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Specification of Soneil Battery Charger

MODEL: 5807SR

60V5A BATTERY CHARGER



General

The 5807SR model 60V5A charger is a fully automatic high frequency switch mode 4 – stage battery charger with battery de-sulfating mode, constant current, constant voltage and float voltage. It comes with a 115/230 VAC input selection. The 60V/5A battery charger can charge any gel, glass-matt (AGM), sealed, wet and any other type of lead acid batteries. This charger can also be used with lithium batteries (Contact Soneil for more information).

Summary:

- **60 Volts, 5Amp Constant Current** (equivalent to 10A tapered charger in charging time)
- **Universal Input 90VAC to 264VAC** - Suitable anywhere in the world.
- Automatic Cut-off and then true Float. Can be left connected indefinitely without harming the battery.
- **UL, CSA, TUV Listed.**
- Meets EMC standards
- Can also be used for On-board (internal) applications.
- Increases battery life by **de-sulphating the battery**.
- Many **advance features** described in this spec:
 - User adjustable selector switch on the outside of charger for High (Wet) or Low (Gel/ AGM) battery voltage selection.
 - Setting of high or low voltages are adjustable independently.
 - Chargers are able to be connected and operated in parallel to provide higher output currents of 5A, 10A, 15A and so on as required.
 - Watchdog feature for Battery Protection: A timer control stops charging if charger does not go to float mode after 60 hrs. from start of charging and gives fault LED indication
 - **Small size and light weight**

1. Main product specification

Max. output power	Input voltage	Output voltage	Output current
For Wet: 373W For Gel: 355W	115VAC/230VAC with selector switch	For Wet: 74.5V * For Gel: 71V *	5A

*Voltages are adjustable

2. Electrical characteristics

2.1 Input characteristics

No.	Item	Technical specification	Remark
1	Input voltage range	90 – 140VAC or 180 – 280VAC	
2	AC input voltage frequency	50/60 Hz	
3	Max input current	3.8A 1.9A	At 115 VAC rated load input. At 230 VAC rated load input.

2.2 Output characteristics

No.	Item	Technical specification	Remark
1	Fast charge voltage	For Wet: 74.5V For Gel: 71V	With selector switch for High/low battery selection
2	Floating voltage	67.5V	Same for high or low battery selection
3	Constant current	12 A +/- 10%	
4	Switching current	About 1.5 A	30% of constant current of 5A
5	Power efficiency	85 %	At 230 VAC rated input voltage.

2.3 Protection features

- a) Short- circuit protection.
- b) Reverse polarity protection.
- c) Over- voltage protection.
- d) Over-current protection.
- e) Output DC present when AC is plugged and battery not connected (non-trigger charger).
- f) No current drain (when output is connected to battery, there is very minimal current flow from battery if AC is off).

2.4 Charging explanation

The charging curve is attached. The explanation of the charging curve is as following for the Wet/Gel battery.

Note: Charger can be used to charge Wet or Gel battery by adjusting the selector switch position on the outside of the charger.

Stages	Condition	Mode*	Current	Voltage	LED Indication
Stage 1	Charging Pulse mode	Battery de-sulfating mode	12.0A Pulsing	0.5V to 5.0V	LED: Orange
Stage 2	Constant Current mode	CC mode	12.0A	5.0V to 74.5V: Wet 5.0V to 71V: Gel	LED: Orange
Stage 3	Constant Voltage mode	CV mode	Reduces from 12.0A***	Holds at 74.5V: Wet Holds at 71V: Gel	LED: Orange
Stage 4	Standby Voltage mode	Standby CV mode	Reduces to battery self discharge current	Maintains 67.5V for both Wet & Gel	LED: Green
	Recharging mode	CC mode	12.0A	<67.5V	LED: Orange

*CC mode: Constant current charge

*CV mode: Constant voltage charge

***See Stage 3 description below

Note: All voltage tolerances are at +/-0.3V and current tolerances at +/- 10%.

Stage 1: Deep Discharge Charging Pulse Mode: LED Flash Orange

The charger starts charging at 0.5V and give pulse current up to 5V. This has an effect of removing recently formed sulphation during deep discharge state of the battery.

State 2: Constant Current Mode (CC): LED Orange

The charger changes to constant current 5A. When the battery voltage reaches cut-off voltage, the charging stage changes form CC (Constant Current) to CV (Constant Voltage) mode.

Stage 3: Constant Voltage Mode (CV): LED Orange

In this stage the voltage of each cell in the battery is equalized. The charger holds the battery at cut-off voltage and the current slowly reduces. When the current reaches 0.3CC (CC=Constant Current), this point is called the Switching Point. The Switching Point is one of the greatest features of this battery charger whereby it can adjust current automatically according to battery capacity which other chargers are not able to adjust automatically.

Stage 4: Standby Voltage Mode: LED Green

The charger maintains the battery voltage at float voltage and current slowly reduces to the discharge current of the battery (almost zero). Charger can be left connected indefinitely without harming the battery.

If the battery voltage goes below 67.5V, for Wet or Gel Battery, the charger changes from any mode to Constant Current mode and restarts charging. The charging cycle will go through Stage 2 to Stage 4.

3. Special Features

- 3.1 Battery Type Selector switch: **User adjustable selector switch** is provided **outside** of the charger for Wet (high) or Gel (low) battery voltage selection. This means the user does not need to open the charger to adjust battery selection.
- 3.2 Independent setting: Setting of wet (high) or gel (low) voltages are **independently** adjustable through two variable resistors inside the charger. Therefore, it is possible to set the high and low voltage settings of any two types of lead acid battery.
- 3.3 Parallel Operation: Chargers can be connected and operated in parallel to provide higher output currents of 5A, 10A, 15A and so on as required.
Example: Connecting two changes of 5A in parallel will give 10A and three chargers of 5A in parallel will give 15A.
- 3.4 Watchdog feature (Timer control): This is a **battery protection feature**. A timer control stops charging if charger does not go to float mode after 60 hrs.* from start of charging and gives fault LED indication. There are two LED's on the charger. One LED for charging indication and one LED for fault indication display incase charger does not go to float mode after 60 hrs. from start of charging.
* 60 hours is a timer adjustable setting, which can be modified for customer requirement

4. LED Indications

4.1 LED 1: Charging indication

Charging: ORANGE colour

Charged: GREEN colour

4.2 LED 2: LED fault indication when charger does not go to float mode after 60 hrs. from start of charging.

LED fault indication: RED colour

5. Safety & EMC

No.	Item		Standard (or test condition)	Remark
1	Dielectric strength test	Input-output	1500VAC /10mA /60 sec.	No breakdown
2	Isolation resistance	Input-ground	$\geq 50\text{Mohm}@500\text{Vdc}$	
		Output-ground	$\geq 50\text{Mohm}@500\text{Vdc}$	
3	Leakage current		$< 0.5\text{mA}$	$V_{in} = 230\text{VAC}, 50\text{ Hz.}$
4	Safety		Certified to cTUVus equivalent to UL/CSA 1012 std.	
5	EMC		Tested and certified to required EMC standards.	

6. Environmental

No.	Item	Technical specification	Remark
1	Operating temperature	0°C to 50°C	Ambient
2	Storage temperature	-20°C to 70°C	Ambient
3	Humidity	+0% ~ +99%	
4	Random vibration	10Hz to 300Hz sweep at constant, acceleration 1.0G (breadth: 3.5mm) for 1 hour per each axis X/Y/Z	Pass functional test without any damages.
5	Drop test	Charger dropped from 1.0m height to a 20mm pine board repeatedly for 2 times on each side	No damage to the charger with charger functioning properly.

7. Mechanical characteristics

7.1 Outline dimension: Metal enclosure: Without mounting plates: L*W*H= 221 * 105 * 56 mm (8.7 * 4.1 * 2.2 in.)

With mounting plates: L*W*H= 255 * 105 * 56 mm (10 * 4.1 * 2.2 in.)

