Off-Road Vehicle Selector Guide

Force-Balanced Inclinometers

LSOX Series

- Temperature Compensation Available
- Connector, Pin Terminals or Wired output types
- 0-5, ±5 VDC or 4-20 mA Outputs
- ROHS Compliant
- CE Certification available on 0-5 V Connector Version

- Heavy Off-road Construction
- Pavement Profiling Rigs
- Oil & Gas/Riser Tilt Monitoring
- Vehicle Wheel Alignment

LCF-300 Series

- Connector or Pin Terminals
- 0-5, ± 5 VDC or 4-20 mA outputs
- ±1 to ±90° Input Range
- -40°C to +80°C Temp Range
- High vibration resistance

- Vehicle Wheel Alignment
- Robotics
- Structural Monitoring

EMERALD SERIES

SMI Series

RMI Series

- Low cost with force-balanced technology
- Higher precision than most MEMS sensors
- Resolution of 3.5 µradians
- Connector or Pin Terminal output types (SMI)
- 0-5, ±5 VDC or 4-20 mA output options
- ROHS compliant
- Mounts horizontally or vertically (RMI)

- Construction Equipment
- Antenna Positioning
- Industrial and Machining Equipment
- Vehicle Wheel Alignment

LCF-2330 Series

- ±1° to ±90° Input Full Range
- Microradian Resolution
- Available Internal Temp Sensor
- ± 5Vdc or 4-20 mA Outputs
- Low Impedance Output
- Fluid Damped

- 2-Axis Machine Tool Leveling
- Offshore Platform Stability
- Antenna Leveling & Orientation

DXI-100/200 Series

- Digital RS485 & RS422 Outputs
- Resolution to 0.001°
- Mechanical Shock 1500g 1msec ½ sine
- High Precision and Performance
- Low Noise

- Radar/Antenna Control
- Structural Monitoring
- Industrial Automation & Control
- Platform Leveling
- Heavy Off-road Construction

MEMS Inclinometers

JMI-100/200

- Single & Dual Axis Available
- **Low-Cost Technology**
- **RoHS Compliant**
- Aluminum Enclosure
- Temperature Sensors Available

- Industrial Automation & Control
- Construction & Agricultural Equipment
- Platform Leveling/ Positioning

AML/DML Series

- Single and Dual Axis Available
- **Resolution <0.05°**
- **Zero Temp Coefficient ±0.02°/°C**
- Analog or Digital Output
- −40° to +85°C Temp Range

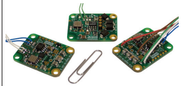
- Solar Tracking & Panel Positioning
- Vehicle Wheel Alignment
- Industrial Automation & Control
- Radar/Antenna Mast Alignment
- Platform Leveling
- Navigation Pitch/Roll Measurement

AMS/DMS Series

- Single and Dual Axis Available
- **Resolution <0.01°**
- **Zero Temp Coefficient ±0.01°/°C**
- Analog or Digital Output

- Boom Position and Control
- Radar and Vehicle Platform Positioning
- Industrial Measurement & Control
- Drilling Equipment
- Navigation Pitch/Roll Measurement

PCA MEMS Boards



- Single & Dual Axis Available
- **Low Cost Technology**
- **RoHS Compliant**
- Temperature Sensors Available

- Industrial Automation & Control
- Construction & Agricultural Equipment
- Platform Leveling/Positioning

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 Vdc 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

Performance Specs

	LSOX Series					LCF-300 Series					EMERALD SERIES SMI Series						LCF-2330 Series					DXI-100/200 Series					JMI-100/200			AML/DML Series				AMS/DMS Series				PCA MEMS Boards			
Input Range (°) [1]:	±1.0	±3.0	±14.5	±30.0	±90.0	±1.0	±3.0	±14.5	±30.0	±90.0	±3.0	±14.5	±30.0	±45.0	±60.0	±90.0	±1.0	±3.0	±14.5	±30.0	±90.0	±1.0	±3.0	±14.5	±30.0	±60.0	±14.5	±30	±90	±10	±30	±60	±90	±10	±30	±60	±90	±14.5	±30	±90
Full Range Output (FRO V± 1.0%[2]):	0-5, 0-5 (CE), ±5 or 4-20 mA					0-5, ±5 or 4-20 mA					0-5, ±5 or 4-20 mA						±5 or 4-20 mA					RS485 or RS422					0-5, ±5 or 4-20 mA			0-5V/0.5-4.5V/4-20mA or RS232/RS485/TTL				0-5V/0.5-4.5V/4-20mA or RS232/RS485/TTL				0-5, ±5 or 4-20 mA		
Non Linearity (%FRO[3], Max.):	Output dependent, see datasheet					Output dependent, see datasheet					0.05	0.02	0.02	0.02	0.04	0.05	Output dependent, see datasheet					0.02	0.015	0.02	0.02	0.03	0.05	0.05	0.05									0.05	0.05	0.05
Scale Factor (V/g, Nom), mA/g), %:	Output dependent, see datasheet					Output dependent, see datasheet					Output dependent, see datasheet						Output dependent, see datasheet					0.05	0.05	0.05	0.05	0.05	Output dependent			0.7	1.4	2.8	3	0.7	1.4	2.8	3	Output dependent		
Scale Factor Temp Sens (PPM, %/°C, Max.):	350	300	100	60	60	350	300	100	60	60	100	100	100	100	100	100	300	300	100	60	60	0.01	0.01	0.01	0.01	0.01														
Natural Frequency (Hz, Nom.[4]):	0.5	2.0	15	20	30	0.5	2.0	15	20	30	5.0	5.0	5.0	5.0	5.0	5.0	0.5	2.0	15.0	20.0	30.0	-	-	-	-	-	5			20	20	20	20	20	20	20	20	5		
Bandwidth (-3db) (Hz, Nom.):	0.5	2.0	15	20	30	0.5	2.0	15	20	30	5.0	5.0	5.0	5.0	0.5	5.0	0.5	2.0	15.0	20.0	30.0	3.0	6.0	30.0	30.0	30.0	5			20	20	20	20	20	20	20	20	5		
Transverse Axis Misalignment (° Max.):	±0.25	±0.25	±0.5	±0.5	±0.5	±0.25	±0.25	±0.5	±0.5	±0.5	±0.25	±0.50	±0.50	±0.50	±0.50	±0.50	±0.25	±0.50	±0.50	±1.00	±1.00	0.15	0.15	0.5	0.5	0.5	±0.5	±0.5	±0.5									±0.05	±0.05	±0.05
Output @ 0° Tilt (Bias) (V, Max), %/°C, m°/°C:	Output dependent, see datasheet					Output dependent, see datasheet					Output dependent, see datasheet						Output dependent, see datasheet					0.01	0.01	0.05	0.05	0.05	Output dependent											Output dependent		
0° Output Temp Sensitivity (V/°C, Max.):	Output dependent, see datasheet					Output dependent, see datasheet					Output dependent, see datasheet						Output dependent, see datasheet					.001°/°C	.001°/°C	.005°/°C	.005°/°C	.005°/°C	±0.004 mA/°C											±0.004 mA/°C		
Resolution and Threshold (µrad, °, Max.):	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	3.5	3.5	3.5	3.5	3.5	3.5	1.0	1.0	1.0	1.0	1.0	.001°	.001°	.001°	.001°	.001°	0.002°	0.002°	0.004°	0.05°	0.05°	0.05°	0.05°	0.01°	0.01°	0.01°	0.01°	0.002°	0.002°	0.004°

Electrical

	LSOX Series	LCF-300 Series	EMERALD SERIES	LCF-2330 Series	DXI-100/200 Series	JMI-100/200	AML/DML Series	AMS/DMS Series	PCA MEMS Boards
Number of Axes	1	1	1	2	1 or 2	1 or 2	1 or 2	1 or 2	1 or 2
Input Voltage (Vdc)	Output dependent, see datasheet	Output dependent, see datasheet	Output dependent, see datasheet	Output dependent, see datasheet	±10 to ±30	Output dependent	9-36 V	9-36 V	Output dependent
Input Current (mA, Nom.)	40	40	Output dependent, see datasheet	Output dependent, see datasheet	Transmitting dependent, see datasheet	Output dependent			Output dependent
Output Impedance (Ohms, Nom.)	Output dependent, see datasheet	Output dependent, see datasheet	Output dependent, see datasheet	Output dependent, see datasheet	-	Output dependent			Output dependent
Noise (Vms, Max.)	0.002	0.002	Output dependent, see datasheet	Output dependent, see datasheet	0.005	Output dependent			Output dependent

Environmental

	LSOX Series	LCF-300 Series	EMERALD SERIES	LCF-2330 Series	DXI-100/200 Series	JMI-100/200	AML/DML Series	AMS/DMS Series	PCA MEMS Boards
Operating Temperature Range	-40°C to +80°C	-40°C to +80°C	-55°C to +85°C	-40°C to +80°C	-40°C to +85°C	-40° to +85°C	-40 to +85°C	-40 to +85°C	-40° to +85°C
Survival Temperature Range	-60°C to +90°C	-60°C to +90°C	-60°C to +90°C	-60°C to +90°C	-40°C to +85°C	-40° to +95°C	-55 to +100°C	-55 to +125°C	-40° to +95°C
Vibration	-	-	-	20 g	20 g (RMS)		10grms @ 10-1000Hz	10grms @ 10-1000Hz	
Shock	1500g, 0.5 msec, 1/2 sine	1500g, 0.5 msec, 1/2 sine	500g, 1 msec, 1/2 sine	1000g, 1 msec, 1/2 sine	1500g, 1msec, 1/2 sine	100 g, 0.011 sec, ½ sine	100g@11ms, 3 times/axis (1/2 sinusoid)	100g@11ms, 3 times/axis (1/2 sinusoid)	100 g, 0.011 sec, ½ sine
Seal	IP66	IP65	IP65	MIL-STD-202, Method 112	MIL-STD-202, Mtd 112	IP65	IP67	IP67	

Mechanical

	LSOX Series	LCF-300 Series	EMERALD SERIES	LCF-2330 Series	DXI-100/200 Series	JMI-100/200	AML/DML Series	AMS/DMS Series	PCA MEMS Boards
Weight (oz.)	13	8.1	4.0	8.1	DXI-100 8.0/DXI-200 10.0	5.8 (1 axis), 5.9 (2 axes)	3.2 (without cable)	4.2 (without cable)	0.15
Dimensions	1.60" W x 3.64" L x 1.68" H	1.38" W x 3.1" L X 2.18" H	1.55" W x 3.10" L x 2.04" H (SMI) 2.27" W x 1.72" H (RMI)	2.03" W x 3.63" L x 2.1" H	2.01" W x 3.609" L x 1.83" H	2.25" W x 2.25" L x 1.71" H	1.46" W x 2.17" L x 0.95" H	1.58" W x 3.54" L x 1.02" H	0.98" W x 1.26" L x 0.06" H
Custom Ability	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: 1 - Other ranges available upon request 2 - Full range is defined as "from negative full input angle to positive full input angle." The inclinometer output is proportional to the sine of the tilt angle., 3 - Referenced to theoretical sine value independent of misalignment., 4 - Output phase angle = -90°