



Epsilon Manual

Version V1.9.1, January 2026



EPSILON 12V100Ah
EPSILON 12V150Ah



Dear customer,

Thank you for purchasing a Super B Epsilon 12 V100Ah/12 V150Ah Lithium Iron Phosphate (LFP) battery. We are pleased that you have chosen Super B Lithium Power B.V.

Disclaimer of liability

This manual provides detailed information necessary for the installation, use and maintenance of the Lithium Iron Phosphate (LFP) battery. Throughout this manual, the Super B Epsilon 12 V100Ah/12 V150Ah Lithium Iron Phosphate (LFP) battery will be referred to as the "LFP battery". This manual is intended for use by both the installer and the end user of the LFP battery. Only qualified and certified personnel are authorized to install and perform maintenance on the LFP battery. During the use of the product, user safety should always be ensured, so installers, users, service personnel and third parties can safely use the LFP battery.

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1. General information

1.1 Safety guidelines

I **IMPORTANT!**

- Read this entire manual carefully before use.
- Handle the LFP battery as described in this manual
- Retain the original product documentation for future reference.
- For detailed information on use and maintenance, see our **Usage and Maintenance Manual**
- on our website: www.super-b.com
- Do not mix LFP batteries of different manufacturer, capacity, size, type or age within a system.
- Keep the LFP battery clean and dry.
- Disconnect the LFP battery from the equipment when not in use.
- LFP batteries need to be charged before use.
- Use a Class II charger for charging the LFP battery. Class II chargers use double insulation to enhance protection against electric shock.
- Use the latest firmware that can be found in the Be in Charge App or Be in Charge monitor kit.

Ω **WARNING!**

- Use only chargers compatible with LFP chemistry and the specified LFP charging profile. Incompatible chargers may cause battery damage, overheating, or fire.
- Do not overcharge the LFP battery.
- In the event of an electrolyte leak, avoid direct contact with skin or eyes. If contact occurs, immediately rinse the affected area with water and seek medical advice.
- Never install multiple Epsilon LFP batteries in series.
- Do not dismantle, crush, puncture, open or shred the LFP battery.
- Do not expose LFP battery to heat or fire.
- Do not place or drop tools on the battery to prevent a short circuit.

⚠ **CAUTION!**

- Do not connect the battery in reverse polarity. The plus (+) and minus (–) terminals marks on the LFP battery and equipment and ensure correct use.
- When working with batteries remove watches, rings and other metal objects.
- Place the LFP battery in well ventilated areas.
- Use only insulated tools. If insulated tools are unavailable, take appropriate measures to prevent accidental short circuits.
- Avoid exposure to direct sunlight

1.2 Stay Informed

To get the most out of your Super B product, we recommend staying up to date with the latest

information.

Join the Super B community and receive exclusive updates and insights, including:

- Product updates and improvements
- Important safety notifications
- Firmware releases and technical information
- News and developments from Super B

You can subscribe to the Super B newsletter via the link or QR code provided below.



Figure 1. <https://www.super-b.com/newsletter-signup>

1.3 Contacting Super B – Service & Support

If you have questions, experience issues, or require assistance, Super B offers several support options. Choosing the right contact method helps us support you as quickly and effectively as possible.

Telephone Support

Phone: +31 (0)88 007 6000

Use telephone support for:

- Urgent technical issues
- Immediate assistance during installation or commissioning
- Situations where the product cannot be operated safely

Email Support

- support@super-b.com – for technical questions, troubleshooting, and service-related issues
- sales@super-b.com – for product information, quotations, and commercial questions

Please include relevant product details (type, serial number, installation details) to help us assist you efficiently.

Support Ticket System

For structured support and service requests, you can open a **support ticket** via the Super B support portal.



Figure 2. [Super B Support | Lithium Battery Help & Resources](#)

Use the support ticket system for:

- Technical issues that require investigation
- Warranty claims
- Repair or return requests
- Tracking the status of ongoing cases

Using the ticket system ensures clear communication and proper documentation throughout the support process.

Warranty and Returns

Please note that **all warranty and return cases must be handled through a registered RMA (Return Material Authorization)**. Products returned without a valid RMA may not be processed.

1.4 Extended warranty

Super B offers an extended warranty. To be eligible, the battery must:

- Be registered with Super B.
- Be kept up to date with the latest software updates whenever new firmware is released for the specific model.

Failure to comply with these conditions may result in the forfeiture of extended warranty coverage.

1.5 Battery Registration

Battery registration is required to activate the extended warranty and allows Super B to provide better service and support.

To register your battery: Visit the Super B registration page via the link or QR code provided. Enter the required product information and submit the registration form.

After successful registration, the battery will be linked to your account in the Super B system.



Figure 3. [Super B Product Registration | Activate Your Lithium Battery Warranty](#)

1.6 Software Updates

To maintain eligibility for the extended warranty:

- Always install firmware updates released for your specific battery model
- Software updates may include safety improvements, performance optimizations, or functional enhancements

Information about available software updates is communicated via:

- The Super B newsletter
- The Super B website or support portal
- The Be In Charge App (Epsilon only)
- The Super B FTP server (registered users only) <ftp://organization@downloads.super-b.com>

If you are unsure whether your battery is running the latest software version, contact Super B support.

1.7 Deep discharged battery policy

Super B defines a deeply discharged (DD) battery as a battery whose voltage has fallen below the minimum operational threshold. Deep discharge can negatively affect battery performance, lifespan, and safety. If deep discharge is a result of improper use, long-term storage without maintenance charging, or failure to follow the operating instructions it may not be covered under warranty.

When a battery is identified as deep discharged, Super B applies the following policy:

- The battery will be inspected and evaluated by Super B or an authorized service partner.
- Recovery attempts may be performed if the battery condition allows this and if it can be done safely.
- If recovery is successful, the battery will be tested to confirm proper functionality before being returned to service.
- If the battery cannot be safely recovered, it will be classified as irreparable and handled according to Super B's recycling and disposal procedures.

For prevention, users must ensure proper storage, periodic charging, and compliance with the guidelines described in this manual.

1.8 Disposal

Dispose the LFP battery in accordance with local, state and federal laws and regulations. Do not mix with other (industrial) waste.



Figure 4. Battery dispose label

2. Introduction

2.1 Product description

The Epsilon is a self-protected Lithium Iron Phosphate rechargeable battery. The unique combination of state-of-the art technology and smart software makes this LFP battery a robust, safe and easy to use energy storage solution. The Epsilon is available in a 12 V 100 Ah variant and a 12 V 150 Ah variant.

The LFP battery uses safe Lithium Iron Phosphate (LiFePO₄) technology. With its integrated battery management system (BMS) the LFP battery is protected from deep discharging, overcharging and overheating. Eliminating the need for an external safety relay means the LFP battery is very easy to install.

The LFP battery also has integrated battery monitoring which provides details about its status such as voltage, current, temperature, state of charge and time remaining. Direct monitoring is possible via the Be in Charge App, Be in Charge software, CI-bus, external monitoring devices and LED indicators, which inform you about the actual status of your LFP battery.

The LFP battery can use the integrated heating to heat up or keep the cells at a temperature level to be able to charge the battery in sub-zero degrees environment conditions. This ensures that the cells operate within their specified limits, thereby extending the lifetime of the LFP battery.

Under the LFP batteries protective lid easy to use connections such as configurable inputs / outputs, CAN and LIN connection, external heater power input and accessory power connection can be found. All connections are standardized, which makes installation of the Epsilon in any application straightforward.

2.2 Intended use

⚠ CAUTION! This battery is not suitable for use as a starter battery (SLI)

Ω WARNING! Never install Epsilon LFP batteries in series.

The Epsilon 12 V 100 Ah / 12 V 150 Ah LFP battery serves as an energy source of 12 V in power systems for recreational vehicles, commercial vehicles, leisure boats, commercial vessels and stationary applications. Potential applications of this LFP battery include off grid power supply, marine power supply, medium for (renewable) energy storage and (traction) battery for vehicles.

2.3 Glossary of Terminology

Table 1. Glossary of terminology

Be in Charge software	Software used for configuring and monitoring the battery system (desktop)
Be in Charge App	Mobile application available for Android and iOS devices; downloadable via the Google Play Store.
BMS:	Battery Management System
Charge cycle:	A period of use from fully charged, to fully discharged, and fully recharged again
CCCV	Constant Current - Constant Voltage
Class II charger	A class II charger meets the necessary safety standards and provides protection against risks (fire hazard, battery damage) during charging.
DoD	Depth of Discharge
Endurance Lifecycle	The product maximum lifespan, achieved by following the guidelines presented in this manual
I/O	Inputs and Outputs
LFP	Lithium Iron Phosphate (LiFePO ₄)
Manual battery disconnect switch	Switch used to safely disconnect power from the battery to consumers or chargers during installation, maintenance, or storage.
On/Off button	The battery can be switched on or off using the button on the battery or an optional external On/Off button.
MPPT	Maximum Power Point Tracker
SoC	State of Charge
SoH	State of Health
MOSFET	An electronic switch that controls the flow of current using a small voltage signal.

2.4 Used symbols

The following icons will be used throughout the manual:

- I **IMPORTANT! An important sign is used to emphasize how important something is. States precautions and restrictions that must be followed.**
- Ω **WARNING! A warning sign indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.**
- ⚠ **CAUTION! A caution sign indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.**

Note: A note is used to address practices not related to physical injury. It provides tips on correct use and supplementary information.

3. Product specifications

3.1 Product features

- A-grade prismatic cells for highest energy density and quality.
- Lithium Iron Phosphate (LiFePO₄): Safe lithium technology.
- Up to eight batteries can be connected in parallel to increase the total capacity up to 800 Ah or 1200 Ah depending on the Epsilon variant.
- Integrated short circuit protection.
- Integrated protection device for maximum protection and safety.
- Integrated BMS (Battery Management System).
- Integrated cell heating to allow safe charging below 0 °C (with autonomous operation if needed).
- Adaptive cell balancing.
- Robust casing made from environmentally friendly materials (fully recyclable).
- Overheating protection on battery terminals in case of badly connected cables.
- Communication interface: Bluetooth® (wireless), CAN bus (wired) and LIN bus (wired).
- Configurable general-purpose inputs/outputs to control external devices (chargers for example).
- Separate power output connection for powering accessories. Analog SoC output.
- Battery monitoring / History Storage.
- Monitoring via Be in Charge App (iOS and Android) and Be in Charge software (PC) (refer to section 5.4).
- Multi-connectable coated aluminum terminals, including temperature sensors for protection.
- LN3 / DIN H6 and LN5 / DIN H8 sizes available in different capacity (100 Ah and 150 Ah).
- Integrated and configurable discharge limit (shutdown based on State of Charge).

3.1.1 General product specifications

Table 2. General product specifications

Product name:	Epsilon 12V100Ah	Epsilon 12V150Ah
EAN-13	8718531362208	8718531362185
Product designation	IFpP/27/148/135[2p4s] M/-20+60/95	IFpP/27/148/135[3p4s] M/-20+60/95
Cycle life	> 5000 (0.3C charge/discharge, DoD 100%) ¹ > 3500 (0.9C charge/discharge, DoD 100%) ¹	

¹ The cycle life value given above is an indication at 23 °C. The LFP battery cycle life depends strongly on temperature and the applied charging and discharging loads.

3.1.2 Electrical specifications

Table 3. Electrical specifications

	Epsilon 12V100Ah	Epsilon 12V150Ah
Nominal capacity	100 Ah	150 Ah
Energy	1280 Wh	1920 Wh
Nominal voltage	12.8 V	12.8 V
Open circuit voltage	13.2 V	13.2 V
Self-discharge	< 3% per month	< 3% per month

3.1.3 Mechanical specifications

Table 4. Mechanical specifications

	Epsilon 12V100Ah	Epsilon 12V150Ah
Dimensions (LxWxH)	278 x 175 x 190 mm 11" x 6.9" x 7.5" [= DIN H6 / LN3]	353 x 175 x 190 mm 13.9" x 6.9" x 7.5" [= DIN H8 / LN5]
Weight	10.7 kg / 23.6 lbs	15.5 kg / 34.2 lbs
Case material	PC / ABS	PC / ABS
Ingress protection	IP56	IP56
Cell type / chemistry	Prismatic - LiFePO4	Prismatic - LiFePO4

3.1.4 Charge & discharge specifications

Table 5. Charge and discharge specifications

	Epsilon 12V100Ah	Epsilon 12V150Ah
Charge method	CCCV	CCCV
Recommended charge voltage	14.4 V	14.4 V
Max charge current	90 A	135 A
End of discharge voltage	8 V	8 V
Discharge current continuous	Max. 190 A	Max. 200 A
Discharge pulse current (10 sec)	300 A	350 A
Short circuit detection	1550 A > 70 us or 610 A > 8 ms	1550 A > 70 us or 610A > 8 ms

3.1.5 Short circuit detection

In case the LFP battery detects a short circuit, the LFP battery will turn OFF. The short circuit detection can be triggered also, when for instance, a large capacitive load is connected (e.g. an inverter). In that case the current spike will be higher and longer than the values mentioned in the table above and that will cause the LFP battery to turn OFF. The LFP battery will then start retrying to turn ON and in case of a capacitive load this will charge the load and eventually turn and stay ON again. In case of a real short circuit or a very large capacitive load where the LFP battery is not able to “charge” the load, the battery will stay OFF. To turn the LFP battery ON again the short circuit needs to be removed and the battery needs to be taken out of this error mode. This can be done by charging the battery (refer to section 6.2) or to reset the battery (refer to section 6.13).

3.1.6 Temperature specifications

Table 6. Temperature specifications

Charge temperature (heating off)	0 °C to 45 °C / 32 °F to 113 °F
Charge temperature (heating on)	-30 °C to 45 °C / -22 °F to 113 °F ²
Discharge temperature	-20 °C to 60 °C / -4 °F to 140 °F
Storage temperature short term (< 1 month)	-20 °C to 45 °C / -4 °F to 113 °F
Storage temperature long term (> 1 month)	18 °C to 28 °C / 64 °F to 82 °F ³
Relative humidity	10-90%

² Charging from -30 °C is only possible with an external power source to power the heaters, the correct settings should be used.

³ Long term exposure to temperatures > 35 °C / 95 °F might affect battery capacity and cycle life.

3.1.7 Compliance specifications

Table 7. Compliance specifications

Certifications	CE, UKCA, RED, RoHS ⁴ , FCC ⁵ , UN 38.3, UN ECE R10.06, UL1642 (Cells)
Shipping classification	UN 3480
Bluetooth® certification ⁶	Declaration ID: D061640

⁴ RoHS is only valid for electronics and excludes the battery cells.

⁵ FCC/IC Information:

Contains FCC ID: Y82-DA14531MOD

Contains IC ID: 9576A-DA14531MOD

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference
2. This device must accept any interference received, including interference that may cause undesired operation.

⁶ Bluetooth® information:

The LFP battery has been certified for Bluetooth® compliancy. Both Epsilon 12V100Ah and 12V150Ah are registered at the Bluetooth® SIG (Special Interest Group) under the declaration ID mentioned in the table above.

3.1.8 Environmental conditions

⚠ CAUTION! The LFP battery may only be used under the conditions specified in this manual.

Exposing the LFP battery to conditions outside the specified boundaries may lead to serious damage to the product, user and/or environment.

Use the LFP battery in a dry, clean, dust free, well-ventilated space. Do not expose the LFP battery to fire, water, solvents or excessive heat.

3.2 Scope of delivery

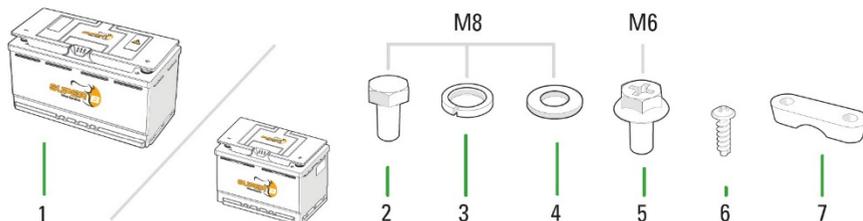


Figure 5. Components

1. (1x) Super B Epsilon 12 V100 Ah / Epsilon 12 V150Ah LFP battery
2. (2x) Hex bolt M8x16
3. (2x) Washer M8
4. (2x) Lockring M8
5. (2x) Terminal Screw M6
6. (4x) Philips screw
7. (2x) Cable clamp

3.3 Terminals and LED indicators

The picture below shows the terminals of the LFP battery.

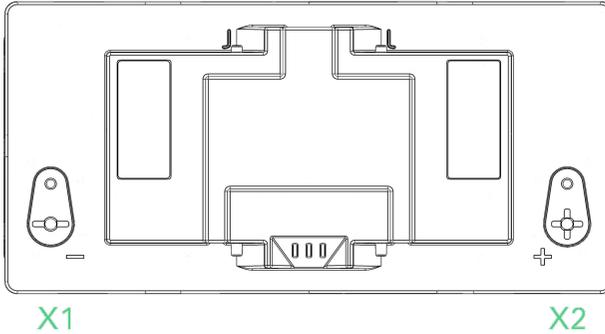


Figure 6. Battery terminals

X1 and X2: Battery Terminal M8 tread for cable lug or standard automotive terminal and M6 thread for accessory connection.

3.3.1 X1 / X2 Battery terminal interface

Table 8. Battery terminals interface

Terminal #	Service description	Function
X1	Battery - Terminal	-
X2	Battery + Terminal	+

3.3.2 LED Indicators

The LFP battery has 3 LEDs depicted in Figure 7 which indicate in which state the LFP battery is

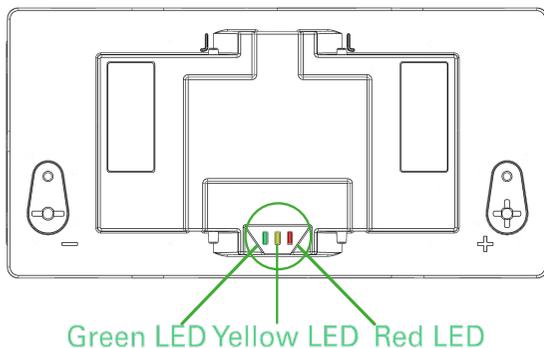


Figure 7. LED indicators

Depending on the state, the LEDs can:

- Be constantly lit; the LFP battery is being charged or discharged at more than 250 mA.
- Flash briefly (100 ms on 3 s off); the LFP battery is being charged or discharged at less than 250 mA.
- Fade (slowly light up and slowly dim again); the On/Off functionality is used to switch the battery off (see section 5.6).
- Flash quickly; this is for special states as referred to in Table 9.

Table 9. LED Mode

	Green LED	Yellow LED	Red LED	Mode
1	Off	Off	Off	Not operational due to deep discharge or an internal problem.
2	Flashing	Off	Off	Operational, normal state. No charge or discharge current.
3	Off	Flashing	Off	Operational, alert state. The LFP battery can be used on a limited basis.
4	Off	Off	Flashing	Operational, alarm state. The LFP battery can no longer be used while the fault is present.
5	On	Off	Off	Operational, normal state of charging or discharging
6	Off	On	Off	Operational, alert state.
7	Off	Off	On	Operational, alarm state. The battery is faulty and must be examined by the dealer.
8	Fading	Off	Off	Operational, normal state: the On/Off button is OFF.
9	Off	Fading	Off	Operational, alert state: the On/Off button is OFF. This may indicate a temperature problem, or the LFP battery is in danger of running out of power.

10	Off	Off	Fading	Operational, alarm state: the On/Off button is OFF. This may indicate a temperature problem, or the LFP battery is too low.
11	Flashing	Off	Flashing	Special state: firmware update active.
12	Off	Flashing alternately		Special state: start-up phase of the LFP battery after a reset.

3.3.3 Signal interfaces

The signal interfaces are located underneath the removable lid.

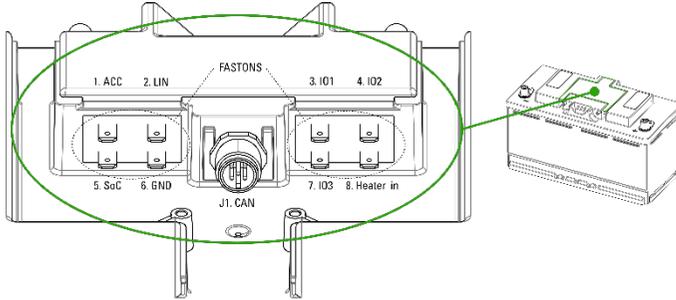


Figure 8. Signal interfaces

3.3.4 J1 CAN

Note: CAN bus is not galvanically isolated

The CAN interface of the LFP battery is not galvanically isolated. The CAN ground pin is fused with respect to the terminal minus with a 200-mA resettable fuse.

Table 10. J1 CAN interface

PIN #	Signal	Description
1	CAN_SHLD	Optional CAN Shield
2	NC	Not in use
3	CAN_GND	Ground / 0V
4	CAN_H	CAN_H bus line (dominant high)
5	CAN_L	CAN_L bus line (dominant low)

Male



Female



Figure 9. J1 CAN Connections Male and Female

The CAN connector is provided with a protective M12 cap (see Figure 6). When CAN is not used, the protective M12 cap must be mounted to ensure the IP rating of the LFP battery.

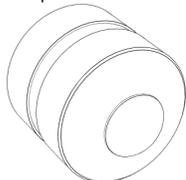


Figure 10. Protective M12 cap

3.3.5 FASTON Connections

Note: FASTON connections are also shown on the inside of the protective lid.

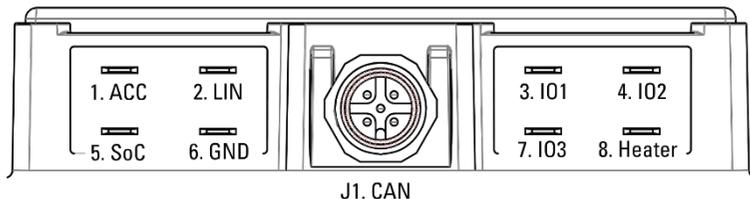


Figure 11. FASTON Connections

Table 11. FASTON connections

Faston #	Description	Function
1	Accessory power output	Connection for power to accessories (fused internally 1.5 A trip current, auto reset)
2	LIN bus connection	LIN bus communication channel (CI- bus support)
3	I/O1 connection	Input or output 1 (fused internally 0.6 A trip current, auto reset)

4	I/O2 connection	Input or output 2 (fused internally 0.6 A trip current, auto reset)
5	SOC output (analogue)	Analogue SOC output (0-10 V) (load must be higher than 100kOhms)
6	GND connection	GND connection (fused internally 1.5 A trip current, auto reset)
7	I/O3 connection	Input or output 3 (fused internally 0.6 A trip current, auto reset)
8	Heater power supply input	External power supply for heater (12- 14 V) (120 W / 10 A max)

3.3.6 FASTON Connection electrical specifications

⚠ CAUTION! The outputs are not electrically isolated from the battery ground/minus, this must be considered when connecting to an external device.

Table 12. FASTON connection electrical specifications

	Description	Value	Units
I/O connection 1-3	Input voltage range	0 .. 15	V
	Input impedance	> 100	KOhm
	Input high level	> 8.4	V
	Input low level	< 6.8	V
	Output current sink (open drain output type)	0.5	A
SoC output	Output voltage range	0.01 .. 10	V
	Output impedance	< 1	Ohm
Heater input	Input voltage range	12 .. 15	V
	Power rating 150 Ah	120	W
	Power rating 100 Ah	80	W

3.3.7 Bluetooth®

Note: Bluetooth® range is strongly dependent on the environment and how the LFP battery is positioned. Metal parts such as battery boxes, covers and cabling can affect the Bluetooth® range and can lead to reduced range. The mentioned range only applies to an “open field situation” and can be less or more depending on the situation. Refer to section 5.10, Bluetooth® pairing, for more details

Table 13. Bluetooth®

Service description	Type of signal	Range
---------------------	----------------	-------

3.3.8 Modes and states of the LFP battery

⚠ CAUTION! If the LFP battery undergoes a deep discharge (any cell block is at 1.5 V or below), this may cause irreversible cell damage. The battery will enter a non-operational state and cannot be used again. The protective shutdown will block all charging and discharging functions.

Note: A deep discharge may occur when the total battery voltage appears acceptable (e.g. 9 to 10 V), due to imbalance between cell blocks.

The LFP battery has two modes: operational and non-operational.

3.3.8.1 Non-operational mode

If the LFP battery is in non-operational mode, it cannot be used anymore. This can occur if the BMS detects a malfunction in the battery's monitoring and control system or if a deep discharge results in cell damage. A deep discharge occurs when any cell block drops to 1.5 V or lower, which can happen even if the overall battery voltage is 10 V. When this is detected, the LFP battery stores this event and is not usable thereafter. The protective shutdown mechanism then prevents charging or discharging.

3.3.8.2 Operational mode

The LFP battery knows three states in operational mode:

- Normal state: the units the LFP battery monitors (voltage, current and temperature) are within the operational level of the cells and other components in the LFP battery.
- Warning state: the units the LFP battery monitors are threatened to go beyond the operational level of cells or other internal components. The battery's protective disconnect device will stay on.
- Alarm state: the units the LFP battery monitors are beyond the operational level of cells or other internal components. The battery's protective disconnect device will disconnect the cells from the terminals and the LFP battery. Charging, discharging or both may be disabled.

3.3.8.3 Operational mode: On/Off functionality

The LFP battery has a On/Off button which can be operated by an external button. When the On/Off button is off, it is not possible to charge or discharge the LFP battery. Regardless of the On/Off button position, the LFP battery always monitors all units. It can also be in normal, warning or alarm state. The On/Off functionality is not equivalent to an electrical disconnect. To provide a true electrical disconnect, a manual battery disconnect switch must be used. Refer to Section 4.5 for more details on the Manual battery disconnect switch.

3.3.9 Operational mode: dependencies

Table 14. Operational mode: dependencies

State	On/Off button 'on'	On/Off button 'off'
Normal state	Discharging/charging possible	Discharging/charging not possible
Warning state	Discharging/charging possible	Discharging/charging not possible
Alarm state	Charging or discharging or both is not possible, this depends on the alarm type	Discharging/charging not possible

Below is a list of possible causes for the LFP battery being in an alarm condition:

3.3.9.1 Charging disabled causes

Charging disabled can be caused by the following events:

- Overcurrent during charging, the charging current is too high.
- Overvoltage during charging:
- The voltage of the charger is too high.
- The cells are unbalanced.
- The temperature to charge is too high or too low.
- The On/Off button is off, the LFP battery cannot be charged or discharged.

3.3.9.2 Discharging disabled causes

Discharging disabled can be caused by the following events:

- Overcurrent during discharging, the load current is too heavy.
- Undervoltage due to discharging, the LFP battery is empty.
- The SoC 'off' level has been reached.
- The temperature to be able to discharge is too high or too low.
- The On/Off button is off, the LFP battery cannot be charged or discharged.

3.3.9.3 Discharging and charging disabled causes

- The protective disconnect device is too hot.
- The On/Off button is off, the LFP battery cannot be charged or discharged.

3.4 Optional Components

Table 15. Optional components that can be used with the LFP battery

Article name	EAN code
CAN cable inline terminator 0.5m	8718531362505
CAN Cable 0.25m RJ45 to straight M12 female	8718531362574
Be In Charge Monitoring Kit	8718531362086
Battery Bracket set for Epsilon	8718531362222
CAN Cable 0.4m Y-split straight female to straight male-female	8718531362239
Touch Display + Connection set 5m for Epsilon 12 V100/150Ah	8718531362291
Touch Display + Connection set 10m for Epsilon 12 V100/150Ah	8718531362307
Touch Display + Connection set 15m for Epsilon 12 V100/150Ah	8718531362352
Display BM01 12 V + Cable 2.5m for Epsilon 12 V100/150Ah	8718531362369
Display BM01 12 V + Cable 5m for Epsilon 12 V100/150Ah	8718531362260
Display BM01 12 V + Cable 10m for Epsilon 12 V100/150Ah	8718531362277
Be in Charge Monitoring Kit ultra-light	8718531362628
On/Off button + Cable 2.5m (optional functionality for internal main switch)	8718531362802

4. Installation

4.1 General information

⚠ **WARNING! Use the Epsilon battery in 12 V systems only.**

⚠ **WARNING! Never install or use a damaged LFP battery.**

⚠ **CAUTION! Do not reverse connect the LFP battery (polarity).**

Note: For installation also refer to the **usage & maintenance manual**

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

4.2 Unpacking the LFP battery

⚠ **CAUTION! Be aware of the product's weight.**

⚠ **WARNING! Take precautions to avoid dropping the battery, as its weight can cause injury.**

⚠ **CAUTION! Carefully take out the battery. Avoid touching the terminals directly.**

⚠ **WARNING! Do not use a damaged battery. Contact the supplier immediately.**

Unpacking an LFP battery should be done carefully to avoid any damage or safety hazards. The following steps must be followed:

- Ensure your workspace is clean, dry and well ventilated.
- Remove any flammable materials from the workspace.
- Examine the packaging.
- Check the packaging for any signs of damage or leakage.
If the package appears to be damaged, do not proceed further and contact your supplier for advice.
- Use anti static gloves if possible.
- Carefully open the outer packaging, avoiding excessive force.
- Be cautious not to puncture the battery or its inner packaging.

Take out the LFP battery.

- Carefully take out the battery by handling the battery by its sides. Avoid touching the terminals directly.
- Visual inspect the battery for any signs of damage, such as dents, scratches, punctures or swelling.
- Check for any leakage or unusual odors.
- If the battery is damaged, do NOT use it. Contact the supplier immediately.

4.3 Mounting the LFP battery

The LFP battery should be mounted so that it can't move. The LFP battery may be placed on its long or short side. Do NOT mount upside down. Use appropriate fastening brackets and fixtures for mounting. Refer to section 3.4, Optional Components.

4.4 Connection cables

I **IMPORTANT! Do not use the cables to lift the LFP battery**

⚠ CAUTION! When using more Epsilon LFP batteries in parallel the wiring should be sized and specified according to the maximum current the parallel bank can deliver.

Use appropriate cables and cable lugs for the connection to the terminals. This prevents overheating and unnecessary losses. Use appropriate fuses matching the cables and load. Super B advises using 95 mm² connection cables. Cables with less diameter can cause overheating or unnecessary losses. Always use the correct crimp tools to crimp the cable lugs and follow the instructions provided by the cable lug manufacturer.

4.4.1 Connecting power cables with automotive type terminals

1. Connect the load or charger to the X2 (+) terminal of the LFP battery (Figure 8).
2. Connect the load or charger to the X1 (-) terminal of the LFP battery (Figure 8).
3. Ensure both contacts are tightened (20 Nm).
4. Place the handle covers over the terminals (Figure 9).

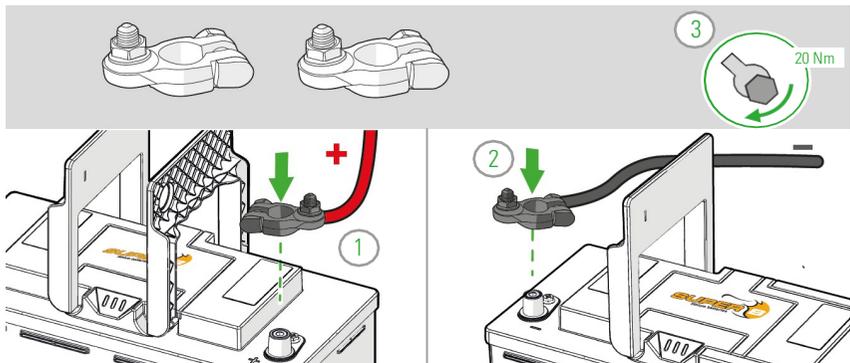


Figure 12. Connecting power-cables with automotive type terminals

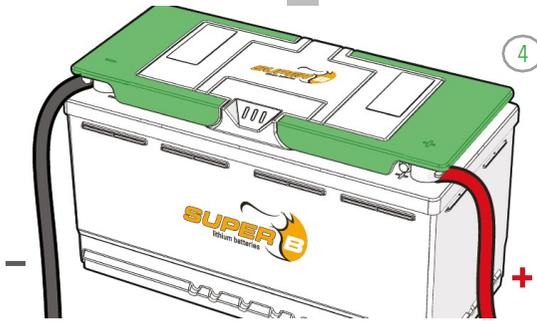


Figure 13. Place the handle cover over the terminals

4.4.2 Connecting power cables with cable lugs

1. Remove the automotive power terminals (Figure 10).
2. Connect the load or charger to the X2 (+) terminal of the LFP battery (Figure 11).
3. Use the included M8 bolt, spring washer and plain washer to connect the LFP battery cable.
4. Connect the X1 (-) terminal of the LFP battery (Figure 11).
5. Use the included M8 bolt, spring washer and plain washer to connect the LFP battery cable.
6. Ensure both contacts are tightened to 20 Nm.
7. Place the handle covers over the terminals (Figure 12).

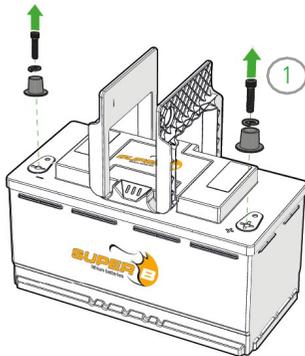


Figure 14. Remove the automotive power terminals

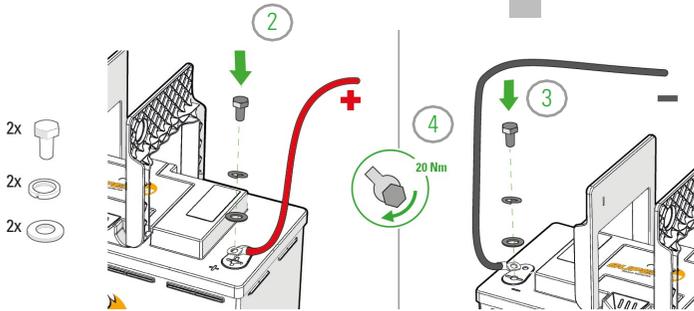


Figure 15. Connecting power cables with cable lugs

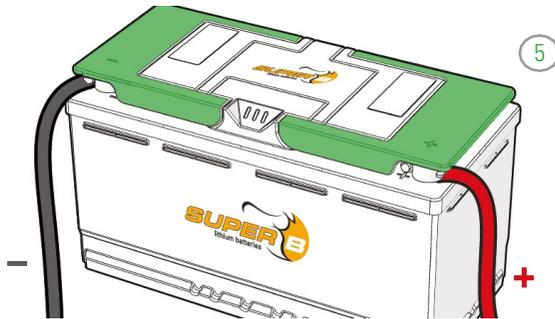


Figure 16. Place the handle covers over the terminals.

4.4.3 Connecting small consumers to the terminals

The LFP battery has an M6 thread on both terminals that is intended to supply power to small consumers. Below is described and depicted how to connect small consumers. This is not the accessory power; that one is FASTON 1 underneath the lid (see Figure 7, section 3.3.5).

1. Connect the plus of the power cable of the small consumer to the X2 (+) terminal of the LFP battery (Figure 13). Use the included M6 bolt.
2. Connect the minus of the power cable of the small consumer to the X1 (-) terminal of the LFP battery (Figure 13). Use the included M6 bolt.
3. Ensure both contacts are tightened to 10Nm.
4. Place the handle covers over the terminals (Figure 12).

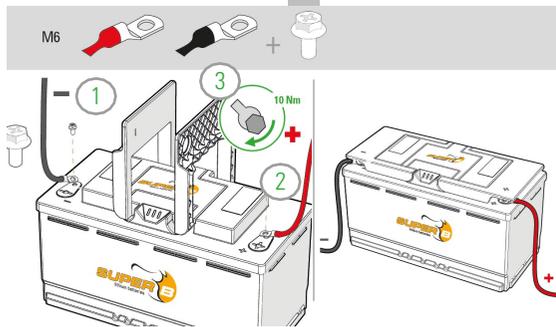


Figure 17. Connecting accessories to the terminals

4.5 Manual Battery Disconnect Switch

Note: Please make sure the Manual Battery Disconnect Switch is installed as close as possible to the battery itself.

Super B recommends using a Manual Battery Disconnect Switch in all installations. Installing a Manual Battery Disconnect Switch provides the following benefits:

- **Safe installation and commissioning:** The battery can be completely isolated from the electrical system while wiring is being connected or modified. This minimizes the risk of short circuits, accidental energizing of equipment, and unintended current flow during installation.
- **Safe maintenance and service activities:** During inspection, troubleshooting, or replacement of components, the battery can be physically disconnected from the system. This prevents unexpected activation of loads and reduces the risk of electric shock, arcing, or damage to connected equipment.
- **Prevention of parasitic loads:** Even when the system is “off”, small standby loads or leakage currents may remain connected and slowly discharge the battery. A Manual Battery Disconnect Switch ensures full electrical isolation, helping to avoid unwanted battery discharge.
- **Long-term storage:** For seasonal or long periods of non-use, the switch allows the battery to be fully disconnected from the application. This helps preserve battery state of charge, prevents deep discharge, and extends battery lifetime.
- **Emergency shutdown functionality:** In the event of malfunction, wiring damage, or unsafe operating conditions, the Manual Battery Disconnect Switch allows a fast and clear method to shut down the electrical system and isolate the battery.
- **Protection during transport and installation handling:** When equipment is shipped, serviced or relocated, the switch ensures the battery is isolated, reducing the risk of accidental activation of the application.
- **System troubleshooting:** The ability to fully isolate the battery simplifies diagnostic activities by clearly separating battery-related behavior from the rest of the electrical system.

When selecting and installing a Manual Battery Disconnect Switch, ensure that:

- It is rated for the maximum system voltage and current (continuous and peak).
- It is installed as close to the battery terminals as possible to minimize the length of energized cables.
- It is clearly accessible and labeled for operators and service personnel.
- The switch complies with applicable marine/automotive/industrial regulations and standards relevant to the application.

A properly selected and installed Manual Battery Disconnect Switch is therefore an important safety and reliability component in any Epsilon battery system.

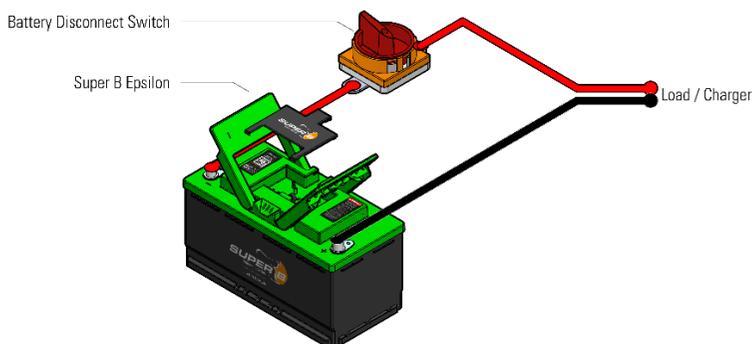


Figure 18. Manual Battery Disconnect Switch

4.6 Communication and FASTON connections

All connections, except for the connection terminals, can be made in one central place under the protective lid. This protective lid is mounted and held in place using self-retaining clips, the lid can be easily removed with light force and replaced in the same way. The specific connections and assignment are indicated on the inside of the lid. The connections can be made using standard 4.75 mm wide automotive FASTON crimp terminals. All connections and cabling can be secured using the integrated cable strain relief, which can easily be unscrewed to secure all cables to the FASTONS. The M12 CAN cable is not fed through the strain relief, as the M12 connector itself has a built-in strain relief and this would damage the wire (see **Error! Reference source not found.**).

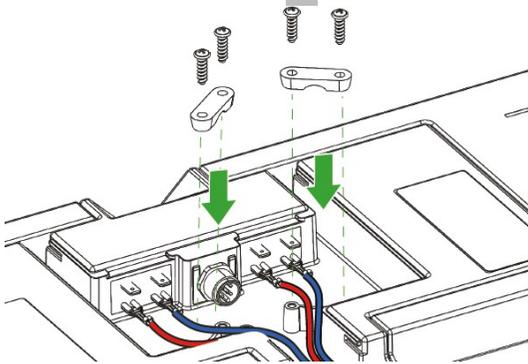


Figure 19. Communication and FASTON connection

The protective lit indicates the function of each FASTON as shown in Figure 20.

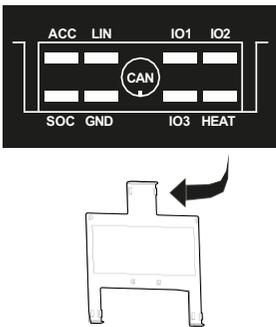


Figure 20. Protective lit

4.6.1 CAN interface

- I IMPORTANT! Always use the supplied protective M12 cap when the CAN connection is not used. Otherwise, ingress protection is not guaranteed.**

The CAN communication interface must be used in a bus network topology. Do not use a ring- or a star topology. The wired communication interface specifications restrict the Bus length/Bus speed as shown in Table 16.

Table 16. Wired network interface cable lengths

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

The connection to the CAN bus can be made using standard CAN cable wiring and accessories. A

Y-split CAN cable and inline CAN terminator cable are available for easy installation and connection to other LFP batteries. Refer to section 3.4 optional Components.

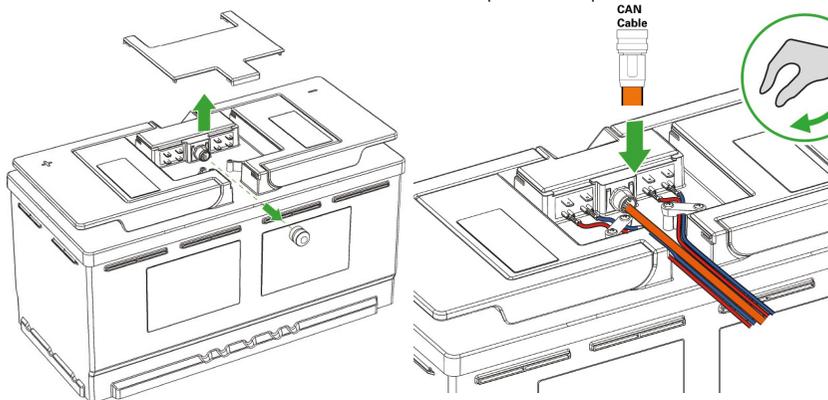


Figure 21. Connecting to the CAN Interface

4.6.2 Termination Resistors

Use termination resistors or the inline CAN bus terminator cable at the end nodes to impede reflections on the line. The value of this resistor should be +/- 120 ohms. More information on termination resistors can be found in CiA document 303_1 V1.8.0, section.

4.7 Connecting to the LIN interface

The LFP battery includes a LIN bus interface (Local Interconnect Network). The LIN bus interface can be used to connect to a LIN bus master which are often present in (recreational) vehicles or caravans. The LIN bus interface is meant to provide the LIN bus master with information about the LFP battery like SoC and other data. The LIN bus is accessible on FASTON 2 under the protective lid. Depending on the electrical installation, LIN ground can be either the terminal minus or the FASTON GND. Make sure no ground loops are made when using the FASTON GND.

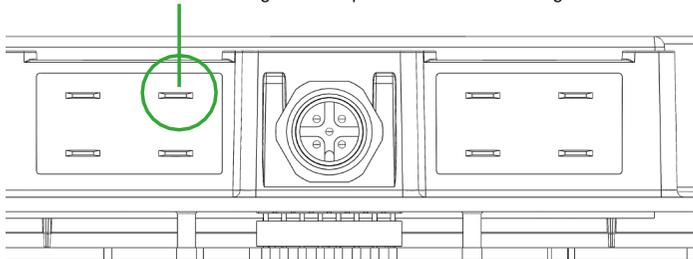


Figure 22. LIN bus FASTON connection

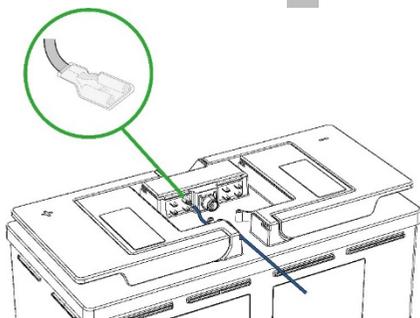


Figure 23. Connecting the LIN Interface using the FASTON connection

4.7.1 CI-BUS protocol

To support easy integration within the RV/caravanning industry the LIN bus protocol is configurable. One of the protocols which can be selected is the CI-bus protocol. When enabled, the LIN bus provides all information necessary for the system using the CI-bus protocol. For more information about the CI-bus visit the CIVD website (<https://www.civd.de/>).

4.7.2 Other protocols

The LIN bus on the LFP battery can also support protocols defined by other manufacturers, this support is extended on a regular basis and prone to change. Please contact Super B to gather information about the supported protocols on the LIN bus.

4.7.3 I/O FASTON connection and functionality

Note: If there is any uncertainty about the proper use of the I/Os, contact your Super B dealer.

Note: A full description of how to use generator/inverter control is explained in chapter 4.12.

The LFP battery has three digital input or output ports (I/Os) accessible via FASTON 3, 4 and 7 (see section 3.3.5, FASTON Connections). The digital I/Os can be used for various purposes which are shown in the table below.

Table 17. I/O functionality

IO functionality	Description
Generator control (I/O 1, output)	Active when SoC is below 20%, off when SoC is 100%, hysteresis of 80%. From firmware version 1.4.0 and higher, the values for Active and OFF are configurable using the latest Be in Charge software.
Inverter control (I/O 2, output)	Active when SoC is above 21%, off when SoC is below 10%, hysteresis of 11%. From firmware version 1.4.0 and higher, the values for Active and OFF are configurable using the latest Be in Charge software.

On/Off button (I/O3, input)
(Note: from firmware version 1.3.5 onwards)

When 12 V is applied to this input, the On/Off button will be off. The battery cannot be discharged or charged.

When 0 V is applied, the battery can be discharged and charged again.

The functionality of the digital I/Os may be expanded in the future and will be included into new firmware updates. The firmware of the LFP battery can be brought up to date by updating it with the Be in Charge App or the Be in Charge PC Software. All digital I/O ports can function as inputs or outputs. When a port is used as an input, the LFP battery determines by its voltage whether it is active or inactive. When used as an output, the digital I/O port behaves as an “open drain” output. This means as much as a switch between the negative of the LFP battery and the I/O. This switch is closed when the output is active. All I/O ports are protected by an internal self-resetting fuse. When an output is overloaded, the fuse will trip to protect the internal electronics. To fix this, the fuse will reset. The output will resume normal operation after that. Refer to section 3.1.2, Electrical specifications, for more details.

4.8 Connecting a charger to the LFP battery

- ⚠ **CAUTION!** Ensure that you have completed all the previous steps as described in Chapter 4.4 before connecting the LFP battery to the charger.

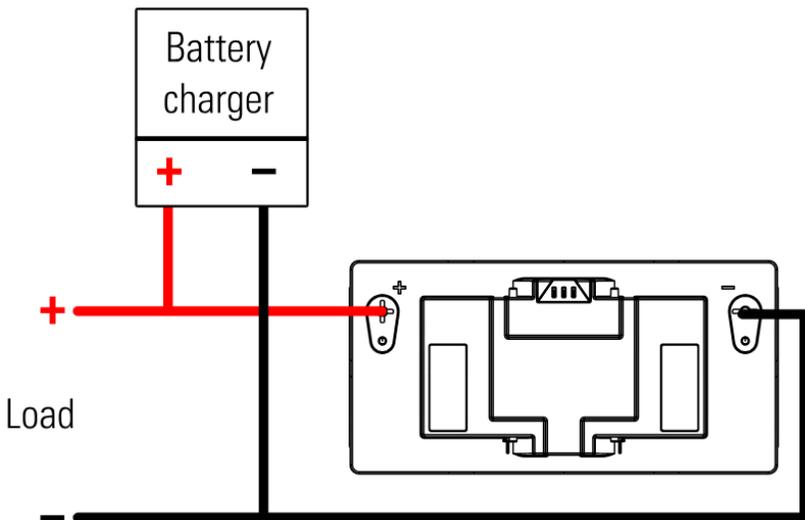


Figure 24. Connecting a charger to the LFP battery

4.9 Connecting the On/Off button (optional)

Note: Power the On/Off button from an external supply only. Do not use Accessory Power or the positive terminal!

Note: The integrated LED increases battery self-consumption by approximately 5 mA. This should be considered in power budgeting, particularly in stand-by mode.

Note: Always use adequate safety measures (fusing, insulation, polarity protection) when connecting an external power source.

Note: The Be in Charge phone application (Android App Version 1.7.0 and below) does not offer the option to check whether the On/Off button has been engaged or not. The Be in Charge Desktop application provides statistics only for Integrators and Manufacturer user levels. To use this feature, please update to the latest version of the app on either platform (iOS or Android).

4.9.1 Function overview On/Off button

The FASTON input of the LFP battery is designed to be controlled by an (optional) On/Off button, see section 3.4. The On/Off button can be connected an external 12 V power source for control. Failure to follow this guideline may result in malfunction of the On/Off button.

4.9.2 Wiring On/Off button and Electrical safety

Use the supplied cable to connect the On/Off button to the IO3 input of the battery. The FASTON connections are shown on the inside of the protective lid, see section 3.3.5, *FASTON connections*. The BMS (Battery Management System) will then read the status of the battery. The BMS interprets the input and sets the battery state to *ON* or *OFF* accordingly.

As stated in the note above, the plus terminal cannot be used to operate the On/Off functionality. This is because the battery is placed in the *Off* state when voltage is present on IO3. If the plus terminal is used, the battery will continuously toggle between the *On* and *Off* states when the switch sets it to *Off*.

As also noted above, the accessory output cannot be used to operate the On/Off functionality. The accessory power is switched off when the battery shuts down due to a low state of charge (SoC). In this condition, the battery is in the *Off* state as a result of low SoC, and the voltage level on IO3 is no longer relevant to its state.

However, as soon as a charger is connected, the LFP battery transitions to the *On* state, which also re-enables the accessory power. This, in turn, drives the LFP battery back into the *Off* state. As a result, the same On/Off toggling behavior then occurs as when using the plus terminal.

4.9.3 LED-Integrated Switch (optional)

The On/Off button includes a built-in LED indicator. This LED indicator provides feedback on the battery status. The LED operates within a voltage range of 12 V to 24 V DC. It should be connected to the battery terminals through a (inline) fuse. Below table clarifies the different switch states.

Table 18. Different switch states when On/Off functionality is used

Switch state	I03 input	LED behavior	Battery state
Released	High	OFF	OFF
Pressed	Low	ON	ON
Pressed	Low	OFF	OFF, due to an alarm

Figure 24 here below, shows the wiring diagram for connecting to an external source.

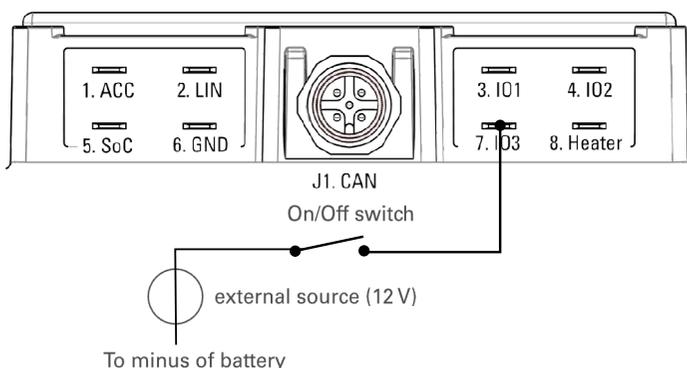


Figure 24. Connecting an On/Off button to an external source

4.10 Connecting LFP batteries in parallel

- ⚠ **CAUTION! Always connect batteries of the same type / capacity and age in a parallel setup. This could lead to a degradation of the total capacity and disturbed current distribution within the system.**
- ⚠ **CAUTION! Before connecting two or more LFP batteries in parallel, the LFP batteries must be charged to 100% SoC.**
- ⚠ **CAUTION! When connecting a battery in parallel with another there will be current through the cable and lugs which might cause a spark and/or heat. Be sure to wear personal protective gear.**

Note: Even when LFP batteries are properly connected in parallel it can be that current is not equally divided between batteries.

The maximum number of LFP batteries in parallel is eight. To divide the current equally amongst

batteries, use the schematic below:

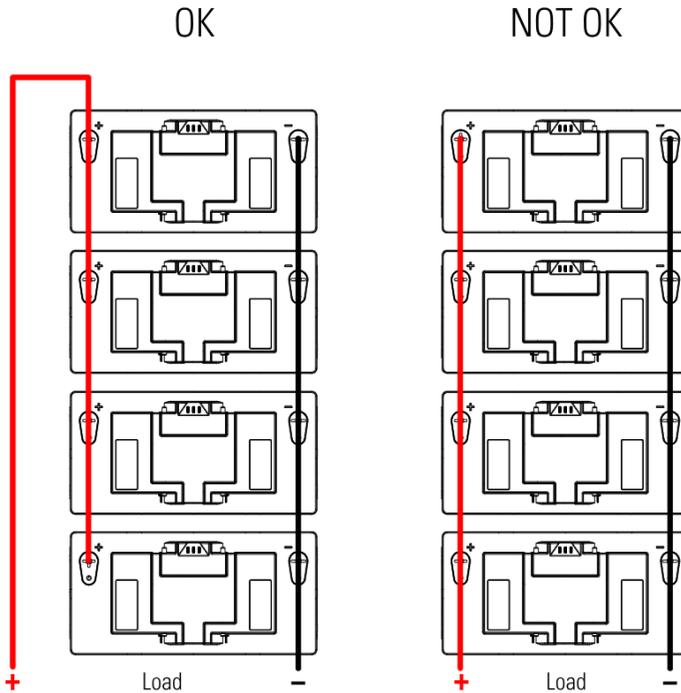


Figure 25. Connecting LFP batteries in parallel

OK: Best way to divide current equally across the batteries.

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 LFP battery close to the load.

Never connect the setup like this!

4.11 Disconnecting the LFP battery

Follow the instructions below when disconnecting the LFP battery.

1. Turn off any device or charger the LFP battery is connected to.
2. Disconnect the negative wire and accessories connection from the - terminal of the LFP battery.
3. Disconnect the positive wire and accessories connection from the + terminal of the LFP battery.
4. Disconnect all other connections like the FASTON and communication interface connection which are located under the protective lid.

4.12 Using Generator and Inverter Control

4.12.1 Introduction

Generator and inverter control are two signals which can drive the remote input of a generator/charger or inverter. These two outputs are available on the FASTON connections under the protective lid and are of the wet-type meaning that they are direct connected to the ground/minus of the battery. Generator and inverter control are two different types of signals and need to be interpreted in a different way. Basically, generator control works exactly the opposite way of the inverter control.

4.12.2 Connections

When an output is active it is “pulling” the signal to ground/minus so that an external device can be controlled. When the output is not active, the signal is left “floating”. The picture below shows several possible connections between the I/O on the battery and the connected device.

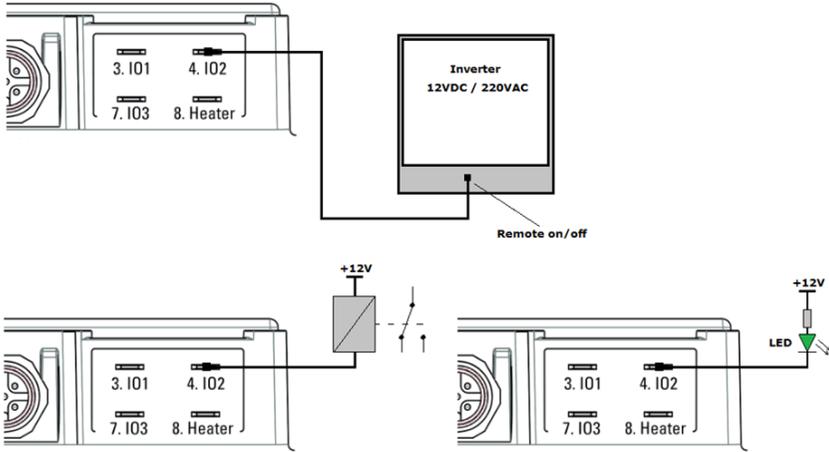


Figure 26. Connection possibilities on the I/O of the battery

4.12.3 Levels and configuration

Note: The levels for generator and inverter control are fixed for firmware versions below v1.4.0. From firmware version v1.4.0 and higher the levels are configurable using the latest Be in Charge software 1.7.0 and later.

To configure the settings for generator and inverter control, please download the latest Be in Charge software and connect to the battery using the Be in Charge monitoring kit. As soon as the connection is established and the status is shown on the screen, the settings can be accessed.

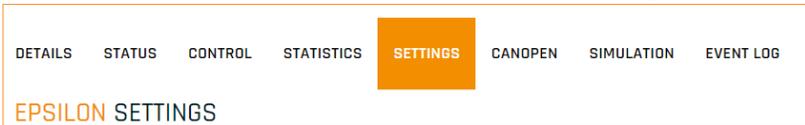


Figure 27. Settings tab within the Be in Charge Software

The settings for both outputs have a default value as described in the table below:

Table 19. Default settings for Generator and inverter control

Default setting	Firmware < V1.4.0	Firmware > = 1.4.0
Inverter control activate level	> 21% (Fixed)	> 21% (configurable)
Inverter control OFF level	< 10% (Fixed)	< 10% (configurable)
Generator control activate level	< 20% (Fixed)	< 20% (configurable)
Generator control OFF level	= 100% (Fixed)	= 100% (configurable)

4.12.4 Example settings and switching

Within the Be in Charge software a few example settings have been set:

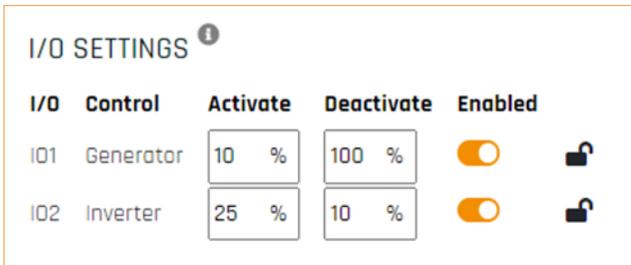


Figure 28. I/O Settings within the Be in Charge software

Generator/charger control will turn ON whenever the SoC reaches a level of 10% and will turn OFF whenever the SoC reaches a level of 100%. Turning ON means that the specific output is actively pulled LOW.

Inverter control will turn ON whenever the SoC is reaching 25% and will stay ON as long as the battery SoC level is above the 25%. Whenever the battery is discharged and drops below 10% the battery will turn the inverter control to the OFF position.

The above scenario is made clear in Figure 29.

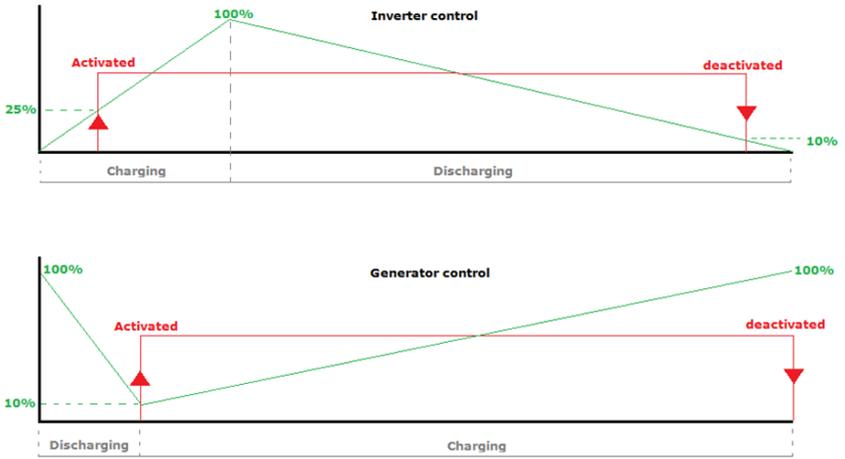


Figure 29. Behavior of the settings for generator / inverter control

5. Battery use

5.1 General information

- I **IMPORTANT! Follow the safety guidelines and measures of Chapter 1.**
- I **IMPORTANT! For detailed information about using the battery, including charging, discharging, long-term storage and regular maintenance, please refer to the instructions in the "Usage and Maintenance manual" which can be found on the Super B website.**
- I **IMPORTANT! This LFP battery internally stores fault conditions and usage data, like excessive charge current or deep discharge situations. Super B will use this information in the warranty process.**
- ⚠ **CAUTION! Do not operate the LFP battery beyond its maximum specifications.**
- ⚠ **CAUTION! Charging at deep discharge conditions can lead to venting, excessive heat or thermal runaway of the cells**
Note: Charge the LFP battery before first use.

5.2 Discharging

- I **IMPORTANT! Turn the Manual Battery Disconnect Switch (See Section 4.5) off when the battery is not in-use. This will prevent the battery from unintentionally draining by other appliances.**
- I **IMPORTANT! When the accessory power is active it can still supply energy and the battery will be discharged.**
- ⚠ **CAUTION! Do not overdischarge your LFP battery. An empty battery needs to be charged as soon as possible to keep the battery healthy.**

5.3 Charging

- I **IMPORTANT! Use a Class II charger for charging the LFP battery.**
- Ω **WARNING! Use only chargers compatible with LFP chemistry and the specified LFP charging profile. Incompatible chargers may cause battery damage, overheating, or fire.**
- Ω **WARNING! Do not overcharge the LFP battery.**
- Ω **WARNING! Never charge the LFP battery with a charging current higher than mentioned in Table 20**
- ⚠ **CAUTION! Stop charging in case the LFP battery switches into error mode.**
- ⚠ **CAUTION! Disconnect the charger from the LFP battery if it is not used for a long time.**

⚠ **CAUTION! When charging by an externally driven alternator, it must be ensured that an optimal charging curve charges the LFP battery. For this, the use of a charge converter (DC/DC booster) is required in such an installation.**

5.3.1 Charger settings

Super-b provides a **usage and maintenance manual** that explains how to setup a charger which profile can be adjusted to LFP batteries.

Before using the charger, ensure the following:

- If battery chemistry type is selectable make use it is set to LFP (Lithium Iron Phosphate).
- Ensure the end-of-charge voltage is set to 14.4 V.
- Ensure the maximum charge current does not exceed the specifications provided for the battery.

5.3.2 Charging scheme when used regularly

To maintain optimal battery performance, it is recommended to charge the battery to 100% after the following:

- 7 to 20 days or
- 10 to 20 cycles.

For more details see the **usage and maintenance manual**.

For precise monitoring, use the Be in Charge App or Be in Charge software to check the battery's State of Charge (SoC), if the battery is equipped with the communication.

5.3.3 Charging scheme for long-term storage

Note: When a manual disconnect switch is not installed Super B recommends storing the battery at 95 % SoC. See **usage and maintenance manual**.

When the LFP battery is not used for an extended period, the SoC should be 50% for proper long-term storage. This is accomplished by:

- Fully charge the LFP battery to 100%.
- Drain 50% charge from the LFP battery with an arbitrary consumer device.
- Disconnect all devices from the LFP battery to make sure it is not drained by 'hidden' consumers. If available, the On/Off button can also be used.

5.3.4 Charging rate

The LFP battery can be charged from empty to full in approximately 1 hour and 15 minutes. Table 19 shows the charging time for the LFP battery at different charge currents. Always use the indicated charge current and end of charge voltage during charging.

Table 20. Charging rates at different charge currents

Charging rate Epsilon 12 V150Ah		
	Time	Charge current
Maximum	± 1 hour 15 minutes	135 A
Endurance lifecycle	3 hours	C3 (50A)

Charging rate Epsilon 12 V100Ah		
	Time	Charge current
Maximum	±1 hour 15 minutes	90 A
Endurance lifecycle	3 hours	C3 (33A)

5.4 Be in Charge Software and App

⚠ CAUTION! When updating the battery firmware, the battery might become unresponsive and can disable the output voltage on the terminals for a few seconds to minutes. Please be aware of this happening in your application and make sure this firmware update can be carried out safely.

Super B provides a Be in Charge Software tool which can be used to read out the internal BMS system of the LFP battery. The software uses a CAN to USB converter to connect to the communication interface. The software can read out the actual status like battery / cell voltages and temperature, but also statistical information. The Be in Charge software can also be used to update the installed firmware of the LFP battery. Some features of the Be in Charge Software and App are:

- Read out the SoC of the battery.
- Configure the SoC Shutdown function of the battery.
- Configuration of the heater functionality.
- Configuration of the CAN Bus and LIN Bus.
- View the statistics and logs of the battery.

The Be in Charge software and hardware are not included in the scope of delivery for the LFP battery.



Figure 30. Be In Charge QR link

Super B also provides a Be in Charge App for mobile devices such as Android and Apple. The App can be found in the Google Play Store or Apple App Store.

The Be in Charge App uses the Bluetooth® connection of a mobile device to connect to the LFP battery. After the connection has been established all important information can be read out such as voltage / current levels, warnings / errors and state of charge.

5.5 Heater functionality

The LFP battery has functionality to heat up the cells and make charging possible if the ambient temperature is causing the cell temperature to drop below charging temperature level (charging LFP cells is only allowed if they are above 0 °C). The heater for this purpose is internally located in the LFP battery and is controlled by the BMS firmware. If heating is requested, this depends on the heating feature configuration and cell temperature, the heater is enabled to heat up and keep the cells at a temperature where they are allowed to be charged.

5.5.1 Heater power source

- I **IMPORTANT! Always ensure that the charger or power supply being used can deliver the minimum required power to prevent erratic behavior of the heating functionality.**
- I **IMPORTANT! Do not use FASTON GND to power the heaters.**

The internal heater can be powered in two different ways:

- Power is supplied by the LFP battery itself and can be aided or fully supplied by a charger connected to the terminals.
- Power is supplied by an external source via FASTON Heater power input and the minus terminal of the battery.

When powering the internal heater from the battery terminals or FASTON connection, it is necessary to have a charger or power supply that can supply a minimum amount of power. The Epsilon 12 V150Ah LFP battery requires a minimum of 120 watts, while the Epsilon 12 V100Ah LFP battery requires at least 80 watts.

When an external source is connected, it is automatically used to heat the LFP battery cells. The BMS detects whether power is available at the FASTON Heater power input. If the user wants to use external power only, heating from terminal power must be disabled (method 1) or method 2

must be used. This is to prevent the energy from the LFP battery from being used when the external source is not present (e.g. a grid power failure).

5.5.2 Heating methods and behavior

There are three heating methods that can be used (or heating can be disabled):

1. Heat up before charging (default).
2. Keep at charge temperature by external source.
3. Keep at charge temperature source independent.
4. (No heating).

Only one of them can be enabled. The Be in Charge App or Be in Charge software should be used to select an option.

5.5.2.1 Method 1: Heat up before charging (default).

If one or more cells are below 0 °C and a charge current is detected, the disconnect device will open the charge path, preventing the LFP battery from being charged. The power for the heaters is then taken from the terminals, hence the charger supplies the power to heat the cells. If there is charging current, the heaters must be used to keep the cells above 0 °C.

If a charger is used that can be regulated by the LFP battery, the charging path will remain closed when a charging current is detected. If power is detected on the FASTON Heater power input, it will use that power to heat up the cells to 0 °C before charging, not the chargers power. However, in case of external power, method 2 or 3 are more appropriate to use.

5.5.2.2 Method 2: Keep at Charge Temperature by external source.

This method keeps the cell temperature above the allowable charging temperature of 0 °C and uses power from the FASTON heater power input. If there is no external source available and charging is detected with cells below 0 °C, the LFP battery will behave as described in method 1.

5.5.2.3 Method 3: Keep at charge temperature source independent.

This method keeps the cell temperature above 0 °C from external power supply energy or the LFP battery energy itself. If an external source is available, it will be used for heating. If the external source is not present, energy from the LFP battery will be used to keep at 0 °C. In that case it will keep it at 0 °C until the SoC drops below a configurable level. If that level is reached the heaters will stop to prevent draining the LFP battery. In Table 21 the range that can be set is stated.

Table 21. SoC Heater levels

SoC	SoC Heater Off (%)
Minimum	20
Maximum	80
Default	50

5.5.2.4 Behavior when there is no external source available.

- When the SoC is below the 'SoC Heater OFF' setting, the heating feature will fall back to method 1: heat up before charging.
- When the external power source is connected/detected again, the LFP battery will start heating if needed, independent of the SoC.

5.5.2.5 Behavior when there is external source available, and the battery is drained.

If the LFP battery is drained due to non-heating use and therefore the SoC level drops below 'SoC Heater Off', and the external power source is used to maintain the LFP battery at CAT (Charge Accept Temperature) level, the heaters will continue to be powered by the external source.

5.6 Battery balancing

The BMS automatically balances the cells if necessary. The LFP battery can be used normally during balancing. Balancing ensures all cells are at the same voltage level and enhances usable battery capacity.

5.7 Shutdown on State of Charge

- Ω **IMPORTANT! When the LFP battery switches off at the pre-configured SoC level, it is recommended to charge the battery to prevent self-discharge to 0% SoC.**
- Ω **WARNING! When the LFP battery has switches off at 0% SoC it must be recharged immediately to prevent deep discharge.**

The LFP battery has the possibility to switch OFF during discharge when the battery reaches a configurable SoC value¹. This functionality provides an energy reserve for the battery and also helps to prevent deep discharge.

The SoC shutdown functionality has two settings:

- Switch off level.
- Warning level.

The warnings are shown on the LEDs on top of the LFP battery and communicated to all the communication channels so that it can be shown on the Be in Charge App / Software or the Display. Both switch-off and warning levels are configurable using the Be in Charge App or Software² and they can be set within the following ranges:

Table 22. Shutdown on State of Charge (SoC)

Setting	Default value	Range
Warning level	25%	5-55%
Switch OFF level	20%	0-50%

Whenever the LFP battery is switched OFF on SoC level, it can be turned ON again by charging the

LFP battery or by forcing the LFP battery ON again using the Be in Charge App or Be in Charge Software. The possibility to force the battery ON again will appear whenever the Li- ion battery reaches the switch off level.

The shutdown on SoC is on by default but it can be disabled using the Be in Charge App or Software (not recommended). Table 23 states how long the battery can stay healthy without charge after switch off.

Table 23. Time remaining after switch off

Switch OFF level	Time till Deep discharge
20%	Approximately 70 days
0 %	Within 7 days

Example behavior of the SoC shutdown functionality:

The installation consists of an Epsilon 12 V150Ah LFP battery with a pre-configured warning level of 25% SoC and a switch-off level of 20% SoC. The LFP battery is being discharged and has reached a SoC level of 25%. The LFP battery will now start showing a warning but is still able to be discharged. The LFP battery is being discharged further and reaches the level of 20% SoC and switches OFF at this level also showing an alarm (Red LED flashing). At that point there is 20% charge left in the cells, but this can still be used by forcing the battery ON again. This can be done by using the Be in Charge App or Software. The LFP battery can be discharged further and will switch OFF at 0% SoC. At this point the battery must be charged.

- ¹ The SoC shutdown feature is available for firmware version v1.2.0 and higher. The configuration can be done using Be in Charge App v1.2.2 and higher and Be in Charge software V1.3.0 and higher.
- ² The default SoC shutdown level before Q2 2025 was 10 %, the warning level was 15%

5.8 On/Off functionality

I IMPORTANT! In case a manual battery disconnect switch is used for storage, follow the storage instructions in Chapter 7.

Ω WARNING! When the On/Off button is in the OFF position, the LFP battery cannot be charged.

The On/Off functionality on the LFP battery is useful for de-energizing the system, such as when storing a vehicle or vessel. The on/off functionality is a feature that helps to ensure that the electrical system is completely disconnected and no charging or discharging occurs when activated. Chapter 4.9 describes how to connect the On/Off button

The On/Off functionality of the LFP battery does not replace a manual battery disconnect switch. If your local regulations require a manual battery disconnect switch, you must install one externally in the power circuit.

5.8.1 How to use the On/Off functionality

Note: The status LEDs on top of the LFP battery indicate the status. Refer to Chapter 3.3.2 for a detailed description of the different status indicators.

To operate the On/Off button, apply a voltage to the IO3 input FASTON connection under the protective cover. Energizing this input will switch off the power on the terminals, and removing the voltage will switch it back on.

5.8.2 Restrictions using the On/Off button

Ω **WARNING! If maintenance is needed on the electrical system (cables and battery), do not use the On/Off functionality. Always disconnect the LFP battery completely by removing the main connection to the terminals before performing any maintenance.**

Using the On/Off functionality in combination with, for example, charging the LFP battery via an alternator can cause a so-called "Load dump" to occur during switch-off. Therefore, always ensure that all sources are switched off before turning off the On/Off button to avoid damage.

Turning off the LFP battery with the On/Off button does not cut off other power sources, such as solar installations or DC-DC converters. To completely de-energize the system, switch off all power sources in the network.

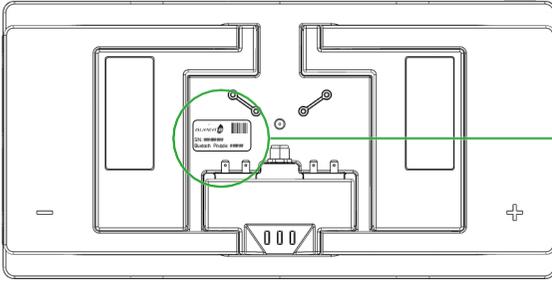
5.9 Accessory Power Output Behavior

Note: The accessory output cannot be used to power the button for the On/Off functionality see 4.9.2.

The On/Off functionality only switches off the terminal voltage, not allowing charge and discharge. The rest of the battery features remain fully functional and the accessory output (e.g. for an external display) stays active and can provide power to small accessories.

5.10 Bluetooth® pairing (PIN code)

For security reasons the Epsilon Bluetooth® connection is protected with a PIN code. This PIN code is needed when pairing to the LFP battery and can be found on the label under the protective lid (see Figure 31). It is advisable to write down this PIN code before installation of the LFP battery.



SUPER B 

S/N: #####
Bluetooth Pincode: #####

Figure 31. Bluetooth® Pairing PIN code

5.11 Reset battery

To reset a battery the Be in Charge software and/or Be in Charge App can be used.

5.12 Battery history recording

The complete LFP battery history and statistics can be downloaded using the Be in Charge software.

5.13 Reading the battery's State of Charge (SoC)

The LFP battery is equipped with an analogue SoC output, this output provides a voltage between 0 and 10 Volts which reflects the 0-100% state of charge value. The state of charge can also be read out using the Be in Charge App for Android and Apple, and with the Be in Charge software for PC applications. The information is also available via LIN bus (CI-BUS protocol).

5.14 Reading the battery's State of Health (SoH)

The LFP battery keeps track of its health using algorithms. These algorithms determine the remaining capacity at that specific moment in the battery life, relative to the initial capacity (as new). Example: A state of health of 95% for an Epsilon 12V150Ah, means that the actual remaining usable capacity in the LFP battery is 142.5Ah.

6. Maintenance

6.1 General information

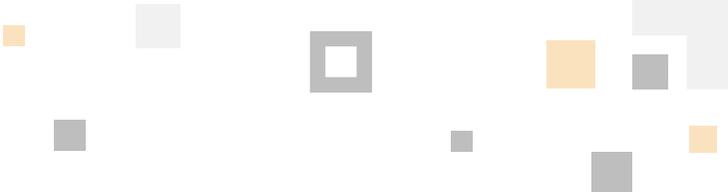
- I **IMPORTANT! Disconnect the LFP battery from all loads and charging devices before performing cleaning and maintenance activities.**
- I **IMPORTANT! Before cleaning and maintenance activities, ensure that the enclosed protective caps are put over the terminals, put the M12 protective cap back in place as well as the protective lid.**
- Ω **WARNING! Never attempt to open or dismantle the LFP battery! The inside of the LFP battery does not contain serviceable parts.**

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 LFP battery is found, it must be replaced. Do not attempt to charge or use a damaged LFP battery. Do not touch the liquid from a ruptured
2. LFP battery.
3. Routinely check the LFP battery's State of Charge. LFP batteries continue to slowly self-discharge (< 3% per month) when not in use or stored.
4. Consider replacing the LFP battery with a new one if you note either of the following conditions:
5. The LFP battery run time drops below about 80% of the original run time.
6. The LFP battery charge time increases significantly.

6.3 Cleaning

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



7. Storage

Follow the storage instructions to optimize the lifespan of the LFP battery during storage. More details regarding storage can be found in our **Usage and maintenance manual**. See our website: www.super-b.com.

8. Transportation

Always check all applicable local, national, and international regulations before transporting a LFP battery.

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

The transport of the LFP battery falls under hazard class UN3480, class 9. For transport over water, air and land, the LFP battery falls within packaging group P1965 Chapter II.

9. Disposal and recycling

Ω **Warning: Do not incinerate, open, crush or short-circuit the battery.**

LFP batteries must not be disposed of with household or general waste. At end of life, the battery must be returned to an authorized battery collection or recycling facility in accordance with applicable local and national regulations.

Before disposal or recycling:

- switch off the application and disconnect the battery
- if possible, reduce the battery state of charge
- cover the terminals with insulating tape or approved terminal caps to prevent short circuits

Recycling of LFP batteries is required in many regions and allows valuable materials to be recovered while minimizing environmental impact. For information on available collection systems, contact your dealer, installer, or local recycling organization.



10. Troubleshooting

10.1 Charge or discharge issues

Table 24. Charge or discharge issues

Battery indicators/state		Solution
Green LED is lit or flashing.		Check the installation of the LFP battery. Check main switches / fuses or other external disconnect devices and cables.
Green LED is fading (Table 9)		Set On/Off functionality to On
All LEDs are OFF		Apply power to the terminals and inspect the battery state with Be in Charge App or Software. If the battery is deeply discharged do not try to charge or discharge anymore. Contact Super-B's service department or local dealer.
Red LED is flashing. Inspect the battery state with Be in Charge App or Software.	Overvoltage	Use the correct LFP charger Balance the battery by charging to 100% (the battery will retry to charge after some time – keep it on the charger)
	Undervoltage	Charge the battery to 100%.
	Overcurrent Charge	Make sure to use an appropriate LFP battery charger, with the correct charge settings.
	Overcurrent Discharge	Make sure that the consumers keep within the maximum discharge current.
	Short Circuit	Make sure that the consumers keep within the maximum discharge current.
		In case of capacitive loads, use a pre-charge circuit during the installation or after engaging the manual disconnect switch.
	High Temperature	Let the battery cool down. Ensure that the battery is in a well-ventilated area.
	Low Temperature	For charging: Let the battery warm up by the internal heaters (if configured).
		For discharging: Place the battery in a warmer environment to comply with its specifications.
	Deep-discharge / Degrade	Contact Super B Service. Do not try to charge or discharge the battery.
Current while Off	Contact Super B Service. Disconnect the battery from any chargers or	

consumers.

10.2 Communication and Connectivity Issues

10.2.1 Bluetooth issues

Table 25. Bluetooth issues

Connection rejected.	Verify no other device is using the Bluetooth® connection.
	Remove Bluetooth® pairing from device settings.
	Re-pair again.
	Use correct PIN code supplied with the LFP battery
Battery cannot be found or connected.	Check if no other devices are connected to the LFP battery.
	Switch off/on Bluetooth® on your phone and retry.
	Check if the Phone and LFP battery are within range.
	Make sure the LFP battery has a working LED indication.
Connectivity is not stable	Connect battery to charger.
	Be sure that the battery is within reach.
	Be sure that the battery is not enclosed in a metal container.
	Update battery firmware and Be in Charge app.
Update interrupted.	If update symbol appears in the app, perform the update.
	The phone should be close to the battery during the update.
	Keep the app active during the update.
	Disable phone sleep mode during update.
SoC shows 1% after update.	Keep internet connection active.
	Keep the battery charged (not empty).
	Recharge battery to 100% to recalibrate SoC and balance the battery.



10.2.2 CAN bus issues

Table 26. CAN bus issues

CAN connection does not seem to work stable or does not work at all.	Ensure to use the right CAN cables.
	Ensure all connections are made and the locking nuts on the CAN cables are fully tightened.
	Ensure to use always two terminator resistors in the CAN bus at both ends of the bus.
	Make sure that the cables are in good condition and connectors are not broken or damaged.
Touch display shows CAN error.	Ensure the cables are connected the right way.
	Always use the termination resistors and undamaged / correct CAN cabling.
Update interrupted.	See: CAN connection does not seem to work stable or does not work at all.
SoC shows 1% after update.	Recharge battery to 100% to recalibrate SoC and balance the battery.

10.2.3 LIN bus issues

Table 27. LIN bus issues

LIN connections does not seem to work stable or does not work at all.	Ensure all connections are made and all connectors are well connected.
	Ensure that the cables are in good condition and connectors are not broken or damaged.

10.3 Heater related issues

Table 28. Heater related issues

Temperature is below zero degrees C and there is a need to charge, but the heater doesn't start.	Check settings for the heaters.
	Provide a stable power supply for the heaters
	If the power source is not stable (very often MPPTs and Solar Panels not delivering enough power), the heaters will stop to avoid battery drainage. The heating will start again automatically.
The heating does not start with the FASTON Heater power source.	Check if external power is active and can deliver enough power to supply the heaters.
	The power-source should be above 8V during full heater load.
	The power supply of the FASTON needs to be above a certain voltage and be able to provide at least 120W for the 12V150Ah and 80W for the 12V100Ah.
	Remove the power source and reconnect it.

10.4 Miscellaneous issues

Table 29. Miscellaneous issues

The cells within the LFP battery are not properly balanced or the LFP battery is worn out.	Perform one full charge (100% SoC) cycle to balance the cells.
--------------------------------------------------------------------------------------------	----------------------------------------------------------------

11. Warranty and liability

No rights can be derived from this document. Any installation or use contrary to these instructions may void the warranty granted to you. Please refer to the sales agreement for warranty and other provisions applicable to your purchase. If the product is defective, please contact the dealer, reseller or retailer from whom you purchased the product. They will be able to guide you through the necessary steps for a return, exchange, or resolution of the issue. Super B's liability for any of its products is limited to the corresponding provisions under mandatory applicable law.

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