7.2 Input AC cord: Comes with IEC320-C14 or direct-wired AC cord options; length 1.5m – 1.8m;

7.3 Output DC wire: Red: +ve; Black: -ve;. (or as indicated on the charger label)

7.4 Inhibit function. / Interlock function options

DC wire length of 1.5m – 1.8m.

DC connector will be supplied as per customer's requirement.

8. Reliability requirements

8.1 MTBF (standard, environmental temperature, load requirement) $\geq 50K$ power on hours at tested value; testing condition: 25°C ambient temperature and at 80% of full load.

8.2 All chargers are burnt-in at an average DC load for a minimum of 4 hours with power on continuously.

9. Charger DC Output Wiring

9.1 Red wire: +ve

9.2 Black wire: -ve

9.3 Green or Yellow wire: Inhibit / Interlock

10. Inhibit/Interlock Function

10.1 The Inhibit / interlock function is optional and can be incorporated into the charger upon customer's request. The inhibit function can be low or high inhibit as required by the customer. In this case the charger will come with a third green inhibit wire. The inhibit function stops the mobility equipment (scooter, wheelchairs, patient lift etc.) from moving when the batteries are being charged. For this the equipment controller needs to have inhibit feature and the charger provides inhibit signal to the controller

10.2 For high inhibit, the charger comes with a third Green/Yellow High Inhibit wire which provides a voltage of around 36V and 10mA – 25mA current. Inhibit is needed so that when the batteries are being charged (charger is being used with AC on), the electrical vehicle motor cannot be used and hence prevents the vehicle from moving when charging the battery.

10.3 For low inhibit the charger also comes with a third Green/Yellow Low Inhibit wire The low inhibit is output of a transistor which floats when AC is not connected and goes ground when AC is connected. The inhibit signal is an open circuit output, leakage less than 5 microAmp, when the charger is not connected to an AC source. This signal will be less than 50 mV DC while sinking 10 mA when the charger is connected to an AC source. This will prohibit the operation of the vehicle's motor controller whenever the charger is plugged to an AC source.

10.4 If Interlock is required the charger can also come with a third Green/Yellow Interlock wire. Interlock is needed so that when the batteries are being charged (charger is being used, AC on), the electrical vehicle motor, head lights etc. cannot be used. It is done by using signal from the interlock wire which is internally connected to a relay inside the charger.

11. Charging Curve

See below.

12. General Description of Switch-Mode Technology

The advance technology of the OEM Battery Chargers supplied by Soneil is fundamentally different from other battery chargers. The conventional linear battery charger is an electrical device whereas the 5807SR is a light weight sophisticated electronic device.

Most of the battery chargers use linear technology, which convert the 115/230 VAC to 60 VDC at 60 or 50 Hz. This requires a large transformer, which has the disadvantage of lower efficiency resulting in higher heat generation, larger size and weight.

Soneil's Battery Charger transforms the 115/230 VAC into 60 VDC at 100,000 Hz (1667 times faster than conventional charger) which requires a much smaller transformer and this results in a unit of smaller size, low weight and improved efficiency.

The 5807SR uses sophisticated electronic circuitry with microchips. All present day computers use switch-mode technology.

13. Other Models of this Family:

With Parallel Application, user can get:

12V – 20A, 40A, 60A, 80A and so on

24V – 15A, 30A, 45A, 60A and so on

36V – 10A, 20A, 30A, 40A and so on

48V – 8A, 16A, 24A, 32A and so on

60V – 5A, 10A, 15A, 20A, and so on

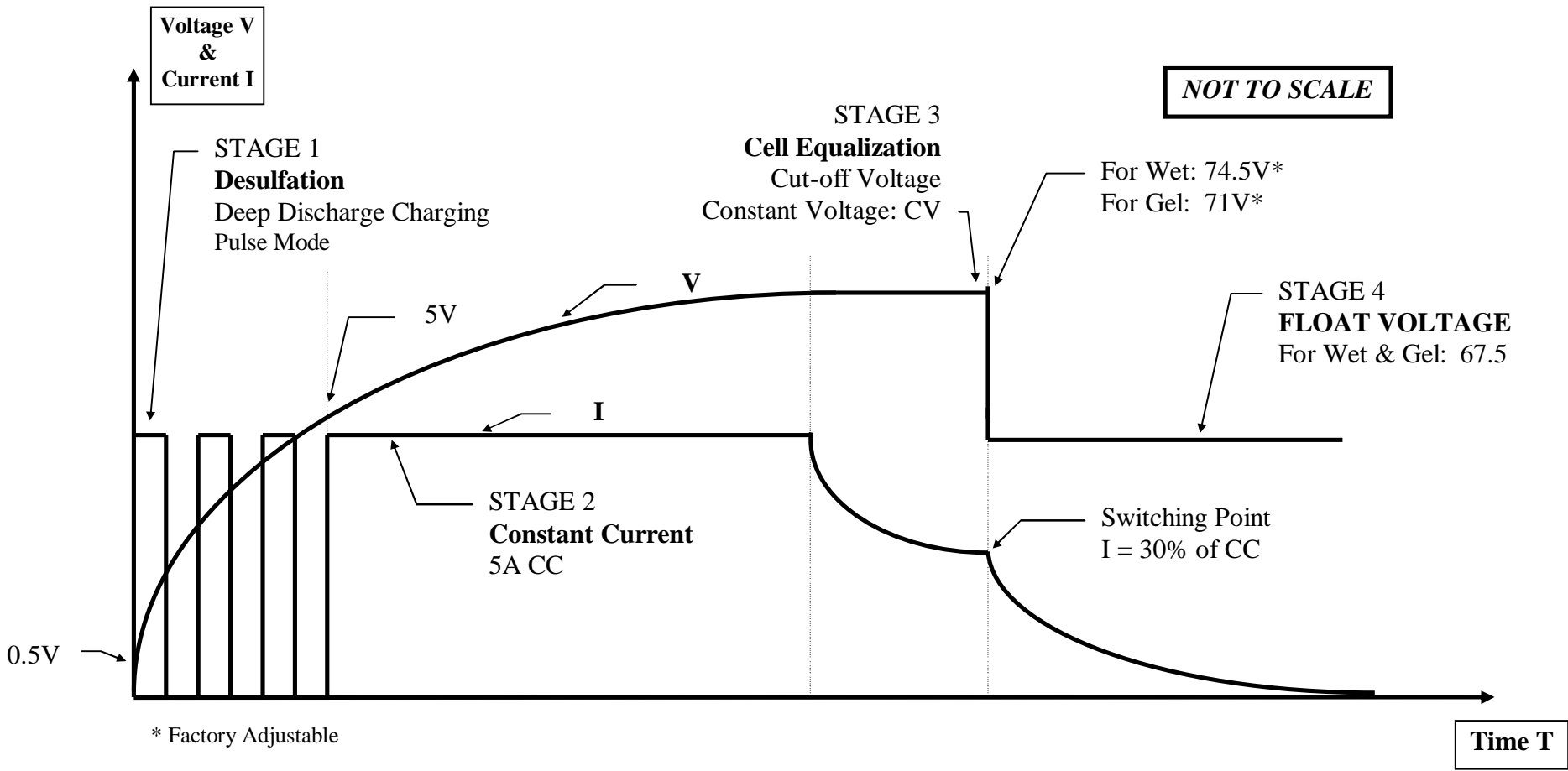
72V – 5A, 10A, 15A, 20A, and so on

Note: Specification is subject to change without notice.

For more detail and accurate information on the charger contact Soneil by email or call via phone

CHARGING CURVE MODEL 5807SR

SONEIL 60V/5A CHARGER



Ref: Charging Curve 5807.010413