**BE - Power Operating instructions / Manual**

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| **Customer:** | **Diverse** |
| **Project:** | **Diverse** |
| **Product/ Module:** | **Li-ion battery systems** |

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| **Description:** | **This document describes the operation and handling of Li-ion battery systems and provides information on guarantee conditions, safety and the dangers involved in using.** |

**Alteration / Documentation of Revisions**

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| **Remark**  | **Revision** | **Date** | **Name** | **State** |

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| Completed: Fire-fighting procedures part. | 2 | 09.12.2021 | Vladyslava R. | **active** |
| Version 01 replaces the old edition 02.1 from 09/28/2013Implementation in new document form and numbers-circleAdded: Firefighting measures | 01 | 15.09.2015 | J.Jung | **achive** |

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###  1. User Manual

### Charge

* Only charge the battery with the supplied or for the intended Li-Ion charger.
* Charge only at temperatures between 0 ° C and 45 ° C
* Before the first use the battery should be charged
* Charge the battery again after each use. The battery can always be charged, even if only small amounts of energy were taken. The battery has no "memory effect"!
* Disconnect the charger after the end of charging battery.

### Discharge

* The battery can be used at temperatures between -30 ° CM and 60 ° C.

Note: At temperatures below 0 ° C the battery has not the full capacity.
The battery must only be operated in accordance with the intended application.

###  Storage

* Storage of the battery have to be in a dry, cool place as possible. Recommendation: 15-20 ° C, rel. Humidity 40 - 60%, non-condensing.
Longer storage (> 2 weeks) at temperatures> 35 ° C are to be avoided.
* Never store the battery completely discharged. Otherwise, it can cause irreversible damage to the battery by deep discharge.
* For longer storage (> 3 months) the battery should be not fully charged. It is recommended that the battery is has approximately 50 - 70% load capacity! Recommended value of 50% remaining capacity is approximately the nominal voltage of the battery system.
* Latest after about 6 months, battery charge status should be checked and possibly reloaded at about 70% capacity.
* Constant charge condition during storage is to be avoided.

# Safety instructions



Non-compliance with safety instructions can damage the battery system and leads potentially to the termination of the warranty

* Do not open the battery.
* Do not short-circuit the battery.
* Do not overload the battery.
* Do not expose battery to extreme temperatures. Follow the specifications of the temperature limits in the respective operating state as described in point 1 (see above).
* Do not expose battery to liquids, especially acids.
* Do not store flammable items on or next to the battery.
* Do not place any heavy objects on the battery.
* Do not damage or remove nameplate.
* Follow the operating manual of the application.

#  3. Warning notice



Failure to comply with the warnings may damage the battery, will void the warranty and may cause fire hazard!

* Do not throw battery.
* Do not damage the battery or manipulate (drilling, welding, soldering additional cables and so on).
* Do not drop the battery.
* Keep battery away from fire.
* Do not let insert liquids into the battery and use the battery only in accordance to the IP protection class.
* Do not touch escaping liquid.
* Damaged batteries or plugs may not be used and must not be transported. The manufacturer must be notified to define measures on how to proceed.

# 4. Transportation

The battery system is to be transported according to international transport regulations ADR / RID, IATA and IMDG and national transport regulations and to be declared as dangerous goods.

The transport must be carried out according to UN 3480 "LITHIUM ION BATTERIES" or UN 3481 "LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT USED TO BUILD / PACKED WITH EQUIPMENT".

Batteries that have a fall damage or show a deformation of the housing must not be transported. Please inform immediately the supplier / manufacturer.

# 5. Fire-fighting procedures

* Hand-held fire extinguishers with special extinguishing powder (class D) have proven themselves for a quick reaction to the smallest formation phase fires. However, these are only effective in the first phase of the smallest formation phase fires and as a result deflagrations can occur. Hand fire extinguishers with carbon dioxide (CO2) or with conventional chemical dry powder (A, B, C - extinguisher) are only effective to a limited extent due to the lack of a cooling effect. There is therefore currently no general recommendation by using fire extinguishers. It is important to have the most effective cooling possible in order to keep the source of the fire contained. This is best done with the help of water.
 => Cooling with as much water as possible can effectively prevent or at least weaken the spread of the fire to neighboring cells that have not yet reached the critical ignition temperature.
* Never touch damaged batteries with bare hands! Use protective gloves, a shovel or tongs.
* If possible, bring reacting (hot) batteries as soon as possible to the open air.
* Attention! Sometimes defects are not immediately obvious and run later for heating and fast source of fire. Therefore do not touch battery directly with bare hands.

# 6. First Aid Measures

Lithium-ion cells and batteries are when properly handled and stored no source of danger and releases not any toxic, health or environmentally hazardous substances.

In the event of damage and / or fire with emerging ingredients, note the following:

* Skin or eye contact

Affected areas thoroughly with water, also clean the skin with soap.
After eye contact a doctor should always be contacted.
* Respiratory tract (inhalation)

Provide adequate ventilation, definitely leave the area immediately.
In case of irritation of the airways or large quantities of inhaled gases, consult a doctor.
* Burns

Treat burns accordingly and if necessary obtain medical attention.

# 7. Disposal

When disposing the battery system please note the legal regulations, the batteries should be recycled.

For Germany, please refer to: <http://www.grs-batterien.de>.

# 8. Guarantee

The battery system is subject to the statutory guarantee and warranty performance rules.

BE - Power GmbH reserves the right to remedy the defect by repair or replacement for valid

claims.

Guarantee Exclusions:

* System damage
* Transport damage
* Downfall damage
* Mechanical damage of plugs and cables
* Water or liquid entry
* Change on the system:
* Opened housing
* Changes of the system (mechanical | electrically | parameterization | Software)
* Removal or obliteration of the nameplate, the serial number and / or the manufacturing date
* Improper handling and/ or improper use:
* Charge by non-approved charger
* Improper handling or storage
* Connection of unauthorized devices
* A usage not according to the intended purpose
* Operation outside the specified operating conditions
* Damage of the battery due to external environmental factors, such as overvoltage caused by lightning.

Natural wear and tear through use and / or aging is not a defect and also not subject to the warranty / guarantee. This includes in particular a reduction in the battery capacity.

For further information on the battery should be directed to our company.

We will gladly assist you.

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