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SL02B Series Microcomputer Solar Charging Controller

Instructions for Updated Version (Ver3.0)

6 new upgrades

■Product Introduction:

SL02B series for controllers are specially designed for solar power DC supply system, solar power DC street lamp system and mini solar power station system. Intelligent control is realized by using dedicated computer chips. The controllers can be used in hard environment, since its adoption of technical grade chips. To the controllers with 12V/24V Battery automatic identification function.

The short circuit, over-load, connection-reverse protection, as well as over-charge, over-discharge protection are available. Besides, the complete indications are usable, including indications for states of charge, storage battery and faults.

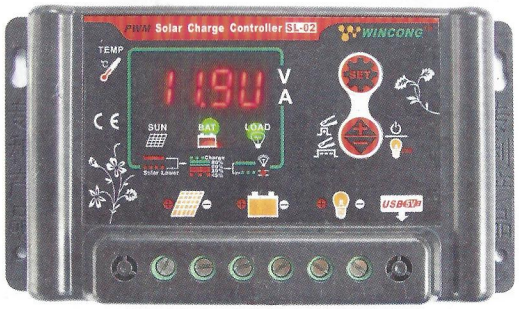
Through the computer chips, the controllers take samples from the parameters of storage battery voltage, photo battery, discharge current and environment temperature, and then use the dedicated control mode calculation to control the discharge rate and make it matched with the characters of storage battery, realize the high accurate temperature compensation. PWM fuzzy charge mode and voltage control are available for the storage battery, so that storage battery is always in the perfect working state .The various working modes of controllers can meet customers' different requirements.

■Upgrading instruction:

SL-02B series solar controller upgrade increases the functionality of voltage and current display, has more Compatibility with a variety of storage batteries such as lead-acid battery ,VRLA battery , gelled electrolyte (GEL)Battery, 3.2V*4 iron-phosphate-based lithium battery 3.2V*8 iron- phosphate-based lithium battery ,3.7V*3 lithium battery,3.7V*6 lithium battery, and 3.7V*4 lithium battery. User can set the model of battery randomly .For your further satisfaction, additional 4 groups of Voltage adjustment parameters are available in the controller, which allows user to conduct personalized adjustment of the parameters for the selected battery. For example, we can set the battery parameters as the ones which help prolong the service life, also old battery's parameters can be adjusted to the favorable ones for long discharge time, parameters can be changed into favorable ones according to various environments. And what's more, the adjustment function is up to the strict discharging requirements of some battery manufacturer, these characters enable user to operate freely compared with the previous ones without this function.(Some use inferior materials and low price controller, will lead to large error voltage of the battery damage, Voltage can not be displayed, the user may not be aware of) And voltage difference, resulting from the wires connecting controller with storage batteries, can be offset by adjustment of controller parameters . The controller has the parameters for adjusting the threshold voltage of solar panel, by using the parameters, users can control the time of lighting on in the evening or lighting off at dawn, or for street lamp engineering, it can decrease the time difference result from the asynchronous on or off for multi- optical control switches.

■Product Features:

- Newly Upgraded: voltage and current display，Using 4 digital LEDs display and settings，intuitive and easy to use.
- Newly Upgraded: The voltage of solar panel can be shown and checked, light-operated the threshold voltage is set flexibility which can recognize day and night reliably according to the voltage of solar panel.
- Newly Upgraded: The charge-discharge parameters of wide range can be adjusted flexibly, which is suitable for various kinds of battery, such as lithium battery. The old and new battery can all be applied to.
- Newly Upgraded: Floating charge voltage can also be set, which can be especially applied to charge and discharge at the same time, controlling the voltage of battery flexibly
- Newly Upgraded: Automatic temperature compensation and adjustable compensating parameter, for example, the lithium battery can choose the closing temperature compensation.
- Newly Upgraded: The USB5V voltage-stabilized source output, for other 5V load like mobile phone charging that compatible USB. (except SL02B-10S)
- Rely on solar panels to start the controller works, To serious under-voltage or zero voltage battery charging, So that the battery back to normal.
- Various protections include over-charge, over-discharge and over-load, as well as unique electron short circuit protection and connection-reverse protection. All the protections are harmless to any parts and fuse. fuse only as the end protection of a controller itself to protect the amount of internal short circuit damage.
- parameter is set to power-down save function, the system model and control parameters, and other important data are stored inside the chip, after power is not lost, to make the adjustment more convenient, more reliable system.
- automatic identification of system voltage classes
- intelligent PWM charge mode
- Configurable load operating mode
- back discharge protection of battery
- low-voltage protection of battery
- transposition protection of battery
- overload and short-circuit protection



