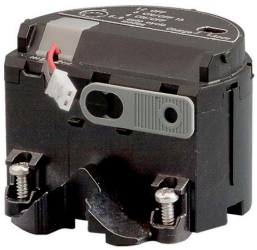
Safety instructions

PLICSAKKU

Lithium-Polymer accumulator pack for
VEGA sensors



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Contents

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1 Area of application and introduction

Scope

These safety instructions are part of the scope of delivery of an instrument with integrated Lithium accumulator. They must be read completely and implemented by the user as a supplement to the operating instructions.

Technical background

The implemented Lithium accumulators are compact energy stores with high energy density. These storage devices feature high cell voltage and cell capacity. They consist of single cells and can be combined into so-called packs.

Dangers

Caution:
If these accumulators are not handled correctly, there is a danger to the user and the environment due to overheating, ignition, deflagration or explosion. This can result in toxic gases being released and persons injured through acid burns and poisoning.

Responsibility of the user/Liability

With that said, it is the responsibility of the user to avoid these dangers through correct handling of the accumulators. These safety instructions supply the necessary information for personal safety, the safety of the plant as well as protection of the environment. They serve as a supplement to the instructions in chapter "*For your safety*" of the operating instructions.

By buying these accumulators, you as the buyer take over the responsibility for the risks involved. If you do not agree to this user responsibility, you are not allowed to put the accumulator into operation. We do not accept liability for damage to the accumulators and any other resulting damage.

Hotline

In case of any questions, please call our service hotline under the telephone number **+49 1805 858550**.

The hotline is manned 7 days a week round-the-clock. Since we offer this service worldwide, the support is only available in the English language. The service is free, only standard call charges are incurred.

2 Possible dangers and their causes

An accumulator consists of one or several individual hermetically sealed containers which are designed to withstand normal temperatures and pressures when used correctly. Under these conditions there is neither a fire/explosion hazard nor a danger of leaking contents. Incorrect handling can cause overheating, ignition, deflagration or explosion. Should this happen, toxic gases can be released and persons injured through acid burns and poisoning.

The following factors can cause fire and explosion damages:

- Mechanical damage
- Short-circuit/wrong polarity on the connections leading to the outside
- Excessive current drain due to incorrect use
- Too high temperatures (see technical data)
- Contact of the accumulator contents with water
- Charging the accumulators with a non-suitable battery charger

Caution:
In the case of strong mechanical impact or a high-impact event to the test system or the accumulators (e.g. drop from heights/accident) the safety of the accumulator is no longer guaranteed. The accumulator pack may look fine but there can be a perforation or damaged wire.

To avoid fire damage through self-ignition due to mechanical effects or an impact, the accumulator must be monitored for **at least one hour** at a fireproof, well ventilated place. To avoid the risk of undetected damage to the accumulator, we recommend disposing of the accumulator according to the valid regulations.

Interrupt the charging process if the accumulator cannot be charged within the specified charging time. Otherwise the accumulator can overheat, get cracks or ignite.

41932-EN-160707

3 Measures to avoid dangers

The following measures serve to avoid dangers:

- Use the accumulator only in the intended VEGA instrument
- Charge accumulator only in installed condition
- Do not operate the charging device and the accumulator unattended
- Never shortcircuit or reverse the accumulator
- Avoid operation under adverse ambient conditions, for example too low or too high temperatures, excessive humidity, combustible gases, dusts, vapours, solvents
- Do not immerse the accumulator in water
- Do not expose to strong mechanical shocks or vibrations
- Do not disassemble, modify or deform
- Only use the specified charging device
- Do not throw into a fire
- Damaged and deformed accumulators must not be used; they must be disposed of (see chapter "*Disposal*")

4 Storage/Transport/Disposal

Storage

Avoid high temperatures and strong temperature fluctuations as well as direct sun and high humidity. A temperature of approx. 20 °C (68 °F) is ideal to ensure a low self-discharge. Make sure that contact with water is avoided.

Transport

The accumulator consists of Lithium cells and is subject to the dangerous goods regulations according to UN 3480/3481. It is hence subject to certain transport regulations depending on the carrier. Because the nominal energy content is below 100 Wh, the accumulator is approved for facilitated transportation.

These dangerous goods regulations require, among other things, a special approved packaging with appropriate handling labels and comprehensive accompanying documents containing an emergency number as well as information for trained packaging staff.

