



gINS[®]

Tactical-Grade Inertial Navigation System



gX-100 VG/IMU/AHRS | gX-200 GNSS/INS | gX-300 Dual-Ant GNSS/INS

The gINS[®] is family of MEMS-Based Tactical-grade inertial navigation systems built within rugged miniature package. These Tactical- grade series includes VG, IMU, AHRS, GNSS/INS and Dual-Antenna (GNSS-Compass) INS system.

Built-In survey-grade multi-frequency/multi-constellation L1/L2/L5 GNSS RTK receiver provide the gINS[®] Unprecedented performances and capabilities for such small size, low-cost navigation system.

Fully calibrated Tactical-Grade Gyro's ($< 1^\circ/\text{hr}$) & Tactical-Grade Accelerometer ($< 1\text{mg}$ over-temp) along with advanced Unscented Kalman Filter (Sigma-points) provide robust cutting-edge solution for various operation modes and applications.

Main Features

- Tactical Grade Gyro $< 1^\circ/\text{hr}$
- Tactical grade Accelerometer $< 1\text{mg}$ over temp range
- Multi-Freq. (L1/L2/L5) / Multi GNSS
- 2 cm RTK accuracy
- Up to 1000 Hz update rate
- Robust Unscented Kalman Filter
- Rugged Miniature package
- ITAR-Free

	gX-100	gX-200	gX-300
Navigation			
Heading - Magnetic	2.0 °	2.0 °	2.0 °
GNSS-Dynamic		0.1 °	0.1 °
Dual-Ant (static)			0.15 ° (1m)
Roll/Pitch – Dynamic	0.10 °	0.10 °	0.10 °
Static	0.05 °	0.05 °	0.05 °
Position - Horizontal		1.5 m	
SBAS		< 0.5 m	
RTK		1 cm + 1ppm	
Vertical		2.5 m	
SBAS		< 1 m	
RTK		1.5 cm + 1ppm	
Velocity Accuracy		< 0.05 m/sec (rms)	< 0.05 m/sec (rms)
Output Rate	1000 Hz (Raw)	200 Hz (Nav)	200 Hz (Nav)
Angular Resolution	< 0.01°	< 0.01°	< 0.01°
Latency		< 5 msec	

GNSS

Receiver Type	1408 Channels GPS L1C/A, L2C, L2P(Y), L5 GLONASS G1, G2 Galileo E1, E5a, E5b BDS B1I, B2I, B3I QZSS L1C/A, L2C, L5, L6 SBAS L1C/A RTK
Update Rate	20 Hz
TTF	Cold start < 30 sec Warm start < 1 sec
RTK format	RTCM v3.0/3.2
Initialization Time	< 5 sec
Velocity Accuracy	0.03 m/sec (rms)
Time Accuracy	20 ns (rms)

Data Output

	gX-100	gX-200	gX-300
IMU - Raw Data & Compensated Gyro, Acc, Mag, Baro Conning & Sculling (ΔV, Δθ)	✓	✓	✓
GNSS - UTC, Position, RTK		✓	✓
Attitude - Roll/pitch/Yaw Quaternions, Euler, DCM	✓	✓	✓
Inertial Navigation Velocity, Position, Attitude		✓	✓
GNSS - Compass INS Heading Static			✓

* All parameters are typical, RMS values

* PRELIMINARY. Specification subject to change without notice

	Accelerometer	Gyroscope	Magnetometer	Pressure
Sensors				
Full Scale Range	± 10g	± 500 deg/sec	± 4,000 μT	10-1200mBar
Bandwidth	0...250 Hz	0...250 Hz	0...50 Hz	0...100Hz
Non Linearity	< 0.2%	< 0.05%	0.1 %	< 0.25%
Bias Stability	< 20 μg	0.8 °/Hr	n/a	1 mbar/yr
Repeatability ToTo	± 300 μg	< 20°/Hr	n/a	< 1 mbar
Day-to-Day	< 400 μg	< 15°/Hr	n/a	< 1mbar
One Year	1,500 μg	n/a	n/a	< 1mbar
Over Full Temp	< 500 μg	< 60°/Hr	n/a	< 1mbar
Over 20°C Span	< 150 μg	< 20°/Hr	n/a	< 1mbar
Hysteresis	300 μg	< 30°/Hr	n/a	< 1mbar
Scale Factor				
Repeatability	500 ppm	100 ppm	n/a	< 1mbar
Over Temp	100 ppm	100 ppm	n/a	< 1mbar
Random Walk	< 0.02 m/sec/√Hr	0.07 °/√Hr	n/a	n/a
Resolution	50 μg	0.008 °/sec	1 μT	0.1 mbar (20cm)
Noise density	< 20 μg /√Hz	< 0.003 °/s/√Hz	300 nT RMS	0.025 mbar √Hz
VRE (Vibration Rectification Error)	< 100 μg/g ²	< 1°/hr/g ²		
G-Sensitivity	n/a	< 10°/hr/g ²		
Latency		< 1 mSec		
Non-Orthogonality		< 300 μRad		
MisAlignment		< 1 mRad	2 mRad	
Communication				
Digital Interface		RS232/RS422		
Frame Rate		1000 Hz Max		
Peripherals		2 x GPIO 1 x RS232		
GPIO Functionality (Optional)		Trigger Input Sync Out PPS In Odometer External GNSS External Magnetometer Air-Data		
Start Up Time		< 800 msec		
Power & Mechanical				
Input Voltage		9 VDC – 32 VDC		
Power (incl. Antena)		gX-100: 250 mA @ 12VDC gX-200/gX-300: 360 mA @ 12VDC		
Connectors		Power/Data: Micro D-Type 15-pin GNSS: SMA		
Size		80 x 66 x 56 mm		
weight		< 250 gr		
Compliance (Design-to-Spec)				
Temp Operation		-40° C to +71° C Mil-Spec 810-G Method 501.5 Procedure I		
Shock		500g, 3 mSec ½ Sine Mil-Spec 810-G Method 516.6 Procedure V		
Vibration		12 G rms, 20-2000 Hz Mil-Spec 810-G Method 514.6 Category 17		
Altitude		70,000 feet Mil-Spec 810-G Method 500.5 Procedure III		
Power		EN55022 Class A & B		
Enclosure		IP65 EN 595		
MTBF		50,000 Hours Mil-HDBK 217		