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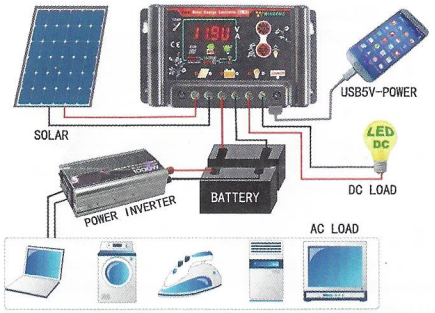
■Installation Instructions:

1. Preparing the related instruments and cables. We advise you choosing the right cable according that the ampere density < 4A/mm2, which can diminish line drop. Checking whether the installation site conforms to related safety requirement. Please avoid installing and using the controller in moist, dusty and environment with flammable, combustible and corrosive gas.
2. Set the controller in vertical plane and the pitch of open holes can see the form parameter for detail. In order to ensure the well thermal condition of the controller, please reserve 10cm above and under the controller. The controller will dissipate heat when operating. Without enough ventilate (such as setting in the control cabinet), the controller will restrain the past current to avoid overheating. We suggest you to install cooling fan according to the scene condition.
3. As shown in installation connection diagram, the battery, solar panel, load and controller should be connected by turns. Please connect the battery first, and then the solar panel or load. The notice the consistency of positive (+) and negative (-) with the controller. The virtual voltage of the battery this controller supported should be higher than 8V.
4. The controller and battery should be set in the same environment with close temperature so that the controller can conduct temperature compensation.
5. USB5V only when the load is ON can be used (for example, mobile phone charging, etc.) If you need to use usb5V, please press the key so that the load is turned on.

Notice: The controller should be installed in a upright and suspended way, the traces of photovoltaic panels and load lights should go as "U" arc-shaped under the controller and be fixed well to avoid the rain directly flowing into the controller along with the electric wire, All terminals and tighten the screws to avoid poor contact.

Warning: Controller may be burned away when several installation errors happen at the same time. Notice that other power cannot be used to replace the solar panel to connect the system for testing, otherwise it may burn the controller. Although this equipment has a multiple protective measures, this is not a panacea. And the proper use of controller is much important even than the users to do the best protective measures.

SUN	Red light is ON	Power generation is normal
	Red light is flash	Power generation is insufficient
BAT	Green light is ON	Sufficient power
	Green light is flash	Charging
	Red and green light is ON	Medium quantity of power
	Red light is ON	Less quantity of power
	Red light is flash slowly	Insufficient power
LOAD	Green light is ON	Output load ON
	Green light is flash	Load short-circuit or over-current



■Operation Instructions:

1. Keys Function Declaration

[SET]: Parameter setting and checking key, each parameter can be checked by turns with short press and the parameter setting interface can be accessed with long press.

[+/-]: Parameter adjustment plus and minus key, Besides, Short press this key in main interface can manually switch the load or force to output load for about 2 seconds. Besides, pressing this key more than 5 seconds when checking parameters until the LED displayed [1224] can be back to factory setting.

2. Battery type selection: immediately after the power is turned on or when the restore factory settings operation, LED displays [1224], at this moment, press the [+/-] key you can choose the following table within several commonly used battery type and automatically set the voltage parameters, if not find a suitable battery type, you can first select voltage approximating type, and then on this basis, manually modify the voltage parameters can fit more battery type. The factory default is [1224].

code	1224	0712	1224	3.2-4	3.2-8	3.7-3	3.7-4	3.7-6	6666
Battery types	12V/24V VRLA battery	12V VRLA battery	24V VRLA battery	3.2V*4 LiFePO4 (LFP) battery	3.2V*8 LiFePO4 (LFP) battery	3.7V*3lithium battery (Li-Ion, Li-POL….)	3.7V*4lithium battery (Li-Ion, Li-POL….)	3.7V*6lithium battery (Li-Ion, Li-POL….)	User-defined
Stop-Charge-Voltage	14.4V/28.8V	14.4V	28.8V	14.4V	28.8V	12.6V	16.8V	25.2V	8.5V-35V
Float-charge-voltage	13.6V/27.2V	13.6V	27.2V	13.8V	27.6V	12.0V	16.0V	24.0V	8.5V-35V
Over-discharge-recover-voltage	12.4V/24.8V	12.4V	24.8 V	11.7V	23.4V	11.0V	14.4V	22.0V	8.5V-35V
Over-discharge-voltage	10.8V/21.6V	10.8V	21.6V	9.4V	18.8V	8.5V	11.2V	17.0V	8.5V-35V

■Detailed Descriptions of Parameter checking:

When the controller is energized correctly, the default setting is entering the battery voltage display interface, which is the

main interface of the controller. Short press 【SET】key and you can scan each parameter interface by turn. It can also make digital LED turned off power savings. Note: The signal【HHH】means high value and 【LLL】means low value, not representing abnormal work condition.

checking on the battery voltage: Number value displayed in the main interface is the battery voltage at present. This interface also displays the charging state, discharging state, electric quantity of battery, etc.

