
V1.0

SDI-M Series

PWM Solar Charge Controller

USER MANUAL

Compatible Models:

SDI-M10A

SDI-M20A

High Technology Create A Better Life!

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 and 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.

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Product Introduction

1.1 Product Description

SDI-M series is the solar power system charge controller with high performance and high reliability.

SDI-M series charge controller optimize the algorithm of the battery charge and discharge.provide the best possible energy to the PV output and battery storage.system losses to a minimum.The LCD screen will provides more detailed system parameters and display digital meters.and with automatic sleep capability.the lowest quiescent current can be less than 8mA.

SDI-M series products use the high-quality components.and through a rigorous quality control and factory test .Already got CE certification.

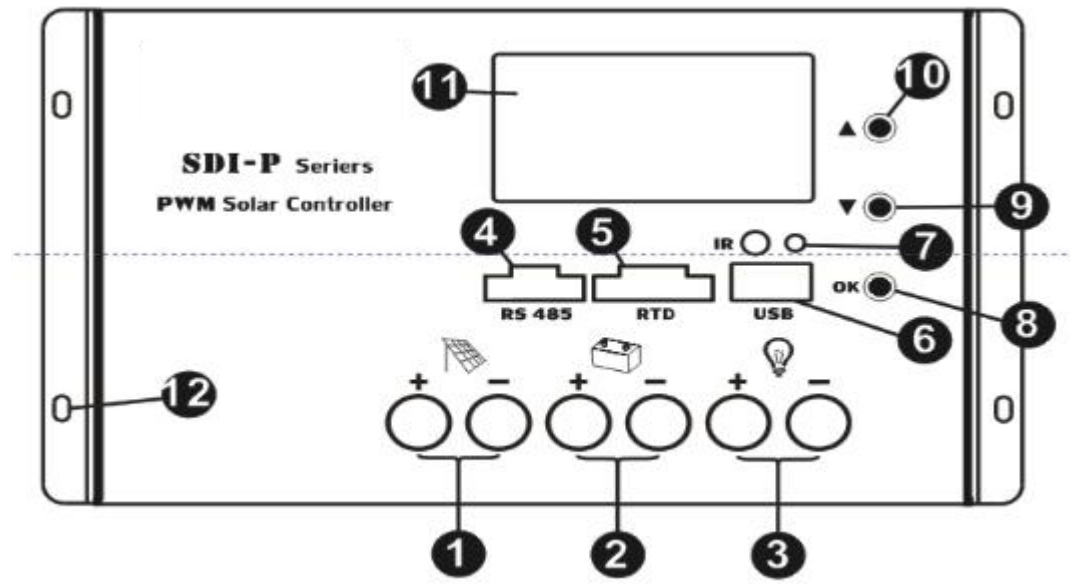
- Products can have a long-term safe and reliable operation within the definition.
- PV and Battery both with against reverse protection.
- All products are equipped with soft start and overload time limit protection, adaptation capacitive load, such as inverters.

1.2 Main Features

- Optimized PWM charging mode.support MCT three-stage charging.
- 12/24v(20A-40A type),12V/24V/36V/48V (50A to 80A) system voltage. max PV open circuit voltage at 100v
- Compatible with normal types of batteries(lead-acid,gel or custom)
- Variety parameters can be modified.(support panel keypad or infrared remote control)
- Support PV/Battery/Load key parameters display and check.
- Manual,Light Control or automatic dual period load out can be set
- Support for RS-485 interface,Modbus communication,support for PC remote monitoring (optional)
- Support USB charge port(5v 1A,optional)
- Quiescent current can lowest as 8mA
- Support for external battery temperature sensor(optional)
- Excellent Radiating design,All-metal shell heat radiating.efficient and artistic

Installation & Operation

2.1 Function



- (1) PV terminal
Positive and negative electrode for connecting PV array.
- (2) Battery terminal
Positive and negative electrode connected with battery pack.
- (3) Load terminal
Positive and negative electrode connected with DC load.
- (4) RS485 terminal
Connected with computer or other controllers to realize the remote communication.
- (5) The terminal of the temperature sensor
Connected with the controller temperature sensor that offered, to provide battery data for controller..
- (6) USB terminal
Provide 5V/1A power supply, can be charged for mobile phones and other devices.
- (7) Infrared signal sensor
Remote infrared communication.
- (8) “Enter” or “OK” button

