

THE VALUE OF PERFORMANCE.

NORTHROP GRUMMAN

LN-200 FOG Family

Advanced Airborne IMU/AHRS

The LN-200 inertial family of fiber-optic gyros (FOG) offers the lowest accel/gyro bias, lowest random walk and the highest mean time between failures (MTBF).

Description

The LN-200 is a small, light weight, highly reliable, state-of-the art, fiber-optic, all-altitude, strap down Inertial Measurement Unit (IMU). The LN-200 has three solid-state fiber-optic gyros and three solid-state silicon Micro Electro-Mechanical System (MEMS) accelerometers in a compact package that measures velocity and angle changes in a coordinate system fixed relative to its case. Digital output data of incremental velocity and incremental angle are provided to user equipment over a digital serial data bus. The LN-200 is hermetically sealed and contains no moving parts, ensuring low noise, long usage and shelf life. The LN-200 has been in high rate production since 1994 with over 25,000 units produced.

Configurations

The LN-200 is a versatile inertial measurement instrument and has a variety of configurations.

LN-200

The LN-200 is a 1 degree/hr gyroscope, 300 mg accelerometer IMU with low white noise for superior performance.

LN-200E (Enhanced)

In the LN-200E, FOG path length is increased by adding more fiber onto the coil. Added fiber length increases gyro performance over the standard LN-200; LN 200E form factor is the same as the standard LN-200.

LN-200A

The LN-200A allows the user to supply +28 volts to the IMU for ease of integration. The LN-200A is a modular top assembly that can be applied to any LN-200 product.

Applications

Any LN-200 can be installed with variations of software, including:

- Attitude and Heading Reference System (AHRS)
- Motion Compensation
- Electro-optical/FLIR / Camera / Radar Stabilization
- Guidance
- Fly-By-Wire (FBW) Flight Controls
- ACMI/TSPI*

The AHRS version of the LN-200 is certifiable to DO-178B Level A.

Advantages

The LN-200 FOG family is a hermetically sealed non-dithered, low-voltage inertial sensor, ensuring long, reliable usage life. It has the lowest gyro and accelerometer white noise and highest MTBF in the medium accuracy IMU class.

* Air Combat Maneuvering Instrumentation/ Time, Space, Position.

LN-200 Core IMU

Performance	
Accelerometer	
Bias Repeatability	300 µg to 3.0 milli-g, 1σ
Scale Factor Accuracy	300 to 5,000 ppm, 1σ
Gyro	
Bias Repeatability	1°/hr to 3°/hr, 1σ
Scale Factor Accuracy	100 to 500 ppm, 1σ
Random Walk	0.07° to 0.15°/√hr Power Spectral Density (PSD) level
Characteristics	
Power	12W steady-state (nominal)
Dimensions	Diameter: 3.5 in. (8.89 cm) Height: 3.35 in. (8.51 cm) (plus connector)
Weight	<1.65 lb (750g)
Temperature	-54°C (-65°F) to + 71°C (160°F) continuous operation
Shock	90g, 6 msec terminal sawtooth
Input Voltage	+5 Volt, ±15 Volt
Cooling	Conduction to mounting plate
Vibration	15g rms, 20-20,000 Hz @ PSD NTE 0.114 g ² /Hz in any bandwidth
MTBF	>20,000 hrs
Features	
Angular Rate	Up to ±11,459°/sec
Angular Acceleration	±100,000°/sec ²
Acceleration	>40g
Angular Attitude	Any Orientation
Input/Output	RS-485 serial data bus (SDLC)

LN-200 “Enhanced” IMU Performance*

Performance	
Accelerometer	
Bias Repeatability	300 µg, 1σ
Scale Factor Accuracy	100 ppm, 1σ
Gyro	
Bias Repeatability	0.5°/hr, 1σ
Scale Factor Accuracy	100 ppm, 1σ
Random Walk (max)	0.05°/√hr Power Spectral Density (PSD) level
* LN-200 “Enhanced” IMU Performance – Achieved with increased FOG length and additional accelerometer processing	

LN-200A IMU - Fly-By-Wire / AHRS Applications

Performance	
AHRS	
Heading Accuracy	0.50°, 1σ
Pitch & Roll Accuracy	0.25°, 1σ
Characteristics	
Power	< 16 W (over all environments)
Dimensions	Diameter: 3.5 in. (8.89 cm) Height: 5.2 in. (13.21 cm)
Weight	< 2.75 lbs (1.25 kg)
Input Voltage	+28 Volts
Input Voltage Range	+13 to +35 Volts
Cooling	Conduction

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