



Smart Charger **SBC - 2403** User's Manual

Introduction

The SBC-2403 is a Switch Mode Battery Charger with MCU controlled charging. Maximum charge is achieved through 4 stage charging (Precondition, Bulk, Absorption and Float charge stages). This charger is suitable for 8Ah - 60Ah 24V lead acid batteries including GEL and AGM. Another excellent feature is a sealed splash proof IP-55 rated polycarbonate casing.

****Please read this manual carefully and follow the instructions****

Features

- 1. 4 Stage Smart Battery Charger.**
 - A. Pre charge** – Battery analysis.
 - B. Bulk** - Constant Current charge.
 - C. Absorption** – Constant Voltage Pulse charge.
 - D. Float** – Charge maintain.
2. Motorcycle, Car, and Low Temperature (< 10°C) charge modes.
3. Easy one button charge selection.
4. Can be permanently connected to the battery.
5. Output short circuit and reverse polarity protection.
6. Dust & Splash proof IP-55 construction with poly-carbonate casing.
7. Over-Temperature Protection.
8. Smart battery charging is achieved with internal Microcomputer Unit (MCU). Condition of the battery is analyzed before charging starts and is monitored constantly during charging.

Contents

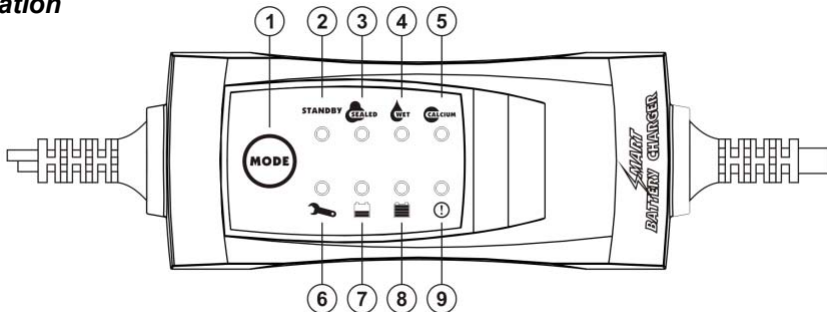





- Smart Battery Charger with lead terminals.
- Detachable leads with protection cover & crocodile clips.
- Detachable leads with protection cover & ring terminals.

Warning :

- This battery charger is designed for charging 24V lead acid 8-60Ah batteries.
- Do not use this battery charger for any other purpose.
- Explosion hazard: A battery being charged can emit explosive gases.
- Avoid smoking or open sparks or naked flames in the vicinity of the battery.
- Do not cover battery charger while charging. Allow good ventilation.
- If your skin or eyes come into contact with acid immediately rinse the affected part with excessive water and seek medical attention.
- Do not charge a frozen battery.
- Do not charge a damaged battery
- Disconnect battery from charger when it is not AC powered.
- Do not charge non-rechargeable batteries.
- If the cord is damaged, the battery charger is not be used.
- When charging for long periods of time check the battery charger frequently.

Operation



Charging Mode	
	Sealed lead acid battery Charge Mode ③ 28.4V/2.2A Max Battery capacities of 8 - 60 Ah
	Wet battery Charge Mode ④ 28.8V/2.2A Max Battery capacities of 8 - 60 Ah
	Calcium-Calcium battery Charging Mode ⑤ 29.6V / 2.2A max Battery capacities of 8 – 60Ah

Plug in the battery charger to AC mains (100 - 240V) wall socket.





The indicators light up one by one as battery charger goes through a series of self checks. When the checking is complete the “Standby” indicator will come on.

Connect the red lead to the positive battery terminal and the black lead to the negative battery terminal.

The “Standby” blinks to indicate that charger is ready for selection of Charge Mode. User has 2 minutes to select the desired Charge Mode. If not selected during battery charger will revert back to last Charge Mode.

Select the appropriate Charge Mode by pressing the Mode button one or more times within 2 minutes. The Charge Mode indicator changes with each press (Sealed → Wet → Calcium-Calcium).

The Mode button will be locked in 10 seconds after a Charge Mode has been selected.

