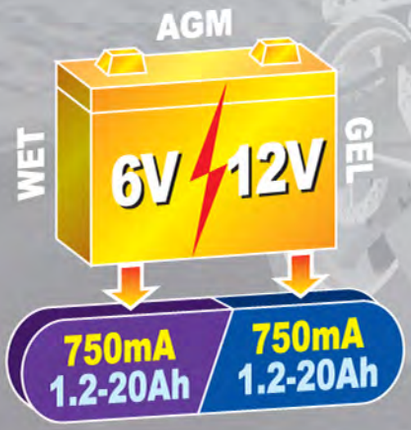
POWERTECH PLUS

3 STEP

- A Unique Battery Charger
- Fully Automatic
- Electronically safe against user errors!
- Smart Option for computerized battery charging and management!

SWITCH MODE BATTERY CHARGER



- Charges 6V & 12V Batteries
- MCU controlled, fully INTERACTIVE
- Select for 6V or 12V Battery, rest is 100% automatic from Charge to Maintenance!!
- Charges WET/Flooded, GEL, AGM type Lead-Acid Rechargeable Batteries
- Automatically Diagnoses, Recovers, Charges & Maintains batteries for months....

CE

TÜV SÜD GS geprüfte Sicherheit

N287

IP60

7.2V / 750mA

14.4V / 750mA

MB-3603

Bulk Charging Time

Time required for the POWERTECH PLUS MB-3603 to complete a charge on a normally discharged battery is shown as under. Deep-discharged battery might take longer time to charge.

Battery Size (Ah)	For about 80% Charge (hours) 6V	12V
1.2	4	4
2	7	7
10	30	30
12	37	37
20	60	60

Note: Above table for reference only. Actual data may differ due to battery condition.

Technical Data

MODEL	MB-3603
Input Voltage AC	220-240VAC, 50/60Hz
Output Voltage	6V & 12V (Manual-Select)
Input Current	130mA RMS max
Efficiency	>75%
Charging Voltage Bulk Charging Mode Trickle Charging Mode Maintenance Charging Mode	 3.75V±0.25V (for 6V Battery), 7.5V±0.25V (for 12V Battery) 6.5V±0.25V (for 6V Battery), 13.0V±0.25V (for 12V Battery) 7.2V±0.25V (for 6V Battery), 14.4V±0.25V (for 12V Battery)
Charging Current	750mA±10%, 750mA ON 100mS OFF 900mS (average current 100mA)
Back Current Drain *	<35mA
Ripple**	Max 150mV, 0.2A
Ambient Temperature	-20°C to +50°C/-4°F to +122°F Reduced output power at higher temperature
Type of Charger	Three step, fully automatic, switch mode with maintenance charging
Type of Batteries	6V & 12V Lead-acid rechargeable batteries (WET, MF,AGM and GEL)
Battery Capacity	1.2-20Ah (for 6V and 12 V batteries)
Dimensions (LxWxH)	100x65x38mm
Housing Protection	IP60 (Dust proof) Indoor use
Weight	0.190kg
Noise Level	<50 dB (Tested from a distance of 50cm)

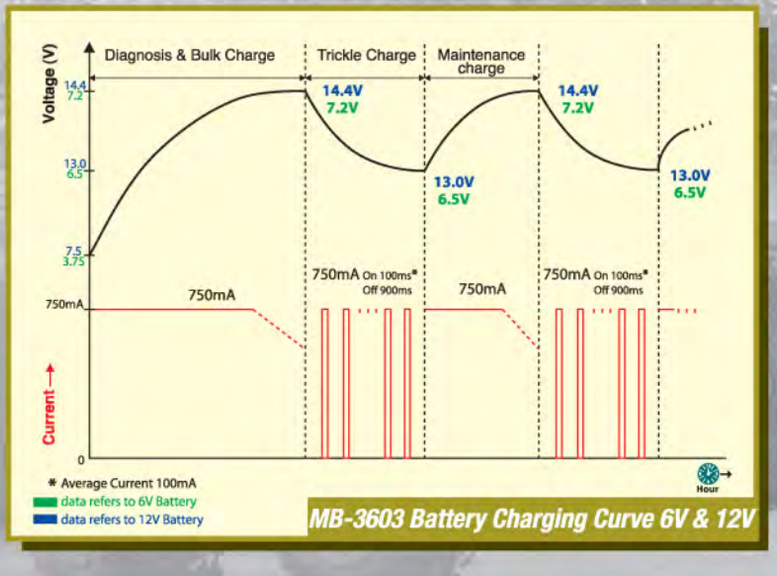
* = Back current drain is the amount of current drawn by the charger from battery, when the charger is connected to the battery, without power cord connected. POWERTECH PLUS MB-3603 has extremely low back current drain which corresponds to 0.7 Ah per month (1mA/hr)

** = Ripple refers to interference of current and voltage. A high current ripple heats up battery and reduces life of battery. Against a linear charger, POWERTECH PLUS MB-3603 charger's ripple voltage is below 2.5% (0.15/6V or 0.3/12V battery voltage), which is much lower than the max 5% for a lead-acid rechargeable battery. Equipments connected to the battery could be damaged by high voltage ripple.

