

PERFORMANCE SPECIFICATION
TRIAxIAL ACCELEROMETER
(MODEL 7284A-XXX-E-ZZZ)

Document Number	Rev	Date	Entered by	Description of Change	Change Accountable Engineer	ECO
EDVPS7284A	B	2/4/21	LMK	Update spec	JN	51442

1.0

DESCRIPTION

The ENDEVCO® Model 7284A series is a family of rugged, lightly damped, piezoresistive triaxial accelerometers designed for high-acceleration shock measurements in three mutually perpendicular axes. This family uses three sensors that are packaged in a mutually orthogonal arrangement in a two bolt-mount housing which shares the same footprint and bolt pattern as Meggitt Sensing Systems' legacy ENDEVCO® Model 7270A and 7280A product families. The housing boasts a robust low noise eight conductor cable that can repeatedly withstand the high-acceleration shock environment.

The Model 7284A utilizes the same sensing element as the Model 72 & 7280A. Each axis uses a unique micro-machined, piezoresistive sensor with light gas damping to attenuate resonant amplitudes, and mechanical stops to reduce breakage under over load conditions. The Model 7284 is available in a 2,000 or 20,000 g range, with all three axes having the same range. Selectable ranges per axis are available by special request.

U.S. patent numbers 6,988,412 applies to this unit.

2.0

CERTIFIED PERFORMANCE

All specifications assume +75°F (+24°C) and 5 volts excitation, unless otherwise specified.

		<u>Units</u>			
2.1	RANGE	g	<u>2K</u>	<u>20K</u>	<u>60K</u>
2.2	SENSITIVITY				
	min / typ / max at 5 Vdc	μV/g	75/150/300	4/8/12	1.25/2.5/3.75
	min / typ / max	μV/V/g	15/30/60	0.8/1.6/2.4	0.25/0.50/0.75
	A specification of μV/V provides a parameter specification that is independent of excitation voltage. Calculate the specification at any excitation voltage by multiplying the value by the excitation voltage. This applies to any parameter with a "unit"/V specification.				
2.3	ZERO MEASURAND OUTPUT				
	maximum at +75°F (+24°C)	mV/V		±20	
2.4	RESISTANCE				
	input	Ω		2200± 700	
	output, each axis	Ω		6500 ± 2000	

Resistance is measured at approximately 1 mA. Bridge resistance increases with applied voltage due to heat dissipation in the strain gage elements.

		<u>Units</u>	<u>2K</u>	<u>20K</u>	<u>60K</u>
3.0	<u>TYPICAL PERFORMANCE CHARACTERISTICS</u>				
	The following parameters are established from testing of sample units and are not 100% tested:				
3.1	NATURAL FREQUENCY typical	kHz	30	100	130
3.2	ZERO SHIFT AFTER FULL RANGE SHOCK				
	After full range shock	μV/V	6	20	20
	After 3X range shock	μV/V	120	60	60
3.3	OVERRANGE LIMIT	g	10,000	60,000	180,000
	The overrange limit is a design safety margin; operating the unit above its rated range is not recommended. See note at paragraph 6.2 for additional over range limitations.				
3.4	FREQUENCY RESPONSE ± 1dB	kHz	10	10	20
3.5	AMPLITUDE LINEARITY typical, to full range	% of reading		±5	
3.6	TRANSVERSE SENSITIVITY	%		5	
	In actual installation, the flatness of the mounting surface can effect the magnitude of this error.				
3.7	DAMPING	of critical	0.5	0.05	0.05
3.8	THERMAL ZERO SHIFT				
	typical, from 0°F to 150°F, ref 75°F	%FSO/°C		0.06	
		%FSO/°F		0.033	

For short duration tests, auto zeroing prior to test is recommended to eliminate this error. For extended duration testing, it is possible to record the temperature and correct the acceleration data in post-processing.

3.9	THERMAL SENSITIVITY SHIFT typical	%/°F	-0.11
		%/°C	-0.2

3.10	WARM-UP TIME	2 minutes after power-on
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Warm-up drift is very sensitive to heat sinking from the mounting surface. Typical specifications listed above are for a unit mounted to a solid metal surface per Paragraph 5.5.

3.11	MECHANICAL OVERTRAVEL STOPS	g	2X range minimum
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4.0 ELECTRICAL

4.1	EXCITATION VOLTAGE (default)	5.0 Vdc
	MAX VOLTAGE WITHOUT DAMAGE	12.0 Vdc

For maximum accuracy, calibration data should be taken at the same excitation voltage as is used in service, e.g. the sensitivity of the unit at 10.0 V_{DC} is not exactly double the sensitivity at 5.0 V_{DC} due to self heating of the gages. The excitation voltage to be used in the application should be specified at the time of order (see Paragraph 9.0).

4.2	Noise (max, dc to 10kHz)	μVrms	10
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4.3	ISOLATION RESISTANCE	100 MΩ minimum at 50 Vdc between cable leads and cable shield or case.
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5.0 PHYSICAL

5.1	CASE, MATERIAL	17-4 PH CRES
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5.2	CABLE	Eight 34 AWG SPC alloy conductors, with SPC braided shield and FEP jacket. See Figure 1 for cable lead color code.
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5.3	WEIGHT accelerometer, excluding cable cable	0.13 ounce (3.6 gram)
		0.11 ounce/ft (10.2 gram/m)

5.4	IDENTIFICATION	Serial number on side of unit, model number and Endevco sigma on cover. Measurement coordinate system marked on sides.
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5.4.1	MOUNTING	
	supplied screws	#4-40 high strength screws, 3/8" long, 2x
	supplied washers	#4 flat washers, 2x
	recommended mounting torque	8 ± 2 lbf-in (0.9 N-m)

For optimal performance use the recommended mounting torque, acoustic couplant (grease) and high strength screws to ensure intimate contact between accelerometer and mounting surface and to prevent yielding of the screw and loss of preload force due to shock.

