Instructions for use Oerlikon® Evolution® — ENGLISH

Gas recombination traction batteries with positive tubular plates type PzV, PzVB

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 S.G. of electrolyte* Type PzV:	1.29 kg/l
5. Rated temperature:	30°C

* Will be reached within the first 10 cycles

Oerlikon® Evolution® batteries are valve-regulated, maintenance free batteries. Unlike conventional batteries with liquid electrolyte they have immobilised electrolyte (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 explosion of electrolytic gas and – with some limitations – from the corrosive electrolyte.
Oerlikon Evolution battery valves should never be removed. These batteries do not require topping-up with distilled or demineralized water.

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

- Use protective glasses and clothes when working on batteries. Pay attention to the accident prevention rules as well as EN 62485-3 and EN 50110-1.

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

- 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.

- 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 electrical voltage!

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

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

1. Electronic devices

The type of device required must be specified at the time of ordering the battery from the factory.
Please follow the table:

Charger	**device**	
Life iQ™ Modular, Life iQ™	Wi-iQ®	Mandatory
Lifetech® Modular, Lifetech® other EnerSys® HF approved chargers	No device capable to communicate	Optional

We encourage to use an electronic device (according the table as above) on all Evolution batteries to make sure that the batteries are properly used and to be able to assist with potential warranty claims.

2. Commissioning

The battery should be inspected to ensure it is in perfect physical condition. Use special coding systems for maintenance free batteries for the charging plug-and-socket devices to prevent accidental connection to a wrong type of charger. The battery end cables must have a good contact to terminals, check that the polarity is correct. Otherwise battery, vehicle or charger could be damaged. The specific torque loading for the bolts of the charger cables and connectors are:

M10 perfect connector	25 ± 2 Nm

Never directly connect an electrical appliance (for example: 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, damage to the cells and this may EFFECT THE WARRANTY OF THE BATTERY.
Charge before use.

3. Operation

EN 62485-3 "Safety requirements for secondary batteries and battery installations Part 3: Traction batteries" is the standard which applies to the operation traction batteries in industrial trucks.

3.1 Discharge

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 1.84 Vpc operating voltage at 80% DOD C_5, when the recharging time is 12 hours, and 1.93 Vpc at 60% DOD C_5 when the recharging time is 8 hours). Discharged batteries must be recharged and never be left in a discharged state for a long time.
Oerlikon® Evolution® batteries can be used in normal duty applications for a maximum 6 days per week.
Avoid applications where:
- no rest time is available allowing the battery to cool
- battery duty leads to a high increase of temperature during operation.

3.2 Charging

A full charge shall be carried out every working day.
The charging time for a 80% discharged battery shall be 12 hours, or 8 hours for a 60% discharged battery with the appropriately assigned HF charger.
After any changing of cables on the charger, our technician must visit the site to check the charger.
Oerlikon Evolution batteries have a low gas emission. Nevertheless, when charging, proper provision shall be made for venting of the charging gases (EN 62485-3). 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.
Opportunity charge, to keep batteries almost fully charged, is not allowed. Especially it is not allowed to extend the 80% daily turnover by supplementary charge in multiple shift applications or with normal opportunity charges.

3.3 Equalising charge

Equalising charges are used to optimise the life of the battery and to maintain its capacity. A unique equalisation charge is automatically carried out weekly 8 hours after the end of the charge with a HF charger.

4. Battery life

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

4.1 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 Oerlikon service technician. Optimal battery life is obtained for a battery temperature of 25-30°C High temperatures reduce battery life according to IEC 1431 technical report, lower temperatures reduce the capacity available.

5. 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 of the valve, contact our After Sales 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 a good insulation and to prevent tray corrosion. If it is necessary to remove cells it is best to call in our service department for this.

5.1 Daily

- Check that the plugs and sockets are in good condition.

5.2 Monthly/quarterly

- Carry out end of charge voltage readings at C_5/100, measure and record:
- the voltage of the battery
- the voltages of each cell

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

5.3 Annually or biannually

Internal dust removal from the charger.
Check with attention:
- the state of the plugs: be sure to have a good contact between the plugs without trace of overheating.
- the state of the output cables.

If you check the torque loading, you shall use a torque wrench with respect of 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 1987-1.
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 EN 62485-3. For batteries up to 20 V nominal voltage the minimum value is 1000 Ω.

6. Storage

If batteries are taken out of service for a lengthy period they should be stored, disconnected from the truck, in the fully charged condition 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

Effect 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 time. Storage at open circuit is not allowed when in discharged state.

7. Malfunctions

If malfunctions are found on the battery or the charger, our service department should be called without delay. A service contract with us makes it easier to detect and correct faults in good time.

Wi-iQ®

The Wi-iQ is the electronic device that communicates wirelessly to download the battery key information for better diagnostics & service. The device is fitted to a main DC cable on the battery to monitor and record data of current, voltage, temperature and electrolyte level (via optional external sensor). The LEDs on the Wi-iQ provide real time status of battery's condition. The information is transferred to the PC or to smartphone via USB or by wireless communication.

1. Operation

The Wi-iQ is suitable for use on all battery technologies. Voltage range is 24V – 120V.
The device records global data during the life of the battery. It will store data for 2555 cycles (complete history stored by PC). The data can be analysed by Wi-iQ Report or E-Connect app, depending on Wi-iQ version fitted to the battery.

2. Clear visibility

Selecting the Wi-iQ Report or E-Connect app will provide information on the condition of your battery and any actions that are necessary. Wi-iQ Report or E-Connect app will quickly enable you to get a handle on your battery fleet charging & discharging characteristics. With information by battery family (truck type) you can see depth of discharge charts, cycles, charging and much more.

See the Wi-iQ User Manual for further details.

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!

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