RELIABLE, HIGH PERFORMANCE PRODUCTS — EXCEPTIONAL SERVICE

FEATURING: Precision MEMS Inclinometers

Jewell Instruments presents both analog and digital inclinometers (tilt sensors) that utilize MEMS capacitive technology. Each are capable of measuring positive and negative inclination (angle) from +/-1° to +/-90° in one and two axis configurations. You can get the exact sensor required for your application by choosing the angle range, bandwidth, analog or digital electrical output and more.

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 a majority of our components in-house and work directly with our customers, maintaining control over the entire development processes. 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:

MEMS Accelerometer Selector Guide

Force-Balanced Precision Inclinometer Selector Guide

Electrolytic Tilt Sensors and Accessories Selector Guide

Jewell Instruments is a world leader in the manufacture and distribution of acceleration and tilt sensors as well as avionics components, solenoids, and panel meters. From sales and design through manufacturing, testing, delivery and support, Jewell Instruments offers complete customer care and engineering expertise. We have two fully modernized manufacturing facilities, one in Manchester, New Hampshire and one in Barbados, West Indies, to handle the most stringent manufacturing requirements with a cost-competitive advantage.

Distributed By:

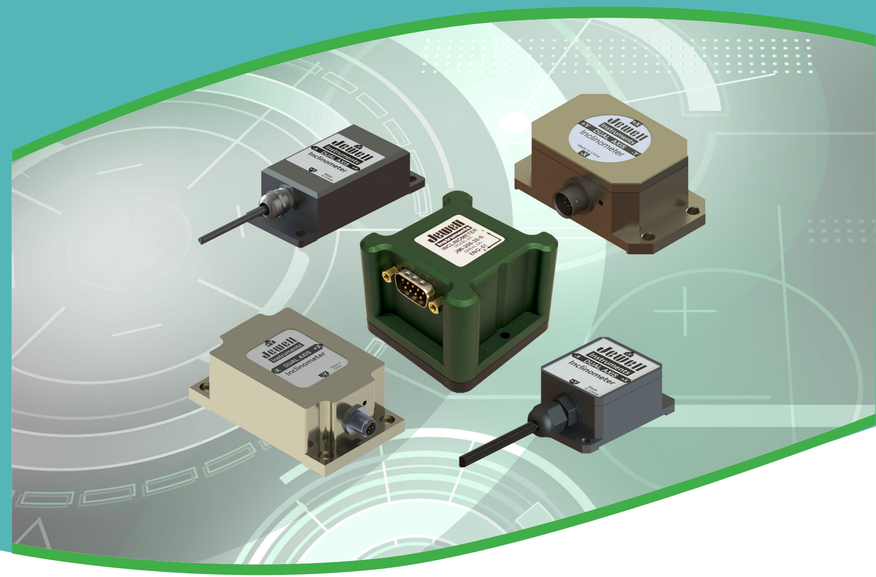
Jewell Instruments

Making Sense Out of Motion...

ISO9001 CERTIFIED

www.jewellinstruments.com

MEMS Precision Inclinometer
Selector Guide



Jewell Instruments

Analog Sensors

Digital Sensors

AML Series

Features & Benefits

- Single and Dual Axis Available
- **Resolution <0.05°**
- **Zero Temp Coefficient ±0.02°/°C**
- High Shock & Vibration Tolerance
- Analog 0-5V, 0.5-4.5V & 4-20mA Output Options
- −40° to +85°C Temp Range

Applications

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

AMS Series

Features & Benefits

- Single and Dual Axis Available
- **Resolution <0.01°**
- **Zero Temp Coefficient ±0.01°/°C**
- High Shock & Vibration Tolerance
- Analog 0-5V, 0.5-4.5V & 4-20mA Output Options
- Up to ±90° Full Range Output

Applications

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

JMI Series

Features & Benefits

- Single and Dual Axis Available
- **Resolution to 0.002°**
- **RoHS Compliant**
- Lightweight Aluminum Enclosure
- Temperature Sensors Option Available

Applications

- Industrial Automation & Control
- Construction & Agricultural Equipment
- Platform Leveling/Positioning
- Railway Track Alignment & Maintenance

AMH Series

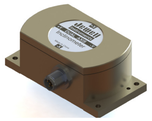
Features & Benefits

- Single and Dual Axis Available
- **Resolution <0.001°**
- **Zero Temp Coefficient ±0.006°/°C**
- High Shock & Vibration Tolerance
- Analog 0-5V, 0.5-4.5V & 4-20mA Output Options
- −40° to +85°C Temp Range

Applications

- Radar & Vehicle Platform Leveling
- Drill Rig Alignment
- Offshore/Subsea Platform Pitch & Roll
- Industrial Measurement & Control