The use of low strength mounting materials (such as aluminum) is not recommended. However, if such is the case, epoxy should be used between the accelerometer and mounting surface to supplement the strength of the threads.

To optimally protect the cable from damage and provide added strain relief, it is suggested to completely encapsulate the cable with RTV within 3 inches of the case. A recommended RTV is Loctite® Clear Silicone RTV (item 37463).

5.4.2 MOUNTING STRAIN SENSITIVITY
250 Microstrain per ISA 37.2, paragraph 6.5 typical/maximum $\mu V/V$ 15/50

6.0 ENVIRONMENTAL

6.1 TEMPERATURE
operating and storage -67°F to +250°F (-55°C to +121°C)

See notes at paragraph 6.2 for additional temperature limitations.

6.2 ACCELERATION LIMITS (any direction)
maximum shock amplitude 3X the lowest rated range present
minimum haversine shock duration Greater of 20 μs or 5X the natural period

6.3 HUMIDITY AND ALTITUDE Epoxy sealed

6.4 ESD SENSITIVITY Class 3B (>8000V) per Section 5.2 of MIL-STD-1686C.

7.0 CALIBRATION DATA

Data for all parameters listed in Paragraph 2.0 (Certified Performance) are supplied on the Calibration Certificate. Sensitivity calibration is performed at 5,000g, for the -20K range and at 1,000g for the -2K range using the ENDEVCO® 2925 POP Shock Calibrator. Calibration will be performed at the excitation voltage specified by the customer at the time of order (see Paragraph 9.0 for ordering information).

Prior to final calibration, each accelerometer is given a shock in each of three axes approximately equal to its rated range using the ENDEVCO® 2973A Shock Motion Accelerometer Calibrator (SMAC).

Tighter specifications or optional calibrations for most other parameters are available upon special request at an additional cost.

8.0 ACCESSORIES

8.1 SUPPLIED
EHW265
EH815
42414

#4 flat washer, 2x
#4-40 x 3/8" screw, alloy steel, 2x
Application Card

OPTIONAL
Model 136
31167
2974M8

D.C. Differential Voltage Amplifier
Adaptor plate to a #10-32 stud mount
Test Fixture, Triaxial

9.0 MODEL NUMBER DEFINITION

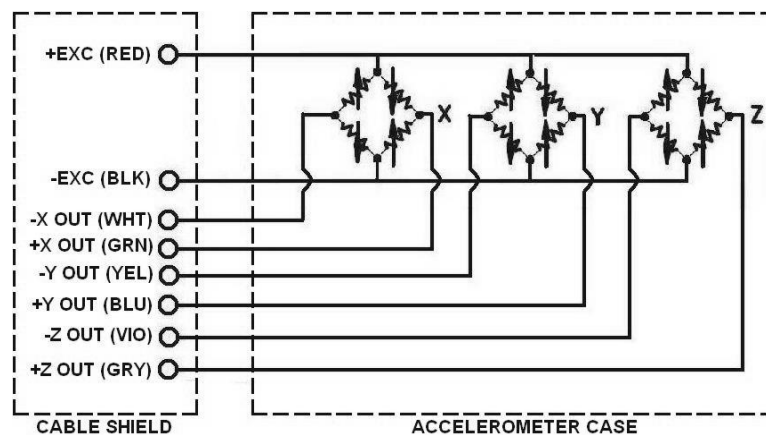
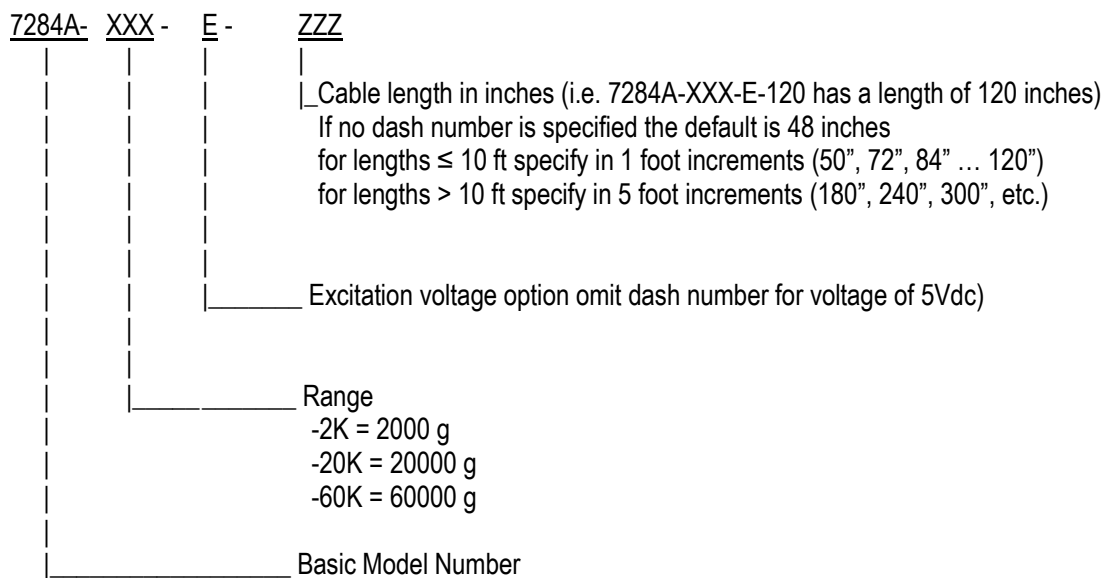


FIGURE 1. Schematic