



M-SERIES

AGM200 >>>

AGM200 MOTIVE POWER VALVE REGULATED LEAD ACID BATTERIES INSTALLATION AND OPERATING INSTRUCTIONS

**PLEASE READ BEFORE PLACING BATTERIES IN SERVICE
THESE INSTRUCTIONS TO BE SHIPPED WITH BATTERY AND DELIVERED TO USER**

Previously Marathon Element.

1. RECEIVING BATTERIES

Immediately upon receipt of shipment, examine the outside of the packing for signs of rough handling before accepting battery from carrier. If there is evident damage, the receipt should be signed and both copies (carrier's and receiving copies) marked "Shipment Received Damaged". The carrier should be called immediately and asked to make a "Carrier's Inspection for Damage Report". If "concealed" damage is later detected, the carrier should be called immediately and requested to make a "Carrier's Inspection for Concealed Damage Report". After inspection by the carrier, arrangements should be made with the local representative to have the battery repaired before placing it in service.

**BEFORE PLACING BATTERIES IN SERVICE,
REVIEW AND ADHERE TO THE SAFETY
GUIDELINES (ITEM 7)**

2. PLACING IN SERVICE

All AGM200 batteries must be given an equalizing charge prior to their use. To accomplish this, connect the battery to an approved charger and commence charging until the automatic charge control terminates.

3. CHARGING*

The charger must be matched to the battery with respect to voltage and ampere-hour capacity. The charger must be an approved Stryten Energy charger with a constant current-constant voltage-constant current profile that has automatic charge control features and a nominal finish rate of 2 amps per 100 ampere-hours of rated capacity. The constant voltage portion of the curve is 2.37 volts per cell. Under no circumstances should you attempt to remove the safety relief-valve vent cap. Such removal shall void

the battery's warranty and seriously impair battery performance.

**OPPORTUNITY CHARGING IS NOT PERMITTED,
EXCEPT IN APPROVED AGV APPLICATIONS.**

**USE OF ANY CHARGERS OTHER THAN
APPROVED STRYTEN ENERGY CHARGERS
CAN RESULT IN PERMANENT BATTERY
DAMAGE. CONTACT YOUR LOCAL STRYTEN
ENERGY REPRESENTATIVE TO VERIFY PROPER
CHARGING.**

4. COOL DOWN

When the battery reaches an 80% depth of discharge, disconnect battery from the lift truck and connect to an approved Stryten Energy charger. The battery will normally reach full charge in eight hours or less. Once the charge is complete, the battery must be allowed to cool down for eight hours. At a minimum, the battery must be allowed to cool down for a time period equal to the time period spent on charge.

**BATTERY REQUIRES COOL DOWN PERIOD
FOLLOWING A CHARGE EQUAL IN TIME TO
CHARGE PERIOD. FAILURE TO ALLOW FOR
COOL DOWN WILL SHORTEN BATTERY LIFE.**

5. EQUALIZING CHARGE

Each cell of a AGM200 battery may have slight differences in uniformity of construction and content. These slight differences cause some cells to take less charge than the other cells in the battery. To bring the cells with a lower state of charge up to the same level as the others, the battery is given an "equalizing charge". The battery should

be given an equalizing charge after 50-100 hours of operation. If you are unsure of battery use hours, give the batteries an equalize charge every two weeks.

6. AGV CHARGING

The battery/charger systems are “BALANCED” on each AGV application to maintain a design operating “STATE OF CHARGE” within the battery. This state of charge is dependent on such factors as:

- AMP-HOUR USED
- CHARGE TIME ALLOWED
- CHARGE CURRENT

Any plant operations that will cause these factors to deviate significantly from the original design could cause sufficient battery/charger imbalance affecting the battery life and performance. Plant deviations such as:

- Plant Shutdowns
- Extended Testing
- Duty Cycle Change
- Vacations

have the potential to cause these imbalances. In general, when opportunity charging is being used, any nonoperational period of greater than 24 hours should be controlled to prevent extended battery charging. This can be accomplished in an AGV application by using the vehicle supervisory controls. Stryten Energy recommends a 7 hours oncharge-17 hours off-charge control for these 24-hour periods.

7. SAFETY

- Wear appropriate safety equipment when working around electrically live batteries.
- The AGM200 battery can emit hydrogen gases under some abnormal charging conditions. Whenever possible, charge in a well-ventilated area and keep open flames away from batteries. However, normal warehouse ventilation is adequate for normal AGM200 usage.
- Lift batteries with a hoist, crane, lift truck, or similar equipment; move batteries on trucks, conveyors, or rollers.
- Make sure equipment is of ample strength and properly installed. Be sure to place a rubber mat or similar insulating material across tops of batteries

without covers when handling. This will prevent accidental shorts.

- Disconnect battery from the truck when performing maintenance and repair on motor or electrical system.
- Open, or “break” battery circuit before attempting repairs to charging plug or receptacles.
- Familiarize yourself with batteries and rules for charging and handling. Contact your local Stryten Energy representative for information.
- Assign battery and charger care to properly trained personnel. Review your company safety regulations.
- Familiarize yourself with industry and government guidelines (OSHA, ANSI, etc.) to help reduce personnel accidents and equipment damage.

8. OPERATION

Batteries are rated in ampere-hour and are selected to perform a specific workload within an established period of time. Increasing the work load or time period could result in over discharging, thus shortening battery life. In general, all lead-acid batteries should not be discharged to more than 80% of its six-hour rated capacity. **ONE BATTERY IS REQUIRED PER TRUCK PER EIGHT-HOUR SHIFT.** If a lift interrupt is used or installed on the lift truck, a minimum interrupt voltage of 1.86 VPC (under load), 2.02 VPC (open circuit) multiplied by the number of cells, should be set to avoid over-discharge of the battery.

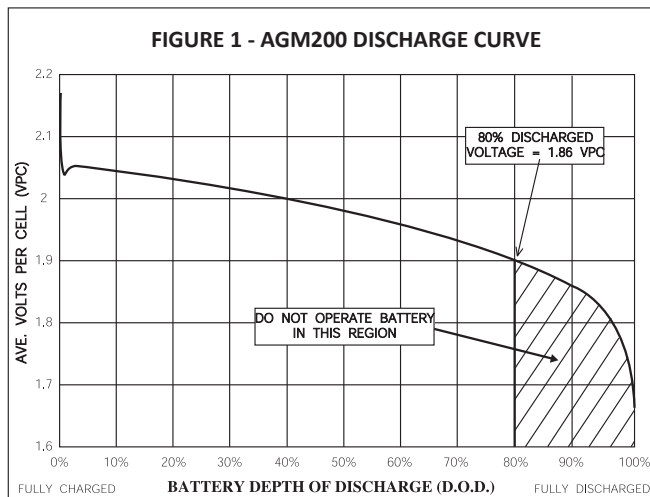
Since your AGM200 is a VRLA battery, its state of charge cannot be approximated by specific gravity. However, average cell voltage (Volts per Cell) with the battery under load can be used to approximate the battery depth of discharge as shown in Figure 1. Alternatively, the battery at 80% depth of discharge will have an open circuit voltage equal to 2.02 VPC multiplied by the number of cells in the battery.

ADJUST LIFT INTERRUPT SETTING ON LIFT TRUCK TO A MINIMUM INTERRUPT VOLTAGE OF 1.86 VPC (UNDER LOAD), 2.02 VPC (OPEN CIRCUIT) MULTIPLIED BY THE NUMBER OF CELLS FOR AGM200 BATTERIES

9. BATTERY DISCHARGE ALARM/MONITORS

Your AGM200 battery is equipped with a Battery Discharge Alarm to protect your Marathon Element battery from over-discharge. An intermittent 80-db alarm will start to sound whenever the battery's voltage drops to or below the alarm reference voltage for a fixed period of time. The alarm will stop if and when the battery's voltage recovers to above the

THE AGM200 BATTERY SHOULD NOT BE DISCHARGED BELOW 1.86 VPC (UNDER LOAD), 2.02 VPC (OPEN CIRCUIT) (80% DEPTH OF DISCHARGE)



alarm reference voltage within a fixed period of time. The battery is at 80% depth of discharge when the alarm sounds continuously. As soon as the alarm begins to sound continuously, the battery should be completely recharged using an approved charger and proper charging procedures. Batteries may be equipped with monitoring devices by Stryten Energy. Damage to or tampering with these devices shall void all warranties. Any addition of monitoring devices affixed to the battery, not authorized in writing by Stryten Energy, shall void all warranties.

10. TEMPERATURE

Normal operating conditions shall be between 60°F and 100°F. Operating temperature above 100°F will reduce the battery's service life. Operating temperature below 60°F results in less capacity and special charging is required.

11. MAINTENANCE

Because this is a AGM200 battery, there is little to do regarding maintenance operations. The top of the battery should be kept clean and dry and may be washed to remove any accumulated foreign matter. In the unlikely event of an accidental contamination with electrolyte or lead, contain the spill and notify your local Stryten Energy representative who is equipped to handle any environmental concerns. Spill kits are available from the Stryten Energy Parts Center by calling (800) 634-4462. Never attempt to add water to the battery - it has been designed to function without any such additions over its entire life. As previously noted, any attempt to remove the vent caps shall void the warranty.

12. CHANGES IN OPERATIONS

If any time after initial purchase you have changes to your operating conditions, such as extended shifts, increased loads or other changes that alter your initial purchase conditions, please contact your local Stryten Energy representative immediately to ensure you are properly equipped and are not affecting the life of the battery.

13. SERVICE

Additional information and assistance can be obtained by contacting your local sales representative. If you are in the United States, call toll free **1-888-563-6300**.