

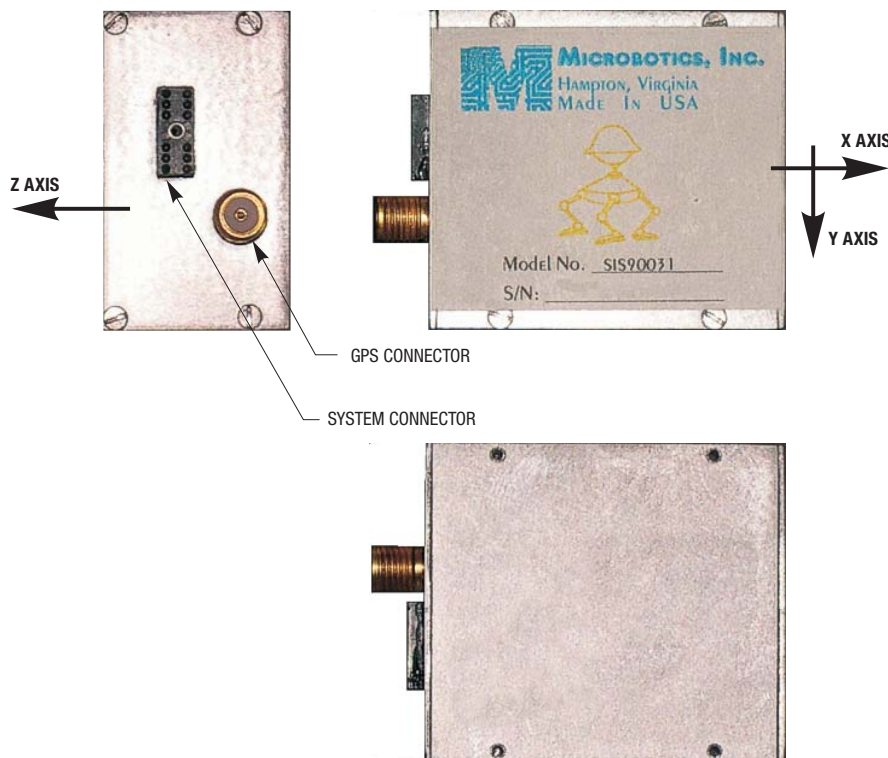
The MIDG II is a GPS aided inertial navigation system (INS) for use in applications requiring attitude, position, velocity, acceleration, and angular rates for navigation or control. An internal GPS receiver measures position and velocity and passes it to the data fusion processor to be combined with the inertial data to generate an optimal solution. An internal three-axis magnetometer provides a magnetic heading reference when needed.



Features

- Full INS Solution
- Low Power
- Light Weight
- Small Size

Sensor Axes



MIDG II Specifications ¹

Power Requirements

| | |
|---------------|----------------------------------|
| Input Voltage | 10 VDC - 32 VDC |
| Power | 1.2W max (including GPS antenna) |

GPS Antenna ²

| | |
|-----------------------|------------------------------------|
| Connector Type | 50-Ohm SMA, right hand thd |
| Antenna Power | +5V at center conductor, 25 ma max |
| RF Power Input | -134 dBm min, -61dBm max |
| Antenna Pre-Amplifier | 45 dB maximum gain |

Measurements

| | |
|------------------------------------|---|
| Angular rate (all axes) | |
| Range | ± 300 °/sec |
| Non-Linearity | 0.1% of FS |
| Noise Density | 0.05 °/sec / $\sqrt{\text{Hz}}$ |
| 3dB Bandwidth | 20 Hz |
| Acceleration (all axes) | |
| Range | ± 6 g ³ |
| Non-Linearity | 0.3% of FS |
| Noise Density | 150 μg / $\sqrt{\text{Hz}}$ |
| 3dB Bandwidth | 20 Hz |
| Attitude Accuracy (pitch and roll) | 0.4° (1 σ) |
| Heading Accuracy | 1-2° |
| Position Accuracy | 2m CEP, WAAS/EGNOS available |
| Velocity Accuracy | < 0.2 m/s |
| Altitude Accuracy | 3m WAAS/EGNOS available, 5m otherwise |
| Data Output Rates | Position , Velocity, attitude, rates, accelerations – 50 Hz Raw GPS measurements – 5 Hz (WAAS/EGNOS) |

Environment

| | |
|--------------------|--|
| Temperature | -20° C to 70° C, operating, -55° C to 85° C, storage |
| Humidity | 10% to 90% RH, non-condensing |
| Survival Shock | 100 g, 8ms., 1/2 sine |
| Survival Vibration | 6 g _{rms} , 10 Hz to 2000 Hz, random |

¹ Typical values.

² See section (p. 4) on active/passive antennas.

³ ± 6 g for SIS90031c, ± 10 g for other models.

Output

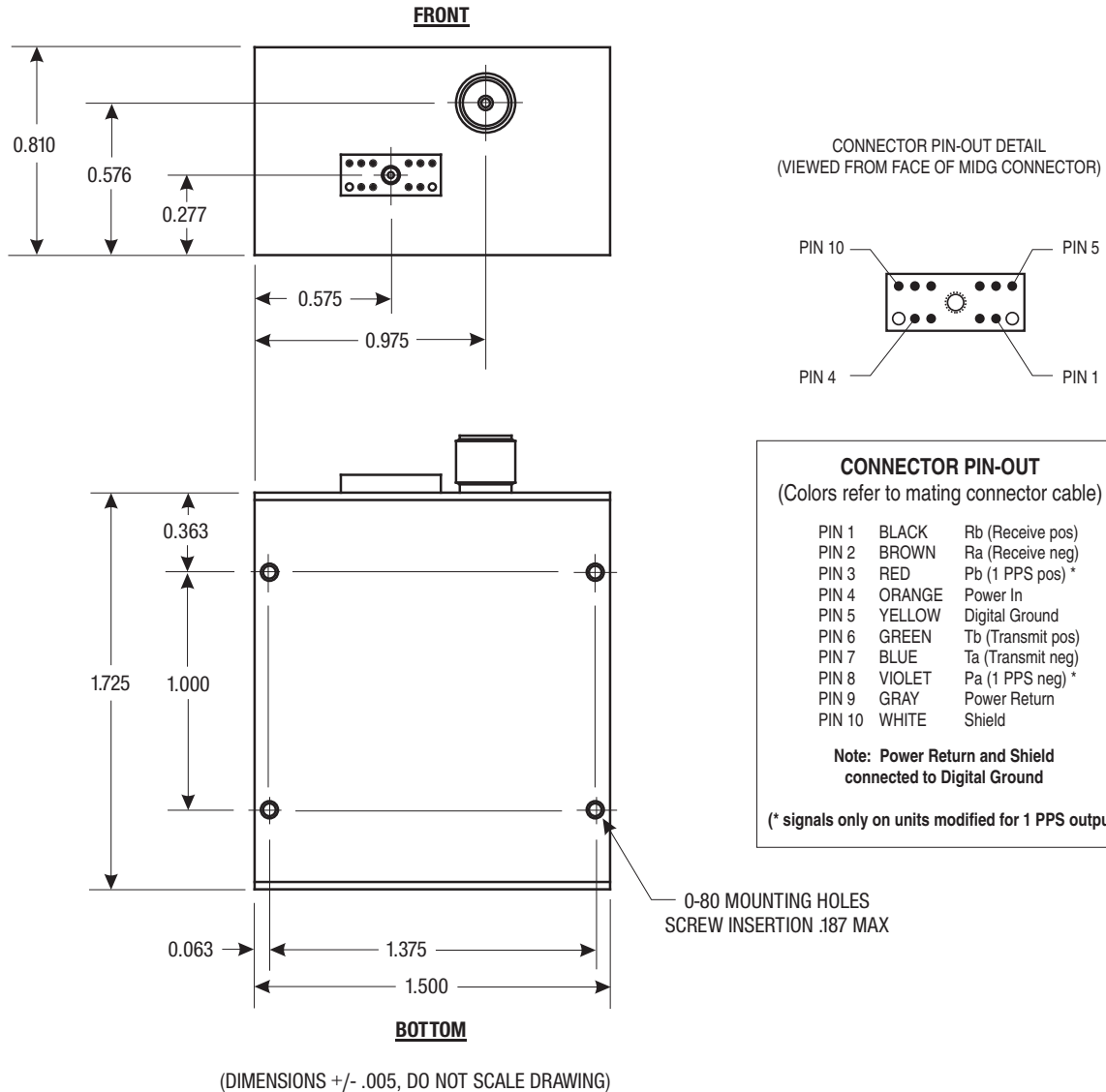
| | |
|-------------------------------|---|
| Electrical | RS422 async., 115200 baud (configurable), 8-N-1 |
| Pulse Per Second ⁴ | RS422 pair, each side TTL compatible |
| Data Format | Microbotics Binary Protocol |

Physical

| | |
|--------|-------------------------------|
| Size | 1.500" W x .810" H x 1.725" D |
| Weight | 55 grams |

⁴ Standard on SIS90031c, order option for other models.

MIDG MOUNTING DIMENSIONS AND CONNECTOR PIN-OUT



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NOTE: If the MIDG II is equipped with the Time Mark option, pin 8 becomes the Time Mark input. A rising edge on this input causes the TIM_TM message to be sent by the MIDG II indicating the time of the rising edge to within 1 msec. The input is TTL compatible (high recognized above 2V, low recognized below 0.4V, do not exceed 5V).

GPS ANTENNA REQUIREMENTS

1. **Antenna mounting** must be non-magnetic as a magnet will interfere with the MIDG's magnetometers.
2. **Antenna and Ground Plane**
A GPS antenna ground plane is recommended. Antenna ground plane of 7 x 7 cm (2.75 x 2.75 in.) is recommended for use with the GPS antenna (part number A-GPS5-SMA) available from Microbotics, Inc.
3. **Note on Active/Passive Antennas**
(The following information is supplied by GPS receiver manufacturer.)
Passive antennas contain only the radiating element, e.g. the ceramic patch or the helix structure. The use of an active antenna is always advisable if the RF-cable length between receiver and antenna exceeds about 10 cm. Care should be taken that the gain of the LNA inside the antenna does not lead to an overload condition at the receiver. A gain of 15 dB is usually sufficient, even for cable lengths up to 5 m. There's no need for the antenna LNA gain to exceed 26 dB for use with this receiver. With short antenna cables, gains in excess of 25dB may swamp the GPS RF front end. When comparing gain measures of active and passive antennas, one has to keep in mind that the gain of an active antenna is composed of two components: the antenna gain of the passive radiator, given in dBic; and the LNA power gain, given in dB. A low antenna gain cannot be compensated by high LNA gain. If a manufacturer provides one total gain figure, it is not sufficient to judge the quality of the antenna. One would need information on antenna gain (in dBic), amplifier gain, and amplifier noise figure.

ALERT regarding antenna connection

5v power for active antennas is supplied via the MIDG GPS SMA connector. The GPS antenna must never be connected or disconnected while the MIDG is powered. Connecting or disconnecting the GPS antenna with power applied to the MIDG may damage the GPS receiver, and will void the MIDG warranty.