

TP-SC Series Smart Solar Charge Controller

TP-SC24-20

User Manual



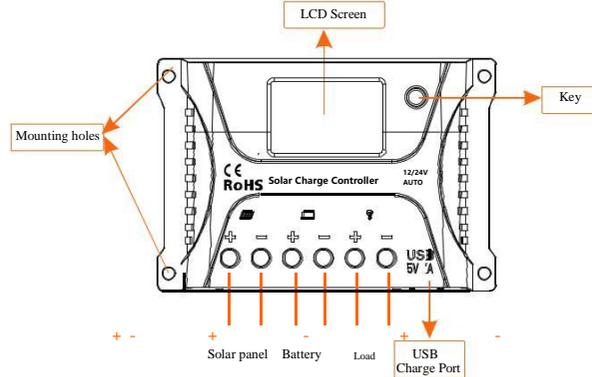
Dear users,
Thank you for choosing our product. Before using the product, please read this manual carefully.

Manual version: 1.01 The contents of this manual are subject to change without prior notice.

Product Features

- 1.12V/ 24 V system voltages are automatically recognized.
- 2.An upgraded 3-stage PWM charging algorithm is adopted. Application of an equalizing charging to the battery periodically or when over discharged, can effectively prevent the battery from non-equalization and sulfation, thus extending the battery's service life.
- 3.With temperature compensation charging, charging parameters are automatically adjusted.
- 4.A wide range of load working modes facilitate the product's application to different types of load.
- 5.The product provides overcharge, over-discharge, overload protection, as well as short-circuit protection.
- 6.By virtue of an advanced load starting method, large-capacitance loads can be started smoothly.
- 7.The product provides an LCD screen for voltage and current measurements.
- 8.The user-friendly design ensures convenient and intuitive operations.
- 9.Boasting an industrial grade design, the product can function well in various tough conditions.
- 10.TVNS lightning protection is included.

Panel Structure

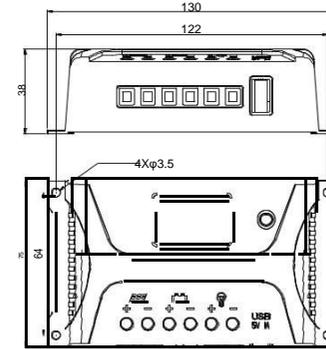


Installation Instructions and Precautions

1.The controller shall be installed securely, and its dimensions are as follows:

TP-SC24-20 External dimensions:130×75×38 (mm)
Installation dimensions:122×64(mm)

2.Installation hole diameter:3.5(mm)



TP-SC24-20

3. Operation Instructions

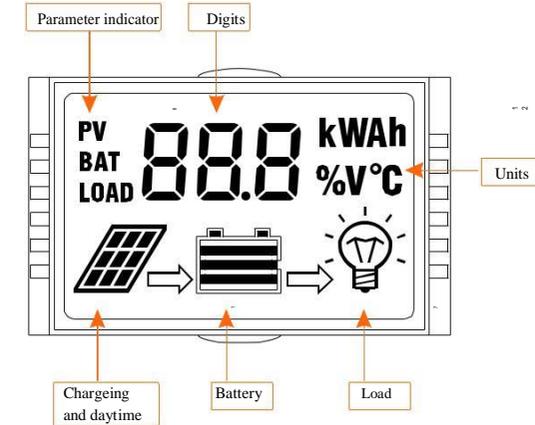
- a)Step 1: Connect the battery. If the connection is correct, the controller screen lights up; otherwise, check whether the connection is correct. Always connect battery first and disconnect battery last to prevent damage to the charge controller.
- b)Step 2: Connect the solar panel. If sunlight is present and strong enough (the solar panel voltage is greater than battery voltage), the sun icon on the LCD screen is on; otherwise, check whether the connection is correct.
- c)Step 3: Connect the load. Connect the load leads to the controller's load output terminal, and the current shall not exceed the controller's rated current of 20A.

- 4.As the controller generates heat during operation, it is recommended that the controller be installed in an environment with good ventilation conditions.
- 5.Choose cables with large enough capacity to minimize losses. We recommend 12AWG cables for most applications.
- 6.The controller has a common positive pole inside. If grounding is needed, ground the positive pole.
- 7.It's important to fully charge the battery regularly. At least once full charging every month is recommended, and failure to do that may cause permanent damage to the battery. Only when in-flow energy outpaces out-flow energy can the battery be charged fully. Users shall bear this in mind when configuring the system.
- 8.Check that each of the controller's connection terminals are tightened securely; if not, the terminals may suffer damage when there is excessive current.

