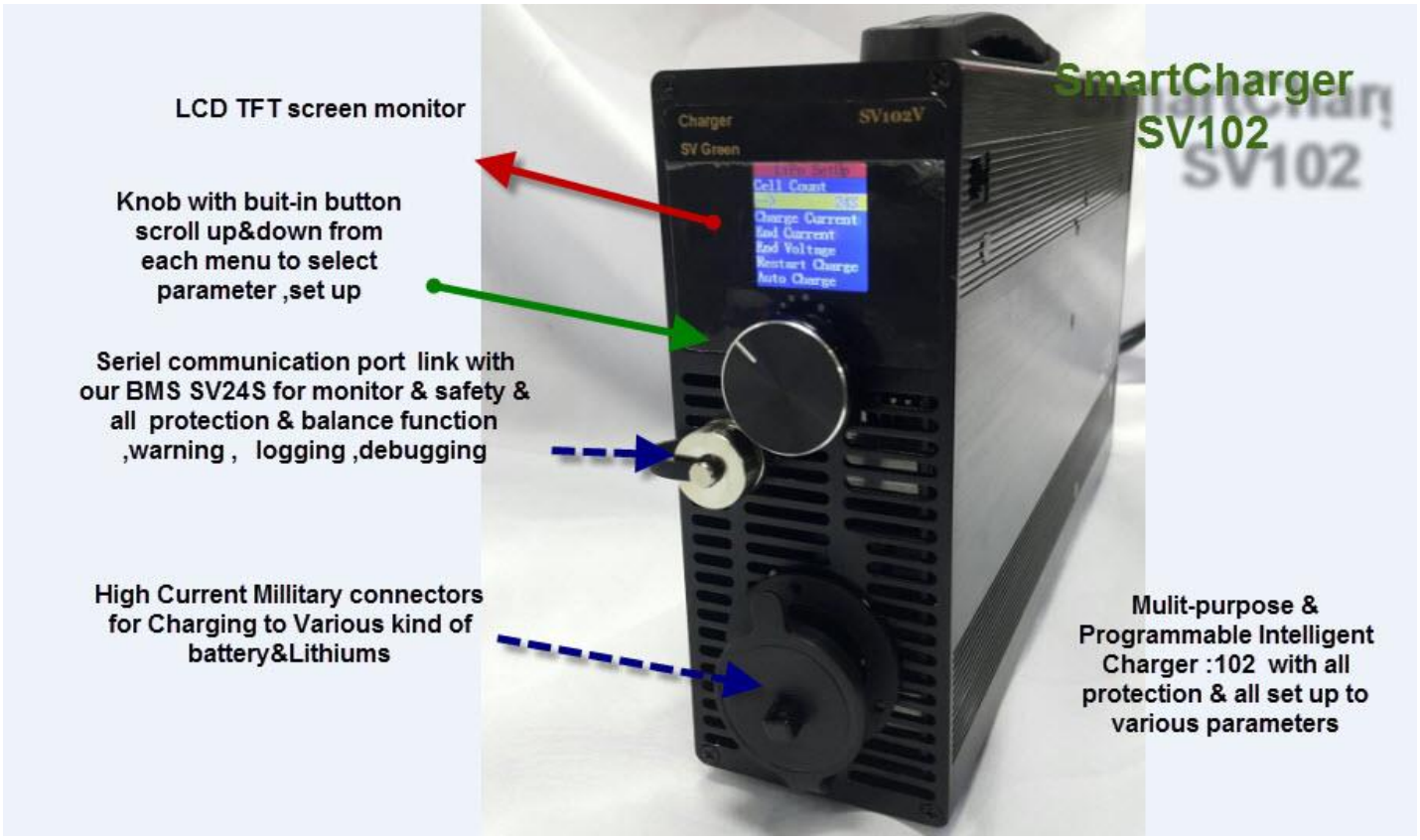
SV102 v1.2 Operation Manual



Read the ENTIRE instruction manua to become familiar with the features/functions of the device before operating.

