Automatic Battery Charger
Switching mode with Micro-controlled
Input: 120Vac / Output: 12Volt DC

User’s Manual and Important Safety Information
Model: 20087

FEATURES

Congratulations on purchasing your Battery Doctor Automatic / Switching Mode Battery Charger.
Battery Doctor Battery Chargers comprise of the latest technology and they incorporate the following features:

- High frequency Switching Mode
- Full time pulse charge output
- Microprocessor controlled
- Multi charging rate - Selectable
- Suits Calcium, AGM, WET, GEL battery - Selectable
- Manual Battery Refresh mode - Selectable
- Heavy-duty cables
- Corrosion-resistant output connectors and clamps

WARNING

- This charger is designed for indoor use only and should never be exposed to rain.
- Make sure you are using proper AC line power voltage.
- Do not attempt to use the charger if it has been dropped or damaged.
- Never attempt to charge a damaged battery, frozen battery or non-rechargeable battery.
- Do not use the charger in a closed area or poorly-ventilated area.
- Never smoke, use an open flame, or create sparks near a battery or charger during charging operation as this may cause an explosion / explosive gas.
- Do not operate the charger if the cord or plug is damaged.
- Do not disassemble the charger. Take it to a qualified person if a repair is required.
- Keep the charger away from infants, children and pets.
- Switch off the mains power supply before connecting or disconnecting the unit to a Battery.

CAUTIONS

- Refer to the battery Manufacture’s specific recommended values to determine your Battery Type and for setting the charging rate.
- Check the Battery Manufacture's specific precautions - such as removing or not removing cell caps while charging.
- Please ensure the correct Battery Type is selected. Do not charge using an incorrect Battery Type Setting. (For example, do not charge a Gel battery with Calcium battery selection setting as this may damage your battery)
- Someone should be within range of your voice or close enough to come to your aid if working near a lead-acid battery.
- Wear protective goggles and turn your face away when connecting or disconnecting a battery.
- If battery acid contacts your skin or clothing, wash immediately with soap and water. If acid enters your eye, immediately flush the eye with running cold water for at least 10 minutes and seek medical attention immediately.
- To reduce risk of damaging the Battery, avoid dropping any metal tools onto the battery.
- Never rest the Battery being charged on top of your Battery Charger.
- The Battery Charger should be kept as far away from the Battery as the output cables permit.
CONTROL AND INDICATORS

1. **Charging Rate Selection Button**
   Press to Select the Current Charge Rate.

2. **Charging Current LED Display**
   LED indicates the selected charging current (2A or 8A or 16A) (Model: 20087)

3. **Battery Type Selection Button**
   Press to select the Battery Type. (Calcium, AGM/WET or GEL Batteries)

4. **Battery Type LED Display**
   LED indicates the selected Battery Type.

5. **Charging Status Display LED**
   Bulk LED – Blue: Indicates the charger is at a maximum charging rate.
   Absorption LED – Green: Indicates that the Battery is approaching full charge.
   Absorption LED – Blinking Green: Indicates equalisation stage for Calcium AGM/WET Battery.
   Full LED – Green: Indicates the Battery is fully charged.

6. **Charging Fault LED Display**
   See trouble shooting for further details.

7. **Refresh Selection Button**
   Press this Button once to Select the Equalisation for extending the equalization time.
   Press and hold this Button for 3 seconds to start the Rejuvenation Stage.

8. **Refresh Stage LED Display**
   Red LED on indicates the Equalisation Charge Stage

RECOMMENDED BATTERY CAPACITY

The following minimum AH capacities are to be used as a general guide only.
Some Batteries may be able to handle a higher Charge Current;
Check with the Battery Manufacturer when charging Batteries with small capacity.

<table>
<thead>
<tr>
<th>Charge Current</th>
<th>2A</th>
<th>4A</th>
<th>8A</th>
<th>10A</th>
<th>16A</th>
<th>21A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery Capacity</td>
<td>6-40AH</td>
<td>12-80AH</td>
<td>18-120AH</td>
<td>30-200AH</td>
<td>45-300AH</td>
<td>60-400AH</td>
</tr>
</tbody>
</table>

OPERATING INSTRUCTIONS

The Battery Doctor Battery Charger is easy to operate and very simple to use.
Please refer to the operating instructions below.

