

LandMark™ 40 IMU



- **Ultra Low Noise MEMS IMU**
- **Form, Fit and Function with LandMark™ 10 and 20 IMU's**
- **Low Gyro Noise** 0.002°/sec/√Hz (100°/s)
- **Low Accel Noise** 0.035mg/√Hz (2g)
- **In-Run Gyro Bias** 6°/hour 1 σ
- **Rugged Environmentally Sealed Packaging & MILSPEC Connector**
- **Fully Temperature Compensated Bias and Scale Factor**
- **Compensated Misalignment <math>< \frac{1}{2}</math> mrad and g-Sensitivity <math>< 0.01^\circ</math>/sec/g 1 σ**
- **External Sync Input** (1kHz or 1pps)
- **Low Power** <math>< 430</math> mW Typical
- **Low Voltage** +3.3V (single sided power)
- **Light Weight** 103 grams
- **Small Size** <math>< 72\text{cm}^3</math>/4.4in³
- **Wide Sensor Bandwidth** 200 Hz
- **Bandwidth Filtering Capability**
- **RS485 Data Rate** 500 Hz (user selectable)
- **Internal Vibration Isolation**
- **Precision Alignment**
- **Internal Temperature Sensors**

**Next Generation Low Noise MEMS
IMU with Small Size & Low Power**

Export Classification: Commerce ECCN7A994

The LandMark™ 40 IMU is the next generation of our 4.4in³ family of IMU's and is form, fit and function interchangeable with our popular LandMark™ 10 and 20 IMU's, enabling existing users an easy upgrade option to superior performance. The unit features ultra low noise gyros and accelerometers with exceptional bias in-run and bias over temperature performance in a small, light weight and ruggedized environmentally sealed enclosure with MILSPEC connector. Proven performance in a multitude of applications by it's predecessor LandMark™ 10 and 20 IMU's, this next generation IMU features low power consumption, small size, light weight and long life MTBF. The **signature feature** of this IMU is the **ultra low noise gyros**, enabling precision measurement for demanding stabilization applications. The IMU's performance is optimized with **fully temperature compensated bias and scale factor and compensated misalignment and g-sensitivity**. The unit is highly durable and employs an FEA designed internal vibration isolator that can withstand environmental vibration and shock typically associated with commercial aircraft requirements. LandMark™ IMU's also include built-in firmware to accept external velocity as well as an external sync input 1 kHz (or 1pps indication). The unit is well suited for the harsh environments of commercial automotive and motorcycle testing, motorsports racing, aircraft and sea applications that require high performance and small size.

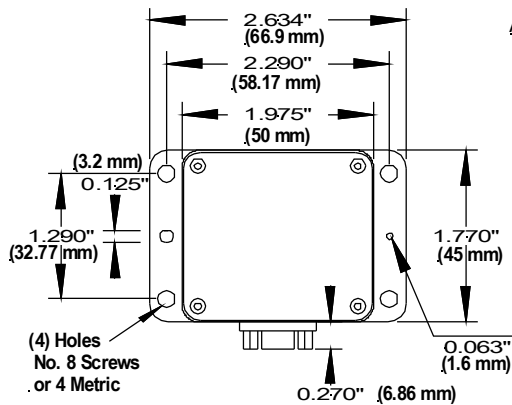


Gladiator Technologies
High Performance Inertial MEMS

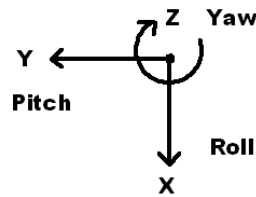
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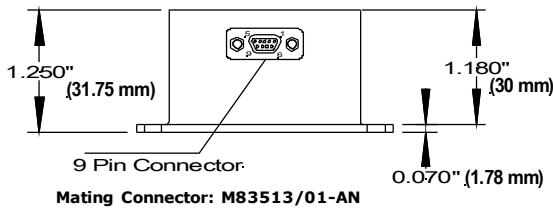
Axes (Top View) Right Hand Rule



LandMark™ 40 IMU

LMRK40IMU-100-02-100 or -10
LMRK40IMU-300-02-100 or -10

Specification



9 Pin Connector:

Mating Connector: M83513/01-AN

Pin No.	Assignment
1	RS-485 A (+)
2	RS-485 B (-)
3	Power Ground
4	Analog/Digital Input (0V to 5V)
5	+3.1V to +5.5V Max Input Power
6	External Sync Input (1kHz or 1pps)
7	+5V Regulator Out
8	Signal Ground
9	Self Test

Note: Any unused inputs (Pins 4, 6, 9) must be connected to signal ground (Pin 8).

Outputs	Serial Sequence at 200Hz
1	Roll Gyro (X)
2	Pitch Gyro (Y)
3	Yaw Gyro (Z)
4	X Accelerometer
5	Y Accelerometer
6	Z Accelerometer
7	Temperature $\pm 0.5^\circ$ C typical

PARAMETER	RATE AXES		ACCEL AXES	
Range	$\pm 100^\circ/\text{sec}$	$\pm 300^\circ/\text{sec}$	$\pm 2 \text{ g's}$	$\pm 10 \text{ g's}$
Bias (Over Temp.)	$< 0.03^\circ/\text{sec}$	$< 0.05^\circ/\text{sec}$	$< 0.5 \text{ mg}$	$< 1.0 \text{ mg}$
	1σ		1σ	
Bias (In Run Stability)	$6^\circ/\text{hour}$	$8^\circ/\text{hour}$	0.035 mg	0.08 mg
	1σ		1σ	
Scale Factor Error %	$\leq 0.1\%$ (over temperature) 1σ			
Sensor Resolution	$0.001^\circ/\text{sec}$		0.02 mg	0.06 mg
Angle Random Walk	0.002°	0.0035°	0.035 mg	0.13 mg
	$/\text{sec}/\sqrt{\text{Hz}}$	1σ	$/\sqrt{\text{Hz}}$	1σ
Alignment	$< 0.5 \text{ mrad}$ 1σ			
G-Sensitivity	$< 0.01^\circ/\text{sec}/\text{g}$ 1σ			
Self Test On	N/A		$\Delta 1.5$	$\Delta 0.3$
			$\pm 0.5 \text{ g}$	$\pm 0.2 \text{ g}$
	Logic 1 = 3V to 5V at Pin 9			
Temp Range	Operating: -40° C to $+85^\circ \text{ C}$			
	Non-Operating: -55° C to $+85^\circ \text{ C}$			
Update Rate	500 Hz, 200 Hz, 100 Hz, or 10 Hz (user selectable)			
Temp Sensors	Internal Temperature Sensors			
Start-up Time	$< 0.3 \text{ sec}$ at 200 Hz			
Input Power	+3.1V to +5.5V Max. Input (single sided)			
Power Consumption	430 mW at 3.3V Typical 450 mW at 3.3V Maximum			
Size	U.S.: $1.97 \times 1.77 \times 1.25 = 4.4 \text{ in}^3$ Metric: $5 \times 4.5 \times 3.2 = 72 \text{ cm}^3$			
Weight	$\leq 103 \text{ grams}$			
Mounting	4ea No.8 or M4 Screws			
Shock	500 g's $\frac{1}{2}$ sine 2 msec powered			
Vibration	6 gRMS (20Hz to 2KHz ~ 10g accelerometers)			
MTBF	53,869 hrs (per MIL-STD-217F, Notice 2 based on AIC environment with ambient temperature at 40° C)			

Specification subject to change without notice



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