

TECHNICAL FEATURES OF THE CBHF1-SM SERIES

The innovative characteristics of the CBHF1-SM range of battery charger are the following:

1. Advanced Mosfet technology with **high frequency** and insulation transformer.
2. Charging process fully controlled by microprocessor.
3. Visualization on a lit display of the charging current, of the battery voltage, of the charging time, of the electric charge supplied in Ah's and of the electric energy absorbed in KWh's.
4. Possibility to change the charging curve by means of microswitches (DIP-switches), choosing from 16 standard pre-programmed curves for lead-acid, Gel and VRLA batteries. Any other optional curve available on request.
5. Possibility to change the battery voltage and the charging current by means of the relevant microswitches.
6. Charging process starting in the "soft start" mode, storing of the data of the cycle just finished and automatic reset upon connection of a new battery.
7. Protection against polarity inversions, short-circuits, over-voltages or anomalies by means of an output relay.
8. Battery to battery charger connection without sparks on the output terminals with obvious advantages for the active safety, thanks to the recognition of the battery voltage downstream the normally opened output relay.
9. Alphanumeric signals of possible anomalies.
10. Insensitive charge parameters in case of $\pm 10\%$ network voltage
11. Efficiency > 85%.
12. Output ripple at maximum charge lower than 100mV.
13. Start of the charge cycle also with 2V batteries.
14. Thermal protection against over heating.
15. An auxiliary relay that permits the partial or total disconnection of an electric traction machine is available in should the batteries have to be re-charged with the battery charger placed on board the machine. In this way the relay prevents the machine from starting while the battery charger is operating. This is a safety device.

OPERATING PRINCIPLE

On switching on a new battery charger of the CBHF1-SM series, programming data are displayed (these parameters depend on internal dipswitch configuration).

After the "**SPE**" logo you can see on display the version of software installed on the machine. At this time the following programmed parameters are displayed on sequence according to internal dipswitch configuration (see tables on page n. 4):

battery voltage, charging current, number of charging curve and is displayed the message "**GEL**" if programmed charging curve is suitable for gel batteries or "**Acd**" if programmed charging curve is suitable for Lead-Acid (Wet) batteries. After these operations the charger is ready to check the battery voltage and to decide whether to start the charging process. If the battery is not connected to the battery charger, the message 'bat' will be displayed. The same message is displayed also in case of negative result of the testing (for example, reversed polarity or battery having a wrong voltage). If the result of the testing is positive, the value of the battery voltage is displayed for about 5 seconds, with output relay open. After 5 seconds the charging of the battery can start. The output relay closes and the current of the first phase rises slowly till it reaches the nominal value programmed.

If the user disconnects the battery from the battery charger during the charging process, after a few seconds the battery charger will re-initialize and prepare to start a new charging process.

The display always shows the charging current of the battery. The battery voltage, the time since the beginning of the charge, the charge yielded in Ah's and the energy consumed in KWh can be seen only by pressing the button S.

The progress of the charging process is shown by three LED's: red, yellow and green, as in the whole range of the battery chargers.

The green LED indicates the stop of the charging or the last phase in case of deep charging process; in the former case, the relay is opened to disconnect galvanically the battery from the battery charger.

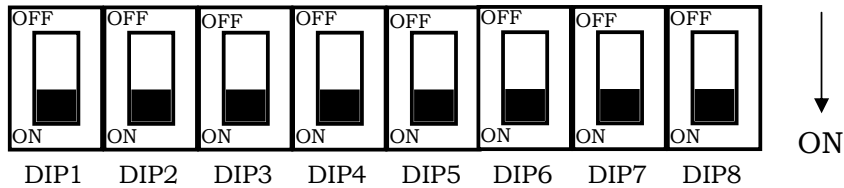
TECHNICAL REMARKS

- When the maximum voltage admissible for a specific battery is reached (value given by the manufacturer) the error message '**E01**' is displayed, and the process is terminated.
 - By using an internal thermostat, the charging can be interrupted in case of excessive battery charger over-temperature. In this case the error message '**E02**' is displayed.
 - Possibility of setting each single charging phase. On exceeding this time, the charge will be interrupted and the error message '**E03**' will be displayed.
 - The display of the message '**Sct**' indicates safety timer operation.
 - The message '**Srt**' will be displayed in case of internal short circuit.
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On the next page we have written the meaning of dipswitch. Through the set of 8 dipswitches it is possible to change the charging curve (16 charging curves are available for Wet and Gel batteries and it is possible to customize the charging profile under the specifications of battery manufacturers), the battery voltage (12V or 24V) and the charging current (4A or 8A or 10A or 12A). The set of 8 dipswitch is easy to find (is located under the front label of the charger, lifting the corner on the bottom-left) without opening the charger.

