

# User Manual



## Lithium Battery Power Plus

12 V / 105 Ah | (1.35 kWh LiFePO<sub>4</sub>)

[whisperpower.com](https://www.whisperpower.com)



## User Manual

### Lithium Power Plus battery 12 V 105 Ah

Dear customer,

This manual contains all the information necessary to install, use and maintain the Whisper Power Lithium Power Plus battery. We kindly ask you to read this manual carefully before using the product. In this manual, the Whisper Power WP-Lithium Power Plus 12 V/105 Ah Lithium Power Plus battery will be referred to as: the Lithium Power Plus battery.

This manual is meant for the installer and the user of the Lithium Power Plus battery. Only qualified, certified personnel may install and perform maintenance on the Lithium Power Plus battery. Please consult the index at the start of this manual to locate information relevant to you.

The boundaries of its use, as described in this manual should always be upheld. The Lithium Power Plus battery may not be used in medical or in aviation related applications. The Lithium Power Plus battery may not be used for any purposes other than described in this manual. Using the Lithium Power Plus battery for any other purpose will be considered improper use and will void the warranty of the product. Whisper Power cannot be held responsible for any damage caused by improper, incorrect or unwise use of the product. Read and understand this manual completely before using the product.

During the use of the product, user safety should always be ensured, so installers, users, service personnel and third parties can safely use the Lithium Power Plus battery. This is the original manual, keep it in a safe location! Please consult [www.whisperpower.com](http://www.whisperpower.com) for the latest version of all manuals.

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# 1. Introduction

## 1.1. Product description

The WP-Lithium Power Plus 12 V/105 Ah is a Lithium Iron Phosphate rechargeable battery. The unique combination of state-of-the art technology and smart software makes this Lithium battery a robust, safe and easy to use energy storage solution.

The Lithium Power Plus battery uses exceptionally safe Lithium Iron phosphate (LiFePO<sub>4</sub>) technology. With its integrated battery management system the Lithium Power Plus battery is protected from deep discharging, overcharging and overheating.



**Caution!** *External disconnect device is required!*

## 1.2. Intended use

The WP-Lithium Power Plus 12 V/105 Ah battery serves as a energy source of 12V in power systems for recreational vehicles, commercial vehicles, leisure boats, commercial vessels and stationary applications. Potential applications of this Lithium Power Plus battery include: off grid power supply, marine power supply, medium for (renewable) energy storage and (traction) battery for vehicles. Use as a starter battery is not possible. Up to 4 batteries can be connected in series or in parallel to increase the total capacity up to 420 Ah. For more batteries in series or parallel always consult with WhisperPower.



## 1.3. Glossary of Terminology

BMS	Battery Managent System
Charge cycle	A period of use from fully charged, to fully discharged, and fully recharged again.
Endurance Life-cycle	The products maximum lifespan, achieved by following the guidelines presented in this manual.
BCI/WIB	Battery Communication Interface / Whisper interface box
LiFePO <sub>4</sub>	Lithium Iron Phosphate
SoC	State of charge
CCCV	Constant Current- Constant Voltage
DoD	Depth of Discharge

Table 1. Glossary of terminology

## 1.4. Used symbols

The following icons will be used throughout the manual:

- **Warning!** *A warning indicates severe damage to the user and/or product may occur when a procedure is not carried out as described.*
- **Caution!** *A caution sign indicates problems may occur if a procedure is not carried out as described. It may also serve as a reminder to the user.*

# 2. Product specifications

## 2.1. Product features

- Modular Traction battery
- Lithium Iron Phosphate (LiFePO4): Safe Lithium Power Plus technology
- Integrated BMS (Battery Management System), external interruption device needed
- PC+ABS (UL94 V-0) flame-retardant battery casing
- Terminals for 2 x 95mm<sup>2</sup> wire connection (2x M8 bolts) per terminal
- External fuse needed
- Maximum continuous discharge (315A)
- Wired communication interface: CANopen
- Battery monitoring / History Storage
- Adaptive cell balancing
- Configurable in serial or parallel connection

## 2.2. General product specifications

Article Number	40290210
Product name	WP-Lithium Power Plus 12 V/105 Ah
Producer	Whisper Power
Battery type	Lithium Iron Phosphate (LiFePO4) / Traction battery
Cycle life	> 3500 (1C continuous discharge, DoD 100%)*

Table 2. General product specifications

\*The cycle life value given above is an indication at 23°C. The Lithium Power Plus battery cycle life depends strongly on temperature and the applied charging and discharging loads.



## 2.3. Technical specifications

Mass	10 kg / 22 lbs
Ingress protection rating	IP66
Cell type/Chemistry	Prismatic LiFe P04

Table 3. Technical specifications

### 2.3.1. Battery designation

Battery designation according to EC61960	IFpP/36/130/195/[4S]M/-20+50/90
--	---------------------------------

Table 4. Battery

### 2.3.2. Electrical properties (23°C)

Open Circuit Voltage*	13.2V dc
Nominal voltage**	12.8V dc
Rated capacity	105 Ah
Energy	1344 Wh
Charge method	CCCV
Charge voltage	14.3V...14.6V
End-of-discharge voltage	10V dc
Charge current	Max 105 A (1C)
Discharge current continuous	315A (3C)
Discharge current 10 seconds	525A (5C)

Table 5. Electrical properties (23 °C)

\*Open Circuit Voltage at 50% SoC, no load

\*\*Nominal voltage (V) at 50%, SoC, 0.2C discharge

### 2.3.3. Dimensions (±1mm)

Height (H)	185 mm / 7.3 “
Width (W)	439 mm / 17.3 “
Thickness (T)	91.5 mm / 3.6 “

Table 6. Dimensions

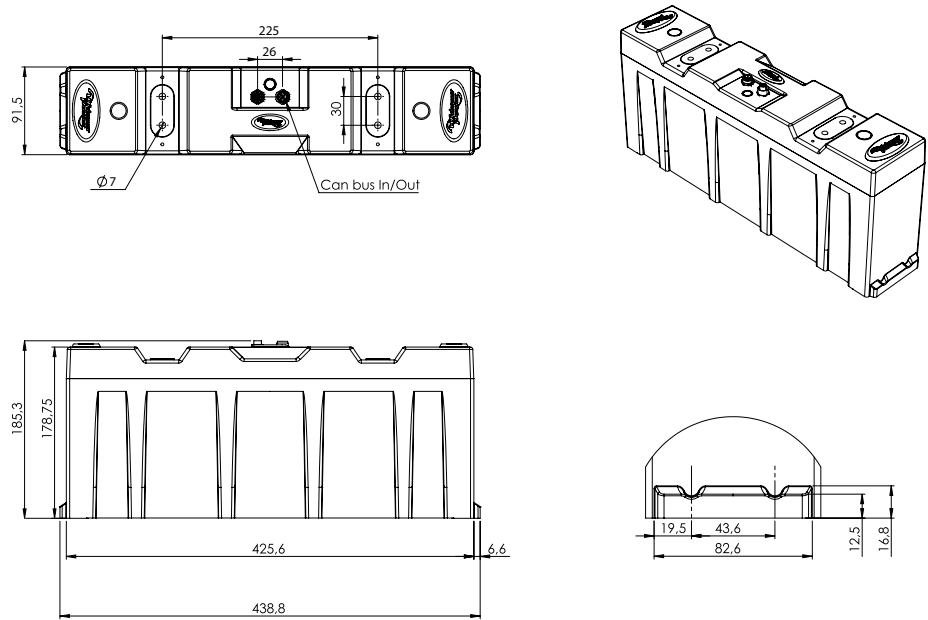


Figure 1. Dimensions

## 2.4. Environmental conditions



**Warning!** The Lithium Power Plus battery may only be used in conditions specified in this manual. Exposing the Lithium Power Plus battery to conditions outside the specified boundaries may lead to serious damage to the product and/or the user.

Use the Lithium Power Plus battery in a dry, clean, dust free, well ventilated space. Do not expose the Lithium Power Plus battery to fire or water or solvents.

When the Lithium Power Plus battery is placed in an enclosed environment without air circulation, it is advised to provide 2 ventilation holes of 100mm x 100mm each. This helps to prevent the heat built-up.

Recommended charge temperature range*	0°C to +45°C / 32°F to 113°F
Discharging operating temperature range	-10°C to +55°C / 14°F to 131°F
Short term (<1 month) storage temperature range	-20°C to +45°C / -4°F to 113°F
Long term (>1 month) storage temperature range	-0°C to +35°C / 32°F to 95°F
Relative humidity	10-90%
Corrosion	Salt-contaminated atmosphere up to 1 mg salt per m³ of air, at all relevant temperatures and humidity conditions. Applicable to equipment located in open air and made of material subject to corrosion.
Placement angle (continuously)	Up right
Vibrations and shocks	According UN38.3

Table 7. Environmental conditions

(\*) Do not charge the Lithium Power Plus battery below 0 °C / 32 F

2.4.1. Marine use

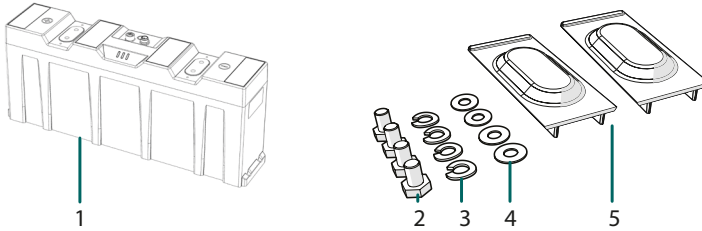
Parameter	Class	Location
Temperature	A	Machinery spaces, control rooms, accommodation, bridge
Humidity	B	All locations except as specified for location A
Vibration	A	On bulkheads, beams, deck, bridge
EMC	B	All locations including bridge and open deck

Table 8. Marine use

2.5. Required tools

- 13mm Hexagon socket wrench
- Torque wrench

## 2.6. Components

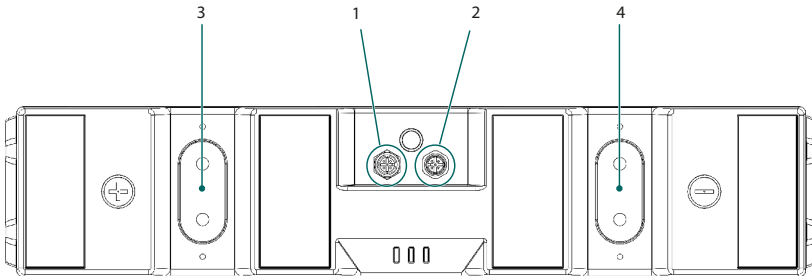


**Figure 2. Components**

### 2.6.1. List of components

1. (1x) WP-Lithium Power Plus 12 V/105 Ah Battery
2. (4x) M8 Bolt
3. (4x) M8 Spring washer
4. (4x) M8 Plain washer
5. (2x) Terminal protection cap

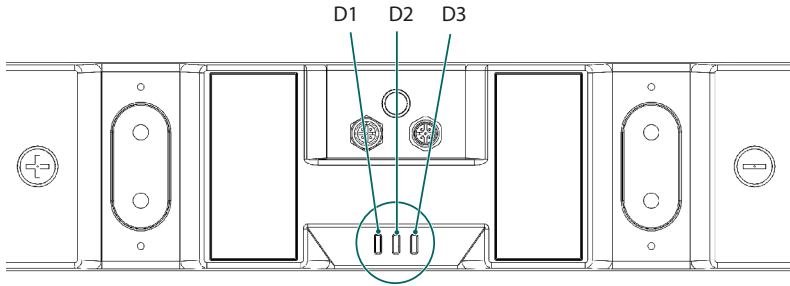
## 2.7. Connections, indicators and battery controls



**Figure 3. Connections, indicators and battery controls**

1. Con 1 (CANopen; 5-pin “micro” style connector female)
2. Con 2 (CANopen; 5-pin “micro” style connector male)
3. Terminal + (2x M8)
4. Terminal- (2x M8)

## 2.7.1. LED Indicators



	D1 (Green)	D2 (Yellow)	D3 (Red)	Mode
1	Off	Off	Off	Empty / Deep discharge
2	Off	Off	On	Alarm mode
3	On	Off	Off	Operational mode
4	Flashing	Off	Off	Operational mode (Idle) <sup>1</sup>
5	Off	On	Off	Warning mode

Table 9. LED Mode

<sup>1</sup>When the Lithium Power Plus battery is in operational mode and the battery is not being charged or discharged, the Green LED indicator flashes every 3 seconds.

## 2.7.2. Con1&2 (CANopen; 5-pin “micro” style connector)

PIN #	Signal	Description
1	CAN_SHLD	Optional CAN Shield
2	CAN_V+	Optional CAN external positive supply (dedicated for supply of transceiver and optocouplers. if galvanic isolation of the bus node applies)
3	CAN_GND	Ground / 0V
4	CAN_H	CAN_H bus line (dominant high)
5	CAN_L	CAN_L bus line ( dominant low)

Table 10. Con 1&2 (CANopen; 5-pin “micro” style connector)

## 2.8. Peripheral equipment

### 2.8.1. Obligatory

In order for the Lithium Power Plus battery to be used safely, a WIB or BCI in combination with an external disconnect device must be installed. If an external switch off device is not installed the warranty of the battery will be void.

### 2.8.2. Optional Components

The Lithium Power Plus battery can be used in combination with a number of (Whisper Power) products:





Art.Number	Article name	code
50214815	WP Power Plus Whisper Interface box WIB 12 V / 600 A 	C
50214817	WP Power Plus Whisper Interface box WIB 24 V / 600 A 	C
50214819	WP Power Plus Whisper Interface box WIB 48 V / 600 A 	C
40290255	WP Power Plus CAN bus cable 0.6 meter	C
40290256	WP Power Plus CAN bus Power cable	C
40290257	WP Power Plus CAN bus splitter	C
40290258	WP Power Plus CAN bus terminator female	C
40290259	WP Power Plus CAN bus terminator male	C
40290340	WP Power Plus CAN bus cable to whisper connect 	C
40290346	WP Lithium Power Plus, bracket kit 12 V 105 Ah	C
40280101	WP-Touch screen panel full color 7"- System panel	C
40280102	WP-Touch screen panel full color 10"- System panel	C
40280103	WP-Touch screen panel full color 7"- System panel NMEA2000	C

Table 11. Optional components that can be used with the Lithium Power Plus battery

## 3. Safety guidelines and measures

### 3.1. General

- Do not short-circuit the Lithium Power Plus battery.
- Treat the Lithium Power Plus battery as described in this manual.
- Do not dismantle, crush, puncture, open or shred the battery.
- Do not expose the Lithium Power Plus battery to heat or fire. Avoid exposure to direct sunlight.
- Do not remove the Lithium Power Plus battery from its original packaging until required for use.
- In the event of the Lithium Power Plus battery leaking, do not allow the liquid to come in contact with the skin or eyes. If contact has been made, wash the affected area with copious amounts of water and seek medical advice.
- Do not use any charger other than that specifically provided for use with the Lithium Power Plus battery.
- Observe the plus (+) and minus (–) marks on the Lithium Power Plus battery and equipment and ensure correct use.
- Do not use any battery which is not designed for use with the Lithium Power Plus battery.
- Do not mix batteries of different manufacture, capacity, size or type within a device.
- Keep the Lithium Power Plus battery clean and dry.
- Secondary batteries need to be charged before use. Always use the correct charger and refer this manual for proper charging instructions.
- Do not leave the Lithium Power Plus battery on prolonged charge when not in use.
- After extended periods of storage, it may be necessary to charge and discharge the Lithium Power Plus battery several times to obtain maximum performance.
- Retain the original product documentation for future reference.
- Remove the Lithium Power Plus battery from the equipment when not in use.
- Do not charge the Lithium Power Plus battery below 0°C



**Warning!** *Keep the Lithium Power Plus battery away from water, dust and contamination. Place the Lithium Power Plus battery in well ventilated areas.*

### 3.2. Disposal



Dispose of the Lithium Power Plus battery in accordance with local, state and federal laws and regulations. Batteries may be returned to the manufacturer. Do not mix with other (industrial) waste.

## 4. Installation

### 4.1. General information



**Warning!** *Never install or use a damaged Lithium Power Plus battery.*



**Warning!** *Always use a proper fuse which fits the system needs.*



**Caution!** *Do not reverse connect the Lithium Power Plus battery (polarity)*

When connecting several batteries in series or parallel, always use batteries of the same brand, type, age, capacity and state of charge.

### 4.2. Unpacking

Check the Lithium Power Plus battery for damage after unpacking. If the Lithium Power Plus battery is damaged, contact your reseller or Whisper Power. Do not install or use the Lithium Power Plus battery if it is damaged!

### 4.3. Preparing the battery for use



**Caution!** *Do not operate the Lithium Power Plus battery beyond published maximum specifications.*



**Caution!** *In case of an under-voltage shutdown, charge immediately.*



**Warning!** *Always remain within the limits indicated in chapter 2 during the use of the Lithium Power Plus battery.*



**Caution!** *This Lithium Power Plus battery stores fault conditions internally, like excessive charge current or deep discharge situations. Whisper Power uses this information in the warranty process*



**Warning!** *Do not overcharge the Lithium Power Plus battery.*

#### 4.3.1. Placement of the battery



Before it is used, the Lithium Power Plus battery must be positioned in such a way that it will not move around in its compartment during use. If necessary, the Lithium Power Plus battery may be fixed in place by means of mounting brackets. Fixing positions for brackets are at the bottom of the tall sides of the battery.

### 4.4. Connection wires



Use appropriate wire for the connection wires to ensure no overheating or unnecessary losses occur. Use appropriate fuses matching the wires and load.

WhisperPower recommends to use at least 70 mm<sup>2</sup> conductors for short lengths and higher rating for longer distances.




-  **Caution!** *Smaller diameter wires can cause overheating or necessary losses and shall be avoided.*
-  **Caution!** *Use appropriate rating for fuse for your system, place fuse in holder near the + (plus) connection of the battery.*

## 4.5. Installing the mandatory Battery Disconnect device

-  **Warning!** *Always connect the relay between the + or - terminal of the battery and the load.*
-  **Warning!** *Never use the Lithium Power Plus battery without a properly installed Battery Disconnect device (WIB or BCI with relay).*

### 4.5.1. Using the WP WIB (WhisperPower Interface Box)

-  **Warning!** *Do not connect a load or charger directly on the Lithium Power Plus battery, always connect these devices at the load side of the WIB.*

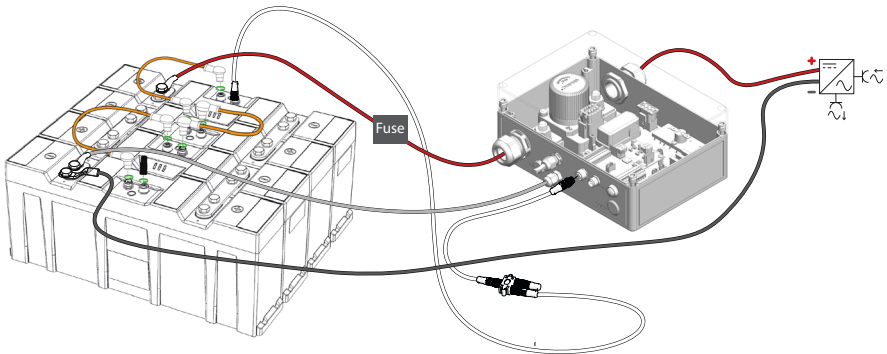


Figure 4. Connecting a Lithium Power Plus battery to the WP WIB

Consult the manual of the WP WIB for installation instructions.

### 4.5.2. Using the WP BCI-C1 (Battery Communication Interface) with a normal relay

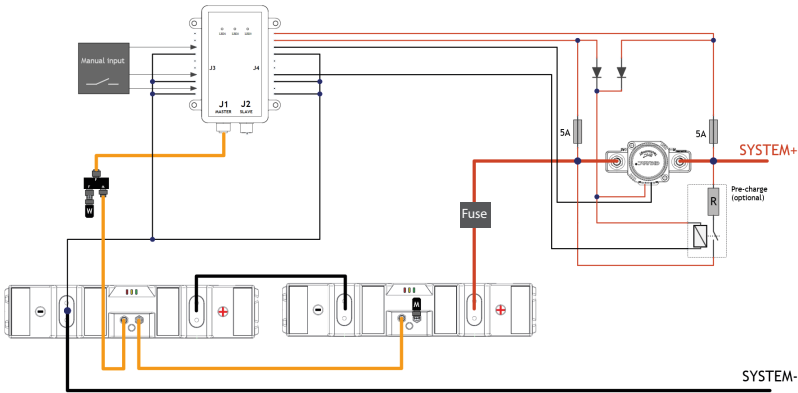





Figure 5. Connecting a Lithium Power Plus battery to the WP BCI-C1

Consult the manual of the WP BCI-C1 for installation instructions.

## 4.6. Connecting Lithium Power Plus batteries in series and parallel

### 4.6.1. Connecting Lithium Power Plus batteries in series

-  **Caution!** Before connecting 2 or more Lithium Power Plus batteries, the Lithium Power Plus batteries must be charged to 100% SoC.
-  **Caution!** For more than 4 Lithium Power Plus batteries in series connection consult Whisper Power or your dealer.
-  **Caution!** Depending on the installation a precharge circuit is needed. For further information consult Whisper Power or your dealer.

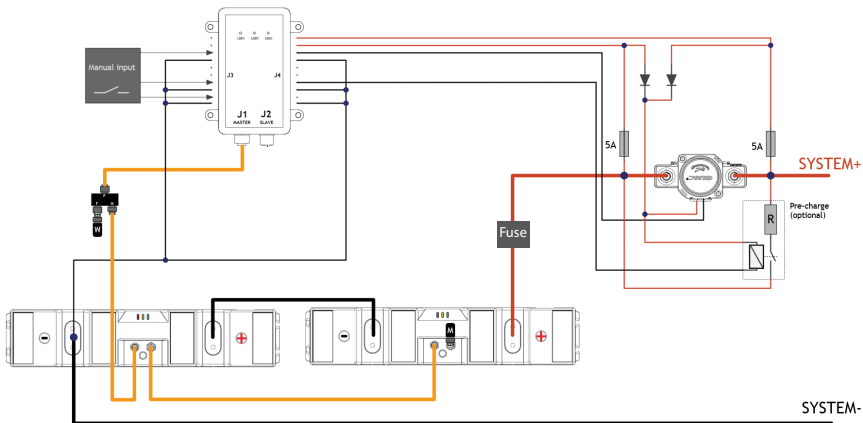
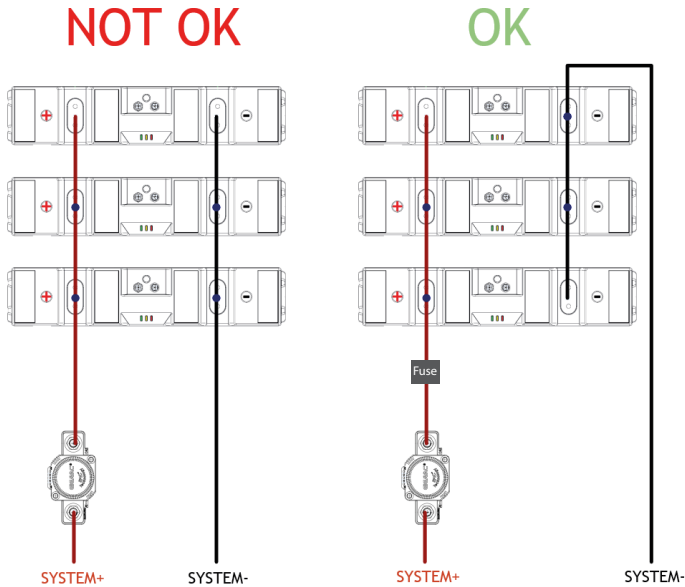


Figure 6. Batteries connected in series with external disconnect device and BCI.

#### 4.6.2. Connecting Lithium Power Plus batteries in parallel

- ⚠ Caution!** Before connecting 2 or more Lithium Power Plus batteries, the Lithium Power Plus batteries must be charged to 100% SoC.
- ⚠ Caution!** For more than 4 Lithium Power Plus batteries in parallel connection consult Whisper Power or your dealer.
- ⚠ Caution!** Depending on the installation a pre charge circuit is needed. For further information consult Whisper Power or your dealer.
- ⚠ Caution!** When batteries are placed in parallel configuration, the used disconnect device (relay) shall be suitable for the current used by the application.



**Figure 7. Three Lithium Power Plus batteries in parallel with external relay**

OK: Equally divided battery current.  
All batteries contribute equally to the current into the load.

NOT OK: Current not equally divided.  
Batteries closest to load will have the highest contribution to the current into the load.  
Whereas batteries further away from load will have lesser current contribution.  
Wear and tear will be higher on the Lithium Power Plus battery close to the load.

#### 4.6.3. Connecting Lithium Power Plus batteries in series and parallel

- ⚠ Caution!** Before connecting 2 or more Lithium Power Plus batteries, the Lithium Power Plus batteries must be charged to 100% SoC.
- ⚠ Caution!** For more than 4 Lithium Power Plus batteries in series and parallel connection consult Whisper Power or your dealer.
- ⚠ Caution!** Depending on the installation a precharge circuit is needed. For further information consult WhisperPower or your dealer.

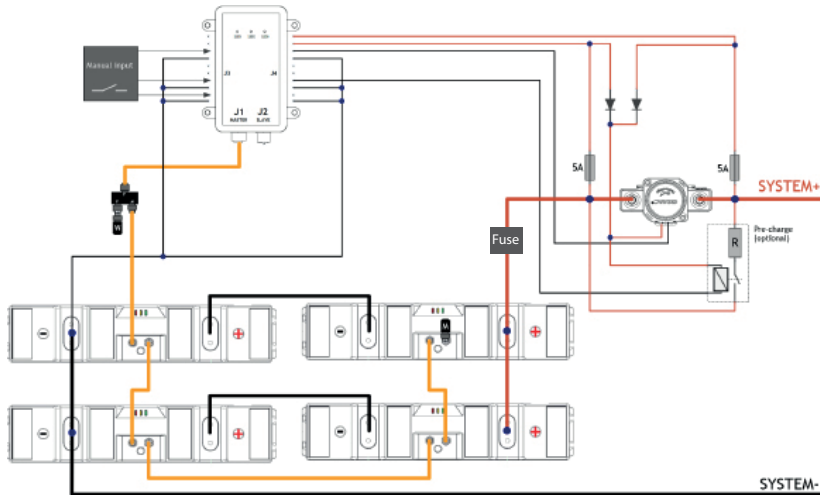


Figure 8. Four Lithium Power Plus batteries in a series - parallel connection with external relay

## 4.7. CANopen interface

The CANopen interface of the Lithium Power Plus battery must be used for CAN balancing and can be used for monitoring purposes.

The Lithium Power Plus battery can be monitored using the Battery Monitor software and the Touch Display Screen. (see paragraph 2.8.2)

To use the Battery Monitoring Software, the CAN bus of the Lithium Power Plus battery (CON 3) needs to be connected by means of CAN-to-USB interface to the computer on which the monitoring software and the usb drivers are installed.

More information about the CANopen bus can be found at the CiA website: [www.can-cia.org](http://www.can-cia.org).

### 4.7.1. CAN Bus network topology

The CAN Bus must be used in a bus network topology. Do not use a ring- or a star topology. The maximum CAN bus length is limited because the Lithium Power Plus battery has a fixed bitrate of 250kbps.

In Table 12 is an overview of these restrictions.

Bit rate	Bus length (L)	Max. stub length (S)	Accumulated stub length
250 kbps	250 m	11 m	55 m

Table 12. CAN bus speed

### 4.7.2. Termination Resistors

The CAN bus requires termination at the two ends of the bus. The USB-to-CAN interface may be connected in anywhere to the CAN bus.

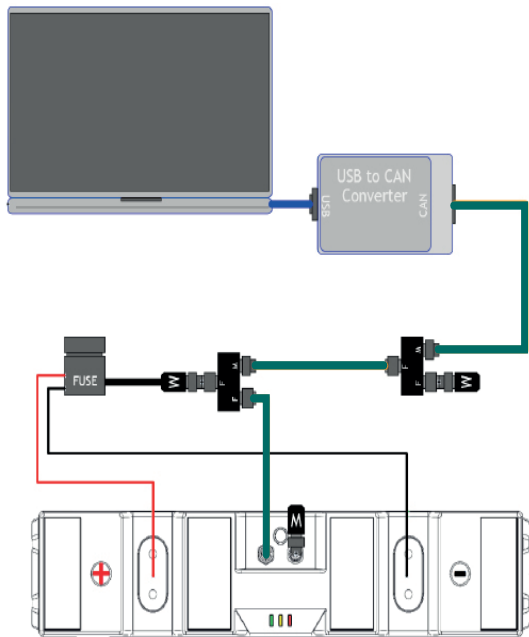
Use termination resistors at the end nodes to prevent reflections on the line. The value of this resistor should be +/- 120 ohms.

### 4.7.3. CAN bus power

Due to the galvanic separation between the BMS and the   Lithium Power Plus batteries CAN interface an external power supply is needed on the CAN bus.

The CAN bus can be powered through the CAN power cable. (figure 9)  
This situation may occur when a USB-to CAN interface is directly connected to the Lithium Power Plus battery.

When using the BCI with 1 Lithium Power Plus battery, the CAN power cable is required. When using the BCI with 2 to 16 Lithium Power Plus batteries, the CAN power cable isn't required. The power is provided by the BCI.



**Figure 9.** Use Con2 to power the CAN bus

## 4.8. Disconnecting the Lithium Power Plus battery

1. Turn off any device or charger the Lithium Power Plus battery is connected to.
2. Disconnect the negative wire from the - terminal of the Lithium Power Plus battery.
3. Disconnect the positive wire from the + terminal of the Lithium Power Plus battery.

## 5. Battery use

### 5.1. General information



**Warning!** Always use the WhisperPower Interface Box (WIB) or the Battery Communication Interface (BCI) in combination with an external Disconnect device for safe operation of the Lithium Power Plus Battery.

**Warning!** In case of an under voltage shutdown, the charging current must be very low until a safe voltage is achieved.

**Warning!** Follow the safety guidelines and measures of chapter 3



**Caution!** Charge the Lithium Power Plus battery before use.

**Caution!** Do not cover the + and - sign as they contain a integrated pressure relief mechanism.

### 5.2. Charging



**Warning!** Never charge the Lithium Power Plus battery with a charging current larger than 1C.

**Warning!** Stop charging when the Lithium Power Plus battery switches into alarm mode. (the protection relay will switch off)



**Caution!** Charge before use

**Caution!** Disconnect the charger from the Lithium Power Plus battery if it is not used for a long time.

**Caution!** To preserve the lifespan of the Lithium Power Plus battery, use a charger approved by Whisper Power.

1. Connect the charger to the Lithium Power Plus battery as described in paragraph 4.6.
2. Charge the Lithium Power Plus battery in case of an under-voltage shutdown or if the state of charge drops below 20% to preserve the lifespan of the Lithium Power Plus battery.

#### 5.2.1. Battery balancing

During the batteries lifespan, the cells within the Lithium Power Plus battery may be unbalanced due to high discharge currents and short float charge periods. This may result in a loss of capacity and unbalanced cells. Cells may be manually equalized by means of the following procedure:

Apply a constant voltage of 14.4V and a current of between 500mA and 800mA to manually equalize the Lithium Power Plus battery.

### 5.2.2. Reading out the battery's State of Charge (SoC)

The Lithium Power Plus battery's State of Charge can only be read out by CAN communication

## 5.3. Battery Monitoring Software

Battery monitoring software offers the possibility to continuously monitor a number of the Lithium Power Plus battery properties through sensors within the Lithium Power Plus battery. It also enables one to download a complete recording of the Lithium Power Plus batteries properties over time.

The Battery Monitoring software and the hardware are not included with the Lithium Power Plus battery. See [whisperpower.com/batterymonitoring](https://whisperpower.com/batterymonitoring) for the most recent products.

### 5.3.1. Battery History Recording

The battery history can be downloaded with the Battery Monitor software. This recording can only be accessed by a reseller or Whisper Power for evaluation.

## 6. Inspection, cleaning and maintenance

### 6.1. General information



**Warning!** *Never attempt to open or dismantle the Lithium Power Plus battery! The inside of the Lithium Power Plus battery does not contain serviceable parts.*

1. Disconnect the Lithium Power Plus battery from all loads and charging devices before performing cleaning and maintenance activities (see paragraph 4.8).
2. Remove the external fuse before cleaning and maintenance activities.
3. Place the enclosed protective caps over the terminals before cleaning and maintenance activities to avoid the risk of making a short circuit.

### 6.2. Inspection

1. Inspect for loose and/or damaged wiring and contacts, cracks, deformations, leakage or damage of any other kind. If damage to the Lithium Power Plus battery is found, it must be replaced. Do not attempt to charge or use a damaged Lithium Power Plus battery. Do not touch the liquid from a ruptured Lithium Power Plus battery
2. Observe and note the run time that a new, fully-charged Lithium Power Plus battery provides for powering your product. Use this new Lithium Power Plus battery run time as a basis to compare run times for older batteries. The run time of the Lithium Power Plus battery will vary depending on the products' configuration and the application it is used for.
3. Routinely check the Lithium Power Plus battery's charge status. Lithium Iron Phosphate batteries continue to slowly self-discharge (<3% per month) when not in use or whilst in storage.
4. Carefully monitor batteries that are approaching the end of their estimated life.



5. Consider replacing the Lithium Power Plus battery with a new one if you note either of the following conditions:
  - The Lithium Power Plus battery run time drops below about 80% of the original run time.
  - The Lithium Power Plus battery charge time increases significantly.

### 6.3. Cleaning

If necessary, clean the Lithium Power Plus battery with a soft, dry cloth. Never use liquids, solvents, or abrasives to clean the Lithium Power Plus battery.

## 7. Storage

Follow the storage instructions in this manual to optimize the lifespan of the Lithium Power Plus battery during storage. If these instructions are not followed and the Lithium Power Plus battery has no charge remaining when it is checked, consider it to be damaged. Do not attempt to recharge or use it. Replace it with a new Lithium Power Plus battery. See chapter 2.4 for storage temperature conditions.

The self-discharge of the Lithium Power Plus battery is <3 % per month.

1. Charge the Lithium Power Plus battery to 100% of its capacity before storage.
2. Disconnect the Lithium Power Plus battery from all loads and, if present, the charging device
3. Place the terminal covers over the Lithium Power Plus battery's terminals during storage.
4. Charge the Lithium Power Plus battery to 80% of its capacity every year.

## 8. Transportation

### 8.1. General

Always check all applicable local, national, and international regulations before transporting a Lithium Iron Phosphate battery.

Transporting an end-of-life, damaged, or recalled Lithium Power Plus battery may, in certain cases, be specifically limited or prohibited.

The transport of the Lithium Power Plus battery falls under hazard class UN3480, class 9. For transport over water, air and land, the Lithium Power Plus battery falls within packaging group PI965 Section II.



Use Class 9 Miscellaneous Dangerous Goods and UN Identification labels for transportation of lithium ion batteries which are assigned Class 9. Refer to relevant transportation documents. Lithium batteries and lithium ion cells are regulated in the U.S. in accordance with Part 49 of the Code of Federal Regulations, (49 CFR Sections 105-180) of the U.S. Hazardous Materials Regulations.

Visit [www.iata.org](http://www.iata.org) for the complete transport regulations and packing instructions for this product. The relevant information for Lithium Power Plus batteries can be found under “Programs” > “Cargo” > “Dangerous goods (HAZMAT)”.

## 9. Disposal and recycling

### 9.1. General information

Always discharge the Lithium Power Plus battery before disposal. Use electrical tape or other approved covering over the Lithium Power Plus battery connection points to prevent short circuits.

Battery recycling is encouraged. Dispose of the Lithium Power Plus battery in accordance with local, state and federal laws and regulations. Batteries may be returned to the manufacturer.

#### **USA & Canada:**

Lithium Iron Phosphate batteries are subject to disposal and recycling regulations that vary by country and region. Always check and follow your applicable regulations before disposing of any Lithium Power Plus battery. Contact Rechargeable Battery Recycling Corporation ([www.rbrc.org](http://www.rbrc.org)) for U.S.A. and Canada, or your local Lithium Power Plus battery recycling organization.

#### **EC**

Waste must be disposed of in accordance with relevant EC Directives and national, regional and local environmental control regulations. For disposal within the EC, the appropriate code according to the European Waste Catalogue (EWC) should be used.

#### **Other**

Many countries prohibit the disposal of waste electronic equipment in standard waste receptacles.

## 10. Troubleshooting

Problem	Possible reason	Solution
The capacity of the Lithium Power Plus battery has decreased	The cells within the batteries are not properly balanced or the Lithium Power Plus battery is worn out. .	Perform one full charge cycle to balance the cells.
The Lithium Power Plus battery cannot be charged / discharged	The Lithium Power Plus battery has been deeply discharged. The BMS is now in “fault condition”.	Disconnect all loads and connect a charger to the Lithium Power Plus battery. Then press the reset button on the WIB/BCI for at least 10-15 seconds to resolve the “fault condition”.
	The Lithium Power Plus battery has been overcharged. The BMS is now in “fault condition”.	Stop charging the Lithium Power Plus battery and press the reset button on the WIB / BCI for at least 10-15 seconds to resolve the “fault condition”.
	The Lithium Power Plus battery has overheated. The BMS is now in “fault condition”.	Stop charging the Lithium Power Plus battery and disconnect all loads and wait for the Lithium Power Plus battery to cool down. Then press the reset button on the WIB / BCI for at least 10-15 seconds to resolve the “fault condition”.

Table 13. Troubleshooting

## 11. Warranty and liability

11.1 Upon delivery the customer is obliged to immediately verify whether the products have been damaged during transport. In the event that any such damage has arisen, the customer must notify Whisper Power thereof as soon as possible, in any event no later than three (3) days of delivery, by means of accurate, written statement, stating the damage and where possible a photograph. Failure to inspect the products and inform Whisper Power within the stated time or the use of the products at any time shall be conclusive evidence that Whisper Power has satisfactorily tendered delivery.

11.2 In the event that the customer demonstrates that any of the delivered products do not conform to the agreement, Whisper Power (at its option, upon having received those products returned by the customer) has the option to either repair or replace such products by new products, or to refund the invoice value, exclusive of any dispatch costs.

11.3 Whisper Power grants a three year limited warranty for damages caused by manufacturing defects starting at the time of delivery. Damages caused by manufacturing defects do not include damage resulting from (a) general wear and tear, (b) short circuit, (c) overcharging, (d) deep discharging, (e) overheating of Whisper Power products (f) installation of the Whisper Power product by persons unskilled to work with electro-technical devices or components, (g) any other wrongful use contrary to the Whisper Power's user manual or the safety instruction, (h) any use contrary to the product specifications of that product; (i) any acts of force majeure.

11.4 Except as specified in the clause 11.3 Whisper Power makes no warranty, whether express or implied, including without limitation any implied warranty of merchantability and fitness for a particular purpose or any warranty arising from any course of dealing, course of performance or usage of trade and specifically disclaims any representation or warranty that the product will meet customer's requirements, perform any specific function or achieve a desired result other than expressly stated by Whisper Power in writing.

11.5 Any liability to the customer in any case ceases to apply in the event that the customer fails to notify Whisper Power of the existence of the defect within ten (10) days of having discovered the defect, in writing, in order to enable Whisper Power to investigate the damage. Some of Whisper Power's products electronically store usage data, including charging/discharging data, in order to enable Whisper Power to analyze such data retroactively when investigating damage.

11.6 Any liability of Whisper Power for damage suffered by the customer is in any case limited to the invoice amount of the relevant products, unless such damage has been caused by gross negligence or willful misconduct of Whisper Power. Whisper Power can never be held liable for (a) damage caused by any of the

circumstances mentioned in clause 11.3, leading to damage to the Whisper Power products or to any other device located near those products, or (b) consequential damage or (c) loss of profits or goodwill.

11.7 To the extent that a court determines that the limitation of liability as meant in clause 11.6 cannot be invoked against a particular claim for damages by the customer, Whisper Power's liability for loss of property, damage to property, and bodily injury (including death) caused by the application of those particular Whisper Power products shall in any event be limited to the amount actually paid out by Whisper Power's insurance company to Whisper Power in accordance with the insurance cover of that insurance policy for that particular type of damage. Whisper Power has taken out insurance against certain risks, as described in the respective insurance policies. These policies contain a usual limitation of insurance payment to be paid out to Whisper Power if, and to the extent that, the event is a covered event.

## Appendix I. Declaration of Conformity



### EC Declaration of Conformity

**Product Number/Name/Description:**

**WP-Lithium Power Plus Battery 12V / 105Ah**

The object of the declaration described above is in conformity with the requirements of the following Directives and standards, as applicable:

- Council Directive 2006/66/EC, Environmental EU Compliance
- Council Directive 2014/30/EU on Electromagnetic Compatibility

European standards used:

- EN 61000-6-3 (2007) + A1 (2011), EN 55016-2-3 (2010) + A1 (2010) + C1 (2013), EMC (Emission) Compliance
- EN 61000-6-2 (2005) + AC (2005), EN 61000-4-2 (2009), EN 61000-4-3 (2006) + A1 (2008) + A2 (2010), EN 61000-4-4 (2012), EN 61000-4-5 (2007), EN 61000-4-6 (2009), EMI (Immunity) Compliance
- IEC 62133, Safety IEC Compliance
- IEC 61960 (ed2.0), Performance IEC Compliance

The Technical Construction File required by this Directive is maintained at the corporate headquarters of WhisperPower BV, Kelvinlaan 82, 9207 JB Drachten, The Netherlands.

Signed by:

Ing. M. Favot

CTO, Drachten

Date: March 3, 2021

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