BATTERY AND CELL CHECKING

Battery check and match any individual cell or battery is done by charging the cells in series, connecting the charger to each individual battery. Checking the battery status and any match is recommended to perform these intervals (ie, discharge / charge cycle):

- first charge
- after the first cycle
- after the 5 cycles
- after the 20 cycles
- after the 50 cycles
- possibly followed by further the anomalies detected about once every 50 to 200 cycles

USING THE BMS

Battery Management System (BMS) is a monitor device, which monitors and records the status of individual cells or batteries. To ensure correct operation and in case of a warranty claim cells and batteries must be monitored during operation. When you detect deflections or malfunction cell or battery, must be such cell / battery removed from service.

For the warranty it is necessary to provide documentation, that the cells or the batteries were not discharged below the minimum level or have not been overcharged above the maximum level.

RECYCLING BATTERIES AND CELLS - REQUIRED INFORMATION STIPULATED BY LAW

1. Method of securing the return or separate collection for which purpose the manufacturer means available to the end user publishes a current list of places to take back and separate collection containing at least the name of the place and its address.
   Place of return and separate collection:
   GWL a.s., Prumyslova 11, Prague 10, Czech Republic
2. The possible negative effects of the substances used in batteries and accumulators on the environment and human health:
   Batteries and cells contain chemical substances with possible negative effects on the environment and human health.
3. About the importance of the graphic symbol for separate collection or take-back and the importance of labeling **This is a graphic symbol for separate collection or take-back.**

Do not throw batteries into household waste, but hand in place of return and separate collection.

GWL Power @GWLPower GWLPower GWL Power

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Your complete power solutions.

LFP manual and guidelines

TRANSPORT AND MANIPULATION

Although the LiFePO4 cells and batteries are safe technology without risk of fire or explosion, they are like all Lithium batteries considered as Dangerous Goods due to high amount of stored energy. Release of this energy may cause dangerous situation.
Therefore high capacity cells and batteries cannot be transported as ordinary goods. Dangerous goods requires special handling care. Lithium cells and batteries are classified as ADR goods – special road transit.

WARRANTY

Warranty is valid for manufacturing faults and cell nominal capacity existing at delivery of goods. Warranty apply for standard usage within a specifications given by manufacturer. Warranty does not apply to decrease of capacity within toleration of charging and discharging specification given by manufacturer. Warranty period is stated on Delivery Note provided with goods.
Warranty is void if voltage on cells or battery terminals exceed the limitation given by manufacturer.
For warranty claim processing we require reliable confirmation that your battery was used within voltage range given by manufacturer. This is ensured by using regulated charging and discharging via BMS.
Warranty does not apply for situation caused by unintentional short circuit, overcharge or undercharge of cells which is usually demonstrated by inflation of the cells or terminal burns. Warranty also does not apply for unintentional discharge when the cell or battery is left without control and the voltage on terminals drop below minimum specified by manufacturer.
Warranty does not apply if the cell was damaged due to failure of BMS (Control Electronic), error of charging or discharging equipment or improper function of device where the cell is placed.
One of requirements for accepting warranty claim is following all recommendation given in this manual.

USER MANUAL

Lithium cells and batteries LiFePO4 (LFP) – LiFeYPO4 (LFYP)

WARNING:
Always check the technical specification of the cells and other products BEFORE the installation. Check the voltage, polarity, dimensions, mechanical shape, the proper design of the terminals, etc. Be sure to report any strange conditions to us BEFORE the operation and installation of the cell or other product. We will be happy to provide support for any irregular situation.

USAGE

Lithium cells and batteries are designed for use as rechargeable and reusable power source. Can be used as a substitute for other types of rechargeable cells and batteries.

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POSSIBLE DANGERS

- **Risk of short circuit and the subsequent fire**
  Charged and uncharged cells contain large amount of electricity, which can cause a short-circuit in the electrical spark or arc. The battery itself is not combustible, but from incandescent contacts may ignite other combustible materials.
- **Risk of injury by DC**
  When connecting more cells and batteries in series increases the risk of injury DC. In any case, do not touch electrical wires or other components under voltage.
- **Risk of chemicals**
  Lithium cells and batteries contain no caustics and acids. However contain chemical substances, that act on the human body. For this reason, in the handling of cells and batteries must observe the following rules:
  - **Eye protection:** protect your eyes with goggles against the ingress of chemicals in the eye.
  - **Skin protection:** wear protective clothing and gloves. Avoid skin contact with chemicals.
  - **Protection against inhalation:** Operate with batteries only in well-ventilated areas. In enclosed spaces it is necessary to provide forced air ventilation.

