PERFORMANCE SPECIFICATION
TRIAXIAL ACCELEROMETER
(Model 7270A-XXXM4-ZZZ)

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79434	NR	7/12/24	NAD	Initial Release of Performance Specification Triaxial Accelerometer (Model 7270A-XXXM4-ZZZ	MTA	54995

1.0 **DESCRIPTION**

The Endevco Model 7270AM4 is a rugged undamped piezoresistive accelerometer designed for shock measurements. The highly efficient sensing system of the 7270AM4 is sculptured from a single chip of silicon, which includes the inertial mass and strain gages arranged in a four-active-arm Wheatstone bridge circuit (patent numbers 4,498,229; 4,605,919 and 4,689,600). The extremely small size and unique construction of the element allows exceptionally high resonant frequency. On-chip balance resistors provide low zero measurand output and low thermal zero drift. The M4 modification provides an integral 1/4-28 mounting stud. This increases the housing mounting stiffness, which is important for short duration shock measurements near and above 20,000 g acceleration.

2.0 **PERFORMANCE**

All specifications assume +75°F (+24°C) and 10 volts excitation.

2.1 SENSITIVITY, RESONANT FREQUENCY AND RANGE, SEE NOTE 1.

	Sensitivity (microvolts/g)			Resonant Frequency (Kilohertz)		Range (g's)	Overrange Limit (g's)
MODEL	Min	Typ	Max	Min	Typ		
-60KM4	1.5	3	5	400	700	60,000 [3]	180,000
-20KM4	5	10	15	220	350	20,000 [3]	60,000
-6KM4	15	30	50	120	180	6,000	18,000
-2KM4	50	100	150	60	90	2,000	10,000

2.2 AMPLITUDE LINEARITY — ±2% of reading up to acceleration corresponding to the recommended range. Measurement uncertainties prevent stating this as a specification limit at accelerations above 10,000 g.

2.3 ZERO SHIFT DUE TO HALF SINE ACCELERATION CAUSING 200 mV AT FULL SCALE RANGE — 0.5 mV maximum

2.4	MOUNTED FREQUENCY RESPONSE	MODEL ±5% Deviation at [2] -60 K 100 kHz -20 K 50 kHz -6 K 20 kHz -2 K 10 kHz
2.5	TRANSVERSE SENSITIVITY	5% maximum
2.6	SENSITIVITY DEVIATION DUE TO TEMPERATURE	Typical deviation is -1.2% change in sensitivity per +18°F (+10°C) change in case temperature.
2.7	ZERO MEASURAND OUTPUT	±100 mV maximum at +75°F (+24°C)
2.8	THERMAL ZERO SHIFT	±10 mV typical, ±50 mV maximum, -30°F to +150°F (-34°C to +66°C) relative to +75°F (+24°C)
2.9	ZERO SHIFT DUE TO MOUNTING TORQUE	±2 mV maximum, 0 to 30 lbf-in
3.0	**ELECTRICAL**	
3.1	EXCITATION	10.00 Vdc, 12 Vdc maximum
3.2	RESISTANCE Input Output	 650 ± 300 ohms 650 ± 300 ohms
3.3	INSULATION RESISTANCE	100 MΩ minimum at 100 Vdc between the sensor (all leads tied together) and cable shield or case.
3.4	WARM-UP TIME REQUIRED TO MEET THE ABOVE SPECIFICATIONS	2 minutes maximum, 15 seconds typical
4.0	**PHYSICAL**	
4.1	CASE MATERIAL	17-4 PH CRES
4.2	WEIGHT EXCLUDING CABLE	1.5 grams
4.3	IDENTIFICATION	Serial Number on side of unit; "ENDEVCO 7270A-XXXM4" Model and dash number on lid. Patent label on end of cable.
4.4	MOUNTING [3]	Integral 1/4-28 thread .175 inch long mounting stud. Recommended mounting torque, 30 ±2 lbf-in (3.5 N-m)

5.0	**ENVIRONMENTAL**	
5.1	TEMPERATURE Operating: Non-operating:	 -67°F to +150°F (-55°C to +66°C) -67°F to +250°F (-55°C to +121°C)
5.2	SHOCK LIMITS (In any direction) [3]	Half-sine pulse at full scale range. Pulse duration should be the greater of 20 microseconds or five periods of the resonant frequency.
5.3	HUMIDITY	Epoxy sealed
5.4	BASE STRAIN SENSITIVITY	Typically less than 0.5 mV for 250 microstrain when tested per ISA 37.2, para 6.5.
6.0	**CALIBRATION DATA SUPPLIED**	(Taken at room temperature and 10.00 Vdc)

Data for sensitivity, ZMO, input resistance, and output resistance are supplied on the Calibration Certificate.

7.0	**ACCESSORIES**
7.2	APPLICATION NOTES
7.3	SHIPPING AND STORAGE BOX

8.0 **NOTES:**

[1] The overrange limit is a design safety margin. Operating the unit above its rated range is not recommended.

IMPORTANT: Frequency content of shocks which exceed the overrange limits of the 7270AM4 often contain significant amplitudes well above 100 kHz. Signal conditioning with insufficient bandwidth may attenuate the signal and give significantly lower indicated peak accelerations.

[2] Frequency response should deviate by less than ±5% from dc to indicated frequency, based on predicted response of single degree of freedom system. Acceleration levels of conventional techniques are too low for accurate analysis of the frequency response for 6K and higher ranges.

NOTE: The sensor chip includes two masses, each with a separate resonant frequency. Both resonance's satisfy the specified minimum resonant frequency. If these resonance's are excited, the transducer output will exhibit a "beat" frequency.

[3] Use 30 ±2 lbf-in mounting torque, acoustic couplant 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, particularly those above 20,000 g. 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.

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

[4] Prior to final calibration, each accelerometer is given a shock in its sensitive axis approximately equal to its rated range, or equal to 100,000g, whichever is lower.

5 Model Number Definition:

7270A – XXX M4 - ZZZ

- ZZZ: Cable length in inches (i.e. 7270A-20KM4-120 has a length of 120 inches). Omit for default length of 98 inches.
- M4: Modifier
- XXX: Range in g's
  - -2K
  - -6K
  - -20K
  - -60K
- 7270A: Basic Model Number