



LocalSense[®]

TB5000-BD UWB Positioning Tag

User Manual V1.1

TSINGOAL

Tsingoal (Beijing) Technology Co., Ltd.

<http://www.tsingoyal.com>

Contact Email: info@tsingoyal.com

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Trademark Declaration

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Disclaimers

- The product acts as an auxiliary aid and is not intended to replace safety management systems, precautions, or emergency responses for hazardous tasks. Nor does it substitute for regulatory measures in operational management. During its use, maintaining a strong safety awareness is imperative. Please ensure to recharge promptly when the battery is low and conduct regular inspections of the product's operational status.
- Within the legal limits, products in this manual (hardware, software, etc.) are provided in their current state, potentially with defects, errors or malfunctions. The company gives no explicit or implicit warranties, and shall not be liable for any special, incidental, or indirect damages from using the product in this manual or other our company products.

- The company shall not be held liable for any personal or property damage to yourself or a third party due to improper use from your failure to follow the instructions in the product manual and this warning.
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- Our product promotional images and ads are for illustration only. Please refer to the actual product for precise details.
- The data provided in this manual are theoretical values from Tsingual's internal lab tests under specified conditions. Actual performance may vary due to product variations, software versions, usage conditions, and environmental factors. Refer to on-site performance for precise details.
- Please note that no separate notification will be provided in cases where the aforementioned modifications and adjustments are deemed necessary.
- If you encounter any problems, please don't hesitate to contact us at Info@tsingual.com for prompt repairs or replacements.



Safety Precautions

Please read this chapter carefully before use. Tsingual is not liable for any damage due to improper use or violation of these instructions contained here.

【Safety】

- The employee badge tag is an integrated device. Do not attempt to disassemble it, as this may damage the battery and potentially release harmful substances that could cause allergic reactions.
- Unauthorized disassembly without proper training will void its waterproofing. Avoid prolonged exposure to corrosive environments, which can degrade its corrosion resistance, leading to material cracks and charging port corrosion, thereby disabling proper function.
- The product is designed to operate within a temperature from -20°C to +70°C and a humidity from 5% to 95%. Use in environments exceeding these limits may cause damage.
- Use original charger only. Third-party chargers that do not meet specifications may cause personal injury or battery damage.

- The product contains sensitive electronic components. Avoid dropping, burning, puncturing, or crushing it, as those will cause damage.

【Battery】

- Do not discard, replace, open the battery, or attempt to penetrate the device with sharp objects, as the internal electrolyte in the battery may harm skin and clothing.
- Avoid metal contact with battery terminals to prevent short circuits and burns caused by battery overheating.
- Stop use the product immediately if the battery becomes hot, emits odor, changes color, deforms, or shows abnormalities during its use, charging or storage.
- Do not puncture or incinerate the device or battery. Dispose of your device/battery according to local regulations (consult the local waste disposal department if necessary). Batteries must be recycled or disposed of separately and not mixed with household waste.

【Charging】

- Charge according to instructions in the manual with provided cable and adaptor.
- Ensure the contacts of your electrical devices and batteries are clean. Give them a good wipe with a damp cloth if necessary.

【Cleaning】

- If the tag is to be worn for an extended period, regular cleaning is essential.
- Instruction: with a soft, lint-free cloth; dampen the cloth with water if needed.

Notes:

- Do not clean while charging.
- Avoid external heat sources(e.g., hair dryers, microwaves) to dry the tag.
- Do not use cleaning products, ultrasonic cleaners, or compressed air when cleaning the tag.
- Do not spray or wipe the tag directly with disinfectants (such as ether, alcohol, chlorine-based disinfectants, peracetic acid, etc.).

【Repairing】

Do not attempt to repair or disassemble the employee badge tag yourself, as that may cause damage, void its waterproofing and result in malfunction. If the product is damaged or malfunctioning, please contact Tsingol immediately.

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, uses and can radiate radio frequency energy and, if not installed and used in accordance with 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 into 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.

Warning:

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.

Caution:

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

FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for uncontrolled environment.

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1. Tag Overview

1.1. Introduction

The TB5000-BD micro-tag is an advanced high-precision wireless tag utilizing pulse technology for accurately tracking the whereabouts of individuals wearing it. Designed as a wearable employee badge, it features an omnidirectional antenna and rechargeable battery for easy wearing and operation. The tag is widely applied across industrial, judicial, construction, healthcare and childcare sectors.



1.2. Functions

- Offers high-precision positioning with a ranging accuracy up to 10cm
- Equipped with a built-in antenna and designed in a employee badge style for effortless wearing
- Emergency SOS feature included

- Features a standard USB Type-C charging port for convenient charging and extended Standby
- IP65 protected, widely applicable

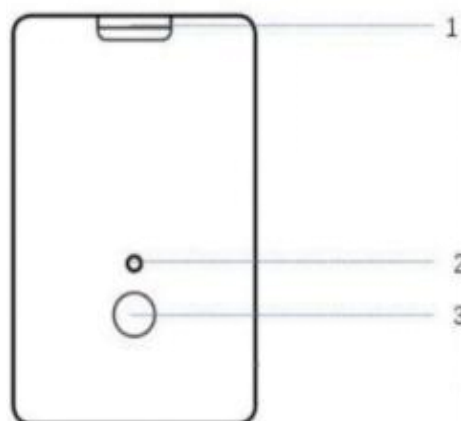
1.3. Applications

- Positioning for personnel in industrial facilities
- Positioning for regulated personnel by legal & justice authorities
- Positioning for construction personnel
- Positioning for special population (elderly, medically fragile, young children) in healthcare & education
- Prohibition of use on toys, ships, aircraft or satellite equipment.

