



Instruction Manual

Sealed Gel Battery










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Battery Part Number	<input type="text"/>
Battery Serial Number	<input type="text"/>
Date Supplied	<input type="text"/>
Despatch Voltage	<input type="text"/>
Vehicle Model	<input type="text"/>
Invoice / Spec Number	<input type="text"/>
Fleet / Serial Number	<input type="text"/>

Rating Data

Nominal Capacity C_{5}	: See Battery plate
Nominal Voltage	: See Battery plate (2.0V x No. of cells)
Discharge Current	: C_{5} / 5h
Nominal S.G of Electrolyte*	: 1.29 kg/l
Rated Temperature	: 30°C

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

* Will be reached within the first 10 cycles

	Pay attention to the operating instructions and keep them close to the battery. Work on batteries should be carried out by a qualified technician!		Electrolyte is highly corrosive. Avoid contact with skin and eyes. Do not mix with alkaline solutions. In normal operation contact with acid is not possible. If cell containers are damaged, the gelled electrolyte is corrosive. Do not remove the battery plugs
	Use protective glasses and clothes when working on batteries. Pay attention to the accident prevention rules as well as AS/NZ1337, EN50272-3 & EN 501110-1		Batteries and cells are heavy. Ensure secure installation. Use only suitable handling equipment. Lifting hooks must not damage the cells, connectors or cables
	No smoking ! Do not expose batteries to naked flames, glowing embers or sparks, as it may cause the battery to explode.		Dangerous electrical voltage!
	Acid splashes in the eyes or on the skin must be washed with plenty of fresh clean water. In case of accident, consult a doctor immediately ! Remove contaminated clothing		Pay attention to the environmental hazards of batteries. Please recycle
	Risk of explosion and fire. Avoid short circuits! Metal parts of a battery are always live. Do not place tools or other metal objects on the battery!		

Hawker Evolution batteries are VRLA - valve regulated, maintenance free batteries. Unlike conventional wet batteries 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. The battery valves should never be removed. These batteries do not require topping-up with water. **Ignoring the operating instructions, repair with non-original parts, using additives for the electrolyte or disconnection of the Wi-IQ® monitor will render the warranty void.**

1. Commissioning Battery

The Hawker Evolution® battery is equipped with a Wi-IQ, an electronic device fitted to the battery connectors. The presence of this device is mandatory on each battery. The battery, including all cables, links and plugs should be inspected upon receipt to ensure it is in perfect physical condition.

The battery should be in a fully charged condition. If it requires charging, see Item 2.2. Use special plug coding systems for the battery to prevent accidental connection to a wrong type of charger. The charging cables must be connected to ensure a good contact, taking care that the polarity is correct, otherwise battery, vehicle or charger could be damaged.

The specified torque loading for the terminal screws of the charging cables and connectors is

M10 perfect connector 25Nm +/- 2Nm.

Never directly connect an electrical appliance (for example: warning beacon) to some cells of the battery. This could lead to a voltage imbalance of the cells during the recharge causing a loss of capacity, the risk of insufficient discharge time and damage to the cells.

THIS MAY EFFECT THE WARRANTY

2. Operation

Standards AS2402.2.2-2005 & EN50272-3 apply to the installation and usage of valve regulated cell traction batteries in industrial trucks.

2.1 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 optimise battery life, deep discharges of more than 80% of nominal capacity must be avoided. One cycle (80% C5) per 24 hour period.

To measure the depth of discharge (DOD) use only recommended discharge indicators with an energy cut-off at 80% (1.83 v.p.c loaded) for a 12 hour recharge, and 60% (1.87 v.p.c loaded) for an 8 hour recharge time.

Both partially and fully discharged batteries must be recharged immediately and not left in a discharged condition.

Batteries can be used in normal duty cycle for a maximum 6 days per week.

Avoid applications where:

- No allowance for battery to cool
- Heavy Duty cycle leading to increase of battery temperature during operation.

2.2 Charging

Only direct current must be used for charging.

Only connect to an Enersys approved charger suitable for type and size of battery, to avoid overloading of electric cables and contacts unacceptable gassing and damage to the cells.

