



Technical manual

GB



**Fiamm Motive Power
Premium HF flex / com**

Contents

Warning	2
Aim of this manual.....	2
Guarantee.....	2
Recommendations.....	2
Electrical safety.....	2
Limitations on use.....	3
Destruction of the equipment.....	3
Improvements and modifications.....	3
Receipt - Storage.....	3
Replacement parts.....	3
Information plate.....	3
Glossary.....	3
EEC declaration of conformity.....	3
Introduction	4
Introduction.....	4
External components.....	4
Control panel.....	4
Menus	5
Menu access.....	5
Memory.....	5
Status.....	6
Configuration.....	6
Contrast.....	6
Backlight.....	6
Language.....	6
Use	7
Unpacking.....	7
Mechanical Installation.....	7
Electrical Connection.....	7
Factory configuration.....	7
Charging the battery.....	7
Display of the history per charging operation.....	9
Display of the charger's history.....	9
Fault messages.....	9
Technical characteristics.....	10

Warning

Aim of this manual

This manual is designed for use by any skilled worker wishing to use Fiamm Motive Power Premium HF com or Premium HF flex three phase battery chargers for recharging lead/acid unsealed 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.

Guarantee

The manufacturer covers the guarantee in accordance with the local regulations. Please contact your dealer for more detailed information.

Recommendations

This manual contains information and advice that should be followed by the operator to ensure his safety and maintain the equipment's safe condition.

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 but, nevertheless, should be cleaned of dust every six months by a qualified person.
- 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 unsealed lead/acid 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". Any adjustment, maintenance or repairs to the equipment while it is open must only 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.

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 unit, permanently mounted on the battery, ensures that certain battery parameters can be sent to the charger, with no additional cable required, for the purposes of optimising the charge and monitoring the charging and discharging characteristics.

Gel

A sealed battery with gellified 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 unsealed 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 the particular conditions required for recharging them 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.

Rest function

The Rest function prevents the battery from being disconnected for a pre-defined period to ensure a period of inactivity after charging.

EEC declaration of conformity

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



Introduction

Introduction

The Premium HF com and Premium HF flex range of chargers enable batteries to be recharged from the 3-phase mains supply. The Premium HF com chargers can recharge 24V, 48V or 80V batteries (depending on the version supplied). The Premium HF flex chargers can recharge automatically batteries in the following ranges 24-36-48V, 48-72-80V or 96V.

The microprocessor control automatically recognises the battery's voltage, capacity, state of charge, etc., providing optimum battery control from highly efficient analyses of its condition. Several charging profiles are available (for free electrolyte "unsealed lead/acid", sealed, gellified or "gel" battery types), depending on the user's configuration. Desulphation, equalisation and compensation charging cycles are available.

External components

The general components are shown below:

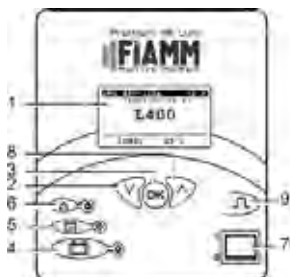


No.	Function
1.	Ventilation holes.
2.	Controls and monitoring devices (please see the next diagram).
3.	Mains power cable.
4.	Protective cover retaining screw.
5.	Wall mounting bracket.
6.	Battery cable.

Figure 1: The charger's general components.

Control Panel

This contains the display and the control buttons. Please refer to the Chapters on Menus and Use for details of the information shown.



No.	Function
1.	LCD graphic display.
2.	Menu navigation button (Up).
3.	OK button.
4.	Menu navigation button (Down).
5.	Red 'Fault' light. Unlit: no fault. Flashing: fault detection in progress. Permanently lit: fault.
6.	Yellow 'Charging in progress' light. Unlit: charger stopped. Lit: charging in progress.
7.	Green 'Charging completed' light (battery charged). Unlit: charger stopped or battery not available Flashing: relaxation phase. Permanently lit: battery available.
8.	Start-Stop switch.
9.	Button for exiting the menu, initiating equalisation and initiating desulphation.

Figure 2: The charger's controls.

Menus

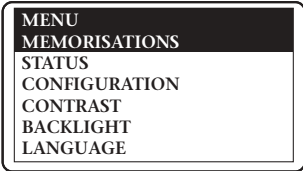
- The menus provide access to the following functions:
- View of the last 100 measurements (Memory Menu).
 - View of the fault and alarm statuses, etc. (Status Menu).
 - Charger configuration (Configuration Menu).
 - Parametering the contrast (Contrast Menu), the display's back-lighting (Backlight Menu) and the display language (Language Menu).

Menu access

The buttons' functions
The buttons have the following general functions:

Button	Function
▼ ▲	Menu navigation.
OK	Selects the active menu or confirms the entered value.
⏏	Closes the window.

Entering the password
When the charger is in the 'Waiting' position (Start-Stop switch on "0"), press **OK**. Enter the password using the ▼ / ▲ buttons until the valid number is displayed. The Main Menu is then displayed.



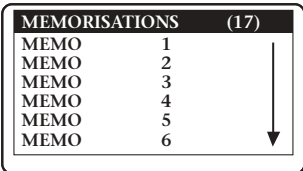
Each of the six menus available is detailed below. The current menu is automatically exited after one minute of inactivity or can be exited voluntarily by pressing the ⏏ button.

Memory

This presents the history of each of the last 100 charging operations.

Access
On the Main Menu, select **MEMORY** and press **OK**.

Call-up screen
The display shows here that 17 charges have been stored in memory (title line). **MEMO 1** is the latest charge memorised. After memorising the one-hundredth charge, the oldest record is deleted and replaced by the next oldest.

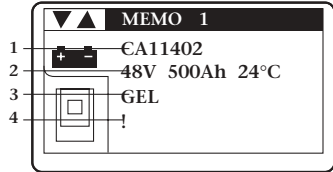


Displaying a history
Proceed as follows:

1. Select a record (MEMO x) using the ▼ / ▲ buttons.
2. Display the first History screen by pressing **OK**.
3. Display the second History screen by pressing ▼.
4. Return to the Main Menu by pressing ⏏.

The information displayed
The history is presented on two screens.

Screen No. 1 (Battery information)

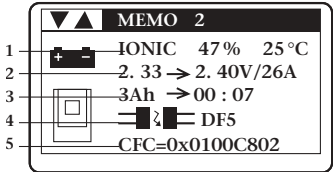


No.	Without FMP energycom	With FMP energycom
1.	Empty line.	Battery's serial number.
2.	Voltage and programmed operating temperature.	Voltage, capacity and temperature memorised before charging.
3.	Programmed type.	Detected type.
4.	Empty line.	Alarm symbol (Table A).

Symbol	Types of alarms
!	Alarms present.
⚡	Low electrolyte level alarm.
⚖	Voltage balance alarm.
⊖	Battery temperature alarm.
⏏	Equalisation charges missing.
⏏	Excessive over-discharges.
⌚	Average number of daily cycles too high.
⏏	FMP energycom disconnected.

Table A: Symbols for the types of alarms.

Screen No. 2 (Charger information)



No.	Without FMP energycom	With FMP energycom
1.	Type, percentage of charge and parametered temperature.	Type, percentage of charge and temperature memorised before charging.
2.	Voltage on starting and completing charging and current on completing charging.	
3.	Capacity restored and charging time (hh:mm).	
4.	Symbol for condition when charging complete (Table B) and type of fault, if present (see 'Fault messages' section).	
5.	Coded indication of the charge.	

The information on these screens can be reset to zero via the Reset line on the **Configuration** Menu.

Symbol	Condition when charging complete
	Normal.
	Abnormal (voluntary interruption or interruption following a fault).

Table B: Symbols for condition when charging complete.

Status

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

Access

On the Main Menu, select **STATUS** and then press **OK**.

Call-up screen

An example is presented below.

STATUS			
CHARGE	→ 20	DF1 →	0
	→ 6	DF2 →	0
	→ 14	DF3 →	0
EQUAL	→ 5	DF4 →	0
TH	→ 0	DF5 →	1
		DF7 →	0

The information displayed

The information on the screen can be reset to **zero** via the **Reset** line on the **Configuration** Menu.

Message	Information
Charge	No. of charging operations performed. This corresponds to the sum of lines 2 and 3.
	No. of charging operations terminated abnormally.
	No. of charging operations terminated normally.
Equal	No. of automatic equalisation operations performed by the charger.
TH	No. of thermal faults*.
DF1, etc.	No. of fault of types 1, 2, 3, 4, 5 or 7*.

(*) : See 'Fault Messages'.

