SDH-P Series Waterproof Solar Hybrid Charge Controller

USER MANUAL

Compatible Models:

SDH-P12100-10A

SDH-P24100-10A

Preface

Thank you very much for selecting our product!

This manual offers important information and suggestions with respect to installation,use and troubleshooting,etc.

Please read this manual carefully before using the product any pay attention to the safety recommendations in it.

Contents of this manual are subject to change without notice, and updates will be added in the new version of the user manual.

For ease of reference, please take good care of this manual

Contents

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Products Introduction

1.1 Product Description

SDH-P Series Grid solar hybrid controller with all functions, including grid(public power AC power)charger,solar charger,smart digital control etc.When the battery power is insufficient to supply load, Grid charger will start automatically.Has the function of BMS(battery management system),intelligent development of grid and solar energy,make priority use of solar energy and grid energy as back up,the same time,grid energy can supply the load for any emergency to continuing working.on the other hand, due to solar energy is not stable from solar panel,grid power can effectively compensate for the solar energy. Therefore. Widely used in street light,garden Lights and express high way lighting system.

Grid solar hybrid charge controller,can be applied to use different loads as the same as battery voltage,like DC motor,LED driver etc.

1.2 Main Features

- 6 Times periods Load Control(Timer)
- Both grid or solar power can be charge battery
- AC grid will power load directly when battery broken or be steal
- Three-stage battery charging with PWM
- Waterproof IP67
- Max output efficient of 96%
- Aluminum housing for better cooling
- -40℃~+55℃ Wide temperature range

1.3 Technical Parameters

Product Name		Waterproof Grid Solar Hybrid Controller	
Model		SDH-P-12100-10A	SDH-P-24100-10A
Grid Specification	Input Voltage	220AC±20%	
	Output Power	≤100W	
	Output Voltage	14.5V/12V	29V/24V
	Output Current	7A/12V	3.5A/24V
Battery Specification	System Voltage	12V	24V
PV Specification	Max.Voltage	55V	
	Max. Current	15A	
Output	Output Current	10A	
	Output Voltage	Same as battery voltage	
Dimension(L* W *H)		130*83.5*49.5mm	
Weight		0.9kg/unit	

1.4 Dimension

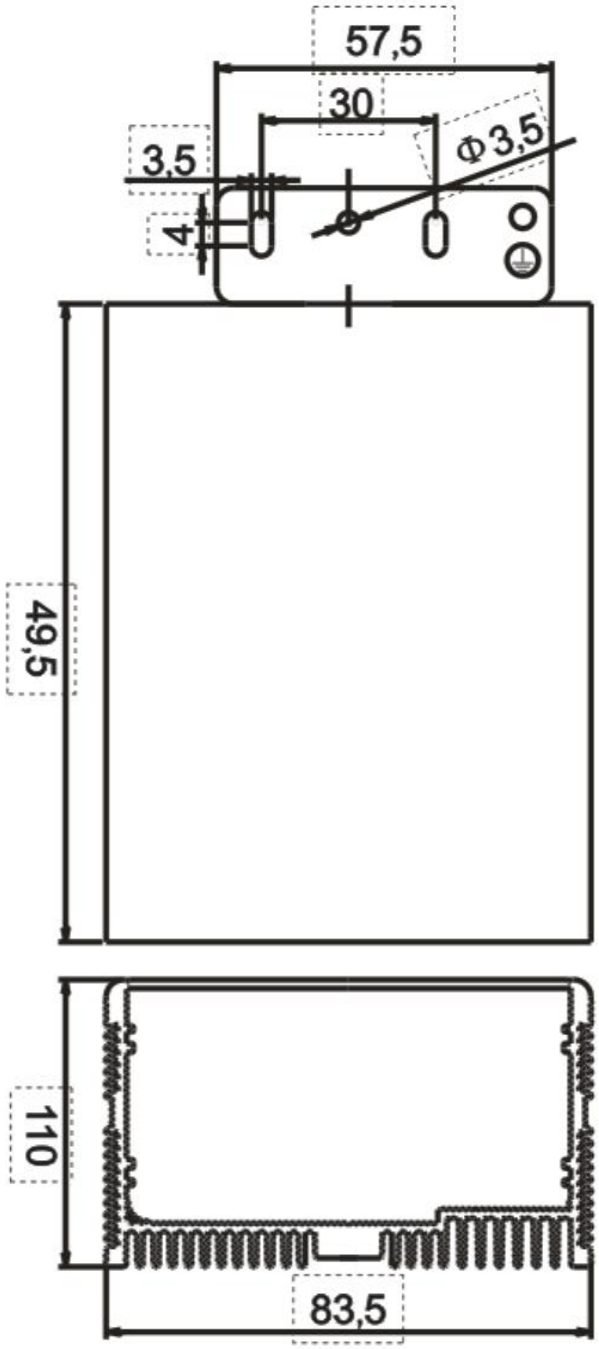
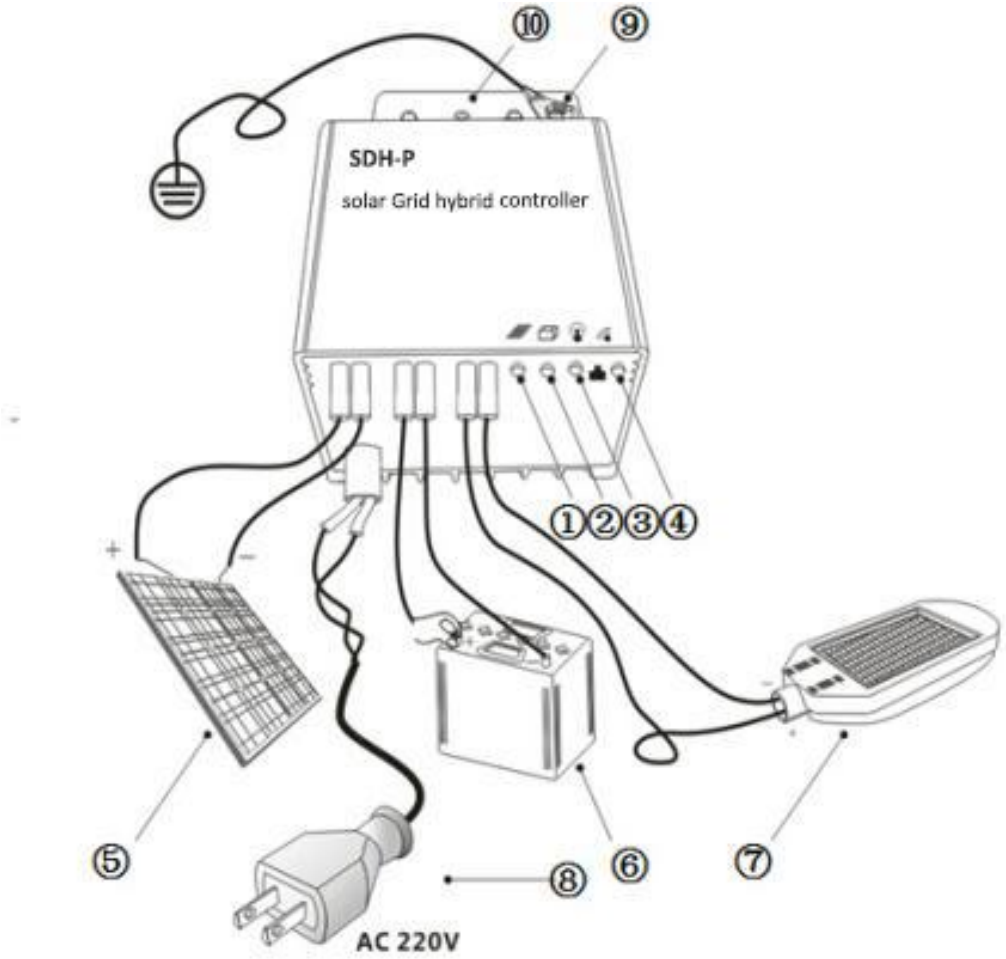


Figure 1.4 Product appearance

Installation

2.1 Panel Introduction



①PV indicator (green)
② Battery indicator (red/green)
③ Load indicator (yellow)
④ IR communication connector
⑤ PV connection terminal
⑥ Battery connection terminal
⑦ Load connection terminal
⑧ Grid AC
⑨Ground Cable connection
⑩Installation hole

2.2 LED Indicators

A,PV Indicator

Color	Indication	Working State
Green	On Solid	PV Voltage higher than L-Ctrl voltage.
Green	Flash Fast	Battery is over voltage
Green	OFF	PV Voltage higher lower L-Ctrl voltage.
Red	On Solid	Grid AC is Charging
Red	OFF	Grid AC is NOT Charging
Red	Flash Slow	Grid Ac Connection is fault,recheck.

B,Battery Indicator

Color	Indication	Working State
Green	On Solid	Battery is Normal
Green	Flash	Battery is full
Yellow	On Solid	Battery is under voltage
Red	On Solid	Battery is over-discharged, turn off Load auto

C,Load Indicator

Color	Indication	Working State
Yellow	On Solid	Load is ON
--	OFF	Load is off
Yellow	Flash Fast	Load short circuit or open circuit
Yellow	Flash Slow	Load string number is too low Or overload limited power output

2.3 Fix the controller

Fix the controller at a place free of direct sunlight, high temperature, and immersion risks. Take care of the radiator under the device, which is used to decrease device temperature during full-power operation. Measures should be taken to avoid obstruction and to ensure heat dissipation through natural convection. For installations in confined space such as lamp post, the radiator ribs should be preferably oriented along the air flow direction.

2.4 Connection method

A connection method commonly used by electricians is recommended below. Please connect each wire of the controller according to standard procedures.

● All delivered wires for the controller have reserved cuts, which facilitate easy stripping during connection while preventing short circuit due to contact between wires.Please follow the steps below during installation and avoid removing insulation of all six wires at one time.

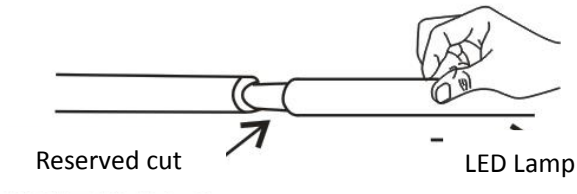


Figure 2.4.1 First step during wiring – wire stripping

● Cross the copper wires in the controller lead and load lead, and then twist them around the rear section of each other and tighten them. This wiring method provides a large contact area and a high connection force, thus ensuring long-time reliable connection. The connectors should be tightened as well. The wires should be preferably fixed with cable ties to prevent loosening of connectors during wire vibration in mobile applications.

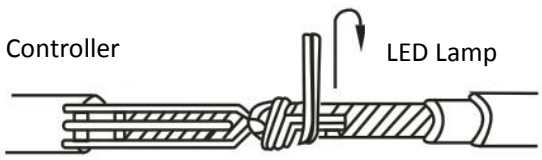


Figure 2.4.2 Second step during wiring - connection

● Use waterproof insulation tapes to wrap around exposed parts of wires. To ensure their reliability, high-pressure rubber self-adhesive tapes can be used as the inner wrapping layer and electrical tapes as outer layer. Measures should be taken to prevent aging and falling of the electrical tapes and consequent short-circuit accidents due to long-time use in humid and hot environments.

Figure 3.2.2 Third step during wiring – wrapping of insulation layers

● Standard wiring is critical for long-time reliable system operations. Loose or unstable wire connections may lead to excessive resistance and consequent heating at connection parts. In these occasions, the wire insulation tend to experience premature aging, which will in turn lead to short circuit, open circuit, and other failures.

2.5 Connection Step

For the sake of safety, please complete wiring in the following order: ①load, ② battery, ③pv ④ Ground cable ⑤AC

● Load connection: As the controller has not started operation, there is no response from the controller after load connection.

● Battery connection: Before connection of the battery, make sure that the battery voltage is higher than 9V so that the controller can be started. For a 24V system, make sure that the battery voltage is not lower than 18V. After completion of battery connection, the controller will start to work. 10s later, the load will be light up automatically to confirm correct wiring.

● Solar panel connection: The controller can be used for both standard 12V or 24V solar panel components and those with an open-circuit input voltage not exceeding the specified maximum input voltage. The voltage at the

highest power point of solar components should not be lower than the battery voltage.

