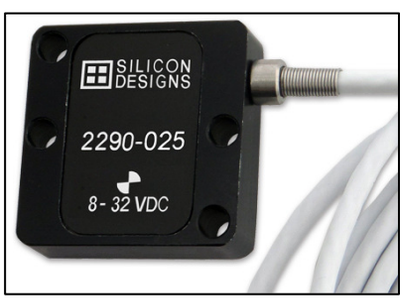
SDI Silicon Designs Inc.

Model 2290 Precision Calibration Reference MEMS DC 1-Axis Accelerometer

- Excellent Long-Term Stability
- Flexible +8 to +32 VDC Power
- ±4V Differential Output
- -55 to +125°C Operating Temperature Range
- Responds to Frequencies from Zero (DC) up to 1800 Hz
- Low Impedance Outputs Support up to 2000 Feet of Cable
- Integrated Cable, Traditional 1-inch square Footprint
- Integrated 10' Cable with Simple 4-Wire Connection
- Rugged Anodized Aluminum Case, Module Mass: 9 Grams
- Fully Calibrated and Serialized for Traceability

AVAILABLE G-RANGES	
FULL SCALE ACCELERATION	MODEL SUFFIX
± 5 g	-005
± 10 g	-010
± 25 g	-025
± 50 g	-050



The SDI Model 2290 Single-Axis MEMS DC Precision Reference Calibration Accelerometer offers a precise, reliable, and accurate means of determining the sensitivity and frequency response characteristics of unknown MEMS DC accelerometers during end-to-end calibrations and related performance verifications. Within these applications, the Model 2290 serves as the "Reference Standard", either for performance specification comparisons, or as an actual substitute for the working accelerometer.

In addition to calibration verifications, the Model 2290 Series supports a variety of zero-to-medium frequency instrumentation applications, ranging from DC to 2000 Hz, and including both center of gravity acceleration measurements and equipment calibrations.

The SDI Model 2290 incorporates SDI's hermetically sealed, low noise, Model 1527 MEMS DC Inertial-Grade surface mount accelerometer chip and SDI's proprietary electronics for extra-low noise performance and inertial-grade stability. The rugged, anodized aluminum, 1-inch square package provides all the same durability and reliability of SDI's industrial accelerometers, along with the convenience of a 4-wire pigtail for seamless compatibility with almost any DAQ system.

The SDI Model 2290, as with the company's other MEMS DC accelerometer lines, is relatively insensitive to temperature changes and gradients. Onboard voltage regulation and an internal voltage reference eliminate the need for precision power supplies. The anodized aluminum case is epoxy sealed and is easily mounted via two screws, an adhesive, or by attaching it to a magnet. The accelerometer is non-ferrous and will not respond to magnetic mounting. An initial calibration certificate is provided with each unit.

The SDI Model 2290 is both REACH and RoHS compliant.

The Model 2290's US export designation is ECCN 7A994. It is not ITAR controlled.