Features

The Battery Charger has been designed to provide reliable, quality charging for battery systems in electric drive vehicles. It is a high efficiency wide input voltage charger, the charger can output 1800W at AC90V~265V in a smaller size. Many creative technology help to realize up to 94% of efficiency, and the internal temperature is still under 50℃. The following are some new features:

- Intelligent control output voltage and current by microprocessor, 100% calibration before delivery
- ±1% voltage and current accuracy
- Active PFC &high freqency:smallerAC input(universal Voltage)current less interference, and Conform to European Commission Regulation no 278/2009 and Energy Star Version 2.0
- AC 90-265V worldwide operation: need not any alternative switcher, worldwide safe operation.
- Low power consumption (less than 1W) at idle mode and standby mode
- Up to 94% of convert efficiency.
- Programmable output voltage from 10V to 102V
- Programmable output current from 1A to 25A
- TFT color LCD display output Voltage, current, power and internal temperature on time.
- Over current, over voltage, over load, over temperature, and short circuit protection
- Short-circuit protection on output, safer and more reliable.
- 2 Intelligent cooling fans turned on and adjust speed upon the temperature automatically
- ZVS/ZCS and Synchronous Rectification
  assure the highest efficiency.
- High power density: 652W/Kg
- Start at no load or full load
- Approved by CE
- 24 months warranty

Application

- Home application
- Electric drive vehicles

Protection functions

1. Over current protection
2. Over voltage protection
3. Charge power protection
4. Over temperature protection
5. Anti spark on battery connection even 100V battery connect to charger
6. Reverse polarity protection of battery connection
7. Prevent any cell from over charging, adjust charge current automatically fit with Charger BMS

Main battery type and cell count

Battery Type	Cell Count	Output Voltage/V	Terminal charge Voltage per cell			Charge current	Terminal charge current/A	Charge Mode
			Min.	Type	Max.			
LiPo	4S-24S	10-102	2.75	4.20	4.25	1.0-25A	5-60%	Pre-charge CC/CV and maintain
Li-ion	4S-24S	10-102	2.50	4.10	4.15			
LiFe	5S-28S	10-102.5	2.00	3.65	3.75			
LiTo	7S-36S	10-100.8	1.50	2.75	2.80			
Pb	6S-41S	10-102.5	1.75	2.40	2.50			
			- delta Voltage /mV					
			Min.	type	Max.			
NiMH /NiCd	Auto	10-102	100	300	1000			CC

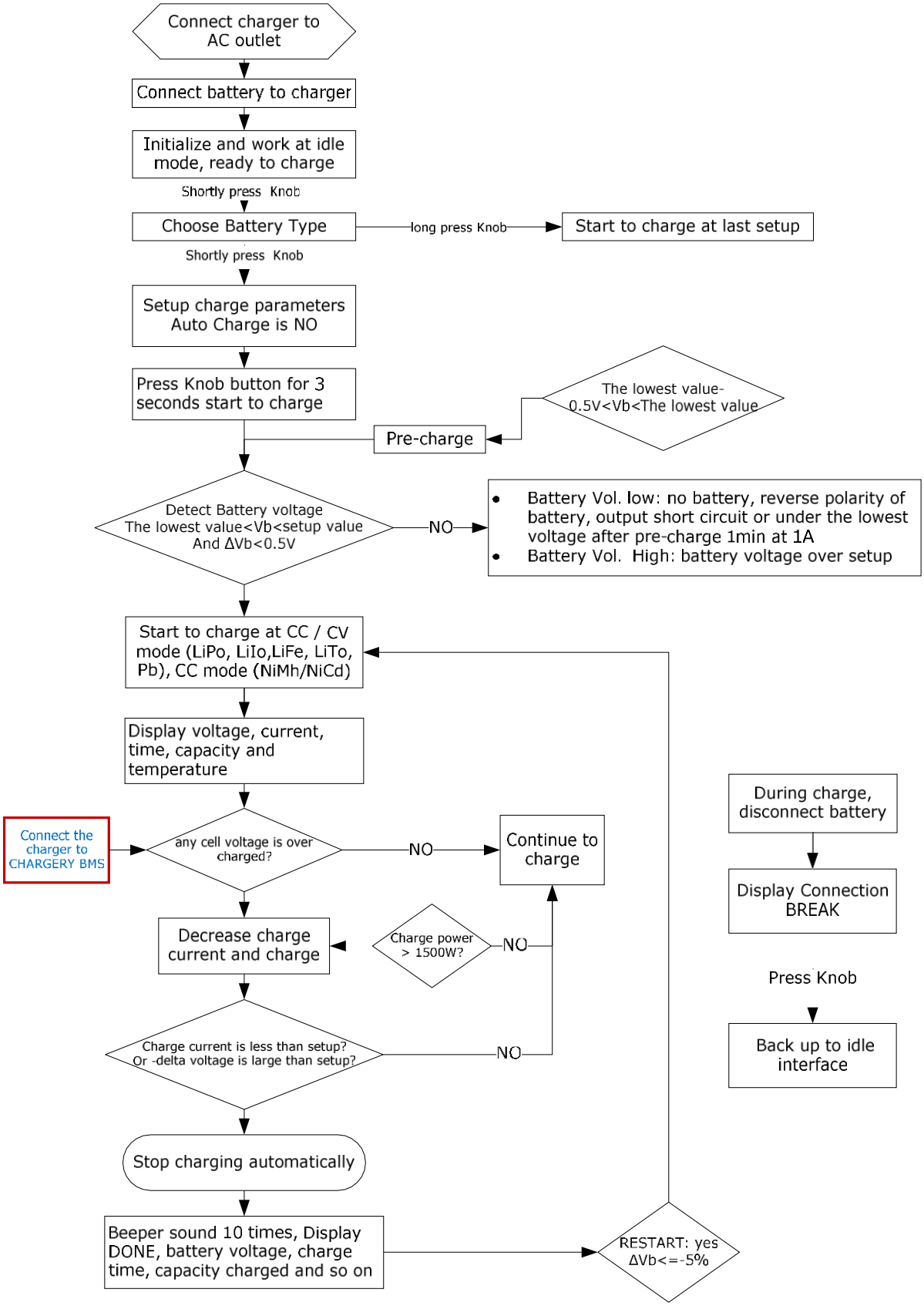
Warning

1. For any lithium battery, such as LiPo, LiFePO4, Li-ion, LiTo and other Li battery, the PCM (Protection Circuit Module), BMS, cell monitor, saver etc. must be built-in the battery pack, because the charger don't monitor each cell voltage, even the total battery voltage don't be over charged, the single cell voltage is possible be over charged, special for larger impedance cell. So if no PCM or BMS protect each cell from over charged, it is very dangerous.
2. Before charge, the cell count must be setup correctly, it is very important. Cell count is not the cell quantity in a battery pack, it means cell count of connection in series, even 5 cells connected in parallel, the cell count is 1 NOT 5. Please according to your battery pack rated voltage and the following table get the cell count.

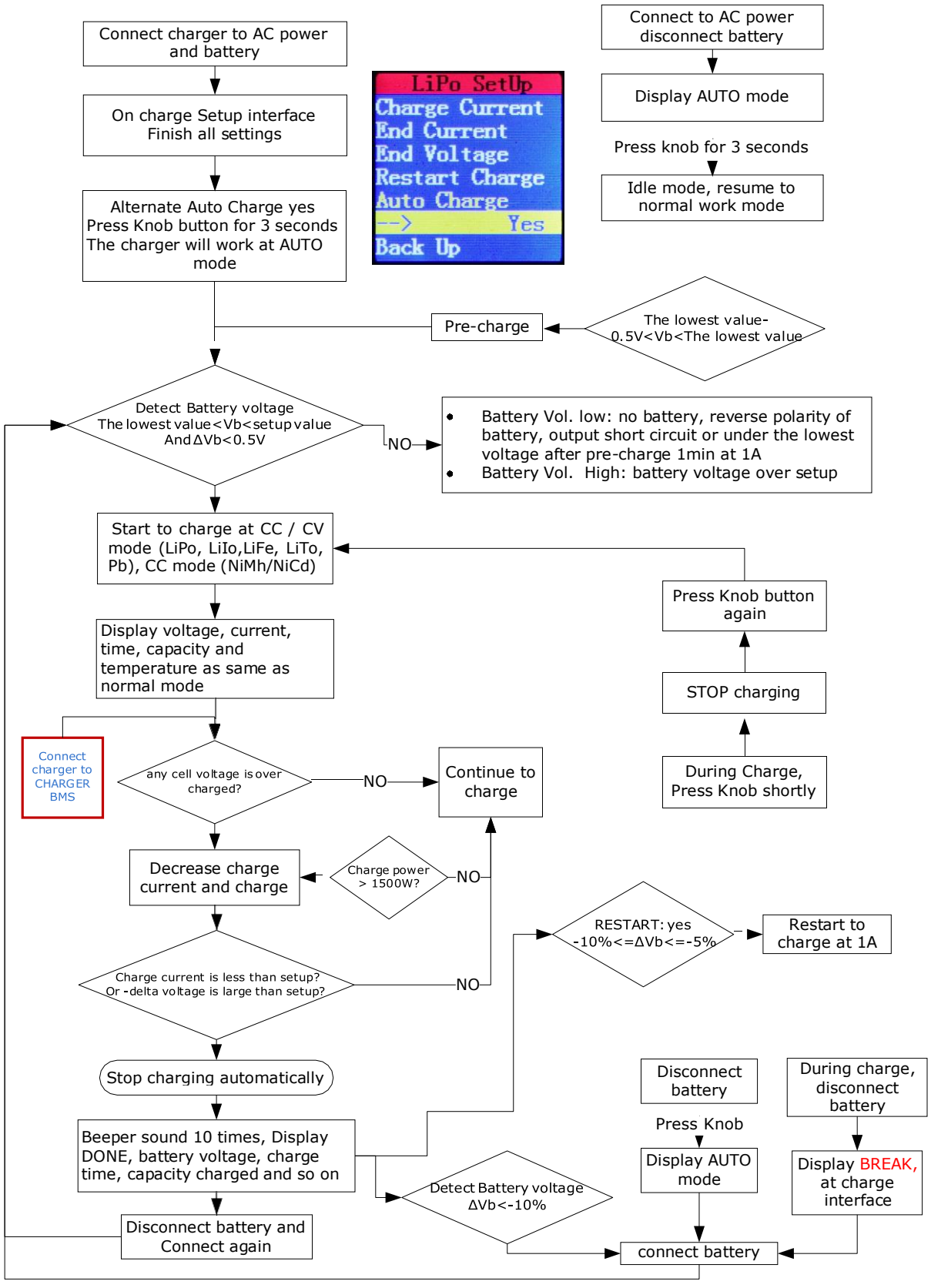
cell count/Battery rated voltage	LiPo,V	Li-ion,V	LiFePO4,V	LiTo,V	Pb/VRLA/Gem battery,V
4	15.4	15.0			
5	19.3	18.8	16.0		
6	23.1	22.5	19.2		12.0
7	27.0	26.3	22.4	16.8	14.0
8	30.8	30.0	25.6	19.2	16.0
9	34.7	33.8	28.8	21.6	18.0
10	38.5	37.5	32.0	24.0	20.0
11	42.4	41.3	35.2	26.4	22.0
12	46.2	45.0	38.4	28.8	24.0
13	50.1	48.8	41.6	31.2	26.0
14	53.9	52.5	44.8	33.6	28.0
15	57.8	56.3	48.0	36.0	30.0
16	61.6	60.0	51.2	38.4	32.0
17	65.5	63.8	54.4	40.8	34.0
18	69.3	67.5	57.6	43.2	36.0
19	73.2	71.3	60.8	45.6	38.0
20	77.0	75.0	64.0	48.0	40.0
21	80.9	78.8	67.2	50.4	42.0
22	84.7	82.5	70.4	52.8	44.0
23	88.6	86.3	73.6	55.2	46.0
24	92.4	90.0	76.8	57.6	48.0
25			80.0	60.0	50.0
26			83.2	62.4	52.0
27			86.4	64.8	54.0
28			89.6	67.2	56.0
29				69.6	58.0
30				72.0	60.0
31				74.4	62.0
32				76.8	64.0
33				79.2	66.0
34				81.6	68.0
35				84.0	70.0
36				86.4	72.0
37					74.0
38					76.0
39					78.0
40					80.0
41					82.0