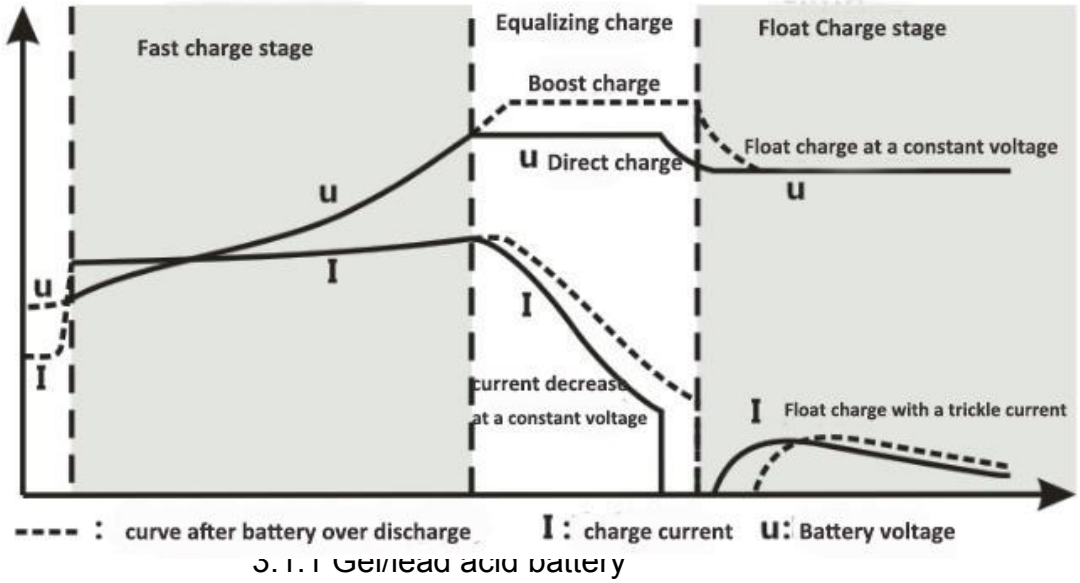
● Ground cable connection:Connect the ground cable terminal A to the controller body of the installation hole,ground cable terminal B to the ground or the street lights pole,attention to prevent electric shock caused by insulation damage.

● AC grid connection:This is the last step to connect all cables,then power on the controller with AC power,Attention that the voltage is much higher than the human body can withstand the safety voltage, please do a good job to prevent electric shock!

Instructions

3. 1 Charge Description

Charging of lead acid or gel battery: The controller manages battery charging based on specified charging curves for different types of cells and settings. If the cell type defined in the controller is lead acid or gel battery, the whole charging process includes three phases: Fast charge stage, equalize charge stage, and float charge stage.



3.1.1 Gel/lead acid battery

● Trickle per-charge stage: at the beginning of charging. If the battery voltage is too low, in order to protect the battery, to avoid large current impact caused damage to the internal structure of the battery. The controller will

charge battery in a small current. And will enter fast charge stage after the battery voltage be some improvement.

● Fast charge stage: The battery voltage has not reached the setting, and the controller will provide the maximum solar power to charge the battery. During Fast charging, the solar panel and the battery are connected directly. The voltage of the solar panel is clamped at the battery voltage.

● Equalize charge stage: When the equalizing charge voltage is reached, pulse width modulation (PWM) is activated. When the battery voltage reaches the setting, the controller continues to adjust battery voltage to maintain it at the setting and prevent over-charging of battery.and this stage will keep 2hours then enter Float charge stage.

● Float charge stage: In this phase, the battery requires no further power, but the controller still provides weak charging to meet power consumption needs of small loads and to make up for power consumption by the battery itself. In this way, the battery is always kept at a saturated state for a longer service life.

● AC(Grid)Charge :At night.when battery voltage low(11.6v for 12v system).the AC will charge battery.(the charge current see the technology data)

3.2 Discharge Description

Discharge operation mode:

The SDH-P series controller can run automatically and unattended by following a

preset mode.

3.2.1 Manual work mode

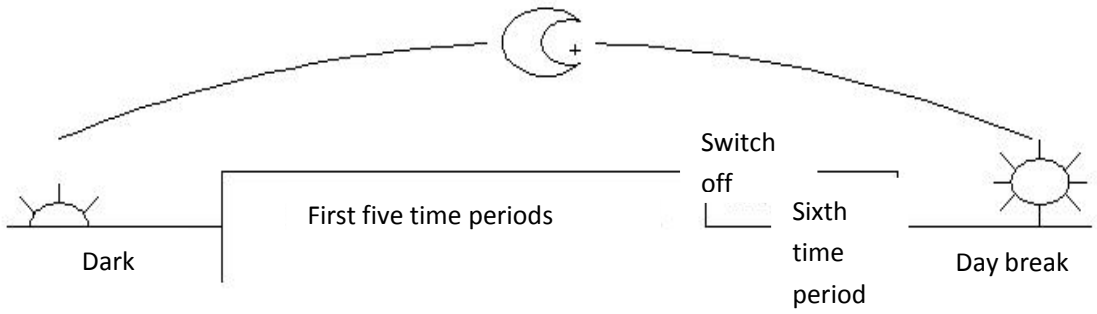
Manual mode: When applied to an independent power system, the controller work mode defaults to "manual ON/OFF". By RC-3 remote control

"F1" button, manually open or close the controller output . If the controller restarted, the operating status of the controller will not be affected.

