ENDEVCO
AN AMPHENOL COMPANY

PERFORMANCE SPECIFICATION
INTEGRAL ELECTRONICS ACCELEROMETER
2255B-XXX

Document Number	Rev	Date	Entered by	Description of Change	Change Accountable Engineer	ECO
76261	NR	3/8/22	DAM	Initial Release of 2255B-XXX Performance Specification	DAM	53001

1.0 DESCRIPTION

The ENDEVCO® Model 2255B-XXX is a miniature, light weight piezoelectric accelerometer designed specifically for high-g shock measurement in structures and test articles. The unit features an electronic second order low-pass filter between the sensor and the amplifier input stage to prevent saturation due to accelerometer resonance.

The Model 2255B-XXX features ENDEVCO's PIEZITE® crystal element, operating in annular shear mode, which exhibits excellent output stability over time. A unique strain isolation design internal to the sensor assembly reduces any strain input due to bending motion in the mounting surface. This accelerometer incorporates an internal hybrid signal conditioner in a two-wire system, which transmits its low impedance voltage output through the same cable that supplies the required constant current power. Both the output and signal ground terminals are electrically isolated from the mounting surface. The accelerometer features an integral 1/4-28 mounting stud and two solder-pin terminals for output connection. Small gauge, light weight hook-up wires are provided for error-free operation. The Model number suffix indicates acceleration sensitivity in mV/g; i.e., 2255B-01 features output sensitivity of 0.1 mV/g.

The following performance specifications conform to ISA-RP-37.2 (1964) and are typical values, referenced at +75°F (+24°C), 4 mA, and 100 Hz, unless otherwise noted. Calibration data, traceable to National Institute of Standards and Technology (NIST), is supplied.

		UNITS	-1	-01	-005
2.0	DYNAMIC CHARACTERISTICS				
2.1	RANGE	k g	± 5	± 50	± 50
2.2	VOLTAGE SENSITIVITY	mV/g	1.0	0.1	0.05
2.2.1	Minimum	mV/g	0.75	0.075	0.025
2.2.2	Maximum	mV/g	1.25	0.15	0.075
2.3	FREQUENCY RESPONSE			See Typical Curve, Page 5	
2.3.1	Resonance Frequency [1]	kHz	270	300	300
2.3.2	Amplitude Response				
2.3.2.1	± 1 dB	Hz	0.5 - 20 k	2 - 20 k	1 - 20 k
2.3.2.2	± 2 dB	kHz	20 -30	20 - 30	20 - 30
2.4	TEMPERATURE RESPONSE			See Typical Curve, Page 5	

		UNITS	-1	-01	-005
2.4.1	At -67°F (-55°C) max/min	%	+15 / 0	+5 / 0	+5 / 0
2.4.2	At +257°F (+125°C) max/min	%	-15 / 0	-5 / 0	-5 / 0
2.5	TRANSVERSE SENSITIVITY	%		5	
2.6	AMPLITUDE LINEARITY * To Full Scale, ** Per 10 kg	%	≤ 2*	≤ 0.5**	≤ 0.5**
3.0	OUTPUT CHARACTERISTICS				
3.1	OUTPUT POLARITY			Acceleration directed into base of unit produces positive output.	
3.2	DC OUTPUT BIAS VOLTAGE	Vdc		+8.5 to +11.5	
3.2.1	-67°F to +257 (-55°C to +125°C)	Vdc		+6.5 to +12.5	
3.3	OUTPUT CONNECTION			See Connection Diagram, Page 4	
3.4	OUTPUT IMPEDANCE	Ω		≤ 100	
3.5	RESIDUAL NOISE 2 Hz to 100 kHz, Broadband				
3.5.1	Typical	equiv. g rms	0.05	0.5	1.0
3.5.2	Maximum	equiv. g rms	0.1	1.0	2.0
3.6	OVERLOAD RECOVERY	µs		10	
3.7	LOAD			See Load Diagram, Page 4	
3.8	GROUNDING			Signal ground connected to inner case but isolated from outer housing.	
3.9	FULL SCALE OUTPUT VOLTAGE	V		± 5	
4.0	POWER REQUIREMENT				
4.1	SUPPLY VOLTAGE	Vdc		+18 to +24	
4.2	SUPPLY CURRENT	mA		+2 to +20	
4.3	WARM-UP TIME To within 10% of final bias	sec	2	0.5	0.5

		UNITS	-1	-01	-005

5.0	ENVIRONMENTAL CHARACTERISTICS				
5.1	TEMPERATURE RANGE			-67°F to +257°F (-55°C to +125°C)	
5.2	HUMIDITY			Epoxy sealed, non-hermetic	
5.3	SHOCK LIMIT	k g	50	50	50
5.4	BASE STRAIN SENSITIVITY	equiv. g pk/µ strain	0.2	1.0	1.0
5.5	THERMAL TRANSIENT SENSITIVITY	equiv. g pk/°F	1	10	10
5.6	ELECTROMAGNETIC SENSITIVITY	equiv. g rms	5	12	12
6.0	PHYSICAL CHARACTERISTICS				
6.1	DIMENSIONS			See Outline Drawing	
6.2	WEIGHT	gm (oz)		2.0 (0.07)	
6.3	CASE MATERIAL			17-4 PH S.S.	
6.4	CONNECTOR [2]			Gold plated solder terminal.	
6.5	MOUNTING TORQUE	lbf-in (Nm)		30 (3.5)	
7.0	ACCESSORIES				
7.1	SUPPLIED				
7.1.1	Cable	1 x	Model 3024-120 (10 ft) (28 AWG twisted pair cable assembly)		
8.0	CALIBRATION				
8.1	SUPPLIED				
8.1.1	Model 2255B-1 [3]				
8.1