Operation Instructions

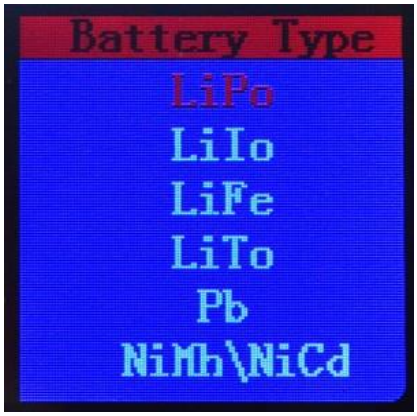
Charge flow diagram

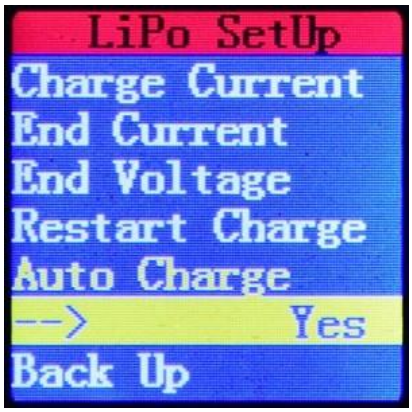


Automatically Charge flow



1. Connect SV102 to AC 110 / 220V outlet by the special heavy power cable, if use other brand cable, please note the wire AWG must be AWG14 at least.
2. Connect battery to charger.
3. Connect Charger BMS SV24 to charger if possible.
4. 2 seconds later, the idle interface is displayed; the charger is ready to charge. Actual output voltage, current and internal temperature is also displayed, but SV102 is at idle mode (no output) to save power consumption.





5. Press knob shortly can choose Battery type; press again on Battery type such as LiPo can enter into LiPo charge setup interface. Here, you can setup cell count, charge current, charge terminal current, and charge terminal voltage per cell, and then press knob for 3 seconds start charging.
6. Stop charging, the battery voltage will goes down because of self-discharge, if need maintain battery voltage, please setup the Restart Charge YES, the charger will continue to charge when battery voltage goes down to 5% of total battery voltage.
   If set up to YES, the charger display KEEP after charge finished.
   If set up to NO, the charger display DONE after charge finished.

7. Setup the charger work at Auto mode,

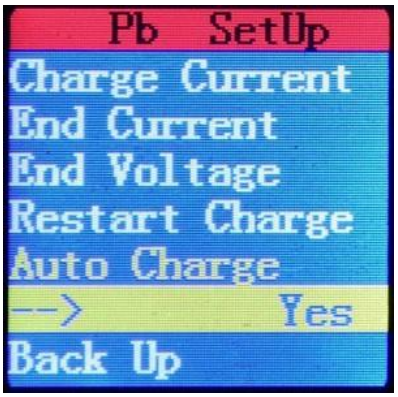
Finish all charge settings, alternate Auto charge YES and press Knob for 3 seconds, the charger will start to charge, and work at Auto mode in future till disable it.

