

Solarshop Control Charger

Series solar charge controller



Features for LED indicator controllers:

1. Intuitionistic LED indicators show the current system battery capacity, charging and discharging state of the battery.
2. Protection functions as overcharging, over discharging, overload and reversed connection.
3. PWM charging method makes the charging efficiency increase by 3% to 6%, compared with non-PWM charging.
4. The parameters of charging and discharging have been set during the production (special parameters need to be told

Features for LCD display controllers:

1. Vivid LCD graphic symbols
2. Protection as battery reverse-discharge protection, battery low voltage disconnection(LVD), battery reverse connection protection, over-current protection
3. Simple button operation make it easy to set the operation mode of load
4. PWM charging mode with 4 stages(bulk, absorption, float and equalized).
5. Adaptable to Sealed, GEL, Flooded and other customized battery type.
6. Automatic identification of system voltage level
7. Adjustable charge-discharge parameters
8. Automatic temperature compensation

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Series solar charge controller



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	AUTO 10 Ah	คอนโทรลล์ชาร์จเจอร์อัตโนมัติ ขนาด 10 แอมป์ 12/24 โวลต์
	AUTO 20 Ah	คอนโทรลล์ชาร์จเจอร์อัตโนมัติ ขนาด 20 แอมป์ 12/24 โวลต์
	SLC-GP2410E	คอนโทรลล์ชาร์จเจอร์อัตโนมัติ ขนาด 10 แอมป์ 12/24 โวลต์ + USB
	SLC-GP2420E	คอนโทรลล์ชาร์จเจอร์อัตโนมัติ ขนาด 20 แอมป์ 12/24 โวลต์ + USB
	SLC-GP2430E	คอนโทรลล์ชาร์จเจอร์อัตโนมัติ ขนาด 30 แอมป์ 12/24 โวลต์ + USB
	SLC-GP4830C	คอนโทรลล์ชาร์จเจอร์อัตโนมัติ ขนาด 30 แอมป์ 48 โวลต์ + USB
	SLC-GP2450E	คอนโทรลล์ชาร์จเจอร์อัตโนมัติ ขนาด 50 แอมป์ 12/24 โวลต์ + USB
	SLC-GP2460E	คอนโทรลล์ชาร์จเจอร์อัตโนมัติ ขนาด 60 แอมป์ 12/24 โวลต์ + USB
	SLC-GP4860C	คอนโทรลล์ชาร์จเจอร์อัตโนมัติ ขนาด 60 แอมป์ 48 โวลต์ + USB
	SLC-GP1220	คอนโทรลล์ชาร์จเจอร์อัตโนมัติ ขนาด 20 แอมป์ 12 โวลต์ พร้อมหลอดไฟ 2 วัตต์ + USB

Solarshop Control Charger



Series solar charge controller

A series of classic traditional solar charge controller. It is equipped with explicit LED indicator or vivid LCD for your choice. While meeting functional needs, it also offers user- friendly installation and operation. All in all, it is a popular high cost-efficient product.

Functions:

NEW

Color screen with backlit

Optional

NEW

Battery capacity percentage

LCD display

12V/24V Auto

PWM

Simple button operation

Protections

USB Output

DC Output

Solar input

Crafts

Optimized circuit design

Selection of quality materials

SCM accurate control

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Intelligent Solar Charge Controller User's Manual



Please read this manual carefully before you use this product.

1. Product Introduction

This intelligent, multi-purpose solar charge and discharge controller has a very friendly interface of fixed LCD display. Various control parameters can be flexibly set, fully meet your various application requirements. It has following features:

- Vivid LCD graphic symbols
- Automatic Identification of System Voltage level
- Automatic Temperature Compensation
- Settable Operating mode of Load
- Battery Low Voltage Disconnection (LVD)
- Overcurrent protection
- Simple button operation
- Intelligent PWM charging mode
- Adjustable charge-discharge control parameters
- Battery reverse-discharge protection
- Battery reverse connection protection

1

2. Installation

2.1 Ready tools and cables. Right cables are recommended. Ensuring that the current density $<4\text{mm}^2$, which is conducive to reducing the line voltage drop. Recommended 10A with 2.5mm^2 cable. Check weather the installation sites compliance with the relevant safety requirements. Please avoid using or installing the controller in damp, dusty places or places with flammable, explosive and corrosive gases.

2.2 Install the controller into a fixed vertical plane. In order to ensure good ventilation and heat dissipation, please keep the instance over 10cm around the inverter and also between the backboard of the inverter and the wall.

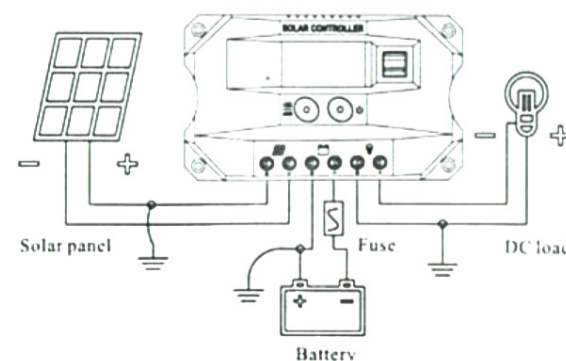
2.3 To connect the controller and the battery by cables with right polarity. The battery indicator light on the controller will be on if successfully connected, otherwise, to check and reconnect.

2.4 To connect the solar panel and the controller by cables with right polarity. If there is sunshine, the charge indicator light will be on in a circular manner to indicate right connection, otherwise, to check and reconnect.

2.5 To connect your load and the cables with right polarity and then connect with the load output port of the controller. Pay special attention to + - polarity to avoid reversed connection, otherwise, your load may be damaged.

Demolition: In case of any accident, please disconnect the solar panel, battery and load with controller in order.

Note: Reversed battery polarity will not damage the controller, but you may bear security risks on your load equipments.



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3. Operation

1 Description of LCD graphic symbol

P1: Digital parameters.

P2: Charging indication. This symbol indicates that the solar panel is charging the battery; without this symbol means solar panel can not charge the battery because of low voltage. If the symbol is flickering, means the battery is fully charged and has entered float charging state.

P3: Indication for solar panel. This symbol indicates that the connection of solar panel is detected by controller; without this symbol means the connection of solar panel can not be detected, or there is no sunshine on the solar panel.

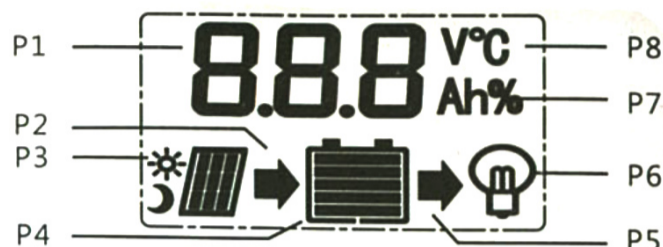
P4: 5 bars battery capacity indicator.

P5: Discharging indication. This symbol indicates that controller is in output state, otherwise not in the output state. The flickering of this symbol indicates the damages of internal control devices.

P6: Load indication. This symbol indicates that controller is in output state, otherwise not in the output state. The flickering of this symbol indicates overload or the damage of the load.

P7: A stands for the unit of current; h stands for hour.

P8: V stands for the unit of voltage.



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2 Description of Button Function:

≡ : Interface loop switch button, use the button to cycle between pages in each switch cycle sequence shown in (figure 1). Moreover, this button can perform the function of “add” in the parameter setting state.

⏻ : This button can open or shut off load in the main interface. It can perform the function of “minus” in the parameter setting state.

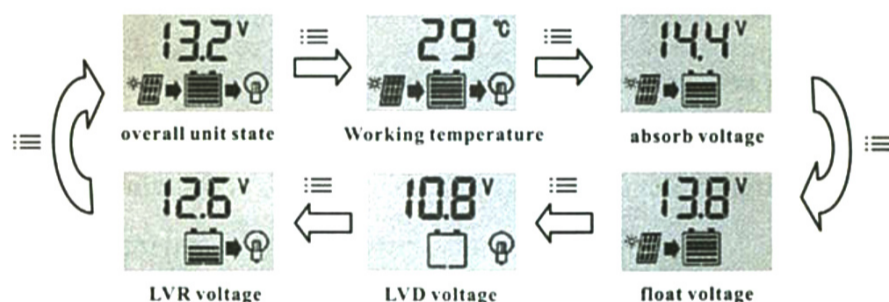


Figure 1

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3 Viewing and setting the parameters:

The controller will default entry “battery voltage” interface after correct power-on. This is the main interface. Use the button ≡ could in turn visit the following parameters interface. If the parameters in that interface could be set, long press the button ≡ (>3seconds, numbers start flashing) to enter the parameter setting interface; calling off the parameter interface after long press the button ≡ again. (The numbers stop flashing)

3.1 Overall unit state

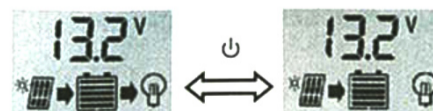
This interface shows the overall unit state (pictured at right)
It is the default interface after correct power-on, showing charging and discharging state, 5 bars battery power indication and the voltage of the battery.



