Technical manual GB

Fiamm Motive Power Premium HF com single phase

Contents

Warning

Aim of the manual

This manual is designed for use by any skilled worker wishing to use Fiamm Motive Power single phase Premium HF com battery charger for recharging lead/acid open cell or gel batteries.
This manual provides details of:
- The chargers' functions.
- Any adjustments required and how to use the chargers.
- The chargers' technical characteristics.

When producing this manual, Fiamm Motive Power has aimed to provide its information in as simple and precise a manner as possible but cannot assume any responsibility for any misinterpretation.
The owner of the equipment is required to retain this manual throughout the equipment's life and to pass it on to any purchaser in the event of its resale.

Guaranty

The guaranty is covered by the manufacturer accordingly to the local rules. Contact your dealer for complementary information.

Recommendations

Recommended use
This manual should be read through carefully before using the equipment and also read by anyone likely to use the equipment. The equipment:
- Presents no obstacles to the free circulation of air through the air inlet and outlet. It should be cleaned of dust every six months.
- Must be used in conformance with its indicated level of protection and never come into contact with water.
- Must be used within the temperature limits stated in the technical characteristics.
- Must not be installed on surfaces subject to vibration (near to compressors, engines, motors, etc.).

Operator safety
Take all necessary precautions when the equipment will be used in areas where there is the possible risk of an accident occurring. Ensure appropriate ventilation when charging lead/acid open cell batteries to allow any gases released to escape. Never disconnect the battery while it is being charged.

General checks
Before putting the charger into service, we recommend that you check:
- That it is correctly earthed.
- That the local power supply conforms to the charger's operating voltage.
- That the battery voltage conforms to that of the charger.
- That the charger's output is suitable for the battery's capacity.

Electrical safety

The prevailing safety regulations must be observed.
The system protection installed on the power supply to the charger must conform to the charger's electrical characteristics. The installation of a suitable circuit breaker is recommended. It is imperative to ensure that when fuses are being replaced only fuses of the specified type and of the correct calibre are used. It is strictly forbidden to use inappropriate fuses or to short-circuit the fuse holders.

This equipment conforms to Class 1 safety standards, which means that the appliance must be earthed and requires to be powered from an earthed supply. Earthing is provided by means of a braid or cable of cross-section in excess of or equal to 6mm²; this cable must be as short as possible.
Before opening the equipment for the purposes of adjustment, replacement of components, maintenance or repairs, it must be disconnected from all sources of electrical power (including mains and battery power).
The battery must only be disconnected after the Start/Stop button has been set to "0".
This access will be carried out by an appropriately skilled person who is aware of the risks involved.
Contact one of the company's trained technicians if any problem is encountered when putting the charger into operation.

Limitations on use

This equipment has been designed for use in a covered environment. It is only designed to recharge lead/acid batteries on industrial premises.

Destruction of the equipment

When the equipment becomes obsolete, the casings and the other internal components can be disposed of by specialist companies. Local legislation takes precedence over any instructions in this document and must be scrupulously observed.

Improvements and modifications

Fiamm Motive Power reserves the right to make any improvements and/or modifications to the product described in this manual at any time and without prior notice and is not obliged under any circumstances whatsoever to update the contents of this manual nor the equipment concerned.

Receipt - Storage

Upon receipt of the package, check for any external or internal damage and, if necessary, notify the haulier at his usual premises, by recorded delivery letter, fax or telex, within 24 hours of delivery.
If the charger is to be stored before its use, it must be kept carefully sealed in its original packaging. It must be stored in a clean and dry location at a moderate temperature (0°C to +40°C). Equipment stored at a temperature of less than 15°C must be brought progressively to operating temperature (over a period of 24 hours) to avoid any risk of condensation causing electrical faults (particularly short-circuits).

Replacement parts

The equipment's production number must be supplied when ordering any replacement parts. This number can be found on the information plate.

Information plate

This is located on one side of the charger.

Glossary

The chargers' advantages
Fiamm Motive Power chargers are microprocessor-controlled. The processor calculates the battery's capacity so that the charging profile can be automatically adapted to the battery's actual state over a wide range of capacities.
The charging coefficient is maintained absolutely on all types of batteries. Fiamm Motive Power chargers adapt to the battery's capacity and its discharge level.

