

# BICODI

## USER MANUAL

### LITHIUM ION BATTERY PACK



Bicodi Website

BD12-100

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### PRODUCT INFORMATION

| Basic Electrical Specification        |               |
|---------------------------------------|---------------|
| Nominal Voltage                       | 12.8V         |
| Nominal Capacity                      | 100Ah         |
| Energy                                | 1280Wh        |
| Resistance                            | ≤10mΩ         |
| Efficiency                            | 99%           |
| Self Discharge                        | ≤3% per month |
| Maximum Modules in Series or Parallel | 4             |

| Charge Specification       |                                 |
|----------------------------|---------------------------------|
| Recommended Charge Current | 50A                             |
| Maximum Charge Current     | 100A                            |
| Recommended Charge Voltage | 14.6V                           |
| BMS Charge Voltage Cut-Off | 15V(3.75±0.05vpc)<br>(1.0±0.5s) |
| Reconnect Voltage          | 14.2V(3.55±0.05vpc)             |
| Balancing Voltage          | 14.4V(3.6±0.05vpc)              |

| Discharge Specification            |                                |
|------------------------------------|--------------------------------|
| Recommended Discharge Current      | 50A                            |
| Maximum Discharge Current          | 100A                           |
| Peak Discharge Current             | 300A(3S)                       |
| BMS Discharge Current Cut-Off      | 400A(1S)                       |
| Recommended Low Voltage Disconnect | 10V                            |
| BMS Discharge Voltage Cut-Off      | 8.8V(2.2±0.1vpc)<br>(1.0±0.5s) |
| Reconnect Voltage                  | 10.8V(2.7±0.1vpc)              |
| Short Circuit Protection           | 200-500us                      |



### Temperature Specification

|                              |                           |
|------------------------------|---------------------------|
| Discharge Temperature        | -4 to 140°F (-20 to 60°C) |
| Charge Temperature           | 32 to 113°F (0 to 45°C)   |
| Storage Temperature-1month   | -4 to 113°F (-20 to 45°C) |
| Storage Temperature-1year    | 59 to 95°F (15 to 35°C)   |
| BMS High Temperature Cut-Off | 167°F (75°C)              |
| Reconnect Temperature        | 131°F (55°C)              |

### BMS Overview

|                          |     |
|--------------------------|-----|
| Over Voltage Protection  | yes |
| Under Voltage Protection | yes |
| Over Current Protection  | yes |
| Overload Protection      | yes |
| Short Circuit Protection | yes |
| Temperature Protection   | yes |

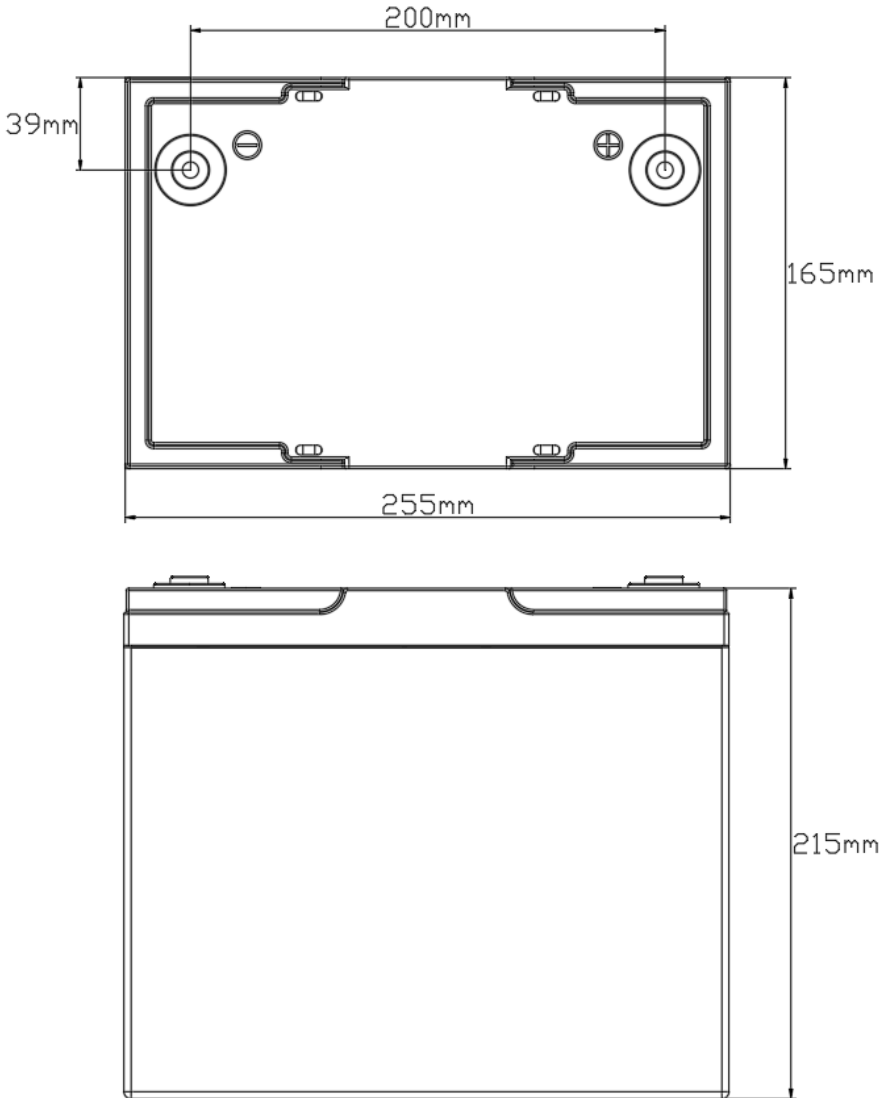
### Compliance Specifications

|                |  |
|----------------|--|
| Certifications | UN38.3, MSDS, IEC62619[cell]<br>UL1642[cell] |
|----------------|--|

### Mechanical Specification

|                       |                      |
|-----------------------|----------------------|
| Dimensions(L x W x H) | 255x165x215mm        |
| Weight                | 10Kg                 |
| Terminal Type         | M8                   |
| Terminal Torque       | 10~12N.m             |
| Case Material         | ABS                  |
| Enclosure Protection  | IP65                 |
| Cell Type-Chemistry   | Square shell-LiFePO4 |

### DIMENSIONS





## DESCRIPTION

### Battery Features

- (1) Super safe lithium iron phosphate (LiFePO<sub>4</sub>) chemistry reducing the risk of explosion or combustion due to high impact, over-charging or short circuit situation.
- (2) Battery Management System (BMS) controls the parameters of the battery to provide optimum safety by protecting against over-charging and over-discharging.
- (3) BMS enhanced design balances the battery cells, optimizing battery performance.
- (4) Delivers twice the power of lead acid batteries, even at high discharge rates, while maintaining high energy capacity.
- (5) Faster charging and lower self-discharge.
- (6) Up to 10 times more cycles than lead acid batteries.
- (7) Compact and only 40% of the weight of comparable lead acid batteries.

### Standard Charge

Charge at 0.2C constant current until the battery reaches 14.6V. The battery then charges at constant voltage of 14.6V while tapering the charge current. Charging will end when the current has tapered to 0.05C. The battery should be charged between 0°C and 45°C, then rest for 30 minutes before discharging. Do not exceed the max charging current, voltage, or temperature limits as specified in this document. Do not reverse-polarity charge the battery.

### Standard Discharge

Battery should be discharged at a constant current of 0.2C to 10.0V at 20 ± 5°C, then rest for 30 minutes before charging.

### Storage

The batteries should be stored open circuit, and protected against the possibility of a short between the terminals. The battery should be charged once every 6 months if not in use to prevent over discharging. The batteries should be stored at room temperature, and charged to 30-50% SOC.

### Warnings

If the battery is over-charged and over-discharged too frequently, this will affect the long-term performance and capacity of the battery. If the battery is stored for too long, reduced capacity and performance can be expected. It is important to cycle the battery at least once every 6 months and stored at the appropriate SOC to prevent deterioration to the battery.



# BATTERIES PARALLEL CONNECTION GUIDE

## Parallel Connection Guidelines

### Caution

- (1) Severe damage to the battery, short circuiting and sparking will happen if the batteries are not connected correctly or properly maintained. We recommend assembly be completed by fully trained professionals only.
- (2) Do not reverse connect the anode and cathode, as this will damage the batteries and/or any equipment connected.
- (3) DO not connect the batteries in parallel AND series at the same time.

### Before install

- (1) Ensure wires can withstand twice the capacity rating of the battery. (Ex: BD12-100 has a capacity of 100Ah, so the wire must be able to withstand 200A.)
- (2) Charge all batteries with 14.6V per standard charge.
- (3) Ensure all batteries have the same voltage level by fully charging each battery prior to connecting in parallel. (Voltage difference < 0.2V)

### Install

- (1) Make sure the connections are tight and the connector is protected from corrosion, wear, and seismic situations. Connecting impedance < 0.1mΩ
- (2) DO NOT connect more than 4 batteries per circuit.

### Maintenance

- (1) Make sure capacity stays within 50-60% when storing the batteries. The temperature should be 0-35°C, humidity 75-85% and fully charged every 3 months and discharged to 50-60% capacity.
- (2) Once a year, the batteries should be removed from string and individually charged. The voltage difference upon reassembly should be no more than 0.2V.





# BATTERIES SERIES CONNECTION GUIDE

## Series Connection Guidelines

### Caution

- (1) Severe damage to the battery, short circuiting and sparking will happen if the batteries are not connected correctly or properly maintained. We recommend assembly be completed by fully trained professionals only.
- (2) Do not reverse connect the anode and cathode, as this will damage the batteries and any equipment connected.
- (3) DO not connect the batteries in parallel AND series at the same time.

### Before install

- (1) Ensure wires can withstand twice the capacity rating of the battery. (Ex: BD12-100 has a capacity of 100Ah, so the wire must be able to withstand 200A.)
- (2) Charge all single batteries with 14.6V per standard charge and series batteries at a voltage of 14.6 times the number of batteries in series.
- (3) Ensure all batteries have the same voltage level by fully charging each battery prior to connecting in series. (Voltage difference <math>< 0.05V</math>)

### Install

- (1) Make sure the connections are tight and the connector is protected from corrosion, wear, and seismic situations. Connecting impedance <math>< 0.1m\Omega</math>.
- (2) DO NOT connect more than 4 batteries per circuit for the BD12 Series line.

### Maintenance

- (1) Make sure capacity stays within 50-60% when storing the batteries. The temperature should be 0-35°C, humidity 75-85% and fully charged every 3 months and discharged to 50-60% capacity.
- (2) Once a year, the batteries should be removed from string and individually charged. The voltage difference upon reassembly should be no more than 0.2V.

General positive



General negative



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