BENTON
CAR ACCESSORIES

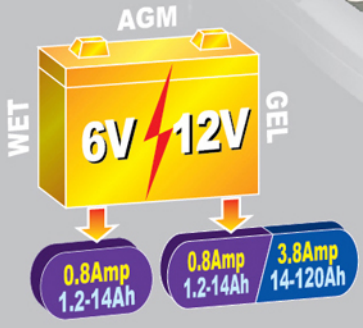
5STEP

- A Unique Battery Charger
- Fully Automatic
- Electronically safe against user errors!
- Smart Option for Computerized Battery Charging and Management!

SWITCH MODE BATTERY CHARGER

IP65

- Charges 6V & 12V Batteries
- MCU controlled, fully INTERACTIVE
- Fully automatic from Charge to Maintenance!!
- Charges WET/Flooded, GEL, AGM type Lead-Acid Rechargeable Batteries
- Automatically Diagnoses, Recovers, Charges & Maintains batteries for months....



7.3V / 0.8A | 14.4V / 0.8A | 14.4V / 3.8A | 14.7V / 3.8A

SB-380

Product Features

Rescues drained batteries over 7.5V (for 12 V batteries) and 3.75V (for 6 V batteries)

Standby feature- Monitors current drawn by battery

No risk of over-charging

Electronically safe against user errors

Spark-proof

Overheat protection

Fully protected against short circuit & wrong connections

Bulk Charging Time

Battery size (Ah)	Mode	For About 80% Charge (hours)	
		6V	12V
1.2		1.5	1.5
2		2	2
14		14	14
14			3
20			4.5
60			14
100			23
120			28

All major starter battery manufacturers recommend to keep your battery fully charged during idle period.

BENTON® SB-380 is a 5-Step fully automatic switch mode battery charger and maintainer, designed for charging a variety of lead-acid rechargeable batteries, widely used in motorbikes, cars and several other vehicles. The batteries may be of various types i.e. WET/Flooded (Liquid Electrolyte), GEL (Gelatin type Electrolyte, absorbed into the plates), AGM (Absorbed Glass Mat) batteries. Their capacity range from 6V/1.2 Ah to 6V/14 Ah and 12V/1.2 Ah to 12V/120 Ah. The **BENTON® SB-380** battery charger also charges batteries in cold conditions. Using state-of-the art technology, the charger enables the recharging of the batteries to almost 100% of their original capacity. It recovers slightly sulphated batteries. It diagnoses and rescues drained battery. It provides trickle charge and maintenance charging which increases battery life and gives superb performance. It also features low back current drain and low ripple.

Product Safety Feature

- Electronically safe against user errors. The charger will not damage vehicle electronics. It is totally safe for months-long connections and maintenance of irregularly or seasonally used batteries even while the charger is still connected to the vehicle. It provides optimal condition without damage. **No risk of over-charging!**
- Full protection against wrong connection and against short circuit ensures safe charging operation.
- Provided with Spark protection mechanism. The charger will not begin operation upon connection to the battery unless charging mode has been selected. This embedded feature eliminates the possibility of a spark that often appears during connections.
- Fully controlled by internal MCU (Micro-Computer-Unit), which makes it faster, powerful, reliable and smarter. It detects the state of charge of the battery plugged into it and initiates charging.
- Dust and splash proof (IP65), for indoor use only
- Double insulated

Battery Type & Settings

The following recommendations should only be referred to as guidelines. For precise details, you must refer to battery manufacturer for instructions.

SYMBOL	MODE	SETTINGS	DETAILS
6V	1	7.3V/0.8A	This mode is normally suitable for 6V WET, MF and GEL batteries <14 Ah batteries
	2	14.4V/0.8A	This mode is normally suitable for 12V WET, MF and GEL batteries <14 Ah batteries
	3	14.4V/3.8A	This mode is normally used for 12V WET, MF and most GEL batteries (14-120Ah)
	4	14.7V/3.8A	This mode is recommended for several 12V AGM batteries. This mode is also suitable for charging batteries in sub-zero temperatures (14-120Ah)

Rescuing Drained Battery

When charger is connected to a battery, before the start of charging process, the charger automatically detects the voltage of the battery. It can recover deeply discharged & drained batteries with pulse charging if the voltage is in the range of 7.5-10.5V for 12V battery or 3.75V-5.25V for 6V battery.

Abnormality Protection

In case of short-circuit, open circuit, reversed polarity connection or battery voltage below 7.5V (for 12V battery) or 3.75V (for 6V battery), the charger will turn-off the electronic system and will immediately reset the system back to basic position to avoid damage to battery and charger.

Overheating Protection

BENTON® SB -380 charger is protected by NTC control. During the charging process, if the charger becomes too hot, the power output is automatically reduced to protect itself from damage. The charger continues to work trickle charge. Charger increases power automatically when the ambient temperature drops.

