GEDC-6 Gyro-Enhanced Navigation Sensor

Description

The Sparton GEDC-6 Attitude Heading Reference System (AHRS) provides superior performance by eliminating nearly all external magnetic disturbances that affect heading accuracy. The GEDC-6 offers highly dynamic response features combined with long-term stability and accuracy. It provides 3D absolute magnetic field measurement and full 360° tilt-compensated heading, pitch, and roll data. Proprietary adaptive algorithms provide accurate, in-field calibration, even in the presence of magnetic distortions due to ferrous objects positioned on the mounting platform. Further, the GEDC-6 corrects for world magnetic variation providing a True North output.

Features

- Best in class *AdaptNav*™ adaptive algorithms outperform traditional Kalman filter based approaches by providing real-time optimization of sensor performance when used in varying magnetic and dynamic operating environments
- 2D and 3D adaptive in-field cal providing hard and soft magnetic interference compensation
- High dynamic heading accuracy enhanced by use of gyroscopes and fast sampling rate
- Simple 2-wire serial (UART) interface (3.3V logic level) with user-selectable baud rate
- Advanced sensing technology (3-axis magnetic, 3-axis acceleration, and 3-axis gyro)
- Built-in World Magnetic Model for accurate true heading anywhere in the world
- Rugged (epoxy encapsulated) construction and small physical size
- Magnetic and True North heading (yaw), pitch, and roll measurement
- Low power consumption and power management (Sleep Mode) functionality
- Powerful user programmable sensor customizations via NorthTek™ Forth interpreter
- Industry leading static heading accuracy and resolution
- Supports multiple communication protocols
- Full 360° rollover capability

sparton
NAVIGATION AND EXPLORATION
5612 Johnson Lake Rd • Deleon Springs, FL • 32130
800.824.0682 • 386.985.4631
www.sparton.com/ne • www.spartonnavex.com

Specifications

Performance data applies to 25°C, 0g Acceleration for Pitch/Roll unless otherwise specified:

Dynamic Heading Accuracy	1.0° RMS[1]
Static Heading Accuracy	0.3° RMS
Heading Repeatability	0.1° RMS
Dynamic Pitch/Roll Accuracy	1.0° RMS[1]
Static Pitch/Roll Accuracy	0.2° RMS
Pitch/Roll Repeatability	0.1° RMS
Pitch/Roll Range	± 90°, ± 180°
Accelerometer Range	+/- 4g (+/- 1g)[2]
Accelerometer Noise Density	126 µg/√Hz
Accelerometer Bias Stability	0.023 mg
Accelerometer Velocity Random Walk (VRW)	0.063 m/s
Gyro Dynamic Range	± 480°/sec (± 300°/sec)[2]
Gyro Noise Density	0.03 dps/√Hz
Gyro Bias Stability	10.8°/Hr
Gyro Angular Random Walk (ARW)	1.5 deg/Sqrt[Hr]
Magnetic Range	±1.2 Gauss (±900 MGauss)[2]
Maximum Magnetic Inclination (Dip)	± 80°
Update Rate (Samples/Sec)	100
Baud Rate	0.3, 1.2, 2.4, 4.8, 9.6; 19.2; 38.4; 57.6; 115.2 kbaud
Dimensions L x W x H	42 x 28 x 11 mm (1.66 x 1.11 x 0.43 inches)
Mass	16g
Encapsulated or Enclosure	Yes
Operating Temp	-40° to +85° C
Storage Temp	-40° to +85° C
Humidity Resistance	95%, 70° C, 240 hrs Meets MIL-STD-202G – Method 103A, Test Condition A
Shock Resistance	1500g, 1ms Pulse, Half-Sine Wave Meets MIL-STD-202G – Method 213B, Test Condition F
Vibration Resistance	.06 dB Power Spectral Density, 9.26 G RMS Meets MIL-STD-202G – Method 214A, Test Condition I/C
Power Supply Input (Unregulated Voltage)	+4 to +10V DC
Input Power, Operating Mode (Typical @ 4V)	320 mW
Input Power, Sleep Mode (Typical @ 4V)	12 mW
3.3V Logic UART Interface	Yes
2D and 3D In-Field Calibration	Yes
Able To Maintain Function When Inverted	Yes
Quaternion/Rotation Matrix Output	Yes
True North Heading Output	Yes
NorthTek™ User Programmable Customizations	Yes
Includes World Magnetic Model	Yes

[1] ***Dynamic heading accuracy derived from Scorsby table set for 7 RPM, 30 degrees of inclination***

[2] ***Specifications in parentheses represent current limits of calibration methodology***

sparton
NAVIGATION AND EXPLORATION
5612 Johnson Lake Rd • Deleon Springs, FL • 32130
800.824.0682 • 386.985.4631
www.sparton.com/ne • www.spartonnavex.com