Configuration

This menu provides access to the charger's 12 configuration menus.

Access

On the Main Menu, select **Configuration** and then press **OK**.

Profile

This defines the type of battery connected to the charger from among different types (for example **Ionic**, **Gel** or **PNEU**). To change the profile, press **OK**, select a profile from the list using the **▼ / ▲** buttons and confirm by pressing **OK**.

Temperature

This value is adjustable according to the battery technology.

- **Without FMP energycom:** it defines the battery's average operating temperature before charging.
- **With FMP energycom:** the battery's operating temperature is defined automatically. It is advisable to enter the average temperature recorded, particularly in cold areas.

Equal time

Only valid for unsealed lead/acid batteries. This defines the length of the equalisation operation (1 to 8 hours).

Delay equal

Only valid for unsealed lead/acid batteries. This defines the delay before equalisation (1 to 8 hours).

Auto equal

Only valid for unsealed lead/acid batteries. This defines the initiation method: manual or automatic. Select:

- **ON** for equalisation to start automatically on completion of charging.
- **OFF** to prevent automatic equalisation on completion of charging.

Delay charge

This defines the delay (1 to 8 hours) between the time charging is initiated and the time that charging effectively starts. This time delay enables you to take advantage of 'Off-Peak' tariff times.

Battery rest

This defines the waiting time (1 to 8 hours) after charging has finished to allow the battery to stabilise.

Electrovalve

This defines the opening time (15 to 120 seconds – Ionic and Pneumatic profiles only) of the electro-valve for filling the batteries automatically. When the **OK** button is pressed, a function test is immediately initiated for ten seconds. The operator can therefore check that the electro-valve is opening correctly.

Range

Only applicable for chargers of the Premium HF flex 48-72-80V type. This defines the battery charging voltage (48/72V or 48/80V).

Cable length

This defines the length of the cable battery-charger (1.0 to 10.0m).

Cable section

This defines the cross-section of the cable (battery-charger). Select a cross-section from the values offered (10, 16, 25, 35, 50 or 70mm²).

Reset

This reinitialises the Status and Memory counters after entry of the password.

Config version

This shows the charger's configuration version.

Contrast

This modifies the display's contrast. A zero value shows a white screen; a value of 100 shows a black screen. The optimum value depends on the ambient lighting conditions. If the messages on the display are unreadable (black or white screen):

1. Hold down and simultaneously.
2. When the LEDs flash (Fig. 2), adjust the contrast via the **▼ / ▲** buttons.
3. Confirm by pressing **OK**.

Backlight

This activates (**ON**) or deactivates (**OFF**) the display's backlighting.

Language

This selects the language displayed in the menus.

Use

Unpacking

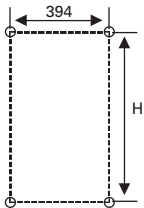
The charger is supplied with the following components:

- A 2m-long mains cable.
- A 3m-long battery cable.
- The present instruction manual.

Mechanical Installation

The charger must be mounted on the wall in a vertical position. For wall-mounted chargers (except type 4), the lower part of the charger must be at least 0.60m from the floor and/or the charger below and the upper part 1.0m from the ceiling. The minimum distance between two chargers must be 0.30m. **You must avoid areas where the chargers may be splashed with water.**

The charger is held by 4 M8 screws suitable for the type of support. The drilling pattern varies according to the model of charger. Follow the illustration below.



	H (mm)
Type 1	390
Type 2	540
Type 3	540
Type 4	(floor mounted)

Electrical Connection

To the three-phase supply

You may only connect to the 3-phase 400V AC mains supply via a standard socket and an appropriate circuit breaker (not supplied). The current consumption is shown on the charger's information plate.

To the battery

Polarity must be observed. Any reversal of polarity will block the output fuse, prevent charging and cause **DF2** to be displayed. Please refer to the Fault Messages section. The charger must be connected to the battery by the cables supplied:

- The RED cable: to the battery's POSITIVE terminal.
- The BLACK cable: to the battery's NEGATIVE terminal.

Factory Configuration

The charger is supplied with the following factory configuration:

Profile:	As per the order
Output cable length:	4 m
Configuration:	As per the order
Automatic equalisation selected:	No
Deferred charging activated:	No

- If no modification to the above is desired, please proceed directly to the section on 'Charging the battery'.
- If modification is required, go to the Configuration section.

