



# CURTIS

## *Concerto (Star) Battery Charger*



VERSION WITH NEW ELECTRONIC CARD PBM750 rev.2 - SW 2.2

## INSTALLATION AND OPERATING INSTRUCTIONS

### Single-phase 240 Volt Supply

The CURTIS **Concerto** battery charger, manufactured by PBM S.r.l., carries the "CE" mark

as required by the European Directives:

- \*89/336/EEC ( Electromagnetic Compatibility )
- \*73/23/EEC ( Low Voltage )

**Important: read the instructions carefully before connecting the charger to the mains and before operating.**

## A) INSTALLATION AND SAFETY WARNINGS

**Read the manual carefully before connecting charger to mains and battery.**

- Skilled and authorised personnel only shall be allowed to open the charger.
- Before setting the charger at work, the insulation of mains connection cable and battery connection connectors has to be checked.
- The electrical appliances have to be operated by skilled personnel only.
- Disconnect from mains before connecting or disconnecting battery.
- **WARNING:** Batteries produce explosive gases while being **charged**, therefore there must be neither flames nor sparks near the charger while it is in operation. Keep the charger far away from other appliances, which may endanger people and objects.
- The charger contains electric components, which may produce voltaic arcs and sparks, therefore if it is used in a closed environment it has to be installed in a proper site. The standard charger (**IP 20**) is to be used in closed and ventilated environments only and not exposed to rain nor splashed with water. It has to be positioned onto solid and levelled floors, far away from dust, water, heating and moisture. The charger has not to be positioned onto supports and/or shelves of wood or other inflammable materials. Do not stack materials near the charger and do not place any objects or fluid containers on the top of the charger.
- Ensure that an adequate earth connection is made to prevent risks of electrocution. The charger has to be connected to a mains supply of standards corresponding to the power of the charger and has to be protected through an adequate electrical device conforming to European Standards (fuses or automatic cut-outs – use Category D breakers). The protection **must be at least 10% higher than** the power absorption of the device; furthermore the device has to be protected from a too high contact voltage, according to the provisions by local Authorities.
- It is recommended to use bipolar standard connectors which do not allow a polarity reversal on battery; check the proper connection of cables in the contacts of the connectors (bad conditions of the connectors due to the oxidation of the electrical contact may produce dangers like sparks or fires).
- Do not use additional cables to prolong the existing electrical connections.
- Check regularly the condition of the battery. It is recommended to use batteries in good state.
- Do not tamper with the charger and in particular the safety systems.
- Problems in the electrical components have to be removed by skilled personnel only. Defective parts have to be replaced with other components with the same features and have to be authorised by the manufacturer.
- Check regularly all internal electrical connections. Make sure that cables and terminals have not been damaged by overheating due to bad contacts; remove dust (in particular from the contactor and the mobile parts).
- The **Curtis** battery chargers do not need any special maintenance, apart from the usual cleaning which has to be performed regularly depending on the installation site. Before cleaning the charger, disconnect it from mains and battery.

## B) MAINS SUPPLY 240-Volt (single-phase)

- Connect the charger to a suitable rated mains supply. See rating label on side of charger for details. The equipment must be earthed.
- **Single phase chargers are pre-set for 240 volt operation.**
- Should the mains voltage differ from the rated value, the charger transformer tapings on the terminal board should be adjusted to suit. The auxiliary transformer must also be adjusted on the single phase equipment.

- The mains supply should allow for a 20% safety margin above the rated input for the charger to allow for potential overloads. As chargers present an inductive load to the mains, the supply should be protected by either slow acting class 4 or class D magnetic breakers or thermal circuit breakers or motor start fuses.

### C) DC CONNECTION

- Connect the DC output cables of the charger to the appropriate style DC connector ensuring correct polarity is maintained and the charger is correctly matched to the battery.

### D) MAINTENANCE

- As with all chargers, an excessive build up of dust may create a fire hazard. It is therefore advised that the charger should be “blown-out” with an air line or equivalent at least once a year.
- Servicing and/or repairs should only be carried out by **Curtis** approved service engineers.

### E) CHARGING PROCESS (standard configuration)

- Once mains and battery connections have been performed, **the card performs a lighting test of all LED’s**. Then the **green “BATTERY CONNECTED”** LED remains lit (constant).
- In the standard configuration the **“AUTOSTART”** function is enabled (as **default setting**): the charger begins automatically charging 5 seconds after connection to battery. The Autostart stage is indicated by the blinking of the **green “END OF CHARGING”** LED, **red “SAFETY TIMER”** LED, and **yellow “EQUALIZING CHARGE”** LED.
- If the Autostart function is disabled, press the **GREEN button** to start the charging process. The **green LED (“CHARGING”)** begins blinking, and **it will blink for the whole charging process**. To stop charging, press the **GREEN button again**.
- After the initial charge stage, depending on the discharge rate of the battery, and provided that the average cell voltage has reached 2.4 V/cell (adjustable value), the **yellow “FINAL CHARGE”** LED will light up on the front control panel. Then an electronic timer starts counting down the **last three hours** of final charge.
- When the final charge time (adjustable value) has elapsed, the charger stops automatically and the **green “END OF CHARGING”** LED lights up.
- **If the operator disconnects charger from battery during the charge process, the battery charger stops the charging process and signals a fault by means of the yellow LD4 LED blinking. On connecting the battery to the charger, the card resets and starts the charging process again. If the same battery is reconnected to the charger, the charger will disregard any final charge, which it might have previously started (beginning from SW 2.1b).**

### F) EQUALIZING CHARGE

- **The equalizing charge** (see the corresponding yellow LED always lit) is an optional function with a default factory setting. To disable it, contact the service engineers.
- The equalizing charge **will start automatically** after each normal charging cycle, but **it can also be deactivated by software** (see the functions of the SW1 DIP switches).
- After the normal charge a pause will take place (**T. Pause = 60 min**) after which Equalizing will be performed (for a **Teq time = 45 h**).
- Equalizing is made up of an **Np** amount (= 3) of **Neq** (= 5) pulse packages, each of which consists of **charges (T.ON = 12 min) and pauses (T. OFF = 48 min)**.
- The above mentioned pulse packages alternate with pauses (**Ts = 15h**).
- These pulses are performed during the **Active cycle (=45h)**, followed by a **Stop cycle (=120h)**.
- This equalizing system has no time limits and stops on battery disconnection. The system is very useful during holidays and week-ends, since it makes it possible to keep battery charged while preventing overcharging, overheating, and/or water consumption.

## G) SPECIAL FUNCTIONS

The new **Curtis Concerto** charger with microprocessor card features special functions which can be selected by the operator, depending on his/her own needs, by means of the jumpers on the **PBM750** electronic card, according to the following description:

Jumper code	Function	Function description	
		Without jumper	With jumper
TV	Quick test	Normal times*	Accelerated times
CF4	Final charge time	3-h final charge time*	4-h final charge time
AS5	Standard Autostart	Manual start	Autostart after 5 sec*
A3H	Delayed Autostart		Autostart after 3 h
CPR	Proportional charge	Proportional charge not enabled	Proportional charge enabled*
CI11h	Safety timer	Safety timer set at 9h*	Safety timer set at 11h
CEQ	Equalizing charge	Not programmed	Programmed*

The PBM750 rev2 card features an additional jumper (J3) with the function described below:

Jumper code	Function	Function description	
		REG*	FIX
J3	Setting of the gassing voltage	Threshold adjustable by means of a trimmer	Fix threshold preset between 2.37 and 2.43V/cell

\* = default programming

**PLEASE NOTE: Before inserting jumpers to achieve the above-mentioned functions, disconnect charger from battery, otherwise the microprocessor will not accept the settings performed.**

**The above configuration has to be performed by skilled personnel only.**

## H) SAFETY DEVICES

- DC output fuse, protection against battery polarity reversals and/or overloads.
- Control card protection fuse.

## I) GUARANTEE

- The charger is guaranteed for 5 years from the date of dispatch against all proven defects in components, assembly and construction.
- Any incorrect installation or incorrect use of the equipment will invalidate the guarantee, as does any unauthorised tampering.
- In case of difficulties please contact **Curtis Instruments**.

**For further assistance or information on the full range of Curtis products please contact:**

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