WITMOTION WTVB01-BT50

WTVB01-BT50 Smart Vibration Module User Manual

Brand: WITMOTION | Model: WTVB01-BT50

1. Introduction

The WITMOTION WTVB01-BT50 is a compact and versatile Bluetooth Low Energy (BLE) vibration sensor module designed for real-time monitoring of 3-axis vibration and temperature data. It provides comprehensive measurements including vibration displacement, speed, amplitude, and operating temperature. With its wireless design and compatibility with Android/iOS systems via the WITMOTION APP, as well as PC connectivity via USB-C, it offers flexible and accurate solutions for condition monitoring and vibration analysis in various industrial and scientific applications.

Figure 1.1: WTVB01-BT50 BLE Vibration Sensor and its mobile application interface.

2. Product Features

- **Integrated Vibration Sensor:** Real-time capture of 3-axis vibration and temperature data, including vibration displacement (0~30000um), speed (0~50mm/s), amplitude (0~180°), and operating temperature (-20°C~60°C).
- **BLE 5.0 Low Power:** Offers a 50m transmission distance and approximately 8 hours of battery life. Compatible with Android/iOS systems, supporting connection of up to 4 sensors on the same smartphone via the WITMOTION APP.
- **Easy Install & Use:** Wireless design allows installation on hard-to-access machine parts. Small, portable, and designed with strap holes for versatile use.
- **Analysis Vibration Sensor System:** Condition monitoring and vibration analysis are seamlessly integrated with WITMOTION PC software, providing quick and easy data analysis and visualization.

- **Accurate & Reliable Attitude Measurement:** Sensors integrate R&D fusion algorithms, ensuring low noise levels and increased measurement accuracy for stable data output.

