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# power core CEL1 Lithium Battery Pack

## Specifications

- BMS Model: Writer Audit DXB30A-1030BU-1001
- Supports UART communication
- Supports Bootloader for program upgrade and maintenance
- Accurate residual capacity estimation (SOC)
- Lithium cycles statistics
- Record of the longest time of uncharged
- Clock function (RTC)
- Perfect battery protection mechanism
- Low power design with automatic sleep function
- Built-in balance function
- Smart LED plate with soft-switch and error indication functions

**BMS SPECIFICATION**

| | | |
|---|---|---|
| Series | | DXB30 |
| BMS Model | : | DXB30A-1030BU-1001 |

| | | |
|---|---|---|
| Writer | | |
| Audit | | |
| Approve | | |

| Client confirm | Date |
|---|---|
| **Remark  Please sign this file back after the product passes the test.**<br><br>**The later batch will be made according to this file!** | |

## Product Usage Instructions

### Installation

Follow the wiring diagram provided in the user manual to connect the BMS to your battery system.

### Communication Setup

Use UART communication to interface with the BMS for monitoring and control purposes.

### Program Upgrade

If needed, utilize the Bootloader feature to upgrade the BMS software for better performance.

### Capacity Estimation

Monitor the accurate residual capacity estimation provided by the BMS for better battery management.

### Battery Protection

Rely on the perfect battery protection mechanism to safeguard your battery system from damage.

## Change History

| Date | Version | Describe | Hardware version | Software version |
|---|---|---|---|---|
| 2020.03.27 | V0.1 | Specification preparation | V1.5 | V2.07 |
| 2020.05.26 | V0.2 | The program version number from V2.07 to adapt to the new<br>2.12 PC new test software | V1.5 | V2.12 |
| 2020.8.12 | V0.3 | V0.2 bug Correction MOS number changed from 5 to 4. Configuration Change The absolute value of the sleep current is changed from 120 to<br>200 | V1.5 | V2.12 |
| 2020.10.29 | V0.4 | The charge balance turn-off current is changed from 100mA<br>to 20000mA | V1.5 | V2.12 |
| | | | | |

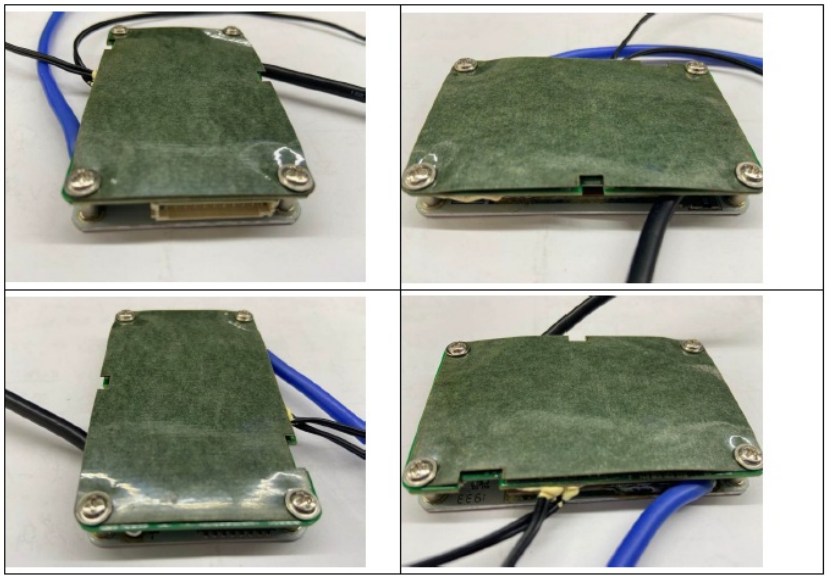
## Product Features

- Support UART communication
- Support Bootloader to facilitate program upgrade and maintenance.

- Accurate residual capacity estimation (SOC), mainly dynamic coulombs, static open circuit voltage compensation to ensure more accurate capacity.
- Lithium cycle statistics.
- Record the longest time of uncharged.
- Clock function (RTC)
- Perfect battery protection mechanism.
- Low power design, automatic sleep function.
- Built-in balance function.
- Smart LED plate with the functions of soft-switch and error indication.
- Supports UART communication.
- Support Bootloader, convenient program upgrade maintenance.
- Accurate Residual capacity estimation (SOC), dynamic based on coulombmeter, static open circuit voltage compensation to ensure more accurate capacity.
- Lithium battery cycle count.
- Record the longest uncharged time.
- Support clock RTC
- Perfect battery protection mechanism.
- Low power design, automatic sleep function.
- Supports the balancing function.

## Product size and wiring

### Product physical drawing



**Product size**

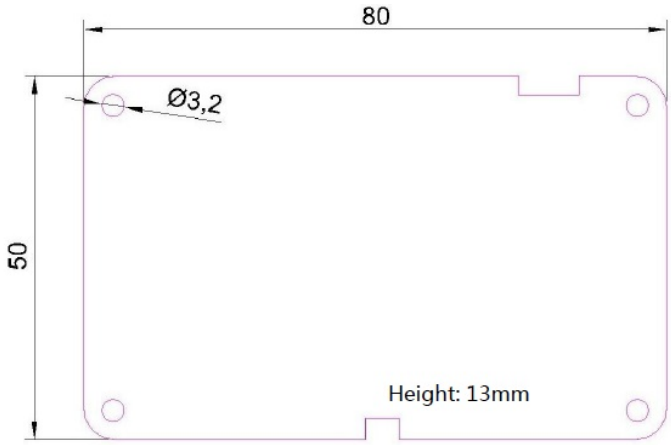
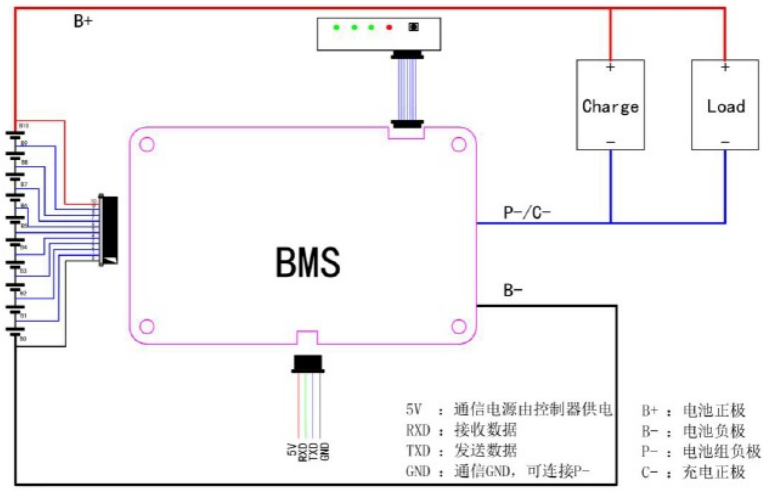



Fig 1-1 Size of DXB30A Series mm

**The product dimension tolerance is 0.5mm.**

**Product assembly diagram**

**DXB30A—10S Connection Diagram**




## Electrical properties of products

| project | The numerical | unit |
|---|---|---|
| Battery pack form | 10 | S |
| Rated discharge c urrent | 30 | A |

| | | | |
|---|---|---|---|
| Fit the type of cell | | Ternary lithium | |
| Charging voltage | | 42.3 | V |
| Charging current | | <20 | A |
| Balance current | | <60 | mA |
| No communication working current | | <10 | mA |
| Sleep current | | <60 | uA |
| Internal resistance | | 2.8 | mΩ |
| Precision | Single-section voltage error | <20 | mv |
| | Total voltage error | <0.1 | v |
| | The current error | <3 | % |
| | The temperature error | <2 | ℃ |
| | Accuracy of SOC | <5 | % |

| | | | |
|---|---|---|---|
| Communication mode | V-in | Response latency | Note |

| | | | |
|---|---|---|---|
| CAN-bus | +5V | | Notable, +5V/TXD/RXD/GND |
| Bluetooth | | | point-to-point |
| | | | |

| Item | | Value | Unit | Recovery |
|---|---|---|---|---|
| Volta | Overvoltage protection voltage | 4230 | mv | Automatic recovery of voltage drop delay |
| | Overvoltage recovery voltage | 4100 | mv | |
| | Overvoltage protection delay | 1 | S | |
| | Overvoltage recovery delay | 1 | mS | |
| | Under-voltage protection voltage | 2800 | mV | |

| | | | | |
|---|---|---|---|---|
| ge pr otecti on | Under-volt age recov ery voltage | 3000 | mv | Automatic reco very of voltage recovery delay |
| | Under-volt age protec tion delay | 1 | S | |
| | Under-volt age recov ery delay | 1 | mS | |
| | Balance v oltage | 3900 | mv | |

| | | | | |
|---|---|---|---|---|
| | Discharge over current 1 protection | 35 | A | Self-recovery |
| | Discharge-overcurrent protection relay | 1 | S | |
| | Discharge over current 2 protection | 80 | A | |
| | | | | |

| | | | | |
|---|---|---|---|---|
| Current protection | Discharge overcurrent 2 delay | 320 | mS | Self-recovery. |
| | Charge overcurrent protection | 20 | A | Remove charger after 500mS |
| | Charge overcurrent protection relay | 250 | mS | |
| | Short circuit protection | 100 | A | Remove the charge, press the buttons, load, and reclose |
| | Short circuit protection delay | 100 | uS | |
| | Discharge high temperature protection | 65 | ℃ | Automatic recovery after a delay |
| | Discharge high temperature recovery | 60 | ℃ | |
| | Discharge high temperature protection relay | 5 | S | |
| | | | | |

| | | | | |
|---|---|---|---|---|
| Temperatur e protection | Discharge high temperature recovery delay | 5 | S | |
| | Charging high temperature protection | 55 | ℃ | Automatic recovery after a delay |
| | Charging high temperature recovery | 50 | ℃ | |
| | Charging high temperature protection relay | 5 | S | |
| | Charging high temperature recovery delay | 5 | S | |
| | Charging low temperature protection | 0 | ℃ | |
| | Charging low temperature recovery | 5 | ℃ | |
| | | | | |

| | | | | |
|---|---|---|---|---|
| | Charging low temperature protection relay | 5 | S | Automatic recovery after a delay |
| | Low-temperature charging recovery delay | 5 | S | |

**LED display specification**

- Order individually.

## Operating instructions

**Power on and off**

| Boot mode | | Shutdown mode | |
|---|---|---|---|
| Item | Describe | Item | Describe |
| Charging | In the case of shutdown, connect the charger to automatically turn on. | Under-voltage protection | Keep the battery under voltage for 1 minute and then shut it off |
| Communication | In the case of a shutdown, UART communication wakes up the battery to power on | Short-circuit protection | The battery automatically shuts down after short-circuit protection. |
| | | Automatically you sleep | When the battery current is less than 200mA, no communication, 60 minutes after the shutdown. |

**Safety of Battery**

- BMS installation should pay attention to electrostatic protection.
- Make sure the battery series is consistent with BMS before BMS installation.
- During the installation process, the total negative electrode of the battery should be connected first, and the PACK wire should be connected to the battery and confirm the correct sequence before plugging in the BMS.
- After the completion of battery installation, it shall be communicated firstly to confirm the correct battery assembly before charging and discharging, and a full charge and a full discharge shall be guaranteed.
- In order to ensure the stability of the system, the key indicator light between the small board and the main board of the wire should not be greater than 50cm.
- Please do not modify the configuration of BMS parameters by yourself. Please contact the manufacturer if necessary.
- All protection parameters should be configured strictly according to the actual conditions of the battery, or it may cause danger.

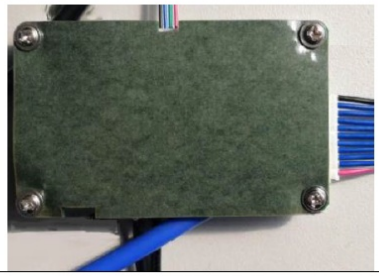
Please pay attention to the following

1. If the short circuit current setting is too large, because the battery capacity is small, the discharge rate is small, the battery internal resistance is large, and other reasons, even if the positive and negative poles of the complete short circuit cannot reach the short circuit protection current, resulting in battery damage
2. If overvoltage protection parameters are too high, the battery will cause unrecoverable damage due to overpressure, and serious will lead to battery damage
3. If voltage protection parameters are too low, the battery to discharge,  leading to irreversible damage
4. If the configuration parameter exceeds the limit parameter of the protective plate, the BMS and battery will be damaged.

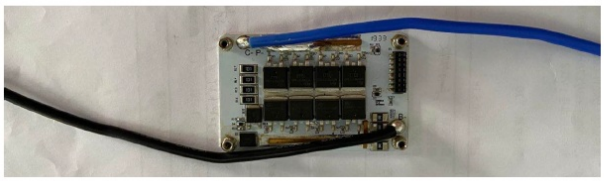
## The actual state of the product

**Product physical drawing**

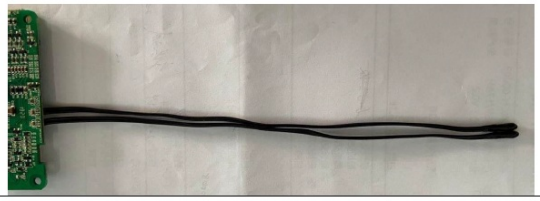
Overall picture with cables



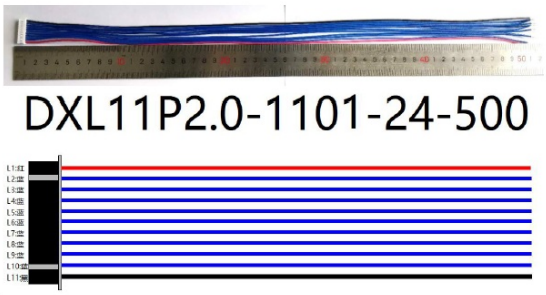
Base plate factory wiring harness: B-12AWG, 300mm ; P-C-12AWG, 300mm



Top plate with temperature sensor picture (length 200mm)



Voltage sampling line drawings and CAD drawings (length 500mm)




## Confirm the hardware version of the product

- DXB30-TV1.5
- DXB30-BV1.5

## Main device model and quantity

| Name | Model | Quantity |
|---|---|---|
| Discharge MOS | NCEPO1T12D | 4 |
| Charge MOS | NCEPO1T12D | 4 |
| Sampling resistor | 2mR | 4 |

## Product validation program version

- BMS firmware  DXB30A-1440BU-1003V0212.hex
- PC software version  BMS Studio V0.8.8

### Product parameter settings

DXB30A-1030BU-1001_20201029.xml

## Protocol

D-powercore BMS customer communication protocol

| Command | Directive Title | Request command | Command response | Valid data | Data physical value | Test result |
|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| 0x01 | Alarm Status | 3a 16 01 00 17 00 0d 0a | 3A 16 01 01 00 18 00 0D 0A | 00 | 00 | OK |
| 0x06 | BMS MOS Temp | 3a 16 06 00 1c 00 0d 0a | 3A 16 06 02 80 0B A9 00 0D 0A | 80 0B | 294.4K = 21.3℃ | OK |
| 0x07 | Minimum battery temperature | 3a 16 07 00 1d 00 0d 0a | 3A 16 07 02 60 0B 8A 00 0D 0A | 60 0B | 291.2K=18.1℃ | OK |
| 0x08 | Maximum battery temperature | 3a 16 08 00 1e 00 0d 0a | 3A 16 08 02 67 0B 92 00 0D 0A | 67 0B | 291.9K=18.8℃ | OK |
| 0x0a | Current | 3a 16 0a 00 20 00 0d 0a | 3A 16 0A 04 00 00 00 00 24 00 0D 0A | 00 00 00 00 | 00mA | OK |
| 0x0f | SOC | 3a 16 0f 00 25 00 0d 0a | 3A 16 0F 04 A0 32 00 00 FB 00 0D 0A | A0 32 00 00 | 12960mAH | OK |
| 0x10 | Full Charge Capacity | 3a 16 10 00 26 00 0d 0a | 3A 16 10 04 78 69 00 00 0B 01 0D 0A | 78 69 00 00 | 27000mAH | OK |
| 0x17 | Cycle time | 3a 16 17 00 2d 00 0d 0a | 3A 16 17 02 00 00 2F 00 0D 0A | 00 00 | 00 | OK |
| 0x48 | Uncharged time | 3a 16 48 00 5e 00 0d 0a | 3A 16 48 02 3D 00 E8 00 0D 0A | 3D 00 | 61 | OK |

| | | | | | | |
|---|---|---|---|---|---|---|
| 0x50 | Battery Series | 3a 16 50 00 66 00 0d 0a | 3A 16 50 01 14 6E 00 0D 0A | 14 | 14 | OK |

## Product packaging

The attachment

Packing pictures

**FCC Caution.**

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, and
2. This device must accept any interference received, including interference that may cause undesired operation.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

**Note**: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates and can radiate radio frequency energy and, if not installed and used tod to the instructions, may cause harmful interference to radio

communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

The device has been evaluated to meet general RF exposure requirements. The device can be used in portable exposure conditions without restriction.


- TEL:86-22-87895805-86
- ADD  Block C, No. 8, Haitai East Road, Xiqing District, Tianjin
- FAX:86-22-87895805-87
- WEB www.d-powercore.com


### Frequently Asked Questions

- **Q: How can I check the lithium cycle statistics?**
  A: The BMS automatically records the lithiumtistics for your reference. You can access this information through the communication interface.
- **Q: What should I do if I encounter an error indication on the Smart LED plate?**
  A: Refer to the user manual to interpret the error indication displayed on the Smart LED plate. Troubleshoot accordingly based on the provided guidelines.
- **Q: Can I adjust the settings for the automatic sleep function?**
  A: The BMS is designed with a preset automatic sleep function to optimize power usage. Custom settings are not recommended and may affect overall performance.

# Documents / Resources

| | |
|---|---|
|  | power core CEL1 Lithium Battery Pack [pdf] Instruction Manual 2BB7A-CEL1, DXB30A-1030BU-1001, CEL1 Lithium Battery Pack, CEL1, Lithium Battery Pack, Battery Pack, Pack |

## References

- User Manual

power
core
2BB7A-CEL1, Battery Pack, CEL1, CEL1 Lithium Battery Pack, DXB30A-1030BU-1001, Lithium Battery Pack, Pack, Power Core

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