



# User manual

## “Zenith” lead acid batteries

WITHOUT THE NEED TO TOP UP THE ELECTROLYTE (MAINTENANCE FREE).



**IMPORTANT:** the "General Warranty Conditions" in force and available on the website [www.unionbatteryservice.it](http://www.unionbatteryservice.it) are to be considered an integral part of this manual and binding.

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### 1. INTRODUCTION

- a. ZENITH lead batteries belong to the VRLA battery family, i.e. maintenance-free batteries (there is no need to top up the electrolyte). They are not currently classified as dangerous goods, however for any assessment please refer to the 16-point Safety Data Sheet available on our website. [www.unionbatteryservice.it](http://www.unionbatteryservice.it) in the DOCUMENTS area.
- b. ZENITH lead batteries are equipped with a safety vent valve (VRLA). Like ALL VRLA batteries they have very low gas emissions during their use.
- c. ZENITH lead batteries are divided into 6 families, each with different and specific characteristics for different fields of application/use. Using a battery in an area for which it was not designed immediately voids any guarantee and any liability of U.B.S.:
  - I. “ZGL” series: AGM technology, for stationary uses (stand-by)
  - II. “ZL” series: AGM technology, for cyclical uses (deep-cycle)
  - III. “ZLS” series: AGM technology, for cyclical uses (deep-cycle)
  - IV. “ZLM” series: AGM technology, for hybrid uses (starting and deep-cycle)
  - V. “ZPC” series: AGM technology, for hybrid uses (starting and deep-cycle)
  - VI. “ZGEL” series: GEL technology, for cyclical uses (deep-cycle)
- d. Since there are areas of application in which it is not so clear which technological battery solution to choose, contact U.B.S. UNION BATTERY SERVICE for clarification.
- e. Before storing, transporting, installing and using the battery, carefully read this manual, as well as the general warranty conditions and the technical data sheet of the battery itself, available on the website [www.unionbatteryservice.it](http://www.unionbatteryservice.it).
- f. For any doubts or questions, the U.B.S. UNION BATTERY SERVICE technicians are available to provide adequate technical support.

## 2. STRAGE

- a. Store the battery in suitable environments in compliance with the reference regulations in force, considering the characteristics of the product as indicated in point a) of the Introduction.
- b. Store in environments protected from bad weather, properly ventilated and which respect the temperatures indicated in the product technical data sheet.
- c. Store the battery in a vertical position (with handles at the top and legible packaging writing).
- d. Keep the battery fully charged.
- e. If storage lasts for a long time, carry out refresh charges keeping in mind that the self-discharge of the battery varies as the storage temperature varies. The table below shows the frequency of refreshment refills depending on the ambient temperature.

REFRESHING CHARGES FOR STOCK BATTERIES	
	(ZLI, ZGL, ZPC, ZLS)
Storage temp. between 10°C and 20°C	every 9 months
Storage temp. between 20°C and 30°C	every 6 months
Storage temp. between 30°C and 40°C	every 3 months

- f. The refresh charge must be carried out using a battery charger equipped with an "IU" curve. The "I" value (constant charging current) to be programmed will be equal to 8/10% of the battery capacity. The "U" value (maximum voltage during charging) to be programmed will be equal to 2.40 Volts per cell (e.g.: 14.4 Volts on a 12Volt battery). Our battery charger series called POWER-SWITCH MULTISYSTEM is ideal for this application.
- g. The frequency and methods of refresh charges must be respected even if the battery has already been installed but remains unused for long periods (use the table in point e. to determine the frequency of recharges). In this case, be very careful that there are no loads connected, even very small ones, because the battery could be irretrievably damaged (e.g. a simple, constant load of 1Amp means discharging the 24Ah battery in a day, which could become 169Ah in one week!).
- h. Store ensuring that the packaging/battery is not deformed.

## 3. TRANSPORTATION

- a. Transport the battery in compliance with the reference regulations in force, considering the characteristics of the product as indicated in point a) of the Introduction.
- b. Transport the battery in an upright position (with handles at the top and legible packaging writing).
- c. Transport the battery ensuring that the packaging/battery is not deformed or damaged. It is recommended to place it on pallets (non-stackable pallets).
- d. During transport the battery must be adequately protected from the elements.
- e. During transport the battery must be protected from short circuit.

