

MTx

3DOF ORIENTATION TRACKER



XSENS

The MTx is a small and accurate 3DOF Orientation Tracker. It provides drift-free 3D orientation as well as kinematic data: 3D acceleration, 3D rate of turn (rate gyro) and 3D earth-magnetic field. The MTx is an excellent measurement unit for orientation measurement of human body segments and other applications requiring very low profile and light-weight sensor units.

PRODUCT OVERVIEW

Features

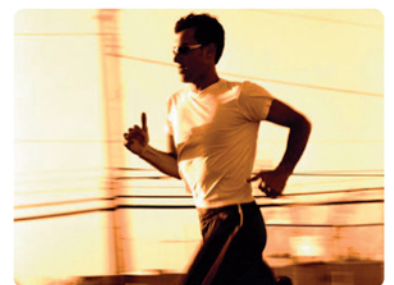
- Accurate full 360 degrees 3D orientation output
- Highly dynamic response combined with long-term stability (no drift)
- 3D acceleration, 3D rate of turn and 3D earth-magnetic field data
- Compact design
- High update rate
- Accepts synchronization pulses
- All solid state miniature MEMS inertial sensors inside
- Individually calibrated for temperature, 3D misalignment and sensor cross-sensitivity

Fields of use

- Biomechanics
- Rehabilitation
- Sports science
- Virtual reality
- Ergonomics
- Animations

The MTx uses 3 rate gyros to track rapidly changing orientations in 3D and it measures the directions of gravity and magnetic north to provide a stable reference. The system's real-time algorithm fuses the sensor information to calculate accurate 3D orientation, with a highly dynamic response which remains stable over prolonged periods. With the MTx Software Development Kit, the MTx can be easily integrated in any system or (OEM) application.

A standalone MTx is available, as well an Xbus version. With the Xbus Master, Xsens' digital data bus, multiple MTx's can easily be used simultaneously, enabling ambulatory and cost-effective measurements of human body motion.



MTx TECHNICAL SPECIFICATIONS

Output

3D orientation (Quaternions/Matrix/Euler angles)
 3D acceleration
 3D rate-of-turn
 3D earth-magnetic field (normalized)
 Temperature

Orientation performance

Dynamic Range all angles in 3D
 Angular Resolution¹ 0.05 deg
 Static Accuracy (Roll/Pitch) <0.5 deg
 Static Accuracy² (Heading) <1 deg
 Dynamic Accuracy³ 2 deg RMS

Sensor performance

Dimensions
 Full Scale (standard)
 Linearity
 Bias stability⁴
 Scale Factor stability⁴
 Noise
 Alignment error
 Bandwidth
 Max update rate

Rate of turn

3 axes
 ± 1200 deg/s
 0.1% of FS
 1 deg/s
 -
 0.05 deg/s/ $\sqrt{\text{Hz}}$
 0.1 deg
 40 Hz
 512 Hz

Acceleration

3 axes
 ± 50 m/s²
 0.2% of FS
 0.02 m/s²
 0.03%
 0.002 m/s²/ $\sqrt{\text{Hz}}$
 0.1 deg
 30 Hz
 512 Hz

Magnetic field

3 axes
 ± 750 mGauss
 0.2% of FS
 0.1mGauss
 0.5%
 0.5 mGauss
 0.1 deg
 10 Hz
 512 Hz

Interfacing

Max. update rate 512 Hz (calibrated sensor data)
 120 Hz (orientation data)
 Operating voltage⁵ 4.5 - 30 V
 Power consumption 360 mW (orientation output)
 Digital interface (standard) RS-232 and USB (external converter) or 'Xbus'

Housing

Dimensions 38x53x21 mm (WxLxH)
 Weight 30 g
 Ambient temperature operating range⁶ -20... +55 °C
 Specified performance operating range⁴ 0.. +55 °C

Options and product code

Interface:		Full Scale Acceleration:		Full Scale Rate of Turn:
RS-232 (RS-232, sync in)	28	5g (50 m/s ²)	A53	300 deg/s
RS-485 (RS-485)	48	18g (180 m/s ²)	A83	1200 deg/s
Xbus	49			G35
(two connectors, only to be used with Xbus Master)				G25

Product code: MTx-## A## G##
 Standard version: MTx-28 A53 G25
 Standard Xbus version: MTx-49 A53 G25

Other options on request.
 Surcharges may apply.

¹ 1 σ standard deviation of zero-mean angular random walk
² in homogenous magnetic environment
³ may depend on type of motion
⁴ deviation over operating temperature range (1 σ) specifications subject to change without notice
⁵ only valid for MTx's with device ID's > 2000, other units operate on 4.5 - 15 V max
⁶ non-condensing environment



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ABOUT XSSENS TECHNOLOGIES

Xsens has strong expertise in biomechanics and inertial sensor technology. Thousands of Xsens inertial motion sensors have already been deployed in challenging human and machine motion applications such as motion capture, training & simulation, biomechanics, marine technology and automotive. Xsens' customers include Daimler, PGA, Össur, Roessingh Research and Development, TNO, INAIL, Electronic Arts, Sony Computer Entertainment, and others. The combination of expertise in human motion analysis and innovative inertial motion sensors makes Xsens a leader in inertial human motion capture solutions.



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