

Instructions for Use

MotionGel Motive Power Maintenance free Batteries with Positive Tubular Plates

PzV and PzVB types

Rating Data

- | | | | |
|------------------------------|---------------------------|----------------------------|----------------------|
| 1. Nominal capacity C_5 | : See battery label | 4. Final discharge voltage | : at 1.87 for 60%DoD |
| 2. Nominal voltage | : 2.0 V x number of cells | | at 1.83 for 80%DoD |
| 3. Nominal discharge current | : $C_5/5h$ | 5. Rated temperature | : 30 °C |

Safety Instructions



Read the instructions carefully and place them close to the battery.

Work on batteries to be carried out by skilled personnel only!



Use protective glasses, protective gloves and apron when working on batteries. Pay attention to the accident prevention rules as well as EN 50272-3 and EN 50110-1.



No smoking!



Do not expose batteries to naked flames, glowing embers or sparks, as it may cause an explosion.



Acid splashes in the eyes or on the skin must be washed with water. In case of accident consult a doctor immediately!

Clothing contaminated by acid should be washed in water.



Risk of explosion and fire. Caution: Metal parts of the battery are always under voltage. Do not place tools or other metal objects on the battery! Avoid short circuits!



Electrolyte is highly corrosive. In the normal operation of this battery contact with acid isn't possible. If the cell containers are damaged, the immobilized electrolyte (gelled sulphuric acid) is corrosive like liquid electrolyte.



Batteries and cells are heavy. Ensure secure installation! Use only suitable handling equipment.



Dangerous voltage!



Batteries with this symbol can be recycled.



Treat batteries as special waste. Do not mix them with other industrial or household waste. Recycling can be achieved through an authorized company for battery recycling or by returning them to the manufacturer, depending on the agreement you have made.

Systems Sunlight MotionGel batteries are maintenance free, valve-regulated gas recombination batteries with Gel immobilized electrolyte. Instead of a vent plug, a valve is used to regulate the internal gas pressure, preventing the ingress of oxygen from the air and allowing the escape of excess charging gasses.

When operating valve-regulated lead acid batteries, the same safety requirements as for vented cells apply, to protect again hazards from electric current, from explosion of electrolytic gas and in case of the cell container is damaged, from the corrosive electrolyte.

The safety valves should never be removed or opened.

Water topping up is not required during the whole battery life.

1. Commissioning

The battery should be inspected to ensure it is in perfect condition. The charger cables must be connected to ensure a good contact, paying attention to the polarities. Otherwise battery, vehicle or charger could be damaged. The tightening torque for all the connector bolts must be 23 ± 2 N·m. The battery should be charged before use as in point 2.2.

2. Operation

The standard which applies to the operation of traction batteries is EN 50272-3: "Safety requirements for secondary batteries and battery installations. Traction batteries" and provides requirements on safety aspects associated with the installation, use, inspection, maintenance and disposal of batteries.

2.1 Discharging

Be sure that all ventilation openings of the battery container, compartment or cover are not blocked, so suitable ventilation of the battery is achieved. Do not connect or disconnect the battery socket under discharging or charging. To achieve battery's optimum life, operating discharges of more than 80% of the rated capacity should be avoided (deep discharge). To measure the state of discharge use only the battery manufacturer's recommended discharge indicators (imperative presence of a discharge limiter with an energy cut-off at 1.83 vpc operating voltage at 80% DOD C_5 , when the recharging time is 12 hours, and 1.87 vpc at 60% DOD C_5 when the recharging time is 8 hours). Discharged batteries must be recharged immediately and must not be left discharged. This also applies to partially discharged batteries. SUNLIGHT MotionGel batteries can be used in normal duty applications.

Avoid applications where:

- no rest time is available allowing the battery to cool, multi-shift operation
- opportunity charging or charging at 8 hours. In the cases of that applications the battery capacity has limits:
for 24V 600-650Ah, for 48V 350Ah, for 80V 200Ah.

2.2 Charging

Only direct current must be used for charging. All charging procedures in accordance with DIN 41773 are permitted. Connect only the battery assigned to a charger, suitable for the size of battery, in order to avoid overloading of the electric cables and contacts and prevent unacceptable gassing. If the charger was not purchased together with the battery it is best to have its suitability checked by the charger's supplier. High Frequency chargers must be used. Sunlight HF chargers have been tested and programmed for optimum compatibility and battery's performance.

PzV batteries have a low gas emission. However, when charging, proper provision must be made, according to standard EN 50272-3, for venting of the charging gases. The battery compartment covers must be removed or opened prior to charging so that the explosive mixture of gases loses its flammability due to adequate ventilation. With the charger switched off connect up the battery, ensuring that the polarity is correct (positive to positive, negative to negative). Then switch on the charger.

A full charging shall be carried out every working day.

Normal charging time for PzV batteries is 11-14 hours. By using special charging profile, charging time can be reduced to 8 hours at 60% DoD, whereas for DoD of 80%, 12 charging hours are still needed.

When charging, the temperature of the battery rises by about 10-15 °C, so charging should only begin if the battery temperature is below 35 °C.

If the temperature stays a substantial time outside 15 - 35 °C range, the charger must be equipped with a temperature regulated voltage under ZVEI code practice 21e §7. The correction factor is $-0,004$ V/cell/Kelvin.

2.3 Equalizing Charge

Equalizing charges are used to safeguard battery's life and to maintain its capacity. They are necessary after deep discharges. Equalizing charges are carried out 8 hours after normal charging.

Weekend equalizing charge mode: 8hours x 1A/100Ah.

2.4 Temperature

Optimal battery temperature range is 25-30 °C. Higher temperatures shorten the life of the battery, whilst lower temperatures reduce the available capacity. The upper temperature limit is 45 °C at the end of the charge and is not acceptable as a continuous operating temperature. The minimum operating temperature is +5 °C when the charger is equipped with temperature regulated voltage and 15 °C if it does not. Sunlight's approval is required for zero or sub-zero operating temperatures.

2.5 Electrolyte

The electrolyte is immobilised in a gel. The density of the electrolyte can not be measured.

3. Maintenance

Never remove the safety valve, never refill with water!

3.1 Daily

Charge the battery after every discharge.

3.2 Weekly

Visual inspection after recharging for signs of dirt and any mechanical damage should be made. The plugs and sockets should be checked to ensure that they are in good condition.

3.3 Monthly

At the end of the charge, and a rest time of 5 hours the voltages of all cells and the voltage of the battery should be measured and recorded. If significant changes from earlier measurements or differences between the cells are found, further testing and maintenance by our Service Dept. should be requested.

3.4 Annually

In accordance with EN 1175-1, at least once per year, the insulation resistance of the truck and the battery must be checked by an electrician. The tests on the insulation resistance of the battery must be conducted in accordance with EN 1987-1. The insulation resistance of the battery shall be at least 50Ω multiplied by the nominal battery voltage, in compliance with EN 50272-3. For batteries up to 20 V nominal voltage the minimum value is 1000 Ω.

4. Care of the Battery

The battery should always be kept clean and dry to prevent tracking currents. Any liquid in the battery tray must be cleaned and disposed. Damage to the insulation of the tray should be repaired after cleaning, to ensure that the insulation value complies with EN 50272-3 and to prevent tray corrosion. If it is necessary to remove cells, it is recommended to call our Service Dept.

Never refill with water! Never remove the safety valve from the cell.

5. Storage

If batteries are taken out of service for extended periods of time, they should be stored in a fully charged condition in a cool, dry room. To ensure that the battery is always ready for use, the following charging methods are available:

1. a normal charge as in point 2.2 the latest
 - every 3 months for storage at 20 °C
 - every 2 months for storage at 30 °C
 - every 14 days if any consumer, e.g measure or controlling system, is connected to the battery.
2. float charging at a charging voltage of 2.27 V x the number of cells. The storage time should be taken into account when considering the life of the battery.

6. Malfunctions

If malfunctions are found on the battery or the charger, our Service Dept. should be notified immediately. The measurements taken in point 3.3 will facilitate fault finding and their elimination. A service contract with us is a good way to detect and prevent potential problems in advance.

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