



LandMark™ 60 INS/GPS

Low Noise MEMS INS/GPS

QMS & CERTS

AS9100C
ISO9001:2008

Cage Code: 47L11
Division of
LKD Aerospace
SAM Registered
JCP certified

Low Noise Inertial MEMS Rugged Low Cost Sensors & Systems

Automated Testing

Comprehensive ERP
Environmental Test Lab:

- Shock
- Vibration
- Temperature Calibration
- G-Sensitivity
- Axis Alignment
- Centrifuge
- GPS Simulation

- High Performance NON-ITAR Commercial MEMS GPS-Aided INS with CAN BUS and RTK Input
- 6 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 *0.0016°/sec/√Hz*
- Low Noise Accels *0.05mg/√Hz*
- In-Run Gyro Bias *3°/hour 1σ*
- Fully Compensated Bias & Scale Factor
Over Temperature *-40°C to +85°C*
- RS422/RS485/CAN 2.0B Serial Data Format
- Low Power *<0.9 W typical*
- Input Voltage *+7V to 36V*
- Light Weight: *≤160 grams*
- Small Size: *113cm³/6.88in³*

Applications

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

Products:

- Gyros
- Accelerometers
- IMU
- VG
- AHRS
- VG/GPS
- GPS/AHRS
- INS/GPS

Export Classification:
Commerce
ECCN7A994 (NLR)



Gladiator Technologies Division
LKD Aerospace
8020 Bracken Place SE
Snoqualmie, WA 98065 USA
Tel: +1.425.396.0829 Fax: +1.425.396.1129



sales@gladiatortechnologies.com
www.gladiatortechnologies.com

LandMark™ 60 INSGPS

Preliminary Specification

PARAMETER	RATE AXES		ACCEL AXES	
Power Requirements				
Input Voltage	+7.0V to +36V Max. Input Voltage (Transient Protection to 80V)			
Power	0.9W Typical (1.2W Max) at 12V			
Inertial Performance				
Standard Full Scale Ranges	±250°/sec	±490°/sec	±6 g's	±15 g's
Bias (In Run Stability) 1σ	3°/hour	5°/hour	0.025mg	0.03mg
Angle Random Walk 1σ	0.0016° /sec/√Hz	0.0016° 1σ	0.05 mg/√Hz	0.055 1σ
Bias Over Temp. 1σ	25°/hr	35°/hr	<0.8mg	<1.0mg
Scale Factor Error %	≤0.06% (over temperature)			
Non-Linearity % of FS	<0.1		<.025	<0.05
Sensor Resolution	0.001°/sec	0.001°/sec	0.03mg	0.03mg
Alignment	< 0.5 mrad 1σ		< 0.5 mrad 1σ	
G-Sensitivity	<0.002°/sec/g 1σ		0.25 mg/g2 1σ	
INS/GPS System Performance				
Free Inertial typical	6 NMPH	12 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)	29 sec			
GPS Reacquisition (Aided start)	2 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	< 160 grams			
Size	U.S.: 1.98 X 1.25 X 2.78 = 6.88 in ³			
	Metric: 5.03 X 3.18 X 7.08 =113 cm ³			
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			

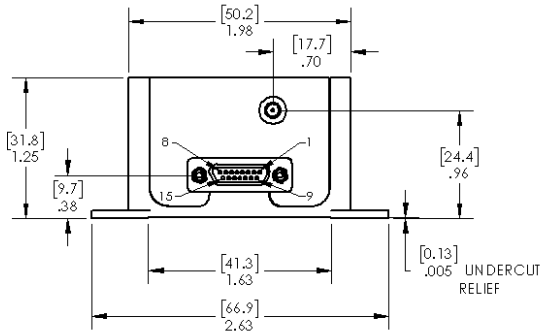
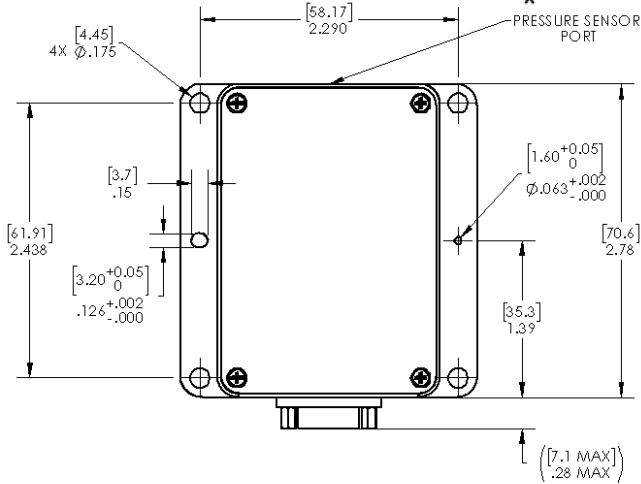
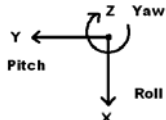
Specification subject to change without notice



