Navitasys India Pvt ltd

Address: Plot No. 32, Sector- 5, Phase- II, HSIIDC Industrial Growth Center, Bawal, Rewari - 123501, Haryana, India

Tel：+1284263568 http://www.nvtpower.com

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SAFETY DATA SHEET

1 Product & Company Identification

Product Identification

English Name	Rechargeable Li-ion Battery
Proper Shipping Name	Lithium Ion Battery
Product Description	Rechargeable Li-ion Battery
Customer Model Name	BLPB21
NVT PN	31900MR4000X
UN No.	UN3480/ UN3481
UN38.3 Report No.	DGT2334DT7001293F
Capacity	4880mAh（Rated）
Nominal voltage	3.91V
Watt-hour	19.09Wh（Rated）
Equivalent lithium content	1.5g
Approximate Weight	67.5g

Safety Data Sheet Provider Information

Manufacturer	Dongguan NVT Technology Co.,Ltd
Address	No.8 Xingguo Road, Jiaoshe Village, Dongkeng Town, Dongguan, Guangdong, P.R.C
Postcodes	523448
Telephone	+86-769 38826188
Fax	+86-769 89086589
E-mail Address	EHS02@nvtpower.com

Emergency call

Emergency call	+86-769 38826188

2 Hazardous Identification

As a whole, the battery is not dangerous in the correct use.	
Explosive risk	This article does not belong to the explosion dangerous goods

Flammable risk	This article does not belong to the flammable material
Oxidation risk	This article does not belong to the oxidation of dangerous goods
Toxic risk	This article does not belong to the toxic dangerous goods
Radioactive risk	This article does not belong to the radiation of dangerous goods
Mordant risk	This article does not belong to the corrosion of dangerous goods

3 Composition /Information on Ingredients

Important note: The battery should not be opened or burned. Exposure to the ingredients contained within or their combustion products could be harmful.

PACK Composition

MATERIAL OR INGREDIENT	%/wt.
Container, Steel Support and Control System （Note: Non-dangerous chemical ）	35-45
Batteries（The composition of the battery reference to the following table 3.2.）	55-65

Composition of battery（Note: The percent in following table is only for the weight of battery）

Component	CAS No.	EC No.	%/wt.
Cobalt lithium dioxide	12190-79-3	235-362-0	15-40
Ethyl propionate	105-37-3	203-291-4	15-40
Copper foil	7440-50-8	231-159-6	10-30
Aluminum foil	7429-90-5	231-072-3	10-30
Graphite	7782-42-5	231-955-3	7-25
Ethylene Carbonate	96-49-1	202-510-0	0-15
Propylene Carbonate	108-32-7	203-572-1	0-15
Lithium Hexafluorophosphate(1-)	21324-40-3	244-334-7	0-15
1,3-propanesultone	1120-71-4	214-317-9	0-1
Separator	9002-88-4	618-339-3	0-5

4 First Aid Measures

First Aid Measures

Under normal conditions of use, the battery is hermetically sealed.

Eye Contact	The ingredients in the battery can cause severe allergies and chemical burns. Open the upper and lower eyelids immediately and rinse the eyes with water for more than 15 minutes until no chemical remains. Then seek medical attention immediately.
Skin Contact	The ingredients in the battery may cause skin irritation or chemical burns. Remove contaminated clothing and wash skin with soap and water. Seek medical attention if chemical burns or irritation persists.
Ingestion	Ingesting the battery is harmful. The composition of the battery can cause severe chemical burns in the mouth, esophagus, and gastrointestinal tract. Do not induce vomiting or food or drink if you ingest the battery or disassemble the battery. Seek medical attention immediately.
Inhalation	Ingredients in the battery may cause respiratory allergies, and inhalation of vapor may cause upper respiratory tract and lung allergies. Breathe fresh air and seek medical attention immediately.

5 Fire Fighting Measures

Extinguishing media

Suitable fire extinguishing medium	Water or water mist, sand, fire blanket, dry powder or carbon dioxide fire extinguisher
Inappropriate extinguishing medium	None

Special hazards arising from this substance or mixture

1	In transportation and test engineering, risk factors such as electric box drop, extrusion, puncture, metal short circuit, liquid immersion may occur, and electric shock and fire risk may occur;
2	If in a confined space, there may be a risk of gas explosion.
3	Liquids leaking from accidents, including improper handling of fire water, pose a risk of environmental pollution.