3.2 Opening and shutting off the load

You can use the ⏻ button on the faceplate to open or shut off the load in the default interface.

Note: There is no such function for this button in other interface.



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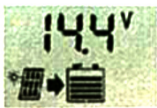
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3.3 Viewing and setting the absorb voltage

As pictured at right, the absorb charge voltage is showed. When the battery reaches the absorb voltage, the controller will maintain the voltage values by PWM charging mode to avoid overcharge.

Long press the button \equiv (>3 seconds, numbers start flashing) to finish the setting of absorb voltage values and use the ϕ , \equiv button to adjust the parameter; calling off the parameter interface after long press the button \equiv again. (The numbers stop flashing) The absorb voltage value will be conserved by controller.



3.4 Viewing and setting the floating voltage.

As pictured at right, the floating charge voltage is showed. When the battery reaches the floating voltage, the controller will maintain the voltage values by PWM charging mode to avoid overcharge.

Long press the button \equiv (>3 seconds, numbers start flashing) to finish the setting of floating voltage values and use the ϕ , \equiv button to adjust the parameter; calling off the parameter interface after long press the button \equiv again. (The numbers stop flashing) The floating voltage value will be conserved by controller.



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3.5 Viewing and setting of under-voltage protection

As pictured at right, the value for under-voltage protection is showed. The controller will cut off load circuit when battery voltage is lower than this value, in order to avoid over discharge of the battery.

Long press the button \equiv (>3seconds, numbers start flashing) to enter the setting interface of under-voltage protection and use the ϕ , \equiv button to adjust the parameter; long press the button \equiv again (The numbers stop flashing) to call off the parameter interface after finish setting. Setting value will be conserved by controller.



3.6 Viewing and setting of recovery after undervoltage

As pictured at right, the recovered voltage is showed. After the controller performs the function of under-voltage protection, the output of the load will be recovered as soon as the battery voltage recovers to higher than the under-voltage value.

Long press the button \equiv (>3seconds, numbers start flashing) to enter the setting interface of recovery after under voltage; long press the button \equiv again (The numbers stop flashing) to call off the parameter interface after finish setting. Setting value will be conserved by controller.



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3.7 Viewing and setting special parameters

As pictured at right, in this page long press the button \equiv (>3 seconds) to enter into special parameters page. The parameters of battery type, temperature compensate ratio and load mode can be setup. Then long press the button \equiv to enter into setting mode and long press the button ϕ to exit setting mode. The special pages are shown as below.

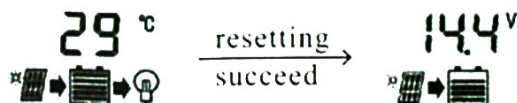


Note:

USr : User mode	-4 :	15H : normal mode
SLd : Sealed	-4mV/cell °C	14H : light control mode
FLd : Flooded		0~13H
GEL : Gel		light control with time control mode

3.8 Reset to default settings

As pictured at right, in this page long press the button ϕ (>3 seconds) to startup resetting action. When the parameters succeed resetting to default value, the display page switches to next page automatically. The correct process is shown as below.



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4. Common Fault and Handling

4.1 Under-voltage protection and treatment:

⚡ shows up and flash on the screen means the battery voltage is lower than the under-voltage protection voltage. The controller has enter the under-voltage protection state and the output has been stopped.

Solution: Using solar panel or battery charger to charge battery, when the battery voltage reaches the recovery value, the load will be on power again and enter normal working state.

4.2 Overload protection and treatment:

⚡ shows up and flash on the screen, it means the occurrence of overcurrent or short circuit. The controller will stop output and enter overload protection state.

Solution: After solving the problem of output short circuit and reducing the load, press the button.

4.3 Input overvoltage and handling:

⚡ shows up and flash on the screen means the battery input voltage of the controller is higher than rated input voltage, controller will stop output and enter overvoltage protection state.

Solution: 1. please choose battery with appropriate voltage grade to connect with controller; 2. other charger for the battery to be removed.

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5. Quality Assurance

1. Quality assurance should be carried out according to the following rules:

● the product is guaranteed of replacement, returning and repairing within 7 days after Sale.

● the product is guaranteed of replacement and repairing within 1 month after sale.

● the product is guaranteed of repairing within 12 months after sale.

2. If it is not possible to identify the using date of the controller, we would refer to the ex-work date, and prescribe 18 months as the warranty period. We need to charge beyond the warranty period. The controller can be repaired for life no matter when and where you use it.

3. If the controller is damaged by the following causes, we need to charge even if it is in the guarantee period:

● do not operate according to the user's manual.

● use the controller under the condition which is beyond the using standard and technical requirements.

● Repair by yourself or reform by yourself.

● Any inappropriate environmental condition which can cause the breakdown and aging of the apparatus.

● Improper carrying or storage.

● Regarding to the service of replacement, returning and repairing, you need to retreat the product to our company, and we decide whether to replace or repair after we make clear who should be responsible.

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6. Technical data

Rated Current	10A	15A	20A	30A	No Load Loss	12mA(12V), 14mA(24V)		
System Voltage	12V/24V auto				Charge/Discharge Voltage Drop	<0.3V/ <0.18V		
Open Circuit Voltage of solar panel	<50V				USB Output	5V/1A		
Float Voltage	13.8V/27.6V				Specification of cable	< 6 mm ²	< 10 mm ²	< 16 mm ²
LVD	10.8V/21.6V				Working Temperature	-10℃ ~50℃		
LVR	12.6V/25.2V				Storage temperature	-20℃ ~60℃		
Boost Voltage	Sealed 14.4V/28.8V		Duration 2 hours		Humidity	10%-90%, NC		
	GEL 14.2V/28.4V				Dimension (mm)	130x75x38	140x85x42.5	160x95x45
	Flooded 14.6V/29.2V				Diameter of mounting hole (mm)	115x60-Ø4.5	126x72-Ø4.5	144x78-Ø4.5
HVD	16.0V/32.0V				Weight (Approx.)	175g	230g	327g
HVR	15.5V/31.0V							

You will not be notified if there is any change of this product.

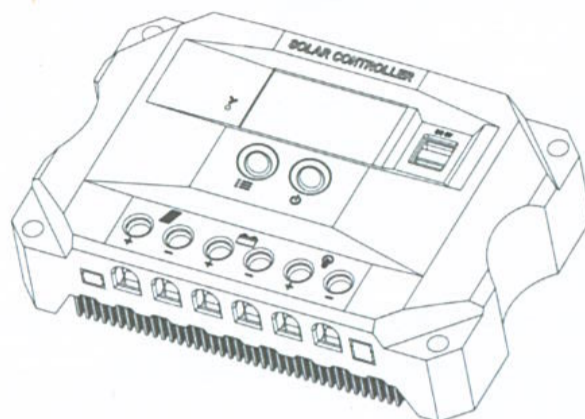
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Solar Charge Controller User Manual



Please read this manual carefully before use. This manual is subject to change without notice, and the company's interpretation of it shall prevail!

1. Safety Instruction

- (1) Please keep installation site clear of flammable or explosive, or corrosive gases and dust etc.
- (2) Please protect the controller from direct sunlight or rain.
- (3) Please prevent foreign object or liquid approaching controller.
- (4) Please contact technical personnel to dismantle or repair the controller.
- (5) Please don't put metal object beside battery.
- (6) Please do not touch terminals or back plate of controller in case of electric shock or scald.

2. Product Introduction

2.1 Profile

This series is a new series of intelligent multi-purpose solar charge controllers. Its innovative design makes it easy to install and quite user-friendly. Optimized charging and discharging management extends the service life of batteries considerably. Meanwhile, parameters are

1

explicitly displayed. Most parameter values can be set to meet various applications.

2.2 Function

- (1) Multi-stage PWM charging mode.
 - (2) Preset charging parameters for three battery types.
 - (3) Detecting mode for battery voltage level is adjustable.
 - (4) Charging and discharging parameters are adjustable.
 - (5) Temperature compensation is applied.
 - (6) Various controlling mode for load.
 - (7) Protection against reverse connected solar panel and input over-current.
 - (8) Protection against under-voltage, over-voltage, reverses connection and reverse discharge of battery.
 - (9) Protection against over-current and short circuit of load.
- Protection against internal over-heat.

