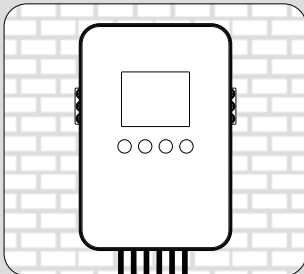
2. Align the installation accessories with the mounting holes on the controller.



3. Fasten the installation accessories to the controller with M4 screws.



4. Tighten and fix the controller to the wall with M4 screws.



5. Well-installed.

Remark:

- Above steps of mounting backboard are suitable for general wall installation. If installed on wooden wall, use self-tapping screws to fix it directly.
- Be cautious to the controller installation position, keep 20cm space up and down for good ventilation and heat dissipation.
- The ambient temperature of installation position must be within -20°C ~ $+50^{\circ}\text{C}$, otherwise, the controller may not work properly.

4. Serial connection(string) of solar panels

The Table 5 is the number(N) of solar panels in series, for reference only.

$$\text{Voc} * \text{N} = \text{PV}_{\text{input}} < \text{DC100V}$$

System Voltage	Voc<23V		Voc<31V		Voc<34V		Voc<38V		Voc<46V		Voc<62V	
	Max.	Best	Max.	Best	Max.	Best	Max.	Best	Max.	Best	Max.	Best
12V	4	2	3	1	2	1	2	1	2	1	1	1
24V	4	3	3	2	2	2	2	2	2	2	1	1

Table 5

5. DC Load Output Voltage and Max. Discharge Current

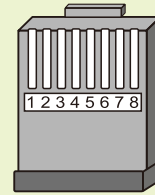
The controller has DC LOAD output function, and its output voltage range is the same as battery pack. It can supply power to DC LOAD continuously if the DC LOAD's current is within the rated range. When the DC LOAD is over-current, the controller will be faulted. After 1 minute, the controller will try to recover. If failed, it will recover the 2nd time after 3 minutes; If failed again, it will recover the 3rd time after 5 minutes. If the 3rd recovery failed, the controller will STOP working. Controller should be restarted manually.

6. Communication port description

The communication port of the controller is compatible with RS485-USB communication cable for real-time monitoring by PC software and Wi-Fi module to have remote cloud monitoring by APP. The communication port is a standard 8 pin RJ45 interface, and the pins are defined as follows(Table 6):

PIN	Function
1	RS485-A
2	RS485-B
3	Dry contact
4	Dry contact
5	GND
6	GND
7	+5V(Non-Isolated)
8	+5V(Non-Isolated)

Table 6



(Figure 2)

(Note: The pin definition is applicable to our related products ONLY!)

When the Load output is off due to the triggering protection mechanism, the dry contact output interface will be ON (low impedance). Otherwise, it is OFF (high impedance).

The controller has dual RS485 communication ports. It can be used for communication and parallel connection.

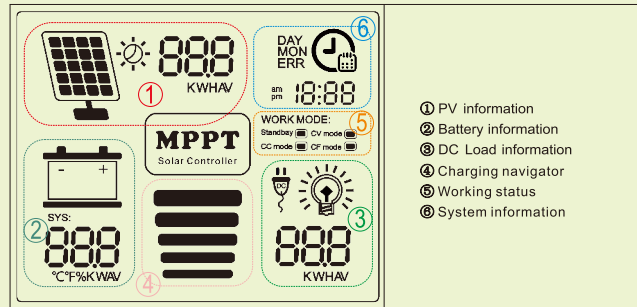
If need to monitor multiple controllers centrally, please set the device address order (1~254) of the controllers accordingly. For example, 5 controllers in parallel connection and monitor centrally, set controllers' address order as 1, 2, 3, 4, 5.

If want to monitor the multiple controllers in Master-Slave communication, set the host controller address to 255. For example, 5 controllers in parallel connection, just need to set the MASTER(host) controller address order as 255.

Tip: For more information, please refer to the official website document.

7. Operation

7.1 LCD display area description



- PV information
- Battery information
- DC Load information
- Charging navigator
- Working status
- System information

7.2 Button Operation: (Four buttons: PV, BAT/up, DC/down, S)

Button	Accessible information	In setup mode function
	PV voltage/PV current/ PV power/PV total energy	Go up/increase
	Bat voltage/Bat current/Bat power/Bat percentage/ Bat temp/Bat type/Device address	
	Load voltage/Load current/Load power/ Load total energy/Load working mode	

