

ANELLO GROUND INS*

Navigation and Localization in GNSS-Denied Environments

*Previously known as ANELLO GNSS INS

Paired with ANELLO's unique optical gyroscope technology, the ANELLO GROUND INS is a hardened, high-volume solution that can maintain centimeter accuracy in harsh GNSS-Challenged conditions including extended full GNSS loss operation.



ANELLO GROUND INS

The ANELLO GROUND INS achieves extraordinary accuracy and reliability with low-drift performance under harsh environments including shock, vibration, and thermal gradients.

The ANELLO GROUND INS is intended for high-volume, cost-sensitive applications in the Automotive, Trucking, Autonomy and Robotics space.

With a power consumption of only 4W the GROUND INS can output data using Automotive Ethernet or RS-232. The all-digital ANELLO GROUND INS also provides high-speed calibrated inertial measurements including ANELLO's high-accuracy z-axis optical gyroscope and a 6-axis IMU.

The interchangeable GNSS engine ensures that the ANELLO GROUND INS provides customers the flexibility and customization necessary for a variety of needs and applications.

A hardware built in test (BIT) output line signals fault detection, alongside diagnostic messages and the BIT data word. The internal circuitry uses one ASIL-B ready functionally safe microcontroller, as well as an ASIL-D rated master CPU.

An ASIL-D graded CPU together with the PXROS RTOS are used for added safety which is critical for automotive, autonomy or heavy equipment control applications.

A Sync/PPS input line allows the optical gyroscope and IMU measurements to be time aligned with an external clock such as a GNSS/GPS pulse per second (PPS) line.

The ANELLO GROUND INS can also act as the time synchronization master and output PPS to other sensors. The ANELLO GROUND INS features full PTP hardware capability and firmware support.

FEATURES

Reference-grade 100 Hz Position, Velocity and Attitude

< 0.5°/hr Unaided Heading Drift

Accurate in severe multipath and GNSS-denied

Dual 184-channel five constellation dual-band GNSS Receivers

GPS, Glonass, Galileo, Beidou (Compass), QZSS

Reliable Autonomous Land Vehicles, Advanced ADAS Systems

Automotive, Precise Heavy Equipment and Machine Control

Hardware PTP Time Sync, ASIL-D CPU and OS

Modular Dual-Band RTK-capable Multi-Band GNSS Engines

On-Board GNSS/INS Sensor Fusion

IP68 - Waterproof, Resistant to Dust, Salt Spray and Chemicals

Automotive Ethernet, Dual RS-232 Interfaces

TECHNICAL SPECIFICATIONS (COMMERCIAL)

Solution Accuracy¹

Horizontal Position Accuracy	
SPS	1.2 m cep
RTK ²	0.02 m cep
60s GNSS Outage³	< 1.0 m rms
Velocity Accuracy	0.01 m/s rms
Heading Accuracy ⁴	0.2° rms
Attitude Accuracy (Roll/Pitch)	0.02° rms

IMU Performance

Optical Gyroscope (Heading/Z-Axis)		
Range	200°/s	
Bias Instability	< 0.5°/hr	
Angle Random Walk	< 0.05°/√hr	
MEMS IMU (6-Axis)	Accelerometer	Gyroscope
Range	8g	up to 400°/s
Bias Instability	20ug	1.5°/hr
Random Walk	0.03m/s/√hr	0.3°/√hr

GNSS & Timing

Signal Bands	L1 C/A, L2C, L1OF, L2OF, B1I, B2I, E1, E5b and SBAS
RTK Initialization Time	< 1 min, using RTCM3 corrections
Output Data Rate	GPS: 4 Hz, IMU: 200 Hz, INS: 100 Hz
Synchronization	PPS Out, PPS Sync In, PTP

Environment

Operating Temperature	-40 to +70°C
Vibration	5g rms
Shock Survival	40g

Electrical

Input Voltage	8 to 30 VDC
Power Consumption	4 W typical
Digital Interface	Ethernet, RS-232 (2 Ports)

Physical

Size	5.8" x 4.3" x 1.3"
Weight	1 lbs.

Notes:

1. After Initialization
2. < 20km Baseline from Base
3. Additional Drift Post GNSS Loss, with Wheel Speed Aiding
4. Properly Installed Antennae