BYD Battery-Box LV User Manual

Battery-Box L 3.5/7.0/10.5/14.0(AU)

Version 2.0

Contents

1 General Information

1.1 Validity

This user manual is applicable to the Battery-Box L 3.5(AU), Battery-Box L 7.0(AU), Battery-Box L 10.5(AU) and Battery-Box L 14.0(AU).

1.2 Application

This user manual contains BYD Battery-Box LV product information, usage guidance, safety information, and details on common operating issues and subsequent corrective actions.
BYD Battery-Box LV is an energy storage unit that is designed to be used in residential on-grid applications with the capability for short-term backup.

1.3 Intended Use

Notes regarding intended use:

- BYD Battery-Box LV is not suitable for supporting life-sustaining medical devices. A power outage must not lead to the inability to use life-sustaining medical devices and subsequent personal injury.
- This product is intended for use only in accordance with the information provided in the enclosed documentation and with the locally applicable standards and regulations. Any other application may cause personal injury or property damage.
- The illustrations in this manual are meant only to help explain system configuration concepts, includes usage guidance, safety precautions, and common operating issues and subsequent corrective actions.
- Alterations to the product, e.g. changes or modifications, are only permitted with the express written permission of BYD. Unauthorized alterations will void warranty claims. BYD shall not be held liable for any damage caused by such changes. Any use of the product other than that described in the Intended Use section does not qualify as appropriate. The enclosed documentation is an integral part of this product. Keep the documentation in a convenient place for future reference and observe all instructions contained therein. The type label (see Section 1.5) must remain attached to the product.
- BYD Battery-Box LV series products must work with compatible inverters, which are listed in the BYD Battery-Box LV Compatible Inverter List.
- Please contact BYD or local after-service providers within 1 week once the user decides to cease using their BYD Battery-Box products.
- The Battery-Box LV system can be installed at altitudes of up to 2000m above Mean Sea Level.

1.4 Definition

Battery-Box L 3.5~14.0(AU) components are defined as below:

- BYD Battery-Box LV: Low-voltage household energy storage battery system.
- B-Plus L 3.5(A): Battery module. The Battery module provides the energy and sends the information about the cell voltage and cell temperature in the battery module to the upper-layer BCU. The nominal capacity of the B-Plus L 3.5(A) battery is 3.5kWh.
- BCU: Battery Control unit and Base. Two parts consisting of both the battery management and control component mounted on top of the battery modulus as well as structural base, which physically supports the battery modules underneath. The top portion of the BCU is responsible for communication to and connection with the inverter or BMU.

1.5 Identifying the Product

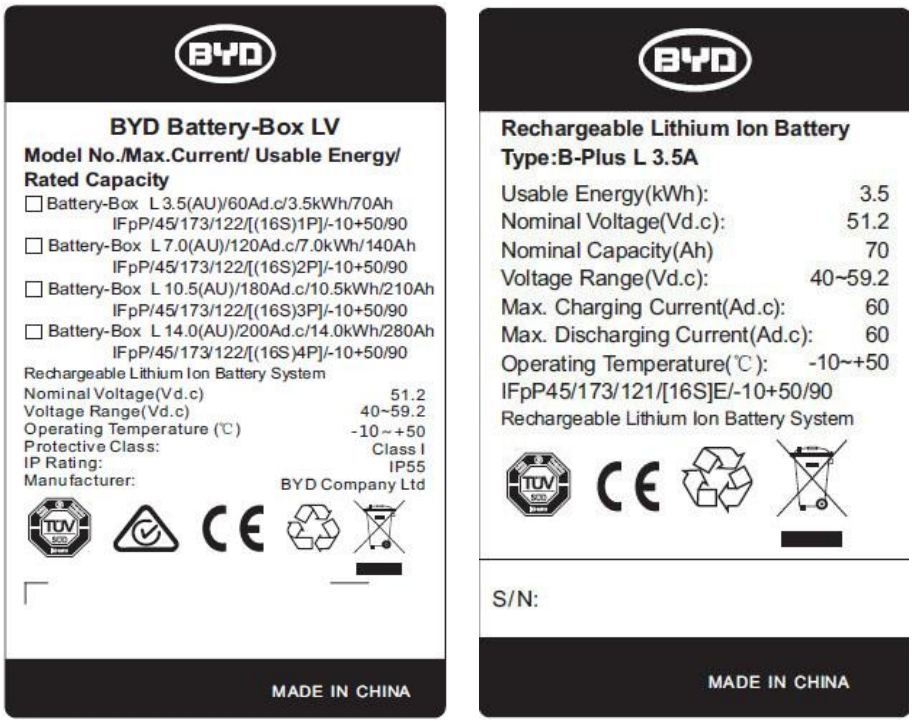
The type label contains the product identification information, and is attached on the product. For safe usage, the user must be well-informed of the contents in the type label. The type label includes:

1.5.1 Warning Label

⚠ Warning

1. Do not crush, drop or puncture the batteries.
2. Always dispose of the batteries according to local safety regulations.
3. Store and recharge batteries in a manner in accordance with the user manual.
4. Once over discharged, recharge the batteries according to the stipulations in the user manual.
5. Do not expose the system to high temperatures above 50℃.
6. Ensure reliable grounding and don’ t short circuit the terminals or reverse the polarity.
7. Disconnect batteries from power and load before maintenance.
8. Batteries shall be repaired, replaced or maintained by skilled personal recognized.
9. Do not stack up unpackaged batteries.

1.5.2 Product Label



2 Safety

This section contains safety information that must be observed at all times when working on or with batteries. To prevent personal injury or property damage and to ensure long-term operation of the batteries, read this section carefully and observe all safety information at all times.

WARNING

Environmental requirement

- Do not expose the battery to temperature above 50℃.
- Do not install or use the battery near any heat sources.
- Do not install or use the battery in wet locations, such as bathroom.
- Do not expose them to moisture or liquids.
- Do not expose the battery to corrosive gases or liquids.
- Do not expose the battery to direct sunlight for extended periods of time.
- Place battery in secure location away from children and animals.
- Do not allow the battery power terminals to touch conductive objects such as wires.
- Do not expose the battery in dusty and salty environment.
- Do not dispose of batteries in a fire, which may explode.

Operating requirement

- Do not touch the battery pack with wet hands.
- Do not crush, drop or puncture the battery.
- Always dispose of the batteries according to local safety regulations.
- Store and recharge battery in a manner in accordance with this user manual.
- Ensure reliable grounding.
- The charging circuit of inverter shall be DVC A, and the output circuit needs to be isolated from high voltage bus.
- The cabinet and battery modules shall be transported separately to reduce the risk of damage caused by drop, vibration, topple, etc.
- Do not short circuit the terminals, remove all metal objects including watches and rings that could product a short circuit before installation, replacement and maintenance.
- The battery shall be repaired, replaced or maintained by skilled personal recognized. (Skilled personnel recognized is a trained and qualified electrician or installer defined in installation guidance).
- Do not reverse the polarity.
- Do not stack up batteries without protective package, when store or handle batteries.
- Do not open, mutilate or disassemble the battery, the released electrolyte, which may be toxic, is harmful to the skin and eyes.

- Disconnect the charging source prior to connecting or disconnecting battery terminals, for instance, disconnect battery from power/load and then power off battery before installation and maintenance.
- Packaged batteries should not be stacked more than specified number stipulated on the package.
- Do not lay tools or metal parts on top of batteries.
- Do not use damaged, failed or deformed batteries, which may reach temperatures that exceed the burn thresholds for touchable surfaces. Continued operation of damaged battery may result in dangerous situation and cause severe injury due to electrical shock.

3 Technical Data

Model	Battery-Box L 3.5(AU)	Battery-Box L 7.0(AU)	Battery-Box L 10.5(AU)	Battery-Box L 14.0(AU)
Battery Module	B-Plus L 3.5(A) (3.5kWh)			
	1 module	2 modules	3 modules	4 modules
Usable Energy[1] [kWh]	3.5	7.0	10.5	14.0
Max Output Power [kW]	3	6	9	10
Peak Output Power [kW]	5.0, 10s	10.0, 10s	15.0, 10s	15.0, 10s
Round-Trip Efficiency	≥95% (Under test condition [1])			
Nominal Voltage [Vd.c]	51.2			
Operating Voltage Range [Vd.c]	40~ 59.2			
Communication	CAN / RS485			
Dimension [W × H × D ,mm]	620 × 475× 355	620 × 711 × 355	620 × 947 × 355	620 × 1183 × 355
Net Weight [kg]	63	105	147	190
Enclosure Protection Rating	IP55			
Warranty[2]	10 years			
Ambient Temperature Range[3] [℃]	-10~ +50			
Certification	TUV(IEC62619) / RCM / UN38.3 /			
Scalability	Max. 3 systems in parallel/42kWh			
Compatible Inverters[4]	Please refer to the Battery-Box LV Compatible Inverter List			
Application	On grid (Self consumption / On grid +Backup / Backup)			

[1] Test conditions: 100% DOD, 0.2C charge & discharge at + 25 ˚C. System Usable Energy may be variant with different inverter brands
[2] Conditions apply. Refer to BYD Battery–Box Warranty Letter.
[3] –10 ˚C to +12 ˚C will be derating
[4] Detailed information refer to BYD Battery–Box Compatible Inverter List
Note: The maximum operating voltage of the rechargeable lithium–ion battery system is less than 60Vd.c

When BYD Battery-Box LV operates in low temperatures, the charge and discharge current is adjusted automatically. The battery will limit the current when the operating temperature gets low. Please refer to the table below for current parameters related to operating temperature:

Discharging current at different temperatures

Temp. (℃)	Max Current (Ad.c)			
	Battery Box L 3.5(AU)	Battery Box L 7.0(AU)	Battery Box L 10.5(AU)	Battery Box L 14.0(AU)
-10~15	50	100	150	200
15~35	60	120	180	200
35~50	50	100	150	200
Remark: The discharging current adjustment takes about 2 minutes.				

Discharging current in backup mode

Temp. (℃)	Max Current (Ad.c)			
	Battery Box L 3.5(AU)	Battery Box L 7.0(AU)	Battery Box L 10.5(AU)	Battery Box L 14.0(AU)
-10~50	40	80	120	160
Remark: The discharging current adjustment takes about 2 minutes.				

Charging current at different temperatures

Temp. (℃)	Max Current (Ad.c)			
	Battery Box L 3.5(AU)	Battery Box L 7.0(AU)	Battery Box L 10.5(AU)	Battery Box L 14.0(AU)
-10~2	15	30	45	60
2~12	20	40	60	80
12~50	40	80	120	160
Remark: The charging current adjustment takes about 2 minutes.				

4 Technical Terms

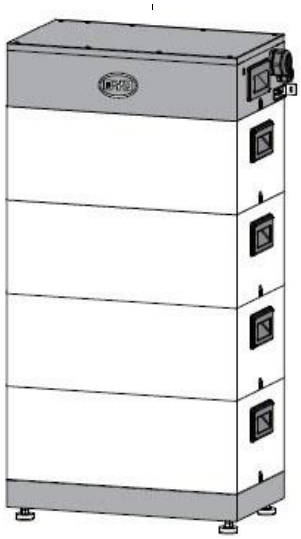
No.	Terms	Comment
1	Discharge	Battery output power for load
2	Charge	To put electricity into battery by the charger
3	Full charged	Battery had been full charged, SOC is 100%.
4	Idle	Ready for charging or discharging
5	Shutdown mode	Power off
6	SOC	State of Charge
7	SW	Software
8	HW	Hardware
9	Battery voltage	The voltage between B+/B-
10	Pack voltage	The voltage between P+/P-

11	Cell voltage	Single cell voltage
12	Failure	Battery or BMS is broken, need to be replaced
13	Alarm	Indicate that the battery is in an abnormal status
14	Over discharged	Energy state of the battery is too low and needs to be recharged

5 Product Overview

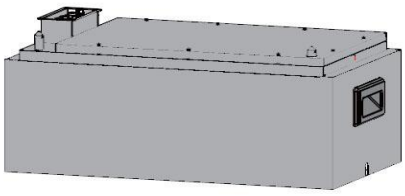
5.1 Brief Introduction

This product is a low-voltage DC battery system with an operating voltage of 48V. It is utilized in household energy storage applications and works together with a low-voltage inverter to realize the goal of energy storage for the home. A battery system consists of 1 to 4 individual battery modules connected in parallel.

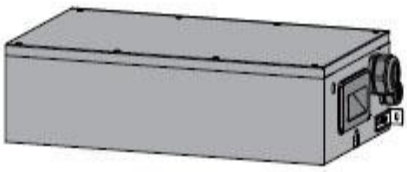


Product overview

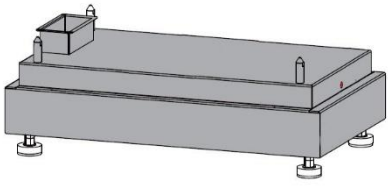
Main Components:



B-Plus L 3.5(A)



BCU



Base

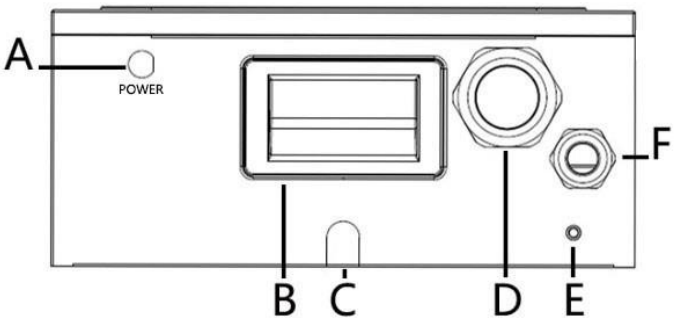
5.2 Configuration Table

No.	Type	BCU	B-Plus L 3.5(A)	Base	Energy(kWh)	Voltage(Vd.c)
1	Battery-Box L 3.5(AU)	1	1	1	3.5	51.2
2	Battery-Box L 7.0(AU)	1	2	1	7.0	51.2
3	Battery-Box L 10.5(AU)	1	3	1	10.5	51.2
4	Battery-Box L 14.0(AU)	1	4	1	14.0	51.2

5.3 Introduction of BCU

BCU, the management unit, is one of the main component of the energy storage system, it communicates upward with inverters and downward with batteries by collecting batteries information and send them to inverters to make sure the system works normally.

5.3.1 BCU interface introduction

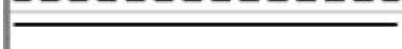
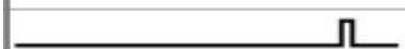
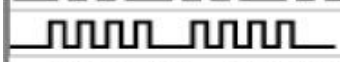
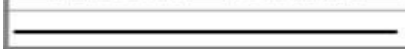
Position	Designation	Terminals on the right
A	Power button/LED indicator	
B	Handle	
C	Rubber plug	
D	Gland for P+ P- & Grounding cables	
E	Bolt	
F	Gland for CAN cables of Inverter and BCU	

Parameters of Wifi module

Catalog	Parameter	Value
Wireless parameters	Working frequency	2.412GHz-2.4835GHz
	Transmit power	802.11b: +16 +/-2dBm (@11Mbps)
		802.11g: +14 +/-2dBm (@54Mbps)
		802.11n: +13 +/-2dBm (@HT20, MCS7)
Distance of communication	Wireless communication distance	Open air, no shelter from 100m
Software parameters	Configuration	AT+Instruction set
		WiFi point to point
		Web server
	Safety	WEP/WPA-PSK/WPA2-PSK
	Wireless network type	STA/AP
	Encryption type	WEP64/WEP128/TKIP/AES
	Network protocol	IPv4,TCP/UDP/FTP/HTTP

5.3.2 Battery status indicated by Led

The battery status can be indicated by the Led, please refer to the following table for details.

Diagram	Status	Meaning
	White blink slow	Charging
	White blink fast	Discharging
	White always ON	Idle
	White blink very slow	Idle
	Orange blink 2 times	System WIFI is lost
	Orange blink 3 times	Loss of inverter communication
	Orange blink 4 times	Lost slave CAN communication
	Orange blink 5 times	Uncalibrated
	Orange always ON	BCU or Battery failure

6 Cleaning and Maintenance

6.1 Cleaning

CAUTION:

Please power off the system before cleaning the BYD Battery-Box LV

BYD Battery-Box LV system is recommended to be cleaned periodically with soft, dry brush or dust collector to remove the dust on the enclosure. Liquids such as solvents, abrasives or corrosive liquids should not be used to clean the enclosure.

6.2 Recharge Requirement

6.2.1 Recharge requirement for batteries in normal storage

Batteries should be stored in an environment with a temperature range between -10℃ ~ +45℃, and maintained regularly according to the following table with 0.5C (35A) current until 40% SOC after a long time of storage.

Recharge conditions for batteries in normal storage

Storage environment temperature	Relative humidity of storage environment	Storage time	SOC
Below -10℃	/	prohibit	/
-10~25℃	5%~70%	≤12 months	30%≤SOC≤60%
25~35℃	5%~70%	≤6 months	30%≤SOC≤60%
35~45℃	5%~70%	≤3 months	30%≤SOC≤60%
Above 45℃	/	prohibit	/

6.2.2 Recharge requirement for over discharged batteries

Please recharge the over discharged batteries in a timeframe that is in accordance to the following table, otherwise the over discharged battery modulus will be damaged.

Recharge conditions for over discharged batteries

Storage environment temperature	Storage time
-10~25℃	≤15 days
25~45℃	≤7 days

7 Compatible Inverter List

To make sure the system can be operated normally, please choose the compatible inverters with BYD batteries and configure the system according to the BYD Battery-Box LV Compatible Inverter List.

8 Common Issues and Solutions

8.1 Common Issues of BYD Battery-Box LV and Solutions

Issue description	Possible cause	Solution
Contactor disconnected	1. Battery high voltage 2. Battery low voltage 3. Battery high temperature 4. Battery over current 5. Other hardware failures.	Please contact our after service provider immediately.

User also can monitor battery running status, warning and alarm information from App or inverter display screen. For detailed information please refer to the Common Failures Displayed on Inverter and Solution in the BYD Battery-Box LV Compatible Inverter List.

8.2 Emergency

Please cut off the power supply and turn off the battery in an emergency.

9 Warranty

BYD provides warranty when the product is installed and used according to the instructions contain in the User Manual, Installation Manual, and Warranty Letter.

1. Please contact our local service provider for technical support & after sales service.
2. Please download the Warranty Letter via the following website:
   Europe customer: www.eft-systems.de
   Australia customer: www.alpspower.com.au

Contact Information

China

BYD LITHIUM BATTERY Co., LTD
E-Mail: eubatterygrp@byd.com
Tel: +86 0755 89888888
Fax: 0755-8961 9653
Address: No.1 Baoping Road, Baolong Industrial Town, Longgang Shenzhen, 518116, China

Local Service Provider

Europe

EFT-Systems GmbH
Buchenstr.37 97816 Lohr a. Main
Customer Service Mailbox: service@eft-systems.de
+49 9352 8523999(DE)
+34 91 0602267 (ES)
+39 02 87368364 (IT)
+44 2037695998 (UK)
www.eft-systems.de

Australia

ALPS POWER PTY LTD
14/47-51 Lorraine St Peakhurst NSW 2210
+61 2 8005 6688
Email: service@alpspower.com.au
www.alpspower.com.au