

## Model 7290D Variable capacitance accelerometer

### Features

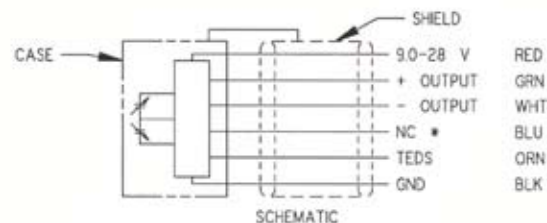
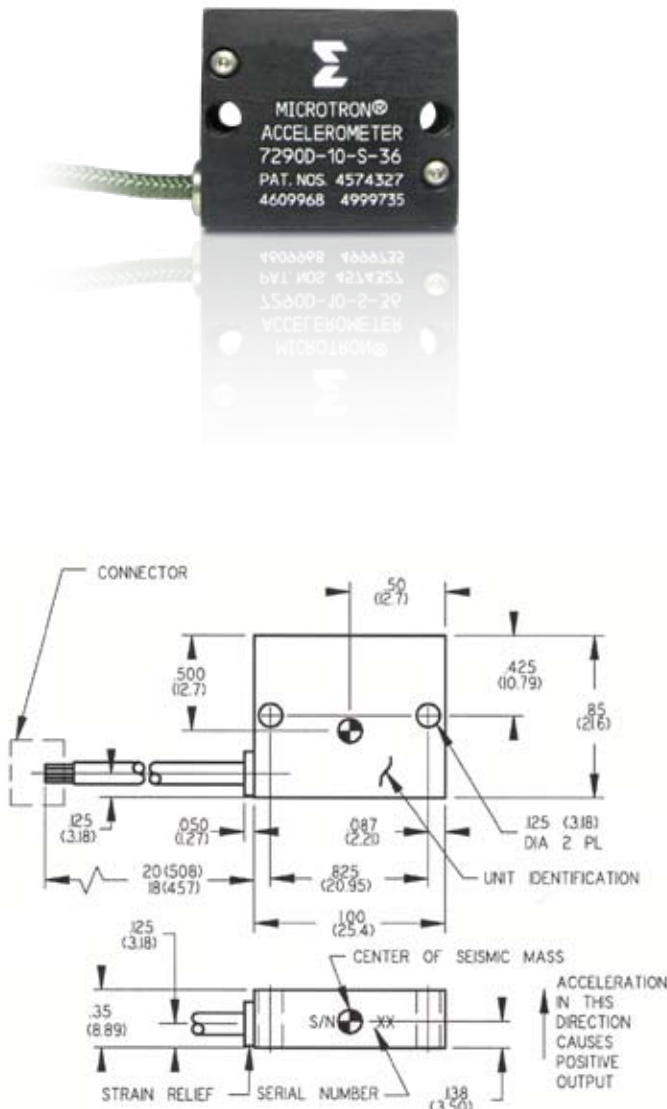
- DC response
- 2 to 100 g full scale
- 2.5% total dynamic accuracy
- Electronic compensation
- Gas damping
- Up to 10 000 g shock survivability
- TEDS

### Description

The Endevco model 7290D accelerometer is designed to provide very high thermal stability and global accuracy as is typically required for flight test and similarly challenging test environments.

The accelerometer utilizes a patented variable capacitance sensing element (patents 4,574,327; 4,609,968; and 4,999,735). Gas damping and internal overrange stops enable the anisotropically etched silicon-sensing element to withstand high shock and acceleration loads.

Included in each accelerometer is a custom signal conditioner enabling the device to operate with a nominal excitation of 8.0 Vdc to 30.0 Vdc and provides a high level, low impedance output. The  $\pm 2.25$  volt differential output (single-ended output optional) is DC coupled at a DC bias of approximately 2.5 V. In order to maintain stringent thermal characteristics and high accuracy, a custom ASIC provides factory programmable temperature compensation. All compensation and adjustments are incorporated within the accelerometer and no post-processing is required. The compensation is accomplished via a five point linear fit algorithm for both Thermal Sensitivity Shift and Thermal Zero Shift. Each 7290D includes a Transducer Electronic Data Sheet (TEDS) conforming to IEEE 1451.4. The TEDS stores the serial number and calibration information.



- NO CONNECTION USED FOR FACTORY PROGRAMMING
- | STANDARD TOLERANCE |                    |
|--------------------|--------------------|
| INCHES             | (MILLIMETERS)      |
| .XX = $\pm .02$    | (.X = $\pm .5$ )   |
| .XXX = $\pm .010$  | (.XX = $\pm .25$ ) |

# Model 7290D

## Variable capacitance accelerometer

Endevco

### Specifications

The following performance specifications conform to ISA-RP-37.2 (1964) and are typical values, referenced at +75°F (+24°C) and 10 Vdc excitation unless otherwise noted. Calibration data, traceable to National Institute of Standards and Technology (NIST), is supplied.

