

Model 7290E Variable capacitance accelerometer

Features

- DC response
- 2 to 150 g full scale
- Motion, low frequency, tilt
- 10K g shock survivability
- Precision digital temperature compensation



Description

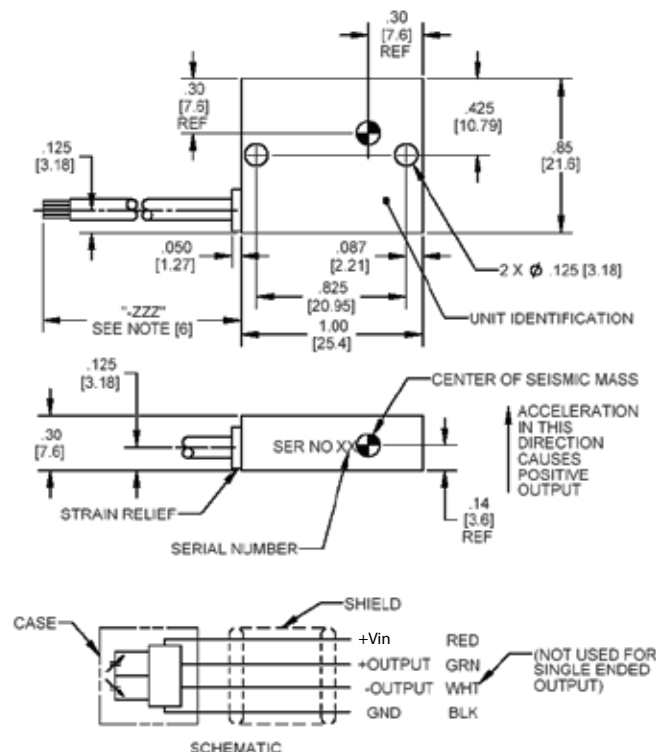
The Endevco® model 7290E Microtron® accelerometer family utilizes unique variable capacitance microsensors. The accelerometers are designed for measurement of relatively low level accelerations in aerospace and automotive environments. Typical applications require measurement of whole body motion immediately after the accelerometer is subjected to a shock motion, and in the presence of severe vibrational inputs. State-of-the-art digital temperature compensation electronics provide for precise compensation over a wide temperature range.

Gas damping and internal overrange stops enable the anisotropically-etched silicon microsensors to withstand high shock and acceleration loads.

The accelerometer is available with a choice of two power options. One option (R) allows for operation from 9.5 V to 18.0 V. The second option (U) allows for operation over a range of 12.5 V to 36 V. The 7290E provides both a differential and single ended output. The differential output has a range of ± 2 V and is DC coupled. The single ended output is 0.5 V to 4.5 V with 2.5 V of bias voltage. Frequency response is controlled by the near-critically damped sensors. The use of gas damping results in very small thermally induced changes in frequency response.

Endevco three-channel systems, model 136 or 436 are recommended as signal conditioner and power supply.

U.S. Patents 4,574,327, 4,609,968 and 4,999,735



STANDARD TOLERANCE
INCHES [MILLIMETERS]
.XX = $\pm .02$ [X = $\pm .5$]
XXX = $\pm .010$ [XX = $\pm .25$]

50L

Model 7290E

Variable capacitance accelerometer

Endevco

Specifications

All values are typical at +75°F (+24°C) and 15 Vdc excitation unless otherwise stated. Calibration data, traceable to the National Institute of Standards, (NIST), is supplied.