Charging coefficient
The ratio of the number of amp hours restored during charging to the number of amp hours consumed during discharge.

Compensation charging
Compensation charging enables the battery to be maintained at maximum charge all the time that it is connected to the charger.

Desulphation charging
Desulphation charging, effected before normal charging, enables the density of batteries that have been heavily discharged or left a long time without use to be restored.

Equalisation charging
Equalisation charging, effected after normal charging, balances the densities in the battery's cells.

Fiamm Motive Power energycom
This equipment, installed on the battery, transmits, without any cable, some battery parameters towards the charger, in order to optimize le charge and to monitor the charge and discharge characteristics.

Gel
A sealed battery with gelified electrolyte.

Charging profile
The charging profile defines the rate of current charge over time. Different charging profiles can be selected, depending on the type of charger. The charger adapts to the battery's age and level of discharge and prolongs its effective life. Controlling the overcharge coefficient, whatever the battery's discharge level, reduces the amount of water (except for sealed batteries) and electricity consumed.

"Ionic" profile
Also called "ionic mixing". This type of charging profile consists of sending short pulses of current to stimulate gas formation in the active material, causing sulphuric acid to be distributed outside the plates.
This system of mixing the electrolyte enables more rapid charging of open cell batteries subject to very high demands and balances out differences in density, homogenising the electrolyte across the surface of the plates.

Gel battery profile
The procedure for charging sealed, maintenance-free batteries has been optimised to ensure that their particular conditions necessary for recharging are observed. The main advantages of these batteries are that there is no necessity to add water, thus reducing maintenance costs, and no necessity for special charging rooms with ventilation and water demineralisation units.

Pneumatic battery profile
This type of battery is fitted with an air injection circuit allowing the electrolyte mixing.

Resting phase
The resting phase prevents the battery from being disconnected for a predefined period of time to ensure a period of inactivity after charging.

EEC declaration of conformity

Fiamm Motive Power hereby declares that the chargers of the range Premium HF com covered by this declaration conform to the descriptions laid down in European Directives 89/336/EEC and 93/68/EEC.

CE

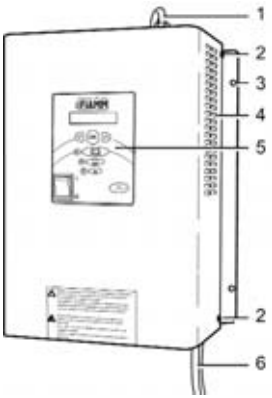
Presentation

Introduction

The Premium HF com range of chargers enables you to recharge 24V or 36V batteries, depending on the version supplied, from the single-phase mains supply.
The microprocessor-controlled unit automatically recognises the battery (voltage, capacity, charge level, etc.) and highly effectively analyses its condition for optimum handling.
Several charging profiles are available (free electrolyte open lead/acid batteries, sealed batteries or gel batteries) depending on the configuration employed by the user. The capability for desulphating, equalisation and compensation charging is also included.

The external components

These are shown below:

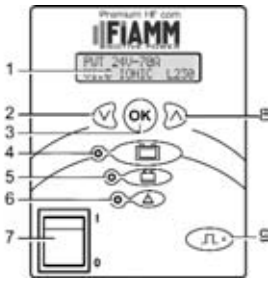


Ref.	Function
1.	Power supply cable.
2.	Screws holding the protective cover.
3.	Wall fixing.
4.	Ventilation holes.
5.	Display and controls (refer to next figure).
6.	Battery cable.

Figure 1: The charger's main components

The control section

This houses the display and the control buttons. Please refer to the chapter on "The Display" for the information shown.



Ref.	Function
1.	LCD alphanumeric display, 2 lines 16 characters.
2.	Menu navigation button.
3.	Confirmation of selection button.
4.	Green battery charged light. Unlit: charger stopped or battery not available Flashing: resting phase Permanently lit: battery available
5.	Yellow charging in progress light. Unlit: charger stopped Lit: charging in progress
6.	Red fault light. Unlit: no fault Flashing: current fault detected Permanently lit: fault
7.	Start-Stop switch.
8.	Menu navigation button.
9.	Menu exit and initiation of equalisation and desulphating button.