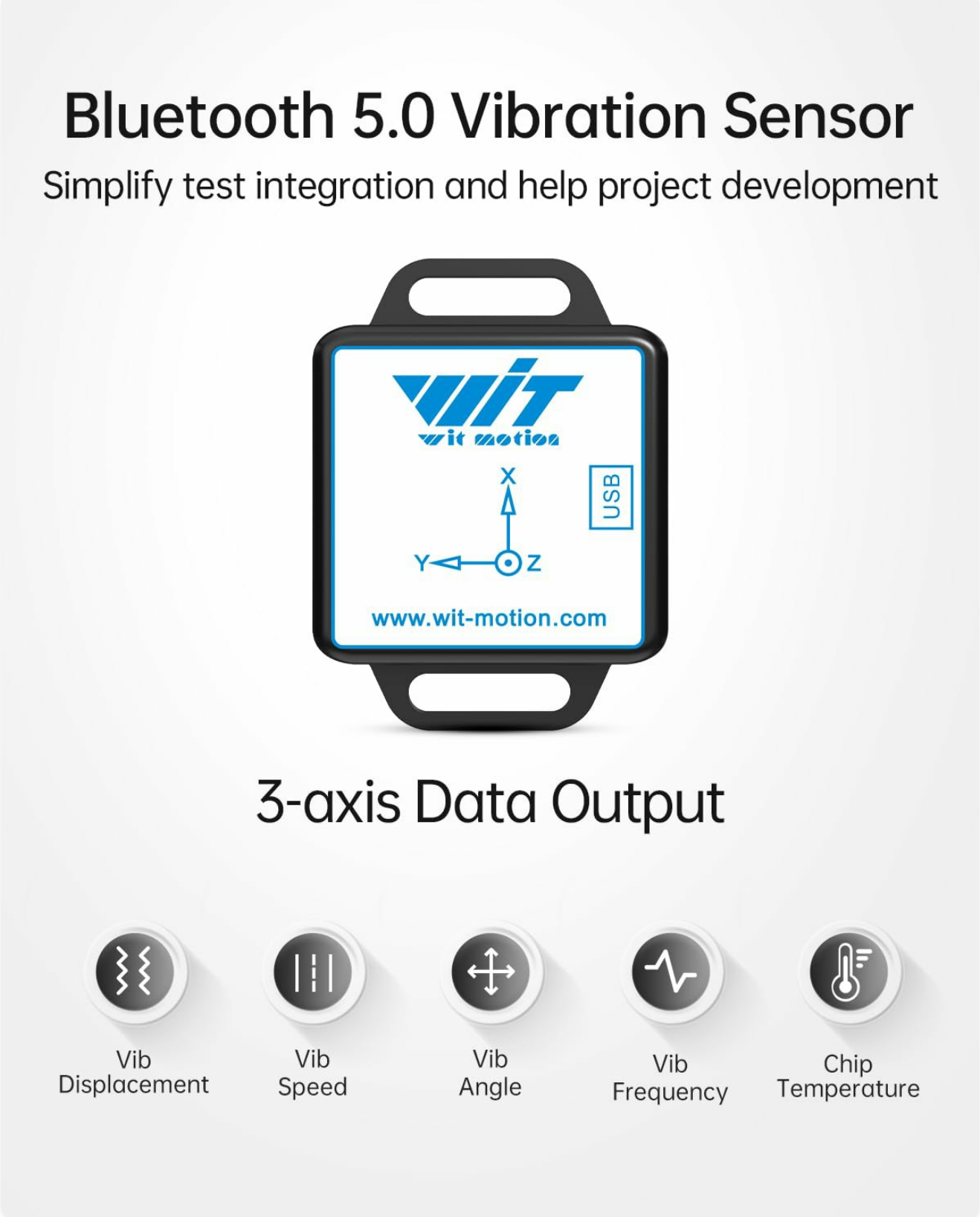


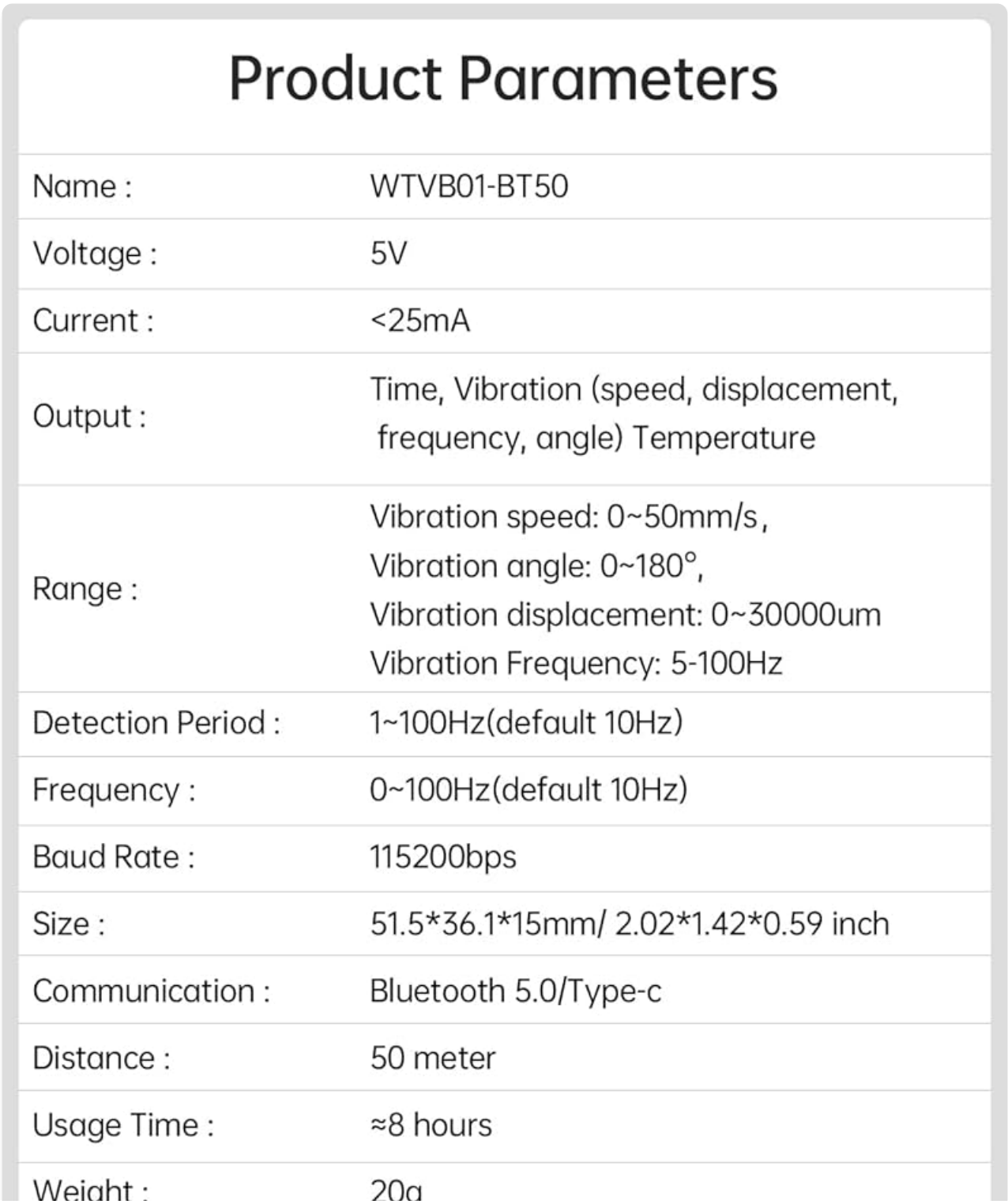
Figure 2.1: Overview of the WTVB01-BT50's Bluetooth 5.0 capabilities and 3-axis data output.

Figure 2.2: Key features including Bluetooth 5.0, low power consumption, USB-C charging, and portability.

3. Product Specifications

Specification	Value

Specification	Value
Product Dimensions	1.42 x 0.59 x 2.02 inches; 1.76 ounces
Item Model Number	WTVB01-BT50
Batteries	1 CR123A batteries required (included)
Date First Available	June 9, 2023
Manufacturer	WitMotion
Country of Origin	China



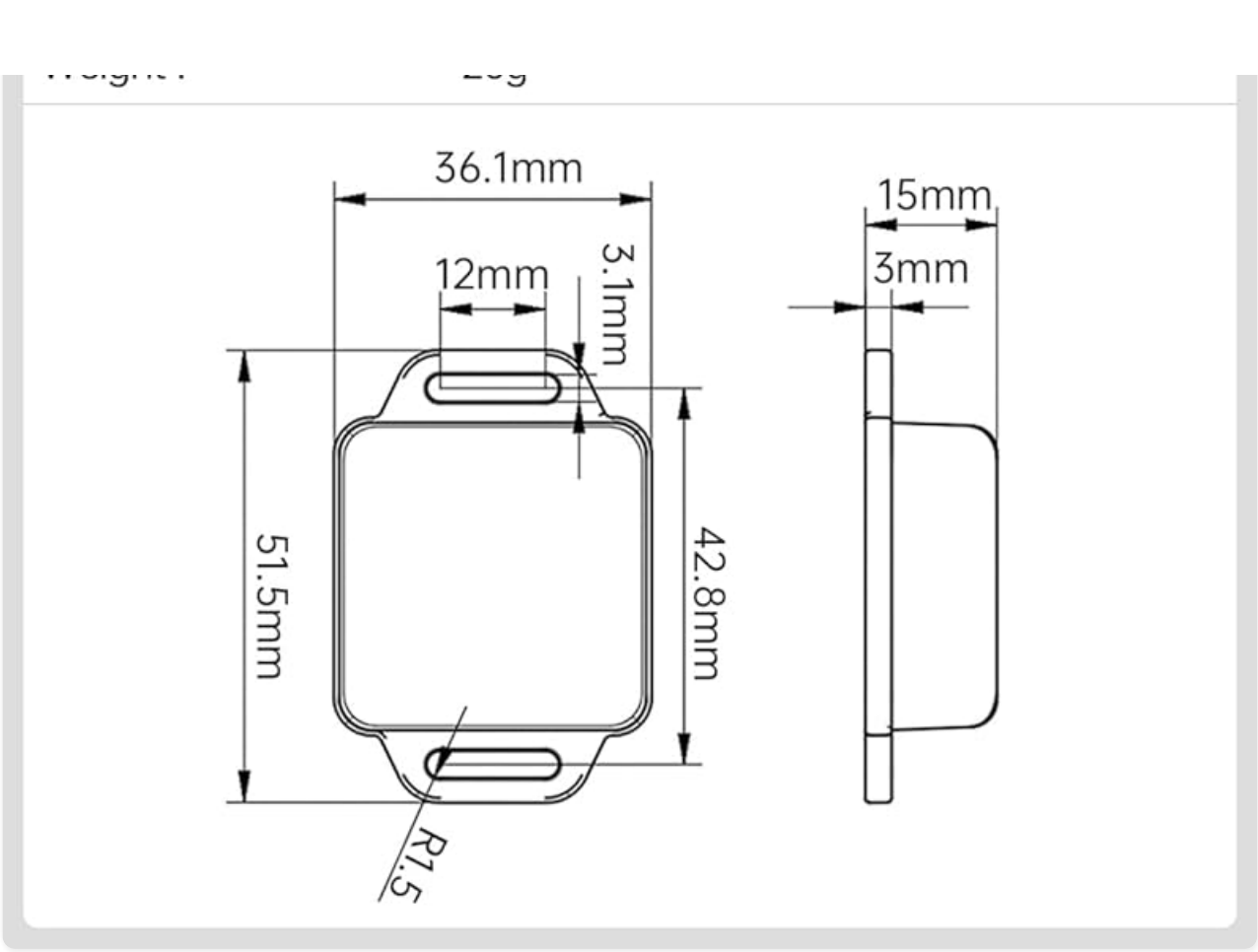


Figure 3.1: Detailed product parameters including voltage, current, output, ranges, and dimensions.

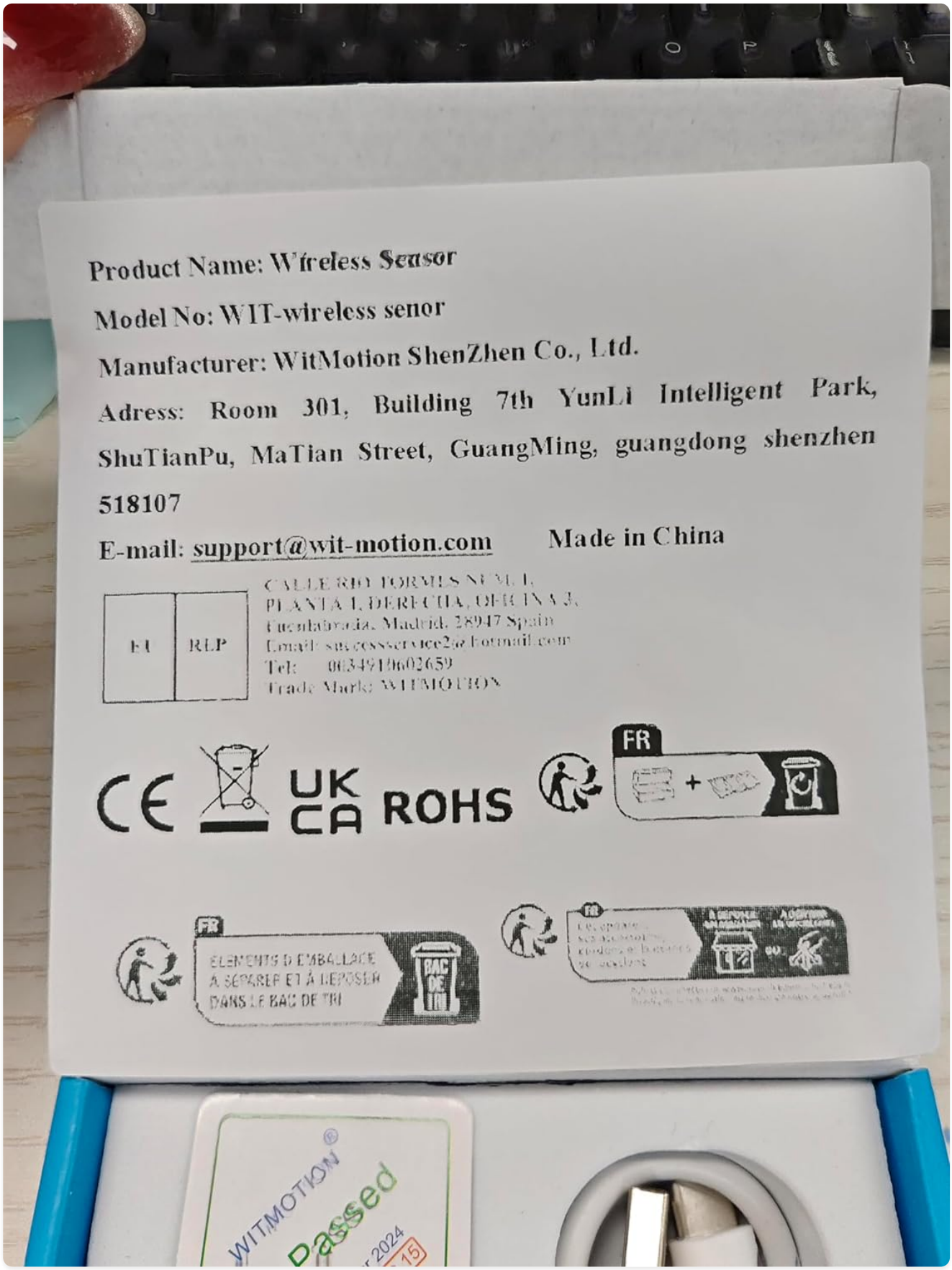


Figure 3.2: Technical drawing illustrating the physical dimensions of the sensor.

4. Setup Guide

4.1. Hardware Setup

The WTVB01-BT50 sensor is designed for easy installation due to its compact size and wireless capabilities. It features strap holes at both ends for secure mounting in various locations. Ensure the sensor is placed on a stable surface or securely attached to the object you wish to monitor.

4.2. Software and App Installation

The WITMOTION WTVB01-BT50 can be used with both mobile applications (Android/iOS) and PC software for data acquisition and analysis.

4.2.1. Mobile App Installation (Android/iOS)

Search for "WITMOTION" in your device's app store (Google Play Store for Android or Apple App Store for iOS) and install the official WITMOTION application. The app supports connecting up to 4 sensors simultaneously.

Video 4.1: Guide on how to connect the sensor to an iOS device and use the mobile application.

4.2.2. PC Software Installation

Visit the official WITMOTION website (www.wit-motion.com) and navigate to the "Document Center" or "Support" section. Locate and download the PC software for Windows. The software provides advanced data analysis and configuration options.

Figure 4.1: WITMOTION provides PC software and smartphone applications with complete development materials.

Figure 4.2: Real-time data update and multi-connection capabilities of the WITMOTION software.

4.3. Driver Installation (for PC)

If connecting the sensor to a PC via USB-C, you may need to install the CH340 driver. This driver is typically available in the same "Document Center" section of the WITMOTION website where the PC software is found. Follow the provided instructions for driver installation.

Video 4.2: Tutorial on how to install the WITMOTION PC software and the CH340 driver.

4.4. Connection Guide

4.4.1. Bluetooth Connection (Mobile App)

1. Ensure Bluetooth is enabled on your smartphone.
2. Turn on the WTVB01-BT50 sensor.
3. Open the WITMOTION APP and select the appropriate model.
4. The app will scan for available devices. Select your sensor from the list to connect.

4.4.2. USB-C Connection (PC Software)

1. Connect the WTVB01-BT50 sensor to your PC using a USB-C cable.
2. Ensure the CH340 driver is correctly installed (refer to Section 4.3).
3. Open the WITMOTION PC software. The software should automatically detect the connected sensor.

5. Operating Instructions

5.1. Data Acquisition and Analysis

Once connected, the WITMOTION APP or PC software will display real-time vibration and temperature data. You can view data in various formats, including numerical values, graphs, and 3D representations.

Video 5.1: Demonstration of the Bluetooth Vibration Sensor applied to a road roller for monitoring vibration data during operation.

5.2. Calibration

For optimal accuracy, it is recommended to perform calibration as needed. The software provides options for acceleration and magnetic calibration.

5.2.1. Acceleration Calibration

Place the sensor on a horizontal, stable surface. In the software, initiate acceleration calibration. The sensor will self-calibrate to ensure accurate readings relative to gravity.

5.2.2. Magnetic Calibration

Magnetic calibration helps to correct for local magnetic interferences. Ensure the sensor is away from strong magnetic fields (e.g., mobile phones, computers, metal desks). Follow the on-screen instructions in the software to rotate the sensor through 360 degrees in various orientations (horizontal and vertical planes) to complete the magnetic calibration.

5.3. Data Export

The WITMOTION software allows you to record and export data in various formats, such as TXT, Matlab, or XLS, for further analysis or record-keeping.

6. Maintenance

6.1. Battery Charging

The WTVB01-BT50 has an approximate 8-hour battery life. Recharge the device using the provided USB-C cable connected to a standard USB power source.

6.2. Cleaning

Use a soft, dry cloth to clean the sensor. Avoid using harsh chemicals or abrasive materials that could damage the casing or internal components.

6.3. Storage

Store the sensor in a cool, dry place away from direct sunlight and extreme temperatures. When storing for extended periods, ensure the battery is partially charged (around 50%) to prolong its lifespan.

7. Troubleshooting

- **Sensor not connecting via Bluetooth:**
  - Ensure the sensor is powered on and within the 50m transmission range.
  - Verify Bluetooth is enabled on your mobile device.
  - Restart the sensor and the mobile application.
  - Check if the sensor is already connected to another device.
- **PC software not detecting sensor via USB-C:**
  - Confirm the USB-C cable is securely connected to both the sensor and the PC.
  - Ensure the CH340 driver is correctly installed and recognized by your operating system (check Device Manager).
  - Try a different USB port or cable.
- **Inaccurate readings:**
  - Perform acceleration calibration (refer to Section 5.2.1).
  - Perform magnetic calibration, ensuring no strong magnetic interferences are nearby (refer to Section 5.2.2).
  - Ensure the sensor is securely mounted and not experiencing unintended movement.
- **App/Software crashes or freezes:**
  - Ensure your app/software is updated to the latest version.
  - Close and reopen the application.
  - Restart your mobile device or PC.

8. Warranty and Support

WITMOTION is committed to providing professional attitude measurement solutions. For any issues or inquiries regarding your WTVB01-BT50 sensor, please refer to the following resources:

- **Official Website:** Visit WIT-MOTION.com for comprehensive documentation, software downloads, and support pages.
- **Online Resources:** Access the WITMOTION Google Drive for tutorials and additional resources.
- **Video Tutorials:** Subscribe to the official WITMOTION YouTube channel for instructional videos and project sharing.

- **Contact Support:** For direct assistance, you can typically find contact information (e.g., email:support@wit-motion.com) on the product packaging or official website.

Figure 8.1: Example of a support card included with WITMOTION products, providing QR codes for documentation and video tutorials.