

BATTERY CHARGER

**POWER-SWITCH**  
HIGH FREQUENCY

04-2013



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# POWER-SWITCH HIGH FREQUENCY BATTERY CHARGER



**BATTERY CHARGER  
INDUSTRY**

## High Frequency Battery Charger

POWER-SWITCH is the name of the series of high frequency automatic battery chargers manufactured by us, completely developed by our technical office (both HW and SW) and suitable to recharge whatever traction battery (flooded and sealed).

During the developing of this new series we took into account also our long experience in conventional chargers with three clear targets: FLEXIBILITY, QUALITY and PERFORMANCES.

■ **FLEXIBILITY:** every device belonging to PSW series can be properly set up, without using deep-switches (too risky because they can be too easily operated), by means of our programmer called MP TOP II (1).

The following parameters can be adjusted:

- battery type: flooded or sealed
- battery capacity (see tables)
- charge time: 13 hours or 11 hours or 8 hours
- gassing point or maximum battery voltage during the charging process (for sealed batteries). Min 2,35V/cell, max 2,45V/cell
- lock against too deep discharges (meaningful if the charger is on-board installed): Min. 1,50V/cell, max 1,85V/cell
- rental/maintenance management function (meaningful if the charger is on-board installed): ON, OFF, ALARM
- rental/maintenance management period (in days): from 0 up to 600
- pump management (meaningful if the charger is equipped with pump)
- equalization charge management.

All that allows to cover all the customers requests with just a few models of chargers, that means lower stocking costs

■ **QUALITY always:** quality during the developing process and quality during the production process.

- only components coming from the main worldwide producers are used
- strict input controls as well as during the production process are carried out (ISO certified company since 1996)
- our own anechoic room is used during the developing process in order to verify the EMC compatibility
- vibration and mechanical tests are carried out
- every single charger is completely dipped into resin in order to protect it against "normal" oxidation
- Climatic test and salt spray test
- BURN-IN test: every single charger works for 3 hours at the maximum power rate with a 40°C room temperature, before being released.

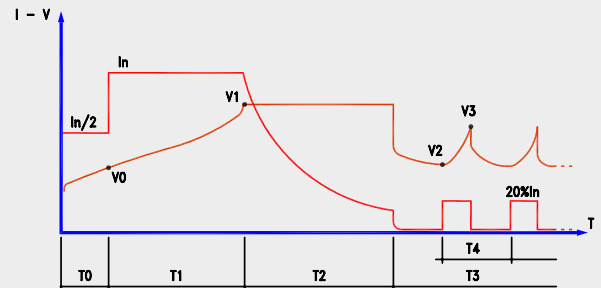
■ **PERFORMANCES in order to supply concrete advantages to our distributors and customers:**

- compact and light version compared with conventional solutions
- metal housing to protect the electronic circuits during the usage, for long time
- chargers completely unaffected by mains fluctuations (see the data sheets) to guarantee batteries always completely charged
- high efficiency rates to let the user save energy during every charge cycle
- models are available to be plugged into whatever socket in the world, without prior setting
- internal thermal probes protect the charger in case of problems with fans and also allow it to work even in case of lower airflow (probably at lower power rate)
- on-board options are always included: vehicle lock during the charging process and vehicle lock to avoid dangerous deep discharges
- in each PSW there is a memory to save information over the charge cycles.



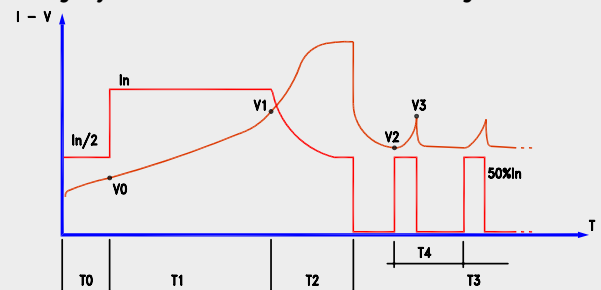
### PROGRAMMABLE CHARGE CYCLES

#### Charge cycle for Sealed batteries : IU + holding



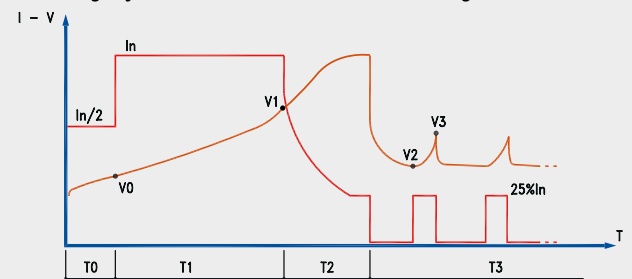
$I_n$  = programmed capacity / 10       $T_0$  = max. 1 hrs  
 $V_0$  = 1.90 V/el                       $T_1$  = max. 12 hrs  
 $V_1$  = programmed value             $T_2$  =  $T_1$  (min 2 --- max 5 hrs)  
 $V_2$  = 2.10 V/el                         $T_3$  = unlimited  
 $V_3$  = 2.30 V/el

#### Charge cycle for Flooded batteries : IWA + holding



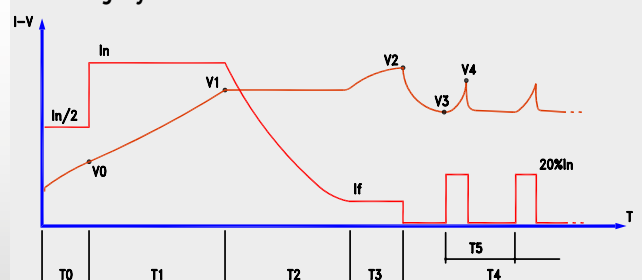
$I_n$  = programmed capacity / 12 (Pb 13h)       $V_3$  = 2.30 V/el  
 $I_{n2}$  = programmed capacity / 10 (Pb 11h)     $T_0$  = max. 1 hrs  
 $V_0$  = 1.90 V/el                             $T_1$  = max. 13 hrs  
 $V_1$  = programmed value                 $T_2$  = 0,6T1 (min 1 --- max 3.5 hrs)  
 $V_2$  = 2.10 V/el                             $T_3$  = unlimited

#### Fast charge cycle for Flooded batteries : IWA + holding



$I_n$  = programmed capacity / 6                     $T_0$  = max. 1 hrs  
 $V_0$  = 1.90 V/el                             $T_1$  = max. 8 hrs  
 $V_1$  = programmed value                 $T_2$  = 1,2T1 (min 1 --- max 3.5 hrs)  
 $V_2$  = 2.10 V/el                             $T_3$  = unlimited  
 $V_3$  = 2.30 V/el

#### IUIa charge cycle for lithium batteries



$I_n$  = programmed value (Icharge)             $T_0$  = max. 1 hrs  
 $I_f$  = programmed value (Ifinal)             $T_1$  = max. 12 hrs  
 $V_0$  = 1.90 V/el                             $T_2$  = max T1+6 hrs or  $I = I_f$   
 $V_1$  = programmed value (Trs V)             $T_3$  = max. 4 hrs  
 $V_2$  = programmed value (Block V)         $T_4$  = unlimited  
 $V_3$  = 2.10 V/el                             $T_5$  = max. 6 hrs  
 $V_4$  = 2.30 V/el

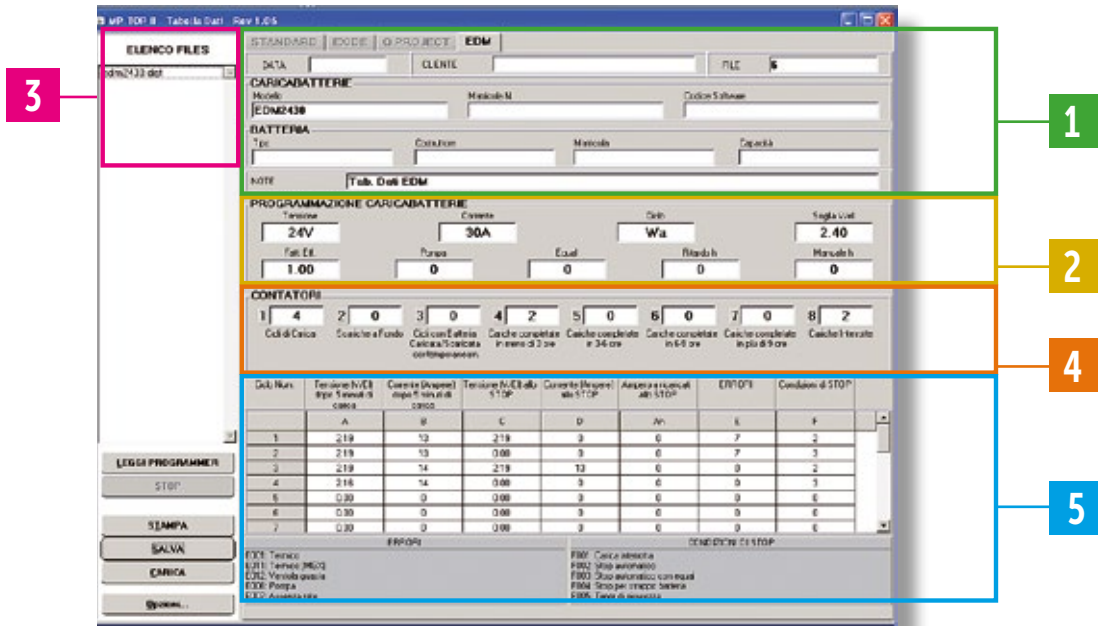
## Battery charger programmer MP TOP II

This high-tech device, recommended to distributors and after sales service centers, is necessary to set up and to download the data memory of POWER-SWITCH chargers. The KIT includes the programmer, cables to connect it to the charger and to the PC. The SW to be installed on your PC is also supplied.

The normal operation is guaranteed by the internal lithium battery, thus no other power source is necessary. The battery is completely recharged by leaving the programmer connected to the USB port of your PC.

The equipped SW can be up-dated through internet and it can be set in different languages:

I, D, E, F, UK, NL  
Code: **MPTOPII**



**1** General information connected to the collected data (date, customer name, battery-type, capacity and so on).

**2** Information about the charger setting

**3** Chargers serial numbers, where information were downloaded from

Counters referred to the whole battery life:

- 4**
  - Counter 1: total number of charge cycles (included those ones interrupted by the operator)
  - Counter 2: how many times the battery was discharged till the lowest possible value (it works only in case the charger is fitted on-board)
  - Counter 3: how many times the battery is simultaneously charged and discharged. Important information because such kind of use damages the battery
  - Counters 4, 5, 6, 7: all the charge cycles automatically completed split into 4 groups in relation to their duration.
  - We clearly understand the average depth of discharge (i.e.: long recharge means deep discharge)
  - Counter 8: how many times the user interrupted the charge cycle before the automatic stop

Detailed information over the last month of charge cycles

- 5**
  - Battery voltage and output current of the charger at the beginning of the charge
  - Battery voltage and output current of the charger at the end of the charge
  - Ah supplied to the battery during the charging process
  - Errors happened during the charging process
  - Stop conditions
  - All these information are useful to detect user behaviour, but also battery and charger operating.



High frequency single phase battery Charger



High frequency three phase battery Charger



High frequency three phase battery Charger with PFC



**BATTERY CHARGER  
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