Dynamic characteristics	Units	7290E-2	-5	-10	-30	-50	-100	-150
Range	g	±2	±5	±10	±30	±50	±100	±150
Sensitivity	mV/g	1000 ±50	400 ±20	200 ±10	66 ±4	40 ±2	20 ±1	13.2 ±0.66
Frequency response (± 5%)	Hz	0 to 15	0 to 30	0 to 500	0 to 1000	0 to 2000	0 to 2000	0 to 2000
Mounted resonance frequency	Hz	1300	1600	3000	5500	6000	6000	6000
Non-linearity and hysteresis [1]	% FSO typ (max)	±0.20 (±0.50)	±0.20 (±0.50)	±0.20 (±0.50)	±0.20 (±0.50)	±0.20 (±0.50)	±1 (±2)	±1 (±2)
Transverse sensitivity	% (max)	2	2	2	2	2	2	2
Zero measurand output	mV	±50	±50	±50	±50	±50	±50	±50
Damping ratio		4.0	2.5	0.7	0.7	0.6	0.6	0.6
Damping ratio change								
From -65°F to +250°F (-55°C to +121°C)	%/°C	+0.08	+0.08	+0.08	+0.08	+0.08	+0.08	+0.08
Thermal zero shift (max)								
From -40°F to 212°F (-40°C to 100°C)	% FSO	±1.0	±1.0	±1.0	±1.0	±1.0	±1.0	±1.0
Thermal sensitivity shift (max)								
From -40°F to 212°F (-40°C to +100°C)	%	±1.0	±1.0	±1.0	±1.0	±1.0	±1.0	±1.0
Overrange (determined by electrical clipping or mechanical stops, whichever is smaller.)								
Electrical clipping	volts	±2.4	±2.4	±2.4	±2.4	±2.4	±2.4	±2.4
Mechanical stops, typical	g	±4	±12	±30	±90	±90	±200	±300
Recovery time	µs	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Threshold (resolution) [2]	Equiv. g's	0.0005	0.00125	0.0025	0.0075	0.013	0.013	0.013
Base strain sensitivity, max	Equiv. g's	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Magnetic susceptibility (@ 100 gauss, 60 Hz)	Equiv. g's	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Warm-up time (to within 1%)	ms	15	15	15	15	15	15	15
Electrical characteristics								
Excitation voltage		9.5 to 18.0 Vdc 12.5 to 36.0 Vdc						
Current drain		8.5 mA typ, 10 mA max						
Output impedance/load		100 ohms max/10K ohms resistance minimum, 0.1 µF capacitance maximum						
Residual noise		100 µV rms typ, 0.5 mV rms max, 0.5 to 100 Hz 500 µV rms typ, 1.0 mV rms max, 0.5 Hz to 10 kHz						
Physical characteristics								
Case material		Anodized aluminum alloy						
Electrical connections		Integral cable, four conductor No. 28 AWG, Teflon® insulated leads, braided shield, Hyperflex™ jacket						
Mounting/torque		Two holes for 4-40 or M3 mounting screws / 6 lbf-in (0.68 Nm)						
Weight		10 grams without cable (cable weighs 9 grams/meter)						
Environmental characteristics								
Acceleration limits (in any direction)		20 000 g						
Static		20 000 g						
Vibration		100 g sinusoidal 20 - 2000 Hz / 40 g rms random 20 - 2000 Hz						
Shock		5000 g (150 µs haversine pulse) for -2, -5 and -10; 10 000 g (80 µs haversine pulse) for -30, -50, -100 and -150						
Zero shift		0.1% FSO typical at 5000 g						
Temperature								
Operating		-65°F to +250°F (-55°C to +121°C)						
Storage		-100°F to +300°F (-73°C to +150°C)						
Humidity/altitude		Unaffected. Unit is epoxy sealed.						
ESD sensitivity		Unit meets Class 2 requirements of MIL-STD-883, Method 3015						



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Calibration

Sensitivity (measured with 15 Vdc excitation)	1 g and 5 Hz for -2 and -5 10 g and 100 Hz for all other ranges
Frequency response	1 g, 1 to 100 Hz for -2 and -5, 10 g, 20 to 10 000 Hz for all other ranges
Zero measurand output	measured at room temp
Transverse sensitivity	measured at 1 g

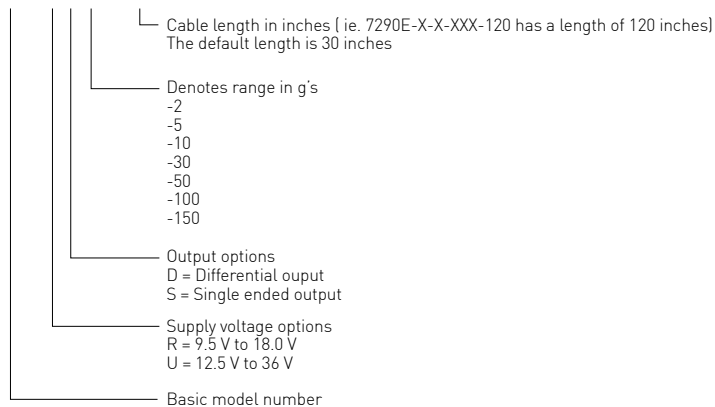
Accessories

Product	Description	7290E
EHW265	Size 4, flat washers (2)	Included
EH702	4-40 x 7/16 inch cap screws (2)	Included
EHM464	Hex key wrench	Included
7990	Triaxial mounting block	Optional

Notes:

1. Full scale output (FSO) is nominally 4 volts.
2. Threshold = (max. residual noise; 0.5 to 100 Hz) / sensitivity
3. Maintain high levels of precision and accuracy using Endevco's factory calibration services.
Call Endevco's inside sales force at 800-982-6732 for recommended intervals, pricing and turn-around time for these services as well as for quotations on our standard products.
4. Model number definition:

7290E-X-X-XXX-ZZZ



Continued product improvement necessitates that Endevco reserve the right to modify these specifications without notice. Endevco maintains a program of constant surveillance over all products to ensure a high level of reliability. This program includes attention to reliability factors during product design, the support of stringent Quality Control requirements, and compulsory corrective action procedures. These measures, together with conservative specifications have made the name Endevco synonymous with reliability.

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