(9) Page “down” button

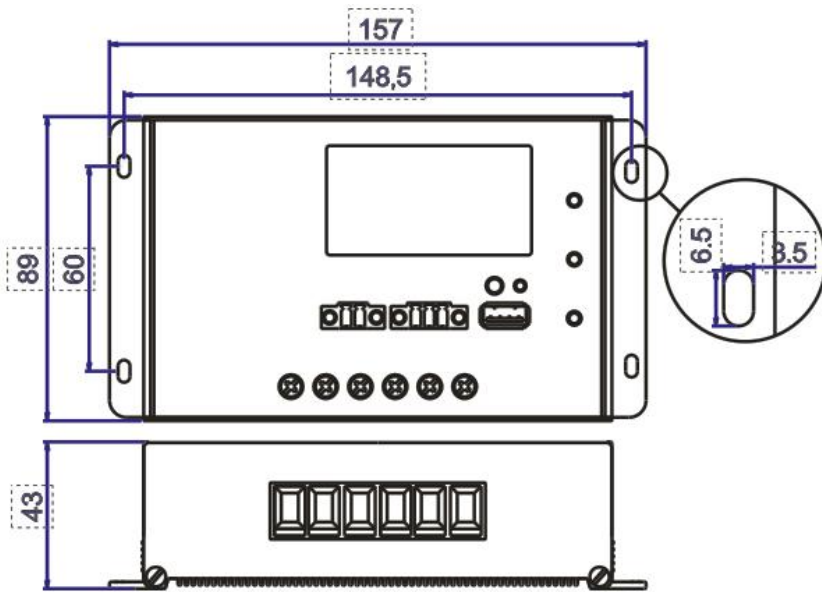
(10) Page “up” button

(11) LCD screen display

Display the operating state of controller, real-time parameters, as well as the realization of human-computer interaction. Also operating settings for the controller.

(12) Mounting holes

2.2 Dimension



SDI-M10A
SDI-M20A

Figure 2.2 Product Appearance

2.3 Installation Step

a) Type Selection

Please strictly follow the system application range .choose the most appropriate products,special attention that the PV side maximum open circuit voltage should not exceed the controller maximum allowable voltage.The SDI-M Series products can stable operation in a long-term at rated current.and can also withstand a certain amount of overload.but should be use to avoid overload operation in a long time.

b) Installation Way

SDI-M Series controller should be perpendicular installation.To ensure that the thermal resistance of the wind through the radiator is minimum, the controller external upper and lower ends should at least keep 15cm space for airiness

c) Battery Connection

Please select the connect cable diameter according to the controller input/output maximum current value.and it is better select the thicker cable.the wiring length as short as possible to avoid too long or too thin.in order to reduce the cable loss and cable temperature.

Firstly,connect the battery,after correctly connection.the LCD display will light up within 2 seconds.and enter self-test,will display the automatic identification system voltage value.If the voltage which display does not match with the actual system voltage.please enter manually set state to adjust it.Typically,as long as the battery voltage is in the range shown in the following table,the controller can correctly recognize the system voltage without manually

setting.

12V system	DC 7V-17V
24V system	DC 18V-28V

Noted.:please use insulating screw driver when wiring, to ensure the connection is secure After battery connection,the user should set up the battery type and charge way.SDI-M series with default battery type at lead-acid battery,three –stage charging.

d) Battery temperature detection cable Connection

Battery temperature detection,Mainly in order to compensate for the battery temperature characteristics of the battery at different temperature, normal is $-5\text{mV}/^{\circ}\text{C}/2\text{V}$, in the case of less demanding system can not be installed. A standard temperature Sensor(DS18B20) for SDI-M series.

e) Solar Panel Connection

Make sure the PV voltage in the correct range before wiring , to avoid damage to the controller. After connecting the PV, LCD screen will display the status of PV solar panel.

f) Load Connection

Before load connected, turn off it. If you need control the load work ,please connect it at controller load port. SDI-M controller defaults to directly open load. Users can set the controller work mode as needed.

