WITMOTION WT9011DCL

WT9011DCL MPU9250 Bluetooth 5.0 Accelerometer+Inclinometer User Manual

Model: WT9011DCL | Brand: WITMOTION

1. Introduction and Overview

The WITMOTION WT9011DCL is a high-precision, low-power 9-axis Attitude and Heading Reference System (AHRS) Inertial Measurement Unit (IMU) sensor. It integrates a Bluetooth 5.0 module, accelerometer, gyroscope, and magnetometer, providing accurate output data including 3-axis acceleration, angular velocity, angle (Pitch, Roll, Yaw), magnetic field, quaternion, and port status. Designed for various applications, this sensor offers stable data output and excellent bias stability through its integrated R&D dynamic fusion algorithm and Kalman Filtering.

Image 1.1: The WT9011DCL sensor module alongside its Bluetooth adapter.

2. Product Features

- **High Performance:** Provides accurate 3-axis XYZ (Pitch, Roll, Yaw) Acceleration, Gyroscope, Angle, Magnetic field, Quaternion, and Port status data.
- **Bluetooth 5.0 Connectivity:** Low consumption Bluetooth 5.0 with a coverage range of up to 50 meters in open areas. Compatible with Android & iOS phone apps and Windows computers, supporting multi-connection for up to 4 sensors.
- **Advanced Algorithms:** Features an 8-year professional attitude measuring solution with integrated R&D dynamic fusion algorithm and Kalman Filtering for stable data output, excellent bias stability, and low noise levels, enhancing measurement accuracy.
- **Robust Design:** Compact and wearable design with a Type-C interface for charging. Battery life is approximately 10 hours.
- **Comprehensive Development Kit:** Includes phone APP, Windows software, Python SDK, Android SDK, and communication protocols to facilitate secondary development and testing.

Image 2.1: Overview of the Bluetooth 5.0 Attitude Sensor and its 9-axis fusion capabilities, including 3-axis acceleration, gyro, angle, magnetic field, quaternion, and port status.

