Orientation. Position. Xsens.

# MTi 10-series

**The reliable industry standard for MEMS Attitude and Heading Reference Systems**

The 4th generation MTi sets the new industry standard for reliable MEMS based AHRS, VRU, and IMUs. The MTi 10-series gives the system integrator a choice of three different integration levels (IMU, VRU, AHRS). The MTi 10-series and the high performance MTi 100-series share a common range of mechanical, electrical and communication/API interfaces to enable easy integration across a wide range of 3D motion tracking requirements.

## MTi 10-series

- Proven XKF3 sensor fusion algorithm
- Cost effective system integrator solution
- Low latency
- Excellent vibration rejection
- Coning and sculling algorithms @ 2 kHz
- Choice of integration levels
- Comprehensive SDK and straightforward system integration

| | IMU | Δq Δv | Roll/Pitch | Yaw | Position & Velocity | Sensor fusion core |
|---|---|---|---|---|---|---|
| **MTi 10-series** | | | | | | |
| MTi-10 IMU | 18°/h | • | | | | |
| MTi-20 VRU | 18°/h | • | 0.4 deg | Unreferenced | | XKF |
| MTi-30 AHRS | 18°/h | • | 0.4 deg | 1.0 deg | | XKF |
| **MTi 100-series** | | | | | | |
| MTi-100 IMU | 10°/h | • | | | | |
| MTi-200 VRU | 10°/h | • | 0.25 deg | Unreferenced | | XEE |
| MTi-300 AHRS | 10°/h | • | 0.25 deg | 1.0 deg | | XEE |
| MTi-G-700 GPS/INS | 10°/h | • | 0.25 deg | 1.0 deg | • | XEE |

## Market leader

- Industry standard from the undisputed leader in MEMS AHRS's
- Many high-profile companies fully rely on Xsens for control and stabilization, measurement correction and navigation.

## Robust and accurate orientation data

- High-quality components, industrial-grade MEMS only
- Low latency (<2 ms), excellent for control and stabilization
- Proven and robust filter design
- Compensation against vibration and transient accelerations

## Maximum flexibility and versatility in mechanical and software interfaces

- Available as OEM board and IP67 encased MTi
- 24-pins connector for OEM
- Extensive suite of output formats, available directly from the MTi
- Choice of several interfaces, onboard USB, 2+ GPIO's
- Xsens' industry standard open Xbus protocol or NMEA (e.g. TSS1)
- All products from the MTi 10-series and MTi 100-series are fully interchangeable

## System specifications

| | | | |
|---|---|---|---|
| Input voltage | 4.5-36V or 3V3; | Clock drift | 10 ppm or external reference |
| Typical power consumption | 480-570 mW | Output frequency | Up to 2 kHz |
| Start-up time | 1.3 sec. | Latency | <2 ms |
| IP-rating | IP 67 (encased) | Interfaces | RS232/422/UART/USB (no converters) |
| Temperature (in use) | -40 to 85 ☒C | GPIO's and options | SyncIn, SyncOut, 2x GPIO, Clock sync |
| Vibration | TBD | Interface protocol | XBus or NMEA |
| Shock | TBD | Mounting | Free; orientation alignment available |
| Sampling frequency | 10 kHz/channel (60 kS/s) | Built-in self test (BIT) | gyroscopes, accelerometers, magnetometer |

## Orientation accuracy MTi 10-series

| | | 20-VRU | 30-AHRS |
|---|---|---|---|
| Orientation | | | |
| Roll/pitch | Static [max] | 0.4 deg | 0.4 deg |
| | dynamics [1σ RMS] | 1.5 deg | 1.5 deg |
| Yaw | In homogenous magnetic field | Unreferenced 18 deg/h | 1.0 deg |

*Details on orientation specification can be found in the MTi Technical Datasheet (MT0503P)

## Mechanical specifications

Encased:
57x42x23 mm
52g
9-pins push-pul connector

OEM:
37x33x12 mm
11g
24-pins header

## Sensor specifications MTi 10-series

| | Gyroscopes | | Accelerometers | |
|---|---|---|---|---|
| | Typ | Max | Typ | Max |
| Standard full range | 450°/s | - | 50m/s² | - |
| Bias repeatability (1 yr) | 0.2°/s | 0.5°/s | 0.03m/s² | 0.05m/s² |
| In-run bias stability | 18°/h | | 40 µg | |
| Bandwidth (-3 dB) | 415 Hz | N/A | 375Hz | N/A |
| Noise density | 0.03°/s/√Hz | 0.05°/s/√Hz | 80 µg/√Hz | 150 µg/√Hz |
| g-sensitivity (calibrated) | 0.006°/s/g | 0.02°/s/g | N/A | N/A |
| Non-orthogonality | 0.05 deg | - | 0.05 deg | - |
| Non-linearity | 0.03% FS | 0.1% FS | 0.03% FS | 0.5% FS |

| | Magnetometer | |
|---|---|---|
| | Typ | Max |
| Standard full range | | +/- 2 Gauss |
| Noise density | 200 µG/√Hz | |
| Non-linearity | 0.1% FS | |

* Typical values @ 25 °C