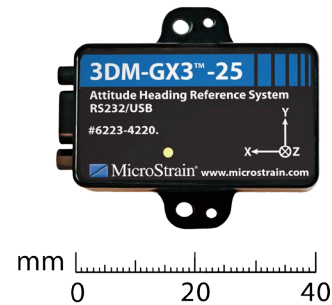


3DM-GX3™ -25

Miniature Attitude Heading Reference System



Introduction

3DM-GX3™ -25 is a high-performance, miniature Attitude Heading Reference System (AHRS), utilizing MEMS sensor technology. It combines a triaxial accelerometer, triaxial gyro, triaxial magnetometer, temperature sensors, and an on-board processor running a sophisticated sensor fusion algorithm to provide static and dynamic orientation, and inertial measurements.

The system offers a range of output data quantities, including fully calibrated inertial measurements: acceleration, angular rate, and magnetic field; or deltaAngle & deltaVelocity vectors. It can also output computed orientation estimates: pitch, roll, and heading (yaw) or rotation matrix. All quantities are fully temperature compensated and are mathematically aligned to an orthogonal coordinate system. The angular rate quantities are further corrected for G-sensitivity and scale factor non-linearity to third order.

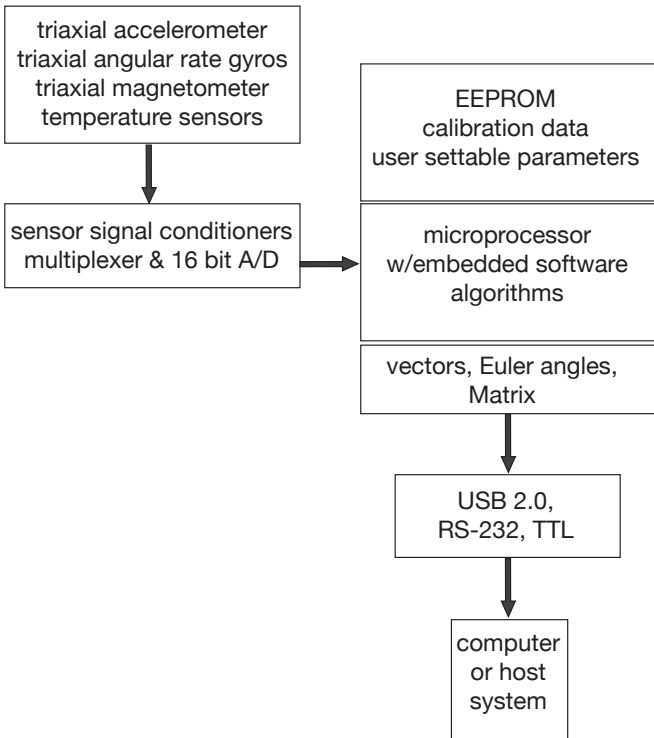
The 3DM-GX3™ -25 AHRS is available with RS-232, USB 2.0 and TTL serial communication interfaces and is a member of the 3DM-GX3™ family of inertial sensors.

Features & Benefits

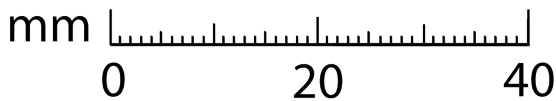
- smallest and lightest AHRS available on the market, with versions weighing only 11.5 grams
- fully temperature compensated over entire -40°C to 75°C operational range
- calibrated for sensor misalignment, gyro G-sensitivity, and gyro scale factor non-linearity
- improved navigation under vibration, as sensors are sampled at 30 kHz and digitally filtered and scaled into physical units; coning and sculling integrals are computed at 1 kHz
- available with RS-232, USB 2.0 and TTL serial communication interfaces
- user adjustable data rate, 1 to 1,000 Hz
- outputs Euler angles, rotation matrix, deltaAngle & deltaVelocity, acceleration angular rate and magnetic field

Applications

- inertial aiding of GPS
- location tracking of personnel
- unmanned vehicles, navigation, artificial horizon
- computer science, biomedical animation, linkage free tracking/control
- platform stabilization
- antenna and camera pointing
- robotics



The system architecture has been carefully designed to substantially eliminate common sources of error such as hysteresis induced by temperature changes and sensitivity to supply voltage variations. On-board coning and sculling compensation allows for use of lower data output rates while maintaining performance of a fast internal sampling rate.



Weighing only 11.5 grams, the OEM version of the 3DM-GX3™ -25 AHRS

Specifications

| | |
|------------------------------|---|
| Orientation range | 360° about all axes |
| Accelerometer range | ± 5 g standard ± 2 g, ± 18 g, and ± 50 g also available |
| Accelerometer bias stability | ± 0.005 g for ± 5 g range ± 0.003 g for ± 2 g range ± 0.010 g for ± 18 g range ± 0.050 g for ± 50 g range |
| Accelerometer nonlinearity | 0.2 % |
| Gyro range | ± 300°/sec standard, ± 1200°/sec, ± 600°/sec, ± 150°/sec, ± 75°/sec also available |
| Gyro bias stability | ± 0.2°/sec for ± 300°/sec |
| Gyro nonlinearity | 0.2 % |
| Magnetometer range | ± 2.5 Gauss |
| Magnetometer nonlinearity | 0.4 % |
| Magnetometer bias stability | 0.01 Gauss |
| A/D resolution | 16 bits (SAR) (oversampled to 17 bits) |
| Orientation Accuracy | ± 0.5° typical for static test conditions ± 2.0° typical for dynamic (cyclic) test conditions & for arbitrary orientation angles |
| Orientation resolution | <0.1° |
| Repeatability | 0.2° |
| Output modes | acceleration, angular rate and magnetic field deltaAngle and deltaVelocity Euler angles rotation matrix |
| Interface options | standard: USB 2.0 or RS232 OEM: USB 2.0 / TTL serial (3.3 volts) |
| Data rate | 1 Hz to 1,000 Hz |
| Filtering | sensors sampled at 30 kHz, digitally filtered (user adjustable) and scaled into physical units; coning and sculling integrals computed at 1 kHz. |
| Baud rate | 115,200 baud to 921,600 baud |
| Supply voltage | standard: 4.4 to 6 volts [up to 15 volts operation possible at limited temp range or low duty cycle] OEM: 3.2 to 5.5 volts |
| Power consumption | 80 mA @ 5 volts with USB |
| Connectors | micro-DB9, OEM: Samtec FTSH-105-01-F-D-K |
| Operating temp. | -40 °C to +75 °C (consult factory for higher temperature operation) |
| Dimensions | 44 mm x 25 mm x 11 mm - excluding mounting tabs, width across tabs 37 mm, OEM: 38 mm x 24 mm x 12 mm |
| Weight | 18 grams RS-232 and USB, 11.5 grams OEM |
| Shock limit | 1000 g (unpowered), 500g (powered) |

*Accuracy and stability specifications obtained over operating temperatures of -40 to 70°C with known sine and step inputs, including angular rates of ± 300° per second.



MicroStrain Inc.
 459 Hurricane Lane, Suite 102 ph: 800-449-3878
 Williston, VT 05495 USA fax: 802-863-4093
 www.microstrain.com sales@microstrain.com
 Patent Pending