

Instructions for use energy LM 70 system

ENGLISH

The energy LM 70 system integrates

- a battery with airmixing system and aquarelevel system,
- an on-board electronic device, the easyplus, for checking temperature, electrolyte level and voltage balance, and for recording data on capacity and battery. This permitting the communication with the HF charger.
- A Premium HF com or Premium HF flex charger (for instructions concerning the charger, please read specific manual)

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*	: 1.29 kg/l
5. Rated temperature	: 30°C
6. Nominal electrolyte level	: up to electrolyte level mark "max."

*Will be reached within the first 10 cycles.



- Pay attention to the operation instruction and fix them close to the battery.
- Work on batteries to 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 50272-3 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 in the eyes or on the skin must be washed with water. In case of accident 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!



- Electrolyte is highly corrosive.



- Batteries and cells are heavy. Ensure secure installation!
- Use only suitable handling equipment.



- Dangerous electrical voltage!



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

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

1. Commissioning

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

The easyplus must be reconnected immediately in case of disconnection (due to installation of battery plug) (max. delay 24 hours).

The charger 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 polscrews of the charger cables and connectors are:

	steel
M 10 perfect connector	25 ± 2 Nm

The battery is then charged as in item 2.2. The electrolyte should be topped up to the specified level with distilled or demineralised water.

2. Operation

EN 50272-3 "Traction batteries for industrial trucks" is the standard which applies to the operation traction batteries in industrial trucks. In normal working condition, the green LED on easyplus must be ON, with fixed or flashing light. The easyplus contains data on the battery (serial number, capacity, technology), records data during the operation (number of cycles, temperature, capacity, ...) and transmits the information to the charger with warnings appearing on the charger's display. (low electrolyte level, topping up needed, overdischarge, daily cycle, excessive temperature, voltage balance anomaly). Some of the information is already indicated through the LEDs on the top of the easyplus.

When the blue led on easyplus is ON and stays fixed, topping up must be carried out.. Water topping up should be done latest when the blue LED is ON or after maximum 70 cycles.

LED	Definition	Action
Off	No power	Check connection
Green LED flashing (slowly)	Power and Hardware OK	
Fixed green LED	Complete charge	
Fixed red LED	Overdischarge	Charge immediately
Red LED flashing	Excessive temperature	Cool down til normal temperature is reached
Blue LED flashing	Difference of voltage balance	FMP Service action
Blue LED ON	Low electrolyte level	Topping up

2.1 Discharging

Be sure that all ventilation openings are not sealed or covered. Electrical connections (e.g. plugs) must only be made or broken 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). This corresponds to an electrolyte specific gravity of 1.15 kg/l at 30°C at the end of the discharge. Discharged batteries must be recharged immediately and must not be left discharged. This also applies to partially discharged batteries.

2.2 Charging

Only direct current must be used for charging. The energy LM 70 system is designed with a Fiamm Motive Power HF charger, Premium HF com or Premium HF flex. In the system, the charger assigned to the battery has been specifically determined for suiting the size of the battery. Energy LM 70 batteries are low gas emission, so some charging gasses are evolved. Battery container lids and the covers of battery compartments must be opened or removed.

The ventilation must comply to EN 50272-3 standard. The aqualvel plugs should stay on the cells and remain closed. With the charger switched off connect up 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 electrolyte rises by about 10°C, so charging should only begin if the electrolyte temperature is below 45°C. The electrolyte temperature of batteries should be at least +10°C before charging otherwise a full charge will not be achieved. If a defect signal concerning the pump or the electrolyte mixing system appears on charger's display, check that the piping system is connected and examine the piping circuit for leaks or defects. (see 3. Maintenance). In the meantime, the HF charger will adapt the profile. The air pipe should never be removed during charge.

2.3 Equalising charge

Equalising charges are used to safeguard the life of the battery and to maintain its capacity. They are necessary after deep discharges or repeated incomplete recharges. Equalising charges can be carried out manually, or will be performed automatically after a rest following normal charging. **Watch the temperature!**

2.4 Temperature

An electrolyte temperature of 30°C is specified as the rated temperature. Higher temperatures shorten the life of the battery, lower temperatures reduce the capacity available. 55°C is the upper temperature limit and is not acceptable as an operating temperature.

A temperature sensor is integrated in the easyplus device. In case of excessive temperature the red LED is flashing. Several hours of rest can be necessary to let the battery cool down and to avoid damage.

2.5 Electrolyte

The rated specific gravity (S. G.) of the electrolyte is related to a temperature of 30°C and the nominal electrolyte level in the cell in fully charged condition. Higher temperatures reduce the specified gravity of the electrolyte, lower temperatures increase it. The electrolyte must conform to the purity regulations in DIN 43530 part 2.