Material prepare & training

Material prepare	
1	Water mist fire extinguisher: use 1 9-liter water mist fire extinguisher or 2 6-liter water mist fire extinguishers per 500KWH, which can extinguish ABCE fire (solid, non-flammable liquid, gas, electrical fire under 36KV). Or carry electric or manual sprayers as water mist extinguishers. Suspension type water - based fire extinguisher can be hung above the two cargoes.

2	Waterproof supplies: raincoat, rain boots, rubber gloves; Plastic wrap. Rags.
3	PPE: mask, high temperature gloves, safety glasses, half mask.
4	Smoke exhaust tools: The storage place should be well ventilated. It is recommended to set up a wall smoke exhaust fan every 20 meters or move the smoke exhaust fan.
Training skills	
1	Turn on or move fan to exhaust smoke
2	After fire control disposal, the product quality department will confirm whether it is necessary to scrap.
3	Use emergency materials to dispose of leaked electrolyte.

Fire extinguishing precautions and protective measures

1	Alarm immediately when battery smoke or combustion is detected
2	Wear protective equipment, including respirators and masks. If water is used, PPE should include raincoats, rain boots, insulated gloves, etc.
3	Cut off the power supply
4	Using solid fire extinguishers, it is recommended to use fire extinguishers in the following order: water or mist, sand, fire blanket, dry powder, carbon dioxide fire extinguishers;
5	Exhaust smoke through fans or air circulation.



Figure1water based fire extinguisher
(Could be used for 36KV electrical



Figure2waters prayers to fire extinguisher (Wear PPE to avoid electrical shock)

6 Accidental Release Measures

On-site: Place the material a suitable container and alert the local police.

In water: When the battery pack is in water, there is a risk of slight electric shock; when electrolyzing water, hydrogen will be generated. Ventilation must be maintained to prevent hydrogen accumulation and explosion in closed space. If possible, remove the batteries or modules from the water and alert the local police.

7 Handling & Storage

One of the most important risks in the transportation of batteries and battery power equipment is the short circuit of batteries caused by contact between the two poles of batteries with other batteries, metal objects or other conductors. Therefore, packaged batteries and battery cells must be separated in an appropriate way to prevent short circuit and electrode damage. In addition, batteries and battery cells must be packaged in strong external packaging or installed in equipment.

Handling

1	Do not make excessive physical impact or vibration on batteries.
2	Short circuit should be avoided, although a few seconds of short circuit will not have a serious impact on the battery. A long short circuit can cause the battery to lose energy quickly and generate enough heat to burn the shell.
3	The sources of short circuit include the random placement of batteries in bulk containers or various metal objects used in battery assembly on equipment. In order to minimize the risk of short circuit of batteries, the protection measures of batteries should be provided when the batteries are transported and stored.
4	Batteries cannot be disassembled or deformed.
5	Do not expose the battery to water when it breaks. Operators need insulation protection when handling battery packs that exceed 50V.

Storage

1	When lithium-ion batteries are stored for a long time, their charging capacity should be between 25% and 75%.
2	Store in a cool, dry and well ventilated area.
3	Excessive temperature can lead to a series of battery problems, such as leakage or rust.
4	Do not put batteries in open fire.

8 Exposure Control/Personal Protection

Important note: The lithium battery is normally sealed and the powder has no fluidity and will not pose a danger to the contact person. It is strictly forbidden for non-professionals to dismantle batteries or cores without permission. Do not touch the leaked electrolyte if it is not necessary. If you need to actively contact the electrolyte, you need to wear chemical-resistant gloves and masks.

Engineering Control

Keep away from heat sources and fires and store in dry and cool areas.

9 Physical/Chemical Properties

Physical/Chemical Properties

Physical state	Solid
Color	Not Applicable
Odor	No Odor
Flash point	Not Applicable
Solubility in ethanol soluble	Not Applicable
Boiling Point	Not Applicable
Solubility in water:	Not Applicable
Vapor pressure	Not Applicable
Explosion limit	Not Applicable
Auto flammability	Not Applicable
Melting Point	Not Applicable
Freezing Point	Not Applicable

10 Stability & Reactivity

Stability & Reactivity

Stability	Good stability at standard temperature.
Reactivity	None
Notice	Do not touch water or acidic substances. Products after decomposition: If the aluminum foil packaging of the battery is damaged, then do not contact strong oxidants, acidic substances and high temperature environment, and the electrolyte may volatilize to form hydrogen fluoride.

11 Toxicological information

No toxic substances will be produced during routine operation and use.

Caution: according to the harmonized classification and labelling (CLP00) approved by the European Union, 1,3 Propanesultone may cause cancer, is harmful if swallowed and is harmful in contact with skin. This substances meeting the criteria for classification in the hazard class reproductive toxicity category 1A or 1B, adverse effects on sexual function and fertility or on development in accordance with section 3.7 of Annex I to Regulation(EC) No 1272/2008.

12 Ecological information

If batteries are to be scrapped, they should be selected and disposed of by professional companies.

13 Disposal considerations

Batteries cannot be discarded directly into sewers or directly discharged into the environment. They should be recycled and treated in accordance with local laws and regulations.

14 Transport Information

Air transportation

The lithium battery should accord with the International Air Transport Association (IATA DGR 66th Edition) requirements for transportation. The battery or cell should be packed and signed as following table.

UN NO.	Proper Shipping Name	Power	Package requirements	Label which need to paste
UN3480	lithium ion batteries	Cells＞20Wh Batteries＞100Wh	PI965 Section IA **Limit per package:** Pax A/C=Forbidden CAO ≤35 kg	Class9 the lithium battery or sodium ion battery label Cargo Aircraft Only label 

		Cells≤20Wh Batteries≤100Wh	PI965 Section IB **Limit per package:** Pax A/C=Forbidden CAO ≤10 kg	Class9 the lithium battery or sodium ion battery label ,Battery sign Cargo Aircraft Only label 
UN3481	Lithium ion batteries contained in equipment	Cells＞20Wh Batteries＞100Wh	PI967 Section I **Limit per package:** Pax A/C ≤5 kg CAO ≤35 kg	Class9 the lithium battery or sodium ion battery label 
		Cells≤20Wh Batteries≤100Wh	PI967 Section II **Limit per package:** ≤2 batteries or ≤4 cells，and≤2 packages per consignment Pax A/C ≤ 5 kg CAO ≤5 kg	\
			PI967 Section II **Limit per package:** ＞2 batteries or ＞4 cells，or ＞2 packages per consignment Pax A/C ≤ 5 kg CAO ≤5 kg	Battery mark 
UN3481	lithium ion batteries packed with equipment	Cells＞20Wh Batteries＞100Wh	PI966 Section I **Limit per package:** Pax A/C ≤5 kg CAO ≤35 kg	Class9 the lithium battery or sodium ion battery label 
		Cells≤20Wh Batteries≤100Wh	PI966 Section II **Limit per package:** Pax A/C ≤5 kg CAO ≤5 kg	Battery mark 

Notes

1	Cells and/or batteries at a SOC of greater than 30% of their rated capacity may only be shipped with the

	approval of the State of Origin and the State of the Operator under the written conditions established by those authorities.
2	After receiving the lithium battery, if the mark is lost, fallen off or difficult to identify, the operator must replace the label according to the information provided in the "shipper's dangerous goods declaration form".
3	The lithium core and battery goods required by the packaging specification PI965 shall not be packed in the same outer package as other dangerous goods.
4	Ban lithium ion battery (UN 3480, PI965 Section IA or IB) with category 1 explosive material (except ammunition) 1.4, 2.1 flammable gas, flammable liquid, 4.1 3 flammable solid, 5.1 class antioxidant and other dangerous goods packaging in the same package.
5	Ensure that the equipment cannot be moved in the outer packing; If there are more than one piece of equipment in the package, it must be packed tightly together to prevent damage caused by contact with other equipment in the package.
6	Do not damage or mishandle this package. If package is damaged, batteries must be quarantined, inspected, and repacked.
7	Cells and batteries identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport.
8	Waste lithium batteries and lithium batteries being shipped for recycling or disposal are prohibited from air transport unless approved by the appropriate national authority of the State of origin and the State of the operator.
9	The lithium battery should pass the UN38.3 test, if the battery cannot pass the testing, it cannot transport, should redesign.
10	The new battery mark allows to be 100mm x 100mm square, the minimum mark size is 100mm x70mm.
11	PI 966 and PI 969—Have been revised to clarify the packing options for Section I, which are: ● the lithium cells or batteries are packed in a UN specification packaging, then placed with the equipment in a strong rigid outer packaging; or ● the cells or batteries are packed with the equipment in a UN specification packaging. The packing options in Section II have been deleted, as there is only one option available given that there is no requirement for UN specification packaging.
12	Lithium ion battery UN3480 PI965 Section IB、PI966 and PI 967 each package must withstand 3m stacking test.
13	In UN3481 PI 966 Section II, 967 Section II, when the package is put into the overpack, the package must be fixed in the overpack, and the overpack shall not affect the expected function of each package.

14	PI 965 and PI 966—Both packing instructions have several notes added to reiterate that batteries shipped at a reduced SoC are less prone to thermal runaway.
15	PI 967—Has been revised to introduce the recommendation that batteries contained in equipment should not be offered with an SOC>30% or an indicated battery capacity exceeding 25%.

Ocean shipping

➢Transportation refers to the IMDG CODE 41-22 Edition, which are managed according to UN NO 3480/3481 and packaged in the second category. Firm installation, isolation from each other, short circuit prevention, packages with more than 24 lithium cells or 12 lithium batteries: special procedures to be followed when damaged must be marked; special procedures document to be followed when damaged is available on board.

➢The clause 188 of IMDG CODE 41-22 Edition required:

(1) The watt-hour rating of lithium ion cell is less than 20 Wh and the watt-hour rating of lithium-ion battery is less than 100 Wh is not classified as dangerous cargo,but each package shall be marked with below lithium battery mark.

(2) For cells and battery or those packed with equipment (not applicable when contained in equipment)，the cells and battery must be packed in inner packagings，which shall completely enclose the cell and battery. Must be protected so as to prevent short circuits, including preventing short circuits caused by contact with conductive materials in the same container. Inner packagings (and equipment (if any))shall be packed in strong outer packagings that in accordance with < Model Regulation>4.1.1.1、4.1.1.2、4.1.1.5.

➢The clause 230 of IMDG CODE 41-22 Edition required:

(1) The model of each lithium ion cell and battery should meets all testing requirements under Part III, subsection 38.3 of <UN Manual of Tests and Criteria>.

(2) Shall be equipped with safe exhaust equipment, prevent violent rupture under normal transportation conditions.

(3) Shall be equipped with effective devices to prevent external short circuit.

➢The LP906 of IMDG CODE 41-22 Edition required:

(1) The specific instructions for use of the package should be made available by the packaging manufacturers and subsequent distributors to the consignor.

Land transportation

- Transport shall be carried out in accordance with the relevant provisions of the List of Dangerous Goods (GB12268-2012), the European regulations concerning the international transport of dangerous goods by road (ADR), the Rules for the International Carriage of Dangerous Goods by Rail (RID), special provisions 188, and the Manual of Tests and Standards.

15 Regulatory Information

Regulatory Information	See ACGIH exposure limits information as noted in Section3
US	This SDS meets/exceeds OSHA requirements.
International	This SDS conforms to European Union (UN), the International Standards Organization (ISO) and the International Labor Organization (ILO) and as documental in ANSI (American National Standards Institute) Standard Z400.1-2010.
Air transportation	According to Civil aviation industry standard MH/T1020-2018 Lithium Battery Air Transport Standard and IATA DGR and ICAO. The international transport and commodity inspection is used this standard at the moment (IMDG CODE),
Ocean shipping	According to International Maritime Dangerous Goods Code to transport and According to the requirements of UN NO 3480/3481 to management the goods.
Land transportation	According to List of Dangerous Goods (GB12268).
Avoid electrical shock	According to Standard for Electrical Safety in the Workplace, NFPA-70E.

16 Other Information

Charging and labeling

Charging	The battery can be recharged repeatedly. Please use the original battery charger. Do not use modified or damaged battery chargers. When the charge exceeds the prescribed charging time, the charge can be stopped to prevent the battery from overcharging. Charging temperature should be between 0 and 45 (32 °F and 113 °F). (from the safety point of view, there is no experience value during fast charging). There is normal heating phenomenon in the process of battery charging.

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Charging Voltages and Currents	When the voltage exceeds the specified value, it is limited by the internal protection circuit of the battery. If the protective circuit is damaged, please stop using it. Please charge and discharge under specified voltage and current. If the battery voltage drops below the specified minimum voltage, please stop using it.
Warning	Chargers provided by the equipment manufacturer shall be used and used in accordance with the operating guidelines. It is forbidden to open the battery, close to the source of fire, and short circuit, which may cause fire, explosion, leakage and personal injury.
Disposal	Disposal shall be carried out in accordance with the relevant regulations of the United Nations, the state and the local authorities.

Declaration

The information contained here is completed without any authorization. This information is only a reference. Users should customize an independent system based on the complete and reliable information they actually collect, so as to ensure the proper use and handling of the safety and health of employees and customers.