THE FORKLIFT COMPANY™

BATTERY CARE AND MAINTENANCE

SAMUK

Motive Power Battery Life

1 battery cycle is one full discharge/1 full recharge (80% depth of discharge).
1 battery cycle is = approximately 5hrs continuous use to reach a discharged state of 80% (dependant on application). In real time this equates to 1 x 8hr shift. For light applications the battery will last longer. Heavy duty use will consume more energy, therefore increase discharge rate, reducing operating time.

It is important to use the capacity available per discharge i.e. a 500Ah rated battery should only ever be discharge to 80% therefore available capacity to use is 400Ah

Do not over-discharge the battery.

Shallow discharging a battery wastes the capacity available per cycle i.e. if the battery is discharged to 10% and then put back on charge, the remaining 70% capacity has not been utilized.

Opportune charging should be avoided. i.e. during break and lunch times.

The correct battery care and maintenance is vitally important in order to ensure that the life expectancy of the battery is achieved.

Overtopping the battery will cause loss of electrolyte and will effect the density of the acid contained within the battery cells. This will also result in a loss of battery capacity also cause general cell failure.

Battery operating temperature: this can vary depending on the application and discharge rate. High discharge rates will increase the operating temperature of the battery. Also unnecessary charging of the battery will increase temperature. Continuous use at operating temperatures above 38 degrees will reduce the life of the battery.

Heavy duty applications may need additional batteries or equipment fitted to a battery to ensure power availability.

Ensure that you have enough batteries and Ah capacity to meet the demands of your application.

Providing all the above and the information enclosed within this document is adhered to the maximum life expectancy from a motive power battery will be obtained.

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Care and maintenance of batteries and chargers

Batteries – daily

- Recharge the battery as soon as possible after discharge.
- Do not interrupt the charge cycle
- Always allow the battery to be fully charged before disconnection from the charger
- Ensure that the top of the battery is clean and dry and free from corrosion – this helps to prevent short circuits
- Inspect battery cables/plug
- Check all connection and report any frayed wires or worn insulation

Batteries – daily

- Check the electrolyte levels and top up if necessary
- Manual filling - top up the cells so that the plates and separators are just covered by electrolyte
- Battery fill system – see section PROCEDURE FOR TOPPING UP WITH B.F.S
- Use only distilled, deionised or approved water for topping up of cells
- Topping up should only be carried out with the battery in a fully charged state
- Do not top up before charge
- Do not overfill
- Never top up with acid
- Clean away any spillage after topping

Batteries fitted with Battery Fill Sytem - B.F.S and AIRMATIC

- Check the Battery fill system, airmatic components and all connections for damage.

Chargers – monthly

- Check output cables and plug for damage
- Check the charger cabinet for damage
- Report any damage immediately

Care for your battery – Care for your safety

General

To ensure safety and to get the best results from your battery, it is essential to operate and maintain your battery in accordance with the manufacturers' recommendations. Please call our Service Office on 01827 874728 who will be pleased to supply and advise on battery selection and maintenance.

Electrolyte

Batteries contain an electrolyte of dilute sulphuric or potassium hydroxide which is poisonous and corrosive. It can cause burns on contact with the skin and eyes. If electrolyte is spilt on skin or clothing wash with plenty of clean water. If electrolyte gets into the eyes wash with plenty of clean water and get **IMMEDIATE MEDICAL ATTENTION.** Always wear protective clothing and protect the eyes especially if your job brings you into contact with the electrolyte.

Gases

Batteries can give off explosive gases:

- **KEEP SPARKS AND FLAMES AWAY FROM THE BATTERY**
- **NO SMOKING.**
- **SWITCH OFF CIRCUIT** before connecting or disconnecting batteries.
- Ensure connections are tight before switching on.
- Do not place metal objects on top of the battery.
- Areas where batteries are kept or charged must be adequately ventilated.

Electricity

Check the circuit to ensure it is safe before making or breaking connections to the battery.

ELECTRIC SHOCK – take immediate action.

- Switch off or remove the source of supply.
- Secure release from contact, ensuring that you are insulated, e.g. rubber gloves, broom handle, etc.
- Start respiratory resuscitation at once if the casualty is not breathing.
- Send for a Doctor or Ambulance.