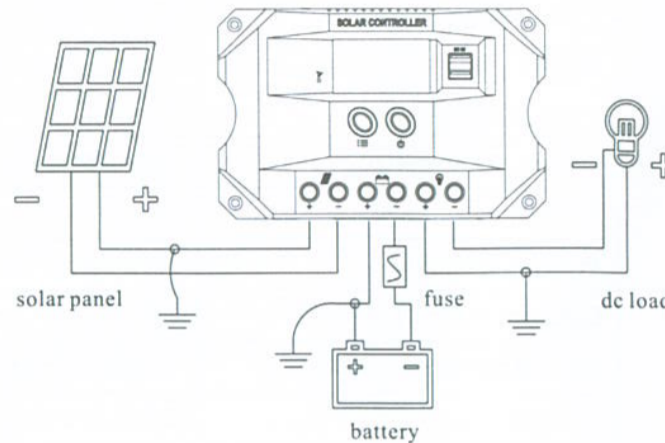
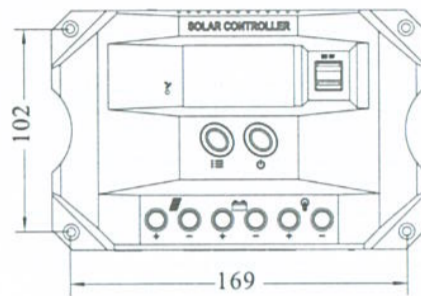
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3. Installation

3.1 Dimension and Circuit Layout



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3.2 Installation Procedure



Please make sure battery and solar panel are disconnected to controller, and do not contact the positive and negative terminals of solar panel and battery at the same time in case of electric shock.



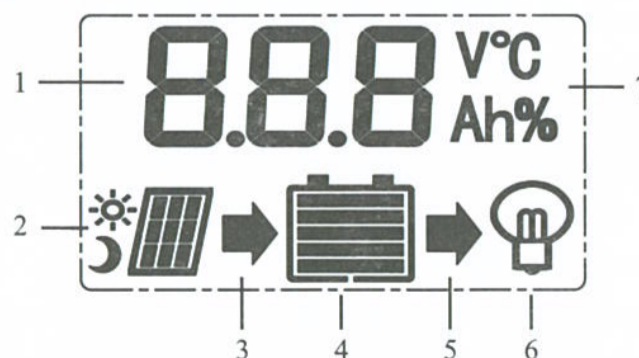
A free space of 15cm on all sides must be provided for better heat dissipation. Current density control system wiring cables within the 4A / mm².

- (1) Make sure installation site meets safety requirements first.
- (2) Make sure voltage of solar panel and battery are compatible with controller.
- (3) Connect battery to controller and check whether the LCD display is on, if not, please solve the problem as mentioned in chapter 5.2.
- (4) Connect solar panel to controller accordingly. If there's sunlight, controller starts charging battery immediately and charging indicator arrow on LCD on.
- (5) Connect load to controller.

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4. Operating Instruction

4.1 Symbols



- | | | |
|----------------------|------------------|-------------|
| 1. Data display area | 2. Day and night | 3. Charging |
| 4. Capacity | 5. Discharging | 6. Load |
| | | 7. Unit |

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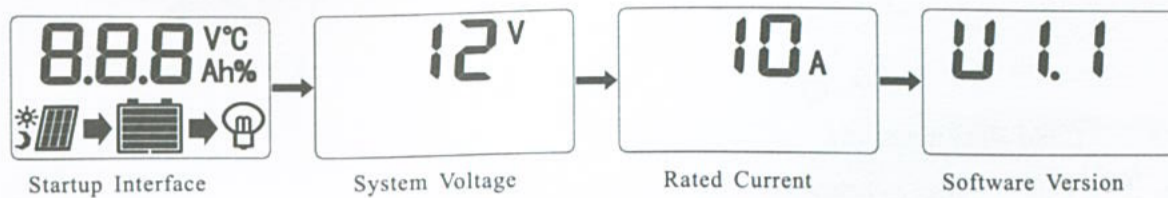
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4.2 LCD Interfaces