Charging Phases

POWERTECH PLUS MB-3603 charger performs 3-step fully automatic charging cycle.

MODE	SETTINGS	SYMBOL
1	7.2V/750mA	6V
2	14.4V/750mA	12V



MB-3603 Battery Charging Curve 6V & 12V

Control Panel

Product Features

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

Standby feature- Monitors current drawn by battery

POWERTECH PLUS **MB-3603** is a 3-Step fully automatic switch mode battery charger and maintainer, designed for charging a variety of Lead-Acid rechargeable batteries, widely used in motorbikes 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), MF , VRLA (Valve Regulated Lead Acid) batteries. Their capacity range from 6V/1.2Ah to 6V/20Ah and 12V/1.2Ah to 12V/20Ah. 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 provides trickle charge and maintenance charging which increases battery life and gives superb performance. It is also ideal for maintaining batteries of non-regularly used vehicles of all types. It also features low back current drain and low ripple.

No risk of over-charging

Electronically safe against user errors

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 proof (IP60) approval. Approved for indoor use.
- Double insulated

Spark-proof

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	7.2V/750mA	This mode is normally suitable for 6V (1.2Ah to 20Ah) WET/Flooded, GEL, AGM, MF, VRLA type Lead-Acid Rechargeable Batteries
12V	2	14.4V/750mA	This mode is normally suitable for 12V (1.2Ah to 20Ah) WET/Flooded, GEL, AGM, MF, VRLA type Lead-Acid Rechargeable Batteries

Overheat protection

Fully protected against short circuit & wrong connections

Abnormality Protection

In case of short-circuit, open circuit, reversed polarity connection or battery voltage below 3.75±0.25V (for 6V battery) or below 7.5±0.25V (for 12V 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

POWERTECH PLUS **MB-3603** 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.

1) Diagnosis & Bulk Charge :

As soon charging instruction is given to the charger, the unique diagnostic function automatically checks status of battery (detects voltage). If a battery's voltage is over 3.75V (for 6V battery) or 7.5V (for 12V battery), charger begins bulk charging mode by applying a constant current 750mA±75mA for both 6V or 12V battery, which terminates when voltage reaches 7.2V (for 6V battery) or 14.4V (for 12V battery).

2) Trickle Charge :

Battery is fully charged and ready to use. Use of a constant high current for extended periods of time risks gassing the battery. . The battery will signal to the charger and will only take enough current to sustain small loads such as alarms etc or current leaks in the vehicle wiring circuit. Low current in frequency of 750mA ON for 100mS, OFF for 900mS is given to the battery. Since current is not delivered constantly, POWERTECH PLUS MB-3603 charger would minimize the heating up of the battery, and hence it will eliminate the build up of gases. This ensures more efficient and safer performance. When voltage drops below 6.5V±0.25V (for 6V battery) or 13.0V±0.25V (for 12V battery), monitoring circuit senses that battery needs more current to maintain its charge than available in trickle charge phase. The Charger switches to Maintenance Charge phase.

3) 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 6.5V±0.25V (for 6V battery) or 13.0V±0.25V (for 12V battery), the charger starts maintenance charging at constant 750mA until voltage reaches to 7.2V±0.25V (for 6V battery) or 14.4V±0.25V (for 12V battery). The maintenance charging is discontinued. Cycle of trickle charging and maintenance charging is repeated indefinitely to keep battery in good condition when it is not in use and enables charger to be left connected indefinitely.

Standby feature

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

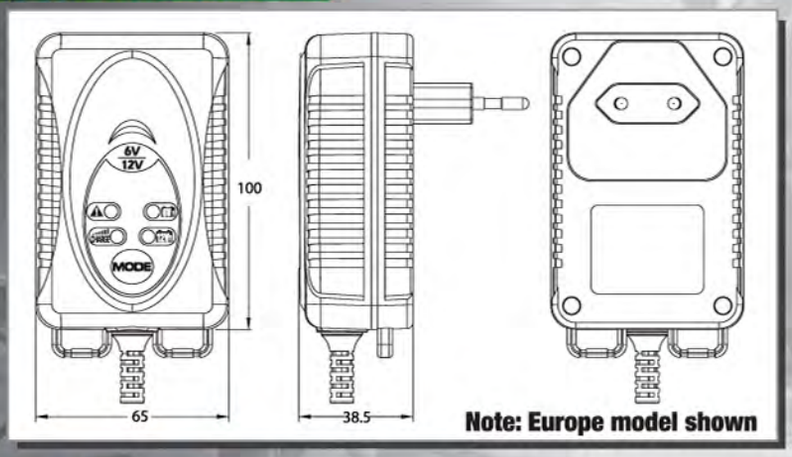
POWERTECH PLUS MB-3604 is fully interactive

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

Mounting & Product dimensions

The charger is direct plug-in type.
(Please refer to product drawing.)

Product Dimensions



Note: Europe model shown

Packing Illustration

Application

Equipment

POWERTECH PLUS MB-3603 charger is supplied with colour coded battery leads, with alligator clamps which can convert to eyelet terminals of 6.3mm diameter

Declaration of Compliance

Tested and approved by TÜV GS and conforms to AN/NZS 60335.2.29 2004, with certificate of approval Q090069

Connectors

POWERTECH PLUS

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