Imperium Lithium Battery 105Ah

2022
USER MANUAL

Imperium Lithium Battery 105Ah

LIFEPO4

MODEL NUMBER: IMP001

Specifications	
Battery Chemistry	$LiFePO_4$
Nominal Capacity	105Ah @ 77° F
Nominal Voltage	12.8V
Max. Charging Voltage	14.6V
Standard Charging Current	20A
Max. Continuous Charging Current	50A @ 77° F
Standard Discharge Current	20A
Max. Continuous Discharging Current	105Ah @ 77° F

Specifications	
Dischargeing Cut-off Voltage	10V
Cycle Life	≥ 2000 @ 80% DOD @ 77° F
Charging Temperatures	32 - 113° F (recommended) 14° - 32° F (current 10A, not reccomended frequently)
Discharge Temperatures	-4 - 60° F
Storage Temperatures	14° - 113° F
Battery Weight	Approx. 26 lbs.

Storage Information

Store battery as approx. 50% capacity. Charge and discharge every 3 month.

WARNING

- Keep away from water and fire
- Do not short circuit battery terminals
- Do not disassemble battery
- Do not pierce or impact case
- Fully charge battery before first use
- Do not let battery stay at flat state of charge
- Misuse may result in fire or injury

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1850 Loveridge Rd., Pittsburg, CA 94565

Welcome!

Thank you for purchasing the high quality Imperium Lithium battery from Purple Line!

This product has been developed using the most modern technologies and quality systems. We assure you that we make every effort to ensure trouble-free operation so that you are happy with your purchase. Our ultimate goal is a satisfied customer. If you have any questions, please contact one of our dealers or our service department.

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CONTACTING PURPLE LINE USA:

WEBSITE: www.purplelineusa.com
E-MAIL: info@purplelineusa.com
PHONE: 1 (925) 215.7315
HEADQUARTERS: 1850 Loveridge Rd., Pittsburg, CA 94565.

We hope your Imperium Lithium battery takes you on longer adventures to the most remote destinations!

Sincerly,
Purple Line USA

MODEL NUMBER: IMP001
LIFEPO4

TABLE OF CONTENTS

1 PRODUCT DESCRIPTION

MODEL NUMBER: IMP001

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.

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 longer 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.

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.

- Our 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 is equipped with Bluetooth technology that allows monitoring of the battery and switching it on and off via an App.

2 SAFETY INSTRUCTIONS

2.1 SAFETY INSTRUCTIONS STATEMENT

The safety instructions help you to avoid hazards when performing actions. The safety instructions are divided into the following categories:

WARNING!

Means that the act in question is dangerous and should be prepared before proceeding.

CAREFUL!

Means that the operation can cause damage.

PAY ATTENTION!

Means advice for instruction to the user.

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 with RV>80%. Avoid damage to the battery and/or charger housing.
- Do not store the battery in discharged condition (< 11.5V) for a longer period of time.
- If the battery is stored for a longer 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 longer period of time.
- Never charge the battery pack at temperatures below 0 °C.
- Always use the supplied charger. This charger is suitable for LiFePO4 cell chemistry with the corresponding charging voltage.
- Never use a damaged battery pack.
- Make sure that the battery and charger are never covered with clothing or other materials! This can lead to overheating!

CAREFUL!

Using a charger that is not suitable for the 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

3.2 CHARGING

When the battery runs out, it must be recharged. Connect the charger to the battery and then plug it into the 230V socket. The charger now starts charging with a charging current of 2A.

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.

The charging time depends on the charging status at the start of the charging cycle. If the capacity is still 40%, 6Ah must be charged. The charging time is then around 3 hours x 2A + around 1 hour = around 4 hours. The charger can be continuously connected to 230V, even after the battery is fully charged. 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. We have the XS20s MPPT Solar charger in our program. 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.

3.3 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:

- 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.

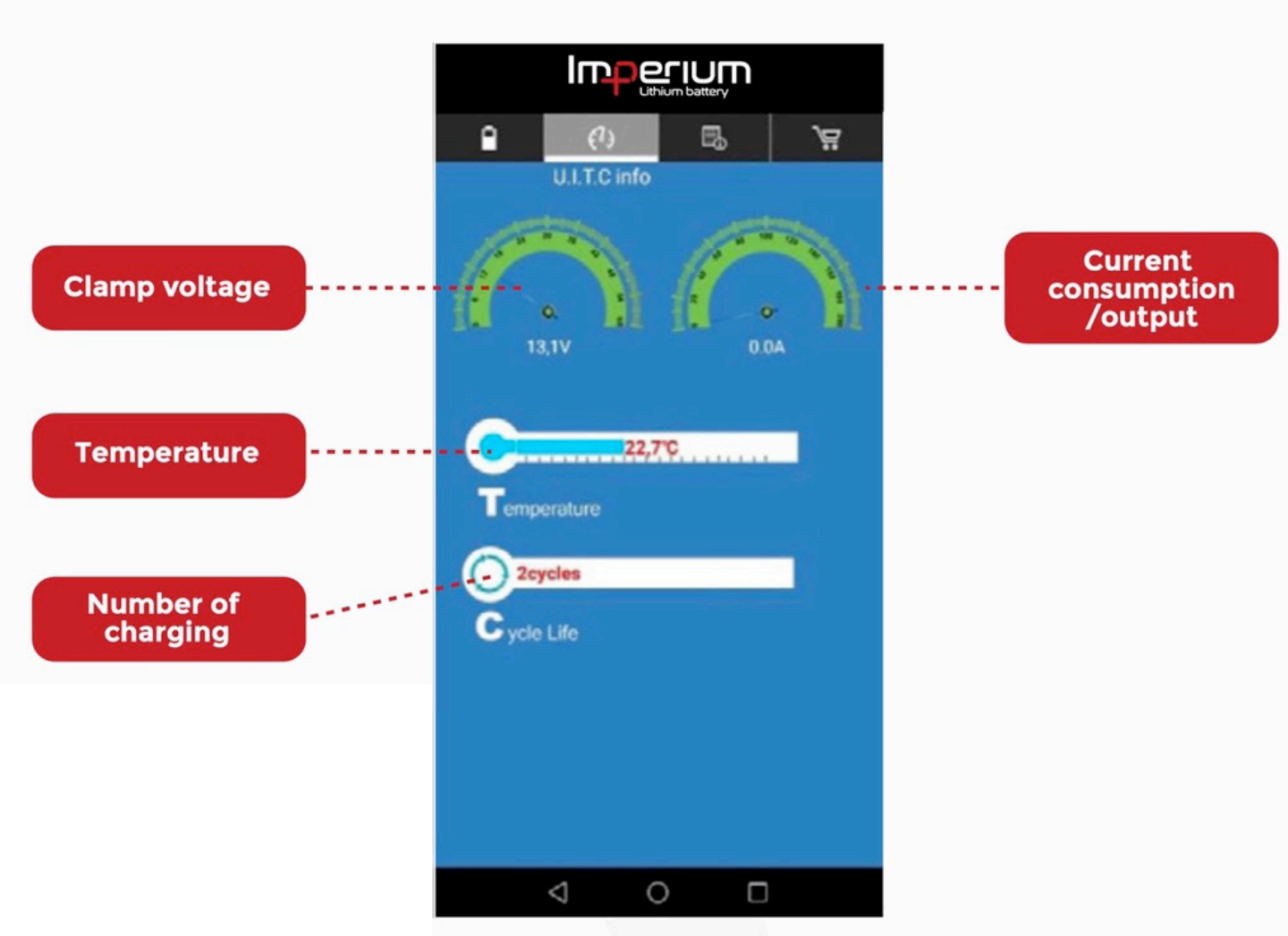
STATUS” shows whether the battery is charging or discharging or whether the battery is in standby mode.

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:

- VOLTAGE METER Terminal voltage of the battery in
- CURRENT METER V Present current consumption in
- TEMPERATURE A Temperature of the battery cells
- CYCLE LIFE Number of charge/discharge cycles



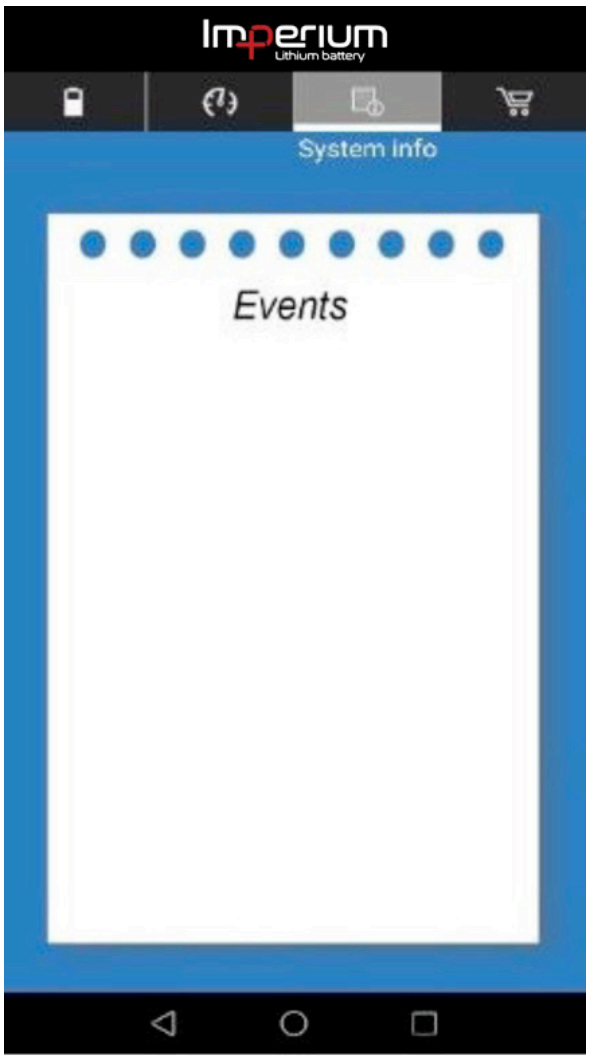
The UITC info shows 2 “meters”, on the left the battery voltage and on the right the current. This can be the charging current or the current drawn from the battery. If the battery is connected to a charger but at the same time power is requested by users, the resulting current is displayed. Temperature of the cell pack. If the temperature is too low or too high, a safety device is activated.

Cycle life keeps track of how often the battery has been discharged by 80%. For example, from 90% SOC to 10% SOC is a cycle. Also, from 70% SOC to empty then charging to 100% and empty to 90% is a cycle.

SYSTEM INFO TAB:

System info contains messages about events that occurred during the charging or discharge process. This refers to the following events:

- Short circuit
- Lift up short circuit
- High temperature at charging
- High temperature at discharge
- Low temperature at charging
- Low temperature at discharge
- Overcurrent when charging
- Too much current when discharged
- High Voltage
- Low Voltage
- Temperature/Voltage/Current back to normal
- Display remaining charge time



BUY INFO TAB:

CONTACTING PURPLE LINE USA:

WEBSITE:	www.purplelineusa.com
E-MAIL:	info@purplelineusa.com
PHONE:	1 (925) 215.7315
HEADQUARTERS:	1850 Loveridge Rd., Pittsburg, CA 94565

PAY ATTENTION

It is possible that the app displays a value that is too low for the SOC (charge status) when the battery has not been used for a longer period of time. Once you have charged the battery, the SOC display will be correct again.

3.4 POWERXCHARGER XC3 (OPTIONAL)

To charge the battery while driving, the PowerXCharger XC3 is available as an option. This converts the charging voltage of the car alternator into the right charging voltage for the Imperium Lithum battery. Due to the limited charging current, there is no need to install thick wiring. The XC3 also acts as a battery guard. If the terminal voltage of the starter battery is too low, the XC3 switches the battery off so that the starter battery does not discharge further. Charging with a solar panel is also possible. However, a suitable charge regulator must be used for this.

3.5 STORAGE

If you want to store the battery for a longer 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.

3.6 INSTALLATION

The following is important for the installation of the battery. In the box, you will find the following parts:

- Battery with charger mounted inside
- Battery terminals + and –
- Mounting plate with Velcro and 4 self-tapping screws
- Charging cord 230V
- Instruction card

FIGURE 2. PACKAGE CONTENTS X20/X30

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

WARNING

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

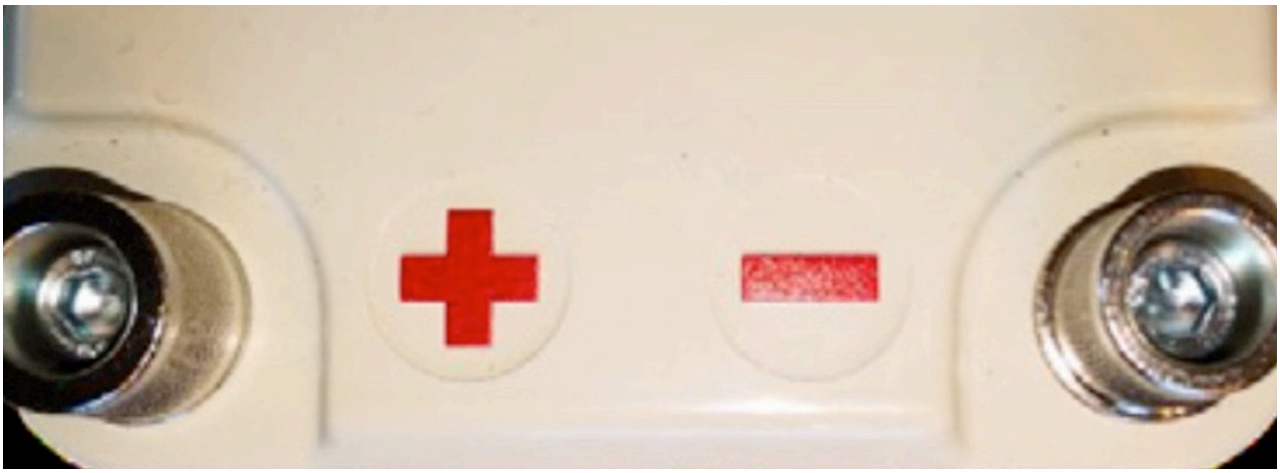


FIGURE 3. DIFFERENCE DIAMETER OF + AND - POLE

- 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 M6 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 longer than 10mm.

CAREFUL!
If bolts that are too long are used, the connections will not get stuck! This leads to large contact resistances and can cause the battery or equipment to spark or switch off.

FIGURE 4. WRONG! LOOSE CONNECTION BY USING TOO LONG BOLT

- Connect the negative pole of the battery to the negative connection of the caravan mover unit.
- Connects the positive terminal of the battery to the positive terminal of the caravan mover unit.
- Use cables as prescribed in your caravan mover manual. It is recommended to use a minimum of 16 mm2. Use one red wire for the + and one black or blue wire for the -.

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 or test all connections for (over) heating. Repair or replace connections that have become too hot.
- Check the wiring and connections at least once a year. Immediately rectify defects such as loose connections and burnt cables.

SYSTEM OVERVIEW:

A = Imperium Lithum 105Ah

B = Fuse

C = Main switch

D = Battery charger

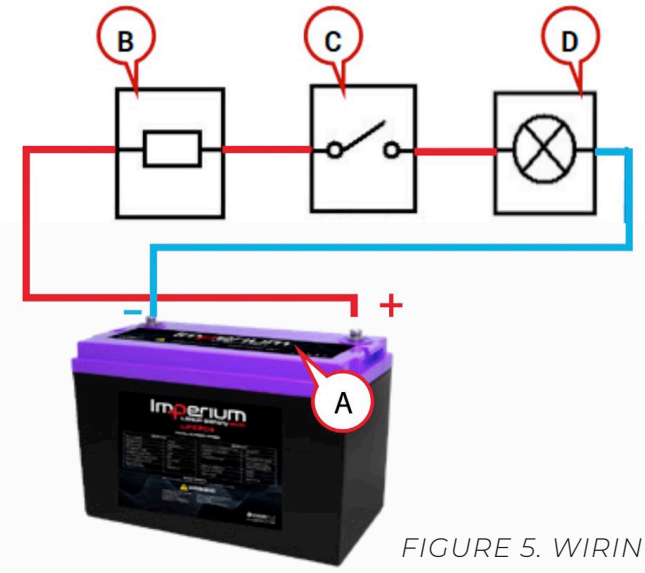


FIGURE 5. WIRING DIAGRAM

WARNING

Never connect the battery in parallel to another battery, including the wiring from the car.

4 DECOMMISSIONING

4.1 DECOMMISSIONING

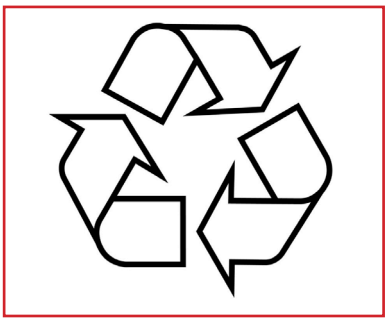
- Lithium-ion batteries and devices containing these batteries should NOT go in household garbage or recycling bins.
- Lithium-ion batteries SHOULD be taken to separate recycling or household hazardous waste collection points.
- To prevent fires, tape battery terminals and/or place lithium-ion batteries in separate plastic bags.

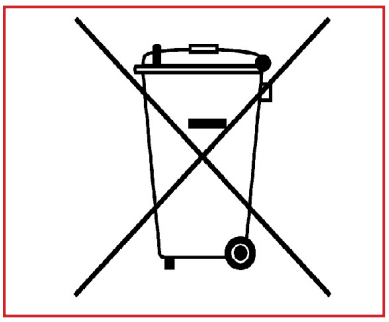
Twenty-five U.S. states currently have electronics recycling laws. The National Center for Electronics Recycling (NCER) developed an interactive map that helps to find out detailed information on state regulations, including a brief summary and link to the laws as well as key dates.

Visit the EPA website for individual state electronics laws: /www.epa.gov/smm-electronics/regulations-initiatives-and-research-electronics-stewardship#03

There are currently 25 states with e-waste laws (plus the District of Columbia). These states have passed some type of e-waste legislation. Click the below link to find each individual-specific information.

Electronics Recycling Coordination Clearinghouse: https://www.ecycleclearinghouse.org/contentpage.aspx?pageid=10





5 TECHNICAL SPECIFICATION

5.2 TECHNICAL DATA

Model	IMP001	AGM
Depth of Discharge	80%	50%
Maximum Capacity	105 Ah	100 Ah
Useable Cpacity	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.

8 LIABILITY

8.1 LIABILITY

Purple Line cannot be held liable for:

- Damage resulting from the use of the Imperium Lithium Battery;
- Possible errors in the supplied manual and their consequences;
- Use that is incompatible with the purpose of the product.

9 EG DECLARATION OF CONFORMITY

9.1 EG DECLARATION OF CONFORMITY OF ELECTRICAL EQUIPMENT

Declaration according to Directive 2014/35 / EC, as amended. This language version of the statement is checked by the manufacturer (original statement).

WE:

Name: PURPLE LINE LLC

Address: 1850 LOVERIDGE RD., PITTSBURG, CA 94565

Country: UNITED STATES

DECLARE FOR THE PRODUCT DESCRIBED BELOW:

Generic name : LiFePO4 battery

Trade name : Imperium Lithium Battery 105Ah

Model : IMP001

Function : 12V Battery for power supply in caravans and other applications.

All relevant provisions of the Machinery Directive are met; that the product also complies with the provisions of the following European directives:

2014-35-EU:

DIRECTIVE 2014/35 / EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 February 2014 on the harmonization of the laws of the Member States concerning the making available on the market of electrical equipment for use within specified voltage limits.

2014-35-EU

DIRECTIVE 2014/35 / EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 February 2014 on the harmonization of the laws of the Member States concerning the making available on the market of electrical equipment for use within specified voltage limits.

2014/30/EU

DIRECTIVE 2014/30 / EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 February 2014 on the harmonization of the laws of the Member States concerning electromagnetic compatibility.

2011/65/EU

DIRECTIVE 2011/65 / EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment

AND THE FOLLOWING HARMONIZED STANDARDS

EN 61000-6-1:2007

Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments

EN 61000-6-2:2005

Electromagnetic Compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments

EN 61000-6- 3:2007+A1:2011

Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standards for residential, commercial and light-industrial environments

EN 61000-3-2-2014

Electromagnetic compatibility (EMC) - Part 3-2: Limit values - Limit values for harmonic currents emissions (input current of the devices ≤ 16 A per phase)

EN 61000-3-3:2013

Electromagnetic compatibility (EMC) - Part 3-3: Limits for voltage fluctuations, voltage fluctuations and flicker in public low-voltage networks for equipment with an input current ≤ 16 A per phase and without conditional connection

EN60950 -1:2005+A1:2009+A2:2013

Information technology equipment - Safety - 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 LLC
Address :	1850 LOVERIDGE RD., PITTSBURG, CA 94565
Country :	UNITED STATES

Done at Kapelle 3-9-2018