

MMQ™ G

Miniature MEMS Quartz GPS/INS

Ideal for High-Precision Civil & Military Applications:

- Targets & Drones
- Position & Orientation System Stabilization
- UAVs & Other Unmanned Vehicles
- Range Instrumentation
- Commercial Aviation
- Navigation
- Railroads
- Helicopter



Key Performance Features:

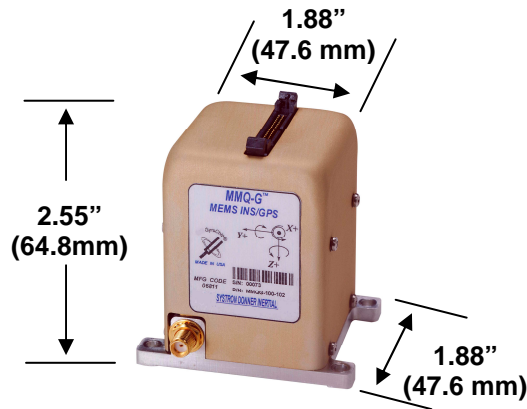
- **Extremely Small Size**
- **Integrated INS/GPS**
- **Optimized 28-State Kalman Filtered Navigation Solution**
- **RS-232 Digital Interface**
- **Low Power Consumption (<5W)**
- **Accepts External Magnetometer Data for Heading Reference**
- **In-Air Dynamic Alignment Capability¹**



The MMQ™G offers a unique combination of the Systron Donner Inertial solid-state Inertial Measurement Unit (IMU) and the Jupiter PICO™ commercial Global Positioning System (GPS) receiver. The MMQ™G's MEMS quartz rate sensors and MEMS accelerometers make up an IMU system that is tightly coupled with the Jupiter's 12-channel Coarse/Acquisition (C/A) Code GPS engine to provide a highly accurate navigation solution. The MMQ™G also accepts 3-axis magnetometer data, which it uses as a heading reference in order to improve heading stability. This also allows for alignment during low dynamic motion, as experienced in ocean applications. A "heading hold" feature allows delayed takeoffs after alignment is complete.

The MMQ™G combines tremendous performance and versatility with an extremely compact size and low weight at a very low price. Leveraging the C-MIGITS® III user-friendly message based navigation outputs, the MMQ™G provides a powerful solution for Guidance, Navigation & Control.

¹ In-Air dynamic alignment without magnetometer reference requires system velocity below 95 kts.



	MMQG-100-102
Physical Characteristics	
Size (Vol.)	9.0 in ³
Weight	<0.50 lbs (<0.227 kg)
Power	+ & - 12Vdc at <5W total
I/O	RS-232, output protocol similar to GPS-153
Navigation Performance (C/A Configuration)	
Position (SEP)	5m
Random Walk	Angle: 0.3°/hr, 1 σ ; Velocity: 0.5 mg/ $\sqrt{\text{Hz}}$, 1 σ
Velocity (1 σ)	0.2 m/s
Attitude (1 σ) (In Dynamic Motion)	5 mrad
Heading (1 σ) (In Dynamic Motion)	5 mrad
Time (1 σ)	1 μ s
Rate Channels	
Range	$\pm 200^\circ/\text{sec}$
Bias Turn-on to Turn-on Stability (fixed temp)	$\leq 100^\circ/\text{hr}$, 1 σ
Bias In-Run Stability (at any temperature)	$100^\circ/\text{hr}$, 1 σ
Bias Instability	$< 4\text{--}15^\circ/\text{hr}$
Angle Random Walk	$0.3^\circ \sqrt{\text{hr}}$ (0.005 $\text{sec}/\sqrt{\text{Hz}}$)
Scale Factor Error	≤ 5000 ppm (0.5%)
Alignment	≤ 5 mrad
Bandwidth (-90°Phase Shift)	50 Hz, nominal
Acceleration Channels	
Range	$\pm 10g$
Bias Turn-on to Turn-on Stability (fixed temp)	≤ 2.5 mg, 1 σ
Bias In-Run Stability (at any temperature)	≤ 3 mg, 1 σ
Velocity Random Walk	0.5 mg/ $\sqrt{\text{Hz}}$
Scale Factor Error	≤ 5000 ppm (0.5%)
Alignment	≤ 5 mrad
Bandwidth (-90°Phase Shift)	50 Hz, nominal
Environmental	
Temperature Range	-40 to +71°C (operating)
Vibration	6g _{rms} (performance) 20 – 2000 Hz
Shock	250g (survival)
Operating Range	Up to 60,000' and 500 m/s Velocity

For more information, contact:

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