Button	Operational instructions	Setup items
	<ul style="list-style-type: none"> Long press 3S to enter or exit setup mode Press the button: <ul style="list-style-type: none"> -> Selection of settable parameters S01~S14. -> Save parameters before exit 	S01 Bat-Type->USER/SEL/FLD/GEL/LIT S02 Device address S03 Load mode->ON/OFF/USER S04 Lead-acid battery system voltage S05 Charge-Volt->9~30V S06 Nominal-Volt->8.5~29V S07 Under-volt protection voltage S08 Under-volt recovery voltage S09 Over-volt protection voltage S10 Over-volt recovery voltage S11~S12 Realtime set S13~S14 Date set Tip: LF1(12V LiFePO4); LF2(24V LiFePO4); LC1(12V Ternary lithium); LC2(24V Ternary lithium);

Table 7

8. Common fault and trouble shooting.

Common Problems	Possible Reasons	Solution
Controller cannot start up, screen can not be on.	Battery positive and negative reverse connected.	Check the wiring, reconnect in right order.
Controller not charging, PV voltage undetectable.	PV Input positive and negative reverse connected.	Check the wiring, reconnect in right order.
Switching from Standby and CC modes in circular manner.	Number of solar panels is too less in series and PV voltage is low.	PV Vmpp voltage must be greater than Vbat. Please refer to the proposed series-parallel scheme(Table 5)
	It may occur in cloudy weather or in early morning and at dusk.	Normal phenomenon.
Controller is on and PV voltage is normal, but not charging.	Unreasonable configuration of solar panels.	Based on sufficient power, please refer to the proposed series-parallel scheme(Table 5)
	The controller can not recognize battery system voltage (The "System" in LCD flashes).	Check whether the battery voltage in LCD is in the range of controller system recognition.
The battery is in a low energy or empty for a long time.	Solar panels quantity are too less to generate enough energy.	Increase solar panels quantity.
	Battery capacity is too small to Store enough energy.	Increase battery capacity.

Table 8

9. Parameters

Product Category	Model	TP-SC24-30N-MPPT	TP-SC24-60N-MPPT
	Battery system voltage range	MPPT efficiency	$\geq 99.5\%$
Standby consumption		0.5W~1.2W	
Heat-dissipating method		Natural-Cooling	
Input Characteristics	12V system	9VDC~15VDC(Lead acid)	
	24V system	18VDC~30VDC(Lead acid)	
	Li-ion	$\leq 30\text{VDC}$ (Optional activation function)	
Charge Characteristics	Max. PV input voltage(Voc)	100VDC(Default)	
	Min. Vmpp Voltage	Battery voltage + 2V	
	Start-up charging voltage	Battery voltage + 3V	
	Low input voltage protection	Battery voltage + 2V	
	Over voltage protection / Recovery	100VDC/95VDC(Default)	
	Rated PV Power	12V system	390W
LOAD Characteristics	24V system	780W	1560W
	Li-ion	378W~756W	756W~1512W
Display & Communication	Activation for lithium battery	STANDARD	
	Battery types(Default SEL battery)	Sealed(SEL), Gel(GEL), Flooded(FLD), User-defined(USE), Li-ion(Lit)	
	Rated charge current	30A	60A
	Temperature compensation	$-20\text{mV}/^{\circ}\text{C}/12\text{V}$	
Other Parameters	Charge method	3-stages: CC(Constant Current), CV(Constant Voltage), CF(Floating Charge)	
	Output voltage stability accuracy	$\leq \pm 0.2\%$	
	Load voltage	Same as battery voltage.	
	Rated load current	20A	30A
Protection	Load control mode	On/Off mode, PV voltage control mode, Dual-time control mode, PV + Time control mode	
	Low voltage protection	11V/22V (12.5V/25V Restored); Settable	
IP(Ingress protection)	Setting method	PC software / APP / Controller	
	Display	High-definition LCD segment code backlight display	
Noise	Communication	Dual RJ45 port/ RS485 protocol / PC (via RS485-USB Cable) & APP (via Wi-Fi module) / Centralized monitoring (via parallel connection and RS485-USB cable)	
	Altitude	Input & output over-volt / low-voltage protection, reverse polarity protection, over-heating protection, battery shedding protection etc.	
Max.Wiring size	Operating ambient temperature	-30°C ~ $+60^{\circ}\text{C}$	
	Storage temperature	-40°C ~ $+75^{\circ}\text{C}$	
Recommended breaker	IP(Ingress protection)	IP43	
	Noise	$\leq 10\text{dB}$	
N. weight (kg) / G. weight (kg)	Altitude	0~3000m	
	Max.Wiring size	28mm ²	
Product size/Packing size(mm)	Recommended breaker	$\geq 63\text{A}$	$\geq 100\text{A}$
	N. weight (kg) / G. weight (kg)	1.65 / 1.98	2.35 / 2.78
	Product size/Packing size(mm)	220*148*58.5/289*212*105	245*170*63.5/334*225*123

Table 9