

OFF-GRID 180

LITHIUM IRON PHOSPHATE BATTERY | 180AH Capacity | 250A Discharge | Built-In Heater  Bluetooth™

Part Number	OFF-GRID 180
Nominal Voltage	12.8V
Rated Capacity	180Ah (20Hr)
Capacity	2,304Wh
Achievable Capacity	Up to 198Ah
Dimensions	355mm long x 175mm wide x 190mm high (±0.5mm)
Terminal Type	SAE High Performance Automotive Post with M8 Threaded Bolt
Case Material	ABS Plastic
Weight	≤18Kg

Charge & Discharge

Charge Voltage	14.2V - 14.4V
Float Voltage	13.3V - 13.9V
Impedance	<10mΩ
Continuous Charge Current	250A
Continuous Discharge Current	250A

Temperature Windows

Operating Temperature	Charging	-20°C to 50°C
	Discharging	-20°C to 60°C
Storage Temperature	7 days or less	-20°C to 60°C
	3 months or less	-20°C to 40°C
	4 months or more	-20°C to 25°C

BMS Features

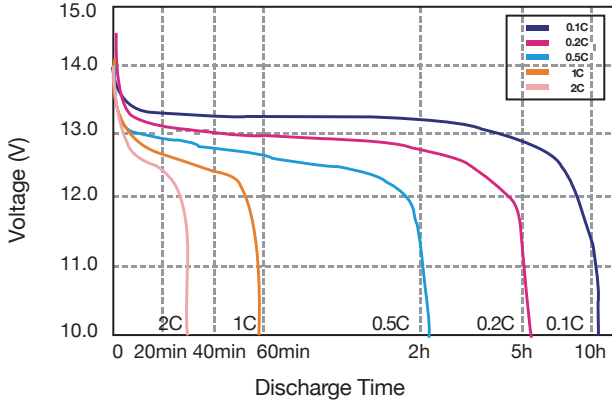
BMS Protection		Protection Trigger
Cell charge over voltage protection	Charge over voltage protection	3.65V
	Charge over voltage protection release	3.50V
Pack charge over voltage protection	Charge over voltage protection	14.40V
	Charge over voltage protection release	14.00V
Cell discharge under voltage protection	Discharge under voltage protection	2.50V
	Discharge under voltage protection release	3.00V
Pack discharge under voltage protection	Discharge under voltage protection	10.0V
	Discharge under voltage protection release	12.00V
Charge over current protection	Charge over current protection	250A
	Charge over current protection release	Remove charger
Discharge over current protection	Primary discharge over current protection	260A
	Secondary discharge over current protection	320A
Short circuit protection	Short circuit current protection	1,500A
	Short circuit protection release	Remove load or charge to release
Temperature protection	Discharge high temperature protection	60°C - 65°C
	Discharge high temperature protection release	55°C - 60°C
	Discharge low temperature protection	-20°C - -25°C
	Discharge low temperature release	-10°C - -15°C
	Charge high temperature protection	60°C - 65°C
	Charge high temperature protection release	55°C - 60°C
	Charge low temperature protection	0°C - 5°C
	Charge low temperature protection release	5°C - 10°C
Balancing voltage	Balanced start-up voltage	3.400V
	Balanced mode	Active Balance
Power consumption	Running mode	≤46mA
	Normal sleeping	≤150uA
	Deep sleeping	≤50uA
Cell Heater	Heater activation	≤3°C & on charge
	Heater power source	Charger
	Heater switch off	5°C - 10°C
	Heater power consumption	85W (±5%)
	Charger current required for full performance	5.8A (±5%)
Communications	Accepted protocols for inverters	CAN & RS485
	Batteries in parallel communication	Ethernet

OFF-GRID 180 Battery Performance

Note: 1C refers to 1 x current of the rated cell. E.g. a 0.5C rating on a 150Ah battery is charging/discharging at 75A. 1C on a 150Ah is 150A.

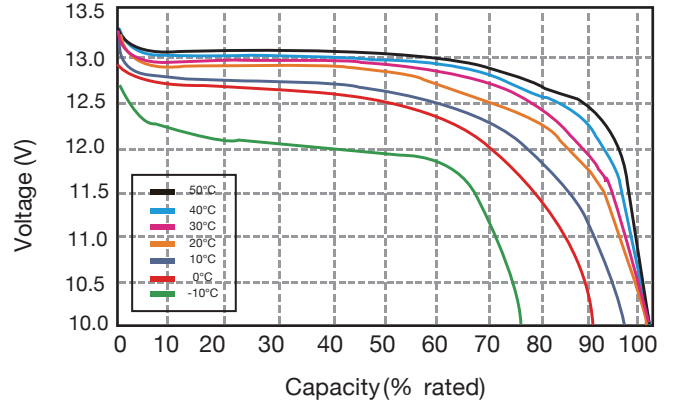
Discharge Rates

At 25°C



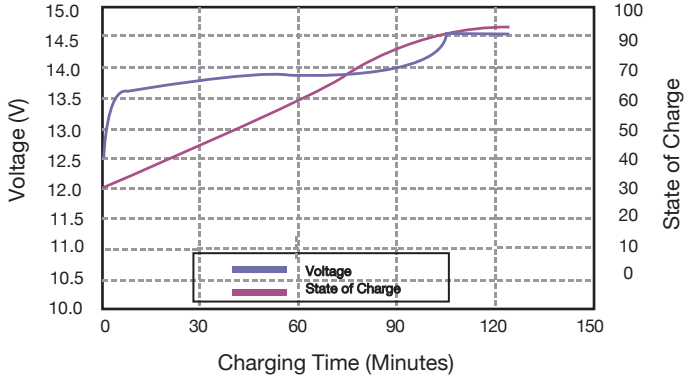
Temperature effects on discharge rates

At 25°C



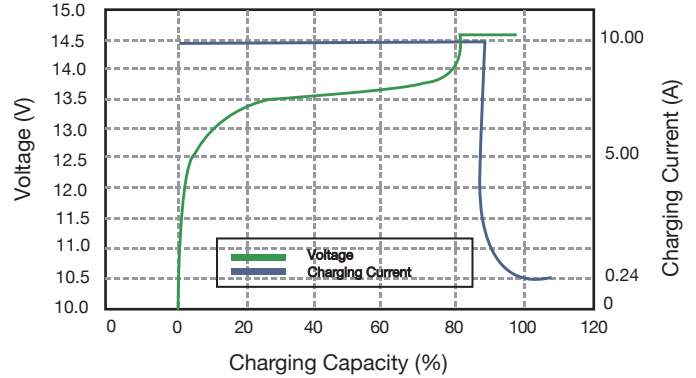
State of charge over time

At 0.5C, 25°C



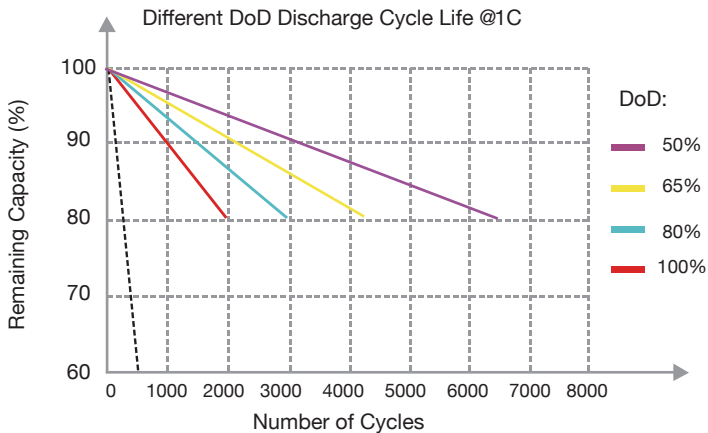
Charging characteristics

At 0.5C, 25°C



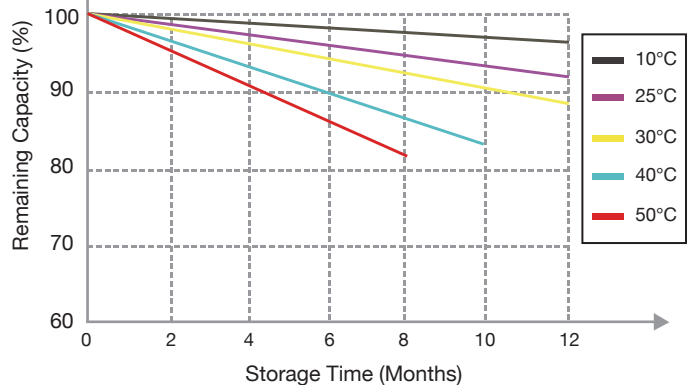
Cycle Life

At 1C, 25°C



Self discharge

Different Temperature Self Discharge Curve for Cells



SECTION 1-COMPANY IDENTIFICATION

Chemical Product Identification

Product Name: Lithium Ion Phosphate Rechargeable Battery

Common Name: Lithium Iron Phosphate (LiFePO₄)

Distributed By: RoadPro Ltd

Address:3 Egerton Close, Daventry, Northamptonshire, NN118PE

Company Registration Number: 1587959

Phone Number: +44 01327 312233

Email: sales@roadpro.co.uk

SECTION 2 – HAZARDS IDENTIFICATION

Emergency Overview: This product contains a chemical substance. Safety information is given for exposure to the product as sold. Intended use of the product should not result in exposure to the chemical substance. This is a battery. In case of rupture, the below hazards exist.

CAS# 1333-86-4

Classification According to GHS

Self-heating substances and mixtures (1) Carcinogenicity (2)

Specific target organ toxicity, repeated exposure (1) (lung)

Label Elements Hazard Images:



Signal Word: Danger Hazard Statements:

H251 Self-heating; may catch fire

H351 Suspected of causing cancer

H372 Causes damage to organs through prolonged or repeated exposure (lung)

Precautionary Statements:

Prevention:

P235 Keep cool.

P201 Obtain special instructions before use.

P202 Do not handle until all safety precautions have been read and understood.

P280 Wear protective gloves, protective clothing, eye protection and face protection.

P260 Do not breathe dust.

P264 Wash skin and clothing thoroughly after handling.

P270 Do not eat, drink or smoke when using this product.

Response:

P308+P313 If exposed seek medical attention.

P314 Seek medical attention if you feel unwell.

Storage:

P407 Maintain air gap between stacks or pallets.

P413 Store at temperatures not exceeding 50°C.

P420 Store separately.

P405 Store locked up.

Disposal:

P501 Contents require disposal at approved waste treatment plants.

CAS# 7440-50-8

Classification according to GHS

Sensitisation skin (1, 1A, 1B)

Specific target organ toxicity, single exposure (1) (digestive system) Specific target organ toxicity, single exposure;

Respiratory tract irritation (30)

Label Elements Hazard Images:



Signal word: Danger Hazard Statements:

H317 May cause allergic skin reaction.

H370 Causes damage to organs (digestive system).

H335 May cause respiratory irritation.

Prevention:

P260 Do not breathe dust, fume.

P272 Contaminated work clothing should not be allowed out of the workplace.

P280 Wear protective gloves, eye protection, face protection.

P264 Wash skin and clothing thoroughly after handling.

P270 Do not eat, drink or smoke when using this product.

P271 Use only outdoors or in a well-ventilated area.

Response:

P302+P352 IF ON SKIN: Wash with plenty of water.

P333+P313 If skin irritation or rash occurs: Seek medical attention.

P321 Specific treatment (See additional emergency instructions).

P362+P364 Take off contaminated clothing and wash it before reuse

P308+P311 IF exposed or concerned: Call a POISON CONTROL CENTRE.

P312 Call a POISON CENTRE if you feel unwell.

Storage:

P403 +P233 Store in a well-ventilated place. Keep container tightly closed.

P405 Store locked up.

Disposal:

P501 Contents handling to approved waste treatments.

AS# 7429-90-5

Classification according to GHS

Substances and mixtures which, in contact with water, emit flammable gases (2, 3)

Specific target organ toxicity, repeated exposure (1) (Lung)
Hazardous to the aquatic environment, long-term hazard (4)

Label Elements Hazard Images:



Signal word: Danger Hazard Statements:

H261 In contact with water releases flammable gas.

H372 Causes damage to organs through prolonged or repeated. exposure (Lung).

H413 May cause long lasting harmful effects to aquatic life.

Prevention:

P223 Do not allow contact with water.

P231+P232 Handle and store contents under inert gas, protect with moisture.

P280 Wear protective gloves and clothing thoroughly after handling.

P270 Do not eat, drink or smoke when using this product.

P273 Avoid release to the environment.

Response:

P302+P335+P334 IF ON SKIN: Brush off loose particles from skin and immerse in cool water.

P370+P378 In case of fire: use the appropriate media to put out the fire.

P314 Seek medical attention if you feel unwell.

Storage:

P402+P404 Store in a dry place. Store in a closed container.

Disposal:

P501 Contents handling to approved waste treatment plants.

Other Hazards

Physical and Chemical hazards: See Section 10

Human Health Hazards: See Section 11

Environmental Hazards: See Section 12

SECTION 3 – COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Characterisation: Mixture

Chemical Composition	CAS No.	EC#	Weight (%)
Lithium iron phosphate (LiFePO ₄)	15365-14-7	604-917-2	20-40%
Lithium hexafluorophosphate	21324-40-3	244-334-7	10-20%
Aluminium	7429-90-5	231-072-3	10-20%
Graphite	7782-42-5	231-955-3	10-20%
Copper	7440-50-8	231-159-6	7-13%
Poly (vinyl chloride)	9002-86-2	618-338-8	1-5%

SECTION 4 – FIRST AID MEASURES

Description of First Aid Measures

General Information: No special measures required.

After Eye Contact

Flush eyes with plenty of water for several minutes while holding eyelids open. Get medical attention if irritation persists.

After Skin Contact

Remove contaminated clothing and shoes. Immediately wash with water and soap, rinse thoroughly. Wash clothing and shoes before reuse. If irritation occurs, get medical attention.

After Inhalation

Remove victim to non exposed area. Administer artificial respiration if breathing is difficult. Seek medical attention.

After Swallowing

Do not induce vomiting. Get medical attention.

Personal protective equipment for first-aid responders: No data available

Most important symptoms/effects, acute and delayed: No data available

Indication of immediate medical attention and special treatment needs: No data available

SECTION 5 – FIRE FIGHTING MEASURES

Suitable extinguishing media:

Use extinguishing agent suitable for local conditions and the surrounding environment, such as ABC extinguisher of the following type: a foam extinguisher, CO₂, ABC dry chemical, powdered graphite, copper powder or soda (sodium carbonate) that is common to extinguish other combustible fire types.

Unsuitable extinguishing media: No data available.

Specific Hazards Arising from the Chemical:

Special hazards arising from the substance or mixture Battery may burst and release hazardous decomposition products when exposed to a fire situation. Lithium ion batteries contain flammable electrolytes that may vent, ignite and spark when subjected to high temperature (>150°C (302°F), when damaged or abused (e.g.) mechanical damage or electrical overcharging); may burn rapidly with flare-burning effect; may ignite other batteries in close proximity.

Specific protective actions for fire-fighters:

Protective equipment: wear self-contained respirator. Wear fully protective impervious suit.

SECTION 6 – ACCIDENTAL RELEASE MEASURES

Personal Precautions: Wear protective equipment. Keep unprotected persons away. Ensure adequate ventilation.

Protective Equipment: No data available.

Emergency Procedures: Remove ignition sources, evacuate area. Sweep up using a method that does not generate dust. Collect as much of the spilled material as possible, place the spilled material into a suitable container for disposal.

Keep spilled material out of sewers, ditches and bodies of water.

Environmental Precautions: Do not allow material to be released into the environment without proper governmental permits.

Methods and Materials for Containment and Cleaning Up:

All waste must refer to the United Nations, the national and local regulations for disposal.

See Section 7 for information on safe handling.

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

SECTION 7 – HANDLING AND STORAGE

Precautions for Safe Handling:

Consumption of food and beverage should be avoided in work areas. Wash hands with soap and water before eating or drinking. Ground containers when transferring liquid to prevent static accumulation and discharge.

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

Conditions for safe storage, including any incompatibilities:

Requirements to be met by storerooms and receptacles

Store in a cool, dry, well-ventilated place.

Information about storage in one common storage facility

Keep away from heat, avoiding long exposure to sunlight.

Further information about storage conditions

Keep container tightly sealed

Specific and use: No data available

SECTION 8 – EXPOSURE CONTROLS/PERSONAL PROTECTION

Appropriate engineering controls: The usual precautionary measures for handling chemicals should be followed. Remove all soiled and contaminated clothing immediately. Wash hands before breaks and at the end of work.

Personal Protective Equipment

Respiratory protection: Wear suitable protective mask in order to reduce the respiratory system. In case of leakage, wear chemical protective clothing, including self-contained breathing apparatus.

Hand protection: Wear appropriate protective gloves to reduce skin contact.

Eyes protection: Wear safety goggles or eye protection combined with respiratory protection.

Skin and body protection: Working environment required, wear suitable protective clothing to minimise contact with skin. The type of protective equipment must be according to the concentration and content of certain hazardous substances in the workplace.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Colour: Black

Physical State: Prismatic

Odour: Not available

Odour Threshold: Not available

pH: Not available

Melting point/freezing point: Not available

Initial boiling point and boiling range: Not available

Flash Point: Not available

Evaporation Rate: Not available

Flammability (solid, gas): Not available

Explosion Limits (vol% in air): Not available

Vapour Pressure, kPa at 20°C: Not available

Vapour Density: Not available

Density/Relative Density (water=1): Not available

Solubility(ies): Not available

Partition Coefficient: n-octanal/water: Not available

Auto-ignition Temperature: Not available

Decomposition Temperature: Not available

Viscosity: Not available

Other Information: Not available

SECTION 10 – STABILITY AND REACTIVITY

Reactivity: No data available

Chemical Stability: Stable

Possibility of Hazardous Reactions: No data available

Conditions to Avoid: Flames, sparks and other sources of ignition, incompatible materials

Incompatibilities Materials: Oxidising agents, acid, base

Hazardous Decomposition Products: Carbon monoxide, carbon dioxide, lithium-oxide fumes

SECTION 11– TOXICOLOGICAL INFORMATION

Acute Toxicity:

CAS No.	LC50/LD50
15365-14-7	No data available
21324-40-3	No data available
7429-90-5	No data available
7782-42-5	No data available
7440-50-8	No data available
9002-86-2	No data available

Skin Corrosion/Irritation: No data available

Serious Eye Damage/Irritation: No data available

Respiratory or Skin Sensitisation: No data available

Germ Cell Mutagenicity: No data available

Carcinogenicity: No data available

Reproductive Toxicity: No data available

Specific Target Organ Toxicity-Single Exposure: No data available

Specific Target Organ Toxicity-Repeated Exposure: No data available

Aspiration Hazard: No data available

Information on the Likely Routes of Exposure: No data available

Eye: No data available

Skin: No data available
Ingestion: No data available
Inhalation: No data available

SECTION 12 – ECOLOGICAL INFORMATION


Ecological Toxicity: No data available
Persistence and Degradability: No data available
Bioaccumulative Potential: No data available
Mobility in Soil: No data available
Other Adverse Effects: No data available

SECTION 13 – DISPOSAL CONSIDERATIONS

Disposal Methods
Recommendation: Consult state, local or national regulations to ensure proper disposal.
Uncleaned Packaging
Recommendation: Disposal must be made according to official regulations.

SECTION 14 – TRANSPORT INFORMATION

Acute Toxicity:

UN Number	
IATA IMDG ADR Model Regulation	UN3480
UN Proper shipping name	
IATA IMDG ADR Model Regulation	Lithium ion battery
Transport Hazard Class (es)	
IATA IMDG ADR Model Regulation	9
Packing group	
IATA IMDG ADR Model Regulation	N/A
Packing Sign	
IATA IMDG ADR Model Regulation	
Environmental Hazards Marine Pollutant:	No
Special precautions for user	N/A

Transport Information:

RoadPro LiFePO4 Batteries have passed compliance tests:
UN38.3
CE
RoHS
UKCA
EMC

Watt-hour exceeds the standard, so it belongs to dangerous goods. The goods are packaged according to the packaging Instruction 965 Section IA of IATA DGR for transportation, Cargo aircraft only.

Watt-hour exceeds the standard, so it belongs to dangerous goods. The goods are packaged according to the special provision 230, 348 of IMDG (37-14).

Watt-hour exceeds the standard, so it belongs to dangerous goods. The goods are packaged according to the <<Recommendations On The Transport of Dangerous Goods- Model Regulations>>(19th).

Separate batteries to prevent short-circuiting and they should be packed in a strong package during transport. Lithium cell or battery should incorporate a safety venting device or be designed to prevent a violent rupture under normal transport conditions. Keep away from high temperature and open flames. Lithium ion cells and batteries must be offered for transport at a state of charge (SoC) not exceeding 30% of their rated design capacity.

Transport Fashion: By air, by sea, by railway, by road.

SECTION 15 – REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture

CAS No.	TSCA	IESC	DSL/NDSL	EINECS/ ELINCS/ NLP
15365-14-7	Listed	Listed	Listed DSL	Listed
21324-40-3	Listed	Listed	Listed DSL	Listed
7429-90-5	Listed	Listed	Listed DSL	Listed
7782-42-5	Listed	Listed	Listed DSL	Listed
7440-50-8	Listed	Listed	Listed DSL	Listed
9002-86-2	Listed	Listed	Listed DSL	Listed

SECTION 16 – OTHER INFORMATION

Issue Department: Technical Department Modification Record: Notice to Reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above names supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although, certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Other Information:

CAS: (Chemical Abstracts Service)

EC: (European Commission)

ACGIH: (American Conference of Governmental Industrial Hygienists) NIOSH: (US National Institute for Occupational Safety and Health) OSHA: (US Occupational Safety and Health)

TLV: (Threshold Limit Value)

TWA: (Time Weighted Average)

STEL: (Short Term Exposure Limit)

PEL: (Permissible Exposure Average)

REL: (Recommended Exposure Limit)

PC-STEL: (Permissible concentration-time weighted average PC-TWA: (Permissible concentration-short time exposure limit) LC50:

(Lethal concentration, 50 percent kill)

LD50: Lethal dose, 50 percent kill)

IARC: (International Agency for Research on Cancer)

EC50: (Median effective concentration)

BCF: (Bio concentration Factor)

BOD: Biochemical Oxygen Demand)

NOEC: (No observed effect concentration)

NTP: (US National Toxicology Program)

RTECS: (Registry of Toxic Effects of Chemical Substances) IATA: (International Air Transport Association)

IMDG: (International Maritime Dangerous Goods)

TDG: (Recommendations on the TRANSPORT OF DANGEROUS GOODS Model Regulations)

TOC: (Total Organic Carbon)

TSCA: (Toxic Substances Control Act of USA)

DSL: 9The Domestic Substances List of Canada)

NDSL: (The Non-Domestic Substances List of Canada)

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