State Indicators

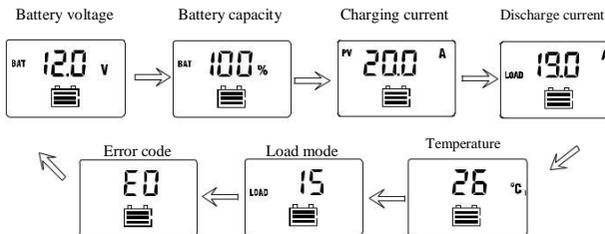
LCD Icon	Indicated Object	State
PV	Solar Panel Current	Cycles
BAT	Battery Voltage	Cycles
LOAD	Load Current	Cycles
	Daytime or Charging	Steady On
	Night Recognition	Steady Off
	Load Short Circuit or Overload	Quick Flashing
	Load Switched On	Steady On
	Load Switched Off	Steady Off
	Normal Battery	All On
	Over-Discharge	Outline Flashes
	Over-Voltage	3 Dashes Flashing

LCD Screen Illustration



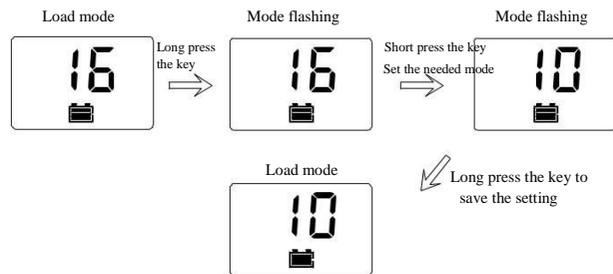
Browsing Menu on LCD Screen

The following menu is shown in an automatic cycle on the screen, with an interval of 3s.



Setting Menu on LCD Screen

Long press the key in any mode to enter the load mode setting interface, and the load mode begins to flash. Short press the key to adjust the load mode, and long press the key again to save and exit mode setting or wait for 10s to let the system save and exit automatically.



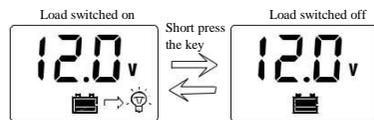
Five Load Working Modes

1. Pure Light Control (0): When sunlight disappears and the solar input voltage drops below the set point, the controller initiates a one minute delay, and then turns on the load output. When sunlight returns and the solar input voltage exceeds the set point, the controller initiates a one minute delay, and then turns off the load output.
2. Light Control + Time Control (1 to 14): The starting process is the same as pure light control. After operating for a preset period of time (settable from 1 to 14 hours), the load turns off automatically.
3. Manual Mode (15): In this mode, the user can switch the load on or off by the key, no matter whether it's day or night. This is the Default mode.
4. Debugging Mode (16): This mode is same as Pure Light Control mode without the 1 minute delay. This mode enables a quick check of the system installation and function.
5. Normal On (17): This mode is the same as Manual Mode (15) except now the load on/off Key is disabled.

LED Display	Mode
00	Pure light control mode
01-14	Light control + time control (1 to 14 hours)
15	Manual mode (default)
16	Debugging mode
17	Normal on mode

Manually Switching On/Off Load

When the load mode is set to 15 (manual mode), short press the key to switch on or off the load.



Note: Because load startup has a soft start function, display of the load icon on the LCD screen may have a slight delay after pressing the on/off key.

Overload and Short Circuit Recovery

Overload and short circuit automatic recovery time: 5s delay for the 1st occurrence; 10s delay for the 2nd occurrence; 25s delay for the 3rd occurrence; 30s delay for the 4th occurrence; after the 5th occurrence it requires manual recovery (press key button) or automatic recovery after 24hours.

Error Code List

Code on LCD screen	Corresponding error
E0	No error
E1	Battery over-discharging
E2	Battery overvoltage
E4	Load short circuit
E5	Overload
E6	Controller inner temperature over heat

Common Problems and Solutions

Symptoms	Causes and Solutions
LCD screen does not light up.	Check whether the battery is correctly connected. Check battery voltage >9V.
Incomplete display or no renewal on LCD screen	Check whether the ambient temperature is too low and whether the display recovers when the temperature rises. Check battery voltage >9V.
No charging with sunlight present	Check whether the solar panel is correctly connected, and contact is good and reliable. Check whether the solar panel voltage falls below the battery voltage.
The battery icon flashes quickly, and there is no output.	System overvoltage. Check whether the battery voltage is too high.
The battery icon flashes slowly, and there is no output.	The battery is over-discharged, and will recover after recharged adequately.
The load icon flashes quickly, and there is no output.	The load's power exceeds the rated value or the load is short-circuited. After the problem is solved, long press the key or wait until it recovers automatically.
Other symptoms	Check whether wiring is sound and reliable, and system voltage is correctly recognized.

Technical Data Sheet

TP-SC24-20	
Rated Current	20A
Current Display Function	Displays Load and Solar Current
System Voltage	Automatic recognition of 12V / 24V
Self Consumption	< 10mA/12V ; < 12mA/24V ; < 0.3W
Max. Solar Panel Input Voltage	< 55V
Max. Battery Input Voltage	< 35V
Overvoltage Protection	17.0V @ 12V ; 34V @ 24V
Equalize Charging Voltage	14.6V @ 12V ; 29.2V @ 24V
Boost Charging Voltage	14.4V @ 12V ; 28.8V @ 24V
Float Charging Voltage	13.8V @ 12V ; 27.6V @ 24V
Charging Recovery Voltage	13.2V @ 12V ; 26.4V @ 24V
Over-Discharge Recovery Voltage	12.6V @ 12V ; 25.2V @ 24V
Over-Discharge Voltage	11.1V @ 12V ; 22.2V @ 24V
Equalize Charging Interval	30 days
Equalize Charging Time	1 Hour
Boost Charging Time	2 Hour
Temperature Compensation	-3.0mV/°C/Cell
Light Control Voltage	Light Control On 5V @ 12V ; 10V @ 24V Light Control Off 6V @ 12V ; 12V @ 24V