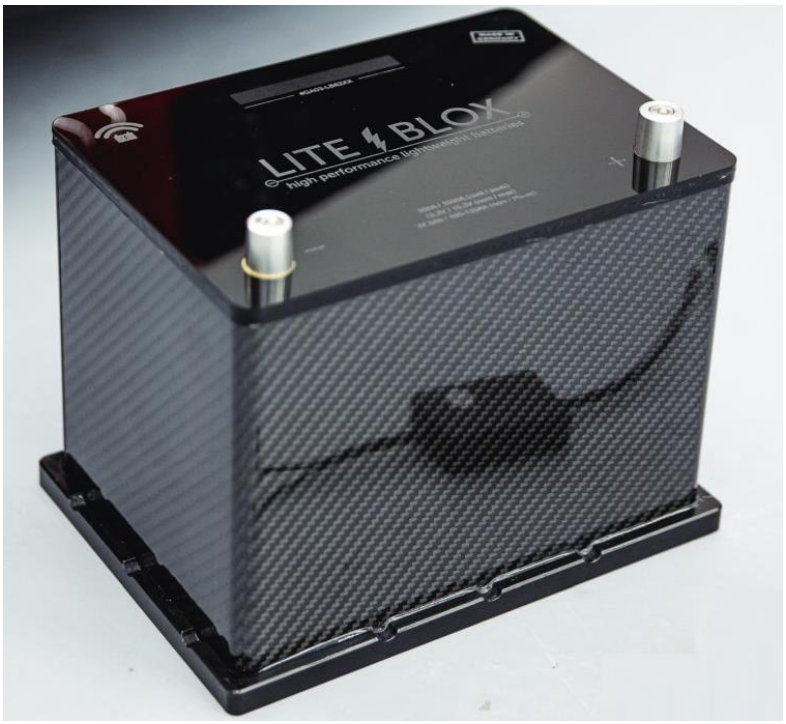
Specification Sheet

PR60 MS

LiFePO4 – 13,2 V – 515 Wh
high performance accumulator



Product may differ from the illustration

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ISO 9001:2015

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1 Technical specifications

Specification	*Value*	*Annotation*
***Dimensions (housing only)** - details see chapter Technical drawings*		
Height	175 mm	±2mm
Width	160 mm	±1mm
Length	227 mm	±1mm
Weight	62XX g	approx.
***Cell** - details see chapter Cell specifications (LITHIUMWERKS)*		
Cell chemistry	LiFePO4	
Cell type	LithiumWerks	ANR26650M1B
Cell configuration	4s15p	
Temperature		
Temperature range for use	(- 20) – (+ 80) °C	(0) – (+ 55) °C for optimal cycle life
Temperature range for storage	(0) – (+ 40) °C	
Other		
Protection class conformity	IP65	

2 Electrical specifications

Specification	*Value*	*Annotation*
Battery Pack		
Capacity (nominal)	39 Ah	± 5%
Voltage (nominal)	13,2 V	
Energy	515 Wh	± 5%
Cell pack impedance	1,6-2,6 mΩ	approx.
Charging		
Voltage charge (maximum)	15,2 V	
Voltage charge (recommended)	14,4 V	
Current charging (recommended)	< 10 A	LiFePO4 charging device
Current charging (continuous)	< 150 A	alternator
Current charging (10s pulse)	< 250 A	alternator
Discharging		
Voltage discharge (minimum)	10,0 V	
Current discharging (continuous)	< 250 A	
Current discharge (10s pulse)	< 1300 A	

3 Features of the Battery Management System (BMS)

Feature	*Description*	*Details*
Balancing	charge transfer to prevent long term cell deviation (passive)	
Communication (via bluetooth)	Wireless connection to an external device (smartphone/tablet) to display battery condition and status (permanent deactivation via CAN possible)	LITE BLOX App
Remote-Support	Firmware updates for continuous improvement & field telemetry data evaluation via our aftersales SUPPORT TICKET system	
Recording	On device recording of important field telemetry in real time via App	
Protection	Self-protection when running outside the intended operation limits	Protection
Thresholds	All thresholds can be adjusted manually via app [expert mode]	Thresholds
I.K.O.S. Intelligent Kill-Operation-Switch	-smart misuse & overload protection -circuit breaker for extended sitting times without recuperation	
A.V.A.T. Active Vehicle Anti-Theft	will instantly shut down the full electrical load at any unauthorized starting event	
CAN	via DEUTSCH ASL006-05SN-HE	CAN Communication & Interface
Deep discharge protection	Additional deep sleep mode for cell protection. Reducing the BMS consumption current to approx. 14,2 µA below 8 V. Bluetooth/BMS is reactivation by adding external power supply.	
low self-discharge	< 1mA for extended sitting time	
Audiovisual feedback	via beeper and LED	

4 Protection

4.1 Protection Modes

The LITE BLOX is autonomously protecting itself when leaving the intended working range (I.K.O.S. Mode). This self-protection is working on three levels:

4.1.1 YELLOW (warning)

As soon as the LITE BLOX is leaving the intended operating range, the first level is active, indicated by the yellow coloured values of the corresponding parameters in the App

→ **no additional operation needed**

4.1.2 RED (soft close)

When the LITE BLOX has left the intended operating range, the second level is active, indicated by the red coloured values of the corresponding values. An automatic deactivation takes place as soon as the BMS switches its operational mode from active to standby. The conditions mandatory for this switch are a current less than 1 A (charge or discharge) and no active Bluetooth connection for at least 60 seconds

→ **press 'Reset Error' button to reactivate and contact customer service afterwards**

4.1.3 BLACK (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. The instant deactivation on this level is performed without any delay (in comparison to soft close level 2)

→ **please contact customer service immediately!**

4.2 Thresholds

The following protection limits are implemented for events that would damage the battery cells **→ do not adjust these without validation & make sure that the LITE BLOX is operated within the specified working range at any time**

Protection mechanism	***YELLOW***	***RED***	***BLACK***
Overvoltage (cell/pack)	3,85 V / 15,4 V	3,9 V / 15,6 V	4 V / 16 V
Undervoltage (cell/pack)	3,15 V / 12,6 V	3,1 V / 12,4 V	2,5 V / 10 V
Short circuit current	-	-	1600 A
Maximum charge current	-	-	260 A
Maximum temperature	80 °C	85 °C	90 °C

5 CAN Communication & Interface

5.1 CAN Communication

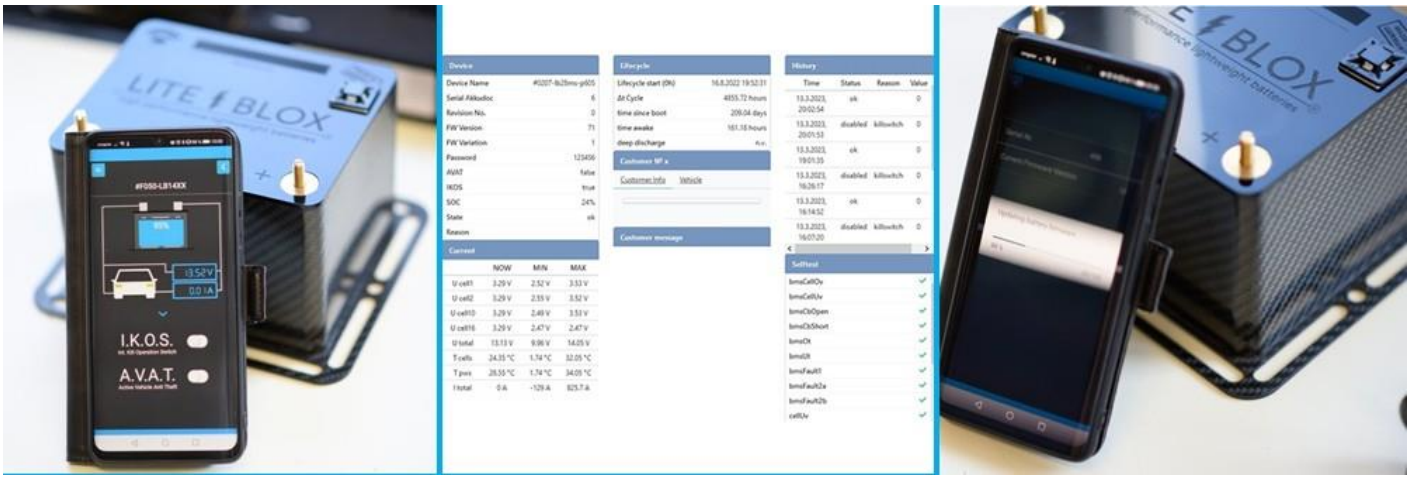
- Only active if data send on 0X300
- CAN Baud Rate = 1Mbaud
- No termination of CAN inside the battery
- dbc file can be provided by request

ECU2BMS		ID=0X300 / calibrate		Freq. = 20ms (50Hz)
Bits	Size	Gain	Engineering Range	Describtion
[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
BMS2ECU1		ID=0X301 / calibrate		Freq. = 20ms (50Hz)
Bits	Size	Gain	Engineering Range	Describtion
[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
BMS2ECU2		ID=0X302 / calibrate		Freq. = 20ms (50Hz)
Bits	Size	Gain	Engineering Range	Describtion
[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]	1	1	[0-1]	Killswitch
[8 - 15]	8	0.5	[0-100] %	SOC
[16 - 31]	16	0.1	[-3276.7 – 3276.8] A	Current Pack
[32 - 38]	8	10	[0 – 2550] A	Max Current Charge
[40 - 46]	8	10	[0 – 2550] A	Min Current Discharge
[48 – 52]	5	1	[0-31]	Error flags
[53]	1	1	[0-1]	DischargeOff
[54]	1	1	[0-1]	ChargeOff
[56 – 63]	8	1	[-40-215] C	Temperature

5.2 Interface (DEUTSCH ASL006-05SN-HE)

PIN	*Assignment*	*description*	*illustration*
1	Killswitch input	Enables the LITE BLOX when connected to ground	
2	Killswitch output	Transmits 12 Volt signal to shut down ECU, in disabled-state	
3	CAN high	CAN-communication	
4	CAN low	CAN-communication	
5	VBat +	VBat +; max 200mA, please do not use without a fuse	

6 LITE BLOX App



Every LITE BLOX unit comes with an innovative interface for wireless operation via smartphone or tablet (bluetooth). In addition to the remote shutdown (I.K.O.S.) plus the integrated vehicle anti-theft (A.V.A.T.), all relevant telemetry data can be monitored in real time and sent to us for evaluation.

Telemetry data:

f300-lb20 | Name

ID	Device Name	Serial ADoc	Date	Time
293451	#f300-lb20xx	97	22.3.2023	15:15:24
292031	#f300-lb20xx	97	19.3.2023	10:53:49
290265	#f300-lb20xx	97	15.3.2023	15:36:29
288916	#f300-lb20xx	97	11.3.2023	17:21:44
288875	#f300-lb20xx	97	11.3.2023	16:21:42
288874	#f300-lb20xx	97	11.3.2023	16:21:07
288871	#f300-lb20xx	97	11.3.2023	16:18:40
288870	#f300-lb20xx	97	11.3.2023	16:18:17

Device

Device Name	
Serial Akkudoc	97
Revision No.	0
FW Version	35
FW Variation	0
Password	
AVAT	true
IKOS	false
SOC	32%
State	ok
Reason	

Current

	NOW	MIN	MAX
U cell1	3.29 V	1.5 V	3.81 V
U cell2	3.29 V	1.53 V	3.82 V
U cell4	3.29 V	1.5 V	3.82 V
U cell6	3.29 V	1.54 V	3.82 V
U total	13.24 V	6.11 V	15.38 V
T cells	10.21 °C	3.76 °C	42.1 °C
T pws	10.06 °C	3.65 °C	39.73 °C
I total	0.08 A	-143.99 A	717.55 A

Lifecycle

Lifecycle start (0h)	7.7.2020 01:06:34
Δt Cycle	23396.59 hours
time since boot	984.48 days
time awake	329.55 hours
deep discharge	4 days

Customer № x

Customer Info | Vehicle

Customer message

History

Time	Status	Reason	Value
15.3.2023, 07:59:32	ok		0
15.3.2023, 07:56:19	disabled	user off	1
15.3.2023, 07:54:56	ok		0
11.3.2023, 12:59:39	disabled	user off	1
11.3.2023, 12:57:44	ok		0
7.3.2023, 15:08:22	disabled	user off	1
13.7.2022	ok		0

Selftest

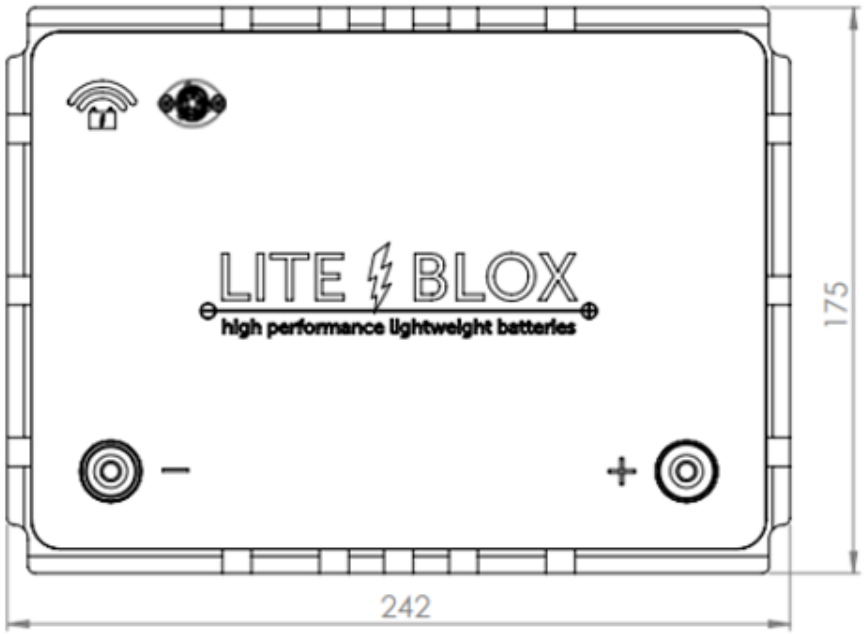
bmsCellOv	✓
bmsCellUv	✓
bmsCbOpen	✓
bmsCbShort	✓
bmsOt	✓
bmsUt	✓
bmsFault1	✓
bmsFault2a	✓
bmsFault2b	✓
cellUv	✓

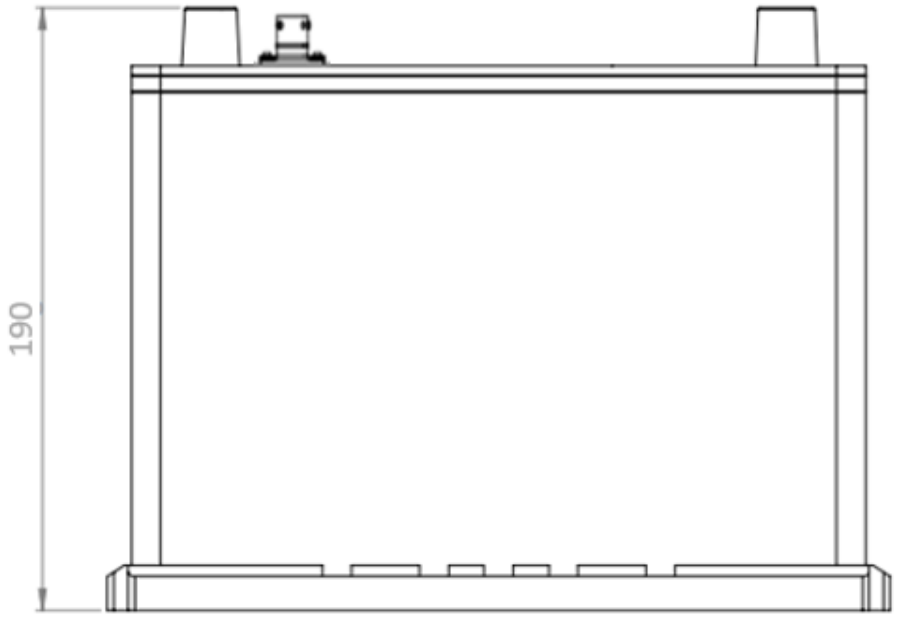
LITE↯BLOX App for download:

7 Technical drawings

7.1 Housing

Step-model can be provided by request





7.2 Bottom/mounting plate

The bottom plate (LN2/H5 DIN EN 50342 2) is irreversibly attached to the battery

Mounting adapter	***Figure***
LN2/H5 to LN3/H6	
LN3/H6 to LN4/H7	

7.3 Battery pole adapter

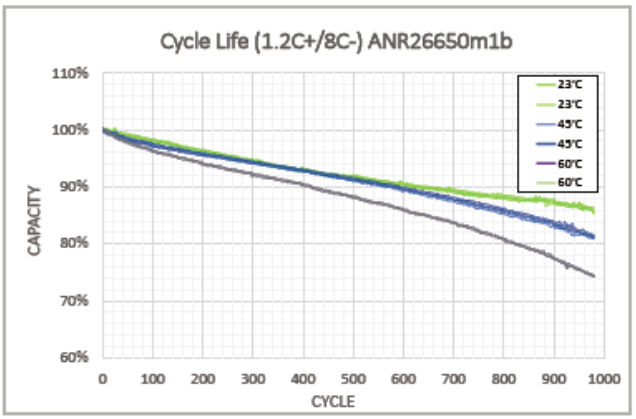
Type (material)	***Figure***	***Dimensions***			***torque***
Battery pole terminals SAE M6 (aluminum) DIN EN 50342 2		pole	Ø	height/ length	10 Nm
		+	19,5 mm	18 mm	
		-	17,9 mm	18 mm	
M6 mounting struts (brass) DIN 551			M6	20	finger-tight

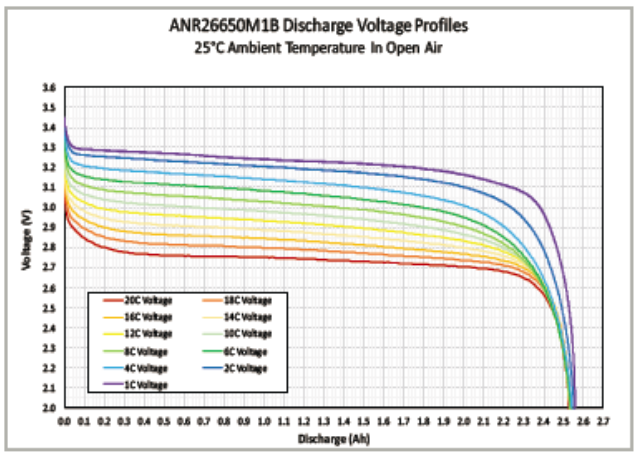
8 Cell specifications (LITHIUMWERKS)

Specs for ANR26650M1B

Nominal Ratings	
Voltage	3.3 V
Capacity @ 23 ºC Typical (Min)	2.6 Ah (2.5 Ah)
Energy @ 23 ºC	8.58 Wh
Specific Power @ 25 ºC, 2 sec pulse	> 4000 W/kg
Impedance (1KHz AC) Typical	<10 mΩ
Cycle Life at 1C/1C, 100% DOD	> 4000 cycles
Discharging	
Max Continuous Discharge Current	52 A (20C rate)
Max Pulse Discharge Current (10s)	120 A (48C rate)
Minimum Voltage / HPPC Pulse	2 V / 1.6 V
Temperature	-30 ºC to 60 ºC
Charging	
Recommended Charge Current	3 A (1.2C rate)
Max Continuous Charge Current	10 A (4C rate)
Max Pulse Charge Current (10s)	26 A (8C rate)
Recommended Fast Charge Voltage	3.6 V
Terminate Charge @ 3.6 V	< 50 mA
HPPC Pulse Voltage	3.8 V
Float Charge Voltage	3.5 V
Temperature Range (Charging current at <250mA when under 0ºC for some applications)	0 ºC to 60 ºC
Storage	
Storage Temperature	-40 ºC to 70 ºC
Mechanical	
Diameter	Ø25.96 +/- 0.5 mm
Length	65.15 +/- 0.5 mm
Mass	76.0 g +/- 1.5 g
Certifications	
Transportation	UN 3480 (UN38.3), CIQ
Safety	UL 1642, IEC 62133-2
Environmental	REACH, RoHS, ISO-14001
Quality System	TS/IATF-16949, ISO-9001
Transportation	
Shipping	30% SOC
Part Number 300832-001	

Cell Data





Abuse

Nail penetration	Pass - EUCAR4
Over-Discharge	Pass - EUCAR3
Thermal Stability	Pass - EUCAR4
External Short	Pass - EUCAR3
Crush	Pass - EUCAR3
Overcharge	Pass - EUCAR2
Vent Open Pressure	1.0 - 2.0 MPa

26650 Data Sheet
Aug 2022
SF00008 rev 2

9 Certification (ISO 9001:2015)

LITEWERKS GmbH

Robert-Bosch-Str. 10, D-78467 Konstanz

wurde durch DSR-CERTIFICATION auditiert und es wird bestätigt, dass das Qualitäts-Management-System den Erfordernissen der

is audited by DSR Certification and applied that the Quality Management System meets the requirements of

ISO 9001:2015

für den nachfolgenden Umfang entspricht:
standard for the following activities:

Entwicklung, Herstellung und Vertrieb von Akkumulatoren
Development, Production and Distribution of Accumulators

Zertifikats-Nr.:*/Certificate No:* **QMS-23.02.372**