AMI Series



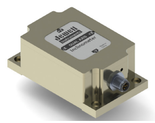
Features & Benefits

- Single and Dual Axis Available
- **Resolution <0.001°**
- **Zero Temp Coefficient ±0.002°/°C**
- Excellent Performance over Temp
- Analog 0-5V, 0.5-4.5V & 4-20mA Output Options
- −40° to +85°C Temp Range

Applications

- Radar & Vehicle Platform Leveling
- Drill Rig Alignment
- Offshore/Subsea Platform Pitch & Roll
- Industrial Measurement & Control

AMV Series



Features & Benefits

- Single and Dual Axis Available
- **Resolution <0.001°**
- **Zero Temp Coefficient ±0.005°/°C**
- Excellent Performance over Temp
- Analog ±5V & ±10V Output Options
- −40° to +85°C Temp Range

Applications

- Radar & Vehicle Platform Leveling
- Drill Rig Alignment
- Offshore/Subsea Platform Pitch & Roll
- Industrial Measurement & Control

DML Series

Features & Benefits

- Single and Dual Axis Available
- **Resolution <0.05°**
- **Zero Temp Coefficient ±0.02°/°C**
- -40° to +85°C Operation and Storage
- Digital RS232, RS485 or UART TTL Outputs

Applications

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

DMS Series

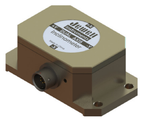
Features & Benefits

- Single and Dual Axis Available
- **Resolution <0.01°**
- **Zero Temp Coefficient ±0.01°/°C**
- Digital RS232 or RS485 and UART TTL Outputs
- -40° to +85°C Operating Range

Applications

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

DMH Series



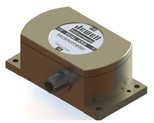
Features & Benefits

- Single and Dual Axis Available
- **Resolution <0.001°**
- **Zero Temp Coefficient ±0.006°/°C**
- Up to ±90° Angular Range
- -40° to +85°C Temperature Range

Applications

- Antenna Deflection Measurement
- Radar and Vehicle Platform Positioning
- Drill Rig Alignment
- Offshore Platform Pitch/Roll
- Industrial Measurement & Control

DMI Series



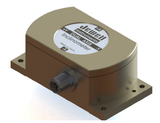
Features & Benefits

- Single and Dual Axis Available
- **Resolution <0.001°**
- **Zero Temp Coefficient ±0.002°/°C**
- Digital RS232, RS422, RS485 or UART TTL Output Options
- High Shock and Vibration Tolerance

Applications

- Radar and Vehicle Platform Leveling
- Drill Rig Alignment
- Offshore/Subsea Platform Pitch/Roll
- Industrial Measurement & Control
- Antenna Position Control

DMP Series



Features & Benefits

- Single and Dual Axis Available
- **Resolution <0.0005°**
- **Minimal Thermal Drift (<0.002°/°C Zero)**
- Digital RS232, RS422, RS485 or UART TTL Output
- -40° to +85°C Operating Range
- High Shock & Vibration Tolerance

Applications

- Radar and Vehicle Platform Leveling
- Drill Rig Alignment
- Offshore/Subsea Platform Pitch/Roll
- Industrial Measurement & Control
- Antenna Position Control

Performance Specs Static/Dynamic

	AML				AMS				JMI			AMH			AMI			AMV			DML				DMS				DMH			DMI			DMP		
Angular Range[1] (°):	±10	±30	±60	±90	±10	±30	±60	±90	±14.5	±30	±90	±10	±30	±60	±10	±30	±60	±10	±30	±60	±10	±30	±60	±90	±10	±30	±60	±90	±10	±30	±60	±10	±30	±60	±10	±15	±30
Resolution (°):	0.05				0.01				0.002	0.002	0.004	0.001			0.001			0.001			0.05				0.01				0.001			0.001			0.0005		
Hysteresis:	0.1	0.1	0.2	0.2	0.02	0.05	0.08	0.1	0.014	0.007	0.004	0.005	0.008	0.01	0.003	0.005	0.008	0.003	0.01	0.02	0.1	0.1	0.2	0.2	0.02	0.05	0.08	0.1	0.005	0.008	0.01	0.003	0.005	0.008	0.001	0.001	0.002
Zero Temp Coefficient, °/°C:	±0.02				±0.01				±0.004			±0.006			±0.002			±0.005			±0.02				±0.01				±0.006			±0.002	±0.003	±0.003	±0.002		
Scale Factor Temp Coefficient (PPM/°C):	≤350				≤200				150			≤50			≤50			≤50			≤350				≤200				≤200	≤200	≤200	≤50			≤50		
Warm Up (s):	0.5				0.5				0.5			0.5			0.5			0.5			0.5				0.5				0.5			0.5			0.5		
Time Constant (s):	0.05				0.05				0.032			0.05			0.02			0.02			0.05				0.05				0.05			0.02			0.05		

Electrical & Environmental

	AML	AMS	JMI	AMH	AMI	AMV	DML	DMS	DMH	DMI	DMP
Output:	0-5V, 0.5 - 4.5V or 4-20mA	0-5V, 0.5 - 4.5V or 4-20mA	±5V, 0-5V or 4-20mA	0-5V, 0.5 - 4.5V or 4-20mA	0-5V, 0.5 - 4.5V or 4-20mA	±5V & ±10V	5Hz, 15Hz, 35Hz, 50Hz	5Hz, 15Hz, 35Hz, 50Hz	5Hz, 15Hz, 35Hz, 50Hz	5Hz, 15Hz, 35Hz, 50Hz	5Hz, 15Hz, 35Hz, 50Hz
Output Type[2]:							RS232, RS485 or TTL	RS232, RS485 or TTL	RS232, RS422, RS485 or TTL	RS232, RS422, RS485 or TTL	RS232, RS422, RS485 or TTL
Electromagnetic Compatibility:	EN61000 and GBT17626	EN61000 and GBT17626	N/A	EN61000 and GBT17626	EN61000 and GBT17626	EN61000 and GBT17626	EN61000 and GBT17626	EN61000 and GBT17626	EN61000 and GBT17626	EN61000 and GBT17626	EN61000 and GBT17626
Impact Resistance:		100g@11ms, 3 times/axis (½ sinusoid)	100 g, 0.011 sec, ½ sine	100g@11ms, 3 times/axis (½ sinusoid)	100g@11ms, 3 times/axis (½ sinusoid)	100g@11ms, 3 times/axis (½ sinusoid)	100g@11ms, 3 times/axis (½ sinusoid)	100g@11ms, 3 times/axis (½ sinusoid)	100g@11ms, 3 times/axis (½ sinusoid)	100g@11ms, 3 times/axis (½ sinusoid)	100g@11ms, 3 times/axis (½ sinusoid)
Vibration Resistance:	10grms @ 10-1000Hz	10grms @ 10-1000Hz	100 g, 0.011 sec, ½ sine	10grms @ 10-1000Hz	10grms @ 10-1000Hz	10grms @ 10-1000Hz	10grms @ 10-1000Hz	10grms @ 10-1000Hz	10grms @ 10-1000Hz	10grms @ 10-1000Hz	10grms @ 10-1000Hz
Temperature Rating, Operation:	-40 to +85°C	-40 to +85°C	-40 to +85°C	-40 to +85°C	-40 to +85°C	-40 to +85°C	-40 to +85°C	-40 to +85°C	-40 to +85°C	-40 to +85°C	-40 to +85°C
Temperature Rating, Storage:	-55 to +100°C	-55 to +125°C	-40 to +95°C	-55 to +100°C	-55 to +100°C	-55 to +100°C	-55 to +100°C	-55 to +125°C	-55 to +100°C	-55 to +100°C	-55 to +100°C
Enclosure:			Anodized Aluminum	Anodized Aluminum	Anodized Aluminum	Anodized Aluminum			Anodized Aluminum	Anodized Aluminum	
Seal:	IP67	IP67	IP65	IP67	IP67	IP67	IP67	IP67	IP67	IP67	IP67
Cables:	1m Cable (standard)	1m Cable (standard)	N/A	1m Cable (standard)	2m Cable (standard)	1m Cable (standard)	1m Cable (standard)	1m Cable (standard)	1m Cable (standard)	2m Cable (standard)	2m Cable (standard)
Weight:	90g (without cable)	120g (without cable)	165 (1 axis), 170 (2 axes)	150g (without cable)	150g (without cable)	150g (without cable)	90g (without cable)	120g (without cable)	150g (without cable)	150g (without cable)	150g (without cable)
Power Requirements:	9-36 VDC @ 60mA	9-36 VDC @ 60mA	±12 to ±18 VDC (±5V) 12 to 30 VDC (0-5V) 28mA (4-20mA)	9-36 VDC @ 60mA	9-36 VDC @ 60mA	9-36 VDC @ 60mA	9-36 VDC @ 60mA	9-36 VDC @ 60mA	9-36 VDC @ 60mA	9-36 VDC @ 60mA	9-36 VDC @ 60mA

Notes: 1 - 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., 2 - Referenced to theoretical sine value independent of misalignment., 3 - Output phase angle = -90° 4 - Other ranges available upon request