3. Maintenance

3.1 Weekly

Control all indications on easyplus and on charger's display for eventual warnings, defects, or need for water topping up (especially if the battery remains in battery compartment in the truck).

If the blue LED on the easyplus is ON, the battery needs to be topped up in the shortest delay. In case of Fiamm Motive Power Service contract, contact it immediately.

3.2 Quarterly

After approx.70 cycles (one shift operation) or when the blue LED on the easyplus is ON the energy LM 70 batteries have to be topped up. In multiple shift and warm ambient temperature operations, it may be necessary to have shorter than 70 cycles topping up intervals. If you have a service contract, please contact the Fiamm Motive Power Service!

3.3 Annually

In accordance with EN 1175-1 and EN 50272-3 at least once per year, the insulation resistance of the truck and the battery must be checked by an electrical specialist.

After charging has ended the specific gravity and the temperature of the electrolyte in all cells should be measured and recorded. If significant changes from earlier measurements or differences between the cells are found further testing and maintenance by the service department should be requested.

The filter of the air pump has to be checked during the annual maintenance and eventually to be cleaned or replaced. Earlier replacement of the filter is necessary if, for undefined reasons (no leaks in the air pipes) the defect signal of the air mixing system on the charger is illuminated. During the annual maintenance, check the correct operation of the air pump.

4. Care of the battery

The battery should always be kept clean and dry to prevent tracking currents. Any liquid in the battery tray must be extracted and disposed of in the prescribed manner. Damage to the insulation of the tray should be repaired after cleaning, to ensure that the insulation complies with EN 50272-3 and to prevent tray corrosion. Repairs on batteries have to be performed by Fiamm Motive Power service personnel only.

5. Storage

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. To ensure the battery is always ready for use a weekly equalising charge as in point 2.3 can be made: After a maximum of 6 weeks storage, proceed to a full charge (see 2.2) 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 in without delay. A service contract with us will make it easier to detect and correct faults in good time.

Aqualevel water refilling system

1. Application

The water refilling system is used to automatically maintain the nominal electrolyte levels.

2. Function

A valve and a float together control the topping up process and maintain the correct water level in each cell. The valve allows the flow of water into each cell and the float closes the valve when the correct water level has been reached. For fault-free operation of the water refilling system, please note the instructions below:

2.1 Manual connection

The battery should be topped up shortly before completion of a full charge, as at this point the battery has reached a defined operational state resulting in satisfactory electrolyte mixing. Filling takes place when the connector (7) from the tank is connected to the coupling (6) on the battery. The battery should only be connected to the filling system once the easyplus BLUE Led is ON, or when the need for water topping is appearing on charger display, or when 70 cycles are reached. In multiple shift and warm ambient temperature operations, it may be necessary to have shorter than 70 cycles topping up intervals. Optional: Solenoid valve kit in the charger and automatic coupling.

2.2 Filling time

Filling time depends on the utilisation rate and the corresponding battery temperature. Generally speaking, the top up process takes some minutes and can vary according to the battery capacity; after this, if manual filling is being used, the water supply to the battery should be turned off.

2.3 Working pressure

The water refilling system should be installed in such a way that a water pressure of 0.2 to 0.6 bar is obtained (with at least 2 m height difference between the upper edge of the battery and the lower edge of the tank). Any deviation from this means that the system will not function properly.

2.4 Purity

The topping up water must be distilled or demineralised. The water used to refill the batteries must have a conductance of not more than 30 µS/cm. The tank and pipes must be cleaned before operating the system.

2.5 Pipe system on the battery

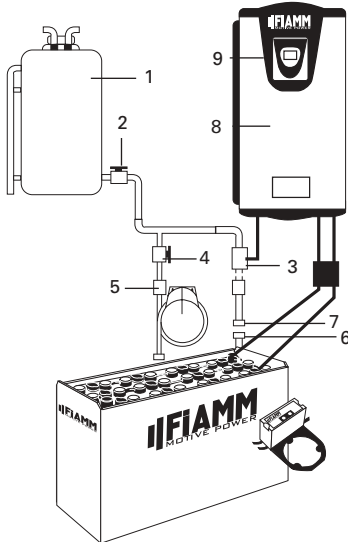
The plugs of each cell are connected in series or series/parallel through a piping system.(EN 50272-3) For safety reasons, the system must not be modified in any way.

2.6 Working temperature

Batteries fitted with aqualevel must only be charged or refilled in a room temperature above 0 °C.

2.7 Flow control

A flow indicator built into the water supply pipe to the battery monitors the filling process. During filling the water flow causes the built-in disc in the flow indicator to turn. When all the plugs are closed the disc stops, indicating that the filling process is complete.



1. tank
2. outflow connector with ball valve
3. plug with magnetic valve
4. plug with ball valve
5. flow control
6. coupling
7. connector
8. battery charger
9. charger main switch

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!

