

PERFORMANCE SPECIFICATION
ENDEVCO® ACCELEROMETER
(Model 7290GM5-XXX-Y-ZZZ)

Document Number	Rev	Date	Entered by	Description of Change	Change Accountable Engineer	ECO
78019	NR	6/23/23	NAD	Initial Release of Performance Specification Accelerometer Model 7290GM5-XXX-Y-ZZZ	HX	53915

1.0 DESCRIPTION

The Endevco® Model 7290GM5 accelerometer family utilizes unique variable capacitance microsensors (Patents 4,574,327, 4,609,968 and 4,999,735). The accelerometers are designed for measurement of relatively low-level accelerations in aerospace and automobile 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.

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

Included in the accelerometer is a signal conditioner so that the device can operate from 8V to 40V. The accelerometer Provides differential or single ended output. The ± 2V differential output is dc coupled at a dc bias of approximately 2.5V. The single ended output is 0.5V to 4.5V with 2.5V bias voltage. Frequency response is controlled by the near-critically damped sensors. The use of gas damping results in very small thermally induced changes of frequency response.

2.0 ELECTRICAL CHARACTERISTICS

All specifications assume +75°F (+24°C) and 15 Vdc excitation unless otherwise stated. The following parameters are 100% tested.

	Units	Range Dash Number							
		<u>-2</u>	<u>-5</u>	<u>-10</u>	<u>-30</u>	<u>-50</u>	<u>-100</u>	<u>-200</u>	
2.1 RANGE [1]	g	±2	±5	±10	±30	±50	±100	±200	
2.2 SENSITIVITY	mV/g	1000 ±50	400 ±20	200 ±10	66 ±4	40 ±2	20 ±1.0	10 ±0.5	
2.3 FREQUENCY RESPONSE	Hz								
(±5% max, ref 5 Hz for -2/5g 100 Hz for the -10/30/50/100/200g)		0-15	0-30	0-500	0-1000	0-2000	0-2000	0-2000	
(±10% typ, ref 5 Hz for -2/5g 100 Hz for the -10/30/50/100/200g)		0-30	0-80	0-1300	0-1800	0-3000	0-3000	0-4000	
(±3dB typ, ref 5 Hz for -2/5g 100 Hz for the -10/30/50/100/200g)		0-60	0-150	0-2800	0-3000	0-4500	0-4500	0-6000	
2.4 TRANSVERSE SENSITIVITY [2]									
(Typical)	%	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
(Maximum)	%	2.0	2.0	2.0	2.0	2.0	2.0	3.0	

		Units	Range Dash Number						
			<u>-2</u>	<u>-5</u>	<u>-10</u>	<u>-30</u>	<u>-50</u>	<u>-100</u>	<u>-200</u>
2.5	ZERO MEASURAND OUTPUT (single-ended output device)	mV	±50	±50	±50	±50	±50	±50	±50
			2500	2500	2500	2500	2500	2500	2500
			±50	±50	±50	±50	±50	±50	±50
2.6	THERMAL ZERO SHIFT (MAX) -40°C to +100°C, ref. 24°C (-40°F to +212°F, ref. 75°F)	%FSO [3]	±1.0	±1.0	±1.0	±1.0	±1.0	±1.0	±1.0
2.7	THERMAL SENS SHIFT (MAX) 40°C to +100°C, ref. 24°C (-40°F to +212°F, ref. 75°F)	%	±1.0	±1.0	±1.0	±1.0	±1.0	±1.0	±1.0
3.0	<u>TYPICAL PERFORMANCE</u> The following parameters are established from testing of sample units								
3.1	COMBINED NON-LINEARITY [3] (BFSL) AND HYSTERESIS (Typical)	%FSO	±0.2	±0.2	±0.2	±0.2	±0.2	±1	±1
	(Maximum)	%FSO	±0.5	±0.5	±0.5	±0.5	±0.5	±2	±2
3.2	NATURAL FREQUENCY, TYP	Hz	1300	1600	3000	5500	6000	6000	6000
3.3	DAMPING RATIO @ 24°C, (Typ)		4.0	2.5	.7	.7	.6	.6	.6
3.4	DAMPING RATIO CHANGE WITH TEMP, FROM -55°C TO 121°C, (Typ) (-65°F TO 250°F)	%/°C	+ .08	+ .08	+ .08	+ .08	+ .08	+ .08	+ .08
3.5	OVERRANGE (Determined by 3.5.1 or 3.5.2, whichever is smaller.)								
3.5.1	Electrical clipping on output, typ, corresponding to	V g	±2.4 ±2.4	±2.4 ±6.0	±2.4 ±12.0	±2.4 ±36.0	±2.4 ±60	±2.4 ±120	±2.4 ±240
3.5.2	Mechanical stops, Typ	g	+/-3	+/-12	+/-15	+/-45	+/-150	+/-150	+/-300
3.5.3	Recovery Time	µs	<10	<10	<10	<10	<10	<10	<10
3.6	TRESHOLD (RESOLUTION) [4]	equiv. g's	0.0002	0.0005	0.0010	0.0030	0.0050	0.0100	0.0200
3.7	BASE STRAIN SENSITIVITY, MAX (PER ISA 37.2 @ 250 µSTRAIN)	equiv. g's	.01	.01	.01	.01	.01	.01	.01