<i>Display</i>	<i>Indications</i>
STANDBY	Standby Mode ② Steady light on : AC mains connected but charger is not yet connected to battery. Blinking light on : Battery is connected. 2 minutes is available to select the Charge Mode before the battery charger reverts back to last selected Charge Mode.
	Check Mode ⑥ Steady light on : On for few seconds for a normal battery. Battery charger is checking the battery. Steady light on : On for longer period. Battery charger is in Desulphate Charge Mode. Blinking light on : When connected to battery that is not suitable to be charged. Blinking light on : After being in Charging Mode for 40 hrs, Desuphating Charge Mode for 8 hrs or battery cannot hold charge or cannot be desuphated. Remove the battery .
	Charging Mode ⑦ Steady light on : Charging is in progress (desulphate, bulk or absorption charge stage)
	Float / Maintenance Charge Mode ⑧ Steady light on : Battery is fully charged and Charger in Float / Maintenance Pulse Mode
	Alarm ⑨ The blinking alarm indicates charging fault, check following faults. Output connectors in short circuit Output connectors in wrong polarity Over Temperature Protection activated. Charging has stopped.

Check Mode and Normal Charging

The Charger first checks the battery condition. For normal battery this indication extinguishes after few seconds and battery charger enters into “Charge Mode” and finally to the “Float/Maintenance Mode” when the battery is fully charged.

Charging Stages

Bulk : This charges the battery up to about 80% full.
 The charger delivers a constant current of 2.2A for 4 minute and 1.2 A for 6 minute cycle until the battery voltage rises to a set value.

Absorption : PWM charges to 100%. The terminal voltage is kept constant at set level. Battery charger delivers current pulses to the battery in varying pulse periods. When the rise time of pulses decreases to a set value, charger switches to Float Mode. The maximum total charging time of Bulk and Absorption is 40 hours at which the charger will shut down.

Float : PWM maintenance charging and cycle charging
 In this mode the charger does not deliver current when battery voltage is above 25.6 V. When battery voltage drops below 25.6V battery charger will deliver small current until the battery voltage rises to about 27.2 V.

When the battery voltage drops further to about 24V, the charger will start a new charging cycle of Bulk, Absorption and Float .

This is to insure that the battery will not be overcharged and will be kept fully charged.

The charger can be connected to a battery for months at a time without over charging it.

Check Mode and Desulphate Charging

The desulphate charging can recondition only slightly sulphated battery.

- A. If "Check Mode" indication is on longer the charger is in desulphate charging. After a period of time if desulphation of the battery is successful the charger will switch to normal charging and the "Check Mode" will cease.
- B. If Desulphate Charge Mode fails to recondition the battery the "Check Mode" will blink.
The battery should be replaced.
The maximum desulphate charging time is 8 hours.

Check Mode and Unchargeable battery

- A. If the Check Mode blinks before or after pressing the Mode button then the battery is not suitable for charging. Check the battery connections and clean the battery terminals to confirm that the battery is not suitable for charging.
- B. The Check Mode also blinks after 40 hours in Bulk and or Absorption Stage charging until battery is removed. This safety time feature is to avoid charging faulty battery which cannot hold charge.

Thermal Protection control

The charger will decrease bulk charging current at high temperature and if temperature still increases above a set safety value the charger will shut down.

Alarm and Faults

Blinking Alarm indicates faulty connections or charge condition. Once the fault has been corrected battery charger will continue to operate normally.

- A. Wrong connection of Positive and Negative terminal will cause "Alarm" to blink.
- B. Shorting the output cable terminals (crocodile clamps or ring connectors)
- C. Over Temperature Protection has been activated and charging has stopped. Unplug charger until temperature cools down .

Interrupting the charging process

When there is a power outage, the battery charger will resume charging at its last selected Charging Mode (Sealed , Wet, Calcium-Calcium) upon the return of mains AC power.

The charger automatically completes the charging process when the charging end voltage is reached and switches to float / maintenance charge mode.

Specifications

AC Input	100-240V, 50/60Hz~, 1.5A MAX.
Maximum Output Charging Current	2.2 A
Max. Power	65W
Efficiency	>78%
Absorption Voltage for Sealed (GEL , AGM)lead acid battery	28.4V
Absorption Voltage for Wet lead acid battery	28.8V
Absorption Voltage Calcium –Calcium lead acid battery	29.6V
Construction	IP-55(dust & splash-proof) , poly-carbonate casing
Accessories	Detachable leads with crocodile clips and leads with ring terminals
Protection:	Overload, Short Circuit, Over Temperature, Reverse Polarity, No Spark –when connecting to the battery or when output shorted.
Cooling System	Natural Convection
Approvals	N2926 Q080450 EN55014, EN6100, EN60335, EN62233
Dimensions (LxWxH)	150x60x30mm

SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE

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