

User manual

Zenith Lithium batteries

These instruction concern the following models:
ZLI012100



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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 LiFePO₄ (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. After 4/6 months check the state of the state of charge (S.o.C.) and eventually restore the missing capacity.
- 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 ZLI012100 battery data sheet

Corrente costante di scarica / Constant discharge current	200A
Corrente impulsiva di scarica / Impulse discharge current	Max 250A per 15" Max 400A per 3"
Corrente max di carica consigliata Max recommended charging current	100A
Corrente impulsiva di carica / Impulse charge current	> 150A per 10"
Tensione di carica consigliata / Recommended charging voltage	13.9V
Tensione di carica massima / Maximum charging voltage	14.6V

Dimostrative example of ZLI012100 battery data sheet

Temperatura di scarica massima Maximum discharge temperature	-15°C / +60°C
Temperatura di scarica consigliata Recommended discharge temperature	-10°C / +45°C
Temperatura di carica massima / Maximum charge temperature	0°C / +60°C
Temperatura di carica consigliata Recommended charge temperature	+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.

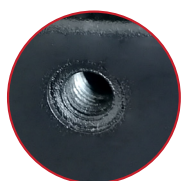
The battery is supplied without connector, available only on request.

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).
 - **Five LEDs** (3) indicate the level of charge (S.o.C.) and the battery status.
 - **A connectors** (4) to plug: the specific display (6) to view all the battery parameters (RS485).
 - A **selector** (5), usable only with the special display, necessary when connecting several batteries (max 4) in parallel.
- For more detailed information contact the manufacturer.



1.Threaded inserts



2.ON/OFF



3.S.o.C. indicators



4.RS485



5.Selector (Dip-Switch)



6.Display

INDICATOR INSTRUCTION

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



Alarm led

Operating led

Level of charge



from 100% to 67%



from 66% to 34%



from 33% to 1%



0%



OFF

● Led ON

○ Led OFF

Battery ON and in operation (charge / discharge)	<div>ALM RUN</div>
BMS block the battery (alarm state)	<div>ALM RUN</div>

CAUSE OF THE ALARMSTATE

Over discharge	<div>ALM RUN</div>
Current pulses beyond the allowed limits	
Short circuit	
Battery temperature too high	
Battery temperature too low	

STANDARD PROCEDURE FOR THE MANAGEMENT OF THE ALARM STATUS

When the battery goes into alarm, wait more than 30 seconds for the red alarm LED turning off automatically. When switched off, check the state of charge of the battery and, if not completely discharged, it will be possible to use it.

If the automatic shutdown does not occur, disconnect the battery from the load, turn it off and on by the ON/OFF button, or 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.



"CAUSE OF ALARM STATUS" MANAGEMENT

- Over discharge.
Procedure:
Follow the standard procedure.
- Current pulses beyond the allowed limits (see the data sheet).
Procedure:
After 10 times in an hour that the battery goes into alarm due to current pulses, the BMS will go into permanent block. To reset it, follow the standard procedure.
- Short circuit.
Procedure:
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 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 (until -15°) but not to charge it.
Even if the discharge is not allowed: disconnect the battery from the load and wait for the temperature rising.
When the red alarm led go off, check the state of charge of the battery and, if not completely discharged, reconnect it to the load.

ON/OFF BUTTON MODE

If the battery is on, using ON/OFF button we can access different modes:

1. If **pressed once** the RUN led start to flash and it will enter in Low Power Mode.
 2. If **kept pressed** until the led switch off state of the battery will shut down.
- To turn the battery back on, press the button again.

LOW POWER MODE

The Low Power mode allow to reduce the self-discharge of the battery (caused by the BMS), in order to preserve its capacity.

In this mode the battery is not active and RUN led will continue to flash.

To reactivate it, the user will have to perform one of the following steps:

- Press ON/OFF button.
- Connect the charger to the battery.
- Discharge the battery.

The low power mode is activated when the battery is on for more than 24h without being used.

For any information regarding the DISPLAY contact the manufacturer.

