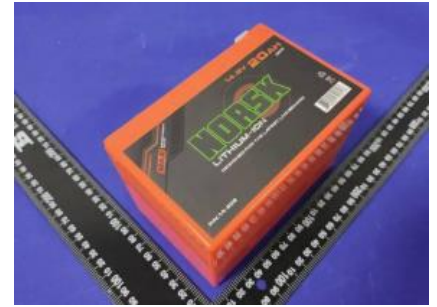


LCM14.8V 20.8Ah (Li(NiCoMn)O₂ 14.8V 20.8Ah, 299.52Wh)

- No fire, No explosion, Safety in use.
- Low self discharge rate.
- Good high temperature performance.
- High Cycle times and long service life.
- High energy density and conversion efficiency.
- Environmentally Friendly, without any heavy metals.
- Easy installation, easy maintenance, easy replacement for lead-acid battery.

JO P/N: 430024-1
 JO Rev: B
 ECO#: 17953
 Date: 07 OCT 21



Item	Specification
Model	LCM14.8V-20.8Ah, Mfg P/N: 14-208
Rated Capacity	20.8Ah
Nominal Voltage	14.4V (14.8V US nomenclature)
Charge Cut Off Voltage	16.8V
Discharge Cut Off Voltage	11.2V
Max. Charge Current	12A
Max. Continuous Discharge Current	20A
Weight	Approx. 1.75Kgs
Terminal	F2
PCB Protection	Over-Charge, Over-Discharge, Over-Current and Short Circuit
Dimension (L*W*H)	151*98*94mm
Outer Package Material	ABS Plastic
Operating Temperature	Charging: 0~60°C Discharging: -20~60°C
Storage Temperature	0~60°C
Cycles	600-800 cycles @100% D.o.D, remaining 80% Capacity
Cell Construction	Cylindrical
Extra Functions	Dual 5V 2A USB ports, power display

Product Design

BMS



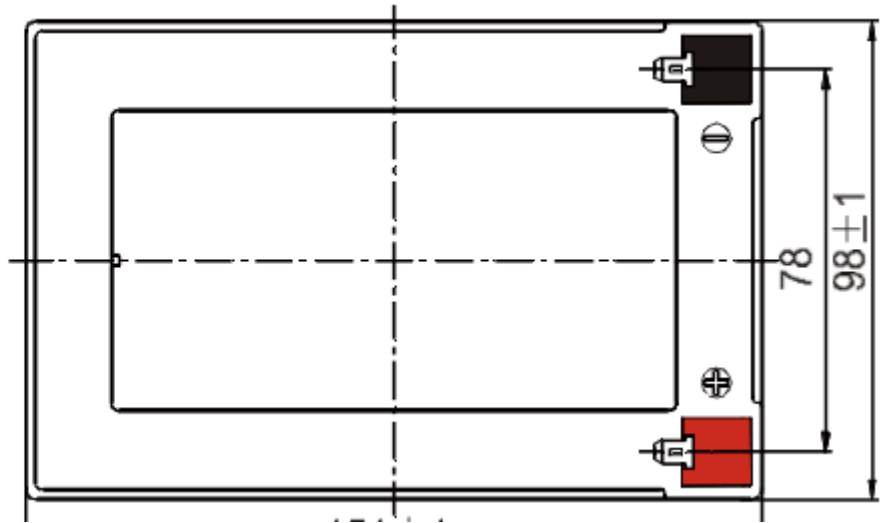
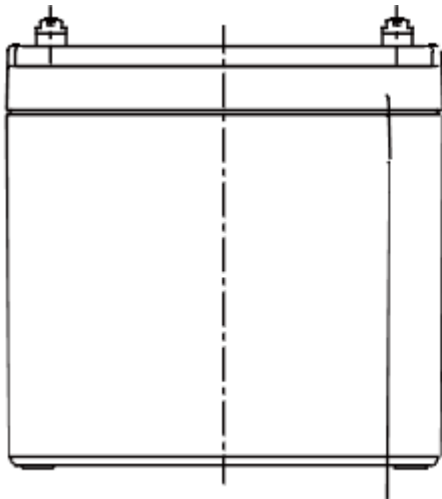
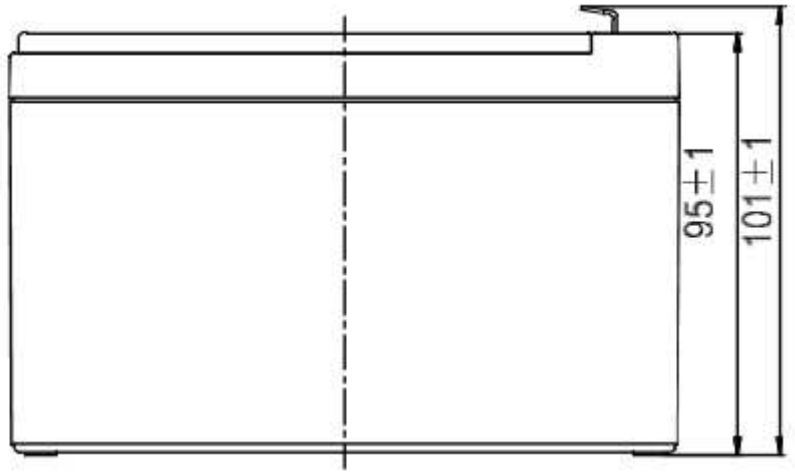
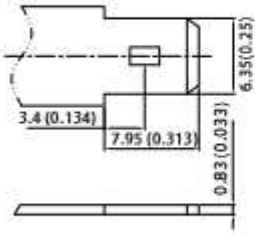
Lithium ion Cell Package



Lithium Battery in Box



■ T2 Terminal
Unit: mm (inches)



Composition Information

Chemical Name	Concentration	CAS Number
Lithium Cobalt Oxide	15-40%	12190-79-3
Graphite	10-30%	7782-42-5
Phosphate(1-), hexafluoro, lithium	10-30%	2132-40-3
Copper	7-13%	7440-50-8
Aluminum	5-10%	7429-90-5
Nickel	1-5%	7440-02-0

Hazards Identification

- Lithium cobalt oxide:** Blue-black powder (odorless), cobalt and cobalt compounds are considered to be possible human carcinogen(s). By IARC: May irritate eyes, skin, nose, throat and respiratory system and may cause allergic skin sensitization.
- Carbon:** Black powder (odorless), no cases of carbon being harmful to humans have been reported. WHO and ILO have never verified that carbon irritation of the skin and mucous membrane, etc.

3. **Electric agent:** Black powder (Garlic-Like), Toxicity (Am. Conf. Of Gov. Ind. Hygienists ACGIH 2000 Edition): Simple Asphyxiant, Flammability limits in air (STP conditions):2.4-83vol% (The upper limit could reach 100%)
4. **Bond:** White powder(odorless), inhalation and skin contact are expected to be the primary routes of occupational exposure to this material. As a finished product, it is a synthetic, high molecular weight polymer. Due to its chemical and physical properties, this material does not require special handling other than the good industrial hygiene and safety practical employed with any industrial material of this type. Under normal processing conditions, this material release fume or vapor components of these release may vary with processing time and temperature. These processer release may produce eye, skin and/respiratory tract irritation and, with repeated or prolonged exposures, nausea, drowsiness, headache and weakness. Although unlikely under normal handling conditions, if this material is heated in excess of 600F(315°C), hazardous, decomposition products will be produced. Hazardous decomposition products include hydrogen fluoride and oxides of carbon, the concentrations of which vary with temperature and heating regimens.
5. **Electrolyte:** Liquid(colorless), may cause moderate to severe irritation, burning, and dryness of the skin. May cause eye irritation or burning. Breathing of the mists, vapors or fumes may irritate the nose, throat and lungs or fumes may irritate the nose, throat and lungs. Exposure of material with areas which contain water may generate hydrofluoric acid which can cause immediate burns on shin, severe eye burns to the mouth and gastrointestinal tract if inhaled. Direct exposure to areas of the body needs to be treated immediately to prevent injury.

Under normal conditions of use the battery is hermitically sealed article. The products referenced herein are exempt article and are not subject to OSHA' s Hazard Communication Standard requirements for preparation of material safety data sheets. This information is provided as a service to our customers.

First Aid Measures

General advice: Burning and disassembly batteries may emit acrid smoke, irritating fumes, and toxic fumes of hazardous oxides of carbons, hydrofluoric acid and other toxic by-products.

Inhalation: Remove to fresh air, if breathing difficulty or discomfort occurs and persists, see a medical doctor. If breathing stopped, give artificial respiration and see a medical doctor immediately.

Skin contact: Remove contaminated clothing and thoroughly wash with soap and plenty of water. If irritation persists, consult a physician.

Eye contact: Rinse thoroughly with plenty of water for at least 15 minutes. If symptoms persist, call a physician. Ingestion: Swallowing a battery can be harmful. Contents of an open battery can cause serious chemical burns of mouth, esophagus, and gastrointestinal tract. If open battery is ingested, do not induce vomiting or give food or drink. Seek medical attention immediately.

Fire Fighting Measures

1. Hazardous combustion products: When burned, hazardous products of combustion including fumes of carbon monoxide, carbon dioxide, and fluorine can occur.
2. Extinguishing media: Water, carbon dioxide, dry chemical or foam.
3. Basic fire-fighting procedures: In the event of fire, wear self-contained breathing apparatus and protective

clothing to avoid fume inhalation.

4. Unusual fire & explosion hazards: This material does not represent an unusual fire or explosion hazard.
5. Flash point: N/A
6. Auto ignition temperature: N/A
7. Flammability limits in air, lower: N/A
8. Flammability limits in air, upper: N/A

Accidental Release Measures

1. Personal precautions: Evacuate personnel to safe areas, ventilate the area. Refer to protective measure listed under sections Handling and Storage.
2. Environment precautions: Sweep up and place in a suitable container, dispose or waste according to local, state and federal laws and regulations.

Handling

1. Battery charge: Charge according to manufacturer specifications.
2. Battery disassembly: The batteries should never be disassembled, or mechanically abused. Should a battery unintentionally crushed or opened, thus releasing its content, rubber gloves should be used to handle battery components. The inhalation of any vapor that may be emitted should be avoided.
3. Short circuiting of a battery: As with any battery, short circuit causes heating. In addition, short circuit reduces the life of the battery and can lead to ignition of surrounding materials. Physical contact with to short-circuited battery can cause skin burns.
4. Reverse polarity: Avoid revering the battery polarity within a battery pack, this can cause the battery or the battery to be damaged or flame.

Storage

1. Storage preferably in cool, dry and ventilated area, do not place the battery near heating equipment, nor expose to direct sunlight for long periods. Elevated temperatures can result in shortened.

Handling/Storage Warnings

- Do not immerse the battery in water.
- Do not use or store the battery near sources of heat such as a fire or heater.
- Do not use any chargers other than those recommended by manufacturer
- Do not reverse the positive(+) and negative(-) terminals.
- Do not connect the battery directly to wall outlets or car cigarette-lighter sockets.
- Do not put the battery into a fire or apply direct heat to it.
- Do not shot-circuit the battery by connecting wires or other metal objects to the positive(+) and negative(-) terminals.
- Do not carry or put the battery together with necklaces, hairpins or other metal objects capable of simultaneously touching both terminals.
- Do not strike, throw or subject the battery to severe physical shock.
- Do not pierce the battery casing with a nail or other sharp object, break it open with a hammer, or step

on it.

- Do not directly solder the battery terminals.
- Do not attempt to disassemble or modify the battery in any way.
- Do not recharge the battery near a fire or in extremely hot conditions

Warning!

Failure to observe the following precautions may result in battery leakage, overheating, explosion and/ or fire.

- Do not place the battery in a microwave oven or pressurized container.
- Do not use the battery in combination with primary batteries (such as dry-cell batteries) or batteries of different capacity, type or brand.
- Do not use the battery if it gives off an odor, generates heat, becomes discolored or deformed, or appears abnormal in any way. If the battery is in use or being recharged, remove it from the device or charger immediately and discontinue use.
- Keep the batteries out of the reach of children. If a child somehow swallows a battery, seek medical attention immediately.
- If the battery leaks or emits an odor, immediately remove it from the proximity of any exposed flame. The leaking electrolyte can ignite and cause a fire or explosion.
- If the battery leaks and electrolyte gets in your eyes, do not rub them. Instead, rinse them with clean running water and immediately seek medical attention. If left as is, electrolyte can cause eye injury

Caution!

Do not use or store the battery where is exposed to extremely hot, such as under window of a car in direct sunlight in a hot day. Otherwise, the battery may be overheated. This can also reduce performance and/or shorten service life.

Use the battery only under the following environmental conditions. Failure to do so can result in reduced performance or a shorten service life. Recharging the battery outside of these temperatures can cause the battery to overheat, explode or catch fire.

Operating environment:

When charging the battery: 0°C ~ 45°C

When discharging the battery: 0°C ~ 60°C

When stored up to 30 days: 0°C ~ 45°C

When stored up to 90 days: 0°C ~ 35

- In cases where children use the battery, instruct them on the contents of the users guide and keep an eye on them to ensure that the battery is being used correctly.
- If a device is not used for an extended period, the battery should be removed and stored in a cool, dry place. Otherwise, resting or reduced performance may occur.
- If the terminals of the battery are dirty, wipe them clean with dry cloth before use. Otherwise, solid electrical contact may not be charged with the equipment, and this can cause power outages or charging to fail

Exposure Controls/Personal Protection

1. Respiratory protection: No necessary under normal use. In case electrolyte leakage from battery, protect hand with chemical resistant rubber gloves. If battery is burning, leave the area immediately. In abuse, use NIOSH approved acid gas filter mask or self-contained breathing apparatus.
2. Ventilation: No necessary under normal use. In case of abuse, use adequate mechanical ventilation for battery that vent gas or fumes.
3. Protective gloves: None under normal use. In case of spill use PVC, neoprene or nitrile gloves of 15 mils(0.015 inch) or thicker.
4. Eye protection: None required under normal conditions. Use ANSI approved chemical work safety goggles or face shield, if handling a leaking or rupture battery.
5. Skin protection: No necessary under normal use. Use rubber apron and protective working in case of handling of a rupture battery.
6. Other protective equipment: Chemical resistance clothing is recommended along with eye wash station and safety shower should be available meeting ANSI design criteria.
7. Work hygienic practice: Use good chemical hygiene practice. Wash hands after use and before drinking, eating or smoking. Wash hands thoroughly after cleaning-up a battery spill caused by leaking battery. No eating, drinking, or smoking in battery storage area. Launder contaminated cloth before reuse.
8. Supplementary safety and health data: If the battery is broken or leaked the main hazard is the electrolyte. The electrolyte is mainly solution of LiPF₆, EC, EMC and DEC.

Physical and Chemical Properties

1. Physical state: Solid-article
2. Freezing point: N/A
3. Boiling point: N/
4. Density: N/A
5. Vapor pressure: N/A
6. Vapor density: N/A
7. Flash point: N/A
8. Evaporation rate: N/A

Stability and Reactivity

1. Stability: Stable during normal operation conditions.
2. Conditions/materials to avoid: Incompatible with water, moisture, strong oxidizing agents, reducing agents, acids and bases.
3. Hazardous decomposition or byproducts: None under normal operating conditions. Carbon dioxide and hydrogen fluoride gas may be generated during combustion of battery.
4. Ventilation requirements: Not necessary under normal conditions of use.

Toxicological Information

1. Not applicable under normal conditions of use. Chemicals within the battery have the following properties: Cobalt in lithium cobalt oxide is considered as a class 2B carcinogen by IARC. Organic

carbonated(electrolyte) vapors are categorized as corrosive, flammable and irritants.

Ecological Information

1. When properly used or disposed, these batteries do not present environmental hazard.
2. The battery does not contain mercury, cadmium or lead.
3. Do not let internal components enter marine environment. Avoid release to waterways, wastewater or groundwater.

Disposal Considerations

1. Waste disposal must be in accordance with the applicable regulations.
2. Disposal of the lithium rechargeable batteries should be performed by permitted, professional disposal firms knowledgeable in federal, state or local requirements of hazardous waste treatment and hazardous waste transportation.
3. Incineration should never be performed by battery use.
4. Batteries contained recyclable materials. Recycling options available in your local area should be considered when disposing of this product, through licensed waste carrier.
5. Batteries should have their terminal insulated in order to prevent short circuits during transportation to the disposal site.

Shipping Guidelines

General Regulatory Information

1. The transportation of the lithium batteries is regulated by the United Nations. "Model Regulations on Transport of Dangerous Goods" .
2. Lithium batteries and cells are subjected to shipping requirements exceptions under 49 CFR 173.185.
3. Shipping of lithium batteries in aircrafts are regulated by the international civil aviation organization (ICAO) and the international air transport association (IATA) requirements in special provision" A88"
4. Shipping of lithium batteries on sea are regulated the international maritime dangerous goods (IMDG) requirements of UN3480.
5. Cobalt compounds are considered hazardous and are subjected to reporting requirements of section 313 of title III of the superfund amendments and reauthorization act of 1986(SARA) AND 40 CFR part 372.

Product Specific Information

This product is rated below 300Wh in capacity. For that reason, it can be shipped with reduced regulatory requirements and exempt from Hazardous Materials surcharges from carriers.

Additional shipping guidelines and requirements can be found at the links below, and according to 49 CFR §173.185 - Lithium cells and batteries.

<https://www.fedex.com/content/dam/fedex/us-United-states/services/Shipping-Lithium-Batteries-via-FedEx-Ground.pdf>

At a minimum, exterior packaging shall contain one of either UN 3481 (Battery with/in equipment) or UN 3480 (Battery alone) AND the label stating "LITHIUM ION BATTERIES - FORBIDDEN FOR TRANSPORT ABOARD [PASSENGER](#) AIRCRAFT".

The marking specified must have a background of contrasting color, and the letters in the marking must be:

(A) At least 6 mm (0.25 inch) in height on packages having a gross weight of 30 kg (66 pounds) or less, except that smaller font may be used as necessary when [package](#) dimensions so require.

(B) At least 12 mm (0.5 inch) in height on [packages](#) having a gross weight of more than 30 kg (66 pounds).



Battery handling mark



**LITHIUM ION
BATTERIES -
FORBIDDEN FOR
TRANSPORT ABOARD
PASSENGER AIRCRAFT**

Other Information

1. The information and recommendations set forth are made in good faith and are believed to be accurate at the date of preparation. Norsk makes no warranty expressed or implied with respect to this information and recommendations and disclaims all liability from reliance on it. "Equivalent lithium content" information is available from Norsk on request. Norsk does not accept liability for any loss or damage that may occur, whether direct, incidental or consequential, from the use of this information. Norsk does not offer warranty against patent infringement.