Danger:
If the transport packaging shows obvious damages, the consignment must not be accepted or further transported because of the danger of ignition.

To avoid fire damage through self-ignition due to mechanical effects or an impact, the accumulator must be monitored for **at least one hour** at a fireproof, well ventilated place. To avoid the risk of undetected damage to the accumulator, we recommend disposing of the accumulator according to the valid regulations.

Note:
If an accumulator-operated instrument is returned for repair, the accumulator must be removed. Please send only the instrument, not the accumulator. When sending accumulators by airfreight, a charging capacity of 30 % must not be exceeded.

Disposal

Note:
Accumulators contain some environmentally harmful but also some valuable raw materials that can be recycled. For that reason accumulators must not be disposed of in household waste.

All consumers are legally obligated to bring accumulators to a suitable collection point, e.g. public collection points. You can also return the accumulators to us for correct disposal. Due to the very strict transport regulations for lithium-based accumulators, this is normally not a good idea because shipment is very expensive. If the accumulator is equipped with an electronics, both components must be disposed of separately.

41932-EN-160707

5 Reaction in case of contamination/fire

Contamination

Avoid contact with parts of the accumulator, e.g. after accumulator leakage or mechanical damage. If this happens nevertheless, observe the following:

- **Skin contact:** Immediately remove contaminated clothes, rinse thoroughly with water and consult the doctor
- **Eye contact:** Rinse thoroughly for at least 15 minutes with water and consult the doctor immediately
- **Swallowing:** Immediately drink plenty of water and consult the doctor
- **Inhalation:** Immediately get the person into fresh air and seek medical advice

In case of fire

In case of a fire in the environment, bring the accumulators immediately to a safe place as long as this is possible without risk. If lithium-based accumulators burn, toxic gases are released and therefore it is necessary to inform the fire brigade. For that reason, leave closed rooms immediately. Inform the fire brigade that lithium accumulators are burning. The necessary measures are listed in the attached safety data sheet from the battery manufacturer as well as in UN 3090/3091 or UN 3480/3481.

6 Supplement

6.1 Technical data

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Accumulator type	Lithium-Polymer, chargeable
Number of cells	4, with 3.7 V each
Operating voltage, accumulator pack	14.8 V DC
Energy content	approx. 4.7 Wh
Lithium content	< 2 g
Chemical constituents	
– Lithium-Cobalite ($LiCoO_2$)	35 … 40 %
– Graphite Powder (C)	20 … 25 %
– Electrolyte ($LiPF_6$ $C_3H_4O_3$, $C_4H_6O_3$, $C_3H_{10}O_3$)	19 … 15 %
– Polyethylene $(C_2H_4)n$	0.5 … 1 %
– Copper Foil (C)	5 … 10 %
– Nickel (Ni)	2 … 3 %
– Polyvinylidene fluoride $(CH_2CF_2)n$	0.5 … 1 %
– Polypropylene $(C_3H_6)n$	2 … 5 %
– Aluminium foil (Al)	5 … 10 %
Charging time with completely empty accumulator	approx. 4 hours
Transport and operating temperature	
– Charging	0 … +45 °C (32 … +113 °F)
– Discharging	-20… +60 °C (-4 … +140 °F)
Recommended storage temperature	0 … +25 °C (32 … +77 °F)

6.2 Liability exclusion

This safety data sheet gives you a short summary of our knowledge and recommendations. We cannot guarantee completeness with respect to worldwide regulations or possible dangers. The existing information was obtained from sources we believe to be reliable and, according to our knowledge, was correct at the time of publication.

The specifications in this document refer to current knowledge, however, they are not an assurance of product properties and do not justify a contractual legal relationship. We do not accept responsibility or give a warranty for the provided information.

We decline any liability for losses and damages resulting directly or indirectly from the use of the batteries/accumulators or the information in these safety instructions.

41932-EN-160707

6.3 Safety instructions of the battery manufacturer

曙鹏科技(深圳)有限公司
SPRINGPOWER TECHNOLOGY (SHENZHEN) COMPANY LIMITED

MATERIAL SAFETY DATA SHEET

Lithium Polymer Rechargeable Battery

Model: Lithium-Ion Polymer Battery

Prepared by	Approved by
Zenghui	Yinshishu
Date: March 4, 2011	Date: March 4, 2011

Material Safety Data Sheet

Section 1-Chemical Product and Company Identification

Product Identification

SP Lithium-Ion Polymer Cell/Battery

Norminal Voltage: 3.7 V
Equivalent Lithium content : ≤20 Wh
Testing Period : March 1，2011 To March 4，2011

Manufacturer

SPRINGPOWER TECHOLOGY SHENZHEN CO.,LTD
Chaoshun Industrial Zone, Renmin Road, Fumin, Guanlan, Baoan, Shenzhen, Guangdong, China
contact person : zenghui
Telephone : +86-755- 61862699
Fax : +86-755-29522241
E-mail : zh@springpowerbattery.com

Section 2-Composition/Information on Ingredients

Chemical Compostion	Molecular Formula	Weight%	CAS No	OSHA(PEL)	ACGIH(TLV)
Lithium Cobalt Oxide	$LiCoO_2$	35～40%	12190-79-3	N/A	N/A
Graphite powder	C	20～25%	7782-42-5	N/A	N/A
Electrolyte	LiPF6 $C_3H_4O_3$ $C_4H_6O_3$ $C_3H_{10}O_3$	10～15%	21324-40-3	N/A	N/A
Polyethylene	$(C_2H_4)_n$	0.5～1%	9002-88-4	N/A	N/A
Copper foil	Cu	5～10%	7440-50-8	N/A	N/A
Nickel	Nickel	2～3%	7440-02-0	N/A	N/A
Polyvinylidene fluoride	$(CH_2CF_2)_n$	0.5～2%	24937-79-9	N/A	N/A
Polypropylene	$(C_3H_6)_n$	2～5%	9003-07-0	N/A	N/A
Aluninum foil	Al	5～10%	7429-90-5	N/A	N/A

Section 3-Hazards Identification

Health Hazards (Acute and Chronic)

These chemicals are contained in a sealed can. Risk of exposure occurs only if the battery is mechanically or electrically abused. Contact of electrolyte and extruded lithium with skin and eyes should be avoided.

Sign/Symptoms of Exposure

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A shorted battery can cause thermal and chemical burns upon contact with the skin. May be a reproductive hazard.

Section 4-First-aid Measures

Eye

Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

Skin

Remove contaminated clothes and rinse skin with plenty of water or shower for 15 minutes.Get medical aid.

Inhalation

Remove from exposure and move to fresh air immediately. Use oxygen if available.

Ingestion

Give at least 2 glasses of milk or water. Induce vomiting unless patient is unconscious. Call a physician.

Section 5-Fire Fighting Measures

Flash Point: N/A.

Auto-Ignition Temperature: N/A.

Extinguishing Media： Water, CO_2.

Special Fire-Fighting Procedures

Self-contained breathing apparatus.

Unusual Fire and Explosion Hazards

Cell may vent when subjected to excessive heat-exposing battery contents.

Hazardous Combustion Products

Carbon monoxide, carbon dioxide, lithium oxide fumes.

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Section 6-Accidental Release Measures

Steps to be Taken in case Material is Released or Spilled

If the battery material is released, remove personnel from area until fumes dissipate. Provide maximum ventilation to clear out hazardous gases. Wipe it up with a cloth, and dispose of it in a plastic bag and put into a steel can. The preferred response is to leave the area and allow the battery to cool and vapors to dissipate. Provide maximum ventilation. Avoid skin and eye contact or inhalation of vapors. Remove spilled liquid with absorbent and incinerate.

Waste Disposal Method

It is recommended to discharge the battery to the end, to use up the metal lithium inside the battery, and to bury the discharged battery in soil.

Section 7-Handling and Storage

The battery should not be opened, destroyed or incinerate, since they may leak or rupture and release to the

 --- File No./Rev.: SP-MSDS-001/E00

environment the ingredients that they contain in the hermetically sealed container.
Do not short circuit terminals, or over charge the battery, forced over-discharge, throw to fire. Do not crush or puncture the battery, or immerse in liquids.

Precautions to be taken in handling and storing

Avoid mechanical or electrical abuse. Storage preferably in cool, dry and ventilated area, which is subject to little temperature change. Storage at high temperatures should be avoided.
Do not place the battery near heating equipment, nor expose to direct sunlight for long periods.

Other Precautions

The battery may explode or cause burns, if disassembled, crushed or exposed to fire or high temperatures. Do not short or install with incorrect polarity.

Section 8-Exposure Controls/Personal Protection

Respiratory Protection

In case of battery venting, provide as much ventilation as possible. Avoid confined areas with venting cell cores.
Respiratory Protection is not necessary under conditions of normal use.

