

RELIABLE, HIGH PERFORMANCE PRODUCTS — EXCEPTIONAL SERVICE

FEATURING: Precision Linear & Angular Accelerometers

All Jewell force-balanced (servo) precision accelerometers are fully self-contained. They connect to a DC power source and a readout or control device for a complete operating system. The output is a high-level DC signal proportional to acceleration and tilt angle sine from as little as $\pm 0.010g$ to $\pm 20g$ full range. Jewell precision accelerometers respond to change in velocity as small as $1\mu g$. Hysteresis is less than 0.0005% of full range output and vibration rectification is less than $50\mu g/G^2$ are available. Review the products in this guide for more information.

Custom Application-Specific Solutions

Jewell Instruments provides both standard and custom solutions for a diverse group of industries, such as aerospace, medical, industrial, telecommunications, and rail markets. We manufacture our components completely in-house and work directly with our clients, maintaining control over the entire development process. Our legacy of experience and success, and the expertise of our engineering team, mean customers benefit from extensive resources at their disposal.

Connecting Experience, Quality & Expertise

For over 60 years, Jewell Instruments has provided commercial and industrial sensors and controls, meters and avionics, and industrial test equipment solutions to a range of global markets. Our ISO 9001:2008 certification ensures that our customers receive products and systems with the dependability and reliability that their applications demand. Jewell Instruments' experienced engineering team works with customers to produce high quality, reliable products that meet or exceed their requirements.

Exceptional Customer Service

We specialize in reliability, value and responsiveness. Cooperation and joint planning between our engineering groups and our clients drive our customer care experience. We work as an extension of our customers' engineering and manufacturing teams to solve problems, improve applications, shorten lead-times and bring more value to their products and services. Superb customer support is the cornerstone of our many successful, long-term customer relationships.

Jewell Facilities

Jewell offers two, fully modernized manufacturing facilities, one in Manchester, New Hampshire and one in Barbados, West Indies.



Manchester Facility

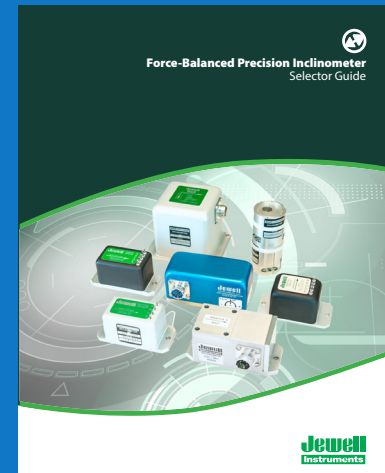


Barbados Facility

Other Product Groups Available:



Rail Transportation Selector Guide



Force-Balanced Precision Inclinator Selector Guide



Precision Quartz Flexure Accelerometer Selector Guide



MEMS Inclinator Selector Guide



MEMS Accelerometer Selector Guide

Distributed By:

Jewell Instruments *Making Sense Out of Motion...*

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Force-Balanced Precision Accelerometer Selector Guide



Jewell Instruments

ENGINEERED SENSOR SOLUTIONS

Rail Transportation

Motion sensing is an affordable, high accuracy method for rail control, performance and testing. Using accelerometers, engineers can monitor and automate the acceleration and deceleration of driver and driverless rail cars, measure and test the efficiency of trains and maintain railways. Many of our accelerometers are CENELEC/AREMA certified to verify that the demands of your application are met.

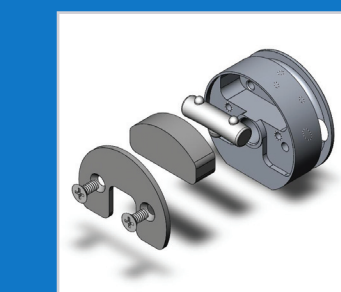


Aerospace

Wind shear detection, flight guidance and fatigue monitoring are a few critical factors within an aircraft that can be solved with a high precision accelerometer. We offer sensors that can measure linear or angular motion within one, two or three axes. Our highly accurate and proven sensors come in compact packages to suit your space requirements and most specifications can be customized based on your application. Contact us today to learn how we can serve your aerospace project.

Military

When defense is at stake, you need a highly accurate and durable product to depend on. Force-balanced angular and linear accelerometers have resolutions up to 0.001 rad/sec^2 , $1\mu g$ and a shock resistance as great as $1500g$, 1msec , $1/2 \text{ sine}$. This makes them reliable enough for crucial applications such as radar/antenna stabilization, weapons leveling, firing control, missile orientation, weapons control and targeting and more.



Customer Sensor Solutions

Jewell Instruments designs and manufactures a large selection of custom sensor solutions for customers worldwide. From the enclosure to the electronics, our skilled engineering and sales staff can customize the ideal sensor for your application. Jewell Instruments has provided custom sensor setups for automotive research, satellite testing, aerospace, military, rail applications and more. No matter the requirements, Jewell Instruments can design a sensor package to meet all of your needs. Call us and see how our precision sensor solutions can help you make sense out of motion!



Angular Accelerometers

ASB Series



- Bandwidths to 200 Hz
- IP68 Seals
- Available 28V Aircraft Input
- Connector or Pin Config
- Aerospace Quality and Reliability

ASMP Series



- Bandwidths to 200 Hz
- 1.05" Cube Housing Size
- ±15 Standard Input Voltage
- Aerospace Quality & Reliability

ASXC Series



- Standard Ranges 2 to 100 rad/sec²
- Resolution Better than 0.001 rad/sec²
- Very High Output to Size Ratio
- Self-test for Greater than 95% Fail Detect
- 30°C to 70°C Operating Temperature Range

- Aircraft Stability Augmentation
- Racecar Performance Testing
- Camera Angular Motion Stabilization
- Autopilot System Input
- Rotating System Performance Testing
- Weapons Control Targeting

- Antenna Stabilization
- Motor Torque Measurement & Control
- Vehicle Ride Analysis
- Autopilot System Input
- Optical System Stabilization

- Motor Torque Measurement & Control
- Automotive Angular Acceleration Testing
- Autopilot System Input
- Optical System Stabilization

Linear Accelerometers

LCA-100 Series



- Built-in Output Filter
- DO-160 Quality Versions
- Available 28V Aircraft Input
- Connector or Pin Config
- 0.20% 10-year Scale Factor

- Aircraft Flight Controls
- Aircraft Fatigue Monitoring
- Aircraft Autopilot System Input
- Aircraft Wind-shear Detect
- Double Integrated Railcar Pos
- Train Performance Testing

LCF-200 Series



- ±0.5g to ±5.0g Full Range
- Filtering 5 to 100 Hz Bandwidth
- Exceptional Bias and Scale Factor
- High Level ±V dc Output
- 1,500g Shock Capability

- Geophysical Testing
- Railcar Accel/Decel Control
- Ocean Buoy Accel Sensing
- Aircraft Stability Control
- Aircraft Flight Testing
- Vehicle Roadway Profiling

LSM Series



- ±0.5g to 20g Full Range
- Filtering to 200 Hz Bandwidth w/0.6 Damping
- Satellite Application Reliability
- Better than 20µg Resolution at 10g Full Scale
- 55°C to +95°C Operating Temperature Range

- Satellite Nutation Sensing
- Radar Leveling
- Fire Control
- AHRS System Input
- Attitude Heading and Reference System
- Train Braking & Banking
- Missile Orientation
- Autopilot Systems
- Train Performance Testing
- Performance Testing

LSB Series



SMA Series



- Low-cost, high precision solution
- ±0.25g to ±2g Full Range
- 3.5µg Resolution
- 55°C to +85°C Operating Temperature Range

- Industrial Automation
- OEM
- Wind Turbine Motion Control
- Robotics
- Track Monitoring and Testing

LCF-500 Series



- Filtering Available
- Exceptional Bias & Scale Factor
- High Level ± Vdc Output
- 1,000g Shock Capability

- Railcar Acceleration Control
- Railcar Harshness (NVH)
- Train Performance Testing
- Railcar Monitoring
- Railcar Vibration Testing

Dual Axis Accelerometers

LCF-2530



- ± 0.25 g to ± 5.0 g Full Range
- Dual Axis Version of LCF-Series
- High Accuracy and Superior Repeatability
- 40°C to +80°C Operating Temp Range

- Satellite Nutation Sensing
- Train Braking and Banking
- Performance Testing
- Attitude Heading and Reference Systems
- Autopilot

Triple Axis Accelerometers

LCF-3500



- ±0.5g to ±5.0g Full Range
- Filtering 5 to 100 Hz Bandwidth
- Exceptional Bias & Scale Factor
- High Level ± Vdc Output
- 1,500 Shock Capability
- Tri-Axis

- Geophysical Testing
- Railcar Acceleration & Deceleration Control
- Ocean Buoy Accel Sensing
- Aircraft Stability Control
- Vehicle Roadway Profiling
- Tri-Axis Acceleration Applications

Digital Accelerometers

DXA-100/200 Series



- Digital Output
- Resolution 8 µg
- Mechanical Shock 1500 g 1msec ½ sine
- Industry Standard RS485 & RS422 Output
- High Precision and Performance
- Low Noise

- Radar/Antenna Control
- Structural Monitoring
- Linear Acceleration/Deceleration Measuring
- Automatic Train Position Control
- Seismic Monitoring
- Track Leveling

Custom Applications



THE JEWELL INSTRUMENTS ENGINEERING TEAM PROVIDES THE FOLLOWING:

- Modifying or customizing an existing designed model series
- A new part number configured from existing model series part and subassemblies
- A new application-specific custom design requiring special features and specifications
- Customized sensor for harsh environments
- A first-time design solution requiring close interaction between Jewell's design engineering team and customer's engineering team
- Design qualifications to industrial, military, and aerospace standards including FAA DO-160
- Sensors designed to meet EMC requirements including lightning
- A customer proprietary sensors solution requiring non-disclosure agreement (NDA) between Jewell Instruments and our customer

CUSTOM CAPABILITIES

- 4-20mA Output signal with single-ended 24 Vac Input
- Internal temperature sensor and thermal modeling for the highest levels of accuracy over a wide temperature range
- Factory set zero biasing for non-horizontal measurements
- Solder terminals and flying leads in place of circular connector
- Custom inclinometer input ranges from +/-0.5 to +/-90.0 degrees available
- Custom accelerometer input ranges from +/- 0.017g to +/- 20.000g available
- Custom output impedance available
- Custom filtering to provide a bandwidth and response tailored to the application
- Custom mounting plates and mechanical assemblies

Features & Benefits

Applications

Performance Specs

Input Range (Ang: rad/sec ² , Lin: g)	±200 ±500 ±1000	±200 ±500 ±1000	±2 ±10 ±20 ±50 ±100	±0.5 ±1.0 ±2.0 ±5.0	±0.5 ±1.0 ±2.0 ±5.0 ±10.0 ±20.0	±0.25 ±0.5 ±1 ±2	± 0.5 ± 1.0	± 0.25 ± 0.50 ± 1.00 ± 2.00 ± 5.00	±0.5 ±2.0 ±5.0	± 0.25 ± 0.50 ±.87 ± 1.00 ± 2.00
Full Range Output (FRO V± 1.0%)	±5.0 ±5.0 ±5.0	±5.0 ±5.0 ±5.0	±5.0 ±5.0 ±5.0	±5.0 ±5.0 ±5.0	±5.0 ±5.0 ±5.0 ±5.0	±5.0 ±5.0 ±5.0 ±5.0	±5.0 ±5.0	± 5.0 ± 5.0 ± 5.0 ± 5.0 ± 5.0	±5.0 ±5.0 ±5.0	± 0.25 ± 0.50 ±.87 ± 1.00 ± 2.00
Non Linearity (%FRO Max.)	0.5 0.2 0.1	0.5 0.2 0.1	1.0 1.0 1.0 1.0 1.0	0.05 0.05 0.05 0.02	0.05 0.05 0.05 0.10 0.50 0.25	0.02 0.02 0.05 0.05	0.02 0.02	0.02 0.02 0.02 0.05 0.10	0.05 0.05 0.05	0.02 0.02 0.03 0.05 Test Case
Scale Factor (Ang: V/rad/sec ² Lin: V/g, Nom.)	0.025 0.010 0.005	0.025 0.010 0.005	5.000 1.000 0.500 0.200 0.100	10.0 5.0 2.5 1.0	10.0 5.0 2.5 1.0 0.5 0.25	20 10 5 2.5	5 5	20.00 10.00 5.00 2.50 1.00	10 2.50 1.00	0.05 0.05 0.05 0.05 0.05
Scale Factor Temp Sens (%reading, PPM/°C, Max.)	0.09 0.09 0.09	0.09 0.09 0.09	0.09 0.09 0.09 0.09 0.09	180 180 180 180	200 200 200 200 200 200	100 100 100 100	100 100	100 60 60 100 100	100 100 100	100 100 100 100 100
Bias (Ang: rad/sec ² , Lin: g, Dig: g, Max.)	±1.0 ±4.0 ±4.0	±1.0 ±4.0 ±4.0	±0.005 ±0.020 ±0.030 ±0.080 ±1.00	±0.01 ±0.01 ±0.01 ±0.01	±0.005 ±0.005 ±0.005 ±0.005	±0.0025 ±0.005 ±0.01 ±0.02	±0.004 ±0.004	±0.001 ±0.002 ±0.004 ±0.005 ±0.005	±0.005 ±0.005 ±0.005	±0.008 ±0.008 ±0.008 ±0.008 ±0.008
Bias Temp Sens (FRO, PPM/°C, mg, Max.)	±0.05 ±0.05 ±0.10	±0.40 ±0.40 ±0.40	±0.001 ±0.001 ±0.001 ±0.001 ±0.001	100.0 100.0 100.0 100.0	50.0 50.0 50.0 50.0	50.0 50.0 50.0 100.0 100.0 100.0	85 100 140 200	0.001 0.0005 0.0003 0.0003 0.0003	100.0 100.0 100.0	90.0 90.0 90.0 90.0 90.0
Bandwidth (-3db) (Hz, Nom.)	70 100 120	70 100 120	100 150 200 170 170	60 60 60 60	30 30 30 30 30	70 100 140 100 140 160	5 5 5 5	30 30 30 30 30	30 30 30	30 30 30 30 30
Damping Ratio (Nom)	0.6 0.6 0.6	0.6 0.6 0.6	0.9 0.9 0.9 0.9 0.9	- - - -	- - - -	0.5 to 0.9	- - - -	- - - -	30.0 30.0 30.0	- - - -
Transverse Axis Misalignment (°, Max.)	±1.0 ±1.0 ±1.0	±1.0 ±1.0 ±1.0	±0.025 ±0.025 ±0.025 ±0.025 ±0.025	±0.71 ±0.71 ±0.71 ±0.71	±0.71 ±0.71 ±0.71 ±0.71	±0.71 ±0.71 ±0.71 ±0.71 ±0.71 ±0.71	1 1 1 1	±0.50 ± 1.00 ± 1.00 ± 1.00 ± 1.00	±1.0 ±1.0 ±1.0	±0.15 ±0.15 ±0.15 ±0.15 ±0.15
Resolution and Threshold (rad/sec ² , µg, Max.)	0.005 0.005 0.005	0.004 0.010 0.020	0.001 0.001 0.002 0.005 0.010	10.0 10.0 10.0 10.0	1.0 1.0 1.0 1.0	10.0 10.0 10.0 10.0 20.0 50.0	3.5 3.5 3.5 3.5	1.0 1.0 1.0 1.0 1.0	10.0 10.0 10.0	8.0 8.0 8.0 8.0 8.0

Electrical

Number of Axes	1	1	1	1	1	1	1	2	3	1 or 2
Input Voltage (Vdc)	±12 to ±18	±15 to ±10	±15 to ±10	±12 to ±18	±12 to ±18	±12 to ±18	±12 to ±18	±12 to ±18	±12 to ±18	±10 to ±30
Input Current (mA, Nom.)	±10	±10	±25	±25	±15	±10	40	25	±50	DXA-100 ±80 mA/DXA-200 ±70 mA
Output Impedance (Ohms, Nom.)	10.0K 4.0K 5.0K	4.0K 4.0K 4.0K	100.0	100.0	100.0	10.0K 5.0K 2.5K 5.0K 2.5K 2.5K	10	100	100.0	-
Noise (Vrms, Max.)	5.00 5.00 5.00	0.005 0.005 0.005	0.030 0.030 0.050 0.050 0.050	0.005	0.001	5.000	0.002	0.002	0.002	0.005

Environmental

Operating Temperature Range	-55°C to +95°C	-55°C to +95°C	-30°C to +70°C	-55°C to +85°C	-40°C to +80°C	-55°C to +95°C	-55°C to +85°C	-40°C to +80°C	-40°C to +80°C	-40°C to +70°C
Survival Temperature Range	-65°C to +105°C	-65°C to +105°C	-40°C to +70°C	-60°C to +90°C	-40°C to +90°C	-65°C to +105°C	-60°C to +90°C	-60°C to +90°C	-60°C to +90°C	-40°C to +75°C
Vibration	-	-	-	0 g	20 g	20 g	-	20 g	20 g	20 g
Shock	100g, 11msec, 1/2 sine	100 g	100g, 11msec, 1/2 sine	100 g	1000g, 1 msec, 1/2 sine	100 g, 0.011 sec, ½ sine	500g, 1 msec, ½ sine	100g, 11 msec, ½ sine	1000g, 1msec, 1/2 sine	1500g, 1msec, 1/2 sine
Seal	MIL-STD-202, Method 112	MIL-STD-202, Method 112	MIL-STD-202, Method 112	MIL-STD-202, Method 112	MIL-STD-202, Method 112	MIL-STD-202, Method 112	IP65	MIL-STD-202, Method 112	MIL-STD-202, Mtd 112	MIL-STD-202, Mtd 112

Mechanical

Weight	3.0 oz.	2.0 oz.	8.5 oz.	5.0 oz.	4.0 oz.	LSM - 2.0 oz., LSB - 5.0 oz.	4.0 oz.	8.0 oz.	8.0 oz.	16 oz.	DXA-100 8 oz./DXA-200 10 oz.
Dimensions	1.10" W x 2.60" L x 1.235" H 1.657" Over Connector	1.05" W x 1.50" L x 1.235" H 1.39" Over Terminal Pins	1.40" Dia x 2.97" L x 2.50" Flange W 3.44" Over Connector	1.38" W x 3.10" L x 1.50" H	1.38" W x 3.10" L x 1.50" H	1.10" W x 2.60" L x 1.225" H (1.857" over connector) 1.05" W x 1.50" L (1.05" body) x 1.235" H (1.39" over pins)	1.55" W x 3.10" L x 1.52" H 2.04" Over Connector	1.38" W x 3.46" L x 1.65" H 2.15" Over Connector	3.609" L x 1.62" W x 1.83" H	3.25" L x 2.75" W x 2.75" H	3.609" L x 1.62" W x 1.83" H
Custom Ability	Yes	No	Yes	No	No	LSM - Yes, LSB - No	Yes	Yes	Yes	Yes	Yes