



“HF7”



3 kW Single-phase Version with PBM205 control board,



- USER MANUAL -



Before connecting the battery charger to the mains supply and to the battery, **CAREFULLY READ THE FOLLOWING INSTRUCTIONS.**



WARNING! This product is in compliance with **EMC** standards in class A as defined by the CEI EN 61000-6-4 (2002) and CEI EN 61000-6-2 (2002) regulations, therefore for use in an **INDUSTRIAL ENVIRONMENT.**



High Frequency “HF7” Battery Charger

A) INSTALLATION / USE / FUNCTION

To use the battery charger, safety rules included in laws, regulations and orders proclaimed by local authorities must be observed.

“User” duties: based on the present instructions, the “user” is any physical person or corporate body that directly utilizes the P.B.M. S.r.l. charging appliances, or he/she who utilizes them on account of said person or body. In particular cases, for example leasing or rental, the “user” is the person that, based on agreements between owner and user of P.B.M. S.r.l. charging appliances, takes on the following duties.

The “user” will be responsible for the location where the appliance will be used. He/she will have to check if particularly sensitive appliances are disturbed by the influx of the battery charger. The place of use must be chosen so that engagement of the appliance (a continuous elevated current creates magnetic fields of interference) does not compromise the functioning of electromagnetic appliances and magnetic data storage devices (such as pace-makers, monitors, disks and magnetic disks, magnetic tape, magnetic boards, watches, etc.).

The “user” must ascertain that use of the P.B.M. S.r.l. charging appliances is in compliance with enforced laws, that any action that may cause danger to the life and health of the user or other parties is avoided, aside from avoiding damage to objects.

The “user” must ascertain that the users and operators have read and understood the present instructions and observe the regulations for industrial accident prevention, the safety rules from the technical point of view and the use and maintenance regulations.

B) INSTALLATION AND SAFETY INSTRUCTIONS

Before connecting the battery charger to the mains supply and to the battery, **CAREFULLY READ THE FOLLOWING INSTRUCTIONS.**

- **FOR CORRECT FUNCTIONING AND IMPROVED YIELD, THE BATTERY CHARGER MUST BE POSITIONED ON THE WALL IN THE CORRECT DIRECTION AND FIXED WITH PLUGS THROUGH THE RELATIVE SLOTS; PAY ATTENTION NOT TO OBSTRUCT THE VENTILATION SLOT HOLES.**
- Only specialized and authorized staff may execute work that requires opening the battery charger.
- Before employment of the battery charger, isolation of the electric cable and the battery connectors must be verified.
- Only well trained personnel must use electric appliances.
- Disconnect the mains supply before connecting or disconnecting the battery.
- **WARNING !!** The charging battery generates explosive gas, therefore smoking is absolutely prohibited in its vicinity; open flames and/or sparks as well as vicinity to other appliances that may cause risky and dangerous situations for people or objects must be avoided.
- This battery charger contains electrical components which may produce voltaic arches and sparks, therefore if used in enclosed places it must be located in an appropriate area for its needed use; in any case the standard battery charger (IP 20) must be used in enclosed and well ventilated location, not exposed to rain and/or water sprinkles, set on solid and level pavement; also dusty areas, areas with fountains of water or heating as well as humidity must be especially avoided. It is also prohibited to place the battery charger on wooden objects and/or shelves as well as other inflammable materials, to accumulate various kinds of materials in the vicinity of the battery charger and to place any kind of object or liquid containers on the lid.
- To prevent dangers of electrocution, the battery charger **must be connected to a current socket connected to the ground.** Moreover, the current socket to which the battery charger will be connected must be proportionate to the power of the same and must be protected by appropriate electric equipment in compliance with standards (fuses or automatic switch). For sufficient selectivity, the protection must have calibration of at least 10 % over the equipment current absorption. Moreover, the appliance must be protected from contact voltage that is too high, in compliance with the provisions envisioned by Local Authorities.



- It is recommended to use relevant bi-polar connectors in compliance with Standards without the possibility of inversion of the polarity on the battery; also check the correct connection of the cables in the connector contacts (a poor state of the connectors due to oxidation of electric contacts may cause dangerous situations such as sparks or fire hazard).
- The use of additional cables to extend the present electric connections must be absolutely avoided.
- It is advised to constantly check the usage state of the battery to be charged, and to only use batteries in good state.
- Any modification to the P.B.M. S.r.l. charging appliance, particularly to the security systems, is prohibited.
- In case of problems of an electric nature, only specialized personnel should intervene to substitute malfunctioning components with others having the same characteristics and authorized by the manufacturer.
- It is advised to periodically check all the internal electric connections ascertaining that the cables and cable terminals do not show signs of overheating due to faulty contact; also remove all eventual dust accumulations (particularly on the contactor and mobile parts).
- The P.B.M. S.r.l. charging device does not need particular maintenance, aside from the normal cleaning regime which must be carried out regularly and periodically based on the type of work environment. Before beginning to clean the appliance, it is necessary to disconnect the mains supply cable and the battery connection cables.

C) CONNECTION TO MAINS

It is essential to connect to a current socket proportioned to the power of the installed battery charger:

- If it is an extended range battery charger: **SINGLE-PHASE 100-240VAC $\pm 10\%$ / 50-60Hz (2 poles + earth).**
- If it is a reduced range battery charger: **SINGLE-PHASE 208-240VAC $\pm 10\%$ / 50-60Hz (2 poles + earth).**

Warning: to verify the range consented for the battery charger, check the registration data, since an inappropriate mains connection not within the indicated range would determine irreparable damage to the battery charger.

Also be sure to correctly connect the **earth conductor**.

MODEL		Active Power	Absorbed Current (230 V)	AC Fuse	MAINS CABLE
		(W)	(A)		mm²
24	50	1714	7,4	GG 10	3x2,5mmq
24	60	2057	8,9	GG 10	3x2,5mmq
24	70	2400	10,4	GG 12	3x2,5mmq
36	30	1543	6,7	GG 8	3x2,5mmq
36	40	2057	8,9	GG 10	3x2,5mmq
36	45	2314	10,0	GG 12	3x2,5mmq
48	25	1714	7,4	GG 10	3x2,5mmq
48	30	2057	8,9	GG 10	3x2,5mmq
48	35	2400	10,4	GG 12	3x2,5mmq
48	40	2743	11,9	GG 15	3x2,5mmq
72	15	1543	6,7	GG 8	3x2,5mmq
72	20	2057	8,9	GG 10	3x2,5mmq
72	25	2571	11,2	GG 15	3x2,5mmq
80	10	1143	5,0	GG 6	3x1,5mmq
80	15	1714	7,4	GG 10	3x2,5mmq
80	20	2286	9,9	GG 12	3x2,5mmq
80	25	2857	12,4	GG 15	3x2,5mmq

D) CONNECTION TO THE BATTERY

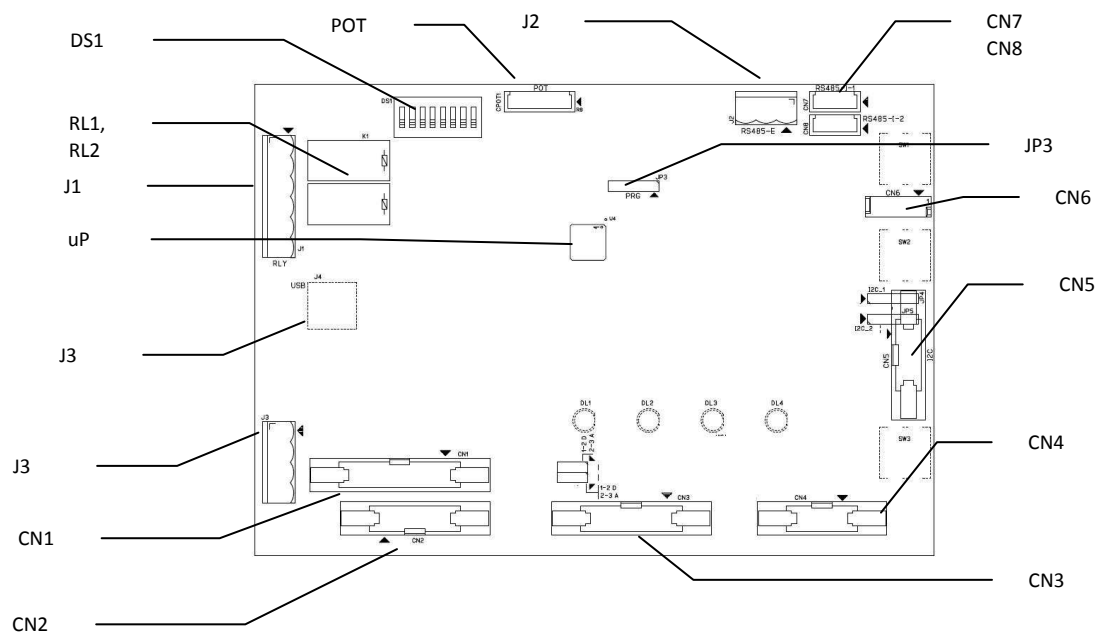
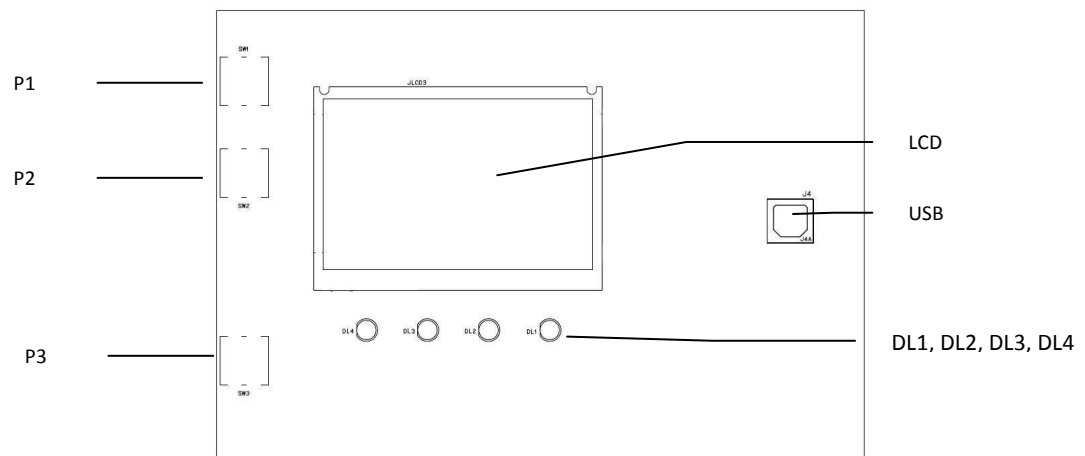
It is recommended to use relevant **bi-polar** connectors in compliance with Standards without the possibility of inversion of the polarity on the battery; also check the **correct connection of the**



cables in the connector contacts.

Only specialized personnel must take part in this activity.

E) DESCRIPTION OF PBM205 CONTROL BOARD



Where:



P1 (SW1): SETUP / UP/INCREASE: enables to access menus, move, modify/increase a parameter

P2 (SW2): PARAMETERS / DOWN/DECREASE: enables to visualize the charge parameters, modify/decrease the parameters

P3 (SW3): ON/OFF, SELECT, CONFIRM: enables to suspend or restart the charge in progress, select a menu, confirm the value of a parameter

DL1: green LED signal **Battery connected (green)**

DL2: yellow LED signal **Final charge in progress (yellow)**

DL3: green LED signal **End of charge (green)**

DL4: red LED signal **Anomaly (red)**

LCD: graphic display with multi-function liquid crystals

USB: USB port for remote reading and visualization of charging data in storage

uP: microprocessor

JP3: Micro-controller programming connector

J1: Relay RL1 and RL2 connector

CN1: FLAT connector 20 connection ways to the CSP203 CPU board for control signals

CN2: FLAT 14 connection ways to the CSP203 CPU board for auxiliary signals

CN3, CN4: FLAT connectors used on other models

CN5 (JP4, JP5): Connectors for I2C protocol expansion boards

CN7, CN8: Connectors for internal RS485 serial (used for connection of more CSP205 boards in MASTER/SLAVE configuration)

J2: Connector for external RS485 serial (of connection between battery charger and external control system)

CN6: Connector for expansion on LED/Remote buttons panel

LCD DISPLAY

The LCD display on the PBM205 board is a graphic 64 lines x 128 columns LCD and is used to visualize up to 8 lines for 20 columns.

During switching on of the board, the display is completely switched on, and then a window will appear displaying the following:

```

      *PBM*
*** Alfa Progetti ***
* [---- HF205 ----] *
BIOS: HF205   -V6.4
FW: b1.21-31.05.2010
    
```

- Version of BIOS
- Version and release date of FW

The display below will follow:

```

48V / 40A

CURVA N.5
ID_C=5000PB.

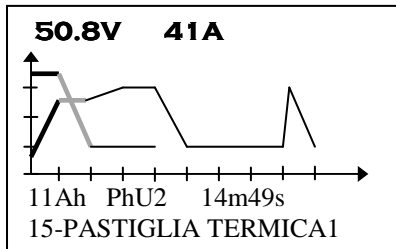
HDW  0=HF1KN   PBM
P3->INFO FW-BIOS
    
```

- Size of the battery charger
- Selected charge curve



- Charge curve identification code
- Model of HW

This monitor page will follow:



Containing the following information:

- Voltage and current of battery
- Stylized graph of the charge curve with indication of Voltage and Current levels:
 - o The **thick line** indicates the completed phases
 - o The **flashing line** indicates the phase in progress
 - o The **thin line** indicates the phases yet to be completed
- Indication of :
 - o Ah charged since beginning of charge
 - o Indication of the phase in progress
 - o Indication of the total charge time
 - o Indication in rotation of eventually active Anomaly messages

A) VISUAL SIGNALS

Ref. N.	SIGNALS	DL4 LED (green)	DL3 LED (yellow)	DL2 LED (green)	DL1 LED (red)
S1	Battery only supply	OFF	OFF	OFF	OFF
S2	Mains only supply	OFF	OFF	OFF	OFF
S3	Mains and battery supply	ON	OFF	OFF	OFF
S4	Autostart Execution	BL	BL	BL	BL

F1	Phase 1 – Initial Charge	BL	BP1	OFF	OFF
F2	Phase 2 – Final Charge CF1	BL	BN1	OFF	OFF
F3	Phase 3 – Final Charge CF2	BL	BN2	OFF	OFF
FX	Phase X – Final Charge CF(x-1)	BL	BN(x-1)	OFF	OFF
DE	Charge finished or equalization pause	ON	ON	ON	OFF
IE/UE	Charge in equalization on steady current	BL	BN1	ON	OFF
	Charge in equalization on steady voltage				OFF

OFF = LED is switched off
 ON = LED is on without flashing
 BL = LED flashes (Blink, T=1 second)

BP1 = LED switched off with 1 switching on blink
 BP2 = LED switched off with 2 switching on blinks
 BPx = LED switched off with x switching on blinks

BN1 = LED switched on with 1 switching off blink
 BN2 = LED switched on with 2 switching off blinks
 BNx = LED switched on with x switching off blinks

BV = LED flashes rapidly (Blink, T=0.2 seconds)
 - - = LED may be in any condition

F) DETAILED DESCRIPTION OF ANOMALIES

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ID	ANOMALY	description	TYPE	DL1V	DL2G	DL3R
----	---------	-------------	------	------	------	------



0	OK STATE	No anomaly	OK	---	---	---
1	EEPROM XX ANOMALY	EEPROM anomaly n.XX	BLOCKING A.	BLINK T=2"	BLINK T=2"	ON
2	I2C-1 MEM ERROR	I2C-1 line not responding to commands	BLOCKING A.	---	---	ON
3		available		---	---	---
4		available		---	---	---
5		available		---	---	---
6		available		---	---	---
7		available		---	---	---
8	USB COMM. ERROR	Communication error on USB line	MESSAGE	---	---	---
9				---	---	---
10				---	---	---
11	POLI BATT. INVERT	Inversion of battery connection	BLOCKING A.	---	---	ON
12	BATTERY STOP	Battery abruptly detached	BLOCKING A.	---	---	ON
13	BATTERY FUSE	Interrupted battery fuse	BLOCKING A.	BLINK T=1"	BLINK T=1"	ON
14	CHARGE TIMEOUT	Global security timer intervention	BLOCKING A.			ON
15	THERMAL PAD	Overtemp. dissipators from thermal pad	NON-BLOCKING A. 3T	---	---	BLINK T=1"
16	MISSING MAINS	Absent mains power supply	NON-BLOCKING A.	---	---	BLINK T=1"
17	CURRENT < MINIMUM	Current below minimal level for charge	NON-BLOCKING A.	---	---	---
18	DRIVER DOES NOT OPEN	Power open (no current supply when on)	BLOCKING A.	BLINK T=0,2"	BLINK T=0,2"	ON
19	DRIVER DOES NOT CLOSE	Power in S.C. (current supply too high)	BLOCKING A.	BLINK T=0,2"	BLINK T=0,2"	ON
20	Battery T SENSOR O.C.	Battery T Sensor open or missing	NON-BLOCKING A.	---	---	BLINK T=1"
21	Battery T SENSOR S.C.	Battery T Sensor in s.c.	NON-BLOCKING A.	---	---	BLINK T=1"
22	HIGH BATTERY TEMP.	Battery temperature above limit	NON-BLOCKING A.	---	---	BLINK T=1"
23	Aux.T SENSOR O.C.	Aux.T Sensor open or missing	NON-BLOCKING A.	---	---	BLINK T=1"
24	Aux.T SENSOR S.C.	Aux.T Sensor in s.c.	NONBLOCKING A.	---	---	BLINK T=1"
25		available				
26		available				
27		available				
28	PARAMETERS UNREAD	BASE unread by EEPROM	BLOCKING A.	BLINK T=2"	BLINK T=2"	ON
29	CURVE UNREAD	CURVE parameters unread by EEPROM	BLOCKING A.	BLINK T=2"	BLINK T=2"	ON
30	EEPROM INITIALIZED	Parameters in EEPROM initialized	MESSAGE	unvaried	unvaried	unvaried
31	ALL1. in PHASE XX	Condition 1 – phase xx	A. PRG.	---	---	BLINK T=1"/ON
32	ALL2. in FASE XX	Condition 2 – phase xx	A. PRG.	---	---	BLINK T=1"/ON
33		available				
34		available				
35		available				
36		available				
37		available				
38		available				
39		available				
40		available				

MESSAGE: Message on LCD display condition

NON-BLOCKING A.: Non-blocking anomaly condition with non-definite number of re-entries

NON-BLOCKING A. 3T: Non-blocking anomaly condition with number of re-entries equal to 3

BLOCKING A: Blocking anomaly condition

USER MENU

The user may interact with the battery charger using the buttons on the panel that have the following functions:

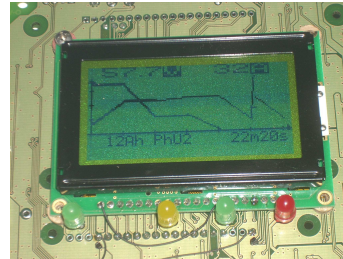
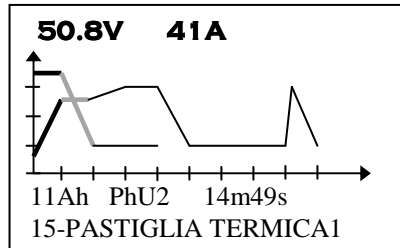
P1 (SW1): SETUP / UP/INCREASE: enables to ^{pag. 7} access menus, move, modify/increase a parameter



P2 (SW2): PARAMETERS / DOWN/DECREASE: enables to visualize the charge parameters, modify/decrease the parameters

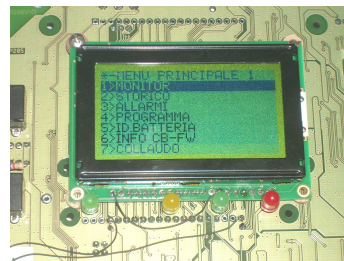
P3 (SW3): ON/OFF, SELECT, CONFIRM: enables to suspend or restart the charge in progress, select a menu, confirm the value of a parameter

Starting from the Monitor menu,



Pressing the P1 button, the following "MENU PRINCIPALE 1" (MAIN MENU 1) will activate.

```
*-MENU PRINCIPALE 1"
1>MONITOR  "
2>STORICO  "
3>ALLARMI  "
4>PROGRAMMA "
5>ID.BATTERIA"
6>INFO CB-FW "
7>COLLAUDO  "
```



By pressing the buttons P1 and P2 one may select the desired sub-menu and press P3 to enter the selected menu.

MONITOR: returns to the default Menu that enables to visualize the actual charge parameters and the executed charge curve.

STORICO NC.xxx (DATA HISTORY NC.xxx): enables to visualize data history of the latest executed charge cycles

ELENCO ANOMALIE (ANOMALY LIST): enables to visualize eventual permanent anomalies (BLOCKING) occurred in different phases of the completed charge cycles.

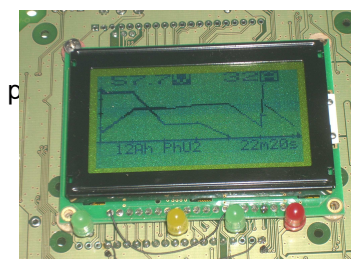
MENU PROGRAM (PROGRAM MENU): enables to visualize and program the type-related parameters on the battery charger

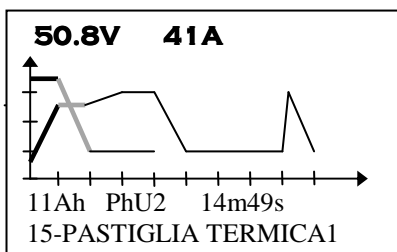
ID BATTERIA (BATTERY ID): enables to visualize the battery code memorized by the PC

INFO CB-FW: displays the V/A size of the battery charger, the identification code of the currently active curve, the version of HW of the CB power, and by pressing the button P3 one may visualize the version of BIOS and FW.

COLLAUDO (TESTING): enables to enter in manual testing mode.

1. MONITOR MENU.





The monitor Menu displays the charge variables of the ongoing cycle

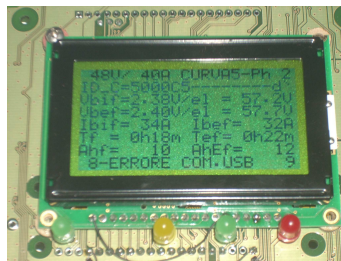
- Battery voltage
- Supplied current
- Stylized graph of the curve with highlighted completed portion and flashing ongoing portion.
- Measure of the supplied capacity, Actual state (phase) of charge, Charge timer.

The Charge timer, before the beginning of the charge, highlights the programmed countdown in seconds (meaning the auto start time which activates as soon as the battery is connected). During the charge the Timer is shown in hours, minutes and seconds (h, m, s), until reaching the first hour of charge; after the first hour of charge it will be displayed as hours and minutes.

The last line contains eventual anomalies, displayed, when more than one, in rolling mode.

By pressing the P1 button, one enters a sub-menu which contains detailed information regarding the charge.

```
48V/ 40A CURVA5-ph.01
ID_C=5000c5-----
Vbif=2.40V/el = 25.4V
Vbef=2.40V/el = 25.4V
Ibif=133A Ibef= 133A
Tf = 0h18m Tef= 0h22m
Ahf= 2345 AhEf= 2345
```



1st line: contains the battery charger size (for example 48V/40A) and the identification code of the charge curve and the ongoing phase (for example CURVE5-ph.01)

2nd line: contains the charge curve identification code.

3rd line: contains the initial phase battery voltage (Vbif) as element voltage, then as absolute voltage (V).

4th line: contains the end phase battery voltage in absolute value (Vbef) and in element voltage (V/el).

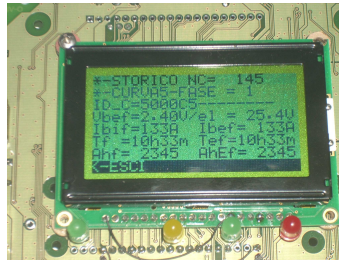
5th line: contains the initial phase current (Ibif) and end phase current (Ibef).

6th line: Single phase time (Tf) and total charge time at the end of the phase (Tef)

By pressing P2 one may switch to the display of parameters relative to the already completed phases, for which the same parameters described above are displayed.

2. DATA HISTORY MENU.

```
*-STORICO NC=65535
*-CURVAX-FASE =xx
ID_C=
VbEnd=2.40V/el= 25.4V
IbIni=133A IbEnd=133A
Tf =10h33m Tef=10h33m
Ahf= 50 AhEnd= 250
<-ESCI
```



With buttons P1 and P2 (up –down) between line 1, line 2 and the last line (EXIT)

The P3 button executes the selection.

From the first line (*-STORICO NC=65535) (*-DATA HISTORY NC=65535) one may select the charge cycle whose parameters he wants to see (the last 50 cycles are stored by overwriting the oldest).

From the 2nd line one may select the phase number for which he wants to visualize the charge parameters. Upon entering the “data history” menu display, the most recent phase of the charge cycle is automatically displayed in default.

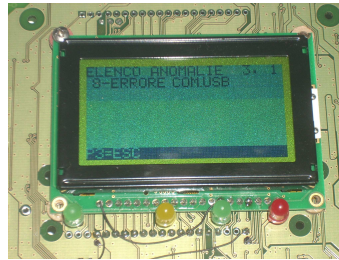
The History data menu displays the following charge variables according to selected cycle and phase:

- ID_C=
Identification code of executed charge curve
- VbEnd=2.40V/el= 25.4V
Battery voltage in element voltage (V/el) and in absolute voltage
- IbIni=133A IbEnd=133A
Current supplied at beginning phase (Ibini) and end phase (IbEnd)
- Tf =3h00m Tef=10h33m
Phase time and total time at phase end
- Ahf= 45 AhEnd= 250
Ah supplied in selected phase and total charge Ahs.

By selecting the last line and pressing P3 one exits the “DATA HISTORY” menu.

3. ALARMS MENU.

```
ELENCO ANOMALIE 3.4
8-ERRORE COM.USB
```



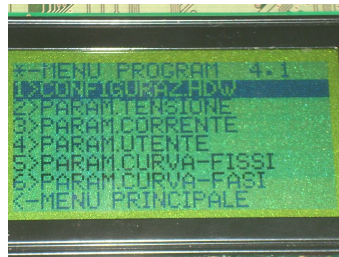
This menu displays eventual anomalies occurred during the selected charge phase.

With buttons P1 and P2 (up –down) I can select the phase (P1 increases, P2 decreases the phase number)

By pressing P3 one exits the menu.

4. PROGRAM MENU.

```
*-MENU PROGRAM 4."
1>CONFIGURAZ.HDW
2>PARAM.TENSIONE
3>PARAM.CORRENTE
4>PARAM.UTENTE
5>PARAM.CURVA-FISSI
6>PARAM.CURVA-FASI
<-MENU PRINCIPALE
```



This menu enables to visualize and modify the battery charger parameters related to the charge curve.

PLEASE NOTE: The modification of parameters is permitted by the FW only if the battery is disconnected.

With buttons P1 and P2 one moves in the menu to select a programming sub-menu.

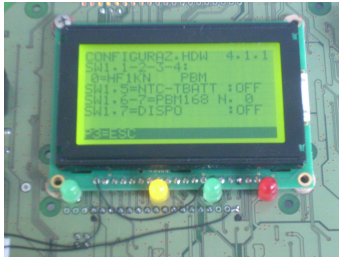
With the P3 button one selects a sub-menu.

Here follows the description of sub-menus.

4.1.1. HDW CONFIGURATION:

```
CONFIGURAZ.HDW 4.1.1
SW1.1-2-3-4:
```

```
SW1.5=NTC-TBATT :
SW1.6-7=PBM168 N.
SW1.8=DISPO :
```



This menu displays the DIP SW settings present on the PBM205 card.

SW 1.1-4: these are the dip-switches used to select the type of power card connected

SW1.5: enables the measure of an NTC sensor for battery temperature reading

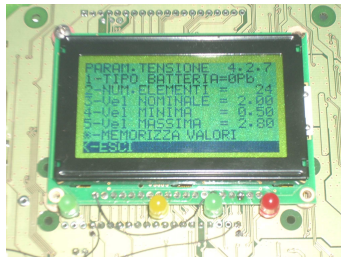
SW1.6-7: they are used to enable the presence of expansion cards such as PBM168 (0, 1, 2, 3 PBM168 cards)

SW1.8: dip switch currently available for future implementation

By pressing P3 one exits the menu.

4.2. VOLTAGE PARAMETERS:

```
PARAM.TENSIONE 4.2.
1-TIPO BATTERIA="
2-NUM.ELEMENTI ="
3-Vel NOMINALE ="
4-Vel MINIMA ="
5-Vel MASSIMA ="
```



This menu enables to visualize and modify the parameters relative to battery type, number of cells, and nominal, minimum and maximum voltage.

TIPO BATTERIA (BATTERY TYPE): enables to select Battery technology:

0: Piombo (Lead)

1: Nickel Cadmio (Cadmium Nickel) (NiCd)

2: Polimeri di Litio (Lithium Polymers) (LiPo)

The selection of battery technology automatically sets the default values for Element Voltage, Minimum voltage and Maximum voltage in case of Pb and NiCd batteries.

For Lithium batteries instead, nominal voltage must be set manually by the user, since there is a vast variety of types of these batteries.

NUM. ELEMENTI (NUMBER OF ELEMENTS): this parameter can be set within the range of 1-400.

Vel NOMINALE (NOMINAL Vel): it is only possible to set this parameter for LiPo within the range of 2-4V

Vel MINIMA (MINIMUM Vel): it is the minimum voltage accepted for the element to recognize the presence of the battery.

Vel MASSIMA (MAXIMUM Vel): it is the maximum voltage accepted for the element and defines the superior limit of accepted operational voltage to be able to set the curve parameters of the battery charger.

4.3. PARAMETRI CORRENTE (CURRENT PARAMETERS):

PARAM. CORRENTE 4.3.
1-ISHUNT @100mV=
2-CORRENTE NOM=
3-CAPACITA' NOM=



This menu enables to visualize and modify the parameters relative to the current supplied by the battery charger.

P1 and P2 enable to move in the menu and P3 to select the parameter to modify.

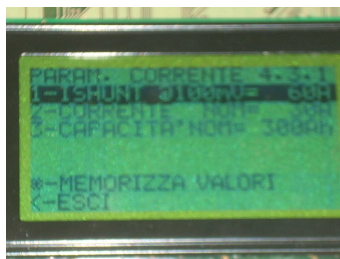
ISHUNT @100mV: This parameter enables to select the shunt current size, if it is a 100mV shunt.

CORRENTE NOM (NOM CURRENT): This parameter enables to select the size of nominal current for the battery charger.

CAPACITA' NOM (NOM CAPACITY): This parameter enables to set the nominal size of the battery charger in C5.

4.4. PARAMETRI UTENTE (USER PARAMETERS):

PARAMET. UTENTE 4.4.
1-LINGUA =
2-U.M. TEMPERAT. =
3-T.CAMP.GRAFICO=
4-INS.PASSWORD =
5-MOD.PASSWORD =
*-MEMORIZZA VALORI
<-ESCI



This menu enables to visualize and modify the parameters relative to current supplied by the battery charger.

P1 and P2 enable to move within the menu and P3 to select the parameter to modify.

1-LINGUA (LANGUAGE) = field that enables to set the LCD display language

Languages currently available are ITA, ENG, DEU, FRA. However the only versions existing today are ITA and ENG (DEU and FRA are momentarily equivalent to ENG).

2-U.M.TEMPERAT. = field that enables to set the temperature measure unit: °C or °F.

3-T.CAMP.GRAFICO= field that enables to set the period of diagram sampling.

4-INS.PASSWORD = it is the field in which to insert the PSW to unblock access battery charger settings. In case a value equal to MOD.PASSWORD is inserted in this field, the MOD. PASSWORD field will display the same inserted value, otherwise a field of '*' (INS.PASSWORD corresponds to the entrance KEY).

5-MOD.PASSWORD =

The PWD value is displayed if inserted correctly, or in alternative a field of asterisks. When the PWD value is correct and displayed here, it is possible in this field to modify the value of the PWD itself. Once a new password is set, one must scroll down to the "*-MEMORIZZA VALORI" line and confirm by pressing P3. This field corresponds to the concept of « lock ».

NOTE:

The default password is currently set to 1.
The password enables the setting of all parameters.

4.5. FIXED CURVE PARAMETERS:

```
PARAMET. CURVA 4.5.
1-CURVA N. =
2-TIMOUT SIC.=16h 0m

*-MEMORIZZA VALORI
<-ESCI
```



This menu enables to select the active curve charge (amongst those present in storage (8 curves)) and the general Sic. Timeout.

P1 and P2 enable to move in the menu and P3 to select the parameter to modify.

1-CURVA N. = This parameter enables to select one of the 8 curves in storage.

- 1: Acid lead
- 2: GEL
- 3: AGM
- 4: Universal
- 5: Lithium
- 6, 7, 8: to be determined

2-TIMOUT SIC. =16h 0m= field that enables to set a timer for general security that, if surpassed, brings to its appointed anomaly.

This timer may be set to:

OFF: disabled

0h 1m – 99h 59m: time expressed in hours and

minutes
pag. 14



4.6. PHASE CURVE PARAMETERS:

```
PARAMET. CURVA 4.6.
1-CURVA N.
2-FASE N.
3>TENSIONE
4>CORRENTE
5-TEMPO =
*-MEMORIZZA VALORI
<-ESCI
```



This menu enables to visualize and modify the parameters relative to the selected charge curve (among those present in storage (8 curves)), phase by phase (voltages, currents, Timer).

P1 and P2 enable to move in the menu and P3 to select the parameter to modify.

1-CURVA N. : enables to select the curve to visualize/modify the charge parameters.

2-FASE N. : enables to select the phase inside the selected curve of which one wants to visualize/modify the charge parameters. There are a maximum total of 8 curve phases, but the user can only modify the parameters of the phases indicated as active by whoever set the charge curve (PBM or Master Dealer)

3>TENSIONE (VOLTAGE) : enables to enter the programming menu of the operational voltage of the charge phase.

4>CORRENTE (CURRENT) : enables to enter the programming menu of the operational voltage of the charge phase.

5-TEMPO (TIME) = : enables to enter, visualize and program the exit Timer of the selected phase. The 0 phase corresponds to Autostart phase and the TIME displayed corresponds to the Autostart Timer.

4.7. VOLTAGE PHASE PARAMETERS:

```
PAR.TENS.FASE 4.5V.
1-FASE N.
2-TIPO CONTROLLO=
3-TENS.MIN= V/el
4-TENS.RIF= V/el
5-TENS.MAX= V/el
*-MEMORIZZA VALORI
<-ESCI
```



This menu enables to visualize and modify the parameters related to the voltage of the curve and phase selected.

P1 and P2 enable to move in the menu and P3 to select the parameter to modify.

1-FASE N. : enables to select the phase inside the selected curve whose charge parameters one wants to visualize/modify. There are a maximum total of 8 curve phases, but the user can only modify the parameters of the phases indicated as active by whoever set the charge curve (PBM or Master Dealer).

2-TIPO CONTROLLO= (CONTROL TYPE) : enables to visualize (not modify) the type of control executed in this phase:

a: Arrest

I: Constant current

U: Constant voltage

W: Decreasing current upon increasing voltage.

3-TENS.MIN= V/el : enables to define the minimum accepted voltage for the battery (voltage at which the presence of the battery is detected). This parameter may be used to define a phase passage or anomaly condition. (It is a reference point for a turning of pag. 15 events).

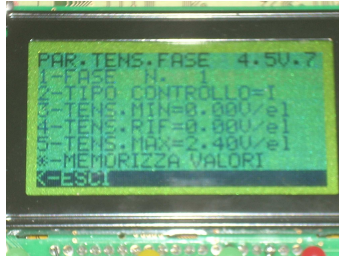


4-TENS.RIF= V/el: enables to define the referential voltage. This parameter defines the control Voltage for the Constant voltage phase (U).

5-TENS.MAX= V/el: enables to define the maximum accepted voltage for the battery (voltage at which the presence of the battery is detected). This parameter may be used to define a phase passage or anomaly condition. (It is a reference point for a turning of events).

4.8. PHASE CURRENT PARAMETERS:

```
PAR.CORR.FASE 4.5I.
1-FASE N.
2-TIPO CONTROLLO=
3-CORR.MIN= A
4-CORR.RIF= A
5-CORR.MAX= A
*-MEMORIZZA VALORI
<-ESCI
```



This menu enables to visualize and modify the parameters related to the curve currents and the set charge phase.

P1 and P2 enable to move in the menu and P3 to select the parameter to modify.

1-FASE N. : enables to select the phase inside the selected curve whose charge parameters one wants to visualize/modify. There are a maximum total of 8 curve phases, but the user can only modify the parameters of the phases indicated as active by whoever set the charge curve (PBM or Master Dealer).

2-TIPO CONTROLLO= (CONTROL TYPE): enables to visualize (not modify) the type of control executed in this phase:

a: Arrest

I: Constant current

U: Constant voltage

W: Decreasing current upon increasing voltage.

3-CORR.MIN= : enables to define the minimum accepted current for the battery charger for the ongoing phase. This parameter may be used to define a phase passage or anomaly condition. (It is a reference point for a turning of events).

4-CORR.RIF= : enables to define the referential current. This parameter defines the control current for the Constant current phases (I).

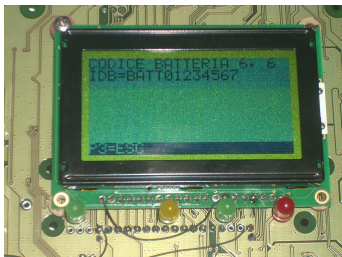
5-CORR.MAX= A: enables to define the maximum accepted current for the battery charger for the ongoing phase. This parameter may be used to define a phase passage or anomaly condition. (It is a reference point for a turning of events).

To modify the parameters, select them by pressing P3, set the desired value with P1 (up) and P2 (down), lastly exit with P3, scroll to the *-MEMORIZZA VALORI line and press P3.

5. BATTERY ID MENU

```
CODICE BATTERIA 5.1
IDB=
```

```
<-ESCI
```



This menu enables to visualize the battery identification code set by the user with SW HFView. This field on the battery charger is not programmable, but requires use of SW HFView. P3 enables to exit the menu.

6. CB-FW INFO MENU

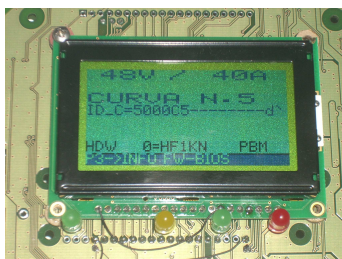
```
48V / 40A
```

```
CURVA N.5
```

```
ID_C=5000C5-----d
```

```
HDW 0=HF1KN PBM
```

```
P3->INFO FW-BIOS
```



This menu enables to visualize:

- 1) SIZE of the battery charger
- 2) active charge CURVE
- 3) active charge IDENTIFICATION CODE
- 4) TIPO of HW controlled on the board

By pressing P3 one enters the FW-BIOS INFO MENU

```
*PBM*
```

```
*** Alfa Progetti ***
```

```
* [---- HF205 ----] *
```

```
BIOS: HF205 -V6.4
```

```
Main: b1.44-23.06.2010
```

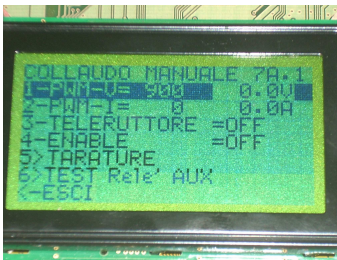
```
P3->INFO FW-BIOS
```

This window displays:

- Name of the Battery Charger manufacturer (PBM)
- Name of the company that developed the product SW
- Version of BIOS
- Version of SW (MAIN) and date of release

7. COLLAUDO MANUALE (TESTING)

```
COLLAUDO MANUALE 7A.1
1-PWM-V= 900 0.0V
2-PWM-I= 0 0.0A
3-TELERUTTORE =OFF
4-ENABLE =OFF
5>TARATURE
6>TEST Rele' AUX
<-ESCI
```



This window enables to execute a battery charger test, manually controlling certain signals managed by the CPU.

1-PWM-V= : enables to set the exit voltage of the voltage reference.

The signal can be set to a value included between 0 and 1023, which is converted in analogue tension within a range of 0-5V.

The exit signal corresponds to the desired Element voltage, and enables power transmission towards the battery, as long as the referential current signal allows it.

The set value is displayed to the right of the equal sign, followed by the Battery Voltage Value.

2-PWM-I= : enables to modify the exit current from 0 to the value which corresponds to the maximum supply power of the battery charger. The PWM-I control in fact defines the primary current set-point for switching transformer.

The signal may be set to a value between 0 and 1023, which is converted into analogue voltage within a range of 0-5V.

Given that the voltage signal is set to a value higher than that corresponding to maximum element voltage, the PWM-I increment determines an increase in exit current.

The set value is displayed to the right of the equal sign, followed by the Battery Current Value.

3-TELERUTTORE = (CONTACTOR) : enables or disables the relay that excites the exit contactor. (0=disabled, 1=enabled)

4-ENABLE =: enables the PWM controller to pilot the converter to supply current.

5>TARATURE (CALIBRATION) : enables to execute circuit calibration to read analogue sizes, voltage and current (see next paragraph).

6>TEST Rele' AUX: enables to manually pilot the excitation of auxiliary relays present on the power board.

7.1. ANALOGUE CALIBRATIONS

```
TARATURA ANALOG. 7D.1
1-TarVb=-12.5% 0.0V
2-TarIc=+12.5% 0.0A
3-Rcavo= 5.0mohm

5<TEST NORMAL
*-MEMORIZZA VALORI
<-ESCI
```



This window enables to execute circuit calibration to read analogue sizes, such as Voltage and battery current.

1-TarVb=-12.5% 0.0V

TarVb enables to correct the battery voltage reading by a set percentage, in order to obtain the same measure given by an instrument of reference.

Next to the value of correction, the correct reading of absolute voltage is indicated.

2-TarIc=+12.5% 0.0A

TarIc enables to correct the battery current reading by a set percentage, in order to obtain the same measure given by an instrument of reference.

Next to the value of correction, the correct reading of supplied current is indicated.

3-Rcavo= 5.0mohm

Enables to set the total resistive value of the battery cable in order to obtain a correct reading, compared to an instrument of reference, of the battery voltage upon variation of supplied current (noting consumption-related errors, meaning cable leaks).

VOLTAGE READING CALIBRATION PROCEDURE:

- 1) Connect the battery to a Multimeter between Positive and Negative poles, and an amperometric clamp on one of the battery cables.
- 2) Place the battery charger on standby (pause), meaning switched on, connected to the battery but in pause (by stopping the charge with the P1 button).
- 3) Select the TarVb line with P3, and with P1 and P2 buttons modify the value of the error percentage in order to obtain a reading on the battery charger equal to that of the multimeter.
- 4) Exit the programming are with P3.
- 5) Go to line 6 (*-MEMORIZZA VALORI) and save the values by pressing P3.
- 6) During storage one obtains a double flashing of the word MEMO
- 7) Scroll to 5<TEST NORMAL
- 8) Confirm with P3
- 9) Enter the window COLLAUDO MANUALE (MANUAL TESTING)



CURRENT READING CALIBRATION PROCEDURE:

- 10) Select the ENABLE line, press P3, set the value to ON (with P1-P2) and confirm with P3
- 11) Move to the PWM-I line (line 2), confirm with P3, and with P1 set the value of PWM-I in order to obtain an exit current equal to the CB nominal current.
- 12) Exit with P3
- 13) Return to page 5>TARATURE
- 14) Scroll to line 2 (2-TarIc=+12.5% 0.0A) and select with P3
- 15) Modify the TarIc value until the battery charger current reading corresponds to the reading of the Amperometric clamp.

CABLE RESISTANCE CALIBRATION PROCEDURE:

- 16) The presence of current on the cables will have determined a difference in voltage reading between battery charger and Multimeter.
- 17) Go to line 3 (Rcavo=) and select it with P3, then modify the value until the battery charger voltage reading does not return to correspond to the Multimeter reading.
- 18) Go to line 6 (*-MEMORIZZA VALORI) (MEMORIZE VALUES) and select it with P3: the double flashing of MEMO will indicate effective storage of calibration values.
- 19) Go to line 7 (<-ESCI) (EXIT) and confirm with P3.

Supplied by:-

Curtis Instruments (UK) Ltd.
5, Upper Priory Street,
NORTHAMPTON.
NN1 2PT
01604 629755
www.curtisinst.co.uk

