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<tr>
<th>Battery Type</th>
<th>Charging Current</th>
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<td>200 A</td>
<td>10 °C - 40 °C</td>
<td>5 °C - 35 °C</td>
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<td>Flooded/Wet Sulfated &amp; Battery Temperatures Above 77°F (25°C)</td>
<td>150 A</td>
<td>10 °C - 40 °C</td>
<td>5 °C - 35 °C</td>
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<tr>
<td>Dry Cell</td>
<td>100 A</td>
<td>10 °C - 40 °C</td>
<td>5 °C - 35 °C</td>
</tr>
<tr>
<td>AGM PowerSport</td>
<td>100 A</td>
<td>10 °C - 40 °C</td>
<td>5 °C - 35 °C</td>
</tr>
<tr>
<td>AGM SuperCrank</td>
<td>100 A</td>
<td>10 °C - 40 °C</td>
<td>5 °C - 35 °C</td>
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<tr>
<td>Flooded/Wet Extreme Cycling</td>
<td>100 A</td>
<td>10 °C - 40 °C</td>
<td>5 °C - 35 °C</td>
</tr>
<tr>
<td>Marine (Antimony)</td>
<td>100 A</td>
<td>10 °C - 40 °C</td>
<td>5 °C - 35 °C</td>
</tr>
<tr>
<td>Calcium</td>
<td>100 A</td>
<td>10 °C - 40 °C</td>
<td>5 °C - 35 °C</td>
</tr>
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### Charging Currents

- **AGM PowerSport** and **AGM SuperCrank**: 100 A
- **Flooded/Wet Extreme Cycling** and **Marine (Antimony)**: 100 A
- **Flooded/Wet Deep Cycle & Flooded/Wet AGM**: 200 A
- **Dry Cell**: 100 A
- **Calcium**: 100 A

### Discharge/Operating Temperature

- All battery types operate within the following temperature range: 10 °C - 40 °C

### Storage Temperature

- All battery types store optimally within the range of 5 °C - 35 °C
Note: This information applies ONLY to 8 volt single lead acid batteries of the types listed.
WARNING: Data is not necessarily valid for conditions where multiple 12 volt batteries are connected in strings (series or parallel)
See notes below the data table for battery strings.

<table>
<thead>
<tr>
<th>Lead Acid Battery Types</th>
<th>Bulk Charging (Constant Current) 8 v Battery</th>
<th>Absorption Charging (Constant Voltage) 8 v Battery</th>
<th>Float Charging (Constant Voltage) 8 v Battery</th>
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</thead>
<tbody>
<tr>
<td>Flooded/Wet Deep Cycle (Premounted) 8 volt Golf Cart Battery</td>
<td>Change at a constant current rate of 1/10 to 1/10 of I20 volts.</td>
<td>Change with I20/6 (3.3A) or lower for 24 hours for full charge.</td>
<td>Charge voltage on 6: 15% of nominal voltage.</td>
<td>Charging Temperature Compensation: All charging voltages are appropriate for a temperature range of 15-25ºC (59-77ºF). For average operating conditions, the battery voltage will be 9.78V at 20ºC (68ºF). Increasing the battery voltage at a rate of 0.063 V per °C (0.25 V per 18ºF) for every 10ºC (18ºF) above 9.78V or every 10ºC (18ºF) for every 10ºC (18ºF) below 9.78V. For average operating temperature above this range (warmer than) the maximum battery voltage set point should be compensated with a decrease at a rate of 0.056 V per °C (0.20 V per 18ºF) for every 10ºC (18ºF) for every 10ºC (18ºF) below 9.78V.</td>
<td>7.65V</td>
<td>8.1V</td>
<td>8.5V</td>
<td>8.2V</td>
<td>Battery Temperature: Batteries should be brought to a temperature of at least 60ºF (15ºC) for most efficient charging and below 90ºF (32ºC) to limit over charging effects. AC Ripple Charge Limitations: Some AC chargers will have a limit to the ripple current. AC ripple current must not exceed 0.4% of the battery's nominal capacity during the charging phase of the charge cycle. Ripple current cannot exceed 0.4% of the battery's nominal capacity during the charging phase of the charge cycle.</td>
<td></td>
</tr>
<tr>
<td>Exide Golf Cart Battery</td>
<td>Change at a constant current rate of 1/10 to 1/10 of I20 volts.</td>
<td></td>
<td></td>
<td></td>
<td>7.65V</td>
<td>8.1V</td>
<td>8.5V</td>
<td>8.2V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exide Special Heavy Duty Battery</td>
<td>Change at a constant current rate of 1/10 to 1/10 of I20 volts.</td>
<td></td>
<td></td>
<td></td>
<td>7.65V</td>
<td>8.1V</td>
<td>8.5V</td>
<td>8.2V</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Multi Voltages**
1. Charging voltages double as listed for 8 volt single lead acid batteries of the types listed.
2. Charging currents double as listed for 8 volt single lead acid batteries of the types listed.
3. All charging voltages and currents double as listed for 8 volt single lead acid batteries of the types listed.
4. All charging times remain identical to 8 volt numbers as listed above (due to the series connection).

