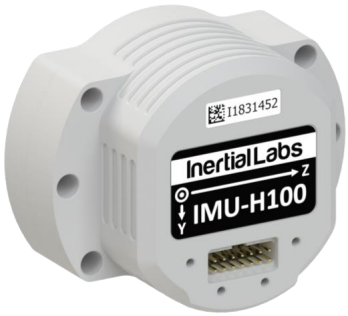
Tactical-Grade MEMS Inertial Measurement Unit (IMU)

InertialLabs
a VIAVI Solutions company

IMU-H100

Datasheet

The **Inertial Labs MEMS Inertial Measurement Unit**, model **IMU-H100** is the latest addition to the Inertial Labs Tactical-grade, Advanced Miniature MEMS sensor-based IMU family. Revolutionary due to its very compact, self-contained strapdown, tactical-grade Inertial Measurement Systems that measures linear accelerations and angular rates with three-axes MEMS tactical-grade accelerometers and three-axes tactical-grade MEMS gyroscopes. Angular rates and accelerations are determined with low noise and very good repeatability for both motionless and dynamic applications.



The **Inertial Labs IMU-H100** is a breakthrough, fully integrated inertial solution that combines the latest and fully calibrated over operational temperature range MEMS sensor technologies:

- 3-axes Gyroscopes: 1 deg/hr Bias in-run stability
- 3-axes Accelerometers: 0.03 mg Bias in-run stability

Continuous Built-in Test (BIT), configurable communications protocols: Serial RS-422 or Synchronous Data Link Control (SDLC) and flexible input power requirements make the **Inertial Labs IMU-H100** easy to use in a wide range of higher order integrated system applications.

Applications for **Inertial Labs IMU-H100:**

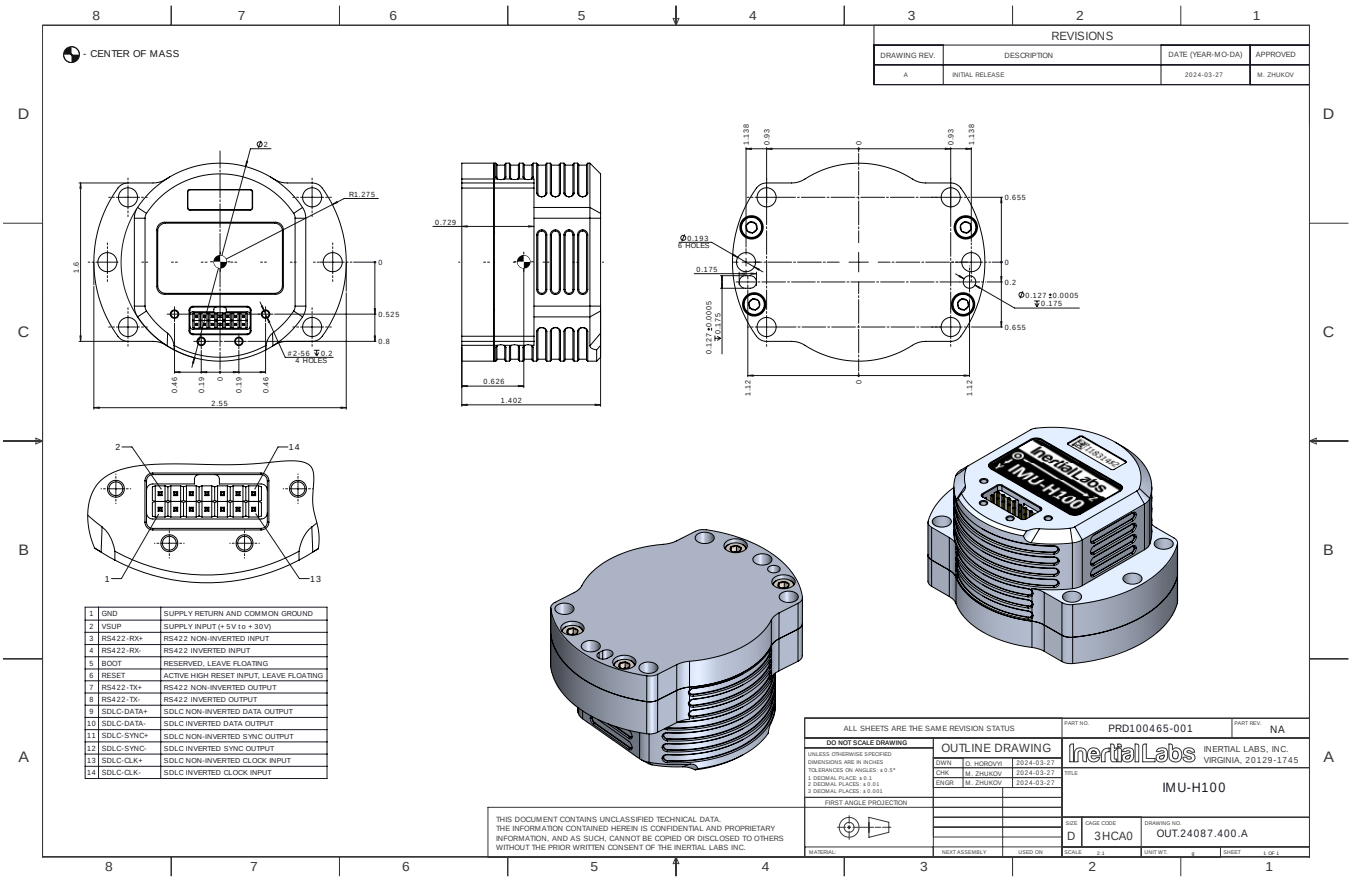
- Autonomous vehicles
- Antenna and Line of Sight Stabilization Systems
- Passengers' trains systems
- Motion Reference Units (MRU)
- Gimbals, EOC/IR, platforms stabilization
- GPS-Aided Inertial Navigation Systems (INS)
- Attitude and Heading Reference Systems (AHRS)
- Land vehicles navigation and motion analysis
- Buoy or Racing Boat Motion Monitoring
- UAV & AUV/ROV navigation and control
- Precision Guidance Munitions (PGM)
- Gliding bombs navigation
- Helicopters flight control systems
- Loitering Munitions
- Torpedo's Guidance & Navigation Systems
- Underwater Unmanned Vehicles (UUV)
- Tactical missiles and gliders

Parameter	IMU-H100
GYROSCOPES	
Measurement range	±2000 deg/sec
Gyroscopes Bias in-run stability	1 deg/hr
Gyroscopes Bias instability (over temperature range)	<30 deg/hr
Gyroscopes Noise - Angular Random Walk	0.2 deg/√hr
ACCELEROMETERS	
Measurement range	±40 g
Accelerometers Bias in-run stability	0.03 mg
Accelerometers Bias instability (over temperature range)	1.2 mg
Accelerometers Noise - Velocity Random Walk	0.045 m/sec/√hr

IMU-H100 Specifications

	Parameter	Units	IMU-H100
GENERAL	Output signals		Accelerations, Angular Rates, Temperature, Synch
	Color of Enclosure		Silver
	Update rate and data rate	Hz	2000
	Start-up time (data availability after power-on)	sec	<0.2
	Full Accuracy Data (Warm-up Time)	sec	<0.5
	Latency (group delay)	milli sec	<2
	Gyroscopes	**Units**	**IMU-H100**
PERFORMANCE	Measurement range	deg/sec	±2000
	Bandwidth (-3dB)	Hz	260
	Data update rate	Hz	2000
	Bias in-run stability (Allan Variance)	deg/hr, 1σ	1
	Bias repeatability (turn-on, to turn-on)	deg/hr, 1σ	20
	Bias instability (over temperature range)	deg/hr, 1σ	30
	SF accuracy (over temperature range)	ppm, 1σ	1000
	Noise. Angular Random Walk (ARW)	deg/√hr	0.2
	Non-linearity	ppm	<100
	Axis misalignment	mrad	0.2
	Accelerometers	**Units**	**IMU-H100**
	Measurement range	g	±40
	Bandwidth (-3dB)	Hz	260
	Data update rate	Hz	2000
	Bias in-run stability (RMS, Allan Variance)	mg, 1σ	0.03
	Bias instability (in temperature range, RMS)	mg, 1σ	1.2
	Bias one-year repeatability	mg, 1σ	1.5
	SF accuracy (over temperature range)	ppm, 1σ	500
	SF one-year repeatability	ppm, 1σ	1500
	Noise. Velocity Random Walk (VRW)	m/sec/√hr	0.045
	Non-linearity	ppm	150
	Axis misalignment	mrad	0.2
	Environment	**Units**	**IMU-H100**
ELECTRICAL & MECHANICAL	Mechanical shock (MIL-STD-810G)	g, msec	400 g, 0.1 ms
	Vibration (MIL-STD-810G)	g RMS, Hz	8, 10 – 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	100,000
	Life time (operational)	years	>10
	Storage life without requiring repair / overhaul	years	>17
	Electrical	**Units**	**IMU-H100**
	Supply voltage	V DC	+5
	Power consumption	Watts	<3 @ 5V
	Output Interface	-	RS-422 and Synchronous Data Link Control (SDLC)
	Output data format	-	Binary, ASCII
	Physical	**Units**	**IMU-H100**
	Volume	In^3/cm^3	5 in^3 (82 cm^3)
	Weight	grams	160

IMU-H100 Mechanical Interface Descriptions



1	GND	SUPPLY RETURN AND COMMON GROUND
2	VSUP	SUPPLY INPUT (+5V to +30V)
3	RS422-RX+	RS422 NON-INVERTED INPUT
4	RS422-RX-	RS422 INVERTED INPUT
5	BOOT	RESERVED, LEAVE FLOATING
6	RESET	ACTIVE HIGH RESET INPUT, LEAVE FLOATING
7	RS422-TX+	RS422 NON-INVERTED OUTPUT
8	RS422-TX-	RS422 INVERTED OUTPUT
9	SDLC-DATA+	SDLC NON-INVERTED DATA OUTPUT
10	SDLC-DATA-	SDLC INVERTED DATA OUTPUT
11	SDLC-SYNC+	SDLC NON-INVERTED SYNC OUTPUT
12	SDLC-SYNC-	SDLC INVERTED SYNC OUTPUT
13	SDLC-CLK+	SDLC NON-INVERTED CLOCK INPUT
14	SDLC-CLK-	SDLC INVERTED CLOCK INPUT

IMU-H100 Product code description

Model	Gyroscope	Accel	Calibration	Connector	Color	Version	Interface
IMU-H100	G2000	A40	TGA	C10	S	V1	26

- G2000: Gyroscopes measurement range = ±2000 deg/sec
- A40: Accelerometers measurement range = ±40 g
- TGA: Gyroscopes and Accelerometers are calibrated over temperature range
- C10: Aluminum case
- S: Color – Silver
- V1: Version 1
- .26: RS-422 and SDLC interfaces

Example: IMU-H100-G2000-A40-TGA-C10-S-V1.26