In many cases, users also can directly connected the load to the

battery, but at this time, the current between load and battery has not be detected & controlled by the controller. We suggest user installed external fuse or breaker to avoid excessive inrush current blown the fuse which built-in.

SDI-M series controller can be soft-start and provides a larger starting current to the load, especially for the capacitive load equipment such as inverters, switching power supplies, motors etc.

2.4 Operation

After wiring , SDI-M controller will display system status and parameters and enter the normal operating state. Once abnormal, the fault code will be displayed.

1, LCD panel setup Instructions

SDI-M series comes standard with large LCD screen and 3 buttons. You can set various functions and parameters through the panel keypad. also supports infrared remote control(RC-3)to setup .

After battery connected, the LCD will enter normal working status in a few seconds, the message shown in Figure 2.4.1.

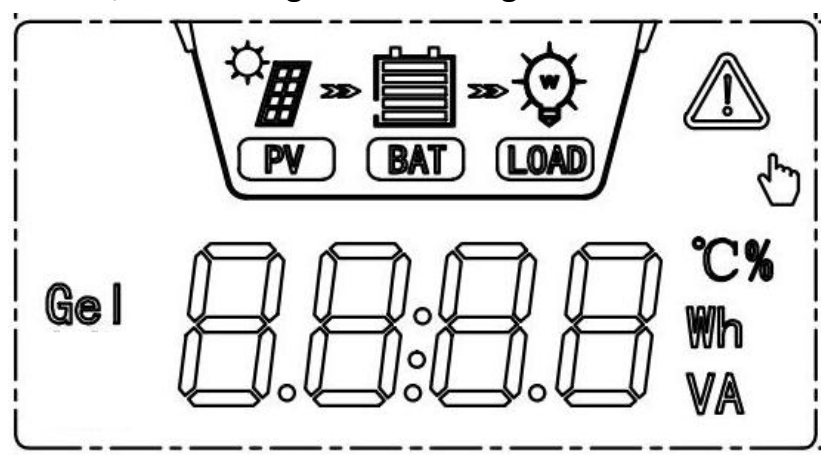


Figure 2.4.1 LCD screen display

In addition to panel displays battery type, work model, charge and

discharge status. The user can press the “up” or “down” button to view the parameters of the controller (battery voltage, load current, PV current, the charge/discharge capacity of last week)

In manual mode, press the "OK" button to on/off the load.


Note: When Controller fails, The error icon  flashes and an error code display on the LCD screen. User can press “up” or “down” button to view details.

Table of Error Code			
E101	load short-circuit	E203	Battery Over-temperature
E102	load Overload	E301	PV over-voltage
E201	Battery over-discharge	E302	PV Over-current
E202	Battery Over-charge	E401	Controller over-Temperature

2 ,Parameter Setting

Press "OK" button Continue for three seconds, the controller will enter the setup mode. As Figure 2.4.2

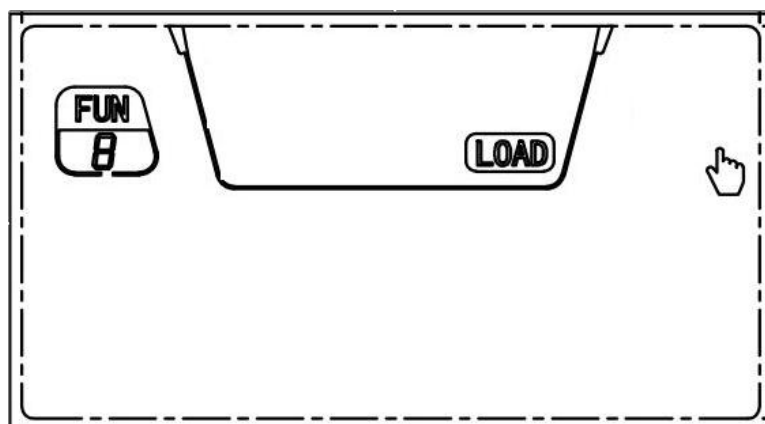


Figure2.4.2 LCD screen display

The user can press “up” or “down” button to select the controller parameters which need be modified. Then press “ok” to set it. when it flashes data can be modified. After edited press “ok” again. It will stop flash. Data be saved. After setting, press “ok” in 3 seconds or no operation in 50s, it will automatic return back to the main page.