Rev. 17Dec14
SN: 100

LandMark™ 60 INSGPS

Axes (Top View)
Right Hand Rule

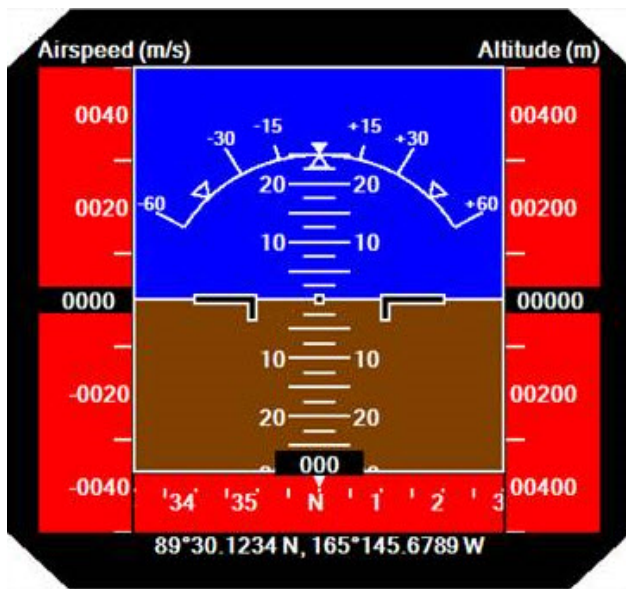


LMRK60 INSGPS

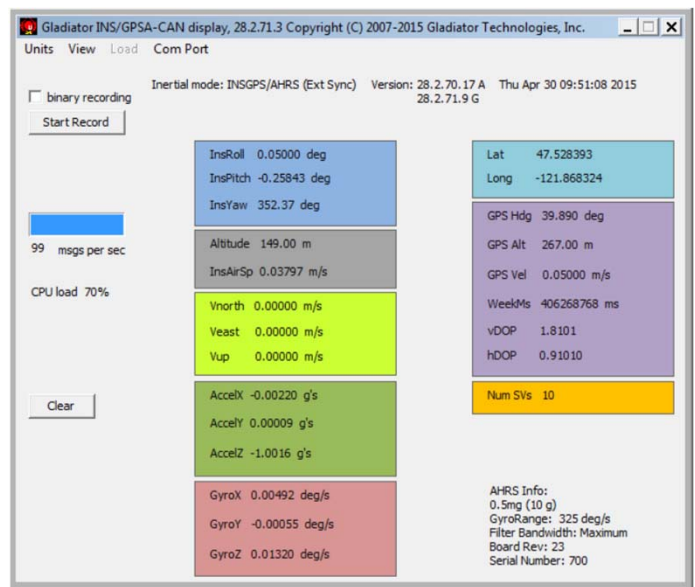
LMRK60IMU-250-06-100
LMRK60IMU-490-15-100

Pin No.	INS/GPS Assignment
1	RS-485 A (+) AHRS
2	RS-485 B (-) AHRS
3	Power Ground
4	RS-485 A (+) Combined GPS/AHRS
5	+7V to +36V Input Power
6	RS-485 B (-) Combined GPS/AHRS
7	+5V Regulated Output
8	Signal Ground
9	Self Test
10	CAN H
11	CAN L
12	CAN Gnd
13	RS-485 A (+) RTK
14	RS-485 B (-) RTK
15	Case

Outputs	Serial Sequence at 100Hz
1, 2, 3	Gyros: Roll (X), Pitch (Y), Yaw (Z)
4, 5, 6	Accels: Fwd (X), Right (Y), Down (Z)
7	Temperature
8, 9, 10	Angles: Roll (X), Pitch (Y), Yaw (Z)
11, 12	Baro Altitude, Airspeed
13, 14	vDOP, hDOP
15, 16	Longitude, Latitude
17, 18	Time ms, Time Week
19, 20, 21	GPS: Altitude, Velocity, Heading
22	No. of SV's
23, 24	AHRS Status/ Status, Checksum



SDK Attitude Indicator Display



SDK Data Display & Recording Software

