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SPECIFICATIONS - 2403SRM10
24V 0.5A MEDICAL CHARGER

Totally Automatic Switch-Mode Medical Battery Chargers

"**Suitable for Gel, Sealed & Wet Lead Acid Batteries in Medical Applications**"

Summary: **24 Volts, 0.5Amp Constant Current**
(equivalent to 1.0A 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.
- **De-sulfation of battery**
- **UL, CSA Approved for Medical Standard (UL60601-1, CSA-C22.2 601.1, IEC 60601-1 approved)**
- Double-insulated with IEC 320-C8 Inlet in the charger for AC connections.
- Meets EN55011/IEC60601-1-2 EMC requirements
- Can also be used for On-board (internal) applications.
- Increases battery life by de-sulfating the battery.
- Many advance features described in this spec.
- **Very small size and very light weight**

Explanation of the Features:

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 2403SRM10 is a light weight sophisticated electronic device.

1. **Switch-Mode Technology:**

   Most of the battery chargers use linear technology, which convert the 115/230 VAC to 24 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 24 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 2403SRM10 uses sophisticated electronic circuitry with microchips and suitable for medical use. All present day computers use switch-mode technology.

2. **International Safety Approvals & Listing:**

   Medical Standard (UL60601-1, CSA-C22.2 601.1, IEC60601-1)
   North American (UL & cUL) approvals in a single charger.
   Meets EN55011; IEC60601-1-2 EMC requirements.

3. **Input Requirements:** Universal Input

   a) 90VAC to 264VAC

   b) 47 - 63 Hz

   Very wide AC input tolerance. **Suitable for every part of the world**.

   Charger comes with the option of US / Europe / UK etc. AC cord as required by

the customer.

4. **Output:**

0.50 Amps Constant Current @ 24 Volts DC
(Equivalent to 1.0 Amp tapered charger in charging time)

a) Line Regulation @ Full Load 2%

b) Load Regulation @ 3%

c) **Ripple Voltage**: Very low

The peak to peak ripple voltage into a resistive load is less than 200mV for the output voltage above 24 VDC.

d) Output wire indications:

White: +ve
Black: -ve
Green: Low inhibit (optional)

5. **Charging Cycle:**

The charging curve is attached. The explanation of the charging cycle is as following.

Stages	Condition	Mode*	Current	Voltage	LED Indication
Stage 1	Charging Pulse mode	Pulse mode	0.50A Pulsing	0.5V to 5.0V	Orange
Stage 2	Constant Current mode	CC mode	0.50A	5.0V to 28.8.V	Orange
Stage 3	Constant Voltage mode	CV mode	Reduces from 0.50A***	Holds at 28.8V	Orange
Stage 4	Standby Voltage mode	Float Voltage mode	Reduces to zero	Maintains 27.4V	Green
	Recharging mode	CC mode	0.50A	<27.4V	Orange

***** CC mode = Constant current charge
***** CV mode = Constant voltage charge
*** See Stage 3 description below

Stage 1: Deep Discharge Charging Pulse Mode: LED Flash
The charger starts charging at 0.5V and give pulse current up to 5V. This has effect of removing loose sulfation formed during deep discharge state of the battery.

Stage 2: Constant Current Mode (CC): LED Orange
The charger changes to constant current 0.50A. When the battery voltage reaches up to 28.8V, the charging stage changes from CC (Constant Current) to CV (Constant Voltage) mode.

Stage 3: Constant Voltage Mode (CV): LED Green
The charger holds the battery at 28.8V and the current slowly reduces. When the current reaches at 0.3C (C = Constant Current), this point called the Switching Point. The Switching Point is one of the great feature of this battery charger that it can adjust the current automatically according to battery capacity. Other chargers are not capable to adjust the current automatically.

Stage 4: Standby Voltage Mode: LED Green
The charger maintains the battery voltage at 27.4V and current slowly reduces to zero. Charger can be left connected indefinitely without harming the battery.

Recharging: LED Orange
If the battery voltage drops down below 27.4V, the charger changes from any mode to Constant Current mode and restart charging. The charging cycle will go through Stage 2 to Stage 4.

Soneil charger can charge gel, sealed or wet lead acid batteries without use of any switch.

6. **Two colours and function in one LED:**

LED is used to show the charging status. When the LED is Orange, the charger is in charging or recharging mode and the current is 0.50A constant. When the LED is Green, the charger is in Standby mode and no current (zero) is flowing.

7. **Protection**:

a) **Reverse polarity protection** - provided
b) **Short circuit protection** - provided
c) Over-Voltage Protection - provided
d) Over current protection - provided
e) **AC Surge Protection** - provided
f) **Soft start and stop:** Starts and stops gradually.

No sudden in-rush of current. This protects both the batteries and any other circuits connected to the charger.

8. **De-sulfation of battery:** The charger will remove loose sulfation and increase the battery life. (Hard sulfation cannot be reversed).

9. **Low current drain:**

Low (almost zero) current is taken from the battery when connected to battery but AC not plugged in. (Many other chargers in the market draw 30-40 mAmp which drains the battery.)

10. **Reliability**:

a) **Mean Time between failures (MTBF)**: 50,000 power-on-hours (POH) or greater. This translates into 17 years of everyday operation of 8 hours.

b) **Burn-in**: All chargers are burned in at an average DC load of 0.50 Amps.

c) **Vibration Test**: The charger passed vibration test at the following test conditions:

Frequency: 5-55 Hz
Range: +/- 1.5 mm
Acceleration: 20m/s
Direction: X/Y/Z 3 directions
Test Time: 2 hours respectively

d) **Drop Test**: The charger was dropped from a 1.0m height to a 10mm pine board repeatedly for four times on each side with no cracks, breaks and no components getting loose or breaking.