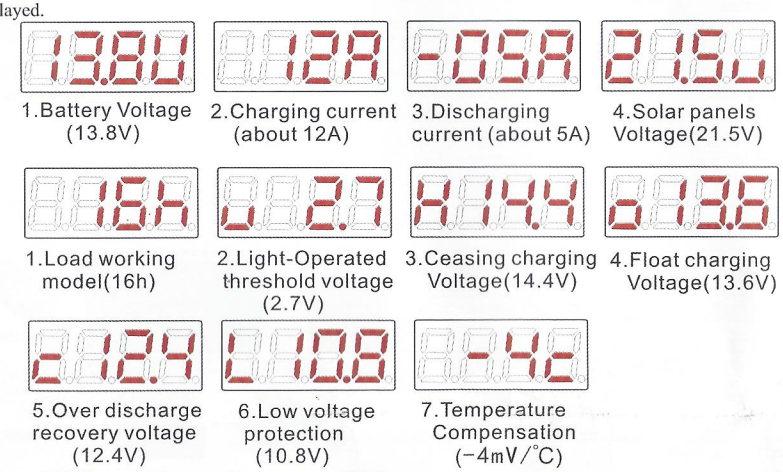
load switch control: Short press 【+/-】in the main interface can manual switch the load or force to output load for about 2 second.

charge current: Charge current of solar panel to battery

discharge current: Electric current of the load

Tips: current display approximately 20% error and displays only integer bits, less than 1A may appear as 0A, if need a relatively accurate current display, select a 32-bit processor 4K resolution SL03 series controllers more appropriate.

voltage of solar panel: Open-circuit voltage of solar panel the controller will stop charging automatically when this value is displayed.



■Detailed Descriptions of Parameter Setting:

Long press the 【SET】in the main interface can enter the parameter setting interface. Short pressing 【+/-】can increase the value and long pressing【+/-】can decrease the value. Continue to press the key【SET】shortly can set each needed parameters by turn. Keep pressing【SET】until it backs to the main interface can save the set parameters. Or the controller will save the set parameters automatically when there is no operation in more than 30 seconds.

Operating Mode of Load（default16h）: 00h means **Light-Operated mode**. The load works at night and self-closes at daybreak. 01h-15h means **Light-Operated Delayed model**. The load supplies power automatically until dark and closes after 1 to 15 hours. 16h means **Manual Mode**. The ON&OFF is controlled by key 【+/-】. 24h means **Normally ON Mode**, namely the load supplies power for 24 hours. Attention please. Whenever the battery is under-voltage or the load is broken, the load will close and it will recover automatically after charging or trouble shooting.

Light-Operated threshold voltage（default 2.7V/5.4V）: The controller recognizes the day and night by the voltage of solar panel and this parameter is the threshold voltage recognizing the transition of day and night. The displayed value is the threshold voltage. It will shift when the value is bigger and light is brighter or when the value is smaller and light is darker. Tips: at dusk, you can check the actual voltage of the solar panel by the controller and set this parameter. Note: the controller simulates the condition of dusk and dawn and it will shift after light-operation judging for scores of seconds. Thus please wait when conducting the experiment.

Stop-charging voltage: When the voltage of battery rise to stop-charging voltage when charging and last for a while, the controller will shift to the floating charging voltage with lower voltage to prevent the battery from overcharge and protect the battery. The voltage at this time is the maximum voltage when the battery is in full energy.

Floating charging voltage: after the battery is fully charged, Then this voltage is used for compensate the energy lose because of self-discharge. It is the safe voltage that maintaining the battery compensation. Generally, the voltage will remain around the floating voltage after the battery is fully charged. When with load, floating charging voltage can offer the energy from the solar panel to the load as well.

Under-voltage recovery voltage: When the battery is in under-voltage protection, the controller will recover to restart load only when the battery voltage is higher than this voltage.