Technical Data

MODEL	SB -380
Input Voltage AC	220-240VAC, 50/60Hz
Output Voltage	Nominal: 6V or 12V
Starting Current	<25 A
Input Current	0.6A RMS max
Efficiency	75%
Charging Voltage	14.4V or 14.7V or 7.3V
Charging Current	3.8A or 0.8A
Back Current Drain*	< 5 mA (No AC input)
Ripple**	150mV max
Ambient Temperature	-20°C to 40°C, Reduced output power at higher temperature
Type of Charger	Five step, fully automatic, switch mode with maintenance charging
Type of Batteries	12V Lead-acid batteries (WET, MF, AGM and GEL)
Battery Capacity	1.2-14Ah (for 6V), 1.2-120Ah (for 12V)
Dimensions (LxWxH)	183 x 65 x 45mm
Housing Protection	IP65 (Dust and Splash proof), for indoor use only.
Weight	0.502kg
Noise Level	<50 dB (Tested from a distance of 50cm)

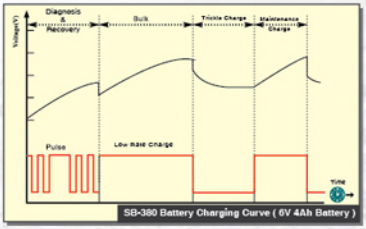
* = Back current drain is the amount of current drawn by the charger from battery, when the charger is connected to the battery, without power cord connected. Benton® SB-380 has extremely low back current drain which corresponds to 0.7 Ah per month (1mA/hr)

** = Ripple refers to interference of current and voltage. A high current ripple heats up battery and reduces life of battery. Against a linear charger, which has a current ripple of upto 400%, Benton® SB-380 charger's current ripple is below 2% (0.15/12V battery voltage), which is much lower than the max 5% for a sealed acid battery. Equipments connected to the battery could be damaged by high voltage ripple.

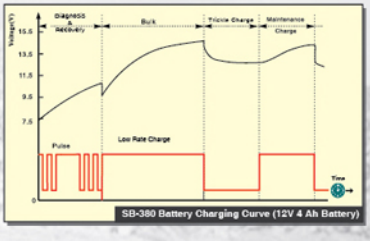
Charging Phases

BENTON® SB-380 charger performs 5-step fully automatic charging cycle.

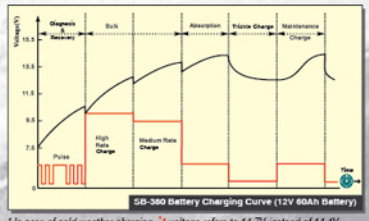
MODE	SETTINGS	SYMBOL
1	7.3V/0.8A	6V
2	14.4V/0.8A	
3	14.4V/3.8A	
4	14.7V/3.8A	



SB-380 Battery Charging Curve (6V 4Ah Battery)



SB-380 Battery Charging Curve (12V 4 Ah Battery)



SB-380 Battery Charging Curve (12V 60Ah Battery)

*In case of cold weather charging, *1 voltage refers to 14.7V, instead of 14.4V*

Control Panel

1) Diagnosis & Recovery :

Initializes the recovery process for drained batteries by pulse charging with small current in order to restoring the battery capacity.

2) Bulk :

80% of energy is returned in this phase of charging. Here charger performs in two states: High Rate Charging and Medium Rate Charging.

3) Absorption :

In this phase complete charging up to almost 100% is achieved. Charger switches to trickle charge phase after sensing that the battery is truly fully charged.

4) Trickle Charge :

Battery is fully charged and ready to use. If the battery needs more current, the charger will switch to Maintenance Charge phase.

5) Maintenance Charge :

As charger continuously monitors the terminal voltage in order to determine if a maintenance charging should be initiated. If the battery is loaded and/or terminal voltage falls below 12.8V (for 12V battery) or 6.4V (for 6V battery), the charger starts a maintenance cycle until voltage reaches to 14.4V (for 12V battery) or 7.35V (for 6V battery). The maintenance charging is discontinued.

Standby feature

When battery remains connected with vehicle's wiring system, during the float mode, circuits continuously monitor the current drawn by the battery.

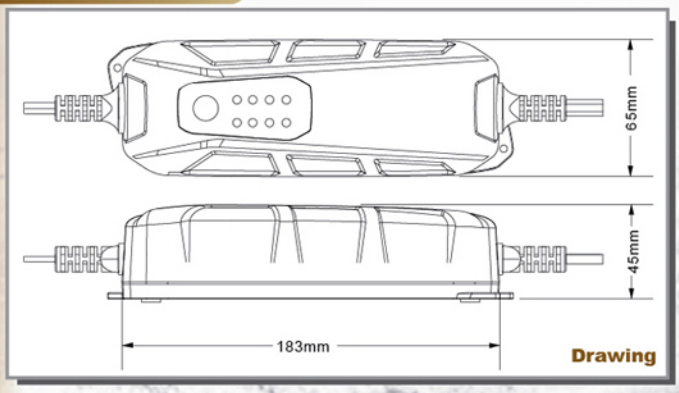
BENTON® SB-380 is fully interactive

charger which adjusts itself to changing current and voltage requirement to charge and maintain the battery.

Mounting & Product dimensions

The charger is easy to fix using two screws.
(Please refer to product drawing.)

Product Dimensions



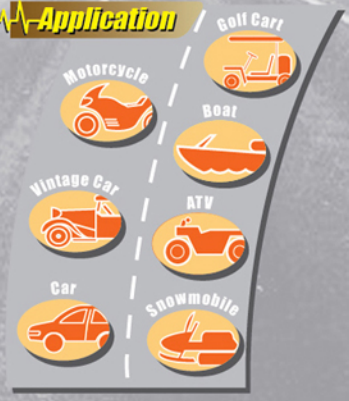
Drawing

Packing Illustration

Equipment

BENTON® **SB-380** charger is supplied with two kind of colour coded battery leads, one with clamps for bench charging and other with eyelet terminals (Ø6.3mm)

Application



Regulatory Approvals

Tested and approved by TÜV and SGS and conforms to EN 60335-1/A15:2011, EN 60335-2-29/A2:2010, EN62233:2008, PPP76001:2008 incl. ZEK01.2-08, EN 61000-3-2:2006+A1:2009+A2:2009, EN 61000-3-3:2008, EN 55014-1: 2006+A1:2009, EN 55014-2:1997+A1:2001+A2:2008

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