PRECAUTIONS TO TAKE WHEN HANDLING MOTIVE POWER BATTERIES

Handling

Lead – acid traction batteries are very heavy

Use the correct equipment when lifting and handling batteries. Keep the battery upright

Keep lifting chains and spreader beams away from the battery terminals and connectors

Due to the wide variation in the types of electric vehicles, designs of battery trays, equipment used and methods of battery changing it is not possible to give detailed instructions on the procedures to be followed when changing the batteries on an electric vehicle. The method and procedure to be followed should be obtained from the manufacturer of the vehicle or battery changing vehicle.

PROCEDURE FOR CHARGING BATTERIES

REMEMBER TO USE THE CORRECTLY MATCHED AND APPROVED CHARGER!

Remove battery cover on truck before charging

Disconnect the battery plug from the electric vehicle

With the charger switched off connect the charger plug to the battery plug ensuring that the polarity is correct (positive to positive, negative to negative)

Switch the charger on – the charging process will begin

PLEASE NOTE there may be a delay before the charger switches on

DO NOT disconnect the battery until the charger has completed a full charging cycle

Should the charge cycle need to be interrupted please make sure that the charger is SWITCHED OFF before disconnecting the battery plug from the charger plug

It is recommended that a battery should be discharged to 80% before being charged indicated by the Battery Display Indicator on the vehicle

On completion of the charging cycle switch the charger off and disconnect the battery plug from the charger plug

Place charger plug and lead in safe position to avoid damage

Plug battery into the electric vehicle - battery now ready for use

NOTE Operation may vary depending on type of charger. See individual operating instructions.

BATTERY WATERING SYSTEMS

For use with The Autofil Battery Filling System – B.F.S

Battery Watering Cart.

The battery water cart operates using a 12 volt pump with a built-in pressure sensor. When the filling coupling on the cart is connected to the B.F.S coupling on the battery, the water pressure drops in the output hose and the pump turns on automatically supplying water to the battery. When the B.F.S has topped the battery and the floats in the valves have shut off the pump also shuts off by itself. Completion of topping is indicated by the non rotation of the flow indicator.

Battery Gravity Feed Bottle.

The Gravity feed bottle as its name implies relies on gravity for it to operate correctly. It must be sited above the height of the battery in order for a flow of water to enter the battery cells via the Battery Fill System. The height should be adjusted accordingly for optimum performance. When the filling coupling on the Gravity Feed Bottle is connected to the B.F.S coupling on the battery, the water pressure drops on the output hose and water is gravity fed into the battery. When the B.F.S has stopped and the floats in the valves have shut off, the topping of the battery is complete indicated by the non rotation of the flow indicator.

Automatic water topping controlled by the charger in Conjunction with B.F.S

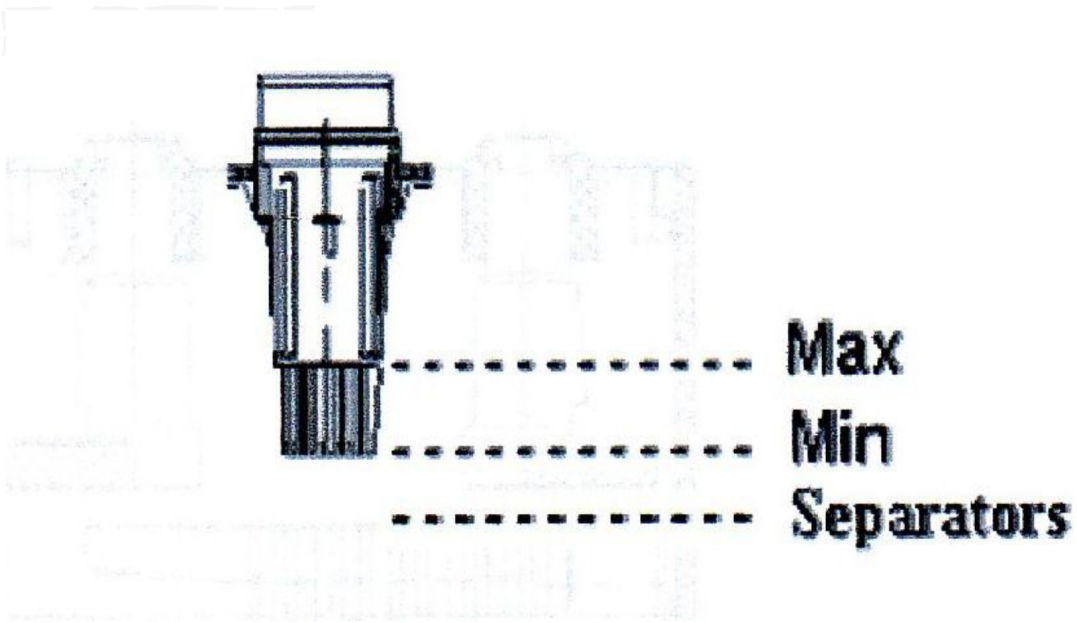
Fully automated and timed watering system where by each charger has a separate water point. The supply of water is then fully controlled by the charger using a solenoid valve. The valve has a Walther coupling end to which the battery is connected (as the above). When the battery nears its end of charge status the charger automatically tops the battery up. A flow of water is pulsed into the battery to allow even circulation. The main supply of water feeding all the chargers is normally available for 2 days per week set by a timer.