Under-voltage protection voltage: When the virtual battery voltage is lower than this voltage values, the controller will turn off the load to protect the battery and prevent it from over discharge.

Temperature compensation voltage (default -4): The controller will automatically compensate the stop-charging voltage of the fine-tuning battery, mainly to amend the phenomenon that the lead-acid battery can't be fully charged in winter and will be

over-charged in summer, which can protect the battery. -4means -4mv/2v/℃. Generally, lead-acid battery is set as -4 and lithium battery is set as 0, namely stopping the temperature compensation.

Note: All the above setting voltage must be according to the law of **[stop-charging voltage] > [floating charging voltage] > [under-voltage recovery voltage] > [under-voltage protection voltage]**, or the controller may be malfunctioning. In order to abnormal due to human factor, the controller will also assist to restrain some parameters. When the parameters can't be adjusted to the wanted result, please check whether the stop-charging voltage or under-voltage protection voltage should be turn up or turn down first. When the parameters is in disorder, you can restore to the default parameters by【+/-】key according to the operation method.

■ Technical Parameter:

types	SL02B-10A	SL02B-20A	SL02B-30A	SL02B-10S
Max charge current	10A	20A	30A	10A
Max load current	10A	20A	30A	10A
Max USB5V load	1.8A	1.8A	1.8A	No USB
Max Voltage of solar panel	<=50V			
Voltage of battery	12V/24V Auto Discriminating			
Stop-Charge-Voltage	default 14.4V/28.8V(can setting8.5V-35V)			
Float-charge-voltage	default 13.6V/27.2V(can setting8.5V-35V)			
Low Voltage Reconnected	default 12.4V/24.8V(can setting8.5V-35V)			
Low Voltage Disconnection	default 10.8V/21.6V(can setting8.5V-35V)			
No load losses current	6mA --25mA（Only when digital LEDs be lighted）			
Over-load and short circuit	1.1 times of max current, works for 5 seconds or Short circuit,, the load is off at once and the indicator light flashing, Then wait 30 seconds, it will automatically restart to work.			
Note	SL02B-10S is to remove USB, The type needs to WINCONG order.			

*Note: the company reserves the right to change without notice

Tips: The lithium battery or other kinds of battery can be used normally when each voltage parameter is set well according to the advice or requirement of your battery provider. **Generally, as long as the charging and discharging parameters (8.5V-35V) range of any battery can be used.** We recommend that 12V battery should be connected to the solar panels with Voltage rating 18V, and 36V solar panes for 24V batteries. At present, the voltage of some low-cost solar panel isn't the standard 18v, 36v nominal voltage, such as charging the 12v battery with voltage of around 29v. At this time, you should modify the voltage parameter of the controller manually, and then the controller will automatically cancel the voltage self-motion recognition function and charging and discharging according to your set parameter. Then the low-cost solar parameter can be used as well.

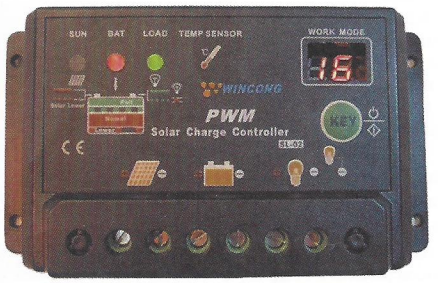
Charging circuit voltage drop	<=0.26V	**Load circuit voltage drop**	<=0.17V		
Temperature compensation	(0~-5mv)/2V/℃	**Working temperature**	-35 ~ +60℃	**Storage Temperature**	-40 ~ +75℃
Humidity Requirements	<=90% ,no condensation	**protection grades**	IP30	**Weight**	230g
outline size(L*W*H)	143*77*40mm	**Mounting Hole Spacing**	134*55mm	**Installation Cable area**	<=8mm² (8# AWG)

*Note: the company reserves the right to change without notice

■Disclaimer: Manufacturers and sellers will not undertake any direct or indirect loss caused by violating the requirements or related safe codes this manual advised and ignoring the advice of battery manufacturer and solar panel manufacturer, which includes but not limit to abnormal use, wrong installation or wrong system design etc. The manufacturer and seller won't undertake any responsibility and joint liability. No matter in which situation, the manufacturer and seller won't undertake any direct or indirect loss except this controller.

■Tips: The following picture is WINCONG Obsolete discontinued controllers, all Use occasions like this appearance controllers can be replaced with more powerful performance superior SL02B upgraded version of the controller.

SL02(2008---2011)



SL02A(2011---2015)