Figure 2: The charger's controls.

The Indications on the Display

Not charging, without pressing OK

When the charger is in the waiting position (Start/Stop switch on "0") and the **OK** button has not yet been pressed, the display shows information on the charger (top and bottom lines):
- Type of charger (PWT signifying Premium HF com) and the characteristics of the voltage/current.
- Software version, charging profile previously selected and mains voltage in Volts.

Not charging, after pressing OK

When the charger is in the waiting position (Start/Stop switch on "0") and the OK button has been pressed, the display shows the three accessible menu groups:
- Effective access to the **MEMO** menu if **OK** is pressed.
- One of the three menu options. The other options can be accessed via the ▼ or ▲ buttons. Please refer to the chapter on "The Menus" for details.

On starting charging

When the charger is in the charging position (Start/Stop switch on "1"), the display shows information on the battery connected, when the charging process is initiated and then in alternation:

Without FMP energycom	With FMP energycom
Type of charger and programmed operating temperature.	Type of charger, battery's voltage, capacity, temperature and serial number as the data are received.
Programmed charging profile, time remaining before charging starts.	Charging profile detected, time remaining before charging starts. The charging profile flashes during this phase.

The ⎍ symbol indicates that equalisation is required on completion of charging (see the chapter on "Use", § "Equalisation charging").

During charging

When the charger is charging (Start/Stop switch on "1"), the display shows, in alternation, the main information for monitoring charging progress visually:

Without FMP energycom	With FMP energycom
Type of charger.	Type of charger, battery's voltage, capacity, operating temperature and serial number.
Programmed charging profile and one item information from the following table:	Charging profile of detected and one item of information from the following table:

Information displayed		
Sign	**Type of measurement**	**Example**
U	Battery voltage (V).	**26.1**
u	Voltage per cell (V).	**2.18**
I	Momentary charging current (A).	**71**
C	Capacity re-injected (Ah).	**218**
%	Percentage of current charge.	**66**
°C	Battery temperature.	**22**
T	Charging time spent in hours and minutes.	**03:36**
H	Estimated charging time remaining in hours.	**03**

The example shown below for information purposes indicates:

- 24V, 330 Ah battery, with 22°C parametered (without Fiamm Motive Power energycom) or picked up (with Fiamm Motive Power energycom).
- Charging profile parametered (without Fiamm Motive Power energycom) or picked up (with Fiamm Motive Power energycom).
- Equalisation requested on completion of charging (symbol ⎍).
- Current injected at the time.

On completion of charging

The display shows, in alternation:

Without FMP energycom	With FMP energycom
Type of charger.	Type of charger, battery's voltage, capacity, programmed operating temperature and serial number.
Programmed charging profile, charging time, capacity injected (Ah) and percentage of charge (100%).	Charging profile detected, charging time, capacity injected (Ah) and percentage of charge (100%).

An indicative example is shown above:
- 24V, 330 Ah battery, with 22°C parametered (without Fiamm Motive Power energycom) or picked up (with Fiamm Motive Power energycom).
- Charging time spent: 7h 34min.

Please refer to the chapter on "The Menus", paragraphs "Memo" or "Status", for details on the completion of charging information.

The Menus

Access to the menus

With the charger in the waiting position (Start/Stop switch on "0"), press the **OK** button. The display shows the main menu:

The icons
The various icons indicate the following:
- ↓ : Line after current line and no line above.
- ↑ : Line before current line and no line below.
- ↕ : Lines above and below the current line.
- ↵ : Press the **OK** button to access the selection.

The buttons' functions
These are as follows:
- ▼ or ▲: show the next or previous line.
- **OK**: enters the selected menu.
- ⏎ : exits the menu.

The accessible menus are:
- **MEMO**: the history of the last 100 charges.
- **STATUS**: display of the charger's internal counters.
- **CONFIGURATION**: access to the charger's parametering menus.

Memo

This shows the history of the last 100 charges.

Access
From the Main menu, select **MEMO** and press **OK**.

Screen called up
This, for instance, is as follows:

The display indicates that 21 charging operations have been memorised. **MEMO (1)** is for the last charge memorised. Once the one hundredth charge has been memorised, the oldest record is deleted and replaced by the next one in date order.