When the charger work at Auto mode, what you need to do is connect the AC power and battery to the charger. The charger will operate at last settings. On Auto interface, press Knob for 3 seconds alternate to Idle mode. More details please read the Auto charge flow.

8. During charge, many charge information is displayed as below

Cell count, Battery Type, Charge status
Battery voltage
Charge current
Capacity charged
Charge time
Internal temperature

9. Similar with LiPo charge setup, you can setup LiIo, LiFe, LiTo, Pb battery and NiMH/NiCd.



10. At any time Press knob shortly stop charging. The charger will work at idle mode to save power consumption. Generally you needn't disconnect it from AC outlet, because it only consume under 1W power at idle mode.

Tips

- All parameters will be remembered by the SV102 till next change.
- Choose battery type, and press knob for 3 seconds start to charge at last setup, save many operating time.
- When you need charge one battery repeat, you can save Auto Charge mode, the charger will charge automatically, you need not setup any parameters, at AUTO charge, press Knob button shortly can stop charging at any time, and press it again start to charge. Or during charge, disconnect battery stop charging, and connect it again, start to charge.

  When need to charge new battery at different parameters, disconnect battery, at AUTO interface, press Knob button for 3 seconds alternate idle interface, the charger will work at intelligent operate mode, all parameters can setup in this mode.

Program Setup

1. In charger idle interface, press knob button for 2 seconds enter into Program Setup menu.
2. LCD display the following information in sequence and you can modify its value. When you want to alter a parameter value, press the knob button make the value blink then modify the value by rotate the button. The new value will be confirmed and saved by pressing the button again. Press knob buttons alternate different items, and press knob to quit the setup menu.

Picture 3 Program setup

Max current ---> 60A	Setup the maximal charge current, range from 1A~25A, step 0.1A, default 25A. It is only active for power supply.
Fan ON Temp. ---> 40℃	Setup the fan starting temperature, range from 30~50℃, step 1℃, default 35℃. The fan speed will increase with the temperature go
Shut Down Temp. ---> 80℃	Setup over temperature protection, range from 70~110℃, step 1℃, default 110℃. Over the temperature, the charger will power off
Buzzer ---> ON	The beeper sounds for each button press to confirm your action. These sounds can be ON or OFF. Default ON.
BACK-LIGHT TIME ---> 5MIN	This menu sets the back-light time of LCD screen backlight. Options: 1MIN, 5MIN, 10MIN, 20MIN and Always on, default 5MIN. At default 5min, LCD back-light will be off to save the power, press knob resume the back-light.
Temp. Unit ---> ℃	Setup the Temperature unit, ℃ or ℉, default ℃.

Note:

- All parameters will be remembered by the SV102 tillnext change.

As power supply

On Battery type interface, choose power supply setup output voltage and maximal output current, the charger will work as a programmed power supply; you can set up the output voltage and maximal output current, and then press Knob for 3 seconds power on the charger.

- □ Output voltage adjustment range: 10V~102V,
- □ Output current adjustment range: 1A~25A.

Environment Requirements

- □ Ambient Temperature : -10--45℃
- □ Ambient Humidity ： 5%--95%
- □ Storage Temp. ： -20℃--70℃
- □ Storage Humidity ： 30%--90%

Input

- □ Rated Voltage ： AC110 / 220V
- □ Voltage allowed：AC90 ~ 265V
- □ Rated Freq. ： 50/60Hz
- □ Freq. Allowed ： 47~63Hz
- □ Max Current ： 18A @90V, 7.5A @220V
- □ Efficiency: 94% at 65% load and 220Vac input.
- □ Active PFC: PF>0.99 at 90VAC and 100% of load; PF>0.97 at 220VAC and 100% of load

Output

- □ Voltage ： 10 ~ 102V programmed
- □ Voltage accuracy: ±1%Current accuracy: ±
- □ Ripple voltage: 10mV.
- □ Charge Curren1 ~ 25A programmed
- □ Power: 1500W max.