ZERO (DC) TO MEDIUM FREQUENCY APPLICATIONS

LAB ROBOTICS SEISMIC TILT VIBRATION CENTER OF GRAVITY MONITOR INSTRUMENTATION

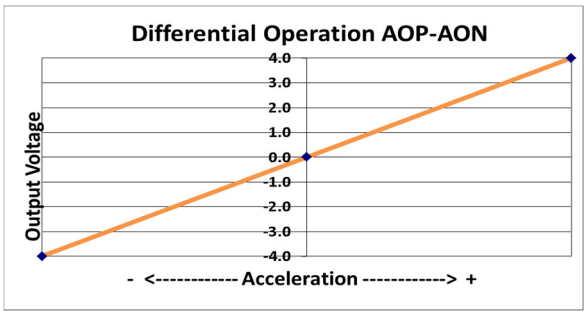
PERFORMANCE BY G RANGE

INPUT RANGE	SENSITIVITY, DIFFERENTIAL	*FREQUENCY RESPONSE (TYPICAL, 5%)	*FREQUENCY RESPONSE (TYPICAL, 3 DB)	*FREQUENCY RESPONSE (MINIMUM, 3 DB)	OUTPUT NOISE, DIFFERENTIAL (RMS, TYPICAL)	MAX. MECHANICAL SHOCK (0.1 MS)
g	mV/g	Hz	Hz	Hz	µg/(root Hz)	g (peak)
±5	800	0 – 500	0 – 700	0 – 400	15	2000
±10	400	0 – 700	0 – 1000	0 – 600	23	5000
±25	160	0 – 1200	0 – 1500	0 – 1100	38	
±50	80	0 – 1500	0 – 1800	0 – 1300	60	

By Model: *V_{DD}=V_R=5.0 VDC, T_C=25°C*

OPERATION

SDI Model 2290 MEMS DC Accelerometer modules produce differential analog output voltage pairs (AON & AOP) which vary with acceleration. The signal outputs are fully differential about a common mode voltage of approximately 2.5 volts. At zero acceleration, the output differential voltage is nominally 0 volts DC; at ±full scale acceleration, the output is ±4 volts DC, respectively, as shown in the figure (below). The output scale factor is independent from the supply voltage of +8 to +32 volts.



SPECIFICATIONS

PARAMETER	MIN	TYP	MAX	UNITS
Bias Calibration Error (%)		0.25	0.6	± % of span
Bias Calibration Error (mV)		20	48	± mV
Bias Temperature Shift (Coefficient)	-75	0	+75	(PPM of span)/°C
Scale Factor Calibration Error		0.5	1.25	± %
Scale Factor Temperature Shift (Coefficient)	-75	0	+50	PPM/°C
Non-Linearity (-90 to +90% of span)		0.15	0.5	± % of span
Cross Axis Sensitivity		2	3	± %
Power Supply Rejection Ratio	50	>65		dB
Output Impedance		1		Ω
Output Common Mode Voltage		2.5		VDC
Operating Current (AOP & AON open)		7	10.5	mA DC
Mass (Excluding Cable)		9		Grams

Unless otherwise specified, T_C=25°C, Differential Mode. Span = ±g range = 8000 mV.

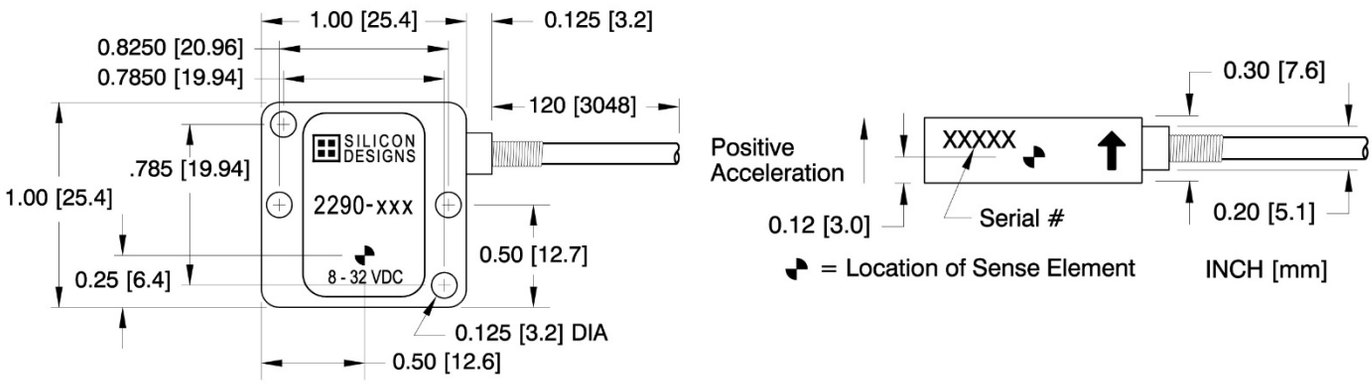
Max Case Operating Temperature	-55 to +125°C	Max Operating Voltage	+8 to +32 VDC
Max Storage Temperature	-55 to +125°C	Max. Mechanical Shock (0.1 MS)	5000g

NOTICE: Minimize exposure above 125°C for maximum lifespan. Stresses greater than those listed above may cause permanent damage to the device. These are maximum stress ratings only. Functional operation of the device at or above these conditions is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability and lifespan.