**Open Circuit Voltage**
- 20ºC: Optimal temperature: 9.78 volts (8 volt battery)
- 60ºC: Warmer than optimal temperature: 9.15 volts
- 65ºC: Hotter than optimal temperature: 9.04 volts
- 2ºC: Colder than optimal temperature: 9.91 volts

**Trickle Charging**
- Charge with a current limit of 0.5% of the battery’s C20 (example: 50A for an 8 volt battery)
- Charge voltage on/off points should be compensated with a decrease at a rate of 0.056 V per °C (0.20 V per 18ºF) for every 10ºC (18ºF) below 9.78V.
- Charge voltage off point - 8.25v
- Charge voltage on point - 8.78v
- Charge voltage on point - 8.25v

**Absorption Charging**
- Charge with a current limit of 0.5% of the battery’s C20 (example: 50A for an 8 volt battery)
- Charge voltage on/off points should be compensated with a decrease at a rate of 0.056 V per °C (0.20 V per 18ºF) for every 10ºC (18ºF) below 9.78V.
- Charge voltage on point = 9.78v
- Charge voltage off point = 8.25v
- Charge voltage on point = 8.78v
- Charge voltage off point = 8.25v

**Float Charging**
- Charge with a current limit of 0.5% of the battery’s C20 (example: 50A for an 8 volt battery)
- Charge voltage on/off points should be compensated with a decrease at a rate of 0.056 V per °C (0.20 V per 18ºF) for every 10ºC (18ºF) below 9.78V.
- Charge voltage on point = 9.78v
- Charge voltage off point = 8.78v
- Charge voltage on point = 9.78v
- Charge voltage off point = 8.78v

**Inrush Currents**
- Inrush current at 2.5 times I20 for a 20 minute interval.
- Inrush current at 5 times I20 for a 2 minute interval.

**Recommended Boost Charging**
- Boost charging should be performed at or before 8.16 volts.
- Boost charging should be performed at or before 8.45 volts.
- Boost charging should be performed at or before 8.25 volts.
- Boost charging should be performed at or before 8.78 volts.

**Recommended Operating Conditions**
- Battery voltage should be maintained at or below 8.45 volts.
- Battery voltage should be maintained at or below 8.25 volts.
- Battery voltage should be maintained at or below 8.78 volts.
- Battery voltage should be maintained at or below 8.16 volts.

**Recommended Storage**
- Batteries should be boost charged every 6 months or when the battery voltage reaches 8.16 volts.
- Batteries should be boost charged every 6 months or when the battery voltage reaches 8.45 volts.
- Batteries should be boost charged every 6 months or when the battery voltage reaches 8.25 volts.
- Batteries should be boost charged every 6 months or when the battery voltage reaches 8.78 volts.