Dynamic characteristics	Units	7290D-2	-10	-30	-50	-100
Range	g	±2	±10	±30	±50	±100
Sensitivity	mV/g	1000 ±50	200 ±10	66 ±4	40 ±2	20 ±1
Frequency response [1]						
±5% amplitude	Hz	0 to 15	0 to 500	0 to 800	0 to 1000	0 to 1000
±3 dB amplitude	Hz	0 to 35	0 to 1500	0 to 2800	0 to 4500	0 to 5000
Resonance frequency	Hz	1300	3000	5500	5500	6000
Non-linearity and hysteresis	% FSO (typ)	±0.2	±0.2	±0.2	±0.2	±1.0
	% FSO (max)	±0.5	±0.5	±0.5	±0.5	±2.0
Transverse sensitivity	% max	2.0	2.0	2.0	2.0	2.0
Zero measurand output	mV	±100	±50	±50	±50	±50
(single-ended output device)	mV	2500 ±100	2500 ±50	2500 ±50	2500 ±50	2500 ±50
Damping ratio		4.5	0.7	0.7	0.6	0.6
Damping ratio change	% / °F	+0.04	+0.04	+0.04	+0.04	+0.04
From -67°F to +257°F (-55°C to +125°C)	% / °C	+0.08	+0.08	+0.08	+0.08	+0.08
Thermal zero shift						
From -67°F to +257°F (-55°C to +125°C)	% FSO (typ)	±1.5	±1.5	±1.5	±1.5 [2]	±1.5 [2]
	% FSO (max)	±3.0	±3.0	±3.0	±3.0 [2]	±3.0 [2]
Thermal sensitivity shift						
From -67°F to +257°F (-55°C to +125°C)	% (typ)	±1.5	±1.5	±1.5	±1.5 [2]	±1.5 [2]
	% (max)	±3.0	±3.0	±3.0	±3.0 [2]	±3.0 [2]
Total dynamic accuracy [3]						
(through specified temperature range)	% FSO	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
Magnetic susceptibility [4]	Equiv. g	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Warm-up time (to within 1%)	ms	10	10	10	10	10

### Output characteristics

Excitation	8.0 to 30.0 Vdc
Current drain	8.5 mA typ, 10 mA max
Output impedance/load	50 ohms max / 10 K ohms resistance minimum, 0.1 µF capacitance maximum
Residual noise (0.1 to 100 Hz), typ.	0.5 mVrms typ, 0.8 mVrms max; 0.1 to 100 Hz 1.0 mVrms typ, 2.0 mVrms max; 0.1 to 1 kHz 30 µVrms / √Hz typ; 0.1 to 10 kHz

### Environmental characteristics

Acceleration limits (in any direction)	
Static	20 000 g
Vibration	100 g sinusoidal 20–2000 Hz      40 g rms random 20–2000 Hz
Shock	5000 g (150 µsec haversine pulse) for the -2 and -10; 10 000 g (80 µsec haversine pulse) for the -30, -50 and -100
Zero shift	0.1% FSO typical at 5000 g
Temperature	
Operating	-67°F to +257°F (-55°C to +125°C)
Storage	-67°F to +257°F (-55°C to +125°C)
Humidity/altitude	Unaffected. Unit is epoxy sealed. Hybrid and sensor are hermetically sealed.

### Physical characteristics

Case material	Anodized aluminum alloy
Electrical connections	Integral cable, six conductor No. 30 AWG, Teflon® insulated leads, braided shield, hyperFLEX jacket
Identification	Manufacturer's logo, model number and serial number
Mounting/torque	Two holes for 4-40 or M3 mounting screws / 6 lbf-in
Weight	15 grams, excluding cable (8 grams) and connector (6 grams)

### Calibration

Sensitivity	Measured at 1g and 5 Hz for -2 Measured at 10g and 100 Hz for -10, -30, -50, and -100
Frequency response	Measured at 1g, 1 to 100 Hz for -2 Measured at 10g, 20 to 10 kHz for -10, -30, -50, and -100
Zero measurand output	Measured at room temperature
Transverse sensitivity	Measured at 1 g

### Notes:

- See calibration data supplied for details.
- Additional compensation process required for higher g ranges.
- Total dynamic accuracy is the root sum squared of thermal sensitivity shift, non-linearity and hysteresis, and transverse sensitivity.
- At 100 Gauss, 60 Hz.
- 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.

### Included accessories

EHW265	(2) flat washers, size 4
EH517	(2) 4-40 x 1/2 inch cap screws
EHM464	(1) wrench, hex key

### Optional accessories

7990	triax mounting block
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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.