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WitMotion HWT3100-TTL

WitMotion HWT3100-TTL Fluxgate Sensor User Manual

MODEL: HWT3100-TTL

1. Introduction

The WitMotion HWT3100-TTL is a high-precision 3-axis electronic compass geomagnetic sensor, also known as a Fluxgate Magnetometer. It is designed to provide accurate heading angle output and magnetic field data, making it suitable for various applications requiring precise orientation and magnetic field measurements. This manual provides essential information for the proper setup, operation, and maintenance of your HWT3100-TTL sensor.



Figure 1: WitMotion HWT3100-TTL Fluxgate Sensor. This image displays the sensor unit, highlighting the connection points for VCC (Red), RX (Green), TX (Yellow), and GND (Black) on one end, and the cable connection on the other. The sensor body also shows 'FLUXGATE SENSOR' and 'http://www.wit-motion.com'.

2. Key Features

- **High Precision:** Designed with a high-sensitivity probe, ensuring accurate detection with error ranges below industry standards.
- **3-Axis Magnetic Field Output:** Provides comprehensive three-axis magnetic field data and heading angle output.
- **Military-Grade Accuracy:** Offers heading angle output with military-grade accuracy.
- **Magnetic-Field Interference Resistant:** Engineered to perform reliably even in environments with magnetic

interference.

- **Quick Response:** Equipped with advanced chip technology for millisecond-level data feedback.
- **Wide Output Rate:** Configurable output rate from 0.1Hz to 100Hz.
- **Flexible Baud Rates:** Supports baud rates of 9600 (default), 115200, and 460800.
- **ASCII Output:** Data is provided in an easily parsable ASCII format.
- **Cascade Support:** Capable of cascading with other units for expanded applications.
- **High Resolution & Low Noise:** Delivers detailed measurements with minimal interference.
- **IP67 Protection:** Features a high-quality aluminum shell, providing protection against dust and water immersion up to 1 meter for 30 minutes, suitable for harsh test environments and daily splashing.
- **Compliance and Security:** Compliant with relevant safety standards for secure operation.



Figure 2: Feature Overview. This image visually represents several key features of the Fluxgate Sensor, including ASCII output, cascade capability, high resolution, and low noise. It also highlights heading angle output, military-grade accuracy, and magnetic-field interference resistance.

3. Setup Instructions

3.1. Wiring Connections

The HWT3100-TTL sensor utilizes a TTL serial communication interface. Ensure correct wiring to your microcontroller or data acquisition system:

- **VCC (Red Wire):** Connect to the positive power supply (typically 3.3V or 5V, depending on your system's TTL logic level).
- **RX (Green Wire):** Connect to the TX (transmit) pin of your microcontroller/system. This is the sensor's receive data line.
- **TX (Yellow Wire):** Connect to the RX (receive) pin of your microcontroller/system. This is the sensor's transmit data line.
- **GND (Black Wire):** Connect to the common ground of your power supply and microcontroller/system.

Important: Double-check all connections before applying power to prevent damage to the sensor or connected devices.

3.2. Mounting

Mount the sensor securely in the desired orientation. For accurate heading measurements, ensure the sensor is placed away from strong magnetic fields (e.g., motors, large metal objects, power cables) that could interfere with geomagnetic readings.

4. Operating Instructions

4.1. Power On

Once wired correctly, apply power to the VCC and GND pins. The sensor will begin its initialization sequence.

4.2. Data Output

The HWT3100-TTL outputs data via its TX pin using serial communication. The default baud rate is 9600 bps. Data includes three-axis magnetic field values (X, Y, Z) and the calculated heading angle.

4.3. Using PC Software (RM3100 Host Computer Software)

For advanced configuration, data visualization, and logging, WitMotion provides dedicated PC software (e.g., RM3100 Host Computer Software). Connect the sensor to your computer via a TTL-to-USB converter (not included) and use the software to:

- View real-time magnetic field data and heading angle.
- Configure sensor parameters such as output rate and baud rate.
- Perform calibration procedures for improved accuracy.

High precision Three-axis magnetic field output

Three-axis magnetic output, heading angle output



Figure 3: PC Software Interface. This image shows a laptop screen displaying the RM3100 Host Computer Software, which visualizes three-axis magnetic field data (X, Y, Z) in milligauss (mg) and the calculated heading angle (100.3°). The sensor is shown connected to the laptop.

5. Maintenance

5.1. Cleaning

Due to its IP67 rating, the sensor is resistant to dust and water. If cleaning is necessary, gently wipe the exterior with a soft, damp cloth. Avoid using harsh chemicals or abrasive materials.

5.2. Storage

Store the sensor in a dry, cool environment, away from strong magnetic fields, extreme temperatures, and direct sunlight when not in use.

IP67 protection

Using high-quality aluminum shell, suitable for various harsh test environments, Daily splashing or working on rainy days will not be affected, and the duration of soaking in water can be up to 30 minutes



Figure 4: IP67 Protection. This image illustrates the HWT3100-TTL sensor submerged in water with splashes, demonstrating its IP67 water resistance. The text indicates its suitability for harsh environments and resistance to daily splashing or working in rainy conditions, with immersion up to 30 minutes.

6. Troubleshooting

- **No Data Output:**

- Verify all wiring connections (VCC, RX, TX, GND) are correct and secure.
- Ensure the sensor is receiving adequate power.
- Check that your receiving device (microcontroller/PC) is configured to the correct baud rate (default 9600 bps).
- Confirm the serial port on your receiving device is open and listening.

- **Inaccurate Heading/Magnetic Readings:**

- Relocate the sensor away from potential sources of magnetic interference (e.g., magnets, motors, power lines, large ferrous objects).
- Ensure the sensor is mounted stably and not subject to vibrations.
- Perform a calibration using the WitMotion PC software if available, especially after initial installation or

relocation.

7. Specifications

Parameter	Value
Model	HWT3100-TTL
Sensor Type	3-axis Fluxgate Magnetometer / Electronic Compass
Output Interface	TTL Serial
Output Data	3-axis Magnetic Field, Heading Angle
Output Rate	0.1Hz - 100Hz
Baud Rate	9600 (default), 115200, 460800 bps
Protection Rating	IP67 (Dust tight, immersion up to 1m for 30 min)
Item Weight	50 Grams
Housing Material	High-quality Aluminum Shell



8. Warranty and Support









For technical support, warranty information, or further inquiries regarding your WitMotion HWT3100-TTL Fluxgate Sensor, please contact WitMotion directly or visit their official website.

Official Website: www.wit-motion.com

Please have your product model (HWT3100-TTL) and any relevant purchase details ready when contacting support.

Related Documents - HWT3100-TTL

	<p>WITMOTION WT901 Inclinator Sensor User Manual</p> <p>User manual for the WITMOTION WT901 Inclinator Sensor, detailing its features, applications, software introduction, and connection methods.</p>
	<p>WitMotion HWT901B AHRS IMU Sensor Datasheet</p> <p>Technical datasheet for the WitMotion HWT901B AHRS IMU sensor, detailing its features, specifications, parameters, and applications for industrial monitoring and predictive maintenance. Includes sensor capabilities, measurement ranges, accuracy, electrical parameters, and pin definitions.</p>

<div><p>USER MANUAL HWT906 IP67 Inclinometer</p><p><small>HWT906 IP67 User Manual (2023-03-11) www.witmotion.com</small></p></div>	<p>WITMOTION HWT906 IP67 Inclinometer User Manual</p> <p>User manual for the WITMOTION HWT906 IP67 Inclinometer, an AHRS IMU sensor that measures 3-axis angle, angular velocity, acceleration, and magnetic field. Includes introduction, warning statements, usage instructions, software introduction, and MCU connection details.</p>
<div><p>USER MANUAL WT9011DCL-BT5.0 Bluetooth 5.0 Inclinometer Sensor</p><p><small>WT9011DCL-BT5.0 User Manual (2023-03-11) www.witmotion.com</small></p></div>	<p>WT9011DCL-BT5.0 Bluetooth 5.0 Inclinometer Sensor User Manual</p> <p>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.</p>
<div><p>USER MANUAL HWT901B(TTL) Robust Inclinometer</p><p><small>HWT901B(TTL) User Manual (2023-03-11) www.witmotion.com</small></p></div>	<p>HWT901B(TTL) Robust Inclinometer User Manual WITMOTION</p> <p>User manual for the WITMOTION HWT901B(TTL) Robust Inclinometer, detailing its features, PC and Android connectivity, calibration, configuration, and MCU integration for industrial applications.</p>
<div><p>USER MANUAL WT901B Inclinometer Sensor</p><p><small>WT901B User Manual (2023-03-11) www.witmotion.com</small></p></div>	<p>WT901B Inclinometer Sensor User Manual</p> <p>User manual for the WT901B Inclinometer Sensor, detailing its features, applications, software, and connection methods. Includes technical specifications and support information from WITMOTION.</p>