

Imperium

Lithium Battery 105Ah

LITHIUM BATTERY 105AH



ULTRA LIGHT WEIGHT



HIGH CAPACITY



EXTREME POWER



LONG LIFE

USER MANUAL

PART NUMBER: IMP001

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1 PRODUCT DESCRIPTION

The Imperium Lithium 105Ah is a Lithium-iron phosphate (LiFePO₄) battery. This is the safest of the most important lithium-ion battery types. Besides safety, the LiFePO₄ technology is characterized by:

- Minimal weight
- Small dimensions
- Low internal resistance
- High efficiency
- Excellent cycle performance
- Large permitted temperature range
- Almost constant Voltage throughout the entire discharge cycle
- It is possible to use 100% of the capacity before the battery is empty and switches itself off. This is in contrast to lead-acid batteries where usually 50 - 60% of the capacity can be used before the battery needs to be recharged.

All of which makes the battery the right choice for a wide range of applications. Another big advantage compared to lead-acid batteries is that the LiFePO₄ battery does not need to be fully charged. A lead-acid battery will fail due to sulphating if it is not fully charged for a long period of time. The Imperium Lithium battery consists of 4 cells connected in series with a nominal voltage of 3.2V which together form 12.8V.

An essential part of the LiFePO₄ battery is its Battery Management System (BMS). The BMS monitors the cells that make up the battery for the following risks

- Too deep discharge - A LiFePO₄ cell will fail if the voltage is less than 2.5V. The BMS disconnects the battery before the cell voltage reaches this point.
- Overvoltage - If the cell voltage exceeds 3.65V during charging, the BMS will stop the higher voltage. The BMS stops the charging process before the cell voltage becomes too high.

- Too high temperature - The BMS will turn off the battery if the system temperature becomes too high.
- Too low temperature - The BMS prevents the battery from being charged at temperatures below -10°C.
- Short circuit - The BMS switches the battery off if the terminals are shorted.
- Imperium batteries have a cell balancing function built into the BMS. Because the cells are never 100% identical, this system ensures that the cells remain balanced and that no major differences in cell voltages can arise due to the discharge and charging.

The Imperium Lithium Battery is equipped with Bluetooth technology that allows both monitoring and operation (switching it on and off) of the battery and via the Imperium App, which is available for both Android and Apple via the App Store

2 SAFETY INSTRUCTIONS

2.1 Safety instructions statement

These safety instructions are divided into 3 categories, as follows



WARNING!

Danger, these instructions must be followed to prevent injury or harm



CAREFUL!

These instructions must be followed to prevent damage



PAY ATTENTION!

Important advice and guidance

2.2 Safety instructions

- Carefully read this manual before using the battery pack.
- Keep the manual close to the battery and make it available to the user of the battery pack.
- Only technically qualified personnel may carry out work on the battery.
- The electrolyte is highly corrosive. Under normal circumstances, contact with the electrolyte is not possible. In case of damage to the battery, avoid direct contact with the electrolyte or powder. If you have come into contact with the electrolyte, rinse it immediately with plenty of water. After this, consult a doctor.
- Use cables of the correct cross-section and keep the cable connections as short as possible. Use reliable cable clamps and tighten the bolts firmly.

- Never short-circuit the + and - poles. The internal BMS is protected against short circuits, but to prevent dangerous sparks this is strongly discouraged.
- Never connect the battery pack in series or in parallel with any other type of battery pack.
- Do not use the battery as a starter battery.
- Do not open the battery pack. The guarantee is void if the battery is opened.
- Do not place the battery pack in a high temperature environment or in direct sunlight or near a heat source >45°C.
- Never install the battery in rain or damp conditions.
- Avoid damage to the battery and/or charger housing.
- Do not store the battery in discharged condition (< 11.5V) for a long period of time.
- If the battery is stored for a long period of time without use, we recommend that you charge it once every six months. **Don't forget to disconnect the battery terminals or turn off the ground switch when you don't use the battery for a long period of time.**
- Never charge the battery pack at temperatures below 0 °C.
- Always use an Imperium charger. Imperium chargers are suitable for LiFePO4 cell chemistry with the corresponding charging voltage.
- Never use a damaged battery pack.
- Make sure the batteries are never covered with clothing or any other materials as this can lead to overheating!

**CAREFUL!**

Using a charger that is not suitable for LiFePO₄ chemicals can damage the battery because it is not properly charged.

2.3 Transport alert

- The Li-ion battery must be transported in its original packaging.
- Our battery has been tested according to the UN handbook for tests and criteria, part III, paragraph 38.3 (ST/SG/AC.10/11/Rev.5). During transport, the battery falls under category UN3480 class 9, packing group II and must be transported in accordance with these regulations. This means that the battery must be packed in accordance with the packaging instruction P903 for transport over land or sea (ADR, RID & IMDG) and in the case of air transport (IATA) in accordance with the packaging instruction P965. The original packaging complies with these instructions.
- Make sure that the battery is properly secured during transport. The battery can become a projectile if a vehicle is involved in an accident.

3 DESCRIPTION AND OPERATION

3.1 Charging

During charging, the LED lights red.

At the end of the charging cycle the LED lights green.

The battery capacity can be read by pressing the thickener in the foil. One, two or three green LEDs will light up as a rough indication of the charge status. When the battery is empty, a small red LED lights up.

Never charge the battery pack at temperatures below 0°C. At -10°C, a protection device is activated which makes charging impossible. The battery can be discharged or used up to a temperature of -20°C.



WARNING!

Stop the charging process if the battery becomes too hot during charging (> 45 °C 50 °C).

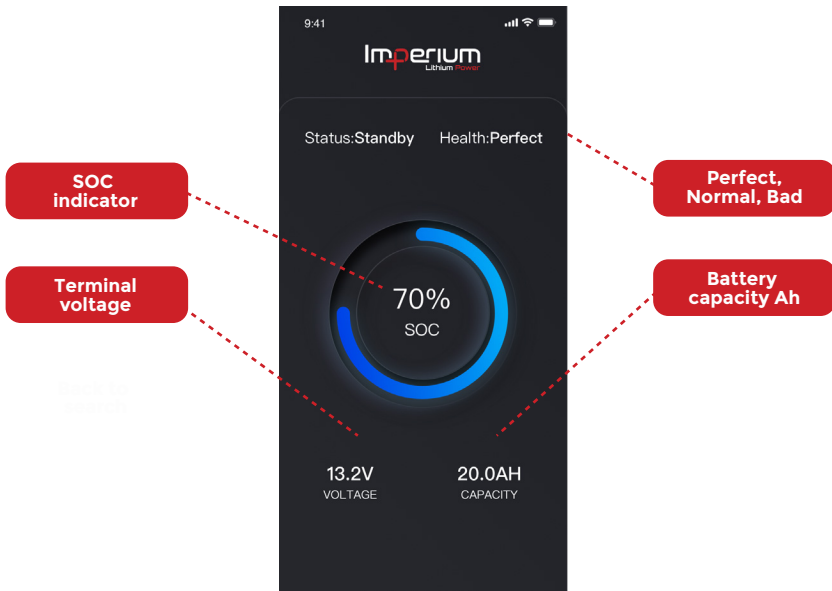
The battery can also be charged by solar panels if they are connected to a charger that is suitable for charging LiFePO4 batteries. The Imperium IMP004 40A DC-DC Charger, with built in MPPT, is ideal for this. Because of the MPPT technique this charger gets the maximum efficiency from your Solar panels. You can also charge the battery while driving. For this you need to use a so-called charge booster, see paragraph 3.4.

3.2 Imperium Lithium App

Via the Apple store (suitable for iPhone 4S with IOS 6 or higher) or the Google Play store (suitable for Android 4.3 or higher) you can download the Imperium Lithium App and use it to read the status and health of your battery. When you open the APP a dialog box appears where you can see all Bluetooth devices within the range (< 5.0 metres). You can recognise your battery by the serial number that starts with EP..... Select your battery, then connect via Bluetooth and you will see all the information about the battery. The following data is displayed in the APP:

Basic Info tab:

- State of Charge: SOC State of charge in %
- Voltage: Terminal voltage of the battery in V
- Capacity: Capacity/Content of the battery in Ah
- Status: Charging - Discharging – Standby
- Health: of the battery
- On/ Off On/ Off switch



SOC means "State of Charge" or the state of charge of the battery. The voltage and capacity of the battery are listed below.

"STATUS" shows whether the battery is charging or discharging or whether the battery is in standby mode.

Health shows the condition of the battery. This varies from Perfect, Good and Bad.

The three dots at the bottom right open a menu intended for service purposes

U.I.T.C. info tab:

The Connect tab shows all of the connected batteries

3.3 Storage

If you want to store the battery for a long period of time, disconnect the battery terminals. This will prevent the battery from being discharged by slumber consumption. Also disconnect the charging current connector from the battery. The battery has a very low self-discharge and can be stored for up to half a year without any problems. Charge the battery after half a year.

3.4 Installation

The following is important for the installation of the battery:

- In the box, you will find the following parts:
 - Battery
 - Battery terminals + and –
 - Mounting plate with Velcro and 4 self-tapping screws
 - Charging cord 230V
 - Instruction card



Figure 2.
Package contents

- After unpacking, check all parts for possible damage.
- Fully charge the battery before first use.



WARNING!

Never use the LiFePO₄ battery in locations with gas or dust explosion hazards or potentially flammable products.

- Mount the battery pack using the supplied mounting plate and Velcro fastener at the location of your choice in the camper.
- Make sure there is at least 10 cm clearance around the battery. Do not install the LiFePO₄ battery in an unventilated area, there is a risk of overheating!



Figure 3. Difference diameter of + and - pole

- Switch off all loads and charging equipment before you start connecting.
- Use proper cabling of sufficient cross-section and correctly dimensioned terminals and battery terminals. Tighten all connections securely. Recommended tightening torque for M8 is 9.9 - 14 Nm. Do not use too great a tightening torque, as this can lead to irreparable damage to the LiFePO₄ battery.
- If you use screws to connect consumers instead of the supplied battery terminals, make sure that these screws are not long than 10mm.



CAREFUL!

If bolts that are too long are used, the connections will be firm enough. This leads to large contact resistances and can cause the battery or equipment to spark or switch off.



CAREFUL!

Observe the polarity of the battery and avoid short circuits! Equipment whose polarity is incorrectly connected can be irreparably damaged

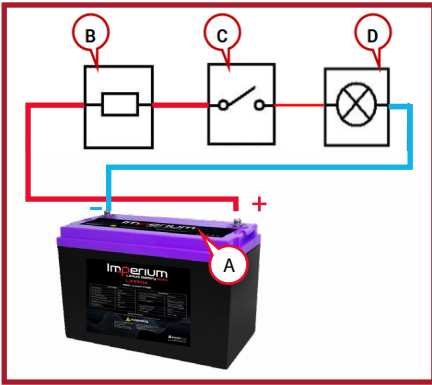
- Never connect the battery in parallel to any other type of battery, including the wiring from the car.
- Do not work on the LiFePO4 battery or the installation when it is still live. Only have changes to your electrical installation carried out by qualified electricians.



PAY ATTENTION!

Install a fuse and a main switch to the power circuit according to local regulations. Place the fuse as close as possible to the + pole of the battery.

- After first use, check all connections for excessive heat. Repair or replace any connections that have over heated .
- Check the wiring and connections at least once a year. Immediately rectify defects such as loose connections and burnt cables.
- System overview:



WARNING!

Never connect the battery in parallel to any other type of battery, including the wiring from a car. Only connect in parallel to other Imperium LiFePO4 batteries.

4 DECOMMISSIONING

Electric appliances should not be disposed of with normal household waste. According to the European Directive 2012/19/EU on waste electrical and electronic equipment (WEEE), these devices must be collected separately in order to recycle them in an environmentally friendly manner possible.



5 TECHNICAL SPECIFICATIONS

5.1 Technical data

Model	IMP001	AGM
Depth of Discharge	80%	50%
Maximum Capacity	105 Ah	100 Ah
Useable Capacity	83 Ah	50 Ah
Cycles (of useable capacity)	2000	500
Effective lifetime capacity	141000 Ah	20000 Ah
Battery weight	11.8 kg	28.7 kg
Runtime @ 20A discharge	311.8 minutes	300.03 minutes
IP rating of 67	✓	—
Internal charger		
Charging temperature range	0-45 degree °C	
Discharging temperature range	20-60 degree °C	
Storage temperature range	10-45 degree °C	

6 FAULTS AND REPAIRS

6.1 Fault finding table

Model	Model	Model
Charger LED-flashes red.	Charger defective.	Send charger to Purple Line for repair.
Charger LED flashes red after charging for a while.	Possible charger defective or charging circuit failure.	Check charging current (4A) with APP. Reconnect the charger. If malfunction comes back send charger to Purple Line for repair.
Battery capacity drops away, but voltage >12V.	SOC decreases faster than is actually the case.	Fully charge the battery. SOC is then again accurate.
No voltage at poles.	Short circuit or overload.	Disconnect the battery terminals. Let the charger charge for a while. Reconnect the battery terminals.
Battery does not work.	Battery is off.	Switch on the battery with App.

EN60950 Information technology equipment - Safety -
-1:2005+A1:2009+A2:2013 Part 1: General requirements

and which the following natural or legal person established in the
Community is authorized to compile the technical file:

Name and position : Purple Line PTY LTD
Address : 13-15 Indian Drive Keysborough VIC 3172 AUS
Country : Australia
Done at Kapelle 3-9-2018

WARRANTY



WARRANTY PERIOD:

Full 2 years warranty from date of purchase against all manufacturing defects.

WHAT DOES THE WARRANTY COVER?

Under normal usage conditions, this warranty covers:

1. Any defect in design or manufacture which results in its failure to perform correctly as described.
2. We will either repair or replace the product at our discretion provide that the fault is found to have been caused by a design or manufacturing defect and not misuse or tampering.

THE WARRANTY DOES NOT COVER

1. Cost of removing and reinstalling the product.
2. Travel and /or other expenses due to customer's location
3. Transport charges and damage in transit. It is your responsibility to deliver and pick up your product, including any costs associated with the postage of repairing or replacing your product. If you want to send the product back we recommend that you insure against loss or damage.
4. Any loss directly or indirectly associated with the product that fails to operate.
5. Damage caused by mould, misuse, incorrect operation, adverse weather, accidents and daily wear and tear.
6. The warranty is non-transferable and only applies to the original purchaser
7. This unit is not intended for commercial use.
8. This warranty does not apply to damage to units from misuse or incorrect installation/connection. Misuse includes wiring or connecting to improper polarity power sources.

Imperium

Lithium Power

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