1. **Pre-Charge Check**
   (a) Check the Battery Electrolyte level (Non-sealed Batteries). If necessary, remove the vent caps and add distilled water so the levels are halfway between the upper and lower fill lines.
   (b) Location – Ensure the Battery is in a well ventilated area. Keep the Charger as far away from Battery as the cables permit. Never place the charger directly above the battery being charged as gasses from the Battery will corrode and damage the charger. Also, keep the charger away from high corrosion / wet and moist areas.

2. **Connecting the Battery charger to your Battery**
   (a) **If the Battery is out of the vehicle**
       1. Connect the Red lead from the charger to the positive (+) battery terminal.
       2. Connect the Black lead from the charger to the negative (-) battery terminal.

   (b) **If the Battery is still in the vehicle**
       1. Determine if the vehicle is positively (+) or negatively (-) earthed.
       (i) **If Negatively Earthed (Most Common)** – FIRSTLY Connect the Red (+) battery charger lead to the positive (+) Battery post and then connect the Black (-) battery charger lead to the vehicle's chassis and away from the fuel line.
(ii) **Positively Earthed** – FIRSTLY Connect the Black (-) battery charger lead to the negative (-) battery post and then connect the Red (+) battery charger lead to the vehicle’s chassis and away from the fuel line.

3. **Connect the battery charger to the Mains power (120Vac)**

   (a) The Charger will automatically start when AC power is connected.
   (Note: If the Fault Indicator LED illuminates Red, please check your connections as it’s likely that the Positive and Negative Leads are reversed. Refer to Trouble Shooting Page for further information)

   (b) **Select the desired charge rate:** 2A and 4A for small batteries; 8A and 10A for medium or deep cycle batteries; 16A and 21A for large or heavy duty deep cycle batteries

   (c) **Select the Correct Battery Type**
      - **Calcium:** is the new generation battery; Sealed Type (VRLA) Lead Acid battery with Calcium Content. (Automotive or Deep Cycle)
      - **AGM/WET:** These are the most common and are also known as WET (Flooded) or AGM (Absorbed Glass Mat) Sealed-valve regulated Lead Acid (VRLA) Batteries. (Automotive or Deep Cycle)
      - **GEL:** Sealed type (VRLA), with a jellified electrolyte (Automotive, Aviation, Solar or Deep Cycle)

**Note:** The charger will automatically memorise your charging rate setting and battery type setting. The next time you use the charger it will automatically start with the last settings.

We strongly recommend that you refer to the battery manufacture’s specifications when selecting the charge rate and battery type.

**The Charging process**

The Charging LED’s will indicate the Charging Stages.

The charging stages are as follows:

● **Soft start:** Charges the battery using half the maximum current until the battery voltage is over 10.5V. *(Indicated by the Blue Bulk LED Flashing)*
   *(Soft Start occurs if the initial voltage is less than 10.5V due to deep discharge)*

● **Bulk Charge:** Charges using a constant maximum current until the battery rises to the absorption level. *(Indicated by the Blue Bulk LED ON)*

● **Absorption:** This stage charges the battery using a constant voltage providing that the Battery Voltage is over 85%. The Charging Voltage for this stage is determined by the Battery type selection: GEL-14.1V; AGM/WET-14.4V; Calcium-14.7V. *(Indicated by the Absorption Green LED ON)*

● **Equalising:** This stage begins automatically if the Calcium/ AGM&WET Battery type has been selected. This cycle pushes the charge voltage up to an equalising level of 16.2V for Calcium battery, 15.5V for AGM/WET battery.
   For further details and Manual equalisation options, please refer to page #5. *(Indicated by the Absorption Green LED Flashing)*
● Analysis: Diagnoses the battery condition for ten minutes. If the Full LED is flashing, this indicates that the battery is still less than 12.5V after the absorption mode and that there is a fault with the battery
  (Indicated by the Green FULL LED Flashing)

● Full / Float: Battery is fully charged and is ready for use. It will be maintained at a safe constant voltage.
  Battery type selection: GEL-13.4V; AGM/WET-13.5V; Calcium-13.6V.
  (Indicated by the Green Full LED ON)

**Refresh Process (EXTEND YOUR BATTERY LIFE)**

Battery Doctor Battery Charger provides a battery rejuvenation function.

**What does this feature do??** - Rejuvenation has been proven to break down the resistance within the battery cells which helps extend your battery life.

We recommend that you periodically use this rejuvenation feature to ensure you get the maximum life out of your battery.

To activate this rejuvenation feature, simply press and hold the ‘Equalisation’ Button for 3 Seconds until the Rejuvenation LED begins flashing (Yellow).

