

# User manual

## Zenith Lithium batteries

These instructions concern the following models:

ZLI024065, ZLI024070, ZLI024100, ZLI036065 and ZLI048060



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### INTRODUCTION

Lithium batteries are complex devices consisting of lithium cells and control electronics called BMS (Battery Management System).

The lithium cells used in these batteries are LiFePO<sub>4</sub> (LFP).

The BMS carries out all and only the control functions to keep the battery safe.

When the BMS detects internal parameters outside the allowed limits, it blocks the operation of the battery. It works again only when the alarm stops.

#### Attention:

- ▶ Keep the battery turned off during transport, assembly and maintenance service.
- ▶ Transportation rules stipulate that the maximum charge capacity during transportation must not exceed 50%.
- ▶ It is strictly forbidden to connect batteries in series.
- ▶ Batteries can be connected in parallel, contact the producer for more information.

### WARNINGS

- Before use, please carefully read the handling instructions and the marks on the battery. Check the load is compatible with the battery.
- During use, please far away from heat source, electrostatic place, high voltage and avoid children to use. Don't beat battery.
- Please use the special charger to charge the battery, and don't put the battery in the charger more than 24 hours.
- Do not make the positive (+) and negative (-) terminals short circuit. Do not immerse in any liquid or damage it.
- Please store the battery well if don't use in a long time. Please keep the battery in half charge, that is to say don't charge fully and don't discharge completely. Please avoid to touch with metal to damage the battery. Please store the battery in shade, cool and dry place.
- Do not put the battery into a fire or water, and please safely deal with the disuse battery.
- Don't charge the battery in environments where the temperature is over 50°C or lower than 5°.
- Don't reverse the two electrodes when use the battery.
- Don't penetrate the battery with sharp things.
- Do not disassemble the battery.
- Battery has usage cycle life, if its using time is quite little than usual, please change your battery.
- Don't weld the battery directly.
- Don't use the battery with seriously scratch and distortion.
- Never connect the battery in series.
- Never connect in parallel with other batteries different from the ZLI series battery and always check compatibility (always contact the manufacturer first).
- Please stop using if you find the battery heat, smell odor, change color, distort or other abnormal states.
- Please far away from the battery if you find leakage. Touch the battery only if properly protected.
- Please wash with clean water if the electrolyte leak on your skin or clothes.
- If the battery leaks, and the electrolyte get into the eyes. Do not wipe eyes, instead, rinse the eyes with clean water, and immediately see a doctor.
- Store the battery with a maximum of 50% charge.
- When not in use, leave the battery with a maximum of 50% charge.
- Check the vehicle manual for lithium battery compatibility.
- Check if the absorptions involved are compatible with the currents allowed by the battery (see data sheet).
- Do not cut the cables.
- ZENITH LITHIUM batteries fall under category UN3480, lithium ion, 9, (E) and are certified according to the relevant standards (see CE declaration of conformity). The customer (user) is aware of the product he is using and is therefore obliged to carefully read the technical characteristics given on the data sheets as well as the user manual (instructions). The customer is also obliged to take ALL the necessary precautions for correct/compatible installation and use, and to check that the environments in which they are used are equipped with all the safety devices required by law, with particular attention to fire prevention solutions.

## PRE-INSTALLATION

Before proceeding with the battery installation, it is necessary to check the compatibility between the battery and the application it will be used.

What to check before installation:

- Read the battery data sheet again.
- Check the maximum absorption of your load and compare with the electrical characteristics of the battery (see technical data sheet).
- Verify that the size, weight and length of the battery cables are compatible with your application.
- Check that the temperatures of the environment in where the battery will be installed is within the limits indicated in the technical data sheet.

### Dimostrative example of ZLI024065 battery data sheet

Corrente costante di scarica / <i>Constant discharge current</i>	100A
Corrente impulsiva di scarica / <i>Impulse discharge current</i>	Max 200A per 15" Max 400A per 3"
Corrente max di carica consigliata <i>Max recommended charging current</i>	50A
Corrente impulsiva di carica / <i>Impulse charge current</i>	> 75A per 10"
Tensione di carica consigliata / <i>Recommended charging voltage</i>	27.8V
Tensione di carica massima / <i>Maximum charging voltage</i>	28.8V

### Dimostrative example of ZLI024065 battery data sheet

Temperatura di scarica massima <i>Maximum discharge temperature</i>	-15°C / +60°C
Temperatura di scarica consigliata <i>Recommended discharge temperature</i>	-10°C / +45°C
Temperatura di carica massima / <i>Maximum charge temperature</i>	0°C / +60°C
Temperatura di carica consigliata <i>Recommended charge temperature</i>	+5°C / +40°C

## INSTALLATION / USE

The battery has two cables, one red (positive) and a black one (negative), with which it will be possible to load and unload it also.

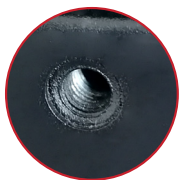
The battery is supplied without connector, available only on request.

Use a connector with adequate capacity for the application.

- During installation, make sure that the battery is off.
- Respect the polarities (red +, black -).
- Use cables with a suitable section for the application, if necessary, ask the manufacturer.
- The favourite mounting position is the spontaneous one with handles on top. For any different positions ask for manufacturer's authorization.
- Secure the battery in case of movement or vibration. Use the appropriate **threaded inserts (1)** provided on the container.

During use:

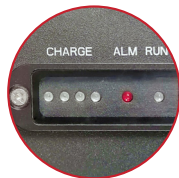
- It is strongly recommended that you turn on the battery first and then the load.
  - **Connect/disconnect only when the battery is not used (no flashing led).**
  - The battery has an **ON/OFF button (2)** for switching the BMS on and off (in OFF there is no voltage on the poles).
  - **Six LEDs (3)** indicate the level of charge (S.o.C.) and the battery status.
  - **Two connectors (4)** to plug: the specific display to view all the battery parameters (RS485) and the CANBUS to put the battery in communication with any vehicle.
  - A **selector (5)**, usable only with the special display, necessary when connecting several batteries (max 10) in parallel.
- For more detailed information on the **display (6)** and parallel connection, contact the manufacturer.
- A **buzzer** that warns in case of anomalies.



1.Threaded inserts



2.ON/OFF



3.S.o.C. indicators



4.CANBUS - RS485



5.Selector (Dip-Switch)



6.Display

# INDICATOR INSTRUCTION

Four led indicate the level of charge (S.o.C.)



Allarm led

Operating led

Level of charge



- Led ON
- Led OFF
- Flashing led

Battery ON	
Battery on discharge	
Battery on charge (last led level of charge flashing)	
BMS block the battery	

## CAUSE OF THE ALLARM STATE

Over discharge	
Current pulses beyond the allowed limits	
Short circuit	
Battery temperature too high	
Battery temperature too low	

## STANDARD PROCEDURE FOR THE MANAGEMENT OF THE ALLARM STATUS

When the battery goes into allarm, wait 1 minute for the acoustic signal and red allarm LED turning off automatically.

When switched off, check the state of charge of the battery and, if not completely discharged, it will be possibile to use it.

If the automatic shutdown does not occur, disconnect the battery from the load and connect it to the "ZHF.LH" series compatible charger.

If the charger does not start automatically, press and hold the red trigger button (located above the output cables) until the red LED on the charger lights up constantly.

If even in this case the charger does not start, it means that the battery has a thermal problem, so wait for the alarm to automatically switch off. The wait could be long: minutes or hours.



## ANOMALIES

- Over discharge.

**Procedure:**

**Follow the standard procedure**

- Current pulses beyond the allowed limits (see technical data sheet).

**Procedure:**

**After 10 times in an hour that the battery goes into allarm due to current pulses, the BMS will go into permanent block.**

**To reset it, follow the standard procedure.**

- Short circuit.

**Procedure:**

**The acoustic signal and the red alarm LED will remain active until the BMS is manually reset.**

**To carry out the manual reset, follow the standard procedure.**

- Battery temperature too high (see technical data sheet).

**Procedure:**

**Disconnect the battery from the load and wait for the temperature to drop.**

**When the buzzer and the red alarm LED go off, check the state of charge of the battery and, if not completely discharged, reconnect it to the load.**

- Battery temperature too low (see technical data sheet).

**Procedure:**

**If the battery temperature is below 0°C it will be possible to discharge the battery but not to charge it.**

**Even if the discharge is not allowed: disconnect the battery form the load and wait for the temperature rising.**

**When the buzzer and the red alarm LED go off, check the state of charge of the battery and, if not completely discharged, reconnect it to the load.**

## STAND-BY

If the battery remains on without being used, it will go into stand-by mode after 10 days.

To exit stand-by mode, press the ON/OFF button or press the red trigger button (located above the output cables) of the charger.

## DISPLAY E CANBUS

For any information regarding the DISPLAY and the CANBUS connection, contact the manufacturer.