Ventilation

Not necessary under conditions of normal use.

Protective Gloves

Not necessary under conditions of normal use.

Other Protective Clothing or Equipment

Not necessary under conditions of normal use.

Personal Protection is recommended for venting battery

Respiratory Protection, Protective Gloves, Protective Clothing and safety glass with side shields.

Section 9-Physical and Chemical Properties

Appearance characters： Silvery-white, prismatic, odorless, solid battery.
Chemical Uses: Digital electronic products.

Section 10- Stability and Reactivity

Stability

Stable

Conditions to Avoid

Heating, mechanical abuse and electrical abuse.

Hazardous Decomposition Products

N/A.

Hazardous Polymerization

N/A.

If leaked, forbidden to contact with strong oxidizers, mineral acids, strong alkalies, halogenated hydrocarbons.

Section 11-Toxicological Information

Inhalation, skin contact and eye contact are possible when the battery is opened.

Exposure to internal contents, the corrosive fumes will be very irritating to skin, eyes and mucous membranes.

Overexposure can cause symptoms of non-fibrotic lung injury and membrane irritation.

Section 12-Ecological Information

Lithium polymer batteries do not contain heavy metals as defined by the European directives 2006/66/EC Article 21. Mercury has not been “intentionally introduced (as distinguished from mercury that may be incidentally present in other materials)” in the sense of the U.S.A. “Mercury-Containing and Rechargeable Battery Management Act” (May 13 1996).
The Regulation on Mercury Content Limitation for Batteries promulgated on 1997-12-31 by the China authorities including the State Administration of Light Industry and the State Environmental Protection Administration defines ‘low mercury’ as ‘mercury content by weight in battery as less than 0.025%’, and ‘mercury free’ as ‘mercury content by
weight in battery as less than 0.0001%’. And therefore: Springpower lithium polymer batteries belong to the category of mercury-free battery (mercury content lower than 0.0001%).
When promptly used or disposed the battery does not present environmental hazard. When disposed, keep away from water, rain and snow.

Section 13-Disposal Considerations

Appropriate Method of Disposal of Substance or Preparation
If waste Li-ion Polymer batteries are still fully charged or only partially discharged, they can be considered a reactive hazardous waste because of significant amount of not reaction, or unconsumed lithium remaining in the spent battery. The batteries must be neutralized through an approved secondary treatment facility prior to disposal as a hazardous waste. Recycling of battery can be done in authorized facility, through licensed waste carrier. Use a professional disposal firm for disposal of mass quantities of undischarged Li-ion Polymer batteries.

Section 14-Transport Information

According to PACKING INSTRUCTION 965 ~ 970 of IATA DGR 52nd Edition for transportation.

More information concerning shipping, testing, marking and packaging can be obtained from Labelmaster at http://www.labelmaster.com..
Separate Li-ion Polymer batteries when shipping to prevent short-circuiting. They should be packed in strong

 --- File No./Rev.: SP-MSDS-001/E00

packaging for support during transport.Take in cargo of them without falling,Droping.and breakage.Prevent collapse of cargo piles and wet by rain

Transport Fashion: By air,By sea.

Section 15-Regulatory Information

Law Information

《Dangerous Goods Regulation》
《Recommendations on the Transport of Dangerous Goods Model Regulations》
《International Maritime Dangerous Goods》
《Technical Instructions for the Safe Transport of Dangerous Goods》
《Classification and code of dangerous goods》
《Occupational Safety and Health Act》(OSHA)
《Toxic Substances Control Act》(TSCA)
《Consumer Product Safety Act》 (CPSA)
《Federal Environmental Pollution Control Act》(FEPCA)
《The Oil Pollution Act》(OPA)
《Superfund Amendments and Reauthorization Act Title Ⅲ （302/311/312/313》(SARA)
《Resource Conservation and Recovery Act》(RCRA)
《Satety Drinking Water Act》(CWA)
《California Proposition 65》
《Code of Federal Regulations》(CFR)
In accordance with all Federal, State and Local laws.

Section 16-Other Information

This information is not effective to all the batteries manufactured by SPRINGPOWER. This information comes from reliable sources, but no warranty is made to the completeness and accuracy of information contained. SPRINGPOWER doesn't assume responsibility for any damage or loss because of misuse of batteries. Users should grasp the correct use method and be responsible for the use of batteries.

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