HOPPECKE
POWER FROM INNOVATION

Operating Instructions

trak® bloc

Valve regulated flat plate traction batteries type (trak® bloc)

Rating data:

1. Nominal capacity:	See type plate
2. Nominal voltage:	See type plate
3. Discharge current:	C_5/5h respectively C_{20}/20h
4. Rated temperature:	30°C

trak® bloc batteries are valve-regulated, sealed batteries with a solid electrolyte, where **water refilling isn't permitted** throughout the life of the battery.

Instead of vent plugs the batteries employ valves, that will be destroyed if they are opened.

When operating valve-regulated lead-acid batteries the safety requirements are the same as for batteries with liquid electrolyte to protect against hazards from electric shock, from explosion of the electrolytic charging gases and, in case of the cell container being damaged, from the corrosive electrolyte.

Observe the operating instructions and display them close to the battery. Work on batteries must be carried out only following instruction by skilled personnel!

Use protective glasses and clothes when working on batteries. Obey 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 there is a risk that the battery might explode or catch fire.

Keep children away from batteries!

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.

Electrolyte is highly corrosive.
In the normal operation of these batteries contact with acid is not possible.

Risk of explosion and fire, avoid short circuits!

Batteries and cells are heavy. Ensure secure installation! Use only suitable handling equipment e.g. lifting gear in accordance with VDI 3616.
Avoid damaging the batteries, connectors or end cables with the lifting equipment.

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!

Ignoring these operating instructions, repair with non-original parts and unauthorised operations will render the warranty void.

1. Commissioning

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

Before installing, the battery compartment should be cleaned.

Only blocs with the same state of charge (the same voltage tolerances shown in the following table) may be connected together.

Never supply electrical loads via a partial tapping of the battery.

The battery terminal is to be connected securely and with correct polarity. Otherwise the battery, vehicle or charger could be damaged. After assembly, the terminals should be greased as protection against corrosion. The battery should be recharged as described under 2.2 below.

Rated voltage of module [V]	Maximum deviation from mean value - ΔU_{bloc} [V]
6	± 0,035
12	± 0,049

The specified torques for terminal and connector screws are:

conical terminal	8 ± 1 Nm
Threaded term. M6/M8	20 ± 1 Nm
Flat terminal M6	6 ± 1 Nm

2. Operation

The provisions of standard EN 50272 - Safety Requirements for Batteries and Battery Installations / Part 3: Traction Batteries for Electric Vehicles - apply to the operation of vehicle traction batteries.

2.1 Discharging

The battery valves must not be sealed or covered.

Electrical connections (e.g. via plugs) must only be made or interrupt when there is no current present.

To achieve the optimum life for the battery, operating discharges of more than 60% of the rated capacity should be avoided.

Discharges of more than 80% of the rated capacity, called deep discharges, are not allowed. These reduce battery life considerably. To measure the state of charge use only the battery manufacturer's recommended discharge indicators.

Discharged batteries must be recharged immediately and must not be left in the discharged state. This applies also to partially discharged batteries. Otherwise a reduction in battery life is to be expected. In a discharged state, the battery may freeze, at low ambient temperatures.

2.2 Charging

Only direct current must be used for charging. Only charging procedures complying with DIN 41773-1 and from the battery manufacturer HOPPECKE approved modifications, should be employed. Therefore only battery manufacturer approved chargers must be used. In order to avoid overloading the electric cables and contacts and unacceptable gassing of the cells, connect the battery only to a charger suitable for the size of battery.

trak® bloc batteries have a low gas emission but are not entirely free from gassing.

When charging, proper provision must be made for venting of the charging gases. 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 begin if the battery temperature is below 35°C (95°F). The temperature before charging should be at least 15°C (59°F), otherwise proper charging will not take place.

If temperatures are constantly higher than 40°C (104°F) or lower than 15°C (59°F), then temperature-based constant voltage regulation of the battery charger is necessary. Here a correction factor of -0.005 V/cell per K should be applied.

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 equalising charges use only the battery manufacturer's prescribed chargers. A quarterly equalising charge with constant current is also recommended. The maximum allowable charging current is 2 A per 100 Ah C_5 rated capacity and should last a maximum of 8 hours.

Watch the temperature!

2.4 Temperature

A battery temperature of 30°C (86°F) is specified as the rated temperature. Higher temperatures shorten the life of the battery, lower temperatures reduce the available capacity. 45°C (113°F) is the upper temperature limit and is not acceptable as an operating temperature.

trak® bloc batteries should not therefore be exposed to sunlight without protection.

2.5 Electrolyte

The electrolyte is fixed sulphuric acid. The density of the electrolyte cannot be measured.

3. Maintenance

Do not attempt to refill water!
Never open or remove the valves.

3.1 Daily

Charge the battery immediately after every discharge.

3.2 Weekly

After recharging inspect visually for signs of dirt and mechanical damage.

3.3 Quarterly

At the completion of charge and a rest time of at least 12 hours, the following should be measured and recorded:

- Battery voltage

- Individual bloc voltages

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

3.4 Annually

(for batteries in steel trays only)

At least once per year, the insulation resistance of the vehicle and the battery must be checked in accordance with EN 50272-3 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 thus determined must be higher than a value of 50 Ω per Volt of nominal voltage.

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 leakage currents. Cleaning must be done in accordance with the ZVEI leaflet „The cleaning of batteries".

5. Storage

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

A quarterly full charge in accordance with 2.2 above. If any load is connected to the battery e.g. measurement or control systems, it may be that this charging will be required every 14 days.

Take a self-discharge rate of 2% per month into account.

The storage time should be taken into account when considering the life of the battery.

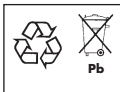
6. Faults

If faults are found in the battery or the charger, our service department should be called without delay.

HOPPECKE Service:
0800 246 77 35
+ 49 (0) 2963 61 1700

The measurements as described in 3.3 above will facilitate fault finding and elimination.

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



Old batteries with this marking are recyclable goods and must be sent for recycling.
Used batteries which are not sent for recycling are to be disposed of as special waste under the relevant regulations.

HOPPECKE
POWER FROM INNOVATION

HOPPECKE Batterien GmbH & Co. KG
P.O. Box 1140 · D-59914 Brilon
Bontkirchener Straße 1 · D-59929 Brilon-Hoppecke

Phone: + 49 (0) 29 63 61-355
Fax: + 49 (0) 29 63 61-735

Email: info@hoppecke.com
Internet: www.hoppecke.de

Teil-Nr. 7240203030/02.08/3 K Printed in Germany