



IMU-NAV-100

High Performance Navigation Grade Inertial Measurement Unit



The **Inertial Labs Inertial Measurement Unit (IMU-NAV)** is the latest addition to the Inertial Labs Advanced MEMS sensor-based family. Revolutionary due to its compact, self-contained strapdown, tactical grade Inertial Measurement Systems and Pitch & Roll Sensor, that measures linear accelerations, angular rates, Pitch & Roll with three-axis high-grade MEMS accelerometers and three-axis tactical grade MEMS gyroscopes. Angular rates and accelerations are determined with high accuracy for both motionless and dynamic applications.



The **Inertial Labs IMU-NAV** is a breakthrough, fully integrated inertial solution that combines the latest MEMS sensor technologies. Fully calibrated, temperature compensated, mathematically aligned to an orthogonal coordinate system, the IMU contains up to 0.5 deg/hr gyroscopes and 0.003 mg bias in-run stability accelerometers with very low noise and high reliability.

Continuous Built-in Test (BIT), configurable communications protocols, electromagnetic interference (EMI) protection, and flexible input power requirements make the **Inertial Labs IMU-NAV** easy to use in a wide range of higher order integrated system applications.

The **Inertial Labs IMU-NAV-100** model was designed for applications, like:

- ❖ Antenna and Line of Sight Stabilization Systems
- ❖ Passengers trains acceleration / deceleration and jerking systems
- ❖ Motion Reference Units (MRU)
- ❖ Motion Control Sensors (MCS)
- ❖ Gimbals, EOC/IR, platforms orientation and stabilization
- ❖ GPS-Aided Inertial Navigation Systems (INS)
- ❖ Attitude and Heading Reference Systems (AHRS)
- ❖ Land vehicles navigation and motion analysis
- ❖ Buoy or Racing Boat Motion Monitoring
- ❖ UAV & AUV/ROV navigation and control



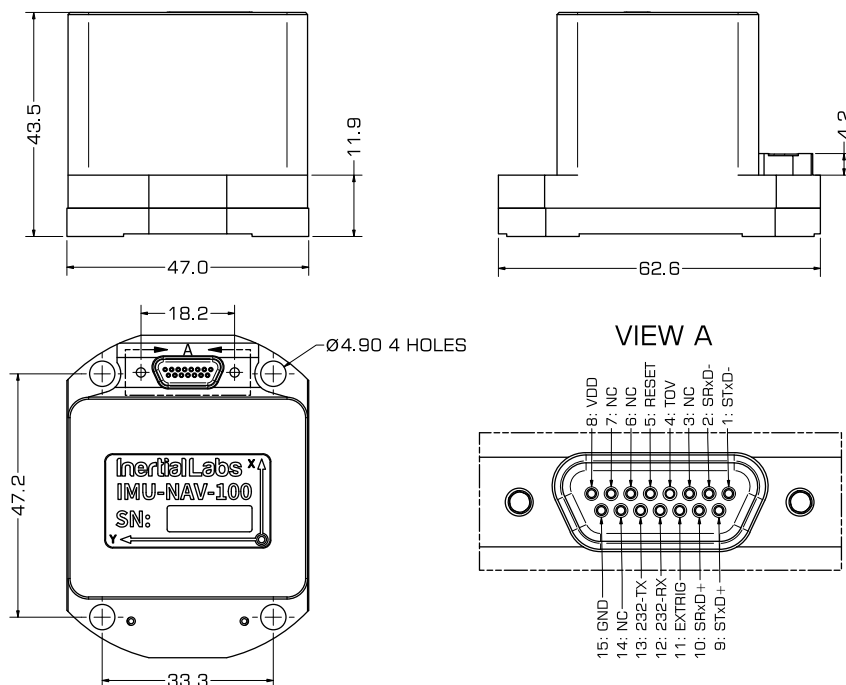
Gyroscopes & Accelerometers Key Performance

Parameter	IMU-NAV-100
GYROSCOPES (± 450 deg/sec range)	
Gyroscopes Bias in-run stability	0.5 deg/hr
Gyroscopes Noise - Angular Random Walk	0.1 deg/vhr
ACCELEROMETERS (± 8 g range)	
Accelerometers Bias in-run stability	0.003 mg
Accelerometers Noise - Velocity Random Walk	0.008 m/sec/vhr
PITCH & ROLL	
Pitch & Roll static accuracy, RMS	0.03 deg
Pitch & Roll dynamic accuracy, RMS	0.06 deg

SPECIFICATIONS

	Parameter	Units	IMU-NAV-100
GENERAL	Output signals		Accelerations, Angular rates, Pitch, Roll, Relative Heading, Temperature, Synchronization
	Update rate	Hz	2000
	Start-up time	sec	<1
	Full Accuracy Data (Warm-up Time)	sec	<5
PERFORMANCE	Gyroscopes	Units	
	Measurement range	deg/sec	±450
	Bandwidth (-3dB)	Hz	260
	Data update rate	Hz	2000
	Bias in-run stability (Allan Variance, RMS)	deg/hr	0.5
	Bias instability (over temperature range, RMS)	deg/hr	15
	SF accuracy (over temperature range)	ppm	1000
	Noise. Angular Random Walk (ARW)	deg/√hr	0.1
	Non-linearity	ppm	100
	Axis misalignment	mrاد	0.2
	Accelerometers	Units	
	Measurement range	g	±8 / ±15 / ±40
	Bandwidth (-3dB)	Hz	260 / 260 / 260
	Data update rate	Hz	2000 / 2000 / 2000
	Bias in-run stability (Allan Variance, RMS)	mg	0.003 / 0.01 / 0.015
	Bias instability (in temperature range, RMS)	mg	0.4 / 0.5 / 0.6
	SF accuracy (over temperature range)	ppm	150 / 300 / 500
	Noise. Velocity Random Walk (VRW)	m/sec/√hr	0.008 / 0.018 / 0.025
	Non-linearity	ppm	150 / 150 / 150
	Axis misalignment	mrاد	0.2 / 0.2 / 0.2
	Inclinometer	Units	
	Measurement range, Pitch / Roll	deg	±90 / ±180
	Data update rate	Hz	200
	Resolution	deg	0.01
	Static accuracy, RMS	deg	0.03
	Dynamic accuracy, RMS	deg	0.06
ELECTRICAL & MECHANICAL	Environment	Units	
	Mechanical shock (MIL-STD-810G)	g	40, 0.011 half-sine pulse
	Vibration (MIL-STD-810G)	gRMS, Hz	7, 20 – 2000
	Operating temperature	deg C	-40 to +85
	Storage temperature	deg C	-50 to +90
	Low pressure	Pa, min	1750, 30
	Humidity	%	up to 95
	MTBF (G _M @ +65degC, operational)	hours	100000
	Life time (operational)	years	10
	Life time (storage)	years	17
	Electrical	Units	
	Supply voltage	V DC	5 to 30
	Power consumption	Watts	3 @ 5V
	Output Interface	-	RS-422/RS-232/RS-485
	Output data format	-	Binary, ASCII characters
	EMC/EMI/ESD	-	MIL-STD-461G
	Physical	Units	
	Size	mm	62.6 x 47 x 43.5
	Weight	grams	155
	IMU version using customized case & connector	custom	Available

MECHANICAL AND ELECTRICAL INTERFACE



Notes:

- All dimensions are in millimeters
- All dimensions within this drawing are subject to change without notice
- Customers should obtain final drawings before designing any interface hardware
- Please contact Inertial Labs if you need IMU to be delivered in a custom enclosure/case with customized connector and output data

PRODUCT CODE STRUCTURE

Model	Gyroscope	Accel	Calibration	Connector & Enclosure	Color	Version	Interface
IMU-NAV-100	G450	A8	TGA	C5	B	V1A.	.12
		A15					.13
		A40					

Example: IMU-NAV-100-G450-A15-TGA-C5-B-V1A.12

Product Code details:

- IMU-NAV-100: Navigation Grade MEMS Inertial Measurement Unit
- G450: Gyroscopes measurement range = ± 450 deg/sec
- A8: Accelerometers measurement range = ± 8 g
- A15: Accelerometers measurement range = ± 15 g
- A40: Accelerometers measurement range = ± 40 g
- TGA: Gyroscopes and Accelerometers
- C5: Aluminum Enclosure, 15-pin connector
- B: Color – Black
- V1A: Guidance and Navigation
- _12: Dual RS-232 and RS-422 interface
- _13: Dual RS-232 and RS-485 interface