

 **HAWKER**

EvoRail™

Battery



OWNER'S MANUAL

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INTRODUCTION



The information contained in this document is critical for safe handling and proper use of the EvoRail™ batteries. It contains a global system specification as well as related safety measures, codes of behavior, a guideline for commissioning and recommended maintenance. This document must be retained and available for users working with and responsible for the battery. All users are responsible for ensuring that all applications of the system are appropriate and safe, based on conditions anticipated or encountered during operation.

This owner's manual contains important safety instructions. Read and understand the sections on safety and operation of the battery before operating the battery and the equipment into which it is installed.

It is the owner's responsibility to ensure the use of the documentation and any activities related thereto, and to follow all legal requirements applicable to themselves and the applications in their respective countries.

This owner's manual is not intended to substitute for any training on handling and operating the EvoRail™ batteries that may be required by local laws and/or industry standards. Proper instruction and training of all users must be ensured prior to any contact with the battery system.

For service, contact your sales representative or call:

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Your Safety and the Safety of others is Very Important

⚠ WARNING You can be killed or seriously injured if you don't follow these instructions.

RATING DATA & SAFETY

Gas recombination traction batteries with positive tubular plates type PzV.

Rating Data

1. Nominal capacity C_5 : See type plate
2. Nominal voltage: 2.0 V x No of cells
3. Discharge current $C_5/5h$
4. Nominal specific gravity (S.G.) of electrolyte* Type PzV 1.29 kg/l
5. Rated temperature 30°C

*Will be reached within the first 10 cycles.

EvoRail™ batteries are valve-regulated, maintenance-free batteries. Unlike conventional batteries with liquid electrolytes, they have immobilised electrolytes (gelled sulphuric acid). Instead of a vent plug, a valve is used to regulate the internal gas pressure, preventing the ingress of oxygen from the air and allowing the escape of excess charging gasses. When operating

valve-regulated lead-acid batteries the same safety requirements as for vented cells apply, to protect against hazards from electric current, from the explosion of electrolytic gas, and with some limitations from the corrosive electrolyte. EvoRail™ battery valves should never be removed. These batteries do not require topping up with distilled or demineralised water.

Safety Precautions



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



- Wear protective glasses and wear safety clothing when working on batteries.
- Adhere to the current accident prevention rules in the country where the battery is used or EN 50272-3, EN 50110-1.



- No smoking!
- Do not expose batteries to naked flames, glowing embers, or sparks, as it may cause the battery to explode
- Avoid sparks from cables or electrical apparatus as well as electrostatic discharges.



- Acid splashes in the eyes or on the skin must be washed immediately with an abundance of clean water. After abundant flushing, 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!
- Do not remove the plugs.

SAFETY & COMMISSIONING

Safety Precautions (cont.)



- 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 the liquid electrolyte.



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



- Dangerous electrical voltage!



- Pay attention to the hazards that can be caused by batteries.

Ignoring the operating instructions, repair with non-original parts, and disconnection of the easy control will render the warranty void. All the failures, malfunctions, or defaults of the battery, the charger, or any other accessories must be reported to EnerSys® Service.

Commissioning

The EvoRail™ battery is equipped with an easy control electronic device, installed on battery connectors. The presence of this feature is mandatory on each EvoRail™ battery. The battery should be inspected to ensure it is in perfect physical condition. Use special coding systems for maintenance-free batteries for charging plug-and-socket devices to prevent accidental connection to the wrong type of charger. The battery end cables must have good contact with terminals; check that the polarity is correct. Otherwise the battery, vehicle, or charger could be damaged. The specific torque loading for the bolts of the charger cables and connectors is:

	Steel
M10 perfect connector	25 ± 2 Nm

Never directly connect an electrical appliance (for example: a warning beacon) to some cells of the battery. This could lead to an imbalance of the cells during the recharge, i.e. a loss of capacity, the risk of insufficient discharge time, and damage to the cells and this may AFFECT THE WARRANTY OF THE BATTERY.