**Recommended Charging Methods**
- Calcium and Antimony notations refer to metal alloy additives used in battery grids. These alloys have small effects on the charge voltages.
- Absorption Charging: Charge at a constant voltage of 9.78V (example: For an 8 volt battery or 50A).
- Float Charging: Charge at a constant current of 0.5% of the battery’s C20 (example: 50A).
- Bulk Charging: Charge at a constant current of 2.5 times I20 for a 20 minute interval.
- Absorption Charging: Charge at a constant voltage of 9.78V (example: For an 8 volt battery or 50A).
- Float Charging: Charge at a constant current of 0.5% of the battery’s C20 (example: 50A).
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- Absorption Charging: Charge at a constant voltage of 9.78V (example: For an 8 volt battery or 50A).
- Float Charging: Charge at a constant current of 0.5% of the battery’s C20 (example: 50A).
- Bulk Charging: Charge at a constant current of 2.5 times I20 for a 20 minute interval.
- Absorption Charging: Charge at a constant voltage of 9.78V (example: For an 8 volt battery or 50A).
- Float Charging: Charge at a constant current of 0.5% of the battery’s C20 (example: 50A).
- Bulk Charging: Charge at a constant current of 2.5 times I20 for a 20 minute interval.
- Absorption Charging: Charge at a constant voltage of 9.78V (example: For an 8 volt battery or 50A).
- Float Charging: Charge at a constant current of 0.5% of the battery’s C20 (example: 50A).
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- Absorption Charging: Charge at a constant voltage of 9.78V (example: For an 8 volt battery or 50A).
- Float Charging: Charge at a constant current of 0.5% of the battery’s C20 (example: 50A).
- Bulk Charging: Charge at a constant current of 2.5 times I20 for a 20 minute interval.
The recommend operating time for charging is double as listed in the above table if current stays as listed in the above table.

The reference to C indicates that for C20=100Ahr, the max charge voltage is 6.4 volts. For C20=50Ahr, the max charge voltage is 6.2 volts. For C20=10Ahr, the max charge voltage is 6.0 volts.

**Recommended boost at State of Charge (SOC)**

- 5.75 volts for C20=100Ahr
- 6.0 volts for C20=50Ahr
- 6.2 volts for C20=10Ahr
- 6.3 volts for C20=5Ahr

**Special notes**

- Flooded/Wet Golf Cart, Deep Cycle & Marine (Antimony)
- Floor Scrubber

**Other Guidelines**

- Calcium and Antimony notation refers to metal alloy additives used in battery grids. These alloys have small effects on the charge voltages.
- Bulk charging is the rapid and most aggressive re-charge method. It is typically only used in applications that need rapid recovery for deeply discharged batteries. Battery cooling may be required.
- Absorption charge is an aggressive method at low current to allow water to diffuse into the battery matrix to create full charge. It can be used for deep or less deep discharged batteries. Battery cooling may be required.
- Float charge is used to maintain charge during a storage period. Charge voltage after float points are very important to battery life.
- State of Charge (SOC) is a highly variable number. Data should be taken as reflective of technology listed, but actual performance may be plus/minus 0.10 volts.
- C represents capacity for 8 volt C6 batteries - multiply C6 rating at 75 amps times 1.48 to get C20 capacity for 8 volt C6 batteries. For example, C6 of 60 Ah results in a C20 of 88 Ah (186 amp hours) or below.
- C represents capacity for 6 volt C6 batteries - multiply C6 rating at 105 amps times 1.48 to get C20 capacity for 6 volt C6 batteries. For example, C6 of 60 Ah results in a C20 of 110 Ah (1620 amp hours).

**For 6 volt systems that are comprised of two 6-volt batteries connected in series that are charged with 12 volt chargers (with no parallel battery connections)**

1. All charging voltages double (due to series connection) as listed in the above table.
2. All charging currents remain identical to 6 volt numbers as listed above (due to the series connection.)
3. All charging times remain identical to 6 volt numbers as listed above (due to the series connection.)

**For 6 volt systems that are comprised of four 6-volt batteries connected in series that are charged with 24 volt chargers (with no parallel battery connections)**

1. All charging voltages double (due to series connection) as listed in the above table.
2. All charging currents remain identical to 6 volt numbers as listed above (due to the series connection.)
3. All charging times remain identical to 6 volt numbers as listed above (due to the series connection.)

**For 6 volt battery strings using two batteries in parallel connection (positive to positive and negative to negative)**

1. All charging voltages remain the same as listed in the above table.
2. All charging currents double as listed above (in order to charge in same amount of time as listed in above table.
3. All charging times double as listed in above table (current stays as listed in the above table.)