2. Tag Configuration

2.1. Front Panel

Below is an image of the front panel of the TB5000-BD employee badge tag, detailing the specific meanings of each element:



Number	Definition	Description
1	Lanyard Hole	For hanging
2	Status LED	Charging: Blue-green flickering Fully Charged: Solid green Battery Full: Green flickering (5s interval) Low Battery: Red flickering (5s interval) Alarm: Rapid red flashing
3	SOS Alarm	Press for more than 3s to activate

2.2. Rear Panel

The rear panel of the TB5000-BD features a charging port, as illustrated in the figure below.

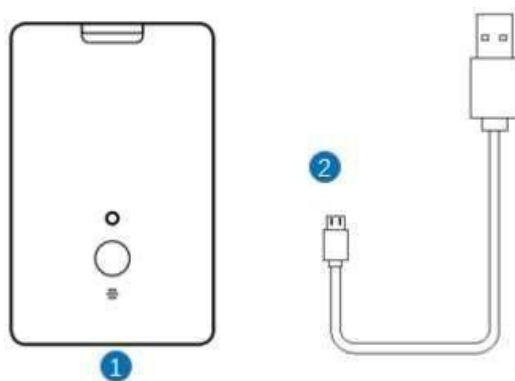


Number	Definition	Description
1	USB Type-C Interface	Please charge with 5V/1A, and USB Type-C Interface Note: check orientation if insertion is tight; avoid excessive force

3. Tag Operations

3.1. Charging

Use only the original, certified charging cable and adaptor to keep your tag functioning optimally. Charge promptly using the standard USB Type-C interface and provided 5V/1A dock. The LED will flicker blue-green while charging and stay green when fully charged.





Number	Definition
1	USB Type-C Interface
2	Charging Cable

 **Warning:** Using a charger with incorrect specifications or inferior quality for charging the tag may lead to battery expansion, overheating, or even combustion. Always use the original charger!

3.2. Emergency Alarm

Press the TB5000-BD's alarm button to transmit an emergency distress signal. The LED will blink red when pressed, indicating a distress alarm state.



3.3. Card Management

When issuing a card, input the tag number via card reader or manually into the positioning system to complete the process. Following issuance, positioning data is recorded.

For card return, remove the tag association via card reader or manually to conclude the process. Subsequently, positioning data is no longer recorded.

3.4. Wearing

The TB5000-BD is sized like a typical employee badge, enabling lanyard attachment. With an IP65 rating, it's fit for office use. For enhanced waterproofing, attach the provided plastic protector.

4. Tag Operating Modes

4.1. Refresh Rate

The frequency of a tag's communication with the Anchor per second is termed as its refresh rate. By default, the tag refreshes at 1Hz, communicating once every second. In LocalSense positioning, this is expressed as the "refresh interval (ms)", with the relationship being:

$$\text{Refresh Interval (ms)} = \frac{1000}{\text{Refresh Rate}}$$

For instance, to achieve a refresh rate of 3Hz (refreshing 3 times per second), the refresh interval should be set to 333ms.

4.2. Sleep Mode

Sleep mode is a power-saving mode designed for the tag. In this mode, the tag's refresh rate is drastically reduced to minimize power consumption and extend standby time. For the TB5000-BD, the refresh interval in sleep mode is set to 10,000ms, or one signal every 10 seconds.

The TB5000-BD determines its status with a vibration sensor to switch between sleep and operating modes. To prevent frequent mode switching, the following mechanisms are employed:

Entering sleep mode: The tag enters sleep mode if it remains stationary for longer than the time set by "**sleep delay**", which is 15 seconds by default. This occurs in scenarios such as being placed on a desk or installed on a stationary surface for longer than 15 seconds.

Exiting sleep mode: The tag immediately exits sleep mode upon detecting vibration. This typically happens when worn by an active person or installed on a moving device, as movement generates vibrations that trigger the switch to normal operating mode.

 **Note:** The TB5000-BD comes with a default "sleep delay" of 15 seconds, which can be modified to anywhere from 0 to 255 seconds with the service configuration software. Notably, 199 seconds is a special presetting. Setting the tag's "sleep delay" to 199 seconds will place it in a "non-sleep mode", where it will not enter sleep mode regardless of how long it remains stationary.

4.3. Operating Mode

In operating mode, the tag transmits UWB ranging frames at a default frequency of 1Hz. When the anchor and the tag are configured to the same frequency band, the anchor will receive the UWB signals from tags within its coverage area and initiate a ranging response. Upon completion of the ranging process, the anchor will transmit the ranging data back to the server to finalize the tag's positioning.

4.4. Charging

While charging, the tag refrains from sending positioning signals. Instead, it uploads its current battery status every 10 seconds, allowing the server software to monitor the charging state.

【Warranty Card】

One-year warranty, non-human damage coverage

Product Name(including components)	Warranty Period	Service
Complete Unit	1 Year (including complimentary warranty)	Customer Shipment*
Accessories (such as adaptor, magnetic charging cable)	Not Warranted	None

Note: *Shipping and repair costs shall be borne by the user.

【Battery Care】

Leaving TB5000-BD unused >2-3 months may lead to deep discharge, rendering it unchargeable. Disassembly and reactivation are required in such cases, with potential significant battery life reduction.

To prevent such deep discharge, please avoid leaving TB5000-BD unused for a long time(>2-3 months). Charge every 2-3 months,max 6-month idle.

【Radio Specifications】

Radio Specifications	
Radio Specification	UWB
Operation Frequency	7500 ~ 8500 MHz
Bandwidth	> 500MHz
Data Rate	6.8 Mbps
Antenna Type	PCB antenna, maximum PK gain: 3.24 dBi
EIRP	Max 0dBm/50MHz