

**PERFORMANCE SPECIFICATION
PRIMARY TRANSFER STANDARD ACCELEROMETER
2270M8**

Document Number	Rev	Date	Entered by	Description of Change	Change Accountable Engineer	ECO
79184	NR	2/24/26	NAD	Initial Release of Performance Specification	LAB	56444

1.0 DESCRIPTION

The ENDEVCO® Model 2270M8 Transfer Standard Accelerometer is designed for the calibration of back-to-back working standards used in comparison calibrations. It is used extensively in calibrating standard accelerometers built into the armatures of vibration exciters, such as the ENDEVCO Model 2901, or comparison standard accelerometers, such as the ENDEVCO Model 2270. The Model 2270M8 is particularly valuable as a calibration source when the working standard is to be used at frequencies up to 20 000 Hz.

The Model 2270M8 is supplied with an absolute reciprocity calibration at 100 Hz. In addition, a comparison calibration from 20 Hz to 10 000 Hz, including a graph of sensitivity versus frequency, is supplied with all results given in a comprehensive report showing traceability to the National Institute of Standards and Technology (NIST). Optional calibrations to extend the frequency response down to 2 Hz or up to 20 000 Hz are also available.

The Model 2270M8 is a precision single-ended compression vibration transducer using the ISOBASE® design. The extremely high stability and very flat frequency response of the accelerometer is achieved through the use of sensing elements made of ENDEVCO PIEZITE® type P-10 crystal material. This is the same material which is used in the ENDEVCO Model 2270 Standard Accelerometer. The Model 2270M8 is designed to have a high degree of mechanical strain isolation and low sensitivity to transverse motion to minimize sensitivity changes in the standard accelerometer caused by imperfect shaker motion. It can be used with any charge or voltage amplifier. However, the ENDEVCO Model 2710FM13 Calibration Standard Reference Charge Amplifier and the ENDEVCO Model 2786M3 Computer Controlled Calibration Standard Charge Amplifier, have been designed for use with this accelerometer and their use is recommended. The standard accelerometer-amplifier system such as the Model 2270M8/Model 2710FM13 or Model 2270M8/Model 2786M3, are designed to eliminate errors which frequently occur when using instrumentation not specifically designed for use in calibration systems.

1.1 KEY FEATURES

- Transfer standard accelerometer for calibration of back-to-back working standards and reference standards built into shakers
- Stable P-10 crystal material
- High (55 kHz) resonant frequency
- Electrical isolation
- Supplied with absolute calibration at 100 Hz traceable to NIST

All specifications are typical at 75°F (24°C), referenced at 100 Hz and conform to ISA-RP 37.2 (1-64) unless otherwise indicated.

2.0 DYNAMIC CHARACTERISTICS

2.1 CHARGE SENSITIVITY 2.2 pC/g $\pm$ 25% (0.22 pC/ms⁻²)

2.2 CHARGE FREQUENCY RESPONSE [1] See typical curve, Figure 2

FREQUENCY	2 Hz	100 Hz	1 kHz	2 kHz	5 kHz	10 kHz	20 kHz
TYPICAL SENSITIVITY DEVIATION	0%	REFERENCE	0%	0%	+2%	+5%	+20%

2.3 MOUNTED RESONANT FREQUENCY 55 kHz typical, with a case resonance of ~3 dB at ~35 kHz (See typical curve Figure 2)

2.4 TRANSVERSE SENSITIVITY 3% maximum in any direction with 1% available on special order

2.5 AMPLITUDE LINEARITY Sensitivity increases approximately 0.1% per 1000 g, 0 to 15 000 g

2.6 TEMPERATURE RESPONSE $\pm$ 4% typical -65°F to 350°F (-54°C to 177°C) referenced to room temperature

3.0 ELECTRICAL CHARACTERISTICS

3.1 CAPACITANCE 1700 pF $\pm$ 20%

3.2 RESISTANCE 20 G Ω minimum at 75°F (24°C) 100 M Ω minimum at 350°F (177°C)

3.3 ISOLATION 10 M Ω minimum between signal ground and housing

3.4 POLARITY Positive output for acceleration into the base. Standard per ISA-RP 37.2, para. 4.3 (See outline drawing)

4.0	<u>ENVIRONMENTAL CHARACTERISTICS</u>	
4.1	TEMPERATURE RANGE	-65°F to 350°F (-54°C to 177°C)
4.2	HUMIDITY	Hermetically sealed by welding and by glass/metal seal in receptacle
4.3	ACCELERATION LIMIT	15 000 g pk shock 1000 g pk sinusoidal in any direction
4.4	ALTITUDE	Not affected
4.5	BASE STRAIN SENSITIVITY	1.1 equivalent g pk at 250 μ strain pk.
4.6	ELECTROMAGNETIC SENSITIVITY	0.06 equivalent g rms at 100 gauss rms, 60 Hz
5.0	<u>PHYSICAL CHARACTERISTICS</u>	
5.1	WEIGHT	0.6 oz. (16.5 gm) typical
5.2	CASE MATERIAL	Stainless Steel
5.3	SENSOR	ENDEVCO PIEZITE type P-10 in the single-ended compression mode
5.4	OUTPUT RECEPTACLE	10-32 UNF threaded coax socket type side connector mates with ENDEVCO Model 3090C cable assembly
5.5	MOUNTING	Detachable 10-32 stud 18 lbf-in (2 N·m) mounting torque
6.0	<u>CALIBRATIONS</u>	
6.1	STANDARD	
6.1.1	CS120A	Primary Calibration Laser Interferometer includes an absolute reciprocity sensitivity at 100 Hz and 2 g pk, and a comparison frequency response from 20 to 10 000 Hz. Test results are furnished in a formal report that includes transverse sensitivity, resistance, capacitance, and frequency response plots. Traceability to the NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY is shown as required by MILITARY QUALITY CONTROL STANDARDS.

6.2	OPTIONAL	
6.2.1	CS120AL	extends the frequency response calibration down to 1 Hz.
6.2.2	CS120AH	extends the frequency response calibration up to 20 000 kHz.
6.2.3	CS310	Temperature Response Calibration, -65°F to 350°F (-54°C to 177°C). If temperature points are not specified, the calibration will be performed at -65°F and 350°F (-54°C and 177°C).
6.2.4	CS110	Shock Calibration
6.2.5	CS210	Sinusoidal Linearity Calibration

7.0 ACCESSORIES

7.1	3090C-120	Cable Assembly
	92981-12	Mounting Stud, 10-32, Hex I.D.
	15071	Adapter Stud, 1/4-28 UNF to 10-32 UNF; flange of adapter stud is designed to bottom within mounting surface of Endevco Model 2270, 2901 and 2907 (or any .276 counter bore diameter .028 deep).
	2984-1	Adapter stud, 1/4-28 UNF to 10-32 UNF; flange of adapter stud is designed to bottom within mounting surface of Endevco Model 2270M8 (or any .250 diameter, .028 deep).
	EHM464	Hex Key Wrench

7.2 OPTIONAL ACCESSORIES

2981-3	Adapter Stud, 10-32
2981-4	Mounting Stud M5x0.8

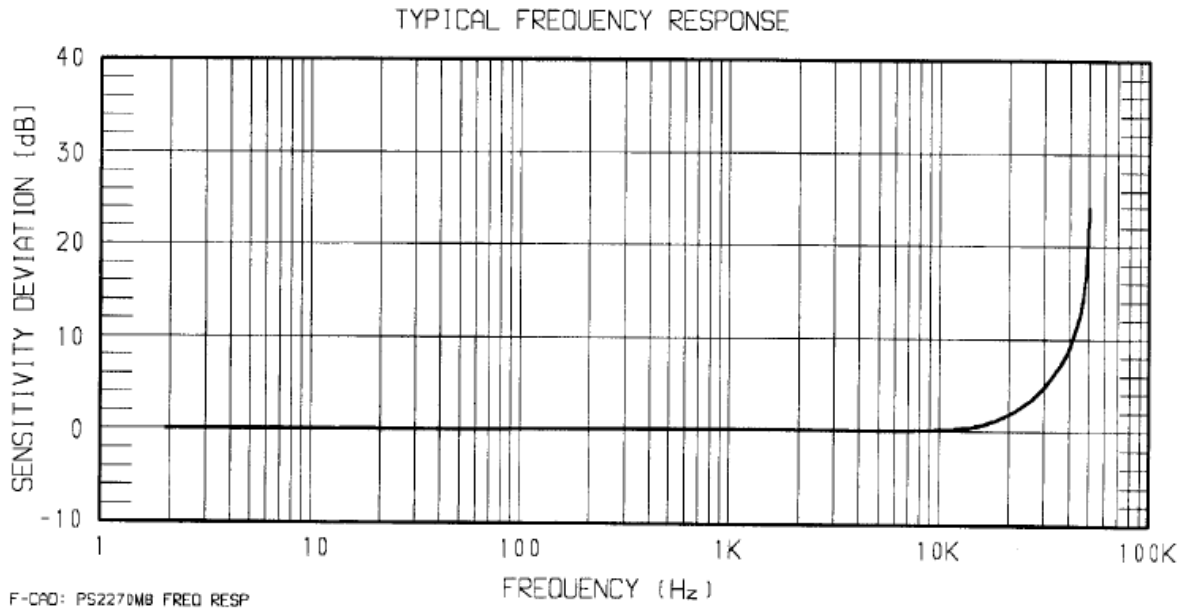
8.0 ORDERING INFORMATION

2270M8

NOTES

- Low frequency response will be determined by the roll-off characteristics of the charge amplifier used with the 2270M8 standard accelerometer.

TYPICAL FREQUENCY RESPONSE
FIGURE 1



TYPICAL TEMPERATURE RESPONSE
FIGURE 2