Charge before use.

Operation

EN 62485-3 "Safety requirements for secondary batteries and battery installations Part 3: Traction batteries" is the standard that applies to the operation of traction batteries in powered locomotives.

Discharging

Ventilation openings must not be 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 must be avoided (deep discharge). They reduce the battery service life. To measure the state of discharge use only the battery manufacturer's recommended discharge indicators (imperative presence of a discharge limiter with an energy cut-off at 1.83 vpc operating voltage at 80% Depth of Discharge (DoD) C_5 , when the recharging time is 12 hours,

and 1.87 vpc at 60% DoD C_5 when the recharging time is 8 hours). Discharged batteries must be recharged, and must never be left in a discharged state for a long period of time.

EvoRail™ batteries can be used in normal duty applications for a maximum of 6 days per week.

Avoid applications where:

- No rest time is available allowing the battery to cool;
- Battery duty leads to a high increase in temperature during operation.

Charging

A full charge shall be carried out every working day. The charging time for an 80% discharged battery shall be 12 hours, or 8 hours for a 60% discharged battery with the appropriately assigned high-frequency charger.

After changing any of the cables on the charger, an EnerSys® technician must visit the site to check the charger. EvoRail™ batteries have low gas emission. Nevertheless, when charging, proper provision shall be made for the venting of the charging gases (DIN EN 50272-3). Battery container lids and the covers of battery compartments shall 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.

Battery Life

The optimum lifetime of the battery depends on the operating conditions (temperature and depth of discharge).

Temperature

The temperature range of use for the battery is between +5°C and + 35°C. Any use outside of this range shall be approved by a service technician.

Optimal battery life is obtained for a battery temperature of 25-30°C.

High temperatures reduce battery life; according to the IEC 1431 technical report, lower temperatures reduce the available capacity.

Maintenance

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

- Never refill with water!
 - Never remove the safety valve from the cell
- In case of accidental damage to the valve, contact EnerSys® Service for replacement.

The battery should always be kept clean and dry to prevent current leakage. Any liquid in the battery tray shall be extracted. Damage to the insulation of the tray should be repaired after cleaning to ensure good insulation and to prevent tray corrosion. If it is necessary to remove cells it is best to call EnerSys® Service for this.

If significant changes from earlier measurements or differences between the cells or bloc batteries are found, please contact EnerSys® Service.

- If the discharge time of the battery is not sufficient, check:
 - That the work required is compatible with the battery capacity
 - The settings of the charger
 - The settings of the discharge limiter.

Annually/Biannually

Internal dust removal from the charger.

Check with attention:

- State of the plugs: be sure to have good contact between the plugs without a trace of overheating.
- State of the output cables.

If you check the torque loading, you shall use a torque wrench with respect to recommended value: 25+/- 2 Nm. In accordance with EN 1175-1, 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 shall be conducted in accordance with EN 1987 part 1. The insulation resistance of the battery thus determined must not be below a value of 50Ω per volt of nominal voltage, in compliance with EN 62485-3. For batteries up to 20 V nominal voltage the minimum value is 1000Ω.

STORAGE

Storage

If batteries are taken out of service for a lengthy period, they should be stored correctly. Disconnect from the truck in a fully charged condition and store in a dry, frost-free room. Batteries shall be recharged after a maximum storage time of:

- 2 months at 30°C
- 3 months at 20°C

Complete a recharge before putting the battery into service. A monthly refreshing charge is recommended. The storage time should be taken into account when considering the life of the battery. Never leave a battery connected to a truck for a long period of time without use.

Storage at an open circuit is not allowed when in a discharged state.



Pb

Battery must be recycled



Environmental Risk!

Risk of lead pollution.

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!

When using motive power batteries and chargers, the operator must comply with the current standards, laws, rules, and regulations in force in the country of use!

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