4.2.1 Startup Interface

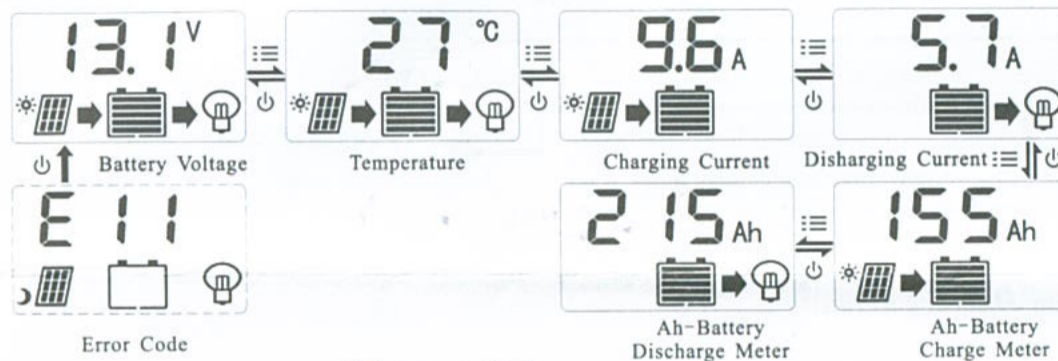


(Picture 4.2-1)

- (1) Startup interface: the interface when system is powered on by which you check whether the LCD is in good condition
- (2) System voltage: battery voltage detected by controller
- (3) Rated current: Rated charging and discharging current of controller

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4.2.2 LCD Main Loop Interface

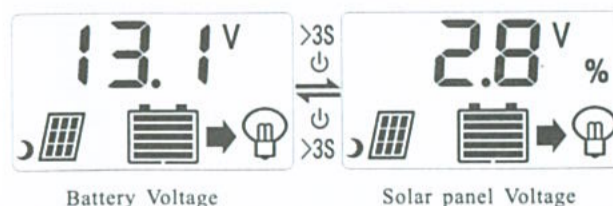


(Picture 4.2-2)

- (1) In main loop interface, by short pressing \equiv or ϕ you can circulate interfaces. If there is no failure, display presents the current interface. If there is failure, it will jump automatically to Error Code.(at 6 section)
- (2) In interface Battery Voltage, by short pressing ϕ load is switched on or off.
- (3) In interface Error Code, by short pressing ϕ it exits.

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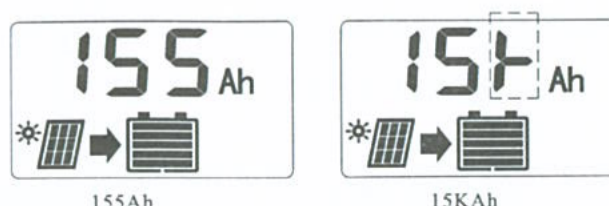
4.2.3 How to View Voltage of PV



(Picture 4.2-3)

- (1) By long pressing ϕ (>3S), battery voltage and PV voltage can be switched each other, distinguished by %.

4.2.4 Ah-battery Statistics



(Picture 4.2-4)

- (1) Picture 4.2-4, showing Ah and Kah.

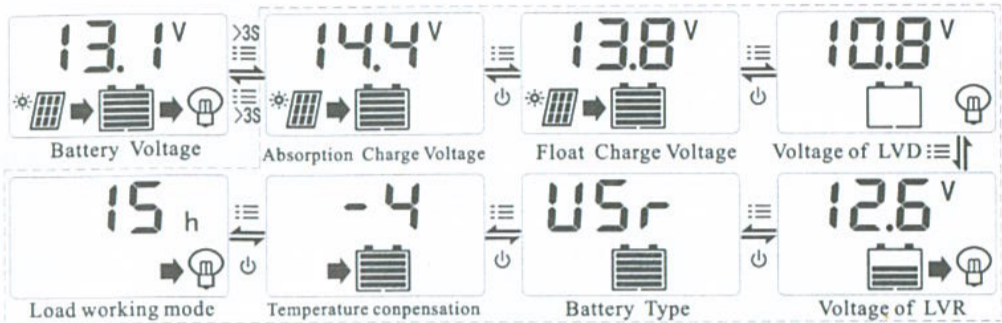
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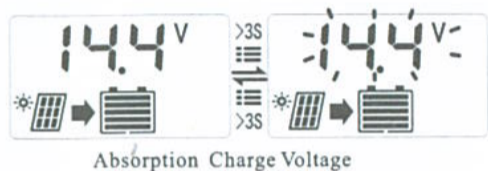


- (2) Ah-battery Charge and Ah-battery Discharge Statistics,Maximum data is 65KAH,it begins from 0AH when exceeds 65KAH.
- (3) By long pressing ⏻ (>3S) , data is cleared.