IUI profile: Nominal current 0.17 - 0.20 X C5
Voltage regulation 2.37v.p.c @ 30°C
Finish constant current C5/200 4rs

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. If the charger was not purchased together with the battery, it is best to have its suitability checked by Enersys. Any changes or repairs to the battery or charger must be performed by our service division.

Gel batteries have a low gas emission, however, during charging, proper provision must be made for venting of the charging gases complying to AS2402.2.2-2005 & EN 50272-3.

Lids and covers of battery compartments must be opened or removed and in the case of a closed battery compartment, the battery must be removed.

The vent plugs should stay on the cells and never be 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.

The charger will indicate end of charge.

Do not interrupt the charge cycle.

2.3 Equalising Charge

Equalising charges are used to optimise the life of the battery and to maintain its capacity.

4 hrs @ C5/200

With the correct charger, an equalisation charge is automatically carried out weekly after the end of the normal charge.

2.4 Temperature

The temperature range of use for the battery is between +5 °C and + 35 °C. Any use outside of this range must be approved by Enersys.

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.

3. Maintenance

3.1 Daily

Charge the battery after every discharge.

Check that the plugs, links, cables and tray are in good condition.

3.2 Weekly

Visually inspect after recharge for signs of mechanical damage and cleanliness of battery. Ensure an equalising charge is carried out (see 2.3).

3.3 Monthly

Following the recharge, with the charger switched on (C5/100), measure and record the cell voltages and temperature using the pages at the end of this document.

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

3.4 Annually

Inspect & remove dust from within the charger. Check that the plugs, links, cables and tray are in good condition.

At least once per year the insulation resistance of the battery must be checked in accordance with EN 1175-1 & EN 1987 part 1.

The insulation resistance of the battery must not be below a value of 50Ω per volt of nominal voltage in compliance with EN 50272-3.

For batteries up to 20V nominal voltage, the minimum is 1000Ω.

4. Care Of The Battery

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 service department.

The battery should always be kept clean and dry to prevent tracking currents.

Damage to the insulation of tray should be rectified after cleaning, ensuring insulation value is within limits (DW 0510 section 3) and to prevent tray corrosion.

If it is necessary to remove cells, repair plugs or cables contact our service department.

5. Storage and Stabling

If batteries are taken out of service for a lengthy period they should be stored in the fully charged condition in a dry, frost-free room.

Storage is not allowed when in a discharged state.

Batteries should be recharged after a maximum storage time of 2 mths (30°C), 3 mths (20°C).

To ensure the battery is always ready for use a choice of charging methods should be made -

- *A monthly equalising charge as in point 2.3*
- *Float charging at 2.27v.p.c X number of cells.*

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

6. Malfunctions

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

The measurements taken in point 3.3 will facilitate fault finding and their elimination.

A service contract will make it easier to detect and correct faults promptly.

7. Wi-IQ® Monitor

The battery is fitted with a WiIQ onboard battery monitoring device.

The WiIQ is suitable for a voltage range 24V - 80V.

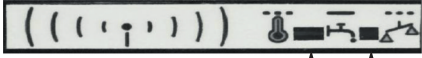
These devices capture battery operating data for later reporting and analysis whilst at the same time offer visual warnings to the operator on the current status of the battery - refer table below.

The device is fitted to a main DC cable on the battery to monitor and record the data of current, Ah throughput, voltage, balance and temperature (the electrolyte sensor is disabled).

The LED's on the WiIQ provide real time status of the battery's condition.

The information is stored in memory and can be transferred wirelessly to a computer via USB key. Plug in the USB key to the PC, scan the WiIQ and upload the data to the PC.

The WiIQ Report software will quickly enable you to get a handle on your battery fleets charging and discharging characteristic through a comprehensive set of simple reports and graphs.

 <p style="text-align: center;">Tri Colour LED Blue LED</p>
Tricolour LED
Green blinking = hardware OK Blue rapid blinking = wireless identification Red blinking = temperature warning >55°C
Blue LED
Rapid blinking = wireless identification Slow blinking = voltage balance warning * Electrolyte level indicator disabled on GEL battery

Maintenance Log

Month _____ Year _____

Monthly Full Readings (After Equalising)

Cell No.	Cell Volts	Cell No.	Cell Volts		
1		21			
2		22			
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18		38			
19		39			
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Pilot Cell Temperature		°C	Battery Voltage		V

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			V

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!



Pb

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