PRELIMINARY

PERFORMANCE SPECIFICATION
ACCELEROMETER
(MODEL 7280AM4-XXX-YY-ZZZ)

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74978	NR	6/4/21	NAD	New Release	JKN	51812

1.0 DESCRIPTION

The ENDEVCO® Model 7280AM4 is a family of rugged lightly damped piezoresistive accelerometers designed for high amplitude acceleration, vibration and shock applications. The Model 7280AM4 feature minimal mass loading, broad frequency response, and minimum zero shift during a shock event.

The Model 7280AM4 uses a unique micro-machined, piezoresistive sensor with light 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, powered at 10 Vdc excitation. The M4 modification provides an integral ¼-28 mounting stud. This increases the housing stiffness, which is important for short duration shock measurements.

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	-2K	-20K	-60K
2.1	RANGE	g	±2000	±20000	±60000
2.2	SENSITIVITY (Calibration is performed at 1,000g for -2K, and 5,000g for -20K and -60K)				
	Minimum/Typical/Maximum at 10 Vdc	μV/g	150/300/600	8/16/24	2.5/5.0/7.5
	Minimum/Typical/Maximum	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.

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	3/40	9/40
	After 4X Range Shock (Typ/Max)	µV/V	120/600	60/300	150/200
3.3	OVERRANGE LIMIT without damage	g	±10000	±80000	±240000
	The overrange 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 ± 1dB	kHz	dc to 10kHz	dc to 10kHz	dc to 20kHz
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		2x 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	grams		2.1	
5.3	CABLE	(4) 36 AWG SPC, SPC shielded, FEP jacket. Cable weight 0.04 oz/ft.			
5.4	IDENTIFICATION	Serial number on side of unit; "7280AM4" and dash number on lid.			
5.5	MOUNTING	Integral ¼-28 thread, .175 inch long mounting stud. Recommended mounting torque: 30 ± 2 lbf-in (3.5 N-m).			

Use 30 ± 2 lbf-in mounting torque and acoustic couplant to (1) ensure intimate contact between accelerometer and mounting surface, and (2) to prevent yielding of the screw and loss of preload force due to shocks, particularly those above 100,000g. 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 7280AM4-20K 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.

6.3	HUMIDITY	epoxy sealed
6.4	ZERO SHIFT DUE TO MOUNTING TORQUE	± 0.1 mV maximum, 0 to 30 lbf-in
6.5	MOUNTING STRAIN SENSITIVITY	Typically less than 2 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 OPTIONAL

Model 32103	Triax Mounting Block

9.0 NOTES

[1] Model Number Definition: