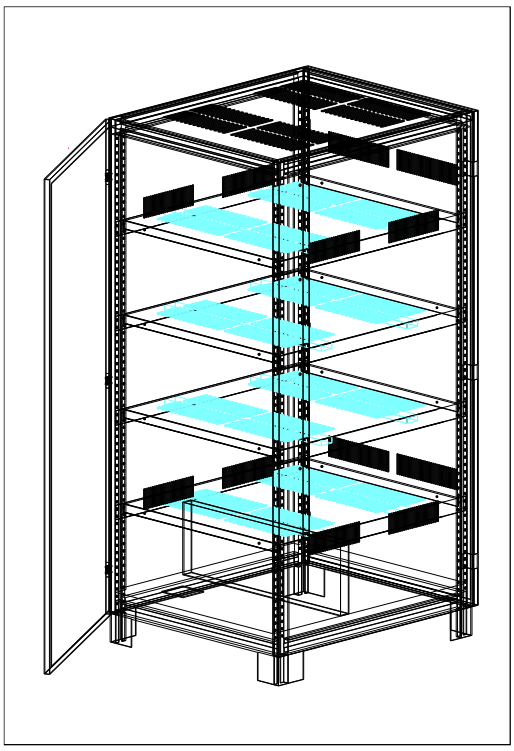
ENERPOWER

BATTERY CABINET



USER MANUAL

ENERPOWER S.r.l. - UFFICI e DEPOSITO Via Boccioni, 7 20900 MONZA (MB)
Tel.++39 (039)-832152 Fax ++39 (039)-2230441 E-mail : segreteria@enerpowersrl.com

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1 PREFACE

Scopo di questo manuale è quello di fornire una guida rapida per l'immagazzinamento, l'installazione di armadi.
Prima dell'inizio di una qualsiasi attività è molto importante leggere attentamente le procedure di sicurezza.

2 DOCUMENTATION AND REFERENCES

2.1 Reference Standards

- DIRECTIVE 2006/95 / EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 12 December 2006
- CEI 17-13 / 1: for electrical panels features.
- CEI EN 60950-1: for electrical panels features in office environments.
- EN 60896-1: Lead acid stationary storage batteries. General requirements and test methods.
    - o Part 1: Open vessel type batteries EN 60896-2: Lead acid stationary accumulator batteries. General requirements and test methods.
    - o Part 2: Batteries of the valve regulated type
- EN 50272-2: Safety requirements for storage batteries and their installations Part 2: Stationary batteries
- CEI 20-22: for connection cables.

2.1.1 - CEI 64-8: for the section of the earth cable and relative connections to the structure. DIRECTIVE 2006/95 / EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 12 December 2006

Here are some particularly important points regarding the supply of battery cabinets whose directive must be applied in its entirety:

- Article 1: the directive applies to "... electrical equipment... intended for use at a rated voltage between... between 75 and 1500 V in direct current. ... "
- Article 2, paragraph 1: "... electrical equipment can only be entered if, built in accordance with the rules of the art on safety valid within the Community, ..."
- Article 2, paragraph 2: refers to the CEI standard
- Article 5: "... consider the electrical equipment that meets the safety provisions of the harmonized standards to comply with the provisions of Article 2. ... "
- Article 8, paragraph 1: "Before being placed on the market, the electrical equipment must be equipped with the CE marking established in Article 10, ..."
- Article 10, paragraph 1: "The CE conformity marking is affixed by the manufacturer or his authorized representative established in the community to the electrical material ..."

2.1.2 CEI EN 50272-2 (CEI 21-39)

Here are some particularly important points regarding the supply of battery cabinets, the standard must be applied in its entirety: When HD 384 is recalled, it corresponds to the Italian standard CEI 64-8 for the paragraphs indicated.

- Paragraph 5.1: "... Doors to battery rooms and battery cabinets are considered obstacles and must be marked with warning labels according to 12.1...". "... If protection by barriers or enclosures is applied, at least a degree of protection IP 2X or IPXXB of EN 60529 must be used".

- Paragraph 5.2: "... A rated contact voltage of 120 V DC must not be exceeded. ... ". The paragraph refers to the regulatory information for the protection cable outside the cabinet. For internal equipotential connection cables (hinged brushes, removable screwed panels, ...) the CEI 64-8 standard in paragraph 547.1.1 requires that the section of these cables is equal to half the section of the protection cable with a minimum of 6 mm2. While the standard CEI EN 60439-1 (CEI 17-13 / 1) in paragraph 7.4.3.1.10, for equipotential conductors recalls a table with the sections related to the current in use, with a maximum of 10 mm2 for higher currents at 63 A. Provide cables with a section of at least 10 mm2 on all cabinets for equipotential connections.
- In the case of galvanized surfaces in contact with other galvanized surfaces (eg trays in contact with guides or uprights), the point of contact between the two parts may be sufficient, clearly the effective low impedance of the connection must be checked.
- In the case of painted surfaces in contact with other galvanized or painted surfaces (e.g. trays in contact with guides or uprights) it may be sufficient for the fixing bolts to be equipped with surfaces or washers made in such a way as to scratch the paint at the fixing point , or by removing the paint from the metal parts at the point of contact, clearly the effective low impedance of the connection must be checked.
- Each cabinet must have a clearly indicated connection point for the customer's PE cable (sticker with the earth symbol) and equipped with a fixing bolt.
- Paragraph 5.2.1.4: "... Overcurrent protection devices are required on all conductors connected to the battery". The devices must be able to operate in direct current with the voltages of use (eg with 40 monoblocks, 240 elements, in buffer charge at 2.27V / cell, the direct voltage is 545V). The disconnecting devices must be able to interrupt this voltage without damage, possibly using a third or fourth pole to pass one or both poles for the second or third time.
- Paragraph 7.2: Protective measures during maintenance. "... Battery terminal covers that allow periodic maintenance while minimizing the exposure of live parts ..." "... Fuse holders that prevent contact with live parts ..." This also applies to the connection points of disconnectors or switches, which we recommend are equipped with protections such as to guarantee at least an IP 2X or IPXXB degree of protection according to EN 60529.
- Paragraph 8.3: "... Battery rooms or battery casings require an air inlet and outlet with a minimum of free opening surface calculated by the following formula: A = 28 x Q ...". Hydrogen accumulates at the top, being lighter than air, so there must be openings on the roof of a section suitable for the installed batteries in the cabinets. We also recommend that there are openings on the battery trays that allow the hydrogen to flow upwards passing from one tray to another.
- Paragraph 10: "... Protection against access by unauthorized personnel ...".
- Paragraph 10.3.1: "... Sufficient ventilation must be provided ..." "... Precautions should be taken to prevent the formation of an explosive concentration ..." "... The distance between valve regulated lead elements or monobloc batteries must not be less than 5 mm, The inside of the closed environment must be chemically resistant to electrolyte, The closed environment must prevent access to dangerous parts by people other than authorized personnel ... "
- Paragraph 12.1: Warning labels.
- Paragraph 12.2: "... It is recommended that each monobloc battery element or battery assembly unit can be easily identified for maintenance purposes, eg. using numbers of elements and batteries ... "
- Paragraph 12.3: Instructions for use, installation and maintenance.
- The same standard indicates the instructions for working safely with batteries, here are some points:
- Paragraph 7.2: Protective measures during maintenance. "... All personal metallic objects ... must be removed before starting work ..." "... For battery systems where the rated voltage is> 120 V DC, insulated protective clothing and local insulating covers are required to prevent personnel

from come into contact with the floor or with parts connected to earth ... "" ... The batteries must not be connected or disconnected when the current is flowing ... "" ...

- For maintenance purposes, batteries with a rated voltage greater than 120 V DC. should be divided into sections of 120 V DC. (nominal) or lower ... ".
- Paragraph 8.8: "... Care must be taken not to wear clothing and footwear that can create electrostatic charges ...".
- Paragraph 9.2: "... In the case of valves regulated or gas-tight coils, at least protective goggles and gloves must be worn...".
- Paragraph 10.4.1: "... To allow emergency evacuation, a permanently unobstructed escape route with a minimum width of 600 mm must be maintained ...".

The battery cabinets must be made with the implementation of the requirements of the CEI EN 60439-1 (CEI 17-13 / 1) standard as applicable, as indicated in the CEI EN 50272-2 standard.

- For the transport of the preassembled battery cabinets, the connections of the monoblocs are expected to be interrupted (with disconnectors or jumpers) to create voltage blocks ≤ 120 Vdc.

3 GENERAL SPECIFICATIONS

- The products in question will be built in a workmanlike manner and in compliance with the reference standards set out in paragraph 2.1.
- For each product supplied, a double copy of the test report (Test report as per attachment A) and the declaration of conformity will be drawn up,
- Declaration of conformity:
    - Conformity with the requirements set out in this prescription and the related documentation for the construction of cabinets and solutions containing batteries is declared in accordance with the UNI CEI EN ISO / IEC 17050-1 and UNI CEI EN ISO / IEC 17050-2 standards for declarations of compliance.
    - ENERPOWER uses its own specifications for the management of manufacturing processes designed to meet the required requirements.

4 GENERAL CHARACTERISTICS OF THE BATTERY CABINETS

- The cabinets will carry the CE marking and will be made in compliance with all applicable European regulations / directives for the CE marking.
- The battery cabinets will be made by means of a metal structure capable of withstanding the weight and mechanical stresses during transport by land THROUGHOUT THE EUROPEAN TERRITORY and in service. If the cabinet is transported without batteries, the cabinet can be shipped pre-assembled or alternatively it can be assembled directly at the destination site by our trusted staff.
- The standard packaging of the cabinets will be in cardboard. A different packaging can be supplied on request.
- The cabinets will have a degree of protection at least IP20 (if equipped with a door they must guarantee the degree of protection IP20 even with the doors open). On request it is possible to reach the degree of protection IP30.
- Suitable disconnection and protection devices are provided for the battery cabinet and in accordance with the UPS to which the battery cabinet is connected.
- The connection cables between the battery cabinet and the UPS are provided.

