



Applications

- Vehicle Instrumentation
- Robotics
- Automotive Testing
- Attitude Reference Systems
- Control Systems
- Dead Reckoning Aiding GPS
- Flight Testing
- Buoy Instrumentation

Description

The MotionPak™ is a “solid-state” six degree of freedom inertial sensing system used for measuring linear accelerations and angular rates in instrumentation and control applications. It is a highly reliable, compact, and fully self-contained motion measurement package. It uses three orthogonally mounted “solid-state” micromachined quartz angular rate sensors, and three high performance linear servo accelerometers mounted in a compact, rugged package, with internal power regulation and signal conditioning electronics.

Features

- “Solid State” Sensors
- Compact, Rugged Package
- Long Operating Life
- Low Cost
- High Level Analog Outputs
- Wide Bandwidth
- Fast Start-Up
- Fully Self-Contained System

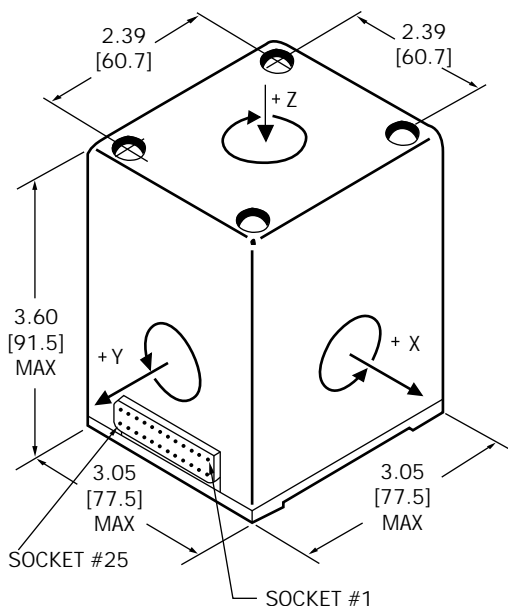
Operation

Angular rates are sensed using micromachined quartz gyroscopes. Linear accelerations are sensed using linear servo accelerometers. The MotionPak™ is directly powered by a ± 15 Vdc input and provides six high-level, wide-bandwidth analog signal outputs. There are three outputs for linear acceleration and three for angular velocity. The package contains internal power regulators and includes a temperature sensor for high performance applications.



BEI MotionPak™

Multi-Axis Inertial Sensing System



NOTES:

1. MOTIONPAK™ IS SUPPLIED WITH A MATING CONNECTOR (ADB-25) AND FOUR MOUNTING BOLTS.
2. OUTPUT VOLTAGE POLARITY MATCHES COORDINATE FRAME (RIGHT HAND RULE).
3. DIMENSIONS ARE IN INCHES/[MM].
4. MOTIONPAK™ COVER IS FOR DUST AND MECHANICAL PROTECTION ONLY.
5. SIGNAL RETURNS AND POWER GROUND ARE COMMON.

Connector Pin	Assignment
1	+Vdc Input
2	-Vdc Input
3	Power Ground
4	Case Ground
5	Rate-X Output
6	Rate-X Return
7	Rate-Y Output
8	Rate-Y Return
9	Rate-Z Output
10	Rate-Z Return
11	Accel-X Output
12	Accel-X Return
14	Accel-Y Output
15	Accel-Y Return
16	Accel-Z Output
17	Accel-Z Return
23	Temp Sensor Output (AD590)

All other pins are "no connection," leave open.

PARAMETER	RATE CHANNELS	ACCELERATION CHANNELS
Power Requirements		
Input Voltage	+ and -15 Vdc ±10%	
Input Current	<270mA (each supply)	
Performance		
Standard Ranges	±50, 100, 200, 500°/sec	1, 2, 3, 5, 10 g's
Full Range Output (Nominal)	±2.5 Vdc	±7.5 Vdc
Calibration (at 22°C)	≤1% of value	
Temperature Sensitivity	<0.03%/°C	
Bias Factory Set	≤2.0°/sec*	<±12.5 mg
Bias Variation over Temperature (Max Deviation from 22°C)	≤3°/sec from 22°C*	≤100 µg/°C
Long Term Bias Stability (1 year)	<2.0°/sec*	<1000 µg
G Sensitivity	≤0.02°/sec/g	—
Start-Up Time	<1.0 sec	
Bandwidth (-90°)	>60 Hz	>300 Hz
Non-Linearity	≤0.05% of F.R.	0.05% F.R.
Threshold/Resolution	≤0.004°/sec*	≤10 µg
Output Noise (DC to 100Hz)	≤0.01°/sec/√Hz*	≤7.0 mV
Operating Life	10 years, typical	
Environments		
Operating Temperature	-40°C to +80°C	
Storage Temperature	-55°C to +100°C	
Vibration Survival	8 g _{rms} 20 Hz to 2 kHz random, 5 hour duration	
Shock	200 g	
Weight	900 grams	

*Values indicated for ±100°/sec range.

Other Information:

1. Part number based on ranges, options and number of channels specified.
2. Rate channel options - High Performance, Low Noise, Wide Bandwidth, Special Ranges.
3. Acceleration Channel Options - Current output for Special Ranges.

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