3.2.2 Auto work mode

Automatic work with two mode.light control mode and automatic mode. Can be used in conjunction with the LED driver.to control the LED solar street lights. When the PV voltage is continuously higher than the set light control voltage for more than two minutes (20s to 10 minutes adjustable), the controller to determine the system in the daytime; when the PV voltage is continuously lower than the set light control voltage exceeds two minutes, the controller judges that the system is at night.

- Light-control mode: Under this mode.the controller will closed the output at daytime and open output at night.
- Automatic mode: under this mode.the controller will closed the output at daytime and at night the output can work in 6 different period.among them,the sixth period is the morning light period.



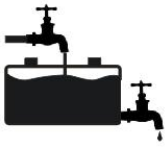
3.2.3 Test

Testing mode: This mode is used for system testing. It's almost the same as complete light-control mode. The only difference is elimination of the delay time before optical signal determination, and all other functions are preserved to facilitate checking of proper system functions during installation and testing.

Trouble Shooting

Phenomenon	Analysis	Solutions
·In daytime,PV indicator is dark ·In daytime,Load is on ·Load work only for the one whole night	·solar panel cables Connection mistake.	·check solar panel cables connection is correct or not. ·cut off the solar panel cables connection it again.
·Load Indicator flash fast & LED lamp not work.	·LED lamp cable is open circuit or short circuit. ·LED lamp is broken	·recheck the LED lamp cables connection is correct or not. ·cut off LED lamp connection cables,then reconnect.
·Load Indicator flash fast & LED lamp flash also.	LED chips connection not meet driver Range. series number too much or too low	.refer to parameter table to adjust the LED chips connection.
·Load Indicator flash slowly	·Output power over the controller rated power	·Low down the output current
·Battery indicator is red ·LED turn on for a short time.	·Battery voltage is low. ·Cables resistance is too big or the battery is damaged .AC Connection mistake or No AC	·If this occurs often,then need to check PV charging is normal or not,solar panel is blocked or not,or other reasons caused PV not charge normally. ·Battery quality is good or not. ·Check the battery cables is too long or if there is any connection not good to battery. Check the AC connection.

Protection

	Load Fault： In case of any short circuit or open circuit in the controller load connections, the controller will provide automatic protection, and the load indicator will flash rapidly. The system detects the load fault at a regular interval to determine if it has been eliminated. If the fault persists for over 7 minutes, the controller will make no further attempts to switch on the load until another attempt is made on the next day, or a manual switch-on operation will be made after the fault has been eliminated by maintenance personnel.
	Over Current Protection: When the load power exceeds the rated power by 1.1%, it will normal work,when exceeds 1.25%will protection with 60s delay.for exceeds 1.5% will protection with 20s delay
	Over Charge Protection： When charging the battery voltage is too high,the controller will automatically disconnect the charging circuit , in order to avoid damage to the battery .
	Over Discharge protection： When battery voltage discharge too low，controller will cut off the load output automatically to protect battery
	PV modules reverse polarity protection: When PV modules reverse polarity(NOT suggested), the controller will not damage,will continue to work after the correction of wiring errors.
	Battery polarity protection： When battery reverse polarity(NOT suggested), the controller will not damage,will continue to work after the correction of wiring errors
	Temperature sensor damage fault protection: When the temperature sensor short circuit or damage , the controller will default working at 25 ℃. In order to avoid battery errors and damage caused by "broken" temperature compensation.
	Over-current protection: A over-current (1.25 times rated current) protection with 60s delay is provided with inverse time lag characteristics.

Warranty

Warranty Card

Product Name_____

Product Model_____

Serial number_____

Date of purchase：_____Date_____Month_____Year

Company Name:_____

Contact:_____

Address: _____

Tel:_____

1,The product warranty period is three years since factory.

2,During the warranty period, any problem caused by normal use under the user manual (determined by the controller factory), reparation is free of charge.