Items	FUN	parameter
LOAD	0	Load work model
LOAD	1	1 st period time(auto mode)
LOAD	2	Morning period time (auto mode)
PV	3	Light control voltage
PV	4	Light control delay time(minute)
BAT	5	Battery type
BAT	6	System Voltage
Note:following parameter only for battery type at DIY		
BAT	7	Over voltage
BAT	8	Over discharge voltage
BAT	9	Over discharge return voltage
BAT	b	Boost charge voltage
BAT	F	Float charge voltage

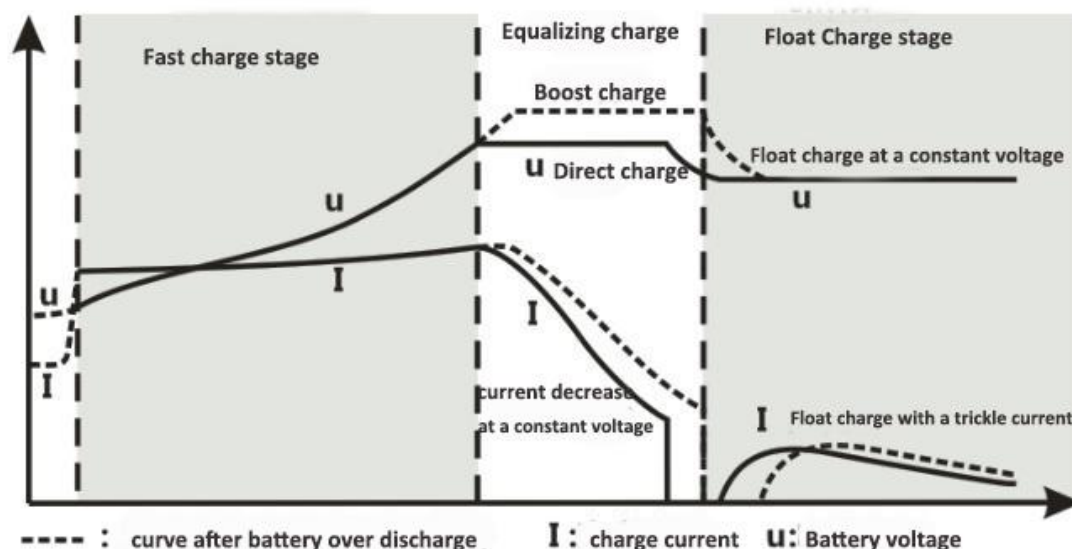
Table of Parameter Selection

2.5 Controller Operate Description

1, Charge

after the battery type be set, SDI-M series controller will be automatic running, without human intervention. In special cases, the user also can adjust parameters. The controller uses three-stage charging method provides a fast, efficient, and safe battery charging. See the following chart Figure 2.5

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 pre-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 2 hours 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.

2 ,Discharge

SDI-M series controllers can be used in unattended mode, run automatically according to the set operating mode. The controller with 3 work modes.

A) Light Control mode: when there is no sunlight, the PV voltage drops to light control starting value.load will running after server minutes.

when the sun rise, the PV voltage will rise to light control voltage start point, the load output will be off.

B) Manual mode: it will manual on or off by press "OK" button or RC-3 infrared remote control.

C) Auto mode: This mode with light control + time delay function.There are 2 period working time can be set..After Sun set, load output will be on auto and work from 1st period.Then,load will cut off at the end of 1st period.Before sun rise,it will work in 2nd period,and cut off when sun rise.

2.6 Remote Communication (optional)

SDI-M series controllers with optional 485 communication interface for remote communication through MODBUS protocol, in order to change the controller operating parameters and status, monitor status of the controller.

2.7,Others

A. Additional interfaces(optional)

SDI-M series controller configuration USB interface is optional interface, which Supports load output capability of USB-5V1A.

B. Battery Temperature Sensor (optional)

SDI-M series controller configure an external battery temperature sensor "DS18B20".

Attention & Protection

3.1 Attention

SDI-M series charge controller heat dissipation through the bottom radiator, please ensure good ventilation when vertical installed according to the best air duct, when controller work in a big current, the radiator may with a high temperature, please careful not to touch the radiator to avoid burns.

