INERTIAL MEASUREMENT UNIT

# Tersus T1

## IMU Sensor


## Overview

The Tersus T1 is a tactical-grade MEMS inertial measurement unit engineered for dynamic attitude and motion sensing on machines that move.

Built on an industrial six-axis IMU core with an anti-interference dynamic tilt algorithm, it delivers stable roll, pitch and heading together with calibrated gyroscope and accelerometer output — even under heavy vibration and shock. Every unit is individually turntable-calibrated and temperature-compensated before delivery, sealed to IP68 and ready for agricultural auto-steer, machine control, robotics and platform stabilization.

## Key Features

- **Tactical-grade MEMS core**: 2.5 °/h gyro bias instability, 25 µg accelerometer bias instability
- **Anti-interference dynamic tilt algorithm** (extended Kalman filter) holds attitude under motion
- **0.01° resolution**, <0.4° RMS low-dynamic accuracy, <0.03° angle repeatability
- **Wide measurement range**: pitch ±80°, roll ±180°, ±450°/s (±2000°/s opt.), ±6 g
- **Configurable output rate** up to 1 kHz
- **Four digital interfaces**: CAN, RS-485, RS-232 and TTL
- **Per-axis factory calibration** of sensitivity, zero bias and non-orthogonality
- **Rugged build**: 2000 g shock, 10 g vibration, IP68, 100% magnetic shielding
- **Full-temperature operation** from –40 °C to +85 °C



**The GNSS Expert**
Right to the Point

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IMU Sensor — Specifications

## Sensor Performance

| | |
|---|---|
| Attitude range | **Pitch ±80° · Roll ±180°<br>Yaw 0–360°** |
| Angle resolution | **0.01°** |
| Angle repeatability | **< 0.03°** |
| Dynamic accuracy (RMS) | **0.4°** |
| Gyroscope range | **±450°/s (±2000°/s opt.)** |
| Gyro bias instability | **2.5 °/h** |
| Accelerometer range | **±6 g** |
| Accel. bias instability | **25 μg** |
| Output update rate | **up to 1 kHz** |

## Electrical

| | |
|---|---|
| Supply voltage | **5 V / 9–32 V DC** |
| Max. ripple (Vpp) | **40 mV** |
| Power consumption | **0.2 – 0.36 W** |
| Interfaces | **CAN / RS-485 / RS-232 / TTL** |

## Communication & Output

| | |
|---|---|
| CAN | **Standard frame, 250 k–1 Mbps<br>500 kbps default · 120 Ω term.** |
| Serial (485/232/TTL) | **115200 bps – 1.5 Mbps<br>115200 default · 8-N-1** |
| Protocol | **Binary frame + CRC32 · AT set** |
| Output data | **Roll · Pitch · Yaw<br>3-axis accel · 3-axis rate<br>Temperature · Timestamp** |

## Physical

| | |
|---|---|
| Housing | **Aluminium alloy** |
| Connector | **M12 aviation 5-pin<br>(GX12-4 cable option)** |
| Coordinate system | **Front-Right-Down (FRD)** |
| Dimensions (dual) | **47 × 96.5 × 24 mm** |
| Dimensions (single) | **47 × 85 × 24 mm** |
| Dimensions (cable) | **55 × 37.6 × 24 mm** |
| Ingress protection | **IP68** |

## Environmental

| | |
|---|---|
| Operating temp. | **–40 °C to +85 °C** |
| Storage temp. | **–40 °C to +85 °C** |
| Shock | **2000 g, 0.5 ms half-sine, 3-axis** |
| Vibration | **10 g, 10–2000 Hz, 3-axis** |
| Magnetic shielding | **100%** |

## Model & Output Rate

| Variant | Interface | Max. rate |
|---|---|---|
| **T1-A** | CAN | 200 Hz |
| **T1-B** | RS-485 | 400 Hz |
| **T1-D** | RS-232 | 400 Hz |
| **T1-C** | TTL | 1000 Hz |

Connector options: dual M12 / single M12 / GX12-4 cable lead-out.
±2000°/s gyro range requires dedicated firmware.



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# Tersus T1

IMU Sensor — Applications & Ordering

## Applications

- Agricultural machinery automatic steering
- Construction & engineering machine control
- Robotics, AGV / AMR navigation
- Antenna & platform stabilization
- Static and dynamic inclination monitoring
- Structural vibration monitoring
- Underwater robotics

## Coordinate System

The T1 uses a Front-Right-Down (FRD) body frame. Euler angle ranges: yaw 0°–360° about Z, roll –180°–180° about X, pitch –90°–90° about Y. Output orientation is software-selectable across 24 axis configurations.

## In the Box

| | |
|---|---|
| IMU unit | **Tersus T1** |
| Cable | **Power / signal lead** |
| Interface adapter | **USB-CAN / 485 / 232 / TTL (opt.)** |
| Calibration cert. | **Per-unit** |

## Notes

(1) Specifications are typical values; performance depends on installation, mounting rigidity and operating conditions.

(2) Dynamic accuracy is the RMS error after deducting installation deviation angle, for vehicle-mounted low-dynamic scenarios.

(3) 5 V is a dedicated voltage version; the standard input range is 9–32 V DC.

(4) Actual size and weight may vary with manufacturing process and measurement method.

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Information is subject to change without notice.





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