For operation with B.F.S please see **PROCEDURE FOR TOPPING UP WITH B.F.S**

PROCEDURE FOR MANUAL TOPPING

- **ONLY** Top battery when in a fully charged condition
- **ONLY** Top up using de-mineralised / deionised water
- **ONLY** Top battery using appropriate equipment
- **PPE** (Personnel protective equipment) **MUST** be worn when topping up
- **DO NOT** Overfill
- **DO NOT** Top Up with Acid
- **CLEAN** AWAY any spillages after topping

FILL LEVELS



PROCEDURE FOR TOPPING UP WITH B.F.S

Your battery is supplied with the Autofil Battery Fill System – B.F.S

This system allows the battery to be topped up automatically without the need for individual cell topping

With this system the topping up of batteries with water has to be done strictly after its charge and only once a week or as indicated by the level of the white eye on top of the BFS valve

1. High Level white eye = battery does not require topping up
2. Low level white eye = battery requires topping up

1. Before connecting the water please ensure that all water connections i.e. plastic piping and end stops on the battery are intact

2. Connect the water coupling on the battery to the coupling on the water supply provided by pulling back on the locking ring and pushing both halves together.

3. A flow of water will now enter the battery indicated by the rotation of the in line flow indicator

4. At the end of the filling process, i.e. the flow indicator is stationary and the white eye is at high level, the water supply must be disconnected immediately

5. Water topping complete

DO NOT leave the battery unattended whilst the topping up procedure is being carried out
DO NOT top the battery up if any connections are broken as the system will leak and flood the battery and its container

Should a leak appear, disconnect the water coupling from the water supply immediately and contact The Forklift Company on 01827 874728

HEALTH AND SAFETY PROCEDURES

SPILLAGES

In the event of a major spillage of any hazardous substance the following procedures should be adopted.

Move away and get help	**Evacuate the area and notify others working Nearby.**
Seal of the area	**Once evacuation has taken place the area should be sealed off using barrier tape and warning signs.**
Check for injuries	**Check all persons working near the spill for any type of injury.**
Identify the hazard	**Try to identify the spillage type to ensure that it can be dealt with in the most effective manner.**
Protective clothing	**Wear the appropriate protective clothing, normally eye protection, gloves, overalls, safety footwear.**
Contain the spill	**Prevent contamination of drains by placing a physical barrier between the drain and the spill. e.g. use a response kit.**
Disposal	**Seal the container, mark in accordance with the CHIP Regulations and dispose of the material through the correct Waste Authority procedures.**

CHEMICAL SAFETY

Nature of Hazard
Corrosive – Sulphuric acid
Causes damage to the eyes and skin
Attacks many materials and clothing

Protective Measures
Eye protection i.e. Goggles
Rubber or plastic gloves
Rubber or plastic apron
Rubber boots
Eyewash bottle or other suitable facility

Spillage
Neutralise with sodium carbonate or sodium bi-carbonate and/or
Drench with water

First Aid
Wash eyes out with plenty of water for at least 15 minutes
Seek medical advice
Wash affected skin with plenty of water

HEALTH AND SAFETY PROCEDURES

BATTERY SAFETY CODE

Always remember that a battery is a source of power, even when fully discharged there remains sufficient energy in a battery to cause serious damage

Never smoke or allow a naked flame or spark near to a battery

Never put metal objects on top of the battery

Replace all insulators and vent plugs firmly

Always wear suitable protective clothing when working on batteries

Wear eye protection

Ensure that an eye bath is available for immediate treatment in the event of an acid splash

If it is necessary to work on a battery, ensure that the electrical connections are isolated first.

Use only insulated tools

For further information call The Forklift Company

Business Park Knowle Hill, Knowle Hill, Hurley, Atherstone, CV9 2JE

Tel: 01827 874728 Email: Serviceteam@theforkliftcompany.net