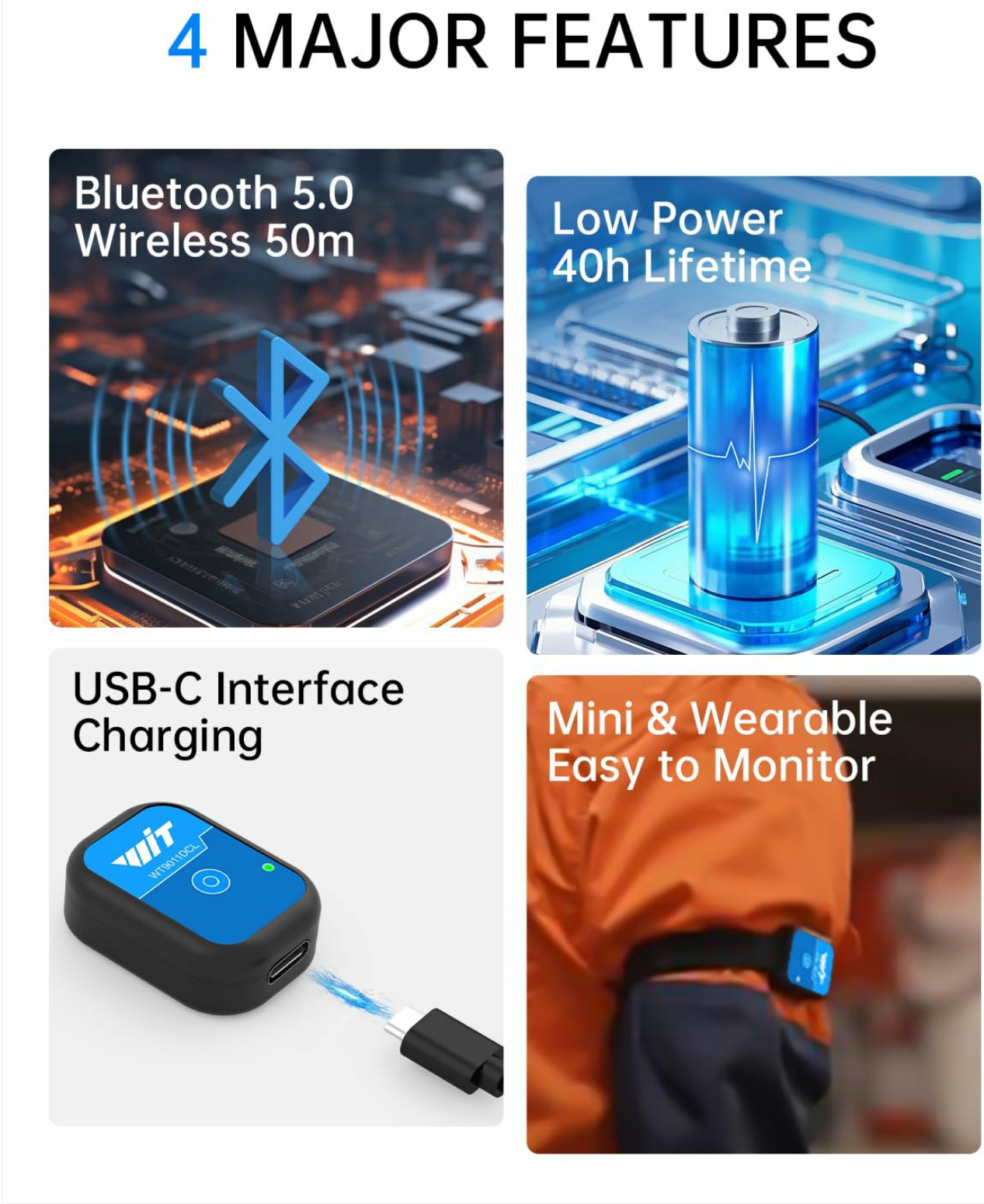


Image 2.2: Key features highlighted: Bluetooth 5.0 wireless range, 40-hour low power lifetime, USB-C interface charging, and mini & wearable design for easy monitoring.

3. Specifications

Product Parameters

Current	Working current: 14mA, Broadcast current: 21mA
	Standby current 14uA-30uA
Range	Acceleration: ±16g, angular velocity: ±2000°/s,
	Mag field: ±2Gauss, Angle: X/Z±180°, Y±90°.
Resolution	Acceleration: 0.5mg/LSB (2048LSB/g)
	Angular velocity: 0.061(°/s)/LSB, mag field:
	0.0667mG/LSB Angle: 0.0055°/LSB
Accuracy	X, Y axis: 0.2° Z axis: 1° (no magnetic field interference and after calibration)
Output content	Acceleration, angular velocity, angle, magnetic field (magnetic field is not output by default)
Output frequency	0.2Hz~200Hz
Trans-mission	Using BLE 5.0 technology, up to 50m (open area)
Commu-nication-	BLE 5.0
Usage time	40h
Weight	9g
Battery	130mAh
Dimensions	32.5*23.5*11.6mm

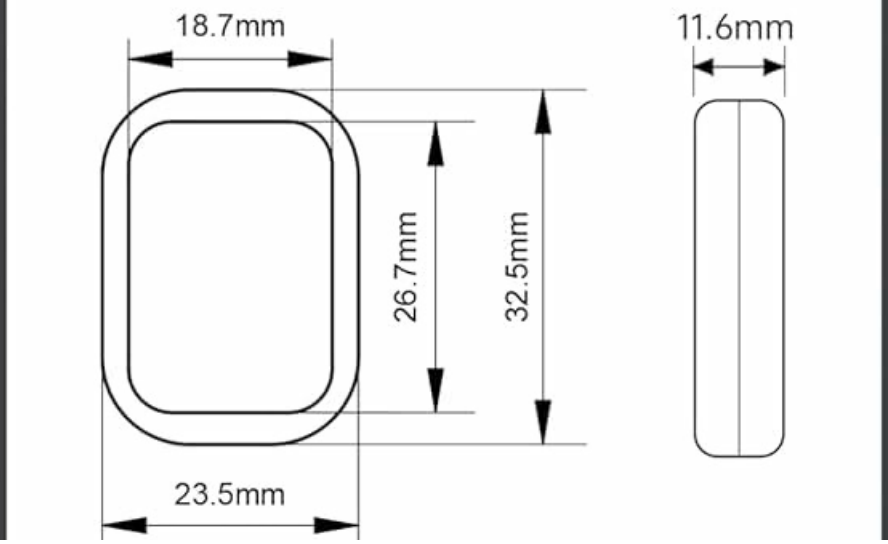


Image 3.1: Detailed product parameters including current, range, resolution, accuracy, output content, transmission, communication, usage time, weight, battery, and dimensions.

Parameter	Value
Product Dimensions	1.26 x 0.92 x 0.45 inches; 1.06 ounces
Item Model Number	WT9011DCL
Batteries	1 Lithium Ion battery required (included)
Date First Available	March 25, 2019
Manufacturer	WitMotion Shenzhen Co.,Ltd
Material	Acrylonitrile Butadiene Styrene
Item Weight	30 Grams
Style	Type-C

4. Setup

To set up your WT9011DCL sensor, follow these steps:

1. **Charge the Sensor:** Connect the WT9011DCL sensor to a power source using the provided Type-C charging cable. Ensure the sensor is fully charged before initial use for optimal battery life.
2. **Connect the BLE 5.0 Adapter:** If using with a computer, plug the included BLE 5.0 adapter into an available USB port on your PC.
3. **Install Software/App:** Download and install the WITMOTION PC software or the mobile application (for Android/iOS) from the official WITMOTION website or relevant app stores. Links and instructions are typically found in the welcome guide or on the WITMOTION support page.
4. **Pair the Sensor:** Follow the instructions within the software or app to pair your WT9011DCL sensor via Bluetooth. The sensor should be discoverable once powered on.