Protection

- □ Over voltage protection, over 2V setup value.
- □ Over current protection, over 2A setup value.
- □ Over charge power protection, 1800W max.

- Over temperature protection, 110℃ max.
- Short- circuit protection on output.
- Prevent any cell from over charging, adjust charge current automatically fit with Charger BMS

Mechanical Characteristics

- Size：275*170*68 (L*W*H, mm) or 10.8 * 6.7 * 2.7 (L*W*H, inch)
- Weight: 2.46Kg without input cable
- Input power cable: AWG14 wire, 1.5m length
- Output DC connector: male connector

Packaging Information

- SV102 base unit: 1pcs
- Power cable: 1pcs
- Communication wire: black,avaitation connector , 1pcs
- power Charging cable Green military connector set :1pcs

Total solution on E-Vehicle application

Charger4S_24S & BMS is a successful combination with the charger. When all cell voltage reach setup value, the BMS will communicate with the charger, the charger will continue to charge at a smaller current rather than stopping charging.

It is very important at large current charge application. Because Start and Stop charge repeat by Close or Open relay or MOSFET, NOT only cause battery voltage fluctuation at a large range, shorten mechanical switch or electronic switch life, but also extend charging time notably.

Charger BMS and charger as a total solution can charge and monitor each cell voltage, temperature, charge and discharge current, short circuit even cell voltage difference, and charge each cell to any voltage you want, such as you can set up the charge terminal voltage 3.85V per LiPo cell, when charge is done, the battery pack will be storage at safe status,

NOTE

Charger SV102 decrease charge current according to "Over Charge Protection (P) Voltage" on BMS setup, so please setup the charge terminal voltage in accordance with Over Charge Protection (P) Voltage on BMS SV24S.

Error Information

When the following error events trigged, the beeper will sound for 10 seconds and error information will be displayed, you can press knob button turn off beeper sound and back up to Idle or auto mode interface.

Error information	DESCRIPTION
Battery Vol. low	No battery connection or reverse polarity of battery connection or short circuit on output, the charger will be power off
Battery Vol. High	Battery voltage over setup, the charger will be power off
Over Current	Output current over 2A of setup for 2 seconds, sv10325 turn off automatically and turn on manually
Over Voltage	Output voltage over 2V of setup for 2 seconds, SV10325 turn off automatically and turn on manually
Over temperature	The heat sink temperature over setup for 2 seconds, SV10325 power off automatically, and turn on manually
Connection Break	At normal charge, disconnect battery, the charger will stop charging, press Knob back up to idle interface

Warnings

- Never leave the charger unattended when it power on. If any malfunction is observed, please press Knob button power off the charger as fast as possible.
- Keep away the charger from dust, damp, rain, heat direct sunshine and vibration. Do not drop it.
- The charger should be set up on non-inflammable and non-conductive surface. Never place on a car seat, carpet or similar.
- Keep all the inflammable volatile materials well away from operating area.
- Do not attempt to charge any Lithium battery not built-in BMS, PCM, cell voltage monitor

Related parts

MODEL	DESCRIPTION	COMMENTS
BMS_S16	2-16S battery management system	
~~BMS S24~~	2-24S battery management system	
S400	High efficiency wide input voltage PFC charger	6~15V 25A 400W output
S600	High efficiency wide input voltage PFC charger	10~18V 33A 600W output
S1200	High efficiency wide input voltage PFC charger	12~24V 50A 1200W output
S1800	High efficiency wide input voltage PFC charger	10~30V 60A 1800W output

The following parts are similar to the SV102 and maybe of interest: