

**VERSION 3**  
**20170714**

# TBB2

## User Manual



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## Safety Instructions

1. Please read the following safety information carefully prior to the proper usage.
2. TBB2 must be used with rated input voltage only.
3. Don't discard TBB2 randomly or expose them to heat sources, such as radiators or space heaters to avoid any fire or explosions. To reduce environmental impacts, please bring your battery to a certified recycling depot at the end of its life.
4. The battery must be tested by an authorized battery maintenance center.

## 1. Product Specifications

- Product model: TBB2
- Input voltage: 29 ~45V DC
- Output voltage: 24V DC
- Battery capacity: 1.2Ah (0.1C-discharge by 120mA)
- Rated output current: 1.2A
- Duty cycle: 10% (2 min. ON /18 min. OFF)
- Operating temperature: 5~45°C
- IP rating: Up to IP66W
- Dimensions: 175\*117\*59.3mm
- Net weight: 1.5kg /pc

## 2.Capacity Status and LED Indications

There are four (4) kinds of LED indication status for the TBB2 power capacity:

- When charging: charging or fully charged.
- When discharging: high electricity capacity or low electricity capacity.

Above LED indications status, please refer to the following chart as Figure A:

Figure A

Status	Capacity of TBB2	LED indication- color & mode	
<b>When charging- (when system is connecting to AC power)</b>			
Charging	<100%	Green	Continuously short flashing- blink once for 1 second /1-second interval
Fully Charged	=100%	Green	Shine continuously
<b>When discharging- (TBB2 provides electricity when the system is unplugged)</b>			
High electricity	25%-100%	Green	Constantly long flashing – blink once for 0.5 seconds / 4-second intervals
Low electricity	<25%	Orange	Constantly long flashing – blink once for 0.5 seconds / 4-second intervals
<b>When TBB2 under protection</b>			
Under protection	<20%	No flash light	
<b>Failure</b>			
Failure	---	Orange	Constantly on

Note 1: Green light will shine continually which means the capacity is around 70%; it will take another extra 10 hours to be fully charged. (Within warranty>90%)

Note 2: When TBB2 is under protection mode (refer to section D): The LED indication is continuously off.

Note 3: If the orange light shines continually, it means disconnection of TBB2 or electrical circuit failure. If any related condition occurs, please contact our authorized sales agent or TiMOTION.

## 3. Operation

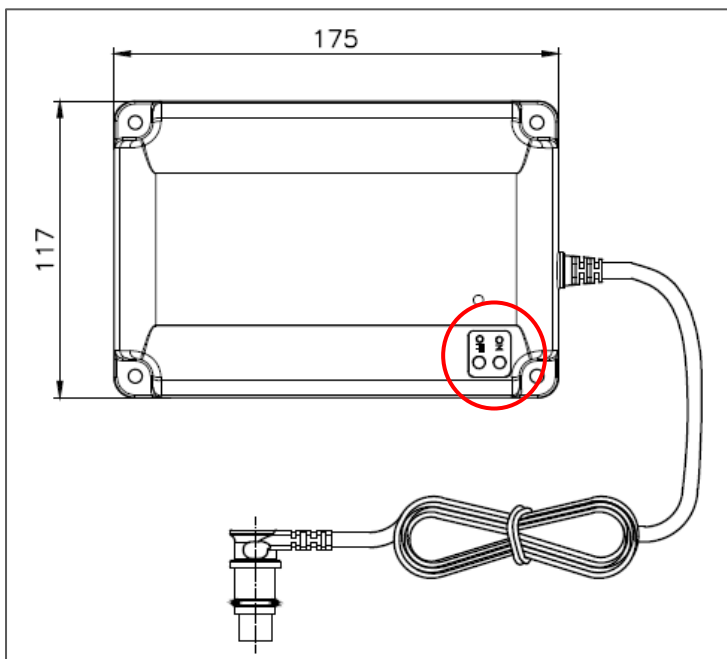
The operation of TBB2 with ON/OFF switches:

- **Switch ON:**

Please connect TBB2 to the control box, and then press the switch constantly for 1~2 seconds until the indication light is on. (As the below picture)

- **Switch OFF:**

Please press the switch constantly for 3 seconds until indication light is off. We can disconnect the TBB2 from the control box for power saving. (As the below picture)



## 4. Maintenance

- It is highly recommended that TBB2 should be charged continuously at least 24hrs+ in the following situations:
  - ✓ First operation
  - ✓ Before long time storage (long period of time when disconnected to AC power)
  - ✓ After long time storage (long period of time when disconnected to AC power)
- Here under is the period of storage and battery capacity chart (Figure B)

Figure B

Period of storage(included time of transportation)	Remaining electricity	TBB2 Status
3 months	78%	Ready to use
4 months	56%	Recommend to be fully charged prior to the operation
>4 months	<56%	After a long period of storage, TBB may be worn out which may lead to poor capacity. It's highly recommended to charge the TBB for 24hrs every 6 months.

**Note:** Initial battery capacity equals to fully charged status at 100% when TBB2 was produced.

- When batteries in TBB2 are defective, please use equivalent batteries for replacements or contact original manufacturer for battery replacements.

## 5. Electrical Protections

### Over current protection:

In the case of continuous 7.5Amp current consumption, over current protection will activate within 10 seconds.

### Low voltage:

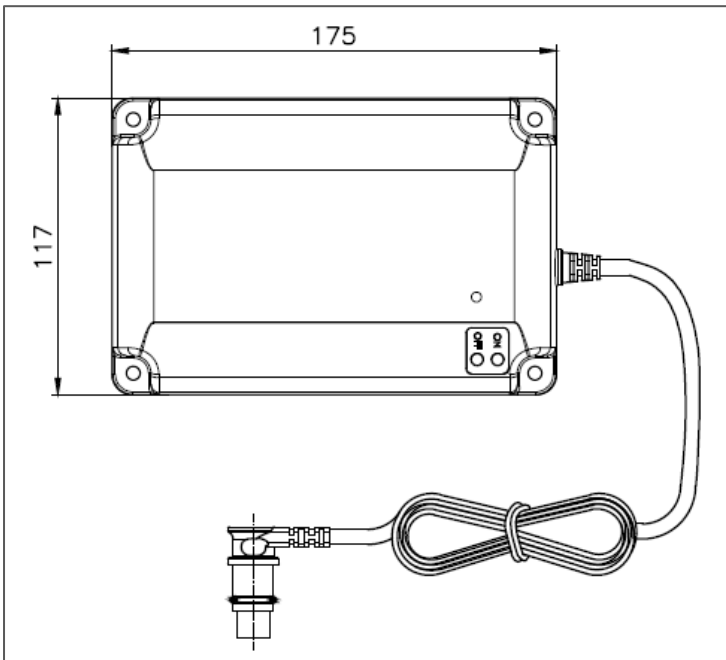
Over discharging protection will activate in the following conditions (as long as the electricity capacity is under 20%).

- On standby mode without operation: The voltage is continuously lower than 22.5V DC for 10 minutes.
- Under operation: The voltage is continuously lower than 16.7 V DC for 15 seconds.

**Note:** Under the above conditions, the LED indication lights on TBB2 are always off.

## 6. Appearance and Wiring Definitions

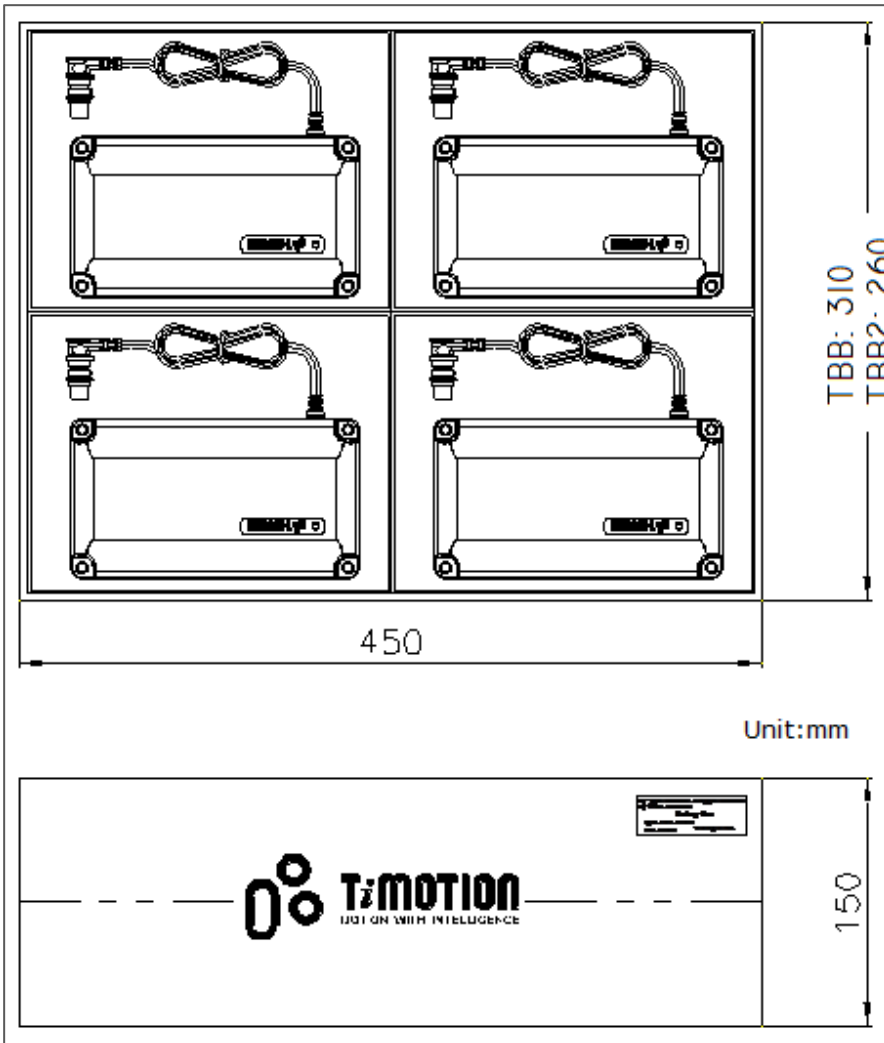
### TBB2



## 7. Packages, Transportations, and Storage

- Standard package as picture below:

TBB2 is packed into small box and 4\*2 layers small boxes for an outer carton.



- Transportations:

By sea or land only.

- Storage conditions:

- ✓ Temperature: 5~45°C
- ✓ Humidity: 10% - 93%
- ✓ Atmosphere: 86KPa - 1006KPa



## 8. Manufacture Information

Company name:

TiMOTION Technology Co., Ltd.

Address:

10F, No.100, Minguan Rd., Xindian Dist., New Taipei City, 23141, Taiwan

Tel: + 886 2 2219 6633

Fax: + 886 2 2219 0295

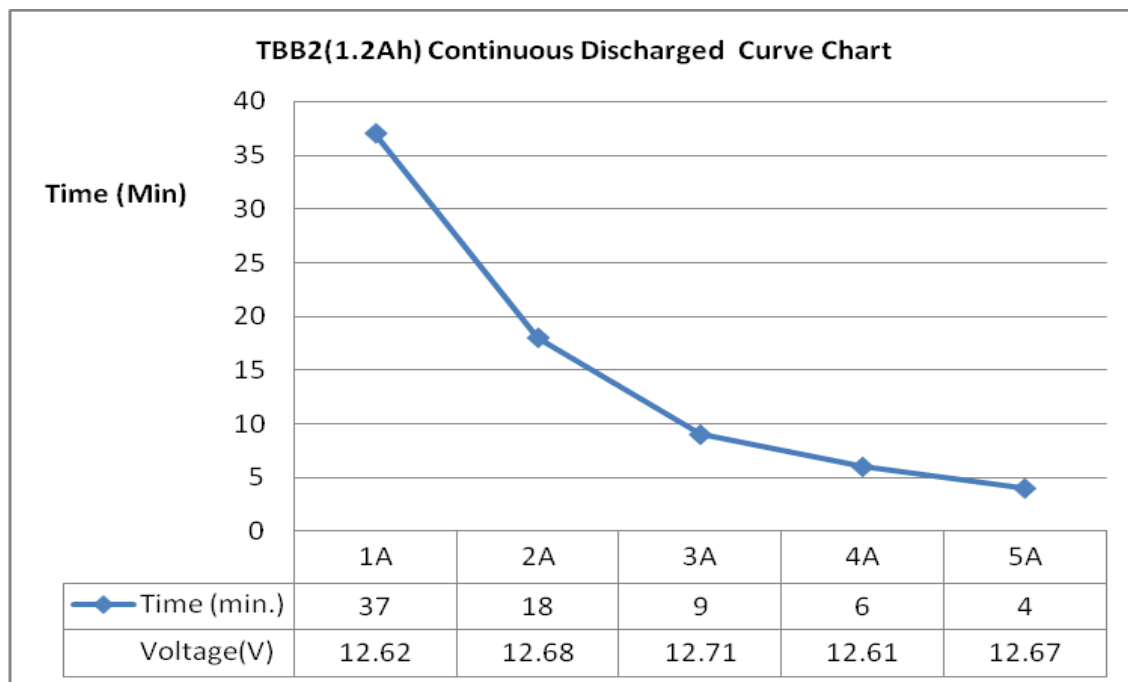
Email: sales@timotion.tw

## 9. Performance Data

### 9.1 Charging and discharging characteristics

The following chart shows the correspondence between the controlled constant current and the charging period through discharging continuously from the Full Capacity State (100% electricity capacity) to the Low Capacity State (<20% electricity capacity).

Figure D: TBB2 (1.2AH) battery discharging test



## 9.2 Constant life tests of charging/discharging on the 12V lead-acid battery in TBB2

300 times test cycles on charging/discharging of the 12V lead-acid batteries in TBB2. Its aim is to check the maximum electricity capacity of the battery, observing how it may decay as we increase the charging/discharging cycles.

### 9.2.1 Testing temperature

- 20°C ± 5°C

### 9.2.2 Testing sample

- Lead acid battery 12V, 1.2Ah (the batteries in TBB2)

### 9.2.3 Testing methods

- One cycle is defined as “discharging + charging” of the battery
  - A. Discharging- to discharge sample1 by 500mA for 2hrs (sample2: to discharge by 300mA for 2hrs)
  - B. Charging- to charge sample1 by 200mA for 6hrs (sample2: to charge by 120mA for 6hrs)
- Repeat till 25th cycles
  - A. Discharging- to discharge sample1 by 500mA until the voltage reaches to 10.2V and under the protection mode (sample2: 300mA)
  - B. Charging- to charge sample1 by 200mA and measure their maximum capacity (sample2: 120mA)