## 4. BATTERY PRE-INSTALLATION/SELECTION

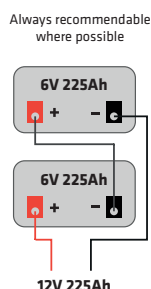
- a. Before proceeding with the installation it is necessary to check the compatibility between the battery and the application on which it will be used:
  - I. Scope of application: starting, cyclic (deep-cycle), stand-by.
  - II. Check that the nominal voltage of your load is compatible with that of the battery(s).
  - III. Check the absorptions of your load and compare them with those allowed by the battery.
  - IV. Check that the "system" on which the battery is installed guarantees that it NEVER discharges it beyond 80% (presence of minimum voltage blocks, appropriately calibrated and functioning).
  - V. Check that the battery compartment is compatible with the battery pack you intend to use, ensuring the correct ventilation and distance between the batteries themselves. IMPORTANT: VRLA lead batteries, the family to which ZENITH batteries belong, should NEVER be installed in completely sealed/watertight compartments. Air circulation is always necessary.
  - VI. Check that the working environment temperature is within the limits indicated in the technical data sheet, remembering that:
    1. Temperatures above 25°C significantly reduce the expected life of the battery (for example at 40°C the battery loses up to 35/40% of its expected life. An eventuality not covered by the warranty).
    2. Temperatures close to 0°C, or even lower, significantly reduce the performance of the battery (an event not covered by the warranty).
  - VII. Check that the battery charger/charging system is suitable for charging the battery.
- b. If the batteries you are installing replace others, remember to always replace ALL of them. Installing a new battery in a pack of already used batteries immediately voids the warranty.
- c. Check the condition of the connection cables extremely carefully and replace them if necessary. Cables that are not in perfect condition compromise the correct functioning of the battery(s).
- d. NEVER mix batteries of different brands or ages.
- e. It is recommended to always perform an equalization charge cycle on each individual battery (one at a time), before installation.
- f. Once the battery has been removed from the packaging, carefully check its integrity. DO NOT install the battery if it is deformed, mechanically damaged in any part or has oxidation on the poles.
- g. These batteries can be connected both in series and in parallel, strictly respecting the directives that we will illustrate in the next paragraph. However, keep in mind that the greater the number of batteries that will make up the battery pack, the higher the risk that they will operate in an unbalanced manner (currents not equally divided, uneven voltage levels). The resulting loss of battery performance is not covered by the warranty.

## 5. INSTALLATION

- a. The installer will always be responsible for connecting the batteries in full compliance with the reference regulations based on the application and their technical characteristics.
- b. During assembly, strictly observe the polarities: positive pole (red +) and negative pole (black/blue -). **Absolutely avoid any short circuit between the two polarities.**
- c. For the battery or battery pack to function properly, there must be only one red output cable and only one black output cable to the load or charging system.
- d. NEVER use the battery poles as a “sorting” of the system. The use of “BUSBAR” is recommended (not supplied with the battery, but available on request). These accessories are essential when it is necessary to connect multiple batteries in series and/or parallel and/or the battery pack must power various loads.
- e. If there are multiple batteries connected together, NEVER use intermediate sockets to power specific loads.
- f. The battery must be installed in a vertical position (handles on top and legible writing on the side label). Any other positions must be agreed with the technicians of U.B.S. UNION BATTERY SERVICE.
- g. Install the battery in adequately ventilated places.
- h. If multiple batteries are installed in the same compartment, place them at a certain distance from each other (at least 1 – 2 cm), to ensure adequate cooling of the batteries.
- i. It is absolutely forbidden to weld, screw or in any way apply fixing brackets directly to the battery.
- j. The battery must NOT be tampered with or altered in its integrity, for any reason.
- k. The battery must be secured in such a way as to ensure its complete integrity during daily use and for the entire period of use.
- l. DO NOT immerse the battery in any liquid.
- m. Keep the battery away from intense heat sources.
- n. DO NOT block the safety valve.
- o. Tighten the battery terminal screws, respecting the values reported below
  - Pole with con M5: 5,9/6,1 Nm
  - Pole with M6: 11,9/12,1 Nm
  - Pole with M8: 22,5/23,2 Nm
  - Pole with M10: 24,5/27,0 Nm
  - I. Too high tightening torque will damage the pole (not covered under warranty).
  - II. Too low tightening torque causes overheating of the pole and/or spark (not covered by warranty).

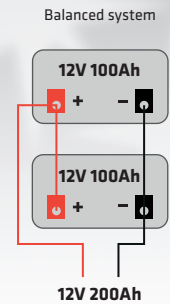
### p. Series connection:

- I. By connecting two batteries in series, you get one with the same capacity, but double the nominal voltage.



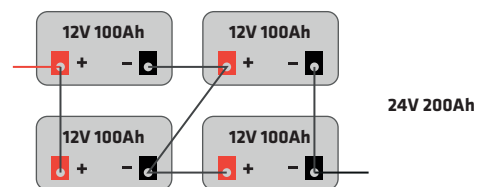
### q. Parallel connection:

- I. By connecting two batteries in parallel, you get one with the same nominal voltage, but double the capacity. Be VERY careful with the balanced connection.



### r. Series/parallel connection:

- I. By connecting four batteries in series/parallel, you get one with double the nominal voltage, and double the capacity. Be VERY careful with the balanced connection.



### s. NEVER connect in series and/or parallel:

1. Batteries of different brands/series/technologies.
2. Batteries of different ages.
3. Batteries of different nominal voltage.
4. Batteries of different capacities.

### t. Use correct cable sections based on the discharge/charge currents and distances. Support tables for sizing are available in the DOCUMENTS section of our website. Undersizing the cable section generates the following problems:

- I. Damage to batteries.
- ii. Incorrect power supply of loads.
- iii. Fire risk.

### u. It is important to point out that in the case of connecting multiple batteries in a battery pack, even using the correct cable sections, it will always be impossible to achieve a perfect theoretical balance since by their nature the batteries are different from each other.

### v. The use of rubber terminal covers is recommended for:

- I. Reduce any dangerous oxidation on the battery terminals.
- II. Avoid short circuits between battery poles.

### z. The correctly sized and installed battery(s) is now ready for use.

## 6. USE

- a. Perform an initial full charge.
- b. Batteries should NEVER be discharged beyond 80%. Deeper discharges will damage them irreparably (an event not covered by the warranty).
- c. The discharged battery must be recharged immediately.
- d. Use ONLY a suitable charging system (see technical data sheet) and above all an “intelligent” one, that is, one capable of modulating the charging according to the actual level of discharge of the battery itself, thus avoiding dangerous overloads. Damage to the battery due to incorrect charging is not covered by the warranty. For stationary use, use a battery charger with a “pulsating” maintenance cycle.
- e. NEVER interrupt the charging cycle: incomplete recharges irreparably damage the batteries. In these cases the warranty is void.
- f. Discharge the battery/batteries up to 80% at least 5-6 times a year, to reduce the negative impact on battery performance due to the Memory Effect.
- g. Batteries for cyclic use can be used only one cycle per day for a maximum of 220 cycles per year. Different uses, if not agreed in writing with U.B.S. UNION BATTERY SERVICE, will void the warranty.
- h. Check the “no-load” voltage (Open Circuit Voltage: without load or battery charger connected) of the individual batteries at least 3-4 times a year: any “problem” on one battery could affect all the others in the same pack, damaging them. This eventuality is not covered by the warranty.

## 7. MAINTENANCE

- a. The battery does not require any complex maintenance.
- b. Alternate the battery position at least 2 – 3 times a year.
- c. Check over time (4 – 5 times a year) that:
  - I. There are no deformations/breakages/tampering.
  - II. There is no oxidation on the poles.
  - III. The connection cables are correctly tightened (see point “o” in chapter 5).
  - IV. Condition of connecting cables.

## 8. REPAIR

- a. These batteries cannot be repaired for mechanical damage.

## 9. DISPOSAL

- a. For disposal, strictly follow the regulations in force at the time you need to do so.



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