Once the charger has entered the rejuvenation charging stage, the process will automatically time out after 24 hours or you can manually stop this process at any time by pressing and holding down the ‘Equalisation’ Button for 3 seconds.

**Refresh Process (For Calcium / AGM&WET Batteries Only)**

Battery Doctor Battery Charger also provides a battery refresh function.

**What does this feature do??** – The Refresh function helps to maintain and balance your battery cells by reversing the high concentration of electrolytes from the bottom of your battery. This allows all the cells to charge evenly and makes you get the most out of your battery.
You can use this feature weekly to ensure your battery is always well maintained.

**Note: The Refresh function process will not work for GEL Batteries.**

To manually activate this equalisation feature, simply press and release the ‘Equalisation’ Button and the Equalisation LED will turn ON (RED).

Depending on the charge rate selected, this process will time out after 2 to 6 hours.

Equalising voltage is set to 15.5V for AGM/WET Conventional batteries and 16.2V for Calcium batteries.

To manually exit the ‘Equalisation’ mode, simply Press and Release the ‘Equalisation’ Button again and the Equalisation LED will turn OFF.

For manual equalisation, always refer to your battery manufacturer’s recommendations / specifications.

**4. Disconnecting the Battery charger from Battery.**

(a) If the Battery is out of the vehicle.
   1. Switch OFF and Remove the AC Power Socket from the outlet.
   2. Remove the Black lead and then the Red lead.
   3. Check electrolyte levels if possible. (As they may need topping up with distilled water after charging)

(b) If the Battery is in the vehicle.
   1. Switch OFF and Remove the AC Power Socket from the outlet.
   2. Remove the lead from the vehicle chassis.
   3. Remove the lead from the battery.
   4. Check electrolyte levels if possible. (As they may need topping up with distilled water after charging)

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**CHARGING STAGES**

Note: The Charger automatically switches off after 24 hours if the Bulk charge cycle is not completed.

**CHARGER SPECIFICATIONS**

1. Input: 120Vac; 60Hz;  
2. Charging starting conditions: Battery is not less than 1.5V  
3. Rated output: 13.5V at 2/8/16A selectable on SW121160,  
4. Type of Lead-acid Battery: Gel/AGM&WET/Calcium  
6. Charging output voltage (Automatic Equalisation): 15.5V for AGM&WET battery; 16.2V for Calcium battery  
7. Float output voltage: 13.4/13.5/13.6V at Gel/AGM&WET/Calcium  
9. Operating Environmental: 0~40 degC, 90% RH maximum; non-Condensing  
10. Net Weight: 1.3Kg approx  
11. Dimension: L230 x W132 x H76mm
# TROUBLE SHOOTING

<table>
<thead>
<tr>
<th>Problems</th>
<th>Indication</th>
<th>Possible causes</th>
<th>Suggest solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charger does not work</td>
<td>Indicator lights are not on</td>
<td>- No AC power</td>
<td>- Check AC connections and make sure Power Point is switched ON</td>
</tr>
<tr>
<td>Charger has no DC output</td>
<td>Fault LED is ON.</td>
<td>- Output is short circuited</td>
<td>- Check DC connection between charger and battery and make sure they are not short circuiting.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Output Reverse polarity connection</td>
<td>- Check that the alligator clips haven’t fallen off the battery.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Check that the alligator clips / ring terminals are connected to the correct polarity.</td>
</tr>
<tr>
<td>No Charging Current</td>
<td>Fault LED is Flash</td>
<td>- Battery is severely sulphated</td>
<td>- Check the Battery condition, age etc.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Battery has a damaged cell</td>
<td>- If battery cannot be rejuvenated it must be replaced.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Charger overhead protection mode</td>
<td>- Move battery &amp; Charger to cooler environment</td>
</tr>
<tr>
<td>Long charging time, Full light does not come on</td>
<td>Fault LED is Flash</td>
<td>- Wrong battery type selected</td>
<td>- Check the charging rate and battery type selection matches the battery.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Battery capacity too large</td>
<td>- Battery cannot be charged and must be replaced.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Battery is defective</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>- 6 hours soft start timer reached</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 24 hours bulk charge timer reached</td>
<td></td>
</tr>
<tr>
<td>Abnormal LED indication</td>
<td>ALL LED’s Flash</td>
<td>- Poor connection from Charger to Battery</td>
<td>- Check for a loose battery terminal connection.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Check the output wires alligator clips for loose / damaged connection.</td>
</tr>
</tbody>
</table>

# OPTIONAL ACCESSORIES

Models: 20087 (2/8/16Amp) – Ring Terminal Connector