

OPERATING INSTRUCTIONS

for TAB Motion - Flooded monoblocks Motive power batteries for small traction

Tubular plate monoblocks
Flat plate monoblocks

TAB 
batteries

NOMINAL DATA

Nominal voltage	Un = 6V, 12V
Nominal capacity (see plate type)	Cn = C5
Nominal discharge current	In = 15
Final discharge voltage	Us = 1,70V/cell
Nominal S.G. of electrolyte	1,29 kg/l
Nominal temperature	Tn = 30 °C

1. COMMISSIONING

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

Check :

- + the battery cleanliness. Before installing the battery compartment has to be cleaned.
- + the battery and cables have a good contact to terminals and the polarity is correct. Otherwise battery, vehicle or charger could be destroyed.
- + the electrolyte level and the presence of the plugs.
- + in the case of water refilling system option, verify the presence of the specific plugs and the piping system. The electrolyte level must always be above the top of the separators.

Top up with distilled water to the nominal level. Charge the battery (see 2.2.2)

Before commissioning. Only blocs with the same state of discharge (the same voltage, tolerance as shown in the following table) should be connected together.

Blocs voltage (V)	Max. tolerance from Average value ΔU max
6	± 0,039
12	± 0,050

After connecting, the terminals must be covered with grease as protection against external corrosion. The specified torque loading for the bolts/screws of the end cables and connectors are:

DIN conic post	8 ± 1 Nm
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2. OPERATION

DIN EN 50272-3 "Traction batteries for industrial truck" is the standard which applies. The nominal operating battery temperature is 30 °C. Higher temperatures shorten the life of the battery, lower temperatures reduce the available capacity. 55 °C is the upper temperature limit and batteries should not be used above this operating temperature. The capacity of the battery changes with temperature and falls considerably under 0 °C. The optimum lifetime of the battery depends on the operating conditions (moderate temperature and discharges equal to or lower than 80 % of the nominal capacity C5). The battery obtains its full capacity after about 10 charging an discharging cycles.

2.1 Discharging

Vent plugs on the battery must not be sealed or covered. Electrical connections (e.g. plugs) must only be made or broken in the open circuit condition. Never allow the final discharge voltage of the battery to drop below that assigned for the discharge current. Unless the manufacturer has specified otherwise, no more than the 80 % nominal capacity is to be consumed. A minimum S.G. of the electrolyte of 1,13 kg/l is to be checked at the end of the discharge. Discharged batteries must be recharged immediately and must not be left in discharged condition.

Discharge	Recharge
> 40%	Every day
< 40%	Every second day

This also applies to partially discharged batteries. Discharged batteries can freeze.

2.2 Charging

TAB motion batteries can be recharged with 50 Hz or HF charger. The charging profile is Wa ; WoWa; IUJa; WUJa. Only direct current must be used for charging. Only connect the battery to the correctly assigned charger, suitable for the battery size in order to avoid overloading of the electric cables and contacts, electrolyte overflow and acceptable gassing of the cell. When gassing the current limits must not be exceeded according DIN EN 50272-3.

Before starting the charge, make sure of:

- + the presence of the plugs.
- + In the case of water refilling system, check the good condition of the filling up circuit and specific plug, the water tube connection for the filling device (fast connection between the battery and the system with water spray).

When charging, proper provision must be made for venting of the charging gasses. Battery container lids and the covers of battery compartments must be opened or removed. Keep vent plugs closed. 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. In the case of automatic filling up, with manual command, press the push-button of the electro-valve box to release the supply of distilled water, at the end of charge. When charging the temperature of the battery rises by about 10 °C, so charging should only begin if the electrolyte temperature is below 45 °C. The electrolyte temperature of the battery should be at least + 10 °C before charging, otherwise a full charge will not be achieved without specific setting of the charger. The charge is considered as achieved when the electrolyte S.G., and the battery voltage remain constant for 2 hours. During the recharge, the cells emit hydrogen and oxygen gas. It is necessary to ensure ventilation in the room, especially during the recharge. All installation must comply with the current regulations in force in the country of operation.

2.2.1 Normal charge

It is applied further to a "normal" discharge of the battery (up to 80 % of C5), it is not interrupted until the end of charge indication by the charger display. It is not necessary to recharge the day after at the latest.

2.2.2 Equalizing charge

Equalizing charges are used for insuring the service life and to maintain the capacity. They are necessary after deep discharges and after repeated un complete charges. They allow homogenization of the specific gravity of the electrolyte.

- + to compensate the self discharge due to the storage period.
- + to compensate the eventual lack of charge with normal charges.
- + to quickly homogenize the electrolyte, following the addition of distilled water.
- + to compensate stratification, following partial charges without mixing of the electrolyte (not recommended).

To be carried out after a normal charge when a variation (differences more than 10 grams per liter) of S.G. is recorded. It is carried out using a constant current with a low value near C5/30 (C5/20 max) and after a normal charge of the battery (end of charge, see 2.2). The recommended duration is 8 hours. The equalizing charge may be interrupted if the specific gravities are homogenized. When the nominal electrolyte S.G. is not the consequence of electrolyte overflowing, a recharge in completion with the equalizing charge can be carried out. It must be done with constant current, near C5/60 A, and after a complete charge for 72 hours. Watch the temperature and a sufficient ventilation!

2.2.3 Desulphation charge:

Should be carried out after a very deep discharge to the battery (> 80% C5) when the charger does not start the recharge due to an over discharge of the battery. It must be carried out with constant current, near C5/60, for 2 hour minimum. It is followed by a normal charge and equalizing charge (desulphation if necessary). The best result is obtained with the lowest value of current. In any case, stop the charge if the electrolyte temperature reaches 45 °C.

2.3 Electrolyte

The electrolyte is diluted sulphuric acid 1,290 kg/l. The nominal electrolyte density is based on 30 °C and the nominal electrolyte level when fully charged maximum ± 0.01 kg/l. Higher temperatures reduce the electrolyte density, lower temperatures increase the electrolyte density. The associated correction factor is 0.0007 kg/l per K. Example: electrolyte density of 1.285 kg/l at 36 °C corresponds to a density of 1.289 kg/l at 30 °C. The purity of the electrolyte must correspond to DIN 43530-2.

2.4 Battery Check

- After normal charge, measure :
- + the total voltage
- + the voltage per cell
- + the electrolyte S.G. on several cells or on the whole battery.

3. BATTERY MAINTENANCE

3.1 Daily maintenance

- + keep the battery, clean and dry in order to avoid self discharge and current leakage.
- + check: the condition of the plugs, cables and that all insulation covers are in place and in good condition.

3.2 Weekly maintenance:

- If necessary, adjust the electrolyte level of each cell, only use distilled water. The level must never be lower than the minimum level in other words, always above the plates. It is carried out:
- + at the end of charge and without over exceeding the maximum level if the battery has standard filling plugs.
- + by connection to the water circuit if the battery is equipped with automatic filling up. The pressure must be between 0,2 and 0,6 bar.

VERY IMPORTANT: In difficult conditions, high room temperature for example, the electrolyte level must be checked as often as necessary. If there are trace of electrolyte-overflowing, in general, lead sulphate trails, wash the battery with clean water at low pressure, with the cells vent plugs in place and closed.

3.3 Monthly or quarterly maintenance:

- Carry out an and-of-charge control: measure and record the voltages of all blocs with the charger switched on. Measure and record the electrolyte S.G. all blocs. If significant variations to the earlier measurements or big variations between the blocs or cells are notice, please contact our Service. If the battery autonomy is not sufficient, check that the work required is compatible with the battery capacity, the battery condition (end of charge S.G.), and the setting of the charger.

3.4 Annual maintenance

- Battery:** for bolt on connectors, check the Torque settings of the terminal bolts/screws, the terminals must be covered with grease as protection against external corrosion.
- Charger:** internal dust removal, check all connections (plugs, cables and contacts) and charging parameters. According to DIN EN 1175-1 when necessary, but at least once a year, the insulation resistance of the truck and the battery must be checked by an electrical specialist. The test on the insulation resistance of the battery must be conducted in accordance with DIN EN 1987-1. The average insulation resistance of the battery must be lower than 50 ohm per Volt nominal voltage (DIN EN 50272-3). For batteries up to 20 V nominal voltage the minimum value is 1000 ohm.

4. Storage and Transportation

Batteries must always be stored and transported securely in the vertical position in order to avoid any electrolyte leakage. Store the battery in a fully charged condition in a dry clean and frost free area. Always disconnect the battery from the electric vehicle before storage. For easy recharge of the batteries, it is advised not to store without recharge for more than 3 month at 20 °C and 2 month at 30 °C. The storage time is to be considered within the battery life expectancy. To ensure the battery is always ready for use a choice of charging methods can be made:

- + monthly equalizing charge according to 2.2.2.
- + float charge with 2,28 V/cell at 20 °C.

SAFETY REQUIREMENTS ACCORDING TO EN 50272-3.



Pay attention to the operating instructions and keep them close to the battery. Work on batteries should be carried out by skilled personnel only!



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



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



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! Do not remove the plugs.



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



Batteries and cells are heavy. Ensure secure installation! Use only suitable handling equipment. Lifting hooks must not damage the cells, connectors or cables.



Dangerous voltage! Caution: Metal parts of the battery are always live - avoid contact and short circuits. Do not place tools or other metal object on the battery!



Acid splashes into the eyes or on the skin must be washed with plenty of water. In case of accident after abundant flushing consult a doctor immediately! Clothing contaminated by acid should be washed in water.

IGNORING THE OPERATING INSTRUCTIONS, REPAIR WITH NON-ORIGINAL PARTS WILL RENDER WITH WARRANTY VOID.

Spent batteries must be COLLECTED SEPARATELY and recycled.

