

Handling and maintenance instructions for traction batteries

Nominal details:

- ① *Nominal capacity: Cs (see details table)
- ② Nominal volt age: 2,0 V * No of cells
- ③ Discharged current: Cs / Sh

*Will reach following the first 10 cycles

- ④ Nominal density of electrolyte: 1,29g/cm³
- ⑤ Nominal temperature: 30°C
- ⑥ Nominal electrolyte level: up to electrolyte level mark „max.“



Observe the instructions for use and position them visibly near the battery! Only work on batteries after instruction by expert personnel!



Risk of explosion and fire - avoid short circuits! Warning! Metal parts of the battery are always live so never place objects or tools on the battery!



When working on batteries wear safety glasses and protective clothing! Comply with the accident prevention regulations and also with DIN VDE 0105 P1



Electrolyte is strong etching!



No smoking! Do not allow open fire, hot objects or sparks near the battery due to the risk of explosion!



Cells are heavy. Ensure secure installation. Use only suitable lifting and handling equipment e. g. lifting gear in accordance with VDE 3616. The elevator hangers should not cause damages in cells, cable connectors or connecting cables.



Flush splashes of lye off the eyes or the skin with high amount of clean water. Then visit doctor without delay. Clothing contaminated by lye should be washed in water with minimum delay!



Dangerous voltage! The electrically flat batteries can cause electric shock. Always use flex tools and proceed increased carefulness.



KOVACO Electric

We think electric...

Non-compliance with the Maintenance Instruction and Handling, repairs using non-genuine spare parts, usage other than specified, usage of electrolyte additives and unauthorised tampering will result in loss of warranty.

1 Installation of filled and charged batteries. Installation of dry charged batteries apply other instructions.

The battery should be inspected to ensure its perfect physical condition. The charger cables should be connected to ensure a proper contact and to make sure that the polarity is correct. Otherwise, battery, vehicle, or charger could be damaged during operation. In case of replacement of cables, 24-25 Nm torque must be applied on all screw.

The level of the electrolyte should be checked. Should the level be below the anti-surge baffle or the top of the separator it should be topped up to this level with purified water first. 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

Operation of traction batteries. It refers to DIN EN 50272-3

2.1 Discharging

To achieve the optimum life for the battery operating discharges of more than 80% of the nominal capacity should be avoided (deep discharge). Besides, the acid density should not sink below 1,13 g/cm³ (by no means below 1,10 g/cm³). If the discharging rate exceeds the 80% of the nominal efficiency (the acid density sinks below 1,13g/cm³, deep discharge) **you should make equalizing charging after the operation charging.**

The batteries should not be stored in discharged condition!!!

This also applies to partially discharged batteries.

2.2 Charging

Only direct electric current should be used for charging! All charging procedures in accordance with DIN 41TT3/ DIN41774 are permitted. In the gassing stage the current limits given in DIN EN 50272-3 must not be exceeded.

Always charge the battery to 100%. Partial charging cycles will result in loss of battery capacity. Once battery is connected to the charger, wait until the charging cycle is completed to avoid the need of equalizing charging!!! Do not disconnect the battery from charger.

If the charger was not purchased with the battery; it is best to have its **suitability checked by the service department of the manufacturer.** When charging, proper provision should be made for ventilation of the charging gases. Battery container lids and the covers of battery compartments should be opened or removed.

The vent plugs should stay on the cells and remain closed. **With the charger switched off** connect the battery, ensuring that the polarity is correct (positive to positive, negative to negative). **Then 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 at the beginning of charging, otherwise a full charge cannot be achieved.

A battery is deemed to be charged when the density of the electrolyte and the battery voltage have remained constant for two hours.

Battery container lids and the covers of battery compartments should be placed back within two hours after charging.

2.3 Equalizing charging

Equalizing charging is used to guarantee appropriate life time and capacity of batteries. It is necessary after deep discharges, repeated incomplete recharges and charges according to an IU characteristic curve. Equalizing charges should be carried out following normal charging. The charging current must not exceed 5A/100 Ah of rated capacity (endow charging cycle - see point 2.2). **Temperature should always be supervised!!**

KOVACO Electric highly recommends avoidance of need of equalizing charging by completing the charging cycles and avoidance of deep discharge of the battery!!!

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. **50°C is the upper temperature limit** and is not acceptable as an operating temperature.

2.5 Electrolyte (acid)

The rated density of the electrolyte refers to a temperature of 30 °C and the nominal electrolyte level in the cell in fully charged condition.

Higher temperature reduces the density of the electrolyte, lower temperature increases it. The temperature correction factor is: 0,0007 g/cm³ E. g. an electrolyte density of 1,28 g/cm³ at 45 °C (corresponds to a density of 1,29 g/cm³ at 30°C). The electrolyte must conform with the purity regulations in DIN 43530-2.

3 Maintenance

3.1 Daily

Always disconnect the battery from the machine after work!!!

Charge the battery after every discharge to 100%!!!

Towards the end of charging, the electrolyte level should be checked and if necessary, topped up to the specified level with purified water. **The electrolyte level must never fall below the „MIN“ level mark.**

3.2 Weekly

Close fittings of pole terminals of the battery should be checked and tightened if necessary. By visual inspection the purity and exemption from damages have to be checked. In case of an IU charging method equalizing charging (see 2.3) should be used.

3.3 Monthly

Before finishing charging processes, voltages of all cells or bloc batteries should be measured and recorded on the check list!

If significant changes are found compared to previous measurement, and if each cell shows significant differences, then for further investigations and tasks Customs service should be informed.

3.4 Annually

In accordance with DIN EN 1175-1 at least once per year the insulation resistance of the truck and battery should be checked by an electrician specialist. The test on the insulation resistance of the battery should be conducted in accordance with DIN 43539-1. The insulation resistance of the battery thus determined must not fall below a value of 50 Ohm / Volt of nominal voltage. For batteries up to 20 V nominal voltage the minimum value is 1000 Ohm / Volt.

4 Maintenance of battery

The battery should always be kept clean and dry to prevent tracking currents. Any liquid in the battery tray should 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 EN 50272-3 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

Batteries not operating for a longer period of time should be stored in fully charged condition in a dry, frost-free room. **Should the battery not be used for more than 1 month, preventive charging cycle to 100% should be done at least once a month. To ensure the battery is always ready for use a choice of charging methods can be made:**

- ⊕ a monthly equalizing charge according to 2.3, or
- ⊕ 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 lifetime of the battery.

6 Malfunctions

If malfunctions are found on the battery or the charger, our service department should be called in without delay. Measurement data collected according to point will make it easier to detect and correct defects in goodtime.



Batteries with this sign can be fully recycled!!! Special waste management companies recycle the batteries. Used traction batteries must not be dropped into communal waste, they need special disposal and handling.