

# Operating Instructions for maintenance free traction batteries with positive tubular plates type PzV\*



BAE Batterien GmbH  
Wilhelminenhofstraße 69/70  
12459 Berlin - Germany  
P.O. Box 9 • 12442 Berlin  
Tel. +49 30 53001-0  
Fax +49 30 5354949  
info@bae-berlin.de  
www.bae-berlin.de

## Rating Data

1. Nominal capacity C5 : See type plate
2. Nominal voltage : 2.0 V x No of cells
3. Discharge current : C5/5 h
4. Rated temperature : 30°C

PzV batteries are valve-regulated batteries with an immobilised electrolyte and where a water refilling isn't permitted during the whole battery life.

Instead of a vent plug there are valves used, who will be destroyed when they are opened.

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

	Respect the operation instruction and display it close to the battery. Work on batteries must be carried out by skilled personnel only!		Risk of explosion and fire, avoid short circuits
	Use protective glasses and clothes when working on batteries. Obey to the accident prevention rules as well as DIN VDE 0510 and VDE 0105 part 1.		Electrolyte is highly corrosive. In the normal operation of this batteries a contact with acid isn't possible. If the cell containers are damaged, the immobilised electrolyte (gelled sulphuric acid) is corrosive like the liquid electrolyte.
	No smoking! Do not expose batteries to naked flames, glowing embers or sparks, there is the risk that the battery explodes.		Batteries and cells are heavy. Ensure secure installation! Use only suitable handling equipment e.g. lifting gear in accordance with VDI 3616.
	Keep children away!		Dangerous electrical voltage! Caution: Metal parts of the battery are always live – avoid contact and short circuits. Do not place tools or other metal objects on the battery!
	Acid splashes into the eyes or on the skin must be washed immediately with an abundance of clear water. In case of accident consult a doctor immediately! Clothing contaminated by acid should be washed in water.		Return to the manufacturer! Batteries with this sign must be recycled. Batteries which are not returned for the recycling process must be disposed as hazardous waste!

Ignoring the operation instructions, repair with non-original parts and non authorised interventions will render the warranty void.

For batteries in classes Ex I and Ex II the instructions for maintaining the appropriate protection class during operation must be complied with (see relevant certificate).

## 1. Commissioning

The battery should be inspected to ensure it is in perfect physical condition.

The battery end cables must have a good contact to terminals, check that the polarity is correct.

Otherwise battery, vehicle or charger could be destroyed.

The battery has to be charged according to item 2.2.

The specified torque loading for the pole screws of the end cables and connectors is:

	plastic head screw	steel
M10	29±1 Nm	29±1 Nm

## 2. Operation

DIN VDE 0510 "Traction batteries for industrial trucks" is the standard which applies to the operation traction batteries in industrial trucks.

If the cells are shipped without trays the shipping lock may not be removed until directly before installation. It is necessary to install the PzV cells in trays or racks which prevent excessive bulging.

### 2.1 Discharging

Ventilation openings must not be sealed or covered.

Electrical connections (e.g. plugs) must only be made or broken in the open circuit condition. To achieve the optimum life for the battery, operating discharges of more

than 60% of the rated capacity should be avoided (deep discharge). They reduce the battery life considerable. To measure the state of discharge use only the battery manufacturer recommended discharge indicators. Discharged batteries must be re-charged immediately and must not be left discharged. This also applies to partially discharged batteries.

### 2.2 Charging

Only direct current must be used for charging. Charging procedures according to DIN 41773 must only be applied in the manufacturer approved modifications. Therefore only battery manufacturer approved chargers must be used. Only connect the battery assigned to a charger, suitable for the size of battery, in order to avoid over-loading of the electric cables and contacts and unacceptable gassing of the cells.

PzV batteries have a low gas emission.

When charging, proper provision must be made for venting of the charging gases. Battery container lids and the covers of battery compartments must be opened or removed.

With the charger switched off connect the battery, ensuring that the polarity is correct (positive to positive, negative to negative). Now switch on the charger. When charging the temperature of the battery rises by about 10 K, so charging should only

\* Also applies to train lighting batteries.

begin if the battery temperature is below 35° C.

The battery temperature should be at least +15° C before charging otherwise a full charge will not be achieved. Are the temperatures a longer time higher than +40°C or lower than +15°C, so the chargers need a temperatures regulated voltage.

The correction factor is, in accordance with DIN VDE 0510 part 1, -0,005 V/cell and Kelvin.

Special instructions for the operation of batteries in hazardous areas.

This concerns batteries which are used in accordance with EN 50 014, DIN VDE 0170 / 0171 Ex I (in areas with a firedamp hazard) or Ex II (in potentially explosive areas). The attention pictograms has to be respected.

### 2.3 Equalising charge

Equalising charges are used to safeguard the life of the battery and to maintain its capacity. Equalising charges are carried out following normal charging. They are necessary after deep discharges and repeated incomplete recharges. For the equalising charges has to be used only the battery manufacturer prescribed chargers. Watch the temperature!

### 2.4 Temperature

A battery temperature of 30°C is specified as the rated temperature. Higher temperatures shorten the life of the battery, lower temperatures reduce the available capacity. 45°C is the upper temperature limit and is not acceptable as an operating temperature.

### 2.5 Electrolyte

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

## 3. Maintenance

Don't refill water!

### 3.1 Daily

Charge the battery immediately after every discharge.

### 3.2 Weekly

Visual inspection after recharging for signs of dirt and mechanical damage.

### 3.3 Quarterly

After the end of the charge and a rest time of 5 h following should be measured and recorded:

- the voltages of the battery
- the voltages of every cells

If significant changes from earlier measurements or differences between the cells are found, further testing and maintenance by the service department should be requested.

### 3.4 Annually

In accordance with DIN VDE 0117 at least once per year, the insulation resistance of the truck and the battery must be checked by an electrical specialist.

The tests on the insulation resistance of the battery must be conducted in accordance with DIN 43539 part 1.

The insulation resistance of the battery thus determined must not be below a value of 50 Ω per Volt of nominal 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. Cleaning must be done in accordance with the ZVEI code of practice "Cleaning of Batteries".

Any liquid in the battery tray must be extracted and disposed of in the prescribed manner. 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 best to call our service department for this.

## 5. Storage

If batteries are taken out of service for a lengthy period they should be stored in the fully charged condition in a dry, frost-free room. To ensure the battery is always ready for use a choice of charging methods can be made:

1. a quarterly full charging like charge as in point 2.2. If any consumer is connected with, e.g. measure or controlling systems, it can be, that charging is necessary every 14 days.
2. float charging at a charging voltage of 2.25 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 department should be called without delay. The measurements taken in point 3.3 will facilitate fault finding and their elimination.

A service contract with us will make it easier to detect and correct faults in good time.