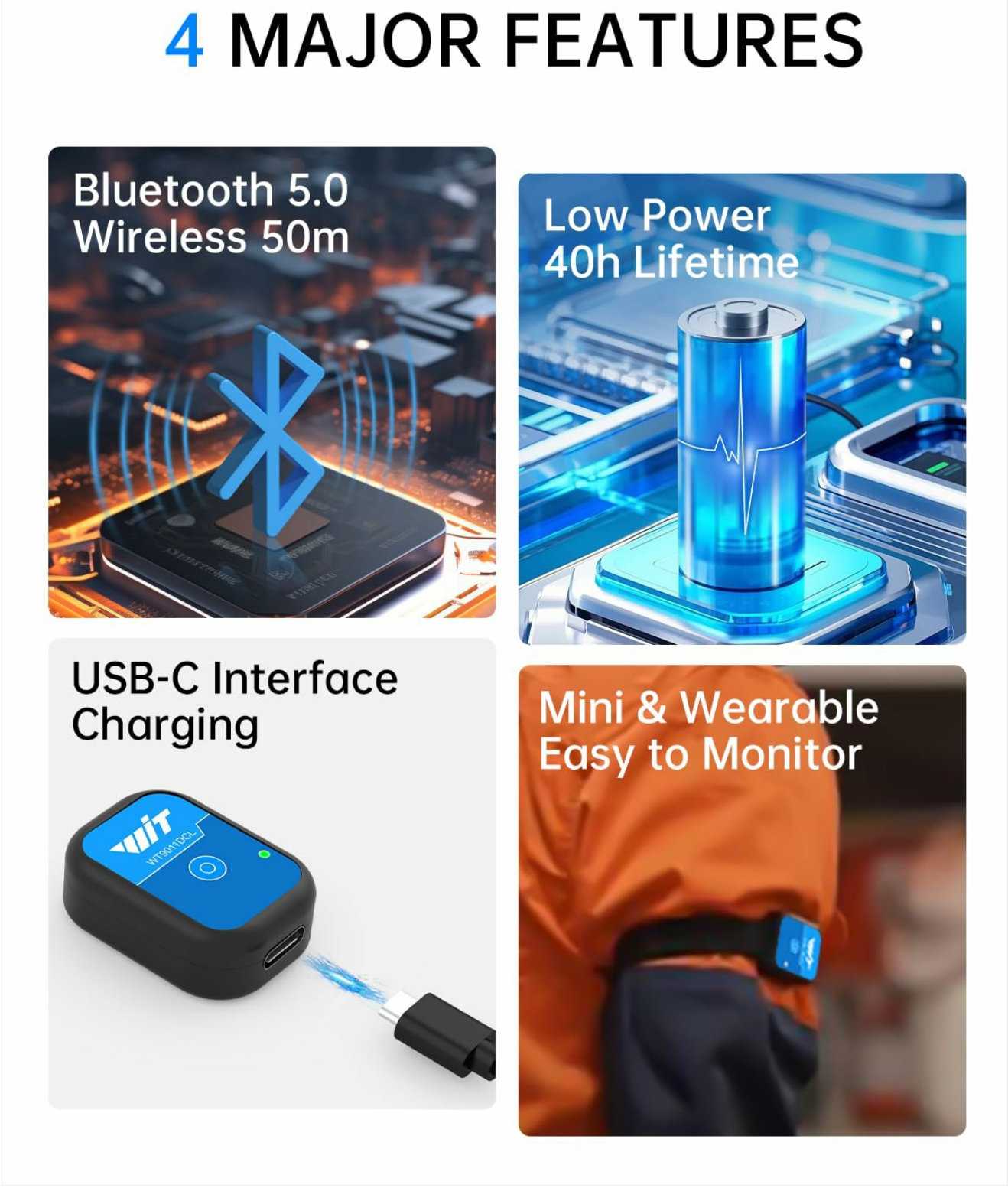


Image 4.1: The WT9011DCL sensor connected via its USB-C port for charging.

5. Operation

Once set up, the WT9011DCL sensor can be operated through the WITMOTION software or mobile application to acquire and analyze data.

- **Data Acquisition:** The software/app allows real-time data streaming from the sensor, including acceleration, angular velocity, angle, magnetic field, quaternion, and port status.
- **Multi-Sensor Connection:** The system supports connecting up to 4 WT9011DCL sensors simultaneously for comprehensive data collection from multiple points.

- **Data Visualization and Recording:** The WITMOTION software provides features such as compass display, 3D visualization, dashboard view, curve display, and data recording for detailed analysis.
- **Configuration:** The software includes a configuration menu to adjust sensor parameters, ranges, and communication settings to suit various application requirements.

