

LandMark™ 50 INS/GPS



- High Performance NON-ITAR Commercial MEMS GPS-Aided INS
- 4 NMPH Free Inertial (*Short-Term GPS Outages*)
- 72 Channel GNSS: GPS, GLONASS, BeiDou, QZSS & SBAS (Galileo Ready*)
- SBAS: *WAAS, EGNOS & MSAS*
- Up to 18 Hz Navigation Update Rate *GPS*
- GPS Velocity Accuracy *0.05 m/s*
- GPS Heading Accuracy *0.3 degrees*
- GPS Horizontal Accuracy $\pm 2.0m$ CEP w/SBAS
- Pitch & Roll Angles $\pm 0.1^\circ$ stationary
- Ultra Low Noise Gyros $0.0009^\circ / \text{sec}/\sqrt{\text{Hz}}$
- Low Noise Accels $0.02\text{mg}/\sqrt{\text{Hz}}$ (2g)
- In-Run Gyro Bias $1^\circ / \text{hour } 1\sigma$
- Fully Compensated Bias & Scale Factor Over Temperature -40°C to $+85^\circ\text{C}$
- RS422/RS485 Serial Data Format
- Low Power <1 W typical
- Input Voltage $+6V$ to $36V$
- Light Weight <550 grams
- Small Size $<360\text{cm}^3/21.8\text{in}^3$



Applications

Platform Stabilization
EO/IR Stabilization
Antenna Stabilization & Pointing
Railway Motion Monitoring
Flight Control
Navigation
Automotive Testing
Laboratory Use

Export Classification:
Commerce ECCN7A994 (NLR)

**High Performance MEMS INS/GPS with
Low Noise and Low Bias Performance**



Gladiator Technologies
Division of LKD Aerospace
High Performance Inertial MEMS

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Rev. 15July17
SN: 600

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Specification

PARAMETER	RATE AXES			ACCEL AXES		
Power Requirements						
Input Voltage	+6.0V to +36V Max. Input K8(Input Transient Protection to 80V)					
Power	0.9W Typical (1.0W Max) at 12V					
Inertial Performance						
Standard Full Scale Ranges	±100°/sec	±175°/sec	±325°/sec	±2 g's	±6 g's	±10 g's
Bias (In Run Stability) 1σ	1°/hour	1.5°/hour	2°/hour	0.02mg	0.04mg	0.05mg
Angle Random Walk 1σ	0.0009°	0.0025°	0.003°	0.02	0.065	0.07
	/sec/√Hz 1σ			mg/√Hz 1σ		
Bias Over Temp. 1σ	<0.01°/sec	<0.02°/sec		<1.0mg	<1.3mg	<1.5mg
Scale Factor Error %	≤0.06% (over temperature)					
Non-Linearity % of FS	<0.1		<0.5	<2	<.025	<0.05
Sensor Resolution	0.0005°/sec	0.0012°/sec	0.0015°/sec	0.02mg	0.05mg	0.06mg
Alignment	< 0.5 mrad 1σ					
G-Sensitivity	<0.002°/sec/g 1σ					
INS/GPS System Performance						
Free Inertial typical	4 NMPH		10 NMPH	<60 sec Duration		
Channels			72 Channels			
GNSS Receiver	GPS L1C/A		GLONASS L1of	BeiDou B1	GALILEO E1B/C	
SBAS			WAAS	EGNOS	QZSS	
Max Navigation Update Rate (GPS)			Up to 18 Hz			
Concurrent GPS/GLONASS or GPS/BeiDou			Up to 10 Hz			
GPS Horizontal Position Accuracy			Autonomous 2.5 m			
SBAS - EGNOS WAAS MSAS			2.0 m			
Velocity Accuracy			0.05 m/s			
Heading Accuracy (GPS)			0.3 degrees			
Heading (sole inertial)			± 0.5° typical			
Pitch & Roll Angles (sole inertial)			± 0.1° typical			
Altitude (barometric)			± 3m typical			
Start-Up Time (inertial)			< 0.65 sec typical (alignment < 2 minutes)			
Time-To-First-Fix						
GPS Acquisition (Cold start)			30 sec			
GPS Reacquisition (Aided start)			3 sec			
GPS Reacquisition (Hot start)			1 sec			
Sensitivity						
Tracking			-166 dBm			
Reacquisition			-159 dBm			
Cold Start			-148 dBm			
Hot Start			-148 dBm			
Accuracy of time pulse signal			RMS 30ns 99% 60ns			
Update Rate (synced inertial) INS/GPS			100 Hz			
Physical						
Weight	< 550 grams					
Size	U.S.:	3.0 X 3.06 X 2.38 = 21.8 in³				
	Metric:	7.62 X 7.8 X 6.05 = 360 cm³				
Operating Life	10 Years typical					
Environments						
Operating Temperature	-40°C to +85°C					
Storage Temperature	-55°C to +100°C					
Dynamics (GPS)	≤ 4 g					
Altitude	50,000 m					
Velocity	500 m/s					
Vibration Operating (inertial)	6gRMS (20Hz to 2KHz ~ 10g accelerometers)					
Shock	500g's ½ sine 1 msec powered, any axis					

Specification subject to change without notice



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 High Performance Inertial MEMS



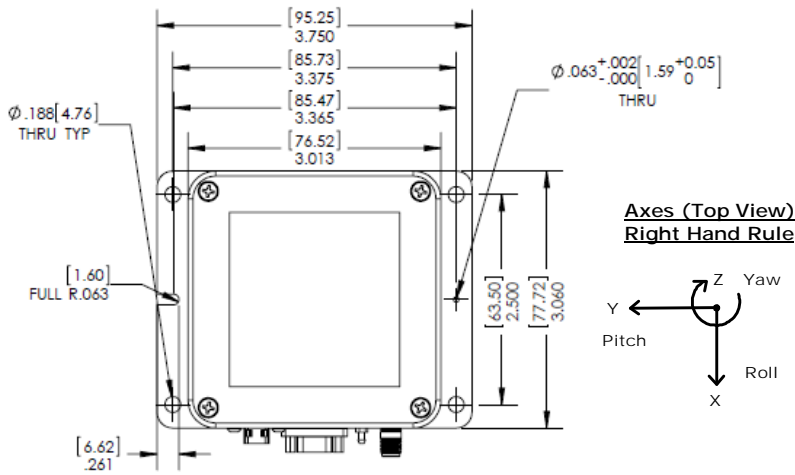
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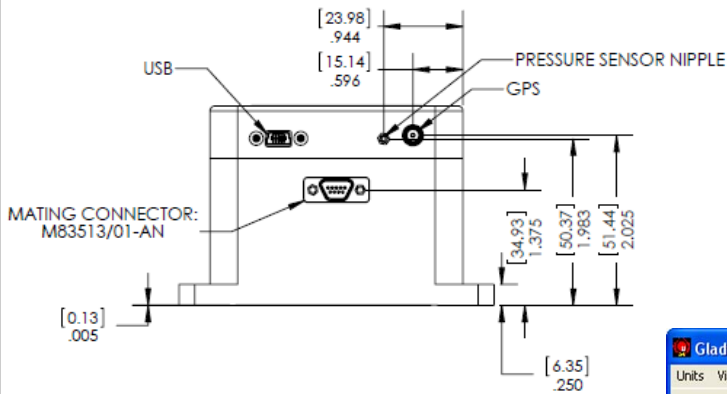
LandMark™ 50 INS/GPS P/N:

LMRK50INSGPS-100-02-100 or -06 or -10

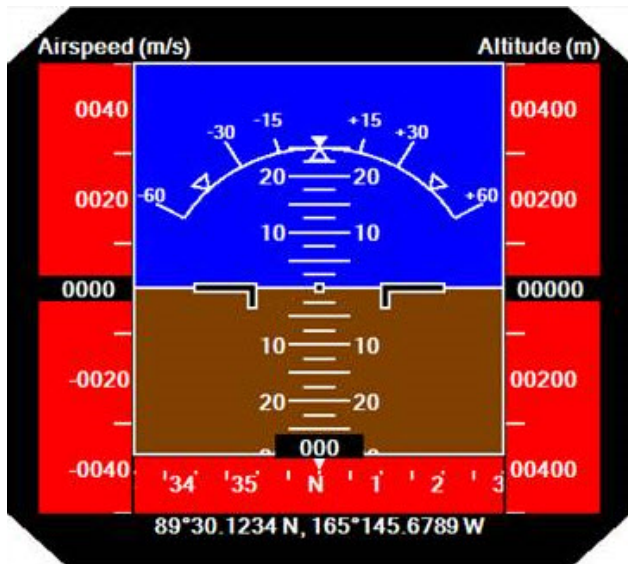
LMRK50INSGPS-175-02-100 or -06 or -10

LMRK50INSGPS-300-02-100 or -06 or -10

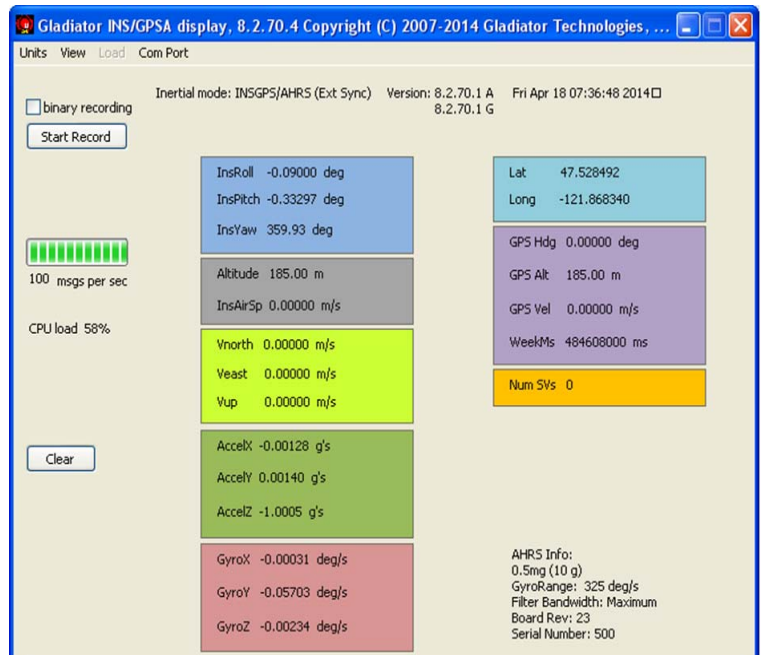
Pin No.	INS/GPS Assignment
1	RS-422/RS-485 A (+) AHRS
2	RS-422/RS-485 B (-) AHRS
3	Power Ground
4	RS-422/RS-485 A (+) Combined GPS/AHRS
5	+6V to +36V Input Power
6	RS-422/RS-485 B (-) Combined GPS/AHRS
7	1 PPS Output
8	Signal Ground
9	Self Test



Outputs	Serial Sequence at 100Hz
1, 2, 3	Gyros: Roll (X), Pitch (Y), Yaw (Z)
4, 5, 6	Velocities: (N), (E), (UP)
7	Temperature
8, 9, 10	Angles: Roll (X), Pitch (Y), Yaw (Z)
11, 12, 13	Baro Altitude, Airspeed
13, 14	Longitude, Latitude
15, 16	Time ms, Time Week
17, 18, 19	GPS: Altitude, Velocity, Heading
20	No. of SV's
21, 22, 23	IMU Status, Status, Checksum



SDK Attitude Indicator Display



SDK Data Display & Recording Software



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