

Instructions for Use

Traction batteries with positive tubular plates type PzSL* and PzBE



Rating Data

- | | | | |
|--------------------------------|---------------------|--------------------------------|-------------------------------------|
| 1. Nominal capacity C_5^{**} | See type plate | 4. Nominal S.G. of electrolyte | |
| 2. Nominal voltage: | 2.0 V x No of cells | Type PzSL/HS: | 1,29 kg/l |
| 3. Discharge current: | $C_5/5h$ | Type PzBE: | 1,29 kg/l |
| | | Train lighting: | see type plate |
| | | 5. Rated temperature: | 30°C |
| | | 6. Nominal electrolyte level: | up to electrolyte level mark "max." |

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Pay attention to the operation instruction and fix them close to the battery.
Work on batteries to be carried out only by skilled personnel!



Use protective glasses and clothes when working on batteries.
Pay attention to the accident-prevention rules as well as DIN/VDE 0510 and VDE 0105 part 1.



No smoking! Do not expose batteries to naked flames, glowing embers or sparks, at it may cause the battery to explode.



Keep children away!



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, avoid short circuits! Caution: Metal parts of the battery are always live. Do not place tools or other metal objects on the battery!



Electrolyte is highly corrosive.



Batteries and cells are heavy.
Ensure secure installation! Use only suitable handling equipment e.g. lifting gear in accordance with VDI 3616.



Dangerous voltage

Ignoring the operation instructions, repair with non-original parts or using additives for the electrolyte will render the warranty void.

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



Back to the manufacturer!



Batteries with this sign must be recycled.
Batteries which are not returned for the recycling process must be disposed of as hazardous waste.

1. Commissioning filled and charged batteries

For commissioning of unfilled batteries see separate instructions!

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

The charger cables must be connected to ensure a good contact, taking care that the polarity is correct.

Otherwise battery, vehicle or charger could be damaged.

The specified torque loading for the polscrews of the charger cables and connectors are:

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

The level of the electrolyte must be checked. If it is below the anti-surge baffle or the top of the separator it must first be topped up to this height with purified water (DIN 43530 part 4).

The battery is then charged as in item 2.2.

The electrolyte should be topped up to the specified level with purified water.

2. Operation

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

2.1 Discharging

Be sure that all breather holes are not sealed or covered.

Electrical connections (e.g. plugs) must only be connected or disconnected in the open circuit condition. To achieve the optimum life for the battery, operating discharges of more than 80% of the rated capacity should be avoided (deep discharge). This corresponds to an electrolyte specific gravity of 1.13 kg/l at the end of the discharge. Discharged batteries must be recharged 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. All charging procedures in accordance with DIN 41773 and DIN 41774 are permitted.

* Also applies to train lighting batteries to DIN 43579 and batteries to DIN 43582.

** is reached after the first 10 cycles!

Only connect the battery assigned to a charger, suitable for the size of battery, in order to avoid overloading of the electric cables and contacts, unacceptable gassing and the escape of electrolyte from the cells. In the gassing stage the current limits given in DIN/VDE 0510 part 3 must not be exceeded. If the charger was not purchased together with the battery it is best to have its suitability checked by the manufacturers service department.

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. The vent plugs should stay on the cells and remain closed.

With the charger switched off connect up 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 electrolyte rises by about 10°C, so charging should only begin if the electrolyte temperature is below 45°C.

The electrolyte temperature of batteries should be at least +10°C before charging otherwise a full charge will not be achieved. A charge is finished when the specific gravity of the electrolyte and the battery voltage have remained constant for two hours.

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). During charging and subsequent gassing the container lids must be removed or opened so that the explosive mixture of gases loses its flammability due to adequate ventilation.

The containers for batteries with plate protection packs must not be closed until at least half an hour after charging has past.

2.3 Equalising charge

Equalising charges are used to safeguard the life of the battery and to maintain its capacity. They are necessary after deep discharges, repeated incomplete recharges and charges to an IU characteristic curve. Equalising charges are carried out following normal charging. The charging current must not exceed 5 A/100 Ah of rated capacity (end of charge - see point 2.2).

Watch the temperature!

2.4 Temperature

An electrolyte temperature of 30°C is specified as the rated temperature. Higher temperatures shorten the life of the battery, lower temperatures reduce the capacity available. 55°C is the upper temperature limit and is not acceptable as an operating temperature.

2.5 Electrolyte

The rated specific gravity (S. G.) of the electrolyte is related to a temperature of 30°C and the nominal electrolyte level in the cell in fully charged condition. Higher temperatures reduce the specified gravity of the electrolyte, lower temperatures increase it. The temperature correction factor is -0.0007 kg/l per K, e.g. an electrolyte specific gravity of 1.28 kg/l at 45°C corresponds to an S.G. of 1.29 kg/l at 30°C. The electrolyte must conform to the purity regulations in DIN 43530 part 2.

3. Maintenance

3.1 Daily

Charge the battery after every discharge. Towards the end of charge the electrolyte level should be checked and if necessary topped up to the specified level with purified water. The electrolyte level must not fall below the anti-surge baffle or the top of the separator or the electrolyte „min“ level mark.

3.2 Weekly

Visual inspection after recharging for signs of dirt and mechanical damage. If the battery is charged regularly with a IU characteristic curve an equalising charge must be carried out (see point 2.3).

3.3 Monthly

At the end of the charge the voltages of all cells or bloc batteries should be measured with the charger switched on, and recorded.

After charging has ended the specific gravity and the temperature of the electrolyte in all cells should be measured and recorded. If significant changes from earlier measurements or differences between the cells or bloc batteries 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 EN 50272-3.

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 DIN/VDE 0510 part 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 DIN/VDE 0510 part 3 and to prevent tray corrosion. If it is necessary to remove cells it is best to call in 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 monthly equalising charge as in point 2.3
 2. float charging at a charging voltage of 2.23 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 in 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.



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