Silicon Designs, Inc. • 13905 NE 128th Street, Kirkland WA 98034 • Phone: 425-391-8329 • Fax: 425-391-0446

SDI MODEL 2290 MEMS DC PRECISION REFERENCE ACCELEROMETER

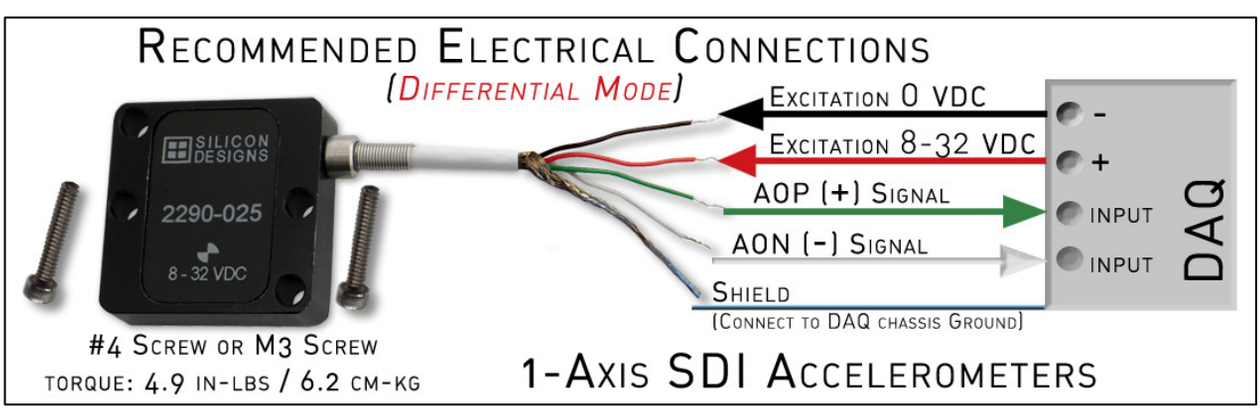
PACKAGE DIMENSIONS



CABLE SPECIFICATIONS & CONNECTIONS

The standard 10-foot (approximately 3m) integrated cable consists of four 28 AWG (7x36) tin-plated copper wires with Teflon FEP insulation surrounded by a 40 AWG tin plated copper braided shield. The shield jacket is Teflon FEP with a nominal outer diameter of 0.096". The cable's braided shield is electrically connected to the case. The black ground (GND) wire is isolated from the case. The cable ends in a 4-wire pigtail.

SDI Model 2290 MEMS DC Precision Reference Accelerometers provide optimal performance when they are connected to instrumentation in a differential configuration using both the AOP and AON output signals.



WIRE	SIGNAL
VS: red wire	Power
GND: black wire	Ground

WIRE	SIGNAL
AOP: (Output) green wire	Positive output
AON: (Output) white wire	Negative output

CABLE LENGTH CONSIDERATIONS

Cable lengths of up to 50 feet (15 meters) can be used without the need to test for output instability. For cable lengths exceeding 50 feet, SDI recommends checking each individual installation for oscillation by tapping the accelerometer and watching the differential output for oscillation in the 20 kHz to 50 kHz frequency range. If no oscillation is present, extended cable length should behave as expected. From the standpoint of output current drive and slew rate limitations, all SDI 8-32 VDC accelerometers are capable of driving over 2000 feet (600 meters) of cable. However, at some length ranging between 50 feet and 2000 feet, each device will likely begin to exhibit oscillation.