4.2.5 Parameters Setting



(Picture 4.2-5)



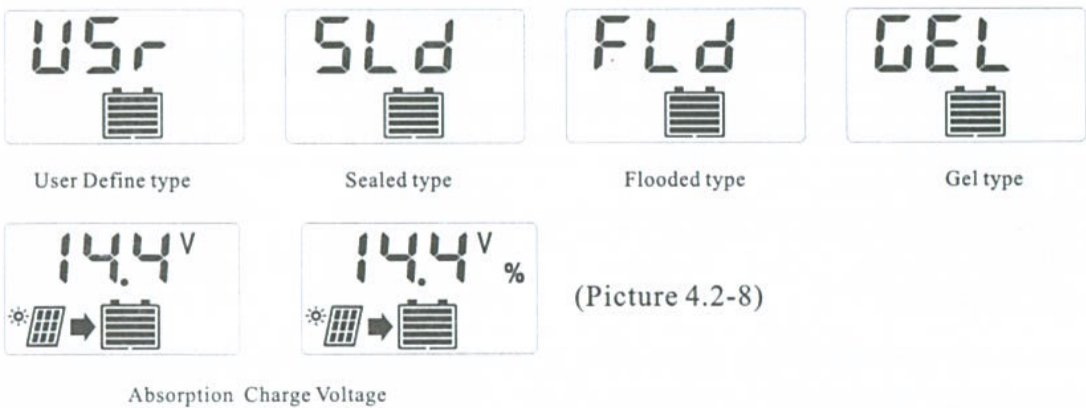
(Picture 4.2-6)

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- (1) In Battery Voltage interface, by long pressing ≡ (>3S),you enter parameters settings loop interface. In loop interface, by short pressing ≡ or ⏻ ,you can switch corresponding settings. By long pressing , you can exit parameter settings loop interface.(Picture 4.2-5) 15s absence of key operation bring you to parameter setting loop interface.
- (2) In loop interface, by long press ≡ (>3S) you can adjust parameters when you choose corresponding settings (Picture 4.2-6,data flickers, then change data by short pressing ≡ or ⏻ . By long pressing ≡ again you can save data and exit.(data doesn't flicker) 15s absence of key operation brings you to main loop interface with data unsaved.
- (3) Other parameter settings refers to the last step.
- (4) Setup requirements about Absorption charge voltage, Float charge voltage, LVD, LVR refer to Picture 4.2-6.

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4.2.6 Battery Type



(Picture 4.2-7)

(Picture 4.2-8)

- (1) Battery type as shown in the picture 4.2-7.
- (2) Voltage of ABSORB,FLOAT,LVD and LVR can be setted only Battery Type is User Defined,% indicates it's not settable.(Picture4.2-8)

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4.2.7 Load working mode



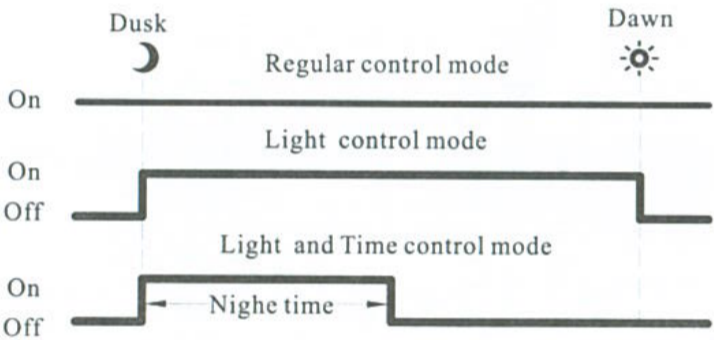
(Picture 4.2-9)

Load working mode

(1) working mode for load as below:

Code	Working mode for load
15	Regular controller mode
14	Light control mode
0~13	Light control with switch-off point at night (0 ~13 hrs)

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(Picture 4.2-10)

4.2.8 Restore factory defaults



(Picture 4.2-11)

Temperature

(1) In “Temperature” interface, by long pressing (>3S) controller is restored to factory defaults.