11. **Electromagnetic Interference (EMI)**:

The charger will not generate excessive radiated or conducted emissions. No interference with TV, radio, computer or other equipment.

Meets EN55011/IEC60601-1-2 EMC requirements.

12. **Ground leakage current**:

The ground leakage current is less than 0.10mA, which complies with the requirements.

13. **Low Inhibit Function :** Optional

The model has a third Green output wire (optional), which provides an interlock signal that will prohibit the operation of the vehicle's motor controller whenever the charger is plugged to an AC source.

High Inhibit Signal: The interlock signal is an open circuit output, leakage less than 5 microAmp or less, 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.

14. **Environmental Operation**

Operating Temperature: 0 deg.C - 40 deg.C
Operating Relative Humidity: 10% - 90%

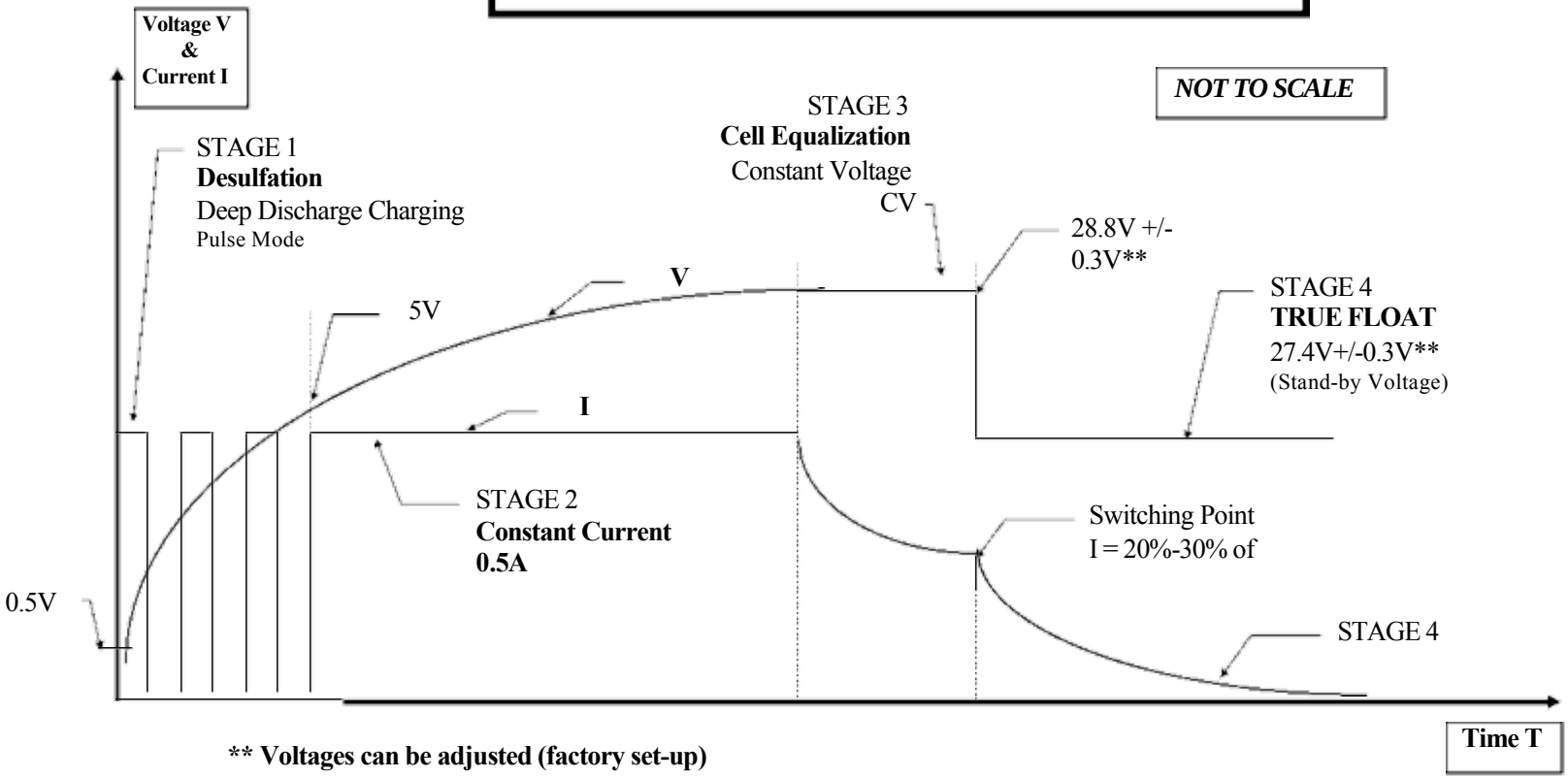
15. **Size:** **Very Small** Length - 4.7" (119 mm)
Width - 2.9" (73 mm)
Height - 1.6" (41 mm)

Very Light Weight 0.9 lbs (410 grams)

Ref: SPEC2403SRM10(REV01).30-Jan-09

CHARGING CURVE
MODEL 2403SRM10

SONEIL 24V/0.5A MEDICAL CHARGER



**** Voltages can be adjusted (factory set-up)**

Ref: Curve2403SRM10.10 June-10