3.8	MAGNETIC SUSCEPTIBILITY	<.1 equiv. g's at 100 gauss, 60 Hz
3.9	WARM-UP TIME (to within 1% of final output value)	15 ms
4.0	<u>ELECTRICAL</u>	
4.1	EXCITATION VOLTAGE	8.0 Vdc to 40.0 Vdc
4.2	CURRENT DRAIN	4.5 ma typ, 6 ma max
4.3	OUTPUT IMPEDANCE	100 ohms max
4.4	LOAD	10K ohms resistance minimum 0.1 μ F capacitance maximum
4.5	RESIDUAL NOISE	0.1 mVrms typ, 0.5 mVrms max; 0.5 to 100 Hz 0.5 mVrms typ, 1.0 mVrms max; 0.5Hz to 10 kHz
4.6	MAXIMUM EXCITATION VOLTAGE WITHOUT DAMAGE	50 Vdc
4.7	INPUT VOLTAGE PROTECTION	REVERSE POLARITY PROTECTED
4.8	INSULATION RESISTANCE Case to leads shorted together Shield to leads shorted together	100 Meg Ohms minimum at 50 Vdc
5.0	<u>PHYSICAL</u>	
5.1	WEIGHT (typical)	10 grams (without cable) plus cable at 13 grams/meter.
5.2	CASE MATERIAL	Anodized aluminum alloy.
5.2.1	CABLE TYPE	4x 30 AWG stranded 7/38 silver-plated copper, PFA 340 insulated conductors. Braided for 90% coverage with 40 AWG silver-plated copper. Gray PFA 340 jacket. Cable length to be specified at time of order. [5]
5.3	MOUNTING/TORQUE	Two holes for 4-40 or M3 mounting screws/6 lbf in (0.68 Nm)
6.0	<u>ENVIRONMENTAL</u>	
6.1	ACCELERATION LIMITS (in any direction)	
6.1.1	Static	20000 g
6.1.2	Vibration	40 g rms random 20-2000 Hz

6.1.3	Shock	5,000g (150 μ S haversine pulse) for the -2, -5 and -10 10000g (80 μ S haversine pulse) for the -30, -50,-100, -200
6.1.3.1	Zero Shift 0.1% FSO typical @ 5000g	
6.2	TEMPERATURE	
6.2.1	Compensated Range	-40°F to +212°F (-40°C to 100°C)
6.2.2	Operating Range	-65°F to +250°F (-55°C to +121°C)
6.2.3	Storage Range	-40°F to +212°F (-40°C to 100°C)
6.3	HUMIDITY AND ALITUDE	Not affected. Unit is sealed
6.4	ESD SENSITIVITY	Unit meets class 2 requirements of MIL-STD-883, Method3015
7.0	<u>CALIBRATION DATA</u>	
7.1	SENSITIVITY (Measured with 15 Vdc excitation)	Measured at 1g and 5 Hz for the -2, -5 Measured at 10 g and 100Hz for the -10, -30 -50, -100 and -200
7.2	TRANSVERSE SENSIVITY	Measured at 1 g
7.3	FREQUENCY RESPONSE	Measured at 1g, 1 to 100 Hz for the -2, -5 Measured at 10 g, 20 to 10000 Hz for the -10 -30, -50, -100 and -200
7.4	ZERO MEASURAND OUTPUT	Measured at room temperature
8.0	<u>ACCESSORIES</u>	
8.1	SUPPLIED EH702 EHW265 EHM464	4-40 x 7/16" cap screws, 2X Flat washers, size 4, 2X Wrench, hex key, 1X
8.2	OPTIONAL 7990	Triaxial Mounting Block

9.0 NOTES

[1] Customized range, available on special order. FSO is nominally 4 volts.

[2] 1% maximum available on special order.

[3] Full scale output (FSO) is nominally 4 volts

[4] THRESHOLD = 2 x RESIDUAL NOISE (0.5 to 100Hz) / SENSITIVITY

[5] Model Number Definition:

