PERFORMANCE SPECIFICATION
PIEZOELECTRIC ACCELEROMETER
7703A-XXXX-X

Document Number	Rev	Date	Entered by	Description of Change	Change Accountable Engineer	ECO
77576	NR	4/21/23	NAD	Initial Release of 7730A-XXXX-X Performance Specification	DAM	53682

1.0 DESCRIPTION

The ENDEVCO® Model 7703A-XXXX ISOSHEAR piezoelectric accelerometer is designed for general vibration measurement in structures and objects. The ISOSHEAR design is extremely stable and virtually insensitive to such environmental inputs as base bending and thermal transients. This line of accelerometers have been tested in a radiation environment up to 10^8 rads without performance degradation. They are also capable of accurate vibration measurement up to +550°F (288°C) and are hermetically sealed against external contamination.

The Model 7703A-XXXX features ENDEVCO's PIEZITE® Type P-8 crystal element, operating in the shear mode, which exhibits low base strain sensitivity, high resonance frequency and excellent output stability over time. This piezoelectric accelerometer self-generates its high impedance output and requires no external power for operation. Signal ground is isolated from the outer case of the unit. The accelerometer features a 10-32 side-connector. A low-noise coaxial cable is required for error-free operation. The model number suffix indicates acceleration sensitivity in pC/g; i.e., 7703A-1000 features output sensitivity of 1000 pC/g.

The following performance specifications conform to ISA-RP-37.2 (1964) and are typical values, referenced at +75°F (+24°C) and 100 Hz, unless otherwise noted. Calibration data, traceable to National Institute of Standards and Technology (NIST), is supplied.

		Units	Range Dash Number			
			-50	-100	-200	-1000
2.0	**DYNAMIC CHARACTERISTICS**					
2.1	CHARGE SENSITIVITY					
2.1.1	Typical	pC/g	50	100	200	1000
2.1.2	Minimum	pC/g	45	90	180	900
2.2	FREQUENCY RESPONSE			See Typical Curve		
2.2.1	Resonance Frequency					
2.2.1.1	Typical	kHz	26	20	17	7.5
2.2.1.2	Minimum	kHz	22	18	13	6
2.2.2	Amplitude Response [1]					
	± 5%	Hz	1 to 6 k	1 to 5 k	1 to 4 k	1 to 2 k
	±1dB (ref.)	Hz	1 to 9 k	1 to 8 k	1 to 6 k	1 to 3 k
		Units	Range Dash Number			

			-50	-100	-200	-1000
2.3	TEMPERATURE RESPONSE		See Typical Curve			
2.3.1	-67°F (-55°C) max/min	%	-13.6 / -1			
2.3.2	+350°F (+177°C) max/min	%	+12 / -5.6			
2.3.3	+550°F (+288°C) max/min	%	+24.2 / -2.4			
2.4	TRANSVERSE SENSITIVITY	%	≤ 3			
2.5	AMPLITUDE LINEARITY Up to vibration limit	%	1/250 g	1/125 g	1/125 g	1/25 g
3.0	**ELECTRICAL CHARACTERISTICS**					
3.1	OUTPUT POLARITY		Acceleration directed into base of unit produces positive output at center socket of receptacle.			
3.2	RESISTANCE [2]	GΩ	≥ 10			
3.2.1	At +550°F (+288°C)	MΩ	≥ 25			
3.3	ISOLATION	GΩ	≥ 1			
3.3.1	At +550°F (+288°C)	MΩ	≥ 10			
3.4	CAPACITANCE	pF	2800	2800	5600	5600
3.5	GROUNDING		Signal return isolated from case			
4.0	**ENVIRONMENTAL CHARACTERISTICS**					
4.1	TEMPERATURE RANGE		-67°F to +550°F (-55°C to +288°C)			
4.2	HUMIDITY		Hermetically sealed			
4.3	SINUSOIDAL VIBRATION LIMIT	g pk	2000	1000	850	500
4.4	SHOCK LIMIT [3]	g pk	10000	5000	2000	1000
4.5	BASE STRAIN SENSITIVITY	equiv. g pk/ µstrain	0.0016	0.0008	0.0004	0.00008
4.6	ELECTROMAGNETIC SENSITIVITY	equiv. g rms/ gauss	0.0002	0.0002	0.0002	0.0001
4.7	TRANSIENT TEMPERATURE ERROR	equiv. g pk/ °F	0.004	0.003	0.002	0.001

		Units	Range Dash Number			
			-50	-100	-200	-1000
4.8	RADIATION					
4.8.1	Integrated Gamma Flux	rad			Up to 10^8	
4.8.2	Integrated Neutron Flux	N/cm^2			Up to 10^{10}	
5.0	**PHYSICAL CHARACTERISTICS**					
5.1	DIMENSIONS				See Outline Drawings	
5.2	WEIGHT	gm (oz)	25 (0.9)	29 (1.0)	62 (2.2)	120 (4.2)
5.3	CASE MATERIAL				Stainless Steel	
5.4	CONNECTOR			Coaxial receptacle with 10-32 UNF threads designed to mate with Endevco Model 3000 series cables.		
5.5	MOUNTING TORQUE	lbf-in (N·m)			18 (2)	
6.0	**ACCESSORIES**					
6.1	SUPPLIED					
	3090C-120 (10 ft) for use to +500°F (+260°C)			Cable Assembly,1x [4]		
	92981-12			Mounting Stud, 10-32, Hex I.D.,1x		
	EHM464			Hex Key Wrench, 1x [4]		
	OPTIONAL					
	3075M6-120 (10 ft) for use above +500°F (+260°C)			Cable Assembly,1x		
	2981-4			Mounting Stud,1x		
	2981-3			Adapter Stud, 10-32,1x		

	Units	Range Dash Number			
		-50	-100	-200	-1000

7.0 **CALIBRATION**

7.1 SUPPLIED

Charge Frequency Response	% dB	20 to 6kHz 6 kHz thru resonance	20 to 5kHz 5kHz thru resonance	20 to 4kHz 4kHz thru resonance	20 to 3kHz 3kHz thru resonance
Charge Sensitivity	pC/g				
Maximum Transverse Sensitivity	%				
Capacitance	pF				

8.0 NOTES

[1] Low-end response of the transducer is a function of its associated electronics. Models -50 and -100 have case resonance at approximately 23 kHz, and Models –200, and -1000 have case resonance at approximately 10 kHz.

[2] Prolonged exposure at maximum temperature may decrease the return to room temperature resistance to as low as 25 MΩ but will not degrade the overall performance of unit. All units are processed to initially meet 10 GΩ at room temperature.

[3] Shock pulses of short duration may excite transducer resonance. Shock level above the sinusoidal vibration limit may produce temporary zeroshift which will result in erroneous velocity or displacement data after integration.

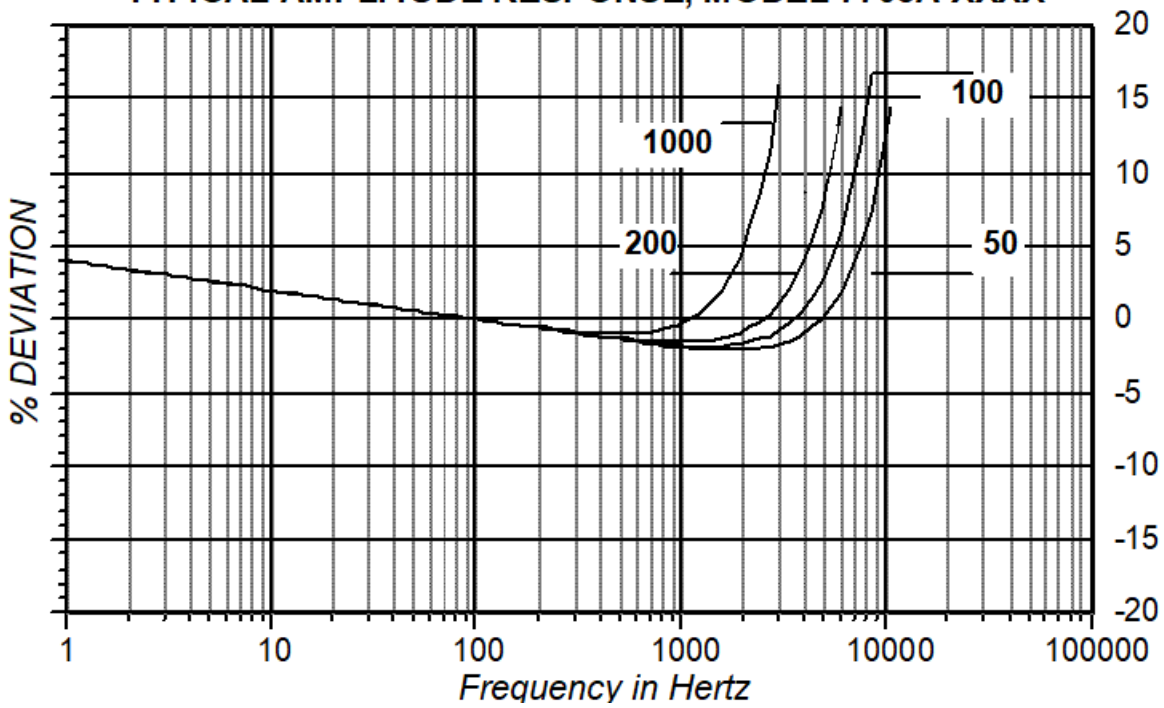
[4] For the "-R" units, the noted accessories are optional.

[5] Model Number Definition:

7703A – XXXX – R

- R — Indicates replacement part available for models 7703A-50/-100 only. (omit if units are not replacements).
- XXXX — Denotes typical charge sensitivity in pC/g.
  - -50
  - -100
  - -200
  - -1000
- 7703A — Basic Model Number

TYPICAL AMPLITUDE RESPONSE, MODEL 7703A-XXXX



TYPICAL TEMPERATURE RESPONSE