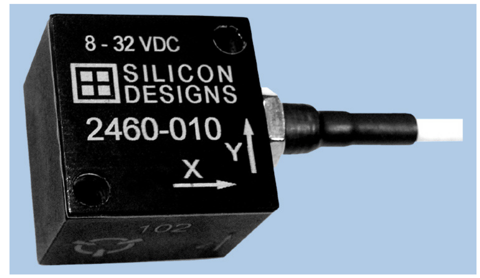
SILICON DESIGNS, INC

Advanced Accelerometer Solutions for Demanding Applications

Model 2460

Triaxial Analog Accelerometer Module

- 3 Axis Acceleration Sensing
- Capacitive Micromachined
- Nitrogen Damped
- ±4V Differential Output or 0.5V to 4.5V Single Ended Output
- Fully Calibrated
- Low Power Consumption
- -40 to +85°C Operation
- +8 to +32V DC Power
- Eight (8) Wire Connection
- Low Impedance Outputs Will Drive Up To 15 Meters of Cable
- Responds to DC and AC Acceleration
- Non Standard g Ranges Available
- Rugged Anodized Aluminum Module
- Good Noise Performance
- Serialized for Traceability



Available G-Ranges

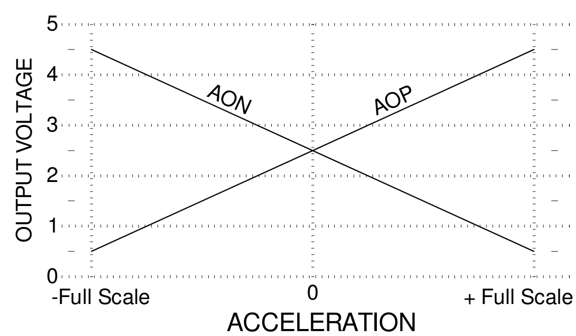
Full Scale Acceleration	Model Number
± 2 g	2460-002
± 5 g	2460-005
± 10 g	2460-010
± 25 g	2460-025
± 50 g	2460-050
±100 g	2460-100
±200 g	2460-200
±400 g	2460-400

DESCRIPTION

The Model 2460 triaxial accelerometer is a three-axis version of our popular 2260 single axis device. It combines three orthogonally mounted model 1221L accelerometers in a rugged case for measuring accelerations in commercial/industrial environments. This module is tailored for zero to medium frequency instrumentation applications. Its anodized aluminum case is epoxy sealed and is easily mounted via two #8 (or M4) screws. On-board voltage regulation and an internal voltage reference eliminate the need for precision power supplies. It is relatively insensitive to temperature changes and gradients. An optional initial calibration sheet (2460-CAL) and periodic calibration checking are also available.

OPERATION

The Model 2460 produces three differential analog output voltage pairs (AON & AOP), which vary with acceleration as shown in the figure (at right). The signal outputs are fully differential about a common mode voltage of approximately 2.5 volts. The output scale factor is independent from the supply voltage of +8 to +32 volts. At zero acceleration the output differential voltage is nominally 0 volts DC; at ±full scale acceleration the output is ±4 volts DC respectively. The axis directions are marked on the case with positive acceleration defined as acceleration in the direction of the axis arrow.



APPLICATIONS

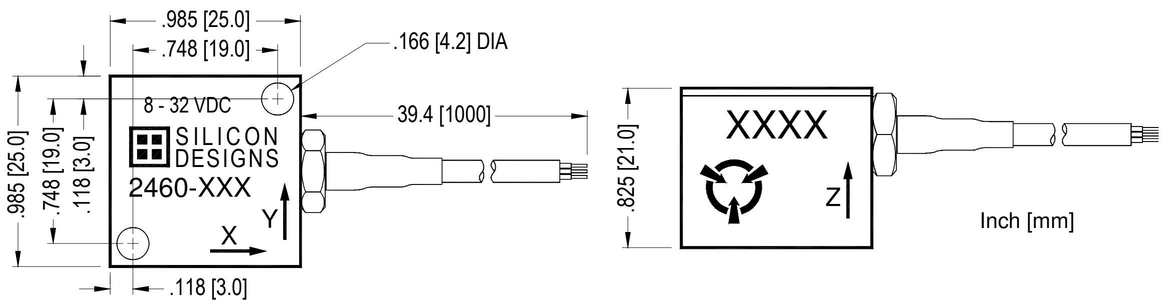
- Vibration Monitoring and Analysis
- Machine Control
- Modal Analysis
- Robotics
- Crash Testing
- Instrumentation
- Rotating Machinery Control

SIGNALS

V_S: (Power) reddish brown wire, GND: (Ground) black wire

AOPX: (Output) green wire	X-Axis positive output
AONX: (Output) white wire	X-Axis negative output
AOPY: (Output) light brown wire	Y-Axis positive output
AONY: (Output) orange wire	Y-Axis negative output
AOPZ: (Output) light blue wire	Z-Axis positive output
AONZ: (Output) yellow wire	Z-Axis negative output

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE



Note: The cable's braided shield is electrically connected to the case. The black ground (GND) wire is isolated from the case.

PERFORMANCE

By Model: VS=+8 to +32VDC, TC=25°C.

MODEL NUMBER	Input Range	Frequency Response (Nominal, 3 dB) [1]	Sensitivity, Differential [2]	Output Noise, Differential (RMS, typical)	Max. Mechanical Shock (0.1 ms)
UNITS	g	Hz	mV/g	µg/(root Hz)	
2460-002	±2	0 - 400	2000	13	2000 g
2460-005	±5	0 - 600	800	32	
2460-010	±10	0 - 1000	400	63	
2460-025	±25	0 - 1500	160	158	
2460-050	±50	0 - 2000	80	316	
2460-100	±100	0 - 2500	40	632	
2460-200	±200	0 - 3000	20	1265	
2460-400	±400	0 - 4000	10	2530	

Note 1: 250Hz ±100Hz, -3dB bandwidth, optionally available. Note 2: Single ended sensitivity is half of values shown.

All Models: Unless otherwise specified, Vs=+8 to +32VDC, TC=25°C, Differential Mode.

PARAMETER		MIN	TYP	MAX	UNITS
Cross Axis Sensitivity			2	3	%
Bias Calibration Error	-002		2	4	% of Span
	-005 thru -400		2	3	
Bias Temperature Shift (T_C= -40 to +80°C)	-002		100	300	(ppm of span)/°C
	-005 thru 400		50	200	
Scale Factor Calibration Error[3]			2	3	%
Scale Factor Temperature Shift (TC= -40 to +80°C)		-250		+250	ppm/°C
Non-Linearity (-90 to +90% of Full Scale) [3, 4]	-002 thru -050		0.15	0.5	% of span
	-100		0.25	1.0	
	-200		0.40	1.5	
	-400		0.70	2.0	
Power Supply Rejection Ratio		50	>65		dB
Output Impedance			1		Ω
Output Common Mode Voltage			2.5		VDC
Operating Voltage		8		32	VDC
Operating Current (AOP & AON open)			27	30	mA DC
Mass (not including cable)			21		grams
Cable Mass			14		grams/meter

Note 3: 100g versions and above are tested from -65g to +65g.
Note 4: Tighter tolerances available upon request.

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CABLE SPECIFICATION & LENGTH CONSIDERATIONS

The cable consists of seven 28 AWG (7x36) and one 26 AWG (7x34) tin-plated copper wires. The seven smaller 28 AWG wires are covered by 5.5 mils of Teflon FEP insulation. The larger single 26 AWG wire is covered by 8.5 mils of black Teflon FEP insulation. The seven smaller gauge wires surround the single larger gauge (black) wire. The wire bundle is surrounded by a braided shield and covered by a 10 mil thick Teflon FEP jacket with a nominal outer diameter of 0.136". Cable lengths of up to 15 meters (50 feet) can be added to the model 2460's standard 1-meter cable without the need to test for output instability. For lengths longer than 15 meters we recommend you check each individual installation for oscillation by tapping the accelerometer and watching the differential output for oscillation in the 20kHz to 50kHz region. If no oscillation is present then the cable length being used is OK. From the standpoint of output current drive and slew rate limitations, the model 2460 is capable of driving over 600 meters (2000 feet) of its cable type but at some length between 15 and 600 meters, each device will likely begin to exhibit oscillation.

DIFFERENTIAL vs. SINGLE ENDED OPERATION

The model 2460 accelerometer will provide its best performance when you connect it to your instrumentation in a differential configuration using both the **AOP** and **AON** output signals. But a differential connection may not always be possible. In such cases, it is perfectly fine to connect the accelerometer to your instrumentation in single ended mode by connecting **AOP** and **GND** to your instrumentation and leaving **AON** disconnected. Keep in mind that the signal to noise ratio is reduced by half for a single-ended vs. a differential connection.

SENSOR LOCATIONS