Applications

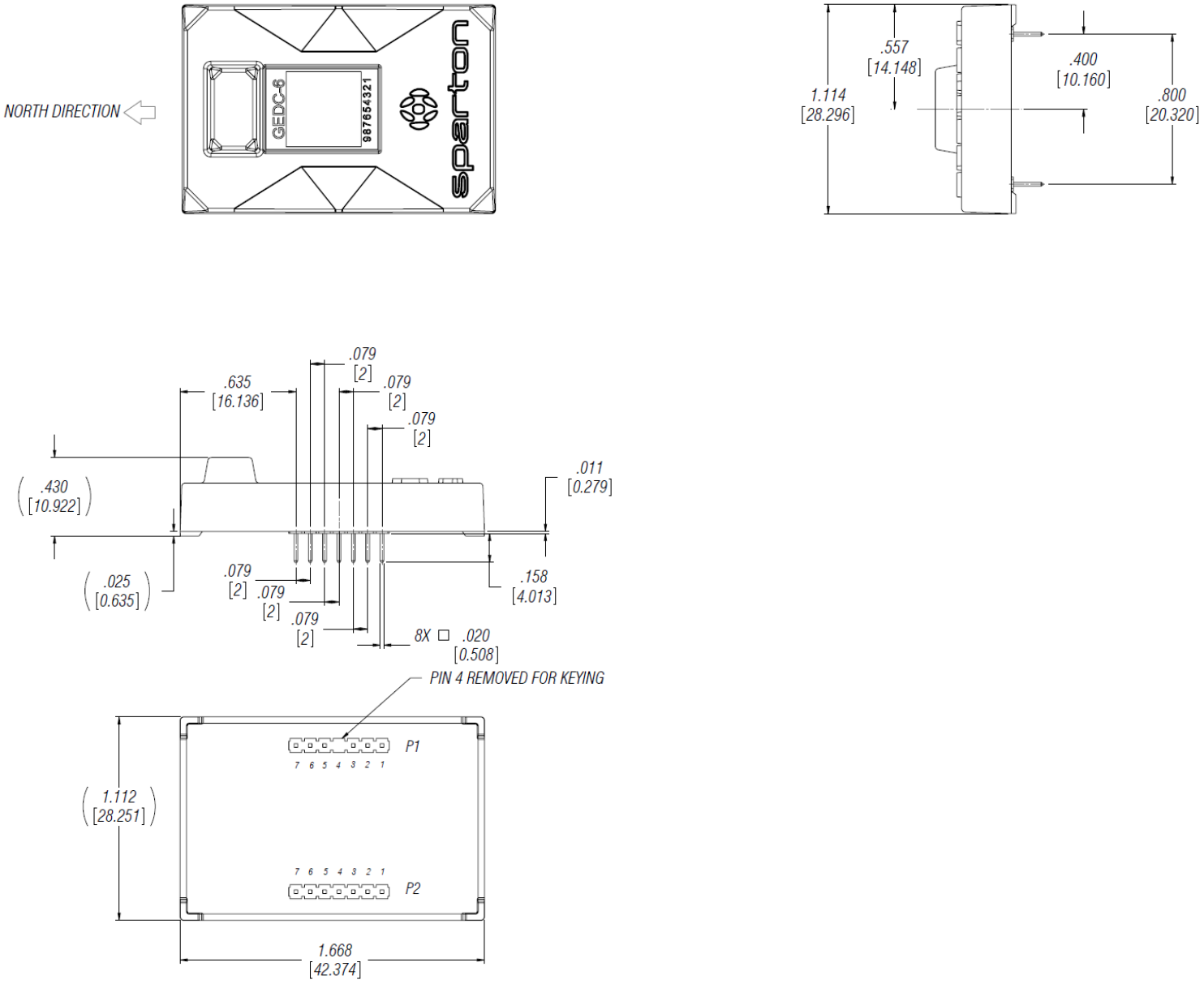
- Weather, data, and ocean surveillance
- Electro-optical target designation sensors
- Accurate vehicle attitude position and orientation sensing
- Precision autonomous vehicle guidance
- Ground, sea surface and sub sea surface survey and monitoring

Connections

Connector – Pin Number	Pin Name	I/O	Function
P1-1	V_TEST	O	3.3V regulator output for test purposes (factory use only)
P1-2	DEBUG_RXD	I	3.3V logic RXD Input to Debug Port (factory use only)
P1-3	DEBUG_TXD	O	3.3V logic TXD Output from Debug Port (factory use only)
P1-4		N/A	Pin removed for keying
P1-5	#WP_EEPROM	I	3.3V logic, active-low EEPROM write protect (the pin has 10kΩ pull-down)
P1-6	Factory Use	I	Do not connect (factory use only)
P1-7	GND	N/A	System Ground
P2-1	V+	I	+4 to +10V DC power supply input. Max load = 80mA
P2-2	USER_RXD	I	3.3V logic RXD input to User Com Port
P2-3	USER_TXD	O	3.3V logic TXD output from User Com Port
P2-4	#RESET	I	3.3V logic, active-low reset input (the pin has a weak pull-up)
P2-5	#EINT0	I	3.3V logic, active-low interrupt input (the pin has a weak pull-up). Used for programming purposes
P2-6	GND	N/A	System Ground
P2-7	GND	N/A	System Ground

sparton
NAVIGATION AND EXPLORATION
5612 Johnson Lake Rd • Deleon Springs, FL • 32130
800.824.0682 • 386.985.4631
www.sparton.com/ne • www.spartonnavex.com

Mechanical Data



For support, please e-mail
productsupport@sparton.com

sparton
NAVIGATION AND EXPLORATION
5612 Johnson Lake Rd • Deleon Springs, FL • 32130
800.824.0682 • 386.985.4631
www.sparton.com/ne • www.spartonnavex.com