Displaying a historical record
Proceed as follows:
1. **Select a record using ▼ or ▲.**
2. **Display the record by pressing OK.**
3. **Read the information using ▼ or ▲.**
4. **Return to the Main menu by pressing ⏎.**

The information displayed

A historical record consists of 9 screens numbered **x.1 to x.9 (x** being the number of the record selected). For example:

>**MEMO** 1.2 signifies Memo record No. 1, Screen No. 2 (of 9).

Screen	Without FMP energycom	With FMP energycom
1	Empty line.	Battery's serial number (S/N: Serial Number).
2	Battery type, voltage and initial percentage of charge.	Battery type, voltage, capacity and initial percentage of charge.
3	Parametered battery temperature (see the "Config" section in this chapter).	Battery temperature memorised before charging.
4	Initial voltage and on completion of charging per cell and current on completion of charging.	
5	Capacity re-injected and charging time (hh:mm).	
6	Icon for the condition on completion of charging (Table A below) and type of fault (chapter on "Use", paragraph "Indications of faults").	
7	Empty line.	Empty line if no alert or display of the memorised alerts (Table B).
8	Empty line.	Number of charging/discharging cycles.
9	Coded indication of internal operation on completion of charging for the system's electronics.	

Icon	Condition on completion of charging
	Normal.
	Abnormal (voluntary interruption or interruption following a fault).

Table A: Icons for condition on completion of charging.

Icon	Type of alert
	Alerts present.
	Low electrolyte level alarm.
	Voltage balance alarm.
	Battery temperature alert.
	Equalisation charges missing.
	Excessive discharges.
	Number of average daily cycles too high.
	FMP energycom disconnected.

Table B: Alerts icons.

Status

This menu displays the status of the charger's internal counters (number of normal charges, equalisation charges, faults by type, etc.).

Access
From the Main menu, select **STATUS** and press **OK**.

Screen called up
This, for instance, is as follows:

The display indicates that this charger has performed 120 charging operations.

Displaying the counters
Proceed as follows:

1. **View each of the 8 statuses on the screen using ▼ or ▲.**
2. **Return to the Main menu by pressing** ⏎.

The information displayed
A status consists of 8 lines.

Indication	Information
Charge	Number of charging operations performed. This corresponds to the sum of lines 2 and 3.
	Number of charging operations terminated abnormally.
	Number of charging operations terminated normally.
Equal	Number of automatic equalisation charges performed by the charger.
DF1, etc.	Number of fault of types 1, 3, 4, 5 or 7*.
TH	Number of heat-related* faults.

(*): Please refer to the chapter on "Use", paragraph "Indications of faults" for the details.

Config

This menu accesses eight parametering menus for the charger.

Access
From the Main menu, select **CONFIG** and press **OK**.

Profile
This defines the type of battery connected to the charger from among different types (for example **Ionic, Gel or PNEU**). The selected profile is followed by a *.

Cable
This defines the characteristics of the battery-charger cable.

Lng
This defines the length of the cable. Select a length from the lengths offered.

Section
This defines the cable cross-section. Select a cross-section from those offered.

Egal/Equal
Only applicable to open lead/acid batteries. This defines the characteristics of an equalisation charge (delay before initiation and method of initiation – manual or automatic).

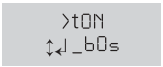
- **Dur:** this defines the duration of the equalisation charge (1 to 8 hours).
- **Delay**: this defines the delay before equalisation commences (1 to 8 hours).
- **Auto**: select **ON** for a equalisation charge launched automatically after charging is complete. Select **OFF** to prevent automatic equalisation on completion of charging.

Delayed charging
This defines the delay (1 to 8 hours) between charging being initiated and charging effectively starting. This delay enables you to make use of the "off-peak" tariff.

Repos / Rest
This defines the waiting time (1 to 12 hours) after completion of charging for stabilising the battery.

Temperature
This value is adjustable according to the battery technology.
- **With FMP energycom absent**, this defines the battery's average operating temperature before charging.
- **With FMP energycom present**, the battery's operating temperature is automatically defined. You are recommended to enter the value of the average temperature stated, particularly in cold areas.

Electro-valve
If present, this defines the opening time (15 to 120 seconds) for the electro-valve that automatically fills the batteries. This filling operation, activated on completion of charging, only concerns ionic profiles.



A 10-second test of the valve's operation is immediately activated on pressing the OK button. The operator therefore can check that the valve opens correctly.

Reset
Access to this procedure is reserved for Fiamm Motive Power technicians.

Use

Unpacking

The charger is supplied with the following components:
- A power cable 2 metres long.
- A battery cable 3 metres long.
- The present Operating Instructions.

Mechanical installation

The charger must necessarily be installed in a vertical position. The lower part of the charger must be at least 0.60m from the floor and/or the lower charger and the upper part must be 1.0m from the ceiling. The minimum distance between two chargers must be 0.30m. **You must necessarily avoid areas where the chargers may be splashed with water.** The area occupied by the charger is inside the fixing area. The charger must be held by 4 fixings suitable for the type of support.

Electrical connections

To the mains power supply
Connection to the single-phase 230V AC mains supply must only be by means of a standard socket and via a suitable circuit breaker (not supplied). The current consumed is indicated on the charger's information plate.

To the battery
It is essential that you observe the polarities. Reversing the polarity will cause the output fuse to blow, prohibition of charging and the display **of DF1**. Please refer to the paragraph on "Indications of faults" in this chapter.
The charger is connected to the battery via the cable supplied:

- RED cable: to PLUS battery terminal.
- BLACK cable: to MINUS battery terminal.

Charging the battery

It is accepted that the charger has been configured in accordance with the chapter on "The Menus", paragraph "Config". Charging can only be initiated when a battery that conforms technically (type, capacity, voltage) is connected to the charger.

Delayed charging
If the charger has been programmed for this (paragraph "Delayed charging"), charging will start after the period of delay; it will then proceed as described in the paragraph on "Initiating charging" below.

Initiating desulphating before charging
The desulphating of an open lead/acid **Ionic** profile battery is initiated:
- Either automatically with a heavily discharged battery; the duration is defined by the charger's electronics unit. The charging process will be initiated automatically at the end of the desulphating period. Proceed to the paragraph on "During charging".
- Or manually, as indicated below.

To initiate desulphating manually:
1. **Switch the Start/Stop switch to "0".**
2. **Hold down the** ⎍c **button.**
3. **Switch the Start/Stop switch to "1". Release** ⎍c **.**

- Desulphating is initiated for the programmed time (**"Egal/Equal" Menu**). The process for initiating charging must be started manually at the end of the desulphating period. Proceed to the paragraph on "During charging".

Initiating charging
1. **Switch the Start/Stop switch to position "1".**
   The display shows the information on the battery connected and counts down the time remaining before charging starts. Please refer to the chapter on "The Display", paragraph "On starting charging".

Once the countdown is finished, the display shows the information on the charging operation.
Faults **DF1** and **DF3** prevent charging. Please refer to the paragraph on "Indications of faults" in this chapter.

During charging
The display shows the information on the charging operation. Please refer to the chapter on "The Display", paragraph "During charging".

Completion of charging
1. **The green LED lights up on correct completion of charging**
   Any other indication on one of the 3 LEDs indicates a problem during charging. Please refer to the chapter on "Presentation", paragraph "The controls section", (Fig. 2, Refs. 4, 5 and 6).
   If the battery remains connected, in order to keep it charged, compensation charges followed by equalisation charges are initiated automatically according to the type of battery concerned.
2. **If an equalisation charge has been programmed (open lead/acid Ionic profile battery), this is initiated automatically.**
   Otherwise, an equalisation charge can be initiated manually; proceed to the paragraph on "Equalisation charges".
3. **If the green LED is flashing, the battery is in a resting phase.**
   Wait until the LED stops flashing.
4. **Switch the Start/Stop switch to "0".**
5. **Disconnect the battery, which is now ready for use.**

Equalisation charges
This only concerns open lead/acid **Ionic** profile batteries. Equalisation can be initiated either manually or automatically.

Manual initiation
1. **As soon as charging is complete (the green LED is permanently lit or flashing), press the** ⎍c **button.**

   Initiation of the equalisation charge is indicated by the message **"EA ="** (equalisation current) and **" EH ="** (equalisation time remaining).

2. **The battery will be available as soon as the green LED lights up (Fig. 2, Ref. 4).**

Automatic initiation
If the battery remains connected, in order to keep it charged, maintenance charges (compensation charges followed by equalisation charges) are initiated automatically according to the type of battery concerned. The same messages as for manual initiation are displayed (see above).

Display of historical records by charge

To access the information on each of the last 100 charges:

1. **Press the OK button to access the menus.**
   The Menus screen is displayed.
2. **Press the OK button.**
   The >**MEMO** line is selected.
3. **Use the ▲ and ▼ buttons to select the desired charging operation(s).**
   MEMO 1 corresponds to the last charging operation.
   Please refer to the chapter on "The Menus", paragraph "Memo" for the details.
4. **Return to the Main menu by pressing the button.**

Displaying the charger's history

To access the information regarding the charger's internal counters:

1. **Press the OK button to access the menus.**
   The Menus screen is displayed.
2. **Press the ▼ button once**
   The >**STATUS** line is displayed.
3. **Press the OK button.**
   The >**STATUS** line is selected.
4. **Use the ▲ and ▼ buttons to select the desired information.**
   Please refer to the chapter on "The Menus", paragraph "Status" for the details.
5. **Return to the Main menu by pressing the button.**

Indications of faults

The faults and their causes are defined as follows:

Fault	Cause	Remedy
DC	Appears before display of a DF1 fault.	
DF1	Charger or output fault (fault light permanently lit).	Check the mains voltage, the output fuse and that the battery is connected correctly (cablesreversed).
DF3	Unsuitable battery	Battery voltage too high or too low. Adapt the charger to the battery.
DF4	Battery capacity more than 80% discharged.	Non-inhibitive fault. Charging continues.
DF5	Battery requires inspection.	Non-inhibitive fault. Check the charging cables (cross-section too small), the battery battery lead connections (oxidisation, not tight enough) and the battery (defective cells).
DF7	Pneumatic mixing air circuit fault (the red light flashes).	Check the air circuit (pump, tubing).
TH	Heat-related fault causing charging to stop.	Check whether the charger's fan is working correctly and/or the ambient temperature is not too high or the charger is poorly ventilated.
STOP	Critical electrolyte level in the battery.	Fill the battery.

Technical characteristics

Information	
Display	LCD alphanumeric 2 lines each of 16 characters.
Display of the internal counters	Total number of charges, charges completed and not completed, number of equalisation operations, number of faults for each of the types and for heat-related faults.
Compensation	Automatic on completion of charging when the battery remains connected.
Desulphating	Manual or automatic after detection by the charger.
Equalisation	Manual or automatic.
Visual indicators	3 LED indicator lights: • Battery charged (green permanently lit) or battery in resting phase (flashing green). • Charging in progress (yellow). • Fault (red permanently lit) or detection of a current fault (flashing red).
Start/Stop	Commutator switch on the front surface.
Parametering	Via the menu and flexible buttons.
Rest	Programmable from 1 to 12 hours.
Filling (*)	Automatic, programmable from 15 to 120 s.
Charging delay	Programmable from 1 to 8 hours.
Equalisation delay	1 to 8 hours.
Flexible buttons	2 navigation buttons, 1 confirmation button and 1 double-function button (Abort/Equalis.)

(*) Optional.

Mechanical and electrical		
Mains supply	V	230 ±10%.
Frequency	Hz	50/60.
Current absorbed	A	See the information plate.
Mains supply and battery cables	mm^2	Depending on the charger.
Mains and battery fuse	A	Depending on the charger.
Battery voltage	V	24 or 36, depending on the model.
Charging current (depending on the model)	A	24V: 35 - 36V: 30 (Type 1) 24V: 40, 50, 60, 70 - 36V : 40, 50 (T2) 24V: 100 (T3)
IP protection		IP21.
Storage temperature	°C	-20 to +40.
Operating temperature	°C	0 to +40.
Weight	kg	Depending on the charger.
Overall dimensions (H x W x D)	mm	Type 1: 246 x 256 x 104 Type 2: 377 x 281 x 186 Type 3: 411 x 317 x 206
Fixing dimensions (H x W)	mm	Type 1: 203 x 245 Type 2: 280 x 268 Type 3: 355 x 304

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