ENDEVCO
AN AMPHENOL COMPANY

PERFORMANCE SPECIFICATION
ACCELEROMETER
(MODEL 7280A-XXX-YY-ZZZ)

Document Number	Rev	Date	Entered by	Description of Change	Change Accountable Engineer	ECO
78107	A	8/8/23	NAD	Updated Section 2.4 and Removed Outline Drawing	JKN	54114

1.0 DESCRIPTION

The Endevco Model 7280A is a family of rugged damped piezoresistive accelerometers designed for high amplitude acceleration, vibration and shock applications. The Model 7280A features minimal mass loading, broad frequency response, and minimum zero shift during a shock event.

The Model 7280A uses a unique micro-machined, piezoresistive sensor with gas damping to attenuate resonant amplitudes, and mechanical stops to reduce breakage under overload conditions. The monolithic sensor incorporates the latest MEMS technology for ruggedness, stability and reliability. The accelerometer features a four-active arm bridge circuit, with a nominal full-scale output of 320 mV at 10 Vdc excitation for the -20K unit, and 600mV at 10V excitation for the -2K unit. The light case is designed to reduce the effect of mass loading for optimal frequency response.

U.S. Patent 6,988,412 applies to this unit.

2.0 CERTIFIED PERFORMANCE

All specifications assume +75°F (+24°C) and 10 Vdc excitation unless otherwise stated. The following parameters are 100% tested. Calibration data, traceable to the National Institute of Standards and Technology (NIST), are supplied.

		Units	Range Dash Numbers		
2.1	RANGE	g	-2k	-20k	-60k
2.2	SENSITIVITY (Calibration is performed at 5000 g)	g	± 2000	± 20000	±60000
	Minimum/Typical/Maximum at 10 Vdc	μV/g	150.0/300./600.0	8.0/16.0/24.0	2.5/5.0/7.5
	Minimum/Typical/Maximum	μV/V/g	15.0/30.0/60.0	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.

Example: 1.7 μV/V/g is the same as 1.7 x 10 = 17.0 μV/g at 10 Vdc excitation.

2.3	ZERO MEASURAND OUTPUT, maximum	mV/V	± 20

2.4	RESISTANCE				
	Input	Ω	6500 ± 2000	6500 ± 2500	6500 ± 2500
	Output	Ω	6500 ± 2000	6500 ± 2500	6500 ± 2500

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

		Units	2K	20K	60K
3.0	**TYPICAL PERFORMANCE CHARACTERISTICS** The following parameters are established from testing of sample units and are not 100% tested:				
3.1	NATURAL FREQUENCY	kHz	25	100	130
3.2	ZERO SHIFT				
	After Full Range Shock (Typ/Max)	µV/V	6/120	3/60	9/60
	After 3X Range Shock (Typ/Max)	µV/V	120/600	60/300	60/300
3.3	OVERRANGE LIMIT without damage	g	± 10000	±80000	±240000
	The over-range limit is a design safety margin; operating the unit above its rated range is not recommended. See additional notes in paragraph 6.2.				
3.4	AMPLITUDE LINEARITY	±2% of reading up to acceleration corresponding to the recommended range.			
3.5	FREQUENCY RESPONSE ± 1 dB	kHz	DC to 10 kHz	DC to 10 kHz	DC to 20 kHz
3.6	TRANSVERSE SENSITIVITY	%		3	
	This specification is based on analysis. In actual installation, the flatness of the mounting surface as well as the thickness of the solder joints can affect the magnitude of this error.				
3.7	DAMPING (over operating temp. range)	of critical	0.5	0.05	0.05
3.8	THERMAL ZERO SHIFT over operating temperature range	%FSO/°C %FSO/°F		0.06 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 over operating temperature range	%/°C %/°F		- 0.2 - 0.11	
3.10	WARM-UP TIME			2 minutes after power on	
3.11	MECHANICAL OVERTRAVEL STOPS	g		1.5x range minimum	

		Units	2K	20K	60K
4.0	**ELECTRICAL**				
4.1	EXCITATION VOLTAGE	Vdc		10.0	
	MAX. EXCITATION VOLTAGE WITHOUT DAMAGE	Vdc		12.0	

For maximum accuracy, calibration data for sensitivity should be taken at the same excitation voltage as is used in service, e.g. the sensitivity of the unit at 5.0 Vdc is not exactly ½ of the sensitivity at 10.0 Vdc due to self heating of the gages. The excitation voltage to be used in the application should be specified at time of order. [1]

4.2	NOISE maximum (dc to 10 kHz)	μV_{RMS}	10
4.3	ISOLATION RESISTANCE	100 MΩ min at 50 VDC between leads (shorted together) and cable shield or case.	
5.0	**PHYSICAL**		
5.1	CASE, MATERIAL	17-4 CRES	
5.2	WEIGHT (EXCLUDING CABLE)	grams	1.4
5.3	CABLE	(4) 36 AWG SPC, SHIELD, FEP Jacket Cable weight 0.04 oz/ft.	
5.4	IDENTIFICATION	Serial number on side of unit; "ENDEVCO-7280A" and dash number on lid.	
5.5	MOUNTING	4-40 high strength screws (supplied), 2X No 4 washers (supplied), 2X Recommended mounting torque, 8 ± 2 lbf-in (0.9 N-m)	

Use 8 ±2 lbf-in mounting torque, acoustic couplet and high strength steel screws to (1) insure intimate contact between accelerometer and mounting surface and (2) to prevent yielding of the screw and loss of preload force due to shocks. Loss of meaningful data and possible damage to the accelerometer due to rattling on its mounting surface can result from using either too high or too low a value of mounting torque.

6.0	**ENVIRONMENTAL**	
6.1	TEMPERATURE	
	Operating	- 67°F to + 250°F (- 55°C to + 121°C)
	Storage	- 67°F to + 250°F (- 55°C to + 121°C)
6.2	ACCELERATION LIMITS (any direction)	
	Shock	4X the rated range
	Minimum haversine shock pulse duration	5X the natural period

Example: The 7280A-20K has a typical natural frequency of 100 kHz and a natural period of 1/100 kHz, or 10µs. The minimum haversine shock pulse duration will be 5 X 10 µs, or 50 µs.

		Units	2K	20K	60K
6.3	HUMIDITY	Rated to IP67			
6.4	ZERO SHIFT DUE TO ± 0.2 mV maximum, 0 to 10 lbf-in				
	MOUNTING TORQUE				
6.5	MOUNTING STRAIN SENSITIVITY	Typically less than 10 µV when tested at 250 microstrain per ISA 37.2, paragraph 6.5.			

7.0 CALIBRATION DATA

Data for range, sensitivity, ZMO, input resistance and output resistance are supplied on the Calibration Certificate. Calibration will be performed at the excitation voltage provided by the customer at the time of order (see Paragraph 9.0 for ordering information). Optional calibrations are available for any other parameters at an added cost.

8.0 ACCESSORIES

8.1 SUPPLIED

EHW265	Washers, 2X
EH137	Screws, 4-40 Allenoy Steel, 2X Or equivalent Socket Head Cap ¼" long, 2X

8.2 OPTIONAL

Model 7970	Triax Mounting Block
31167	Mounting Plate (10-32 Stud Adaptor)

9.0 NOTES

[1] Model Number Definition:

7280A – XXX - YY - ZZZ

- ZZZ: Cable Length in inches (omit for default length of 48 inches)
  - for lengths ≤ 10ft specify 1ft increments (60", 72"…120")
  - for lengths > 10ft specify 5ft increments (180", 240"…)
- YY: Excitation voltage (omit for default voltage of 10 Vdc)
  - example: 7280A-20K-2.5-ZZZ has an excitation voltage of 2.5 Vdc
- XXX: Range
  - -2K
  - -20K
  - -60k
- 7280A: Basic Model Number