

MTi

Miniature Attitude and Heading Reference System

The MTi is a miniature, gyro-enhanced Attitude and Heading Reference System (AHRS). Its internal low-power signal processor provides drift-free 3D orientation as well as calibrated 3D acceleration, 3D rate of turn (rate gyro) and 3D earth-magnetic field data. The MTi is an excellent measurement unit for stabilization and control of cameras, robots, vehicles and other equipment.

Features

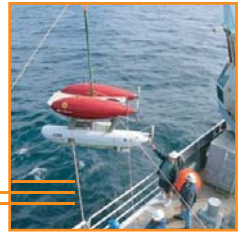
- accurate full 360 degrees 3D orientation output (Attitude and Heading)
- highly dynamic response combined with long-term stability
- 3D acceleration, 3D rate of turn and 3D earth-magnetic field data
- all solid state miniature MEMS inertial sensors inside
- compact design
- high update rate
- various digital output modes
- accepts or generates synchronization pulses
- temperature, 3D misalignment and sensor cross-sensitivity compensated

Fields of use

- robotics
- aerospace
- autonomous vehicles
- marine industry
- bore industry

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



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

	rate of turn	acceleration	magnetic field
Dimensions	3 axes	3 axes	3 axes
Full Scale (standard)	± 300 deg/s	± 50 m/s ²	± 750 mGauss
Linearity	0.1% of FS	0.5% of FS	0.2% of FS
Bias stability ⁴ (1σ)	5 deg/s	0.02 m/s ²	0.5 mGauss
Scale Factor stability ⁴ (1σ)	-	0.05%	0.5%
Noise density	0.1 deg/s/√Hz	0.02 m/s ² /√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)
 Digital interface (standard): RS-232 and USB (external converter)
 Operating voltage⁵: 4.5 - 30 V
 Power consumption: 360 mW (orientation output)

Housing

Dimensions: 58x58x22 mm (WxLxH)
 Weight: 50 g
 Ambient temperature operating range⁶: -20... +55 °C



Options and product code

Interface:	Full Scale Acceleration:	Full Scale Rate of Turn:
RS-232 (RS-232, analog in, sync out, sync in)	1.7 g (17 m/s ²) : A33	150 deg/s : G15
RS-485 (RS-485, sync out, sync in)	5 g (50 m/s ²) : A53	300 deg/s : G35
RS-422 (RS-422, sync in)	10 g (100 m/s ²) : A13	1200 deg/s : G25

Product code: MTi- ##A##G##
 Standard version: MTi- 28A53G35

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
 5 only valid for MTi's with device ID's > 2000, other units operate on 4.5 - 15 V max
 6 non-condensing environment

