MTx

3DOF Orientation Tracker

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.

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
- all solid state miniature MEMS inertial sensors inside
- compact design
- high update rate
- accepts synchronization pulses
- individually calibrated for temperature, 3D misalignment and sensor cross-sensitivity

Fields of use

- biomechanics
- exercise and sports
- virtual reality
- animation

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 systems real-time algorithm fuses the sensor information to calculate accurate 3D orientation, with a highly dynamic response and stable over time.

With the MTx Development Kit, the MTx can easily be integrated in any system or (OEM) application.

The MTx is available in a stand-alone, as well as an Xbus version. On the Xbus, Xsens' digital data bus, multiple MTx's can easily be used simultaneously, enabling ambulatory and cost-effective measurement of human body motion.

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 Resolution[1]:	0.05 deg
Static Accuracy (Roll/Pitch):	<0.5 deg
Static Accuracy[2] (Heading):	<1 deg
Dynamic Accuracy[3]:	2 deg RMS

Sensor performance

	rate of turn	acceleration	magnetic field	temperature
Dimensions	3 axes	3 axes	3 axes	-
Full Scale (standard)	± 1200 deg/s	± 17 m/s²	± 750 mGauss	-55...+125 °C
Linearity	0.1% of FS	0.2% of FS	0.2% of FS	<1% of FS
Bias stability[4] (1σ)	5 deg/s	0.02 m/s²	0.5 mGauss	0.5 °C accuracy
Scale Factor stability[4] (1σ)	-	0.05%	0.5%	-
Noise density	0.1 deg/s/√Hz	0.001 m/s²/√Hz	0.5 mGauss (1σ)	-
Alignment error	0.1 deg	0.1 deg	0.1 deg	-
Bandwidth (standard)	40 Hz	30 Hz	10 Hz	-

Interfacing

Max update rate:	512 Hz (calibrated sensor data) 120 Hz (orientation data)
Operating voltage:	4.5 - 15 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 range:	0 - 55 deg Celsius

Options and product code

Interface:		Full Scale Acceleration:		Full Scale Rate of Turn:	
RS-232 (RS-232, sync in)	: 28	1.7 g (17 m/s²)	: A33	150 deg/s	: G15
RS-485 (RS-485)	: 48	5 g (50 m/s²)	: A53	300 deg/s	: G35
Xbus (two connectors, only to be used with Xbus Master)	: 49	10 g (100 m/s²)	: A13	1200 deg/s	: G25

Product code:	MTx- ##A##G##
Standard version:	MTx- 28A33G25
Standard Xbus version:	MTx- 49A33G25

Other options on request.
Surcharges may apply.

1 1σ 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 (1σ) specifications subject to change without notice

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