SDI-M series already built in over-current fuse of the battery charge and discharge, but we still suggested that user configure as appropriate effective fuse and circuit breaker switch according to the system case.

SDI-M series charge controllers all with TVS lightning protection and surge protection at the access terminal, but such protection is limited, when use in a large-scale system, we suggest set more effective lightning and surge protection device separately.

When use in a complex electrical environment, we suggest you make a appropriate ground connection for the system.

When connect battery and PV panel, please note the correct wiring and protection, to avoid wrong wiring and short-circuit, wiring too long, it will have a greater voltage drop and line loss, and cause excessive surges.

3.2 Protection

The controllers have the best protection features to protect the safety and reliability of the controller.

PV array input short circuit, over voltage, over current, reverse polarity protection.

Battery over charge, over discharge, reverse, polarity,

over-temperature protection.

Load short circuit, Overload time limited protection (support for capacitive load)

Controller over temperature protection

A, Over-discharge protection

the battery during discharge, more than the termination voltage of the battery discharge, it may cause pressure within the battery while also continue to discharge, positive and negative active material damage was reversible, so that the battery capacity to produce significantly reduced. When the battery reaches over-discharge protection voltage, the controller into the over-discharge protection state, turn off the load output, protect the battery will not be damaged. When the battery charge is higher than the over-discharge voltage returns, the controller exits over-discharge protection, restore power to the load.

B, over-voltage protection

When the battery voltage is increased to over-voltage point, the controller enters the state of overcharge protection, turn off the load output, in order to protect the load is not damaged. When the battery voltage is lower than over-voltage, the controller exits over-voltage protection, restoration load output.

C, Overload protection

When the load current exceeds the rated current, will enter the overload time limited protection mode, to avoid damage to the controller. When the load current is less than 1.25 times the rated current, the controller may overload long run, but by the controller temperature protection control.

D,overload time limited protection

The load current is equal to 1.25 times the rated current with working for 120s,load disconnect output; 1.5 times for 10S,2 times overload protect immediately.

E,Load Fault protection

If load short circuit, the controller automatically protection, the Controller will detect whether the load fault exclusion. If the fault persists more than 5 times, the controller will off the load output.

F,Over-temperature protection

When the controller itself temperature is too high ($> 85^{\circ}$), in order to avoid damage, the controller will cut off the load output or charging, stop working, and so on after the temperature dropped to 65° , and then restarting the load or charge.

G,Temperature sensor damage fault protection

When the temperature sensor short circuit or damage, the controller will default to work at 25°C , in order to avoid erroneous temperature compensation for damage to the battery.

H, Battery polarity protection

Battery reverse polarity, the controller will not be damaged, will continue normal operation after correcting wiring errors.

I, Light battery polarity protection

the photovoltaic cell polarity reverse, the controller will not be damaged, will continue normal operation after correcting wiring errors.

Technical Data

Model	SDI-M20A	SDI-M20A
Rated charge current	20A	20A
System voltage	12/24V	
PV max open circuit voltage	100V	
Rated load current	10A	20A
Direct charge voltage	GEL: 14.4V, LEAD ACID: 14.2V, Custom: 9~17V (12V)	
Boost charge voltage	GEL: 14.8V, LEAD ACID: 14.6V, Custom: 9~17V (12V)	
Float charge voltage	GEL / LEAD ACID: 13.8V, Custom: 9~17V (12V)	
Over-discharge return voltage	GEL / LEAD ACID: 12.6V, Custom: 9~17V (12V)	
Over-discharge voltage	GEL: 11.0V, LEAD ACID: 11.1V, Custom: 9~17V (12V)	
Loss	≤15mA(12V); ≤10mA(24V); ≤8mA(48V)	
Load dual period control	Auto	
External temperature sensor	DS18B20(optional)	
Temperature compensation	-5mV/°C/2V	
Communicate interface	RS485,MODBUS (optional)	
USB interface	5V 1A (optional)	
Dimensions	157x90x43mm	
Terminal Connection	6 AWG 16mm	
Net weight	510g	
Protection class	IP30	
LCD operate temperature range	-20°C ~ +70°C	
Work temperature range	-25°C ~ +55°C	
Humidity	≤95% N.C.	

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.