LITEBLOX

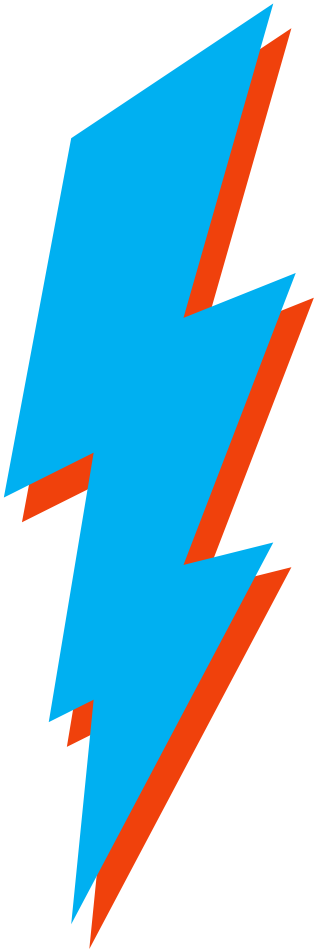
INSTRUCTION MANUAL

VERSION 01.1 - EN

August 2020

LITE BLOX

high performance lightweight batteries



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1 SAFETY GUIDELINES

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1.1 GENERAL

ATTENTION! Please read the following instructions carefully.

This manual is an extension to the printed DIN A6 flyer for „startup & maintenance" that comes with your **LITE⚡BLOX** battery. It is part of the product and contains important notes for correct handling & maintenance. Therefore please make sure to store this document at a safe place in order to have it at hand at all times in cases of uncertainties and when the product is passed on.

Fig 1: Flyer „startup & maintenance"

1.2 ADVICES

Please pay close attention to the following advices in order to ensure best performance at any time for maximum product life:

- Refer to this manual for appropriate installation, maintenance & charging.
- Do not remove the **LITE⚡BLOX** battery from its original packaging until required for use.
- Always keep your **LITE⚡BLOX** clean and dry.
- Only use as starter battery on common automotive alternators.
- Pay attention to the plus (+) & minus (–) marks on the **LITE⚡BLOX** battery as well as on the peripherals to ensure correct use at any time.
- Do not short circuit your **LITE⚡BLOX** & treat as described in this manual.
- Only use appropriate chargers, validated for Lithium Iron Phosphate batteries (LiFePO4).
- Do not mix batteries of different spec, capacity, size or cell chemistry in one application
- Never leave your **LITE⚡BLOX** plugged to a battery charger without attendance.
- Never recharge your **LITE⚡BLOX** at an environment temperature below 0°C.
- Disconnect from the vehicles peripherals when not in use for longer sitting periods.
- Recharge on extended storage periods (>150days when fully charged).
- Do not dismantle, crush, puncture, open or shred your **LITE⚡BLOX**.
- Do not expose your **LITE⚡BLOX** to heat or fire. Avoid exposure to direct sunlight.
- In the event of a chemical reaction of the battery cells, avoid contact with skin or eyes.

1.3
DISPOSAL

Dispose the Li-ion 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.

1.4
SAFETY SYMBOLS

The following markings can be found on the product:

Do not dispose in household waste

Fig 2: Safety symbol 1

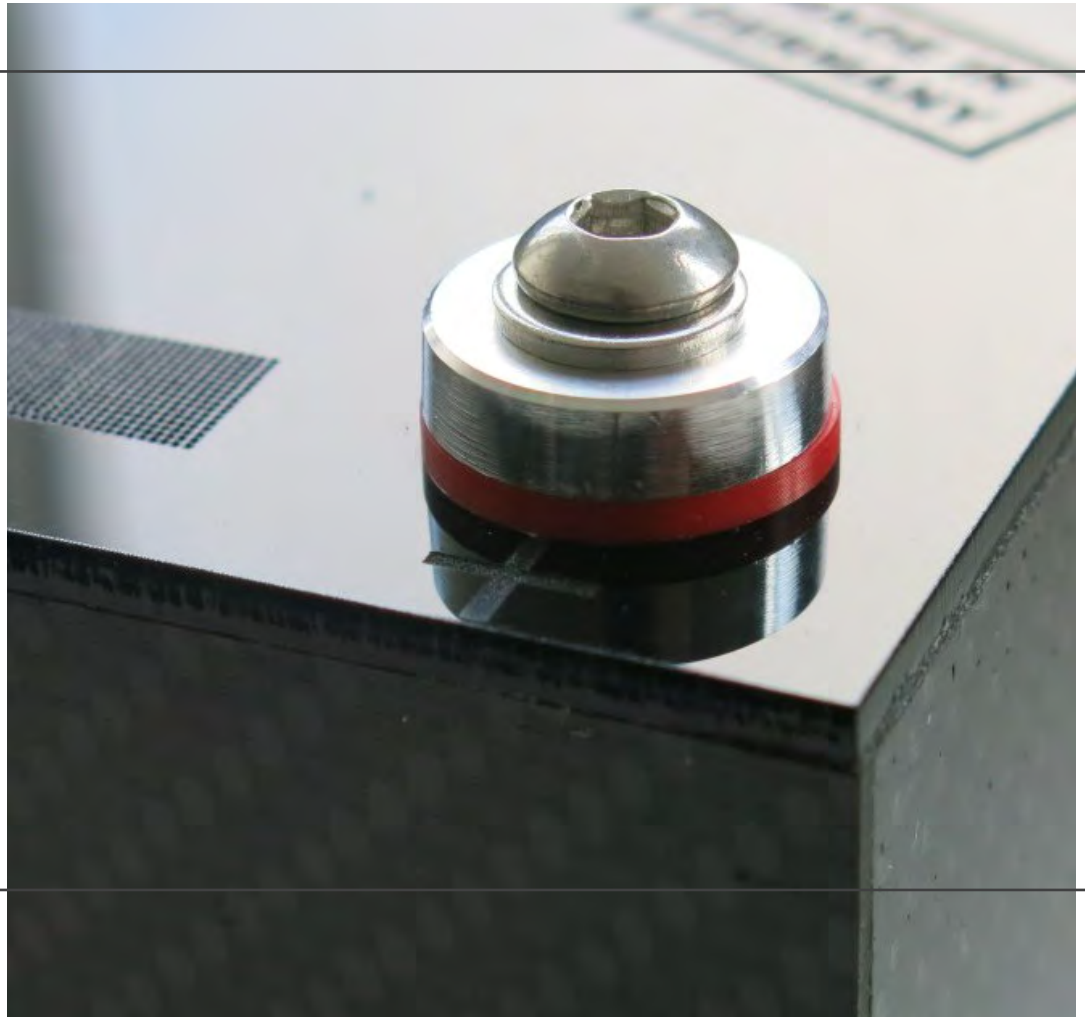
Battery can be recycled

Fig 3: Safety symbol 2

1.5
PRODUCT LABELING

Please note that Li-ion batteries have to be treated differently from conventional lead-acid batteries. Therefore, make sure to pay close attention to the specifications & thresholds on the label attached to your **LITEBLOX** LBXXXX (LB14XX / LB20XX / LB28XX) battery model – do not remove and get in touch if missing!

Fig 4: Product label



2 INTRODUCTION

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2.1
PRODUCT DESCRIPTION

Our LBXXXX(MS) high performance battery series has been developed extensively over the past 6 years for maximum performance, reliability and safety. Thanks to premium LITHIUMWERKS (R) lithium iron phosphate battery cells in combination with our industry leading intelligent Battery Management System (BMS), all **LITE⚡BLOX** batteries are extremely reliable and offer an outstanding cycle life according to our company maxim: quality before quantity!

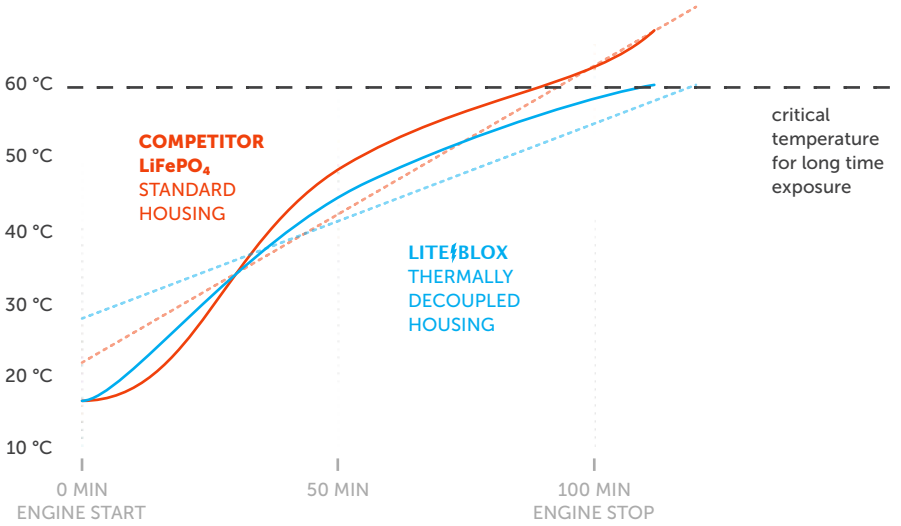

Fig 5: Temperature diagram

We invented a groundbreaking, patent pending housing concept based on a carbon fiber-foam-sandwich structure, scalable to any form factor:

- extremely lightweight CFC container
- shields the cells effectively from shock (joggling & bumps) and heat
- provide easy replacement of the battery cells
- works as an efficient crash barrier in case of an accident

Fig 6: Housing concept

2.2
INTENDED USE

Our LBXXXX(MS) series Li-ion battery is only to be used as a power source for starting combustion engines, with a 12V board net, backed by common automotive alternators.

Therefore, it is not advised to use the battery in vehicles or systems where the battery voltage, current or temperature exceeds the specified working range (see chapter 3).

The LBXXXX(MS) series battery has an integrated BMS, monitoring whether the **LITEBLOX** is being misused or used outside of the intended working space and may disconnect from the vehicles peripherals in order to protect the Li-ion cells from permanent harm or damage (see 3.7).

2.3
GLOSSARY OF TERMINOLOGY

IBS	Intelligent Batterymanagement System
SOC	State Of Charge
C.C.-C.V.	Constant Current – Constant Voltage
ECU	Engine Control Unit
OEM	Original Equipment Manufacturer
LiFeP04	Lithium Iron Phosphate (LiFePO4)
BMS	Battery Management System

2.4
SYMBOLS

Following icons will be used throughout the manual:

!WARNING! **!CAUTION!**

3 PRODUCT SPECIFICATIONS

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3.1
TECHNICAL SPECIFICATIONS

3.1.1 ELECTRICAL

	LB14XX(MS)	LB20XX(MS)	LB28XX(MS)
Nominal capacity	7,5Ah	12,5Ah	17,5Ah
Energy	99Wh	165Wh	231Wh
Nominal voltage	13,2V		
Self-discharge	<3% per Month		
EqPb (Equals lead-acid battery)	20 to 35Ah	35 to 50Ah	50 to 65Ah

3.1.2 MECHANICAL

	LB14XX(MS)	LB20XX(MS)	LB28XX(MS)
Dimensions (LxWxH) in mm	183 x 156 x 103		235 x 156 x 103
Weight	14XXg	20XXg	28XXg
Protection	IP65		
Cell type	LITHIUMWERKS ANR26650M1B (GEN3)		
Cell setup	4s3p	4s5p	4s7p
Chemistry	LiFePO4		

3.1.3 CHARGING

	LB14XX(MS)	LB20XX(MS)	LB28XX(MS)
Charge method	CCCV		
Max charge voltage	15,2V		
Max continuous charge current	30A	50A	70A
Max charge current (10s)	60A	100A	140A
End of discharge voltage	10,0V / 12,4V		
Discharge current (continuous)	150A	250A	350A
Discharge current (peak 1s)	450A	750A	1050A

3.1.4 TEMPERATURE

	LB14XX(MS)	LB20XX(MS)	LB28XX(MS)
Charge temperature	0°C to 55°C		
Discharge temp.	-22°C to 55 °C / -4°F to 131°F		
Storage temp. short	-20°C to 45°C / -4°F to 113°F (term < 1 month)		
Storage temp. long	-10°C to 25°C / 14°F to 77°F (term > 1 month)		
Relative humidity	10 – 90%		

3.1.5 COMPLIANCE

	LB14XX(MS)	LB20XX(MS)	LB28XX(MS)
Certifications	CE, FCC, UN38.3, UN ECE R10		
Shipping classifications (see MSDS for further info)	UN3480		

3.1.5 GENERAL

	LB14XX(MS)	LB20XX(MS)	LB28XX(MS)
Cycle life*	>1000 (10C discharge, 100%DoD)		

*The cycle life given above is an indication at Room Temperature (RT). Battery lifespan depends strongly on application, environment and the applied charging / discharging currents.

3.2 ENVIRONMENTAL CONDITIONS

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

⚠ !WARNING!

The Li-ion battery may only be used in conditions, specified in this manual. Exposing the battery to conditions outside the specified boundaries may result in serious harm to the product and/or the user.

3.3 REQUIRED TOOLS

6 mm Hexagon Allen key

3.4
SCOPE OF DELIVERY

A - 1x **LITE⚡BLOX** battery LBXXXX(MS)
B - 1x Terminal Pole + (large diameter)
C - 1x Terminal Pole - (small diameter)
D - 2x Bolt M6x20 (for pole terminals)
E - 2x Bolt M6x8 & washer M6 (for ring cable lugs)
F - Manual for Installation & Maintenance

1x Sticker NoFatBatteries (Promo)
1x Air Refresher (Promo)
1x Sticker DMSB LBXXXX

3.5
CONNECTIONS

X1 / X2 - Battery Terminal for M6 bolt.

Fig 7: Scope of delivery

3.6
OPTIONAL COMPONENTS

LiFePO4 charger	LB 300l	*#062*
LiFePO4 charger	LB 100l	*#012*
Bracket OEM	battery adapter bracket	*#022*
Bracket Porsche	battery adapter bracket	*#016* / *#19* / *#39*
Bracket Nissan GT-R	battery adapter bracket	*#037*
Pole terminals	Pole terminals pair (brass/aluminium)	*#009* / *#003*
Battery cable	Battery cable extension (black/red)	*#014*
Protective Caps	Protective pole caps battery	*#010*

3.7
PROTECTION THRESHOLDS

The protection limits are implemented to protect the **LITE⚡BLOX** battery from unintentional events that will damage the **LITE⚡BLOX** battery. Still, the best practice is to prevent possible malfunctions in the vehicle system in order to make sure the **LITE⚡BLOX** battery is being used in the specified working range (see chapter 5 for more info).

	LB14XX(MS)	**LB20XX(MS)**	**LB28XX(MS)**
Threshold soft			
Overvoltage (cell / pack)	3,9V / 15,6V		
Undervoltage (cell / pack)	3,1V / 12,4V		
Temperature (ambient battery cells)	85°C / 185°F		
Threshold hard			
Overvoltage (cell / pack)	4,0V / 16,0V		
Undervoltage (cell / pack)	2,5V / 10,0V		
Temperature (ambient battery cells)	90°C / 194°F		
Current			
Current (peak discharge @ RT)	700A	900A	1100A
Current (peak charge @ RT)	80A	120A	160A

4 INSTALLATION

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4.1
GENERAL

⚠ !WARNING!

Never install or use a damaged Li-Ion battery.

⚠ !WARNING!

Never short circuit the Li-Ion battery.

4.2
UNBOXING

Carefully check your **LITE⚡BLOX** battery for damages right after unpacking. In case of damage or pre-use, contact your reseller or LITEWERKS GmbH.

Never install or use a battery which appears to be damaged!

To prevent malfunction before first use, every LITE⚡BLOX is being shipped deactivated from factory (0V between the poles)!!

4.3
FIRST USE

1

Mount to the location of the OEM starter battery, using the integrated bottom bracket plate, along with our vehicle specific adapters (see. 3.6).

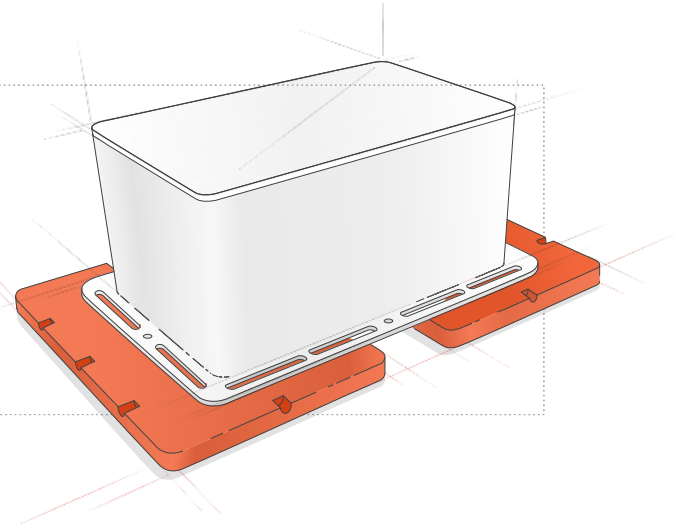

Fig 8: First use 1

2

Ensure both terminal are fastened properly (M6 = min. 10Nm)

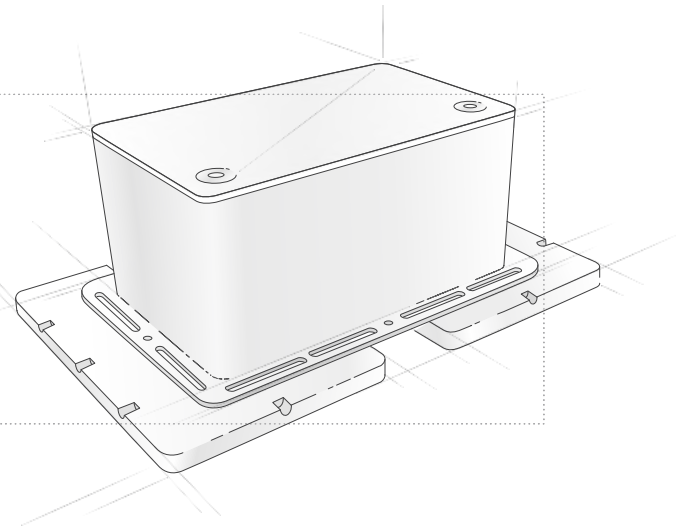

Fig 9: First use 2

3

Attach the vehicles pole clamps (first plus / then minus pole).

FIRST PLUS.

! LARGER DIAMETER !

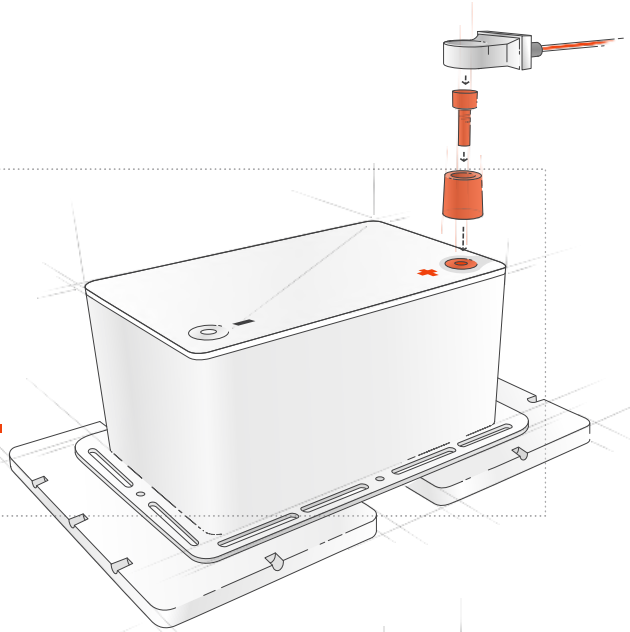

Fig 10: First use 3

4

Make sure to cover the plus pole in order to avoid short circuits.

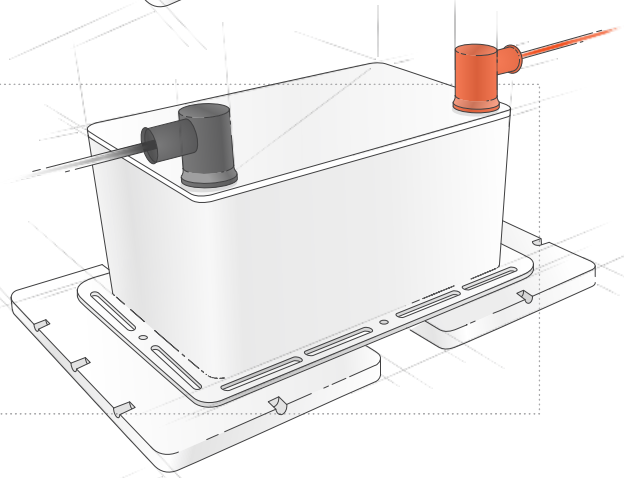

Fig 11.: First use 4

5

All cables must be protected against vibrations, chafing & moisture.

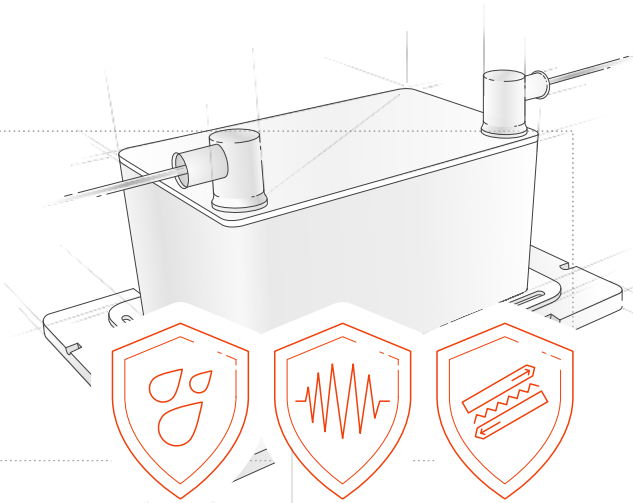

Fig 12: First use 5

6

Before first cranking, activate your **LITE⚡BLOX** by unlocking the I.K.O.S. function using the remote smartphone APP (see 5.6).

