2000 series

NAVIGATION GRADE ACCELEROMETERS

The best value inertial-grade accelerometers

The 2000 series is a miniature, high-performance, and high-reliability ITAR-free range of linear accelerometers designed to provide inertial acceleration measurements about one reference axis. Due to its excellent price-performance point, the 2000 series is unmatched by any other high-standard products on the market for commercial and military strap-down inertial navigation systems on land, at sea and in the air.

The core technology used in the 2000 series is IXSENS improved Fused Quartz Pendulous Servo Accelerometers technology, designed, engineered, and manufactured by IXSENS.

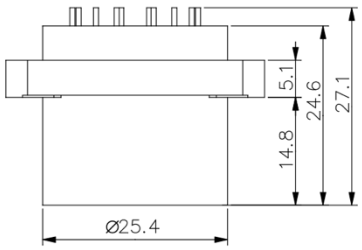
At the heart of the accelerometer is a proof mass made of a high purity fused quartz disc structure connected to a rigid outer frame by two thin hinges. A deposited gold film is used to form an electrode pattern on the surface of the pendulum for capacitive detection. The outer frame is clamped symmetrically between two magnetic structures comprising a high stability magnet and a nickel-iron alloy case. When acceleration is applied perpendicularly to the proof mass, a servo loop circuit derives an error signal from the capacitive detection and delivers a current into a coil attached to the proof mass. Laplace forces are then applied to the winding and the proof mass is maintained in a capture mode with its center in a null position. As the current running through the coil is proportional to the applied acceleration, the same current flowing through an external load resistor will then generate an output voltage proportional to acceleration.

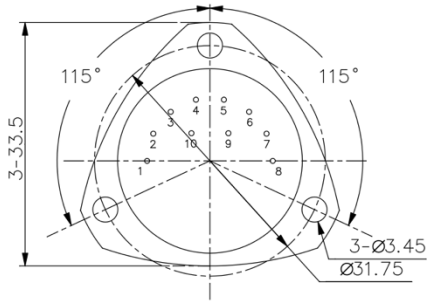
The 2000 series is available in a type-C version for applications limited to 15g, and a type-D version for applications with extended range up to 60g. In any case, a Standard precision, High precision and Ultra-precision grades are offered to meet customer's performance requirements at the right price.

FEATURES

- 15g and 60g measurement range
- Navigation-grade accuracy
- ITAR-free
- Superior reliability (MTBF ≥ 500,000 hr)
- 1-axis measurement
- Analogue output
- Internal temperature sensor for thermal compensation
- Low power electronics
- Built-in self-test

DIMENSIONS – ELECTRICAL INTERFACE





Pin	Function	Characteristics
1	Signal Out	Acceleration output, current signal
2	Current Torque	Current input test pin
3	Negative Power Supply	-13 V to -28 V (-26 V for type C)
4	Positive Power Supply	+13 V to +28 V (+26 V for type C)
5	Factory test	Do not connect to that pin
6	Temperature Sensor Output	Temperature output, current signal
7	Voltage Self-Test	Voltage input test pin
8	Signal & Power Return	Ground reference for power supplies and signals
9	Voltage output	-10 V DC
10	Voltage output	+10 V DC

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PERFORMANCE AND KEY CHARACTERISTICS

Type D – Dual-use accelerometers

Performance	2201-2000-30 Ultra-precision	2201-2000-20 High precision	2201-2000-10 Standard precision
Input Range	±60 g	±60 g	±60 g
Bias	≤4 mg	≤4 mg	≤4 mg
Bias stability (FTR, compensated)	≤50 µg	≤100 µg	≤150 µg
Bias one-year composite repeatability	≤160 µg	≤220 µg	≤550 µg
Bias temperature slope	≤30 µg/°C	≤30 µg/°C	≤30 µg/°C
Scale factor	1.20 to 1.46 mA/g	1.20 to 1.46 mA/g	1.20 to 1.46 mA/g
Scale factor stability (FTR, compensated)	≤50 ppm	≤100 ppm	≤150 ppm
Scale factor one-year composite repeatability	≤310 ppm	≤500 ppm	≤600 ppm
Scale factor temperature slope	≤30 ppm/°C	≤30 ppm/°C	≤30 ppm/°C
Axis misalignment	≤2,000 µrad	≤2,000 µrad	≤2,000 µrad
Axis misalignment stability (FTR, compensated)	≤25 µrad	≤25 µrad	≤50 µrad
Axis misalignment one-year composite repeatability	≤100 µrad	≤100 µrad	≤100 µrad
Axis misalignment temperature slope	≤4 µrad/°C	≤4 µrad/°C	≤4 µrad/°C
Vibration Rectification	≤20 µg/g²rms (50-500 Hz) ≤60 µg/g²rms (500-2 kHz)	≤40 µg/g²rms (50-500 Hz) ≤60 µg/g²rms (500-2 kHz)	≤40 µg/g²rms (50-500 Hz) ≤150 µg/g²rms (500-2 kHz)
Intrinsic Noise	≤7 µg-rms (0-10 Hz) ≤70 µg-rms (10-500 Hz) ≤1,500 µg-rms (500-10 kHz)	≤7 µg-rms (0-10 Hz) ≤70 µg-rms (10-500 Hz) ≤1,500 µg-rms (500-10 kHz)	≤7 µg-rms (0-10 Hz) ≤70 µg-rms (10-500 Hz) ≤1,500 µg-rms (500-10 kHz)
Environment			
Operating Temperature Range	-55 to +95 °C	-55 to +95 °C	-55 to +95 °C
Shock, half-sine, 4ms	250 g	250 g	250 g
Vibration Peak Sine	15 g @ 20-2 kHz	15 g @ 20-2 kHz	15 g @ 20-2 kHz
Resolution/Threshold	≤1 µg	≤1 µg	≤1 µg
Bandwidth	≥800 Hz	≥800 Hz	≥800 Hz
Temperature sensor output			
	Yes	Yes	Yes
Electrical			
Quiescent Current per Supply	≤16 mA	≤16 mA	≤16 mA
Quiescent Power (±15 V DC)	≤480 mW	≤480 mW	≤480 mW
Input Voltage	±13 to ±28 V DC	±13 to ±28 V DC	±13 to ±28 V DC
Physical			
Weight	70 ±2 grams	70 ±2 grams	70 ±2 grams
Diameter below mounting surface	Ø25.4 mm Max	Ø25.4 mm Max	Ø25.4 mm Max
Height bottom to mounting surface	14.8 mm Max	14.8 mm Max	14.8 mm Max
Case Material	300 Series Stainless Steel	300 Series Stainless Steel	300 Series Stainless Steel

FTR: Full Temperature Range

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PERFORMANCE AND KEY CHARACTERISTICS

Type C – Commercial accelerometers

Performance	2201-2000-31 Ultra-precision	2201-2000-21 High precision	2201-2000-11 Standard precision
Input Range	±15 g	±15 g	±15 g
Bias	≤4 mg	≤4 mg	≤4 mg
Bias stability (FTR, compensated)	≤50 µg	≤100 µg	≤150 µg
Bias one-year composite repeatability	≤160 µg	≤220 µg	≤550 µg
Bias temperature slope	≤30 µg/°C	≤30 µg/°C	≤30 µg/°C
Scale factor	1.20 to 1.46 mA/g	1.20 to 1.46 mA/g	1.20 to 1.46 mA/g
Scale factor stability (FTR, compensated)	≤50 ppm	≤100 ppm	≤150 ppm
Scale factor one-year composite repeatability	≤310 ppm	≤500 ppm	≤600 ppm
Scale factor temperature slope	≤30 ppm/°C	≤30 ppm/°C	≤30 ppm/°C
Axis misalignment	≤2,000 µrad	≤2,000 µrad	≤2,000 µrad
Axis misalignment stability (FTR, compensated)	≤25 µrad	≤25 µrad	≤50 µrad
Axis misalignment one-year composite repeatability	≤100 µrad	≤100 µrad	≤100 µrad
Axis misalignment temperature slope	≤4 µrad/°C	≤4 µrad/°C	≤4 µrad/°C
Vibration Rectification	≤20 µg/g²rms (50-500 Hz) ≤60 µg/g²rms (500-2 kHz)	≤40 µg/g²rms (50-500 Hz) ≤60 µg/g²rms (500-2 kHz)	≤40 µg/g²rms (50-500 Hz) ≤150 µg/g²rms (500-2 kHz)
Intrinsic Noise	≤7 µg-rms (0-10 Hz) ≤70 µg-rms (10-500 Hz) ≤1,500 µg-rms (500-10 kHz)	≤7 µg-rms (0-10 Hz) ≤70 µg-rms (10-500 Hz) ≤1,500 µg-rms (500-10 kHz)	≤7 µg-rms (0-10 Hz) ≤70 µg-rms (10-500 Hz) ≤1,500 µg-rms (500-10 kHz)
Environment			
Operating Temperature Range	-55 to +95 °C	-55 to +95 °C	-55 to +95 °C
Shock, half-sine, 4ms	250 g	250 g	250 g
Vibration Peak Sine	15 g @ 20-2 kHz	15 g @ 20-2 kHz	15 g @ 20-2 kHz
Resolution/Threshold	≤1 µg	≤1 µg	≤1 µg
Bandwidth	≥800 Hz	≥800 Hz	≥800 Hz
Temperature sensor output			
	Yes	Yes	Yes
Electrical			
Quiescent Current per Supply	≤18 mA	≤18 mA	≤18 mA
Quiescent Power (±15 V DC)	≤480mW	≤480 mW	≤480 mW
Input Voltage	±13 to ±26 V DC	±13 to ±26 V DC	±13 to ±26 V DC
Physical			
Weight	70 ±2 grams	70 ±2 grams	70 ±2 grams
Diameter below mounting surface	Ø25.4 mm Max	Ø25.4 mm Max	Ø25.4 mm Max
Height bottom to mounting surface	14.8 mm Max	14.8 mm Max	14.8 mm Max
Case Material	300 Series Stainless Steel	300 Series Stainless Steel	300 Series Stainless Steel

FTR: Full Temperature Range

Additional product specifications, outline drawings, block diagrams, and test data are available on request.

DISCLAIMER:
Specifications are subject to change without notice. IXSENS does not assume any liability arising out of the application or use of the product.

FOR INFORMATION:
Type C series not subject to Export Control.
Type D series subject to Export Control.

For More Information:
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