- The color of the cabinet, unless otherwise specified, will, in all its visible parts, conform to the order.
- The cabinet will have a front door and side walls that can be removed using a tool to ensure easier maintenance of the storage batteries.
- All metal parts are electrically connected to each other in order to guarantee the continuity of the earth.
- The battery cabinets are designed for handling with trans-pallets.
- Inside the door of the battery cabinet there is a label with the characteristic data of the battery.

5 ELECTRICAL SPECIFICATIONS

- The items of the supply will be intended to power the UPS and will therefore contain batteries suitable for this purpose, of the "general purpose" or Long Life "type as specified at the time of order.
- Overcurrent protection and sectioning devices will be provided, accessible from the front with open doors, unless otherwise requested. Protections and disconnection will guarantee protection from overcurrents and disconnection under load. Therefore, fuses and disconnectors (or automatic switches) of adequate size and curve will be mounted such as to allow the passage of the discharge current on the cables with the UPS operating even with nominal overload (in value and duration) and battery voltage at the end of discharge. . The protections will intervene for short circuit downstream of the battery cabinet even with the battery short circuit current considered in the worst case. A label indicating the polarities of the batteries will be present in the vicinity of the sectioning devices in order to facilitate / guide the connection with the UPS. There will also be labels indicating dangerous voltage in relation to the configuration of the battery cabinet and in compliance with regulatory requirements.
- ENERPOWER will attach to each cabinet a single-line electrical diagram also indicating the protection and sectioning devices and related main technical characteristics.
- An adequately sized protective earth terminal will be provided for connecting the cable coming from the protective earth system.
- In the case of battery cabinets with branches in parallel, as far as possible, connections with cables of equal length will be provided to obtain balanced discharge currents between the various branches.
- The connection cables between the batteries will be as short as possible, to limit the resistive drops and will also be suitably sized to withstand the maximum current required.
- The cables connecting to the outside will be present up to the sectioning organ.
- An installation manual will be available inside the battery cabinet, accessible to the customer, with all the requirements that must be performed for both internal (if intermediate sectioning) and external connections.

6 Receipt of the goods

6.1 Inspection on delivery

- All the material has been checked at ENERPOWER before being packed and shipped.
- Upon receipt, it is therefore essential to carry out a visual inspection of the conditions of both the packaging and its contents in order to highlight any damage due to transport or its positioning in the case of a delivery at the work site.
- Material damage to the packaging may indicate careless handling. Write a description on the delivery receipt before signing it. In the event of damage to cells or units, request an inspection from the carrier and fill in the damage report immediately. Any batteries with damage to the terminals and seals must be replaced.

6.2 Hidden Damages

- Within 15 days of receipt, examine all batteries for hidden damage. In the event of damage, immediately request the carrier's inspection and fill out the hidden damage report.
- A delay in notifying the carrier may give rise to a loss of the right to reimbursement for damages.

6.3 Removing the packaging

- Use great care when removing the packaging in order to avoid damaging the contents.
- Inspect the packaging very carefully before discarding it in order to avoid the loss of part of the supply and / or documentation.
- Pay particular attention if the packaging material shows electrolyte damage or coloration.

6.4 Cabinets

- After receipt of the shipment, remove the packaging from the cabinets and carry out a careful internal and external inspection of each cabinet.
- Position the battery cabinet.
- Open the door and, after removing the 2nd access panel, cut the straps that secure the batteries to the shelf.
- Open the battery disconnect switch and reset the series using the special bars supplied, fixed on the front of the 2nd access panel.
- Check that the total voltage and polarities are correct.
- Some batteries are supplied already wired in a cabinet for which an intercelle interconnection is deliberately removed in order to interrupt the continuity of the series and reduce the danger. When opening, in any case, pay the utmost attention to the danger of chorus-circuits [↯] and high battery voltage.

7 INSTALLATION

7.1 Required spaces

It is important to know exactly the spaces made available for positioning the battery. There must always be a corridor in front of each battery to allow initial installation and maintenance or surveillance.

After installation, no other equipment should impair access to the battery.

7.2 Minimum characteristics of the room / battery cabinet

The room must be clean, cool and dry.

The floor must be sufficiently level and able to support the weight of the battery.

Do not enclose batteries in watertight containers that prevent ventilation and keep the battery temperature at recommended values.

7.3 Load on floor [☞]

The floor of the area where the battery system is to be installed must be able to support the weight of the batteries and any auxiliary equipment.

The total weight of the battery will depend on the size of the cell, the number of units, and also the expected configuration of the modules.

7.4 Fixing to the floor

Where seismic conditions are foreseen, fixing to the floor must be provided. This fixing is the responsibility of the user.

7.5 Batteries installation

Attention batteries must be installed no later than 6 months after receipt. If this is not possible it is necessary to refill them every 3 ÷ 4 months in order to avoid sulphation processes of the plates.