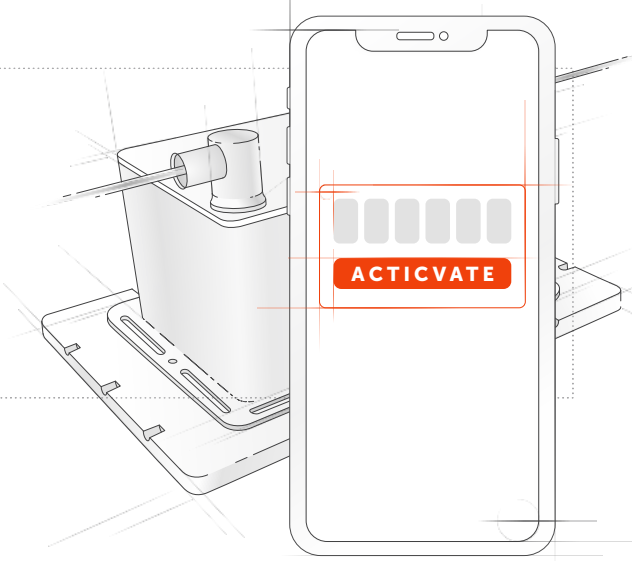

Fig 13: First use 6

4.3.1 PLACEMENT

Before it is used, the battery must be positioned in such a way that it will not move around in its compartment during use and that none of the connecting cables are being stretched or harmed.

4.3.2 CONNECTING WIRES

Use appropriate dimension and material for the connection wires to prevent overheating and voltage drop. Make sure that all wires are connected safely & tight.

4.3.3 CONNECTING CHARGER

Disconnect minus cable (mass) before attaching the charger clamps to the battery terminals to prevent malfunction (use appropriate charger LB100 / LB300 only and see charger manual).

First attach both pole clamps to the battery poles, then plug in charger to 110/230V!

⚠ !WARNING!
Do not connect the (-) terminal first as this may lead to short circuits.

⚠ !WARNING!
Connect to 12V systems only. Never install multiple Li-Ion batteries at the same time.

⚠ !WARNING!
Avoid short circuit when using a wrench.

⚠ !WARNING!
Do not reverse connect the power cables (polarity).

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5 BATTERY USE

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5.1
OVERVIEW

⚠ !WARNING!

Follow the safety guidelines of chapter 1.

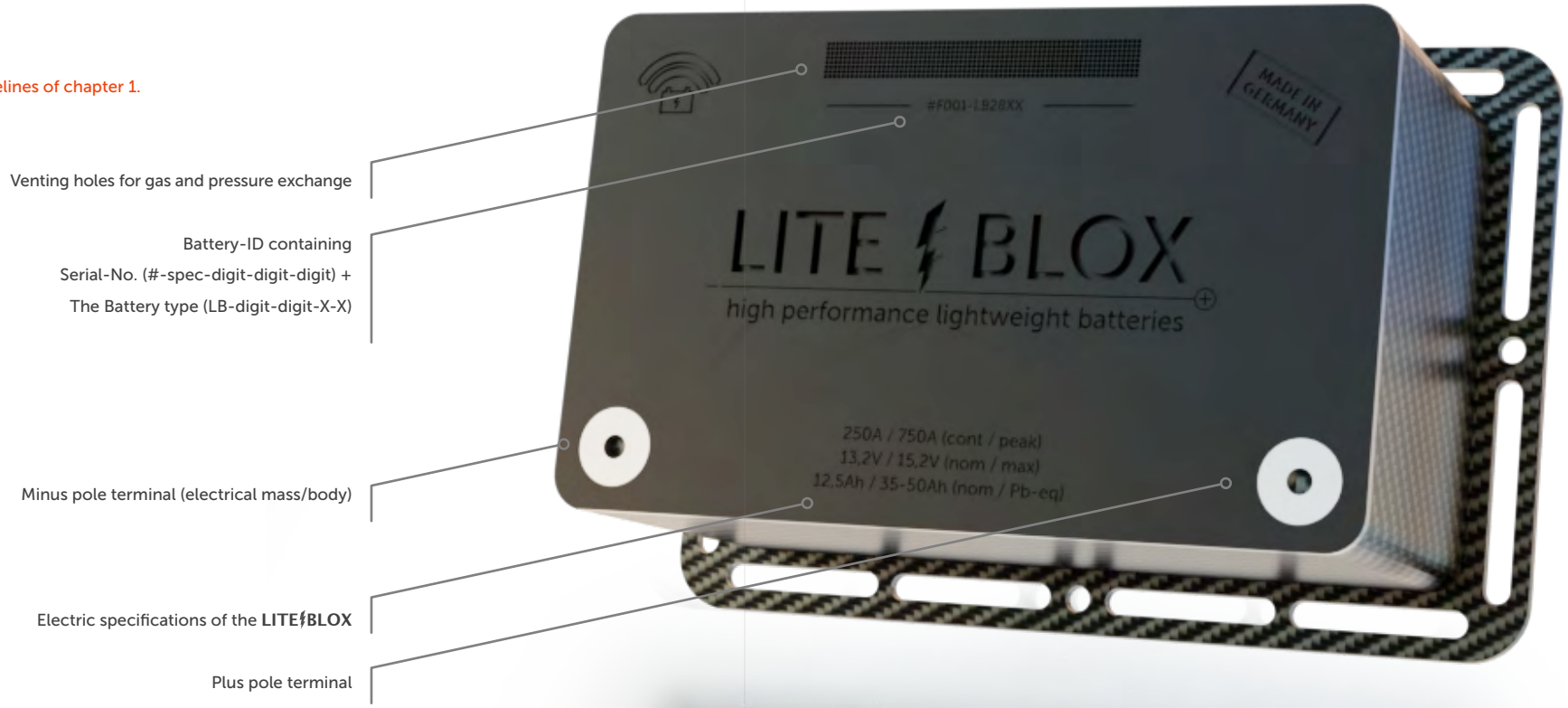

Fig 14: General information

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5.2
CHARGING

⚠ !CAUTION!

To charge your **LITE⚡BLOX** battery, only use a charger (LB100 / LB300) or device which is suitable for charging LiFePO4 batteries (in this case please make sure to validate beforehand with our customer service).

1 Read the manual that comes along with your appropriate **LITE⚡BLOX** charger (LB100 / LB300)

2 Make sure to recharge your **LITE⚡BLOX** if the state of charge drops below 0% (see Smartphone App), in case of an undervoltage shutdown and in case of extended sitting periods with activated consumers (GPS, Alarm, Keyless-Go...)

3 Connect the charger to your **LITE⚡BLOX** as described in 4.3.3

4 Never leave unattended during recharging process (recharging of the respective LBXXXX model will take max. 1h/2,5h from 0% of charging when using our LB300/LB100 charger)

5.2.1 CHARGING RATE

Find the charge rates for the respective **LITE⚡BLOX** model below and make sure to respect the indicated charge current.

CHARGE CURRENT

	LB14XX(MS)	LB20XX(MS)	LB28XX(MS)
Pulse (10 s)*	60 A	100 A	140 A
Max (continuous)*	30 A	50 A	70 A
Recommended**	7 A		

*in field use / **maintenance charging

⚠ !WARNING!

Never discharge or overcharge a Li-Ion battery, as this may permanently damage the battery cells.

5.3
INTELLIGENT BMS

In the following chapters the expression 'deactivated' will be used to describe the switched off state of the **LITE⚡BLOX** meaning, that the internal connection of the battery terminals and the cell pack is interrupted so that no current can be drawn from it. Moreover the process when switching from 'deactivated' to 'activated' is referred to as 'reactivation' in the following.

5.3.1 I.K.O.S.

(INTELLIGENT KILL OPERATION SWITCH)

Offers the ability to deactivate the **LITE⚡BLOX** via the integrated power switch unit. The control element for the manual cut off is placed at the bottom of the main page of the **LITE⚡BLOX** remote APP.

Please note, that it may take a few seconds until the switching process is performed by the BMS.

The successful operation will then be confirmed by a short beeping noise.

5.3.2 A.V.A.T.

(ACTIVE VEHICLE ANTI THEFT)

An integrated effective guard function, that protects from car theft by automatically deactivating the **LITE⚡BLOX** in case of an unauthorized starting attempt. With this function being active, minor electric loads like headlights, radio or interior lighting can still be used.

As soon as the current drawn from the **LITE⚡BLOX** exceeds this threshold (e.g. when starting the motor), the **LITE⚡BLOX** immediately deactivates itself before the starter receives enough energy to start the motor. In order to be able to draw a current from the **LITE⚡BLOX** after this event, it has to be reactivated via the **LITE⚡BLOX** Remote app by pressing the 'Reset Error' button (chapter 5.6.5).

5.3.3 SELF PROTECTION

The I.K.O.S. is also proactively protecting your **LITE⚡BLOX** when leaving the intended operating range for current, voltage or temperature (chapter 3) or when being misused (wrong charger, alternator malfunction...). This self protection is working on three levels:

1 **Warning (yellow):** As soon as your **LITE⚡BLOX** is being operated outside of the intended operating range, the first level is active (indicated by yellow coloured digits of the corresponding parameters). If for example the **LITE⚡BLOX** suffers from over-temperature, the temperature value on the main page of the **LITE⚡BLOX** Remote APP will be displayed in yellow. There is no automatic deactivation on this level.

2 **Soft Close (red):** When the **LITE⚡BLOX** has left the intended operating range, the second level is active, which is indicated by the red coloured digits of the corresponding values. On this level your **LITE⚡BLOX** will actively protect itself as soon as the BMS switches its operational mode from active to standby. The conditions mandatory for this switch are minor current (charge or discharge) and inactive Bluetooth connection for at least 60 seconds. This way it's ensured that the deactivation is performed when the vehicle isn't driven (engine not running). Prior to the next utilisation of the **LITE⚡BLOX** (charge and discharge), it must be reactivated via the **LITE⚡BLOX** Remote APP by pressing the button 'Reset Error' (chapter 5.6.5).

3 **Instant cut off:** When being used outside the intended operating range lithium cells may face permanent damage or internal cell failure which can result in outgassing or fire. Therefore, an instant cut off function (deactivation) is implemented, which is active as soon as the operating parameters of the **LITE⚡BLOX** are critical. This way the **LITE⚡BLOX** protects itself from overcharging, overtemperature and extensive current-draw. The instant deactivation on this level is performed without any delay (in comparison to soft close level 2) and prior to the next utilisation of the **LITE⚡BLOX** (charge and discharge) it must be reactivated via the **LITE⚡BLOX**Remote APP by pressing the button 'Reset Error' (chapter 5.6.5)

5.4
SITTING TIME

The sitting time of the **LITE⚡BLOX** depends on its deactivation status as well as on the bluetooth connection status. In the deactivated state the only current drawn from the cell pack is the internal consumption. This internal consumption current is higher if there is an active bluetooth connection via the **LITE⚡BLOX** Remote APP compared to when the BMS is on standby (<1mA).

5.4.1 I.K.O.S. ACTIVATED

When activated in a fully charged state (100%), the following anticipated periods for a remaining sitting time apply - please make sure to recharge for standing periods apart from that:

LB14XX(MS) ~150 DAYS
LB20XX(MS) ~300 DAYS
LB28XX(MS) ~450 DAYS

⚠ !WARNING!
If not recharged up to min. 10% of capacity (see APP), the power output will be insufficient to start the engine properly!

5.4.2 I.K.O.S. DEACTIVATED

As there can be a huge number of electric consumers in modern cars, high quiescent current for parked vehicles may occur. The quiescent current limits the sitting time of the **LITE⚡BLOX** and can vary from vehicle to vehicle. Typical electrical consumers that are active while the vehicle is parked are alarm systems, keyless go systems, GPS trackers. To be able to calculate the expected sitting time of the **LITE⚡BLOX**, the respective quiescent current has to be determined.

Quiescent current (example):
0.05A --> 0.001A (int discharge on the BMS) + 0.049A (peripheral discharge)

Nominal battery capacity: 12.5Ah

Sitting time:
Sitting time: 12.5Ah @ 0,05A = 250h ≈ 10d

The **LITE⚡BLOX** is designed to have a remaining capacity that is sufficient to start the vehicle after an automatic deactivation after extended sitting times – this is true for a cut off at 12,4V (Soft Close Level 2).
Due to the internal power consumption by the BMS, the remaining capacity will be limited to:

LB14XX(MS) 7 DAYS
LB20XX(MS) 10 DAYS
LB28XX(MS) 14 DAYS

5.5
VEHICLE INTEGRATION

In modern vehicles intelligent battery-management systems (IBS) can be found. These systems enables the control unit (ECU) to evaluate the status of the starter battery and alternator at any time.

An IBS System can be recognized by a black plastic cover on the minus pole clamp of the OEM battery, containing the external battery sensor. This sensor allows a temporary increase of the exploitable engine power by decoupling the generator.

Since the battery won't usually be charged when the generator is decoupled, it must be ensured, that the battery state of charge (SOC) is sufficient to power the car for the time of the decoupling. The ECU evaluates if the SOC is high enough to do so via the IBS sensor and on basis of the programmed battery characteristics.

If the OEM battery is being replaced against a **LITE⚡BLOX** (same for any aftermarket car battery), make sure to program it to your vehicles ECU in a qualified workshop for immaculate operation at any time.

Please see our manual for „installation & maintenance" to properly adapt your **LITE⚡BLOX** to the cars ECU (chapter 4)! *https://en.liteblox.de/downloads/*

⚠ !CAUTION!
Since the **LITE⚡BLOX** comes with less capacity than the respective standard (OEM) starter battery, make sure to use a charger for maintenance in case of extended energy consumption (keyless-go, activated alarm system, ECU mapping, etc.) The before mentioned recommendation on the battery ECU settings may vary for different applications and are therefore supplied without liability.

5.6
LITE⚡BLOX „REMOTE“ APP

Our **LITE⚡BLOX** Remote APP is available to be used on Android (Play Store) or iOS (Apple Store) systems.

Make sure to activate „bluetooth & „location services“ before first use!

Google Play Store

Apple Store

Fig 15: App

5.6.1 START PAGE

Press the **SCAN** button to search for your **LITE⚡BLOX**
(listed with the respective serial number).

By pressing the menu-button ☰, a list with the functions: **DEMO** (switch) and **LOGIN** appears.

The „**DEMO** Mode“ can be used to explore the functionalities of the APP without actually being connected to a real **LITE⚡BLOX** battery (in this case
only simulated values will be displayed).

The **LOGIN** offers access to the professional BMS-settings for service and authorized personnel such as **LITE⚡BLOX** retailers or service partners.

5.6.2 CONNECTING

Fig 16: App – Start page

To connect to your **LITE⚡BLOX**, proceed as following:

1 By pressing the **SCAN**-button as described in 5.6.1 a list of various Bluetooth devices near you might appear.

2 By pressing „**CONNECT**“ next to the battery serial number, a connection between the mobile device and the respective **LITE⚡BLOX** model will be established, followed by a dialog box, requesting a password (may pop up in the background).

3 Enter the 6-digit password (in the packaging box as well as on the bottom of your **LITE⚡BLOX**) and press „**OK**“. The device is now connected, enabling full remote operation (within max. 5 meters of distance).

Fig 17: App – Connecting

5.6.3 STATUS DISPLAY

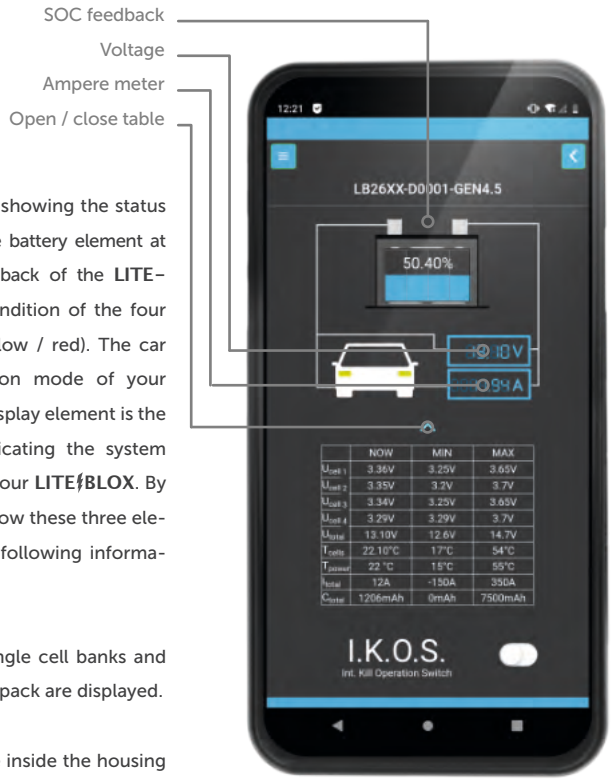


Fig 18: App – Status display

The main screen of the APP is showing the status of your **LITE⚡BLOX** battery The battery element at the top gives a graphical feedback of the **LITE⚡BLOX**'s SOC in % plus the condition of the four single battery cells (blue / yellow / red). The car symbol indicates the operation mode of your **LITE⚡BLOX** (see below). The display element is the voltage- / ampere-meter indicating the system voltage / current drawn from your **LITE⚡BLOX**. By clicking on the white arrow below these three elements, a table containing the following information is opened:

Voltage: the voltage of the single cell banks and the total voltage of the battery pack are displayed.

Temperature: the temperature inside the housing of the **LITE⚡BLOX** and on the BMS are displayed.

Current: the current drawn from or supplied to the **LITE⚡BLOX** is displayed. A minus symbol indicates, that the current is supplied to the **LITE⚡BLOX**, thus that it is being charged.

For all parameters the momentary ('CURRENT') as well as the lowest recorded value ('MIN') and the highest recorded value ('MAX') are displayed.

5.6.4 DEACTIVATION

In the lower area of the main page of the app, the two switches for the I.K.O.S. and the A.V.A.T. Function can be found. When the blue part of the switches is visible, the function is active. For the I.K.O.S.-Function this means that the **LITE⚡BLOX** is deactivated where as for the A.V.A.T. this means that the anti-theft mode is active.

Fig 19: App – Deactivation

5.6.5 REACTIVATION

In case of a cut off by the self protection function of the **LITE⚡BLOX**, it must be reactivated before one can discharge or charge it again. In order to reactivate the **LITE⚡BLOX**, one must establish a connection between the **LITE⚡BLOX** and a mobile device via the **LITE⚡BLOX** remote APP. When the **LITE⚡BLOX** is deactivated, the app shows a red, crossed symbol on top of the box-shaped SOC display element at the top of the main page of the app. On the right a button 'Reset Error' appears. This button must be pressed in order to be able to use the **LITE⚡BLOX** after a cut off.

5.6.6 MENU

Fig 20: App – Reactivation

At the top left corner of the main page, a menu-button can be found. By pressing on this menu-button a list of several function opens. These functions are:

5.6.7 CONTACT

In the contact menu you can provide us with your contact information in order to monitor your **LITE⚡BLOX** on field. And if it is not working properly, we are able to contact you.

5.6.8 DEVICE

Information on the current product name, password, firmware version...

5.6.9 MANUAL

Gives you the link to the documentation of our **LITE⚡BLOX** series.

5.6.10 SERVICE

Fig 21: App – Menu

In order to comprehensively monitor the operational parameters and in order to be able to provide an uncomplicated and effective customer service, the app has a built in function to collect and send telemetry data of the **LITE⚡BLOX** to the server of the customer service. This way it is provided that potential failures can be detected and serviced without having the **LITE⚡BLOX** removed from the vehicle. Please make sure to provide us with your contact information, so that we are able to contact you.

5.6.11 HISTORY

The behaviour of the **LITE⚡BLOX** in terms of switching-events (I.K.O.S., A.V.A.T. and self protection) is documented in the history table. For every event there is a reason (e.g. over-temperature) and a corresponding timestamp. This data can be used for status monitoring and troubleshooting.

5.6.12 CHARTS

To trace the operational parameters voltage, current, temperature and SOC, the app provides a chart function to display and record those parameters. With this function one can determine the voltage drop respectively the current demanded for starting the engine, the quiescent current or the temperature prevailing in the engine bay during operation. For the desired values to be displayed, they must be selected below the chart. By clicking the button 'Share' a graphic along with a .csv file can be shared/sent.

5.6.13 UPDATE

The **LITE⚡BLOX**'s BMS functions and features are implemented via its exchangeable frmware (also available as bespoke setup for a specific application) and can be updated via the the APP.

Every time the APP is started with internet connection, it will check for latest frmware and ask for an automatically update if available. To manually update the frmware press the button 'choose file', select the file in your folder system and start the update.

5.6.14 RACING LOGIN

(MS VERSION ONLY!)

There is the possibility to activate a „Racing configuration" (connect motorsport harness beforehand) via **LOGIN**

Name: **Racing**
Password: **wwracelite**

In this custom menu it is possible to make professional adjustments of your **LITE⚡BLOX** Motorsport version LBXXXXMS fitting your very application. Please get in touch with our customer service before changing the stock configuration as this might lead to shutdown during operation!

should not be changed

should not be changed

deactivate to protect yourself from misuse when car used in a traffic environment

If activated Killswitch only can be reactivated with the app or via CAN Bus

changes the polarity of the Killswitch output signal

described in decimal can be changed

500Kbit or 1Mbit

deactivates Voltage, temperature and current shut off

if deactivated the **LITE⚡BLOX** will reactivate automatically if cells return to normal state

activates the soft close function as described 5.3.3.

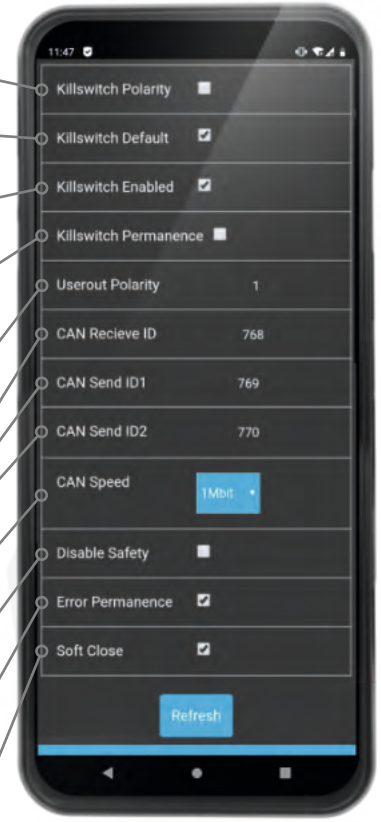


Fig 22: App – Racing login

5.7

CAN BUS
(MS-VERSION ONLY)

1 CAN Baud Rate = 1Mbaud

2 No CAN termination inside of the battery

3 CAN Com only ON with Input on 0X300

4 CAN Speed and CAN IDs are configurable (see 5.6.12.)

ECU2BMS14V (ID = 0X300 / CALIBRATE) (FREQ. = 20MS [50HZ])

BITS	SIZE	GAIN	RANGE	DESCRIPTION
[0]	1	1	[0-1]	Charge override
[1]	1	1	[0-1]	BT On
[2]	1	1	[0-1]	BT Off
[3]	1	1	[0-1]	Disable Crash
[4]	1	1	[0-1]	Reset Killswitch

BMS14V2ECU (ID = 0X301 / CALIBRATE) (FREQ. = 20MS [50HZ])

BITS	SIZE	GAIN	ENGINEERING RANGE	DESCRIPTION
[0-11]	12	0.001	[0–4.095] V	Voltage cell 1
[12-23]	12	0.001	[0–4.095] V	Voltage cell 2
[24-35]	12	0.001	[0–4.095] V	Voltage cell 3
[36-47]	12	0.001	[0–4.095] V	Voltage cell 4
[48-63]	16	0.001	[0–65.535] V	Voltage Pack 14V

BMS14V2ECU (ID = 0X302 / CALIBRATE) (FREQ. = 20MS [50HZ])

BITS	SIZE	GAIN	ENGINEERING RANGE	DESCRIPTION
[0-3]	4	-	-	Alive Counter
[4]	1	1	[0-1]	Warnlevel 1
[5]	1	1	[0-1]	Warnlevel 2
[6]	1	1	[0-1]	Warnlevel 3
[7-14]	8	0.5	[0-100] %	SOC
[15-30]	16	0.1	[-3276.7–3276.8] A	Current Pack 14V
[31-38]	8	10	[0–2550] A	Max Current Charge
[39-46]	8	10	[0–2550] A	Min Current
[47-54]	8	1		Discharge

5.8
EXTERNAL KILLSWITCH
(MS-VERSION ONLY)

5.8.1 CONNECTOR LAYOUT (DEUTSCH ASL006 - 05SN)

PIN	NAME	DESCRIPTION
1	Killswitch input	enables the LITEBLOX when connected to ground
2	Killswitch output	Transmits 12 Volt signal to shut down ECU, in disabled-state (white cable on harness)
3	CAN high	CAN-communication DTM 06-2s Pin1
4	CAN low	CAN-communication DTM 06-2s Pin2
5	Vbat + or LIN (not implemented yet)	Vbat +; max 200mA, Please do not use without a fuse (green cable on harness)

5.8.2 WIRING HARNESS

⚠ !CAUTION!

Make sure that the GROUND (yellow) is connected to the vehicles mass at any time - otherwise the Kill-Switch will not work!

5.8.3 KILLSWITCH STATES

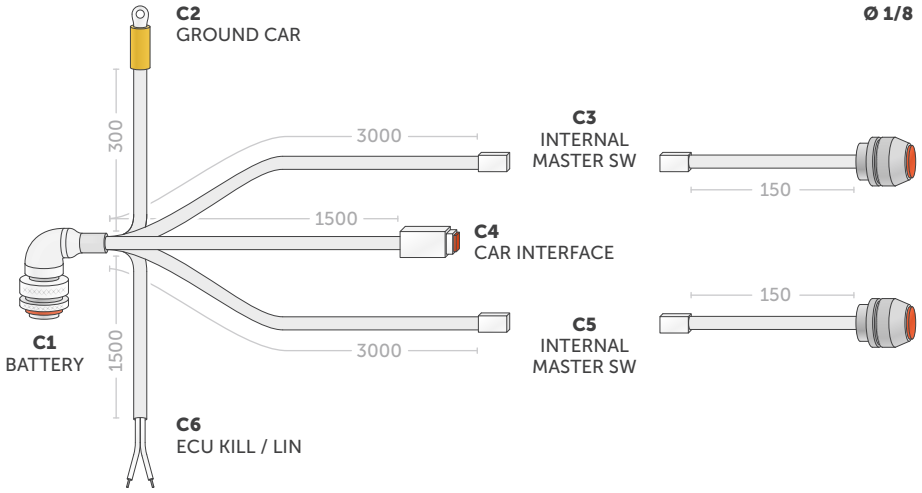


Fig 23: Wiring harness

Killswitch circuit closed.

LITE⚡BLOX is activated and

engine is running.

Killswitch circuit open.

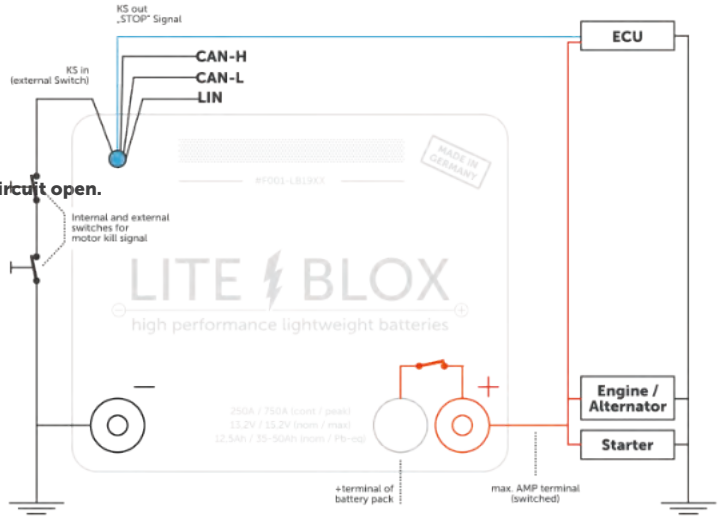


Fig 24: Killswitch circuit closed

LITE⚡BLOX is deactivated and

engine is shut off.

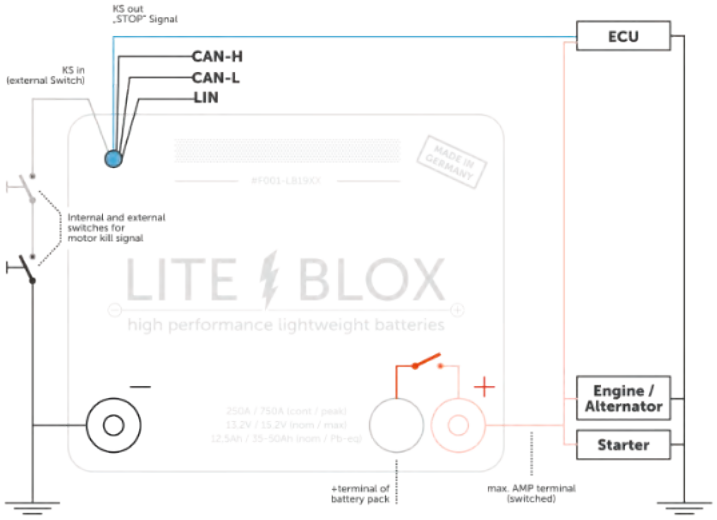


Fig 25: Killswitch circuit open

6 MAINTENANCE

6.1 GENERAL

1 Disconnect the Li-ion battery from all loads and charging devices before performing cleaning and maintenance activities (see paragraph 4.4).

2 Place the enclosed protective caps over the terminals before cleaning and maintenance activities to avoid the risk of a short circuit.

6.2 INSPECTION

Inspect for loose and/or damaged wiring and contacts, cracks, deformations, leakage or damage of any other kind. If damage to the Li-ion battery is found, it must be replaced by a professional. Do not attempt to charge or use a damaged Li-ion battery. Do not touch the liquid from a ruptured Li-Ion battery.

Consider replacing the Li-ion battery with a new one if you note either of the following conditions:

1 The battery loses charging when not being connected or when I.K.O.S. activated the self-discharge of a **LITEBLOX** battery is ~3% per month.

2 The charging time from 0% to 100% increases significantly.

3 The battery cells (cell1- cell4) appear to drift apart frequently (indicated by yellow or red digits in your APP charts)

6.3 CLEANING

The **LITEBLOX** cover plate has a scratch-proof coating preventing scratches caused by use. If necessary, clean the Li-ion battery with a soft, dry cloth. Never use liquids, solvents, or abrasives to clean the Li-ion battery.

⚠ !WARNING!

Never attempt to open or dismantle the Li-ion battery!

The inside of the Li-ion battery does not contain serviceable parts.

7. STORAGE

Follow the storage instructions in this manual to optimize the lifespan of the Li- ion battery during storage and therefore ensure immaculate operation at any time.

If the Li-ion battery is being un-maintained for an extended period of time, this may result in a deep discharge of the battery, resulting in major harm to the LiFePO4 battery cells. In this case, do not attempt to recharge or use it anymore and contact our customer service in time!

STORAGE INSTRUCTIONS:

1 Store in a clean and dry environment with no temperatures below 0°C

2 Charge the Li-Ion battery to >80% capacity before storage.

3 Disconnect the Li-Ion battery from all peripheral loads (physically or activate the I.K.O.S. function).

4 Check for state of charge frequently and immediately recharge if SOC is <10%

8. TRANSPORT

Always check all applicable local, national, and international regulations before transporting a Lithium Iron Phosphate (LFP) battery. Transporting an end-of-life, damaged, or recalled battery may, in certain cases, be specifically limited or prohibited.

The transport of a **LITEBLOX** Li-ion battery is listed as hazard class UN3480 (class 9). For transport over water, air and land, the packaging group PI965 Section II is to be applied.

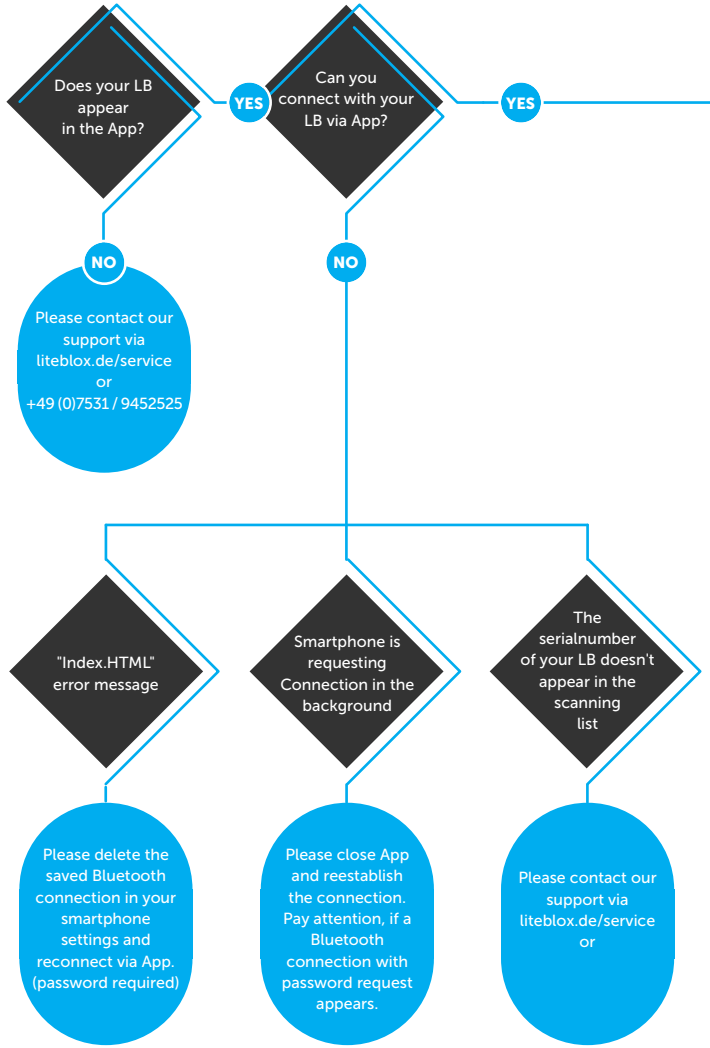
9. UPGRADE, REPAIR & DISPOSAL

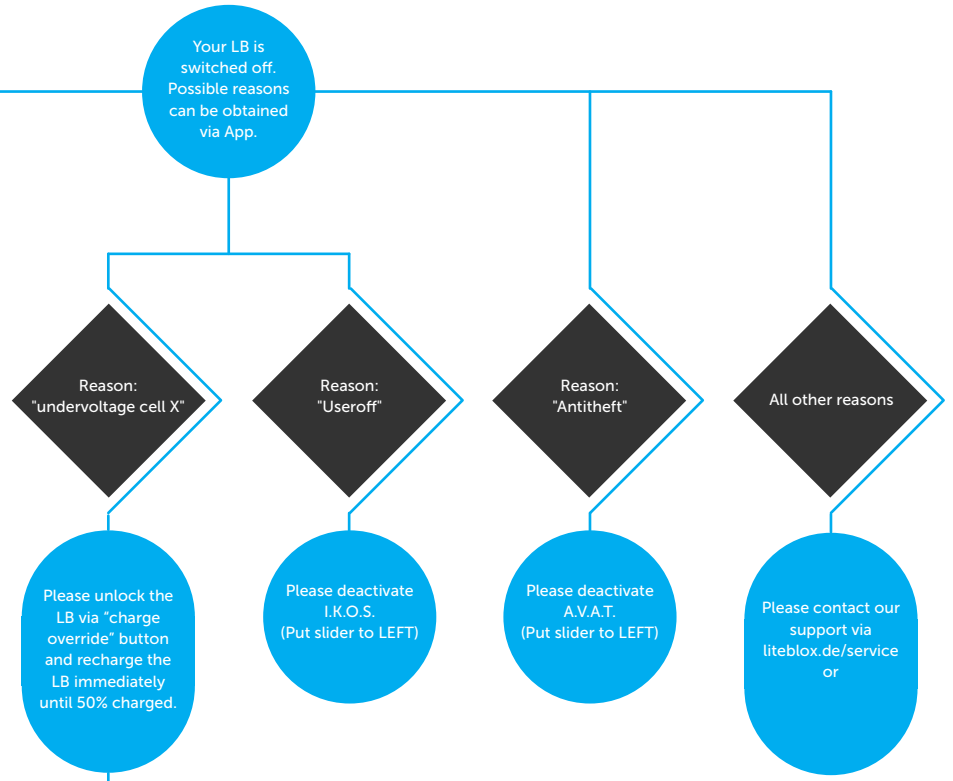
If the **LITEBLOX** is defective or at the end of its life, do not dispose it. Due to the fact that the **LITEBLOX** is engineered in a fully modular way, its parts can be repaired and recycled. For the case that you need your **LITEBLOX** to be repaired or if you no longer want to keep it, please contact the LITEWERKS customer service.

To contact the customer service please use the online-service form available at: *https://en.liteblox.de/support.*

After sending the service form field out with the sufficient information regarding your case, our staff will get in touch with you ASAP.

Car doesn't start / no power





10. TROUBLE-SHOOTING

11. WARRANTY & LIABILITY

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 the LITEWERKS GmbH 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 (see contact below). Failure to inspect the products and inform LITEWERKS within the stated time or the use of the products at any time shall be conclusive evidence that LITEWERKS has satisfactorily tendered delivery.

2 In the event that the customer demonstrates that any of the delivered products do not conform to the agreement, LITEWERKS (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.

3 LITEWERKS grants a 5 years limited warranty for damages caused by manufacturing defects starting at the time of delivery. Register online: *https://en.liteblox.de/gtc/warranty/*
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 LITEWERKS products (f) installation of the LITEWERKS product by persons unskilled to work with electro-technical devices or components, (g) any other wrongful use contrary to the LITEWERKS's user manual or the safety instruction, (h) any use contrary to the product specifications of that product; (i) any acts of force majeure.

4 The warranty period for parts of the product which have been repaired or replaced under the warranty, shall be twelve (12) months from the date of repair or delivery of the replacement.

5 Except as specified in §3 and §4 LITEWERKS 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 LITEWERKS in writing.

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

For further information, please contact:

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https://en.liteblox.de

LITE BLOX

high performance lightweight batteries