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5 Fault Management

5.1 Error Code and Correction

Error code	Cause	Correction
E×1	LVD protection of battery and load switched off	Protection removed automatically after battery is fully charged.
E×2	HVD protection of battery and load switched off	Make sure connection between battery and controller is good. Make sure battery capacity is not too low. Make sure voltage of other battery charger connected to battery is not too high. When battery voltage is 0.5V lower than defined overvoltage protection point, load switched on automatically by controller.

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E×3	Over load and load switched off	Remove excessive load at load output, and switch on load manually or wait for 6 mins for auto switch-on by controller.
E×4	Short circuit protection of load	Rectify short-circuit, and switch on load manually or wait for 10 mins for auto switch-on by controller.
E×5	Battery charging switched off due to over-temperature of controller.	Allow the controller to cool down and restart charging automatically.

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5.2 Failure and Correction

Failure	Correction
No sign on LCD initialization	Make sure no reverse connected battery. Make sure connection between battery and controller is good. Make sure circuit of battery switched on. Make sure fuse protector connected.
No charging current	Make sure no reverse connected solar panel. Make sure connection between solar panel and controller is good with no open circuit.
Load not work	Make sure there's no reverse connected load. Make sure controller is not in protection against overload, short circuit, under-voltage or overvoltage.
Load not switched on at preset point	Make sure load controlling mode is correctly set. Make sure battery voltage not too low.

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Load unable to be switched on at night in Light control mode	Make sure load controlling mode is correctly set. Check solar panel not illuminated by other light sources at night.
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6 After Sales Service

6.1 Warranty

Manufacturer provides

- (1) One-month warranty of free replacement is provided for this product commencing from the date of purchase.
- (2) One-year warranty of free repair is provided for this product commencing from the date of purchase.
- (3) Lifetime warranty of payable repair is provided for this product commencing from the date of purchase.

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Free guarantee service will not be provided to the said equipment if

- (1) It has been damaged through transportation or storage or
- (2) It has been operated otherwise than in accordance with the instructions or
- (3) Any unauthorized repair or modification has been carried out on the unit or
- (4) It has been damaged through natural calamities

6.2 Return & Repair

Please contact customer service before return controller for repair and send controller together with original invoice and associated information like controller model, SN, cause. After receiving return controller, customer service will contact you to confirm cost and time etc. Please note any cost of transportation is on the account of purchaser.

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7 Technical data

Input						
PV voltage	≤50V			≤100V		
Rated Current	30A	50A	60A	30A	50A	60A
Output						
System Voltage	12V/24V Auto			48V (36V optional)		
HVD	16.00V ×1/×2/×3/×4					
Rated discharge current	30A	50A	60A	30A	50A	60A
No-load loss	≤13mA			≤25mA		
Charge loop voltage drop	≤0.3V					
Discharge loop voltage drop	≤0.2V					
Charging mode	PWM Multi-stage (bulk, absorption, float)					

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Voltage of float charging	$13.8V(13V\sim 15V) \times 1/\times 2/\times 3/\times 4$	
Voltage of absorption charging	$14.4V(13V\sim 15V) \times 1/\times 2/\times 3/\times 4$	
Duration of absorption charging	2hs	
LVD	$10.8V(10V\sim 14V) \times 1/\times 2/\times 3/\times 4$	
LVR	$12.6V(10V\sim 14V) \times 1/\times 2/\times 3/\times 4$	
Load working mode	Regular control mode Light control with switch-off point at night and switch-on point before dawn Light control mode	
Light control voltage	$5V(1V\sim 10V) \times 1/\times 2/\times 3/\times 4$	
Battery type	GEL, SLD, FLD and USr(default)	
USB	5V 1A	None

Solarshop Control Charger

GP2410D / GP2420D



Other						
Man-machine interface	LCD, 2 buttons					
Wiring	PCB terminal, ≤ 16mm ²	PCB terminal, ≤ 25mm ²		PCB terminal, ≤ 16mm ²	PCB terminal, ≤ 25mm ²	
Working temperature	- 10~ +50℃					
Storage temperature	-20~ +60℃					
Working humidity	10% ~ 90%, no condensation					
Dimension (mm)	160x95x45	188x120x51		160x95x45	188x120x51	
Net Weight (Approx.)	335g	627g	696g	337g	630g	699g
IP Code	IP30					

Battery type:

Battery type	Voltage of float charging (V)	Voltage of absorption charging(V)	Time of absorption charging(h)
GEL	13.8	14.2	2
Sealed	13.8	14.4	2
Flooded	13.8	14.6	2
User	13.8	14.4	2