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Specification of Soneil Battery Charger

MODEL: 1220SR20

12V / 10A LEAD ACID BATTERY CHARGER



General

The 1220SR20 model 12V10A 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. The 12V/10A 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:

- **12 Volts, 10Amp Constant Current** (equivalent to 20A tapered charger in charging time)
- **Universal Input 100VAC to 240VAC** - 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.
- **Small size and light weight**

1. Main product specification

Max. output power	Input voltage	Output voltage	Output current
144 W	100 – 240 VAC	14.4V *	10A

*Voltages are adjustable

2. Electrical characteristics

2.1 Input characteristics

No.	Item	Technical specification	Remark
1	Input voltage range	100 VAC - 240VAC	
2	AC input voltage frequency	50/60 Hz	
3	Max input current	3.5 A	At 230 VAC rated load input.

2.2 Output characteristics

No.	Item	Technical specification	Remark
1	Fast charge voltage	14.4V	
2	Floating voltage	13.5V	
3	Constant current	10 A +/- 10%	
4	Switching current	About 3A	30% of constant current of 10A
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	10A Pulsing	0.5V to 5.0V	LED: Orange
Stage 2	Constant Current mode	CC mode	10A	5.0V to 14.4V	LED: Orange
Stage 3	Constant Voltage mode	CV mode	Reduces from 10A***	Holds at 14.4V	LED: Orange
Stage 4	Standby Voltage mode	Standby CV mode	Reduces to battery self discharge current	Maintains 13.5V for both Wet & Gel	LED: Green
	Recharging mode	CC mode	10A	<13.5V	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 10A. 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 13.5V, 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. LED Indications

Charging: ORANGE colour

Charged: GREEN colour

4. Safety & EMC

No.	Item	Standard (or test condition)	Remark	
1	Dielectric strength test	Input-output	3000VAC /10mA /1 sec.	No breakdown
2	Isolation resistance	Input-ground	$\geq 10\text{Mohm}@500\text{Vdc}$	
		Output-ground	$\geq 10\text{Mohm}@500\text{Vdc}$	
3	Leakage current	$< 0.25\text{mA}$	$V_{in} = 230\text{VAC}, 50\text{ Hz.}$	
4	Safety	Certified to cTUVus equivalent to UL/CSA std.		
5	EMC	Tested and certified to required EMC standards.		

5. 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.

6. Mechanical characteristics

6.1 Outline dimension: Metal enclosure: L*W*H= 168*76*44 mm (6.6*3*1.7 in.)

6.2 Input AC cord: Comes with IEC320-C8 or direct-wired AC cord options; length 1.5m – 1.8m;

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

DC wire length of 1.5m – 1.8m.

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

6.4 Inhibit function optional

7. Reliability requirements

7.1 MTBF (standard, environmental temperature, load requirement) $\geq 50\text{K}$ power on hours at tested value; testing

condition: 25°C ambient temperature and at 80% of full load.

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

8. Charger DC Output Wiring

8.1 White wire: +ve

8.2 Black wire: -ve

8.3 Green wire: Inhibit

OR as specified on label

9. Inhibit Function

9.1 The Inhibit 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

9.2 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.

9.3 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. Charging Curve

See separate attachment.

11. 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 1220SR20 is a light weight sophisticated electronic device.

Most of the battery chargers use linear technology, which convert the 115/230 VAC to 12 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 12 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.

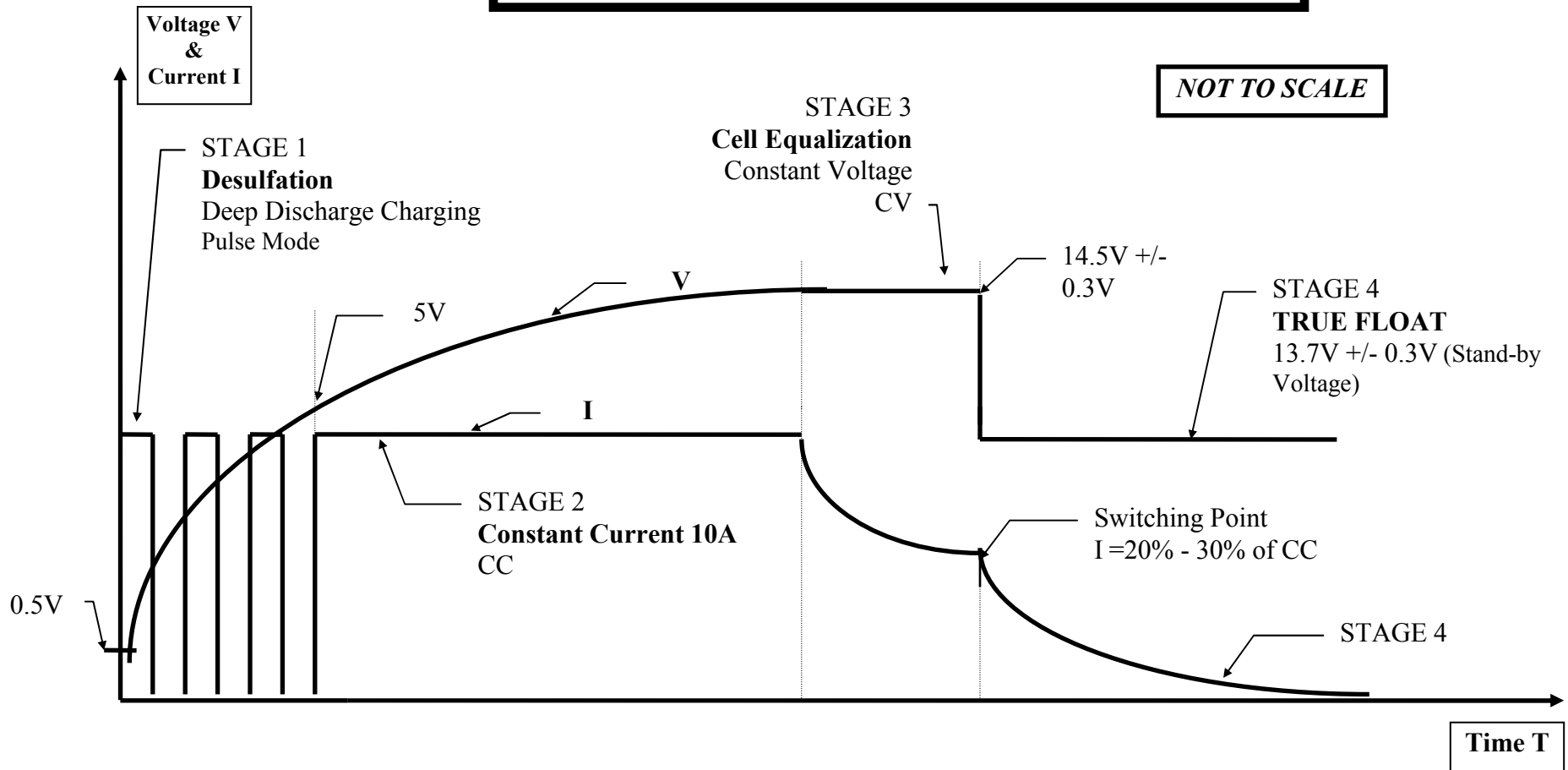
The 1220SR20 uses sophisticated electronic circuitry with microchips. All present day computers use switch-mode technology.

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 1220SR

SONEIL 12V/10A CHARGER



Ref: 1220SR20 Charging Curve.080212