



## Dynamic Measurement System with Dual Antenna GPS

**DMS-SGP02**

### **Description:**

The DMS-SGP02 is Watson Industries' newest addition to the DMS line of inertial sensor packages. The sensor is a miniaturized version of the DMS-EGP02. To allow for a smaller package, the DMS-SGP02 uses our S series MEMS rate gyro.

The DMS may be used in almost any application where triaxial angular rate and acceleration data is required. The sensor provides both angular rate and acceleration outputs in analog and digital formats. The DMS features six accelerometer outputs. The X, Y, and Z axis outputs represent the accelerations in the plane of the vehicle body, while the second set of three outputs measure the acceleration aligned with an earth-level coordinate system. This allows forward and lateral acceleration measurements that are essentially free of gravity influences. The triaxial sensor set allows software alignment of sensors, greatly reducing any alignment errors. The serial interface is highly configurable and provides access to almost all operational parameters.



The DMS-SGP02 is designed to be used in vehicle applications where accurate heading is required, but a magnetic compass is infeasible. This sensor is equipped with a dual GPS antenna system that provides heading data even when the vehicle is not in motion. The addition of the GPS antennas also gives vehicle velocity data to the DMS that enhances the unit's performance during highly dynamic maneuvers such as sharp turns. This makes the DMS-SGP02 inertial gyro sensor a more complete system since it does not require velocity information to be supplied from an external sensor. An antenna spacing of 0.500 meters  $\pm$ 5mm is required.

- Solid State, Strap Down System
- GPS Heading Reference
- Low Cost
- Rugged, High Reliability
- Vibration Resistant
- Analog and RS-232 Serial Outputs
- One Year Limited Warranty
- Engineering Support

### **Applications:**

The DMS-SGP02 is useful in automotive testing, vehicle dynamics, marine and aircraft applications. This sensor is most useful in applications where strong magnetic fields make heading data from a fluxgate magnetometer unreliable.



### **Watson Industries, Inc.**

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## DMS-SGP02 Specifications

### Attitude

Range: Bank	±180°	
Range: Elevation	±75°	
Resolution:	0.02°	Binary mode (14 bit)
Analog Scale Factor:	18°/V	±10V Output
Accuracy: Static	±0.5°	
* Accuracy: Dynamic	±2%	

### Heading

Range:	0° - 360°	
Resolution:	0.02°	Binary mode (14 bit)
Analog Scale Factor:	18°/V	±10V Output
Accuracy: Static	±0.5°	Using GPS
* Accuracy: Dynamic	±2%	±0.1°/sec (without GPS)

### Angular Rate

Range: Roll, Pitch, Yaw	±100°/sec	
Resolution:	0.01°/sec	Binary mode (14 bit)
Analog Scale Factor:	10°/sec/V	±10V Output
Scale Factor Accuracy:	1%	
Bias: Roll, Pitch, Yaw	< ±0.2°/sec	
Non-Linearity	< 0.05%	Full scale range
Bandwidth	20 Hz	

### Acceleration

Range: X, Y, Z	±10g	
Range: Forward, Lateral, Vertical	±10g	
Resolution:	4mg	
Analog Scale Factor:	1g/V	±10V Output
Scale Factor Accuracy:	1%	
Bias: X, Y, Z	< ±5mg	
Non-Linearity:	< 1%	Full scale range
Bandwidth:	20 Hz	

### Environmental

Temperature: Operating	-40°C to +85°C	
Temperature: Storage	-55°C to +85°C	
Vibration: Operating	2.5g rms	20 Hz to 2 kHz
Vibration: Survival	10g rms	20 Hz to 2 kHz
Shock: Survival	500g	10ms ½ sine wave

### Electrical

Frame Rate	71.1 Hz	Maximum
Startup Time: Data	5 sec	
Startup Time: Fully operational	< 60 sec	Typical
Input Power:	10 to 30VDC	7.5 W
Input Current:	625mA @ 12VDC	315mA @ 24VDC
Input Velocity: (Optional)	±10VDC	Full scale (±400kph)
Digital Input/Output	RS-232	
Analog Input/Output	±10VDC	

### Physical

Axis Alignment:	< 0.25°	
Size: Including Mounting Flanges	3.24"W x 5.78"L x 3.50"H	8.2 x 14.7 x 8.9 (cm)
Weight:	25oz (1.6lb)	710g (0.7kg)
Connection: RS-232	9 pin female "D" subminiature	
Connection: Power / Analog Outputs	25 pin male "D" subminiature	
Connection: GPS (Qty 2)	SMA	

\* Using velocity data with GPS mode on.

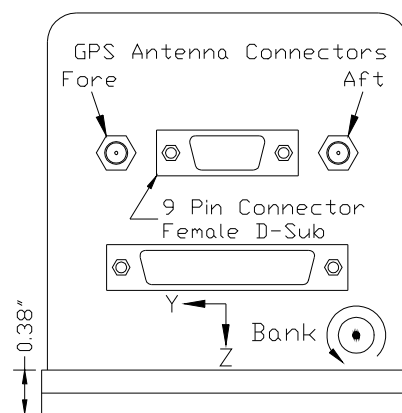
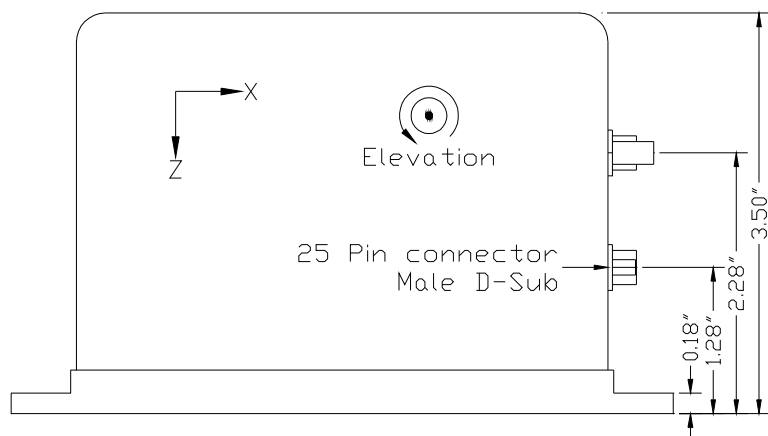
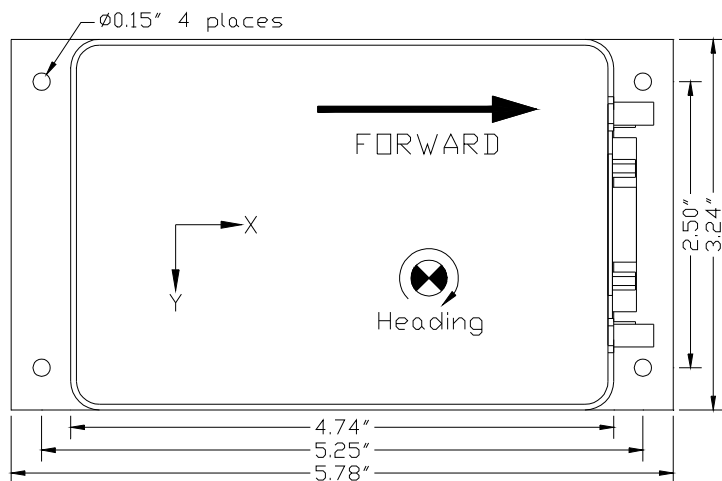
Actual accuracy can be calculated as the listed percentage multiplied by the change in value over the entire dynamic maneuver.  
Specifications are subject to change without notice.



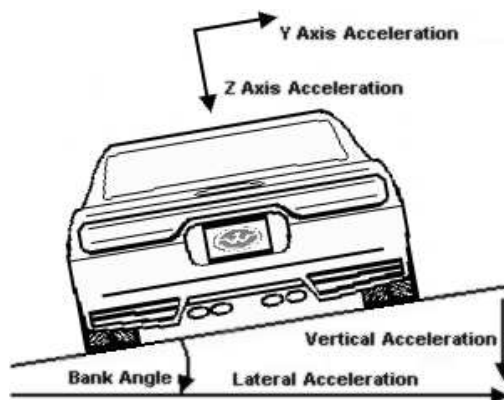
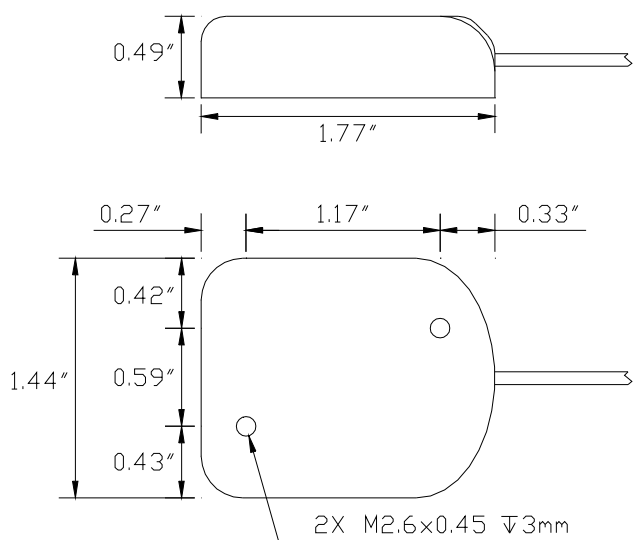
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**Dimensions:  
DMS-SGP02**



**GPS Antenna**



03/08 DAO



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