Orientation. Position. Xsens.

MTi 100-series

The most accurate and complete MEMS AHRS and GPS/INS

The 4th generation MTi sets the new industry standard for reliable MEMS based INS's, AHRS's, VRU's and IMU's. The breakthrough sensor fusion algorithm that overcomes limitations in Kalman Filtering, the Xsens Estimation Engine (XEE), lets the MTi 100-series pioneer as an alternative for optical gyroscopes. The MTi 10-series and MTi 100-series are fully interchangeable with respect to physical and electrical interface, wich allows to choose the specific MTi that best fits the application.

MTi 100-series

- Breakthrough tracking performance
- Coning and sculling algorithms @ 2kHz
- Motion processing core for multiple sensor inputs and data sources
- High-performance XEE, beyond traditional Kalman Filtering
- Tuned for performance under vibrations and magnetic distortions
- 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

Breakthrough performance from market leader

- Next level MEMS AHRS's with vibration rejecting gyroscopes
- Cutting-edge sensor fusion technology
- Market leader serving a large and high-profile customer base

Complete product, with highest accuracy

- Low latency (<2ms) for real-time applications
- Compensation against long-lasting transient accelerations
- Able to cope with GPS outages and magnetic distortions
- Leading innovator introducing a new class of AHRS's

Maximum flexibility and versatility

- 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 and GPIO's
- Xsens' industry standard open Xbus protocol or NMEA
- 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 (1 ppm w. GPS)) or ext. ref.
Typical power consumption	675-950 mW	**Output frequency**	Up to 2 kHz
Start-up time	2.5 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 and position accuracy MTi 100-series

		200-VRU	300-AHRS	700-GPS/INS
Orientation				
Roll/pitch	Static [max]	0.25 deg	0.25 deg	0.25 deg
	Dynamics [1σ RMS]	1.0 deg	1.0 deg	0.5 deg*
Yaw	In homogenous magnetic field	Unreferenced 10 deg/h	1.0 deg	1.0 deg
Position and velocity				
Horizontal position	1σ STD (SBAS)			1.0 m
Vertical position	1σ STD (SBAS, baro)			2.0 m
Velocity	1σ RMS			0.1 m/s

*1.0 deg without valid GPS
Details on orientation and position specification can be found in the MTi Technical Datasheet (MT0503P)

Mechanical specifications

MTi-G encased:
57x42x23 mm, 55g
9-pins push-pull connector

MTi encased:
57x42x23 mm, 52g
9-pins push-pull connector

OEM:
37x33x12 mm, 11g
24-pins header

CAD-drawings (STEP/IGES) available on request via sales@xsens.com

Sensor specifications MTi 100-series

	Gyroscopes		Accelerometers	
	Typ	**Max**	**Typ**	**Max**
Standard full range	450°/s	-	50 m/s^2	-
Bias repeatability (1 yr)	0.2°/s	0.5°/s	0.03m/s^2	0.05m/s^2
In-run bias stability	10°/h		40 µg	
Bandwidth (-3 dB)	450 Hz	N/A	375 Hz	N/A
Noise density	0.01°/s/√Hz	0.015°/s/√Hz	80 µg/√Hz	150 µg/√Hz
g-sensitivity (calibrated)	0.003°/s/g	0.015°/s/g	N/A	N/A
Non-orthogonality	0.05 deg	-	0.05 deg	-
Non-linearity	0.01% FS	-	0.03% FS	0.5% FS

	Magnetometer		Barometer	
	Typ	**Max**	**Typ**	**Max**
Standard full range		+/- 2 Gauss		300-1100 hPa
Noise density	200 µG/√Hz		0.01 hPa/√Hz	
Non-linearity	0.1% FS			

GPS receiver (MTi-G-700 GPS/INS only)

Receiver type	50 ch, L1, C/A code	**DGPS**	SBAS
Update rate	4Hz	**GPS L1 C/A horizontal accuracy [CEP]**	2.0 m (2.5m w/o SBAS)
Start-up time cold start	27s	**GPS L1 C/A vertical accuracy [CEP]**	5.0 m
Tracking sensitivity	-161 dbM	**Velocity accuracy**	0.1 m/s @ 30 m/s

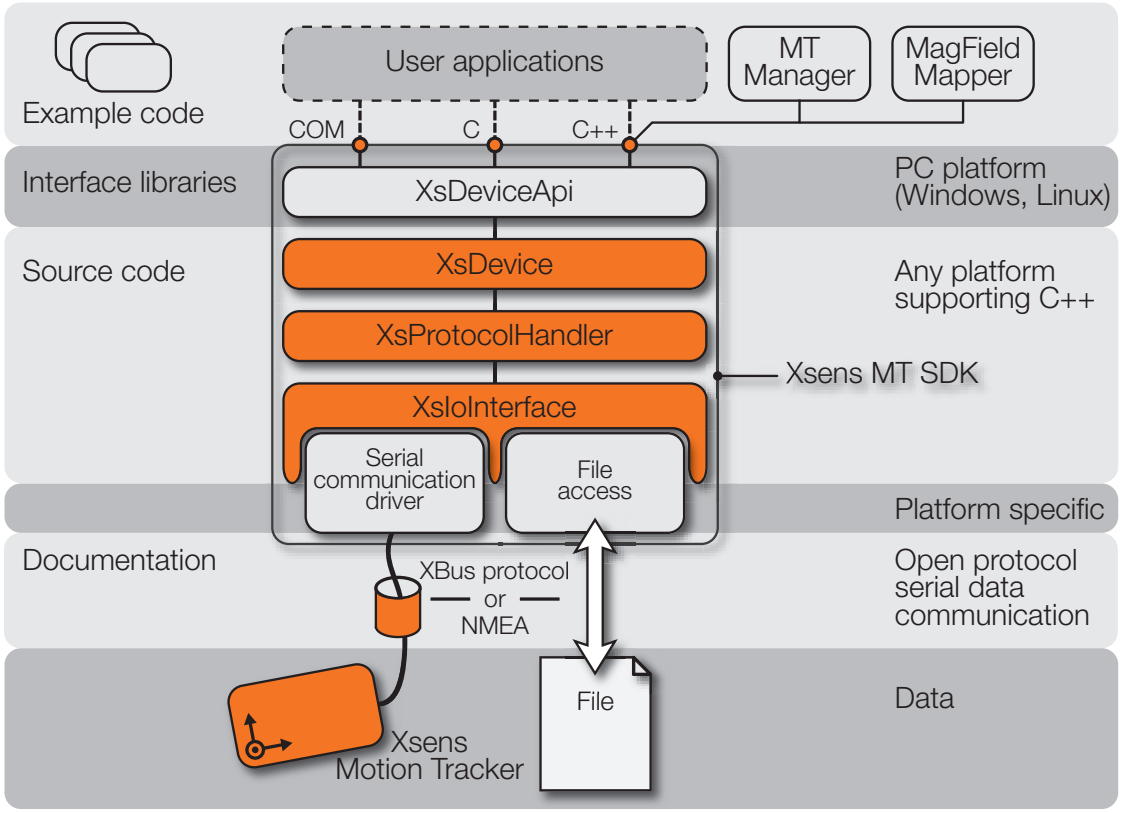
* Typical values @ 25 °C

System integration

Integration with the MTi is very straightforward with the Xsens MT SDK. The MT SDK is an easy-to-use API which can be interfaced with via a COM, C and C++ interface with support for Windows and Linux. In addition, there is complete access to the low level source code for full flexibility on any platform. The components of the MT SDK are:

Xsens Device API	API to communicate with the MTi. Interfaces for common programming languages as well as source code for lower communication levels.
Example code	To make starting with the MTi even easier, example code is provided for various platforms, amongst others Matlab and Linux.
MT Manager	An intuitive GUI for Windows and Linux, including configuration and recording tools, graphs and a serial port viewer to help understanding the Xbus protocol.
Magnetic Field Mapper	An algorithm and tool to calibrate the MTi for hard- and soft iron effects. The calibration can be done during normal operation; there are no restrictions on the trajectories or rotations.
Documentation	Full (HTML-)documentation on the MTi, API, SDK and application notes.

Xsens MT SDK



Development kit

The best way to start with the MTi is with the complete MTi Development Kit. This kit will make development very easy. The MTi Development Kit contains the following:

- MTi
- Cable set for USB and serial communication, as well as GPIO's.
- MT Software Development Kit (on USB flash drive)
- Robust suitcase
- Test and calibration certificates
- Antenna (MTi-G-700 GPS/INS only)

ABOUT XSENS

Xsens is a leading developer and global supplier of 3D motion tracking products based upon miniature (MEMS) inertial sensor technology.

Since its foundation in 2000, thousands of motion sensors and motion capture solutions have successfully been deployed for 3D character animation, movement science, control of autonomous vehicles and stabilization. Clients of Xsens include Electronic Arts, NBC Universal, INAIL Prosthesis Centre, Daimler, Saab, Kongsberg Defence Systems and many other companies and institutes throughout the world. Xsens is working with several industry partners, including Autodesk, Sagem (Safran Group) and Siemens.

Xsens' research department has created unique intellectual property in the field of multi-sensor data fusion algorithms, combining inertial sensors with GPS and RF positioning and biomechanical modelling. Xsens and its products have received several awards and five consecutive entries in Deloitte's ranking of fastest growing technology companies in Europe.

Xsens is a privately held company with its headquarters in Enschede, the Netherlands and a US subsidiary in Los Angeles, California.

Xsens		**Xsens North America Inc.**	
phone	+31 88 97367 00	phone	310-481-1800
	+31 88 xsens 00		
fax	+31 88 97367 01	fax	310-416-9044
general e-mail	info@xsens.com	general e-mail	info@xsens.com
sales e-mail	sales@xsens.com	sales e-mail	sales@xsens.com

Pantheon 6a
7521 PR Enschede
The Netherlands

10557 Jefferson Blvd, Suite C
Culver City, CA 90232
USA

Visit xsens.com/distributors for an overview of Xsens' worldwide distributor network

Preliminary specifications: specifications are subject to change without notice

MT0502P.A