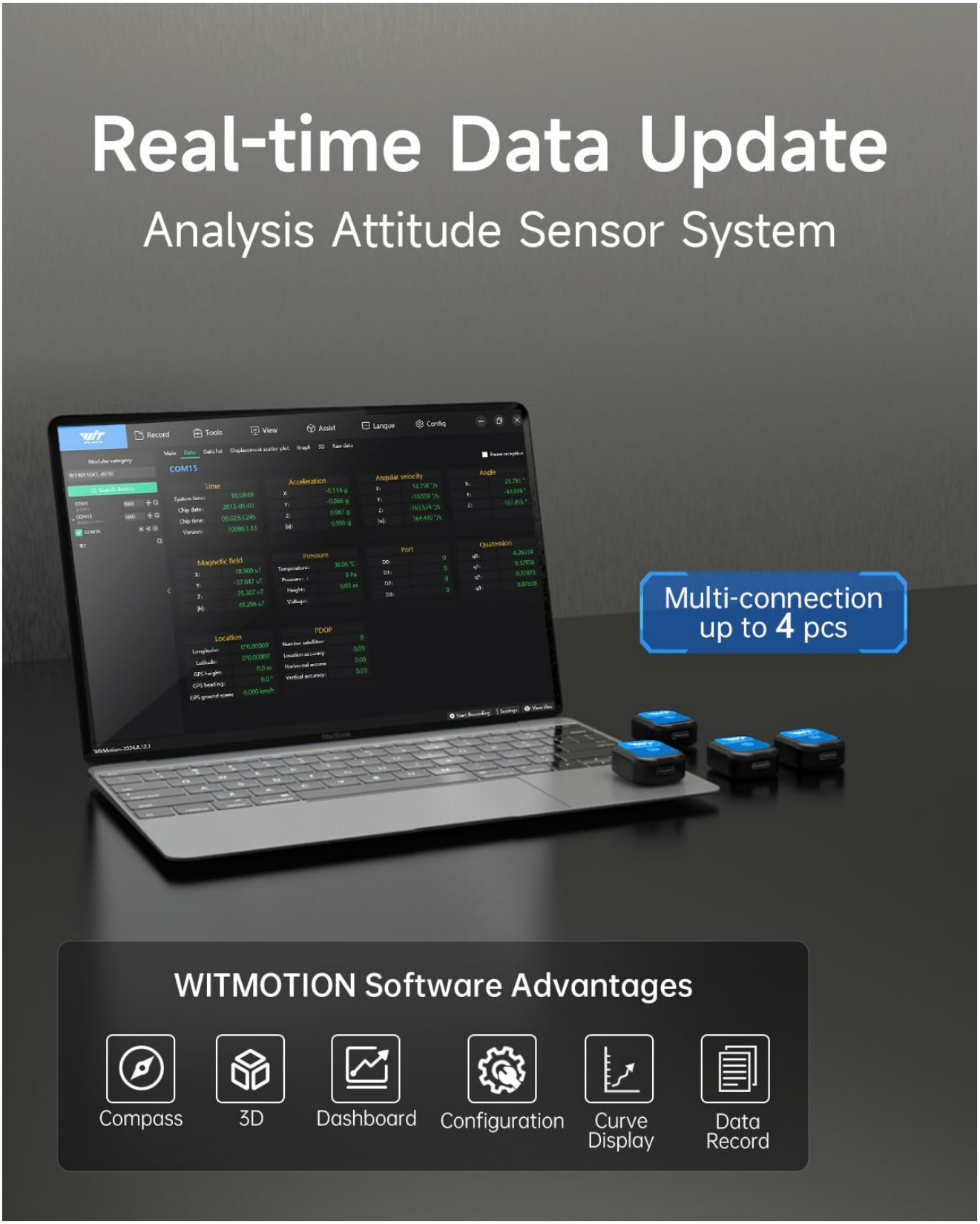


Image 5.1: Screenshot of the WITMOTION PC software displaying real-time sensor data and multi-connection capability.

Image 5.2: The WITMOTION ecosystem, showing PC software and smartphone apps with various development materials like manuals, SDKs, and protocols.

6. Maintenance

Proper maintenance ensures the longevity and accuracy of your WT9011DCL sensor:

- **Cleaning:** Keep the sensor clean and free from dust and debris. Use a soft, dry cloth for cleaning. Avoid using harsh chemicals or abrasive materials.
- **Storage:** Store the sensor in a cool, dry place away from direct sunlight and extreme temperatures.

- **Battery Care:** Recharge the sensor when the battery is low. Avoid fully discharging the battery frequently to prolong its lifespan. The estimated battery life is approximately 10 hours on a full charge.
- **Magnetic Interference:** For accurate magnetometer readings, ensure the sensor is calibrated before use and kept at least 20cm away from strong magnetic interference sources and hard magnetic objects during operation.

7. Troubleshooting

If you encounter issues with your WT9011DCL sensor, consider the following:

- **Connectivity Issues:** Ensure the sensor is charged, powered on, and within the Bluetooth range (up to 50m in open area). Verify that the Bluetooth adapter (if used) is properly connected to your computer. Restart the sensor, adapter, and host device if necessary.
- **Inaccurate Readings:** Perform a calibration of the sensor using the provided software. Ensure there are no strong magnetic fields or vibrations affecting the sensor during operation, especially for magnetometer and gyroscope readings.
- **Software/App Problems:** Ensure you are using the latest version of the WITMOTION software or mobile application. Reinstall the software if persistent issues occur.
- **No Data Output:** Check the sensor's power indicator. Verify that the sensor is correctly paired and connected in the software/app.

For further assistance, refer to the support section below or contact WITMOTION customer service.

8. Areas of Applications

The WT9011DCL sensor is versatile and suitable for a wide range of applications requiring precise attitude and motion sensing:

- **Virtual Reality (VR):** For head tracking and motion control in VR environments.
- **Robotics:** For robot navigation, balance control, and precise movement.
- **Motion Monitoring:** In sports, fitness, and industrial settings for tracking movement and posture.
- **Medical Rehabilitation:** For monitoring patient movement and progress during physical therapy.
- **Gesture Recognition:** Enabling control through hand or body gestures.
- **Virtual Interaction:** For interactive systems and simulations.

Image 8.1: Visual representation of diverse applications including VR, robotics, motion monitoring, medical rehabilitation, gesture recognition, and virtual interaction.

9. Support and Warranty

WITMOTION provides comprehensive support for its products:

- **Warranty:** Enjoy a 12-month warranty and lifetime friendly customer service from the WitMotion team.
- **Documentation:** Access the complete tutorial, user guides, and instructions for use by visiting wit-motion.com and navigating to the support page. You can also find a tutorial link on the guide card inside the product package.

- **Video Tutorials:** Find and subscribe to the WITMOTION YouTube channel for instructional videos and project sharing.
- **Contact Support:** For any assistance, you can contact support directly atsupport@wit-motion.com.

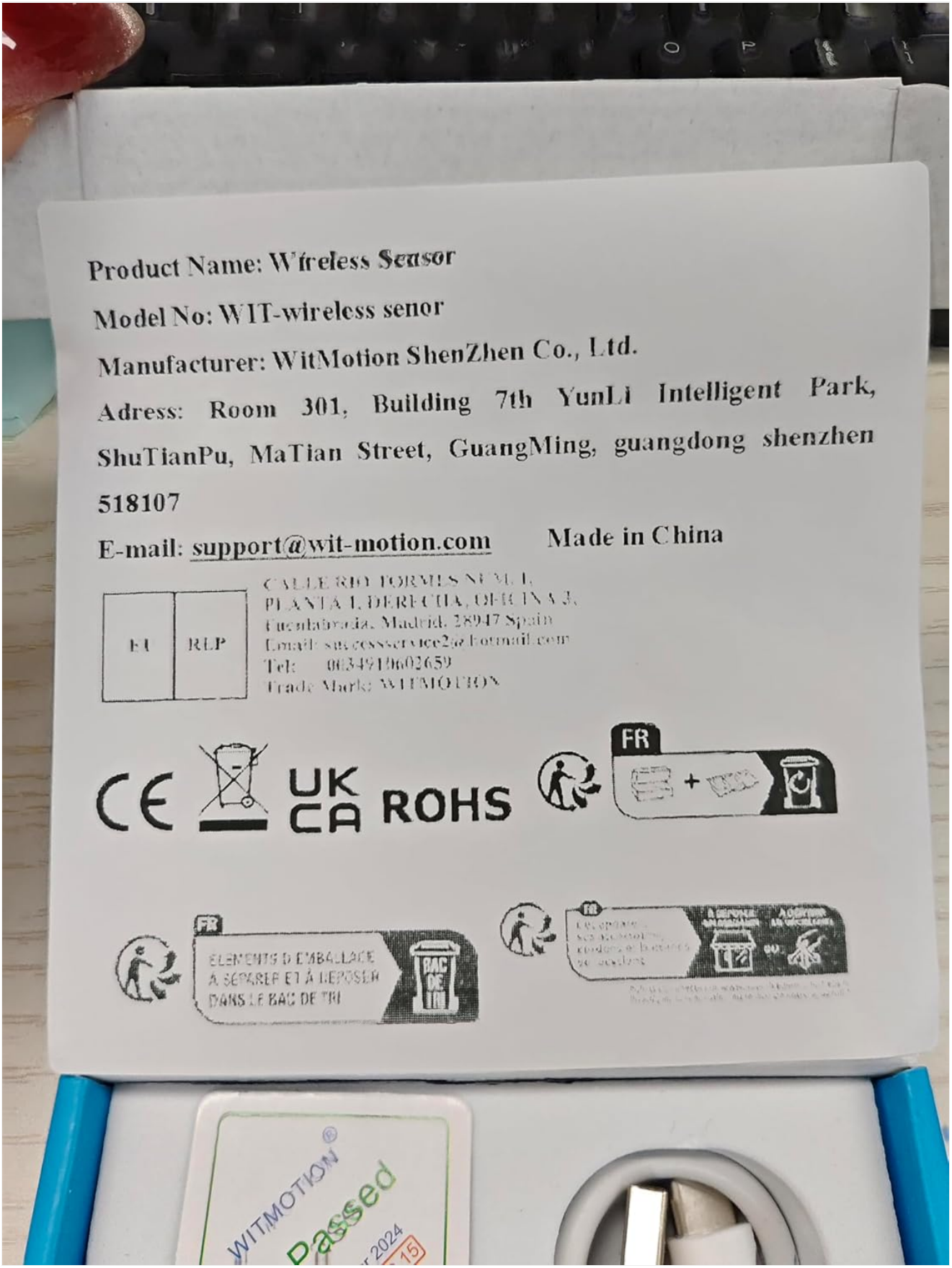


Image 9.1: Product label showing manufacturer details and support email address.

Related Documents - WT9011DCL

	[WT9011DCL-BT5.0 Bluetooth 5.0 Inclinometer Sensor User Manual] User manual for the WITMOTION WT9011DCL-BT5.0, a Bluetooth 5.0 inclinometer sensor. This guide provides detailed instructions on installation, connection, calibration, and configuration for various platforms including Android, iPhone, and PC.
	[WITMOTION WT901 Inclinometer Sensor User Manual] User manual for the WITMOTION WT901 Inclinometer Sensor, detailing its features, applications, software introduction, and connection methods.
	[WITMOTION BWT901CL User Manual: Bluetooth 2.0 Inclinometer Sensor Guide] Comprehensive user manual for the WITMOTION BWT901CL Bluetooth 2.0 Inclinometer Sensor. Learn about installation, PC and Android app connection, calibration, and configuration for accurate attitude measurement.
	[WITMOTION WT901C(RS232) 9-Axis Inclinometer Sensor User Manual | MPU9250, Kalman Filtering] User manual for the WITMOTION WT901C(RS232) RS232 9-axis vibration inclinometer sensor. Details features like high-stability acceleration, gyro, angle (XY 0.05° Accuracy), digital compass, MPU9250 sensor, and Kalman filtering. Covers applications, PC and MCU connection methods, and software for industrial control, robotics, and AGVs.
	[WITMOTION HWT905(RS485) IP68 Inclinometer User Manual] User manual for the WITMOTION HWT905(RS485) IP68 Inclinometer, detailing its features, applications, installation, and software usage. This AHRS IMU sensor provides high-precision angle, acceleration, and angular velocity measurements.

[WT901B Inclinometer Sensor User Manual]
User manual for the WT901B Inclinometer Sensor, detailing its features, applications, software, and connection methods. Includes technical specifications and support information from WITMOTION.

Documents - WITMOTION – WT9011DCL

[WT9011DCL-BT5.0 Bluetooth 5.0 Inclinometer Sensor User Manual]
User manual for the WITMOTION WT9011DCL-BT5.0, a Bluetooth 5.0 inclinometer sensor. This guide provides detailed instructions on installation, connection, calibration, and configuration for various platforms including Android, iPhone, and PC.
lang:en score:51 filesize: 5.77 M page_count: 54 document date: 2023-06-14

[WITMOTION WT9011DCL-BT5.0 Bluetooth 5.0 Inclinometer Sensor User Manual]
Comprehensive user manual for the WITMOTION WT9011DCL-BT5.0, a Bluetooth 5.0 inclinometer sensor. Learn about installation, PC and mobile connections, calibration, configuration, and data recording for this AHRS IMU sensor.
lang:en score:49 filesize: 2.91 M page_count: 40 document date: 2023-02-13

[WitMotion Sensor Product Catalog and Document Center]
Explore the comprehensive range of WitMotion sensors, including Bluetooth Accelerometers, Digital Inclinometers, GPS IMUs, RTK Positioning Sensors, and more. Access tutorials, datasheets, and support information for WitMotion products.
lang:en score:45 filesize: 1.8 M page_count: 16 document date: 2024-02-27

[pdf] Instructions Datasheet

Administrator WT9011DCL BTL5 Datasheet WITMOTION MPU9250 Bluetooth Accelerometer sensor High Precision 9 axis Gyroscope Angle XY 0 2° Magnetometer 3 AHRS IMU for Arduino RobotShop ac3651b6 wt9011dcl btl5 datasheet cdn robotshop rbm f83835f4 5e29 4ee0 9cc2 e49300031503 d d8719ac7 3d35 4dd9 975f 22c94582aa69 |||

WitMotion Shenzhen Co., Ltd Datasheet Bluetooth AHRS IMU sensor **WT9011DCL**-BT5.0 The Robust Acceleration, Angular velocity, Angle Magnetic filed Detector The **WT9011DCL**-BTL5.0 is a Bluetooth 5.0 multi-sensor device, detecting acceleration, angular velocity, angle as well as magnetic filed. Th...

lang:en score:39 filesize: 562.04 K page_count: 21 document date: 2023-02-13

[pdf] Instructions Specifications Datasheet

Administrator Bluetooth 5 0 Accelerometer Inclinometer WT9011DCL MPU9250 High Precision 9 axis Gyroscope Angle XY 2° Accuracy Magnetometer with Kalman Filter Low Power 3 AHRS IMU Sensor for Arduino Specification Sheet WITMOTION WitMotion Shenzhen Co Ltd 91NuPLc5ScL m media amazon images I |||

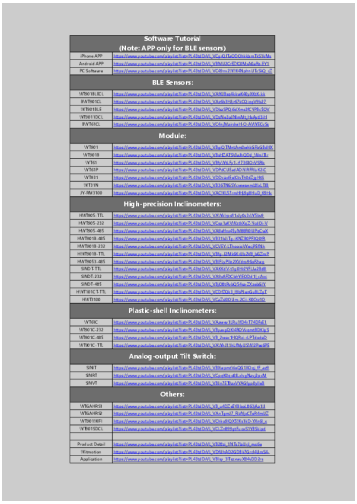
WitMotion Shenzhen Co., Ltd Datasheet Bluetooth AHRS IMU sensor **WT9011DCL**-BT5.0 The Robust Acceleration, Angular velocity, Angle Magnetic filed Detector The **WT9011DCL**-BTL5.0 is a Bluetooth 5.0 multi-sensor device, detecting acceleration, angular velocity, angle as well as magnetic filed. Th...

lang:en score:39 filesize: 532.13 K page_count: 21 document date: 2023-06-14

WITMOTION WT9011DCL-BT5.0 Bluetooth AHRS IMU Sensor Datasheet

Datasheet for the WITMOTION WT9011DCL-BT5.0, a Bluetooth 5.0 AHRS IMU sensor. It measures acceleration, angular velocity, angle, and magnetic field, suitable for industrial applications like condition monitoring and predictive maintenance. Features high precision, advanced filtering, and Bluetooth 5.0 connectivity.

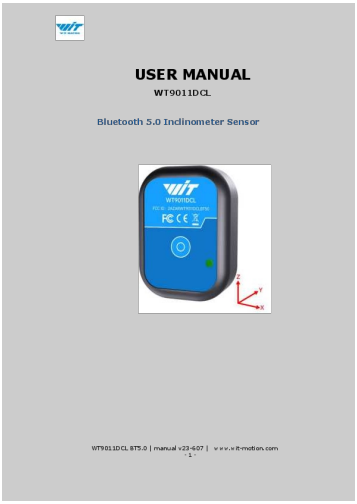
lang:en score:39 filesize: 466.93 K page_count: 21 document date: 2023-06-21



[Witmotion Sensor Software Tutorials and Product Links]

Access software tutorials and product links for Witmotion's range of sensors, including BLE sensors, high-precision inclinometers, and analog-output tilt switches, covering various models and applications.

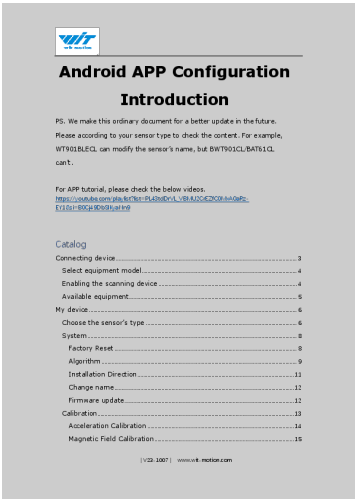
lang:i-klingon score:37 filesize: 51.11 K page_count: 1 document date: 2023-05-22



[WT9011DCL Bluetooth 5.0 Inclinometer Sensor User Manual | WITMOTION]

Comprehensive user manual for the WITMOTION WT9011DCL Bluetooth 5.0 Inclinometer Sensor. Learn about installation, connection, calibration, PC and mobile app usage, and data recording.

lang:en score:35 filesize: 2.11 M page_count: 26 document date: 2025-07-27

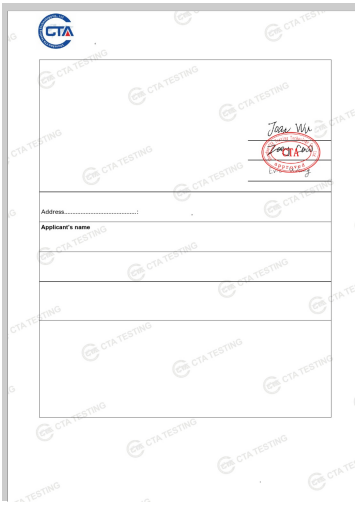


[pdf] User Manual Catalog

drive google file d 122Es4QPLi5R O4TjN43FMFRcaNK9eSY8 view WiT BWT901CL Bluetooth Inclinometer Sensor User Manual Android APP Configuration Introduction |||

Android APP Configuration Introduction PS. We make this ordinary document for a better update in the ... g type. If you re using BWT901CL/BWT61CL, please choose HC-06. When you re using WT901BLCL/WT901BLE/**WT9011DCL** sensor, please choose WT901BLE68/ WT901BLE67. V23-1007 www.wit-motion.com My device ...

lang:fr score:30 filesize: 709.54 K page_count: 20 document date: 2023-10-07



[pdf] Specifications Test Report

CTA25011601201 Test Report 2 4G WIFI Part1 WitMotion Shenzhen Co Ltd WT901WIFI Inertial Accelerometer sensor 2AZAR 2AZARWT901WIFI wt901wifi

Shenzhen CTA Testing Technology Co., Ltd. Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Co ... . : Modulation Type ..... : WT901WIFI WT901BLECL, **WT9011DCL**, WT9012DCL, WTVB01-BT50, WTVB02-BT50, WT901SDCL-BT50, WT901SDCL CCK/DSSS/OFDM Operation F...

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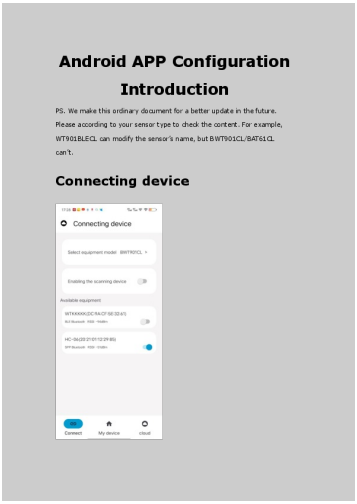

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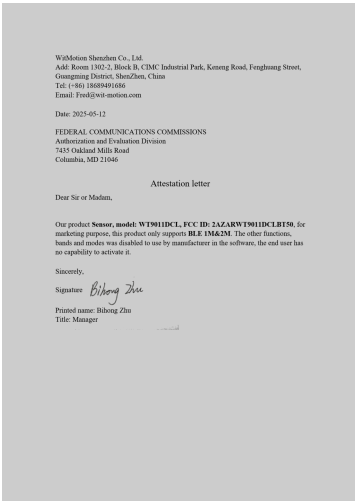
Android APP Configuration Introduction PS. We make this ordinary document for a better update in the ... g type. If you re using BWT901CL/BWT61CL, please choose HC-06. When you re using WT901BLCL/WT901BLE/**WT9011DCL** sensor, please choose WT901BLE68/ WT901BLE67. My device Choose the sensor s type Choose ...

lang:en score:22 filesize: 640.64 K page_count: 17 document date: 2023-06-12



WitMotion Shenzhen Co., Ltd.
Add: Room 1302-2, Block B, CIMC Industrial Park, Keneng Road, Fenghuang Street, Guangming District, ShenZhen, China
Tel: (+86) 18689491686
Email: Fred@wit-motion.com

Date: 2025-05-12

FEDERAL COMMUNICATIONS COMMISSIONS
Authorization and Evaluation Division
7435 Oakland Mills Road
Columbia, MD 21046

Attestation letter

Dear Sir or Madam,

Our product **Sensor, model: WT9011DCL, FCC ID: 2AZARWT9011DCLBT50**, for marketing purpose, this product only supports **BLE 1M&2M**. The other functions, bands and modes was disabled to use by manufacturer in the software, the end user has no capability to activate it.

Sincerely,

Signature: Bihong Zhu

Printed name: Bihong Zhu
Title: Manager

[pdf]

SZ122 Attestation LetterWitMotion Shenzhen Co Ltd WT9011DCLBT50 Sensor 2AZARWT9011DCLBT50 wt9011dclbt50

WitMotion Shenzhen Co., Ltd. Add: Room 1302-2, Block B, CIMC Industrial Park, Keneng Road, Fenghuang ... d Mills Road Columbia, MD 21046 Dear Sir or Madam, Attestation letter Our product Sensor, model: **WT9011DCL**, FCC ID: 2AZAR**WT9011DCL**BT50, for marketing purpose, this product only supports BLE 1M 2M. ...

lang:en score:21 filesize: 210.98 K page_count: 1 document date: 2025-07-09