

amps  
Volts  
Hours  
Ah

S.P.E. ELETTRONICA  
INDUSTRIALE

# **ChargePlus** **FLEX**

**High Frequency Battery Charger**

Model #: 24-CBHF2M-3625FLEX



Attention: Read the user manual carefully before using the battery charger.

**User Manual**

**Important Safety, Installation, and Operation Instructions**

## **IMPORTANT SAFETY INSTRUCTIONS. KEEP THESE INSTRUCTIONS.**

**This manual contains important instructions for the safety of the user and operation of the device.**

### **GENERAL WARNINGS**

- 1) Before each use of the battery charger the instructions set out below must be carefully read and abided by.
- 2) The failure to follow these instructions and/or errors in installing or using the battery charger could lead to endangering the operator and/or damaging the device, voiding the manufacturer's guarantee.
- 3) The battery charger cannot be used as a component in systems which provide life support and/or medical devices, without explicit written authorization from S.P.E. ELETTRONICA INDUSTRIALE.
- 4) The battery charger must not be used by person with reduced physical, sensory, and mental capabilities or with lack of experience and/or knowledge, unless they are properly supervised and instructed by a person responsible for their safety.
- 5) The rating label must be visible after installation.

### **CHILDREN**

- 6) This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory, or mental capabilities or lack of experience and knowledge, if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.

### **WHERE TO INSTALL**

- 7) Never place the battery charger in the immediate vicinity of the battery in order to prevent gases produced and/or emitted by the actual battery during charging corroding and/or damaging the battery charger. Place the battery charger as far away from the battery as the length of cables permits.
- 8) Do not install the battery charger in a closed space or in such a way as to somehow prevent ventilation. For units equipped with fans, at least 30 mm clearance must be left around the vents. In order to facilitate the heat exchange of the battery charger it must be positioned vertically, exploiting the fixture holes (where provided).

- 9) Do not use the battery charger outdoors.
- 10) Do not expose the battery charger to rain, water splashes or steam.
- 11) Do not install the battery charger in caravans and / or similar vehicles.
- 12) Do not install the battery charger near any heat sources or in areas with high concentrations of dust.
- 13) Do not install the battery charger near any potential sources of flammable material, for example methane gas pipes or fuel depots (petrol, kerosene, ...).
- 14) Do not place and/or fit the battery charger onto surfaces manufactured out of combustible materials, like wooden shelves or walls.

## **BATTERIES**

- 15) Follow the specific safety instructions provided by the battery manufacturer carefully, for example, whether to remove cell caps during charging and the recommended charge rates.
- 16) Working in the vicinity of a lead-acid battery is dangerous, as batteries generate explosive gases during charging. Therefore, smoking and/or generating open flames and/or sparks must be avoided.
- 17) Never charge a frozen battery.
- 18) Batteries must be charged in specific, well-ventilated areas.
- 19) In order to reduce risk of injury only charge Lead–Acid, GEL or AGM type, Lithium Polymer or Lithium-Ion batteries. Do not charge other types of rechargeable or non-rechargeable batteries as they could explode causing damage and/or injury.

## **FURTHER SPECIFICATIONS FOR LITHIUM BATTERIES**

- 20) In order to charge Lithium Polymer and Lithium-Ion batteries, a BMS (Battery Management System) must always be used, comprising an active and passive safety system, in compliance with safety regulations in force.
- 21) The possibility of the BMS acting directly on the battery charger operation during cell balancing phases rules out, for any reason whatsoever, that the battery charger is held directly responsible should damage caused to the battery, or even a fire or an explosion, be due to an error in the BMS software.
- 22) The faculty offered by the materials produced by S.P.E. ELETTRONICA INDUSTRIALE to select different levels of voltage for charging, is entrusted to the control and supervision of the end user and S.P.E. ELETTRONICA INDUSTRIALE is not liable for any consequences resulting from the selection of the incorrect level of voltage. If in doubt, the user should ask a qualified professional for clarification.

- 23) The battery charger tolerance thresholds, as far as levels of over-voltage and overcharging are concerned, are used only for the safeguarding of the systems of the same and have no safety functions for the battery itself, the safety of which depends solely on the BMS, even when the battery charger is connected to the battery, whether the latter is being charged or not.
- 24) Should the client want to use the battery charger on a specific on-board system or in any special usage case, it is the client's responsibility to inform S.P.E. ELETTRONICA INDUSTRIALE, so that the latter can draw up any necessary recommendations. In this case, the client must provide S.P.E. ELETTRONICA INDUSTRIALE with all designs, diagrams, and descriptive material necessary. S.P.E. ELETTRONICA INDUSTRIALE cannot be held responsible for any damage resulting from the use of the battery charger after opening it and/or modifying it and/or inserting it into other systems.
- 25) Under no circumstances can S.P.E. ELETTRONICA INDUSTRIALE be held responsible for the malfunctioning of the batteries or the incineration/explosion of these, in so much as the safety of the battery is the task of the BMS and not of the battery charger.

### **CHECKING CABLES, GRID, EARTHING**

- 26) Do not transport the battery charger by pulling on the cables as they could be damaged. Use the handles on the battery charger, if provided.
- 27) Before using the battery charger, check that the sleeving on the mains cable and battery cables are in good condition. Should one of the cables be damaged, have it replaced by a S.P.E. ELETTRONICA INDUSTRIALE qualified technician.
- 28) Check that the input voltage of the battery charger given on the data plate is in line with the voltage available.
- 29) Check the compatibility of the mains plug supplied with the battery charger: the use of adaptors is not recommended (*in Canada it is against the law*). This charger is provided with cord set for connection to outlets operating at nominal 120 Volts (or 240 Volts as appropriate). If the input plug does not fit the power outlet, contact S.P.E. ELETTRONICA INDUSTRIALE for the proper cord set terminating in an attachment plug of the proper configuration for the power outlet.
- 30) The battery charger must be plugged into a socket fitted with an earth wire. Should the socket not be equipped with an earth connection, do not use the device before having a suitable socket installed by a qualified technician.
- 31) The power socket to which the battery charger is to be connected must

be protected by an electrical device by law (fuse and/or automatic cut-out), capable of absorbing an electrical current equaling the absorption of current stated on the matriculation number of the battery charger, increased by 10%.

- 32) Do not open the battery charger as there are no parts which can be serviced and/or replaced by the user. Only specialized personnel, authorized by S.P.E. ELETTRONICA INDUSTRIALE may carry out servicing which involves opening the actual device. Electrical/electronic components inside may cause electric shocks even if the device is not plugged in.

### CHECKING BATTERY CHARGER OPERATION AND CURVE

- 33) **Before charging, make sure that the battery charger is in line with the voltage of the battery, that the charging current suits the capacity of the battery and that the selected charging curve (for lead-acid batteries, or for airtight GEL or AGM type batteries, Lithium Polymer or Lithium-Ion batteries) is correct for the type of battery to be charged.**
- 34) We recommend unplugging the battery charger from the mains supply before connecting and disconnecting batteries.
- 35) During normal operation of the battery charger, the external surface may become hot and may remain so for a length of time after it has been switched off.
- 36) The battery charger needs no special maintenance, only regular cleaning procedures, to be carried out according to the type of working environment. Cleaning procedures should only be carried out on the external surface of the battery charger. Before starting any cleaning procedures, the mains supply cable and battery cables must be unplugged. Do NOT use water and/or detergents in general and/or pressure washers of any kind when carrying out cleaning.
- 37) If safe operation of the battery charger can no longer be ensured, stop the device, and ensure that it cannot be put back into operation.
- 38) The specifications set out in this manual are subject to change without notice. This publication replaces any previously supplied information.

**Battery type** = 80 – 280Ah C5 (130 – 350Ah C20) LEAD-ACID, GEL, AGM, LITHIUM

**Number of cells** = 6 – 12 – 18 – 24

**Storage temperature:** from -20°C to +50°C (from -4°F to 122°F)

**Relative humidity:** 0 – 80% up to 50°C (0 - 80% up to 122°F)

**Operating temperature:** from 0°C to 45°C (from 32°F to 113°F)

**Programmable Charging Profiles are:**

INDEX	CURVE
1	MK AGM
2	Acid Wet
3	Zenith AGM
4	Acid Wet Float
5	Fullriver AGM
6	Haze GEL
7	PzV GEL
8	Optima 12V
9	Sonnenschein
10	Optima AGM
11	Discover AGM

# BATTERY CHARGER IDENTIFICATION LABEL

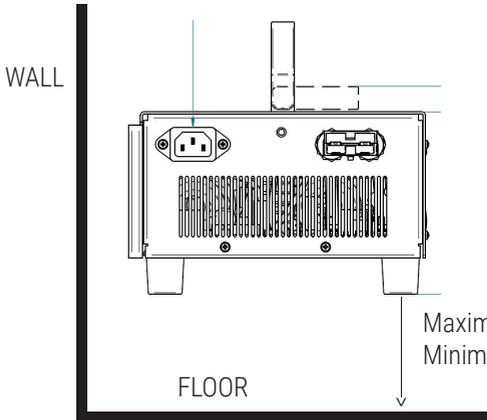
<b>S.P.E. ELETTRONICA INDUSTRIALE</b>		<b>L</b>	<b>CE</b>
Mod. <b>A</b>	Ser <b>B</b>	Dat. <b>C</b>	
Input: <b>D</b>	Max Input Current: <b>H</b>		
Output: <b>E</b>	Fuse: <b>F</b>		
Charging Curve: <b>G</b>	Batt: <b>I</b>		
N° CELLS: <b>M</b>			

<b>S.P.E. ELETTRONICA INDUSTRIALE</b>		<b>M</b>	<b>CE</b>
CP/N: <b>A</b>			
P/N: <b>B</b>			
Model: <b>C</b>			
Input: <b>D</b>			
Output: <b>E</b>			
Battery Type: <b>F</b>			
Setting: <b>G</b>			
Date: <b>H</b>			
S/N: <b>I</b>			
WARNING: <b>L</b>			

A	MODEL
B	BATTERY CHARGER SERIAL NUMBER
C	BATTERY CHARGER MANUFACTURE DATE
D	INPUT VOLTAGE
E	OUTPUT VOLTAGE AND CURRENT
F	MAIN FUSE VALUE
G	CHARGING CURVE
H	MAINS ABSORPTION
I	BATTERY CAPACITY RANGE
L	PRODUCT CERTIFICATION STAMPS
M	NUMBER OF CELLS

A	CUSTOMER PART NUMBER
B	PART NUMBER
C	MODEL
D	INPUT VOLTAGE AND MAINS ABSORPTION
E	OUTPUT VOLTAGE AND CURRENT
F	BATTERY TYPE - NUMBER OF CELLS
G	SETTING
H	BATTERY CHARGER MANUFACTURE DATE
I	BATTERY CHARGER SERIAL NUMBER
L	WARNING
M	PRODUCT CERTIFICATION STAMPS

## WALL - MOUNT INSTALLATION



Drill two or four holes into the wall and fasten charger with 2 or 4 screws. Do not tighten the screws all the way so that the charger can hang on the screws.

Maximum height 150cm (59 1/16")  
Minimum height 30cm (11 13/16")

## ELECTRONIC BATTERY CHARGER - OPERATING MANUAL

### CONTROL COMPONENTS

#### The display shows:

- Charging current (A)
- Battery voltage (U)
- Amp-Hours returned (C)
- Elapsed time (h)
- Active charge profile is displayed when ▲ button is pressed.
- To enter the charging parameter menu, see **CHARGING SETTINGS**.

### OPERATION

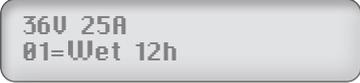
Connect the AC power cable supplied with the battery charger to the charger. Connect the battery to the charger with the correct polarity. Then, plug the AC power cord into the wall receptacle.

The LCD display of the battery charger will now show, in sequence, information related to the internal programming of the charger: the software version installed on the charger (e.g., Ver 009-008-001):

Ver: 009-008-001

On the next screen, the LCD will display the parameters for:

- Battery voltage
- Charging current
- Number and type of charging curve

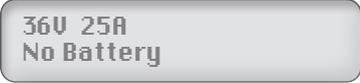


36V 25A  
01=Wet 12h

A test is conducted on the battery voltage to decide whether or not to start the charging process.

If the battery is not connected to the charger, the display shows *"No Battery"*. This message remains on the display, if the test is unsuccessful. The same message is displayed in the case of:

- Reversed polarity
- Battery in short circuit
- Battery voltage is lower than 3V



36V 25A  
No Battery

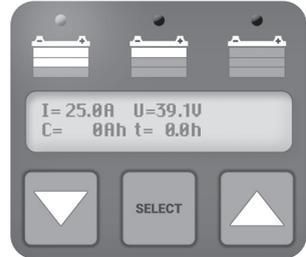


If the battery test is still unsuccessful, the charger continues to check the voltage on the battery cables until it detects an acceptable condition.

If the test is successful, the battery charger displays the battery voltage before starting the charge, then displays the current value (**A**), the voltage (**V**), Recharged Capacity (**C**) and Time Elapsed from the start (**t**) Indicating that the charging is in progress by turning on the red LED.

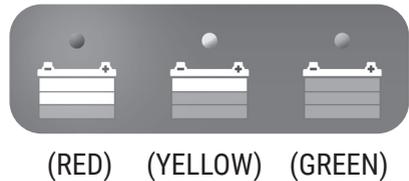


Shown below is an example of what the battery charger display looks like after a successful start:



The progress of the charging cycle is also indicated by three LEDs:

- DL3 = display LED 3 (RED)
- DL2 = display LED 2 (YELLOW)
- DL1 = display LED 1 (GREEN)

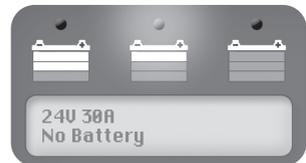


## CHARGING SETTINGS

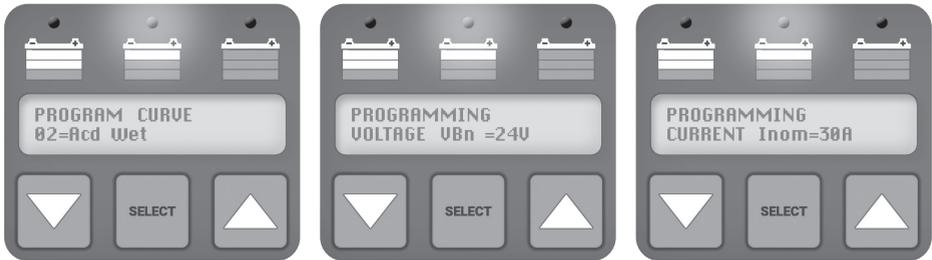
To set the charger in relation to the battery that needs to be charged, it is necessary to carry out a few steps. Please note, only a service technician should perform these functions!

The charging curve is set when the battery charger is not connected to the battery.

To enter the programming menu, disconnect the battery and once "No Battery" message appears, press, and hold the ▲ and ▼ keys together for 10 seconds (the yellow DL2 LED ON indicates the programming phase).



You can now use the keys to scroll through the various parameters. The following parameters can be changed: Type of curve, Voltage, and Current.



After selecting the parameter, you want to change, press **SELECT** to activate the option to edit the value (indicated by the red DL3 LED that turns on) and use the ▲ and ▼ keys to set the desired value.



Press **SELECT** again to confirm the set value (the red DL3 LED will turn off).



After setting the values, exit the setup menu by selecting "Programming Save and Exit" and press **SELECT** so that the display shows "PARAMETERS SAVED" and the parameters are saved in EEPROM.



*If the operator has entered the programming section and is still in it without operation, the battery charger automatically goes back to the display showing the charging status after about 30 seconds.*

## LED MESSAGES DISPLAYED

Ref.	Messages reported	DL3 LED (Red)	DL2 LED (Yellow)	DL1 LED (Green)
Start	Auto-start execution	OFF	OFF	OFF
F1	Phase 1: Initial charge at constant current	ON	OFF	OFF
F2	Phase 2: Final charge at constant voltage	ON	OFF	OFF
F3_I (*)	Phase 3: Final charge at constant current	OFF	ON	OFF
F3_U (*)	Phase 3: Final charge at constant voltage	OFF	ON	OFF
F4	Charging complete	OFF	OFF	ON

Where:

OFF = the LED is off

ON = the LED is steady

BLK = the LED is blinking

Note (\*): The sequence of phases and relative messages varies according to the curve.

## ERROR MESSAGES ON THE DISPLAY

In the event of anomalies, the following error codes may be displayed.

ERROR CODE	PROBLEM	SOLUTIONS
Srt:IB > IBmax	The output current has exceeded circuits the nominal current value by more than 10%.	Make sure there are no short circuits on the battery or the battery cables or there is an active load on the battery that draws more current than the charger can provide.
E01: Open Circuit	The current suddenly went to zero unexpectedly.	Check the connection of the clamps to the battery and check the voltage of the battery elements to make sure that there are no elements in an open circuit condition. The charger starts again after 5 seconds.
E02: Temperature	The internal thermal sensor has detected high temperature.	Use the charger in a well-ventilated area.
E03: Timer	The safety timer of one of the phases has been activated.	Make sure that a suitable charging current has been set for the battery capacity and that the selected voltage corresponds to the voltage of the battery. Also, make sure that there are no elements in short circuit and that the battery is not sulphated.

REF.	MESSAGES REPORTED	DL3 LED (Red)	DL2 LED (Yellow)	DL1 LED (Green)
	Phase timeout or too much current	BLK	OFF	OFF
	No Battery	OFF	BLK	OFF
	Inversion of polarity	OFF	BLK	OFF
	Battery in Short Circuit	OFF	BLK	OFF
	Incorrect Battery Voltage	OFF	BLK	OFF
	Over temperature error	BLK	OFF	OFF
	Corrupted charging profile	BLK	OFF	OFF

Shown is an example of how an “E02: Temperature” error will be displayed.





## CE DECLARATION OF CONFORMITY

We

S.P.E. ELETTRONICA INDUSTRIALE DI POLETTI SERGIO  
Via di Mezzo Ponente, 383 – 40014 Crevalcore (Bologna) ITALY

Declare under our sole responsibility that the product:

**ELECTRONIC AUTOMATIC BATTERY CHARGER MODEL:**

**CBHF2-M 12-15, CBHF2-M 12-20, CBHF2-M 12-25, CBHF2-M 12-30  
CBHF2-M 24-15, CBHF2-M 24-20, CBHF2-M 24-25, CBHF2-M 24-30  
CBHF2-M 36-15, CBHF2-M 36-20, CBHF2-M 36-25  
CBHF2-M 48-15, CBHF2-M 48-20**

to which this declaration applies, complies with the provisions of the Directives of the Council of the European Union on the approximation of the laws of the members states:

Relating electromagnetic compatibility (EMC) directive 2014/30/EC of the European Parliament and of the Council of 26 February 2014 on the approximation of the laws of member states relating to electromagnetic compatibility and repealing directive 89/336/EEC, conformity is proven by compliance with the following standards:

- ✓ EN 55014-1:2017 (Emission)
- ✓ EN 55014-2:2015 (Immunity – Category II)
- ✓ EN 61000-3-2:2014 (Harmonic Current Emission)
- ✓ EN 61000-3-3:2013 (Voltage Fluctuation and Flicker)

Relating extra low voltage (LVD) directive 2014/35/EC of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of member states relating to electrical equipment designed for use within certain voltage limits, conformity is proven by compliance with the following standards:

- ✓ EN 60335-1:2010+A1:2013+A2:2016  
"Safety of household and similar electrical appliance - Part 1: General requirements".
- ✓ EN 60335-2-29:2016  
"Safety of household and similar electrical appliance - Part 2: Particular requirements for battery chargers".
- ✓ EN 62233:2008  
"Measurement methods for electromagnetic fields of household appliances and similar apparatus with regard to human exposure".

Crevalcore 04-06-2021

Sergio Poletti  
President



In case you need help with S.P.E.'s chargers you already have and use – like technical assistance, repairs due to faults or replacements, contact:

**Flight Systems Industrial Products (FSIP)**

1015 HARRISBURG PIKE – CARLISLE, PA 17013

WEBSITE: [www.shop.fsip.biz](http://www.shop.fsip.biz) | PHONE: 1-800-333-1194

Or

**Flight Systems Industrial Products (FSIP)**

**MIDWEST BRANCH**

80 S. FAIRBANK STREET STE 7

ADDISON, IL 60101

1-800-804-5711

**Always remember to provide the serial number and the manufacturing date of the chargers.**

