

GNSS-INS



Features

- **Sensor Fusion:** Combined GNSS and inertial navigation solution
- **High Data Rate:** 200 Hz navigation solution (position, velocity, pitch, roll, heading)
- **High Performance Sensors:** state-of-the-art 3-axis MEMS gyroscope, accelerometer, and magnetometer
- **Measuring Range:** roll, heading/yaw: $\pm 180^\circ$, pitch: $\pm 90^\circ$
- **Multi-Constellation Receiver:** GPS, GLONASS, BeiDou, Galileo, SBAS, and QZSS
- **Industry Standard Parts:** IP 67 compliant connector, cable, and housing
- **Robust Enclosure:** aluminum housing and connectors
- **Low Power Consumption:** $< 1 \text{ W}$ (180 mA @ 5 V, including active antenna)

Highlights

$< 0.05^\circ$	1.5°	$< 10 \mu\text{g}$	1.5 m / 2.0 m
Static Pitch/Roll Accuracy (INS)	Static Heading Accuracy	Accelerometer In-Run Bias Stability	Horizontal / Vertical Position Accuracy
0.15°	0.25°	$10^\circ/\text{hr}$	0.05 m/s
Dynamic Pitch/Roll Accuracy (INS)	Dynamic Heading Accuracy	Gyroscope In-Run Bias Stability	Velocity Accuracy

Product Overview

The CS-GN300 is a small-sized, high-performance GNSS-Aided Inertial Navigation System (GNSS-INS) that provides optimal estimates of position, velocity, acceleration, and attitude under the most demanding conditions. It combines the latest in inertial and GNSS sensors with advanced Kalman filter fusion algorithms into a beautifully compact form factor. Inside there are 3-axis accelerometer, 3-axis gyroscope, and 3-axis magnetometer sensors alongside the latest in GNSS multi-constellation receivers. A continuous 200 Hz stream of 3D position, velocity, and orientation are available via the internally fused GNSS-aided inertial navigation solution.

The CS-GN300 is configured for easy setup for many applications and includes all that is needed to hit the ground running. Use the included CTi Sensor Connect GUI software to begin testing within minutes or integrate the sensor into your own data acquisition workflow.

Applications

- Mapping and surveying
- Automotive and ground-vehicle testing
- Off-road vehicle testing
- Marine applications
- Unmanned Autonomous Vehicles (UAVs)
- Simulation Localization And Mapping (SLAM)
- Beyond Visual Line Of Sight navigation (BVLOS)
- Precision agricultural
- Construction applications
- Machine control and automation
- Robotics application

Specifications – Performance

Range	Roll and heading/yaw: $\pm 180^\circ$, Pitch: $\pm 90^\circ$
Static accuracy (RMS)	Pitch and roll: $< 0.05^\circ$ Heading: 1.5°
Dynamic accuracy (sufficient motion)	Pitch and roll: 0.15° , 1σ Heading: 0.25° , 1σ
Angular resolution	$< 0.003^\circ$
Horizontal position accuracy	1.5 m CEP
Vertical position accuracy	2.0 m
Velocity accuracy	0.05 m/s
Free inertial position Drift	3.0 cm/s^2

Specifications – GNSS Receiver

Receiver type	184-channel GPS L1C/A L2C, GLO L1OF L2OF, GAL E1B/C E5b, BDS B1I B2I, QZSS L1C/A L1S L2C, SBAS L1C/A
Constellations	GPS, GLONASS, Galileo, BeiDou, SBAS, QZSS
Time-to-first-fix	Cold start: 25 second, Reacquisition: 2 second
Altitude limit	80,000 m
Velocity limit	500 m/s

Specifications - Sensors

	Accelerometer	Gyroscope	Magnetometer
Range	$\pm 2 \text{ g}/\pm 4 \text{ g}/\pm 8 \text{ g}$	$\pm 125/250/500/1000/2000^\circ/\text{s}$	$\pm 800 \mu\text{T}$
In-run bias stability	X & Y: $< 5 \mu\text{g}$, Z: $< 10 \mu\text{g}$	$10^\circ/\text{hr}$	-
Random walk	X & Y: 5.3 mm/sec/vhr , Z: 7.7 mm/sec/vhr	$0.35^\circ/\text{vhr}$	-
Noise density	$25 \mu\text{g}/\text{VHz}$ (@200Hz)	0.007 dps/VHz (@ 10 Hz)	0.06 uT/VHz (@ 100 Hz)
Nonlinearity	$\pm 0.1\%$ FS	0.1% FS	0.2% FS
g- Sensitivity	-	$0.1^\circ/\text{s/g}$	-

Specifications – System

Power source	4.5 – 38 VDC
Power consumption	900 mW (180 mA @ 5 V, including GNSS antenna)
Dimensions	2.16" x 2.16" x 1.18" (55 x 55 x 30 mm)
Data format	ASCII and Binary
Output data rate	Navigation data: Up to 200 Hz
Serial interface options	RS232, RS422, RS485, USB, UART, RS485 with multi-drop networked
GUI software	CTi Sensor Connect®



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