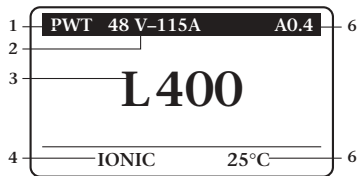
Charging the battery

When the charger has been configured in accordance with the Configuration section, it can only be started when a technically compliant battery is connected to it (type, capacity, voltage).

Display when not charging

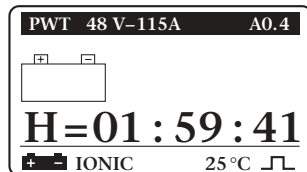
When the charger is in the waiting position (Start/Stop switch on "0") and the OK has not been pressed, the display shows the information regarding the charger (top and bottom lines):

1. Type of charger (**PWT** means **Premium HF com or Premium HF flex**).
2. Charger's characteristics.
3. 'Waiting' status message.
4. Previously selected charging profile.
5. Software version.
6. Selected operating temperature.



Initiating delayed charging

If the charger has been programmed in this way (Configuration Menu / Delayed Start), charging starts after the time delay set. The display shows the time remaining before charging starts.




Initiating desulphation before charging


Desulphation of an unsealed lead/acid battery:

- Either starts automatically when the battery is heavily discharged; the length of the desulphating operation is defined by the charger's electronics. The charging process is initiated automatically at the end of the desulphation period.
- Or is initiated manually, as shown below.

To initiate desulphation manually:

1. Set the Start/Stop switch to "0".

2. Hold down the  button.

3. Set the Start/Stop switch to "1". Release .

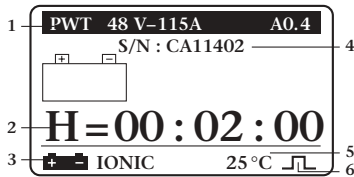
Desulphation is initiated for the programmed period ("Equal time" menu). The charging initiation process must be started manually on completion of the desulphation period.

Initiating charging

1. Set the Start/Stop switch to "1".

The display shows the information on the battery connected and counts down the time remaining before effective charging starts.

No.	Without FMP energycm	With FMP energycm
1.	Type of charger, software version.	
2.	Countdown for 2 minutes before charging effectively starts.	Countdown for 2 minutes maximum before charging effectively starts.
3.	Programmed charging profile – flashing during this phase.	Detected charging profile – flashing during this phase (*).
4.	Empty line.	Alternating display of the voltage, capacity and the serial number detected, as the information is received and alarms if present (*).
5.	Programmed operating T°.	Detected operating temperature (*).
6.	Equalisation symbol requested on completion of charging (see § Completion of charging with equalisation).	

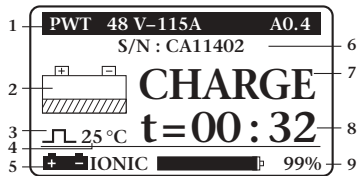


(*) As the information is received. Once the two-minute countdown is complete, the display shows the information regarding the charging operation. Proceed to the section on Effective Charging. Faults **DF1**, **DE2** and **DE3** prevent charging. Please refer to the section on Fault Messages.

Effective charging

A few moments after charging starts, the display shows the various charging details in alternation.

No.	Without FMP energycm	With FMP energycm
1.	Type of charger, software version.	
2.	Charging symbol.	Priority alarm if present.
3.	Equalisation requested on completion of charging.	
4.	Programmed operating T°.	Detected operating temperature.
5.	Programmed charging profile.	Detected charging profile.
6.	Empty line.	Alternation between the voltage, capacity, the serial number detected and alarms if present.
7.	Charging indicator.	
8.	Information updated and displayed cyclically. Please refer to Table C.	
9.	Percentage of charge.	



Information displayed		
Sign	Type of measurement	Example
U	Battery voltage (V).	26.1
u	Voltage per cell (V).	2.18
I	Instantaneous charging current (A).	55
C	Capacity restored (Ah).	71
t	Charging time spent (hh:mm).	03:36
H	Estimated remaining charging time (hours).	05
DF	No. of any fault occurring. See § Fault Messages.	DF5

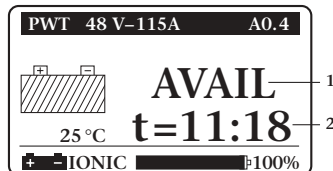
Table C: Symbols for the information displayed during charging.

Completion of charging without equalisation

1. The green light (Fig. 2, No. 7) illuminates when charging has been completed correctly.

The green 'charging complete' light (Fig.2, No. 7) is illuminated and the message **AVAIL** is displayed (1). The display shows, in alternation (2):

- The charging time taken.
- The number of amp hours restored.



Please refer to the sections on Memory or Status for details of the information on completion of charging. Any other visual indication from any of the three lights indicates a problem during charging. Please refer to the Control Panel section.

If the battery remains connected, in order to keep it charged, compensation and subsequent equalisation charging operations will be initiated automatically, depending on the type of battery.

2. **If an equalisation charging operation has been programmed (unsealed lead/acid battery), this is initiated automatically.**
If this is not the case, equalisation charging can be initiated manually: please refer to the section on Completion of charging with equalisation.
3. **If the green light is flashing, the battery is in its resting phase.**
Wait until the light stops flashing.
4. **Set the Start/Stop switch to "0".**
5. **Disconnect the battery, which is now ready for use.**

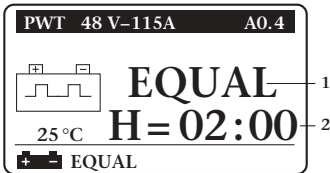
Completion of charging with equalisation

Equalisation only concerns unsealed lead/acid batteries. It can be initiated either manually or automatically.

Manual initiation

1. **As soon as charging is complete (the green light is permanently lit or is flashing - Fig.2, No. 7), press the  button.**

The messages **EQUAL I** = (equalisation current) and **EQUAL H** = (remaining equalisation time) (Nos. 1 and 2 below) indicate that equalisation has been initiated.



2. **The battery is ready for use as soon as the green light (Fig. 2, No. 7) illuminates.**

Automatic initiation

If equalisation has been programmed (Configuration Menu / Equal time, Delayed equal and Auto equal set to ON), equalisation charging is initiated automatically.

Furthermore, if the battery remains connected, in order to keep it charged, maintenance charges (compensation and subsequent equalisation charging operations) will be initiated automatically, depending on the type of battery. The same information as for manual initiation is displayed (see above).

Display of the history per charging operation

To display the memorised information and to reset it to zero, please refer to the Memory section.

Display of the charger's history

To display the history and to reset it to zero, please refer to the Status section.

Fault messages

Fault	Cause	Remedial action
DC	Appears before a DF1 fault is displayed.	
DF1*	Charger fault.	Check the power supply voltage.
DF2*	Output fault.	Check that the battery is correctly connected (that the cables are not reversed) and the output fuse.
DF3*	Unsuitable battery.	Battery voltage too high or too low. Connect the correct charger for the battery
DF4	The battery has been discharged more than 80% of its capacity.	Charging continues.
DF5	Battery requires inspection.	Check the charging cables (cross-section too small), the terminals (oxidisation, not tight) and the battery (defective elements).
DF7	Pneumatic mixing air circuit fault (the red light flashes).	Check the air circuit (pump, tubing).
TH*	Thermal fault resulting in interruption of charging.	Check that the fan(s) is (are) working correctly and/or that the ambient temperature is not too high or whether there is poor natural ventilation to the charger.
STOP*	Critical electrolyte level in the battery.	Fill the battery.

(*): A blocking fault preventing charging from continuing.

Technical characteristics

Please refer to the next page.

Technical characteristics

Premium HF com

		48 V - 75 A		48 V - 100 A		48 V - 115 A		48 V - 140 A		48 V - 170 A		80 V - 65 A		80 V - 85 A		80 V - 105 A		80 V - 120 A		80 V - 160 A	
Units		24V - 140 A	48 V - 75 A	48 V - 100 A	48 V - 115 A	48 V - 140 A	48 V - 170 A	80 V - 65 A	80 V - 85 A	80 V - 105 A	80 V - 120 A	80 V - 160 A									
Power supply voltage	V	400 ±10% tri	400 ±10% tri	400 ±10% tri	400 ±10% tri	400 ±10% tri	400 ±10% tri	400 ±10% tri	400 ±10% tri	400 ±10% tri	400 ±10% tri	400 ±10% tri	400 ±10% tri	400 ±10% tri	400 ±10% tri	400 ±10% tri	400 ±10% tri	400 ±10% tri	400 ±10% tri	400 ±10% tri	400 ±10% tri
Frequency	Hz	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60
Current absorbed	A	7	7	9	10	13	17	10	13	17	17	17	10	13	17	17	17	19	19	19	26
Power supply cable	mm ²	4 x 2.5	4 x 2.5	4 x 2.5	4 x 2.5	4 x 4	4 x 4	4 x 2.5	4 x 4	4 x 4	4 x 4	4 x 4	4 x 2.5	4 x 4	4 x 4	4 x 4	4 x 4	4 x 4	4 x 4	4 x 4	4 x 6
Power supply fuse	A	Protistor 20A	Protistor 20A	Protistor 20A	Protistor 20A	Protistor 20A	Protistor 30A	Protistor 30A	Protistor 30A	Protistor 30A	Protistor 30A	Protistor 30A	Protistor 20A	Protistor 30A	Protistor 30A	Protistor 30A	Protistor 30A	Protistor 30A	Protistor 30A	Protistor 30A	2 x Protistor 30A
Battery cable (1)	mm ²	25	25	25	25	50	50	50	50	50	50	50	25	50	50	50	50	50	50	50	50
Battery cable length	m	1 to 10	1 to 10	1 to 10	1 to 10	1 to 10	1 to 10	1 to 10	1 to 10	1 to 10	1 to 10	1 to 10	1 to 10	1 to 10	1 to 10	1 to 10	1 to 10	1 to 10	1 to 10	1 to 10	1 to 10
IP protection level		IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20
Operating temp.	°C	0 to +40	0 to +40	0 to +40	0 to +40	0 to +40	0 to +40	0 to +40	0 to +40	0 to +40	0 to +40	0 to +40	0 to +40	0 to +40	0 to +40	0 to +40	0 to +40	0 to +40	0 to +40	0 to +40	0 to +40
Display		LCD	LCD	LCD	LCD	LCD	LCD	LCD	LCD	LCD	LCD	LCD	LCD	LCD	LCD	LCD	LCD	LCD	LCD	LCD	LCD
Weight	kg	13	22	22	22	30	30	30	30	30	30	30	22	30	30	30	30	55	55	55	140
Dimensions (HxWxD)	mm	600x410x317	600x410x317	600x410x317	600x410x317	750x410x317	750x410x317	750x410x317	750x410x317	940x410x317	940x410x317	940x410x317	600x410x317	600x410x317	750x410x317	750x410x317	940x410x317	940x410x317	940x410x317	940x410x317	990x719x605

(1) Take the electrical installation into account when determining the actual cable cross-section.

Premium HF flex

		2004		2006		2008		2010	
Power supply voltage	V	400 ±10% tri	400 ±10% tri	400 ±10% tri	400 ±10% tri	400 ±10% tri	400 ±10% tri	400 ±10% tri	400 ±10% tri
Frequency	Hz	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60
Current absorbed	A	7	10	13	13	17	17	17	17
Power supply cable	mm ²	4 x 2.5	4 x 2.5	4 x 2.5	4 x 4	4 x 4	4 x 4	4 x 4	4 x 4
Power supply fuse	A	Protistor 20A	Protistor 20A	Protistor 20A	Protistor 30A	Protistor 30A	Protistor 30A	Protistor 30A	Protistor 30A
Battery cable (1)	mm ²	25	25	25	50	50	50	50	50
Battery cable length	m	1 to 10	1 to 10	1 to 10	1 to 10	1 to 10	1 to 10	1 to 10	1 to 10
IP protection level		IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20
Operating temp.	°C	0 to +40	0 to +40	0 to +40	0 to +40	0 to +40	0 to +40	0 to +40	0 to +40
Display		LCD	LCD	LCD	LCD	LCD	LCD	LCD	LCD
Weight	kg	30	30	30	30	30	30	30	55
Dimensions (HxWxD)	mm	750x410x317	750x410x317	750x410x317	750x410x317	750x410x317	940x410x317	940x410x317	940x410x317

(1) Take the electrical installation into account when determining the actual cable cross-section.

European Headquarters:

EnerSys EMEA

EH Europe GmbH

Löwenstrasse 32

8001 Zürich

Switzerland

Phone: +41 44 215 74 10

Fax: +41 44 215 74 11

www.enersys-emea.com