LESSONS FOR END CONSUMER

The batteries can be used only by the person who was properly instructed on the use of lithium cells and batteries. Lessons performs the last seller. In case of internet orders, have instruction provided in manipulation manual. More information are listed on the website of the seller.

THE RULES FOR USE AND STORAGE OF BATTERIES

- Protect from improper handling.
- Do not insert with opposite polarity, follow the signs. If the batteries are inserted in reverse, can cause a short-circuit or charging.
- Prevent short-circuiting. If possitive (+) and negative (-) battery terminals are connected, short-circuiting happens.
- Before installing, clean the terminals of battery and the terminals facilities.
- The LiFePO4 should be always mounted with the terminals facing upwards.
- Do not heat excessively. – batteries operate at temperatures according to the specifications.
- Do not weld the cells.
- Do not disassemble. When open may be contact with different parts of the battery harmful.
- Do not distort. Batteries should not be compressed, punctured or damaged in any way.
- Do not dispose of in fire.
- Do not expose to water or excessive humidity.
- Keep away from children. Beyond their reach, it is necessary first of all to keep away batteries which can be swallowed. In addition, children should not be allowed replacement of batteries without adult supervision.
- Do not incase or modify. Any modifying of the battery may cause block safety ventilation mechanism. Any adjustments should consult the dealer.
- Unused batteries should be stored charged and keep them away from metal subjects, which can make short-circuiting the battery. Alreary unpackage units should not be mixed and stored with unused batteries.
- Avoid extreme humidity (over 95%) High temperature or humidity may worsening of battery characteristics and / or corrosion of the surface.
- Do not storage / expose the battery to direct sunlight, in places where they may be exposed to rain, excessive heat such as radiators or heaters.
- Batteries stored in well-ventilated and dry environment, ideally enclosed in a protective case.
- During storage, keep the temperature within the range according to the specifications of a particular article.
- Do not mix with other materials.
- Do not stack cardboard box with batteries. When stacking may cause deformation of the battery in the lower layers and the subsequent flow of electrolyte.
- For additional transportation / handling and packing materials, choose the method of packaging to prevent unintentional electrical contact and corrosion terminals, providing protection against environmental influences and mechanical damage.
- Considerate handling of the boxes. Rough handling can cause a short circuit or damage.
- Ensure proper circulation of stocks, follow FIFO system (First In, First Out).
- Check the voltage of the cell every 2 month. Charge the cell if the voltage dropped to a minimum value of voltage

Battery operate under the supervision or constant monitoring protection and control systems. Protect against overcharge and deep-discharge.

CHARGING

WARNING:
Carefully check the maximum voltage as specified cells or batteries. Exceeding the voltage will damage the battery and void the warranty.

- **Initial charging**
  New batteries LFP/LFYP are partly charged from factory. However, before first use it is absolutely necessary to charge the battery to full capacity. This initial charging should be done at maximum current of 1C and the voltage level according to the specification of the cell or battery. Please see specifications of the cell about value of initial charging. Battery capacity in the first cycle gradually grows. In the first few cycles is recommended to avoid rapid discharge to the minimum capacity and we do not recommend quick charging. After about the fifth, sixth cycle, is nothing to prevent the batteries used in full operating cycle according to the manufacturer‘s specifications for the type of battery.
- **Standard charging**
  Because LiFePO4 batteries has no memory effect, charging can be done at any time. Repeated short charge cycles the battery life not significantly changed (within + / - 5%).

Maximum charging currents for single cells or batteries are listed in the manufacturer‘s specifications for the type of cell.

DISCHARGING

WARNING:
Carefully check the minimum voltage as specified cells or batteries. Discharging below this voltage will damage the battery and void the warranty.

Maximum discharging currents for single cells or batteries are listed in the manufacturer‘s specifications for the type of cell.

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