CBHF1-SM DIP SWITCH CONFIGURATION

In the following tables you can find meaning of all different position of dipswitch for programming CBHF1-SM battery chargers.



➤ DIP1 DIP2 DIP3 DIP4 for the selection of the CHARGING CURVE

DIP1	DIP2	DIP3	DIP4	CHARGING CURVE
ON	ON	ON	ON	0
OFF	ON	ON	ON	1 (curve for Lead-acid (Wet) traction batteries)
ON	OFF	ON	ON	2
OFF	OFF	ON	ON	3
ON	ON	OFF	ON	4
OFF	ON	OFF	ON	5
ON	OFF	OFF	ON	6 (curve for Sealed Lead-acid and GEL batteries from Trojan and other manufacturers)
OFF	OFF	OFF	ON	7
ON	ON	ON	OFF	8
OFF	ON	ON	OFF	9
ON	OFF	ON	OFF	10
OFF	OFF	ON	OFF	11 (curve for GEL batteries from Sonnenschein, DEKA and other manufacturers)
ON	ON	OFF	OFF	12
OFF	ON	OFF	OFF	13
ON	OFF	OFF	OFF	14
OFF	OFF	OFF	OFF	15

➤ DIP5 DIP6 DIP7 for the selection of the CURRENT I1

DIP5	DIP6	DIP7	CORRENTE
ON	ON	ON	4A
OFF	ON	ON	8A
ON	OFF	ON	10A
OFF	OFF	ON	12A

➤ DIP8 for the selection of the battery voltage

DIP8	VB
ON	12
OFF	24

PRE-PROGRAMMED CURVES FOR CBHF1-SM

Tab.1

CURVE	CURVE TYPE	DIPSWITCH DP1-DP2-DP3-DP4
00	IUa SO (IUa + float charge 2,30VPC) = IUo Technology for charging DRYFIT TRACTION BLOCK (TRACTION GEL batteries). In compliance with the DIN 41773 regulations.	ON-ON-ON-ON
01	IUIa Lead-Acid Technology for charging TRACTION Lead-Acid batteries.	OFF-ON-ON-ON
02	IUUa (2,45VPC) Technology for charging SEALED LEAD-ACID batteries.	ON-OFF-ON-ON
03	IUUa (2,40VPC) Technology for charging Sealed Lead-acid and GEL batteries batteries from Trojan and other manufacturers.	OFF-OFF-ON-ON
04	IUIa Lead-Acid + float charge at 2,30VPC Technology for charging TRACTION lead-acid batteries.	ON-ON-OFF-ON
05	IUUa (2,45VPC) + float charge at 2,30VPC Technology for charging SEALED LEAD-ACID batteries.	OFF-ON-OFF-ON
06	IUUa (2,40VPC) + float charge at 2,30VPC Technology for charging Sealed Lead-acid batteries and GEL batteries from Trojan and other manufacturers.	ON-OFF-OFF-ON
07	IUIa PzV Technology for charging large capacity DRYFIT PzV (A800) GEL batteries. In compliance with the DIN 41773 regulations.	OFF-OFF-OFF-ON
08	IUIa GNB Technology for charging GNB Sealed Lead-Acid batteries.	ON-ON-ON-OFF
09	IUo (2,35VPC) Technology for charging Lead-Acid start-up batteries.	OFF-ON-ON-OFF
10	IUIa drysafe (HAGEN) Technology for charging DRYSAFE HAGEN batteries.	ON-OFF-ON-OFF
11	IUIa per TRACTION BLOCK + float charge 2,30VPC Technology for charging DRYFIT TRACTION BLOCK batteries from Sonnenschein, DEKA and other manufacturers. In compliance with the DIN 41773 regulations. (This curve is an alternative of curve 00)	OFF-OFF-ON-OFF
12	IUa for Lead-Acid batteries (2,40VPC) Technology for charging Lead-Acid starting batteries with stop.	ON-ON-OFF-OFF
13	Iua for Lead-Acid batteries (2,60VPC) Technology for charging Lead-Acid starting batteries with stop.	OFF-ON-OFF-OFF
14	---	ON-OFF-OFF-OFF
15	---	OFF-OFF-OFF-OFF

NOTES:

A: charging curves with charge stop.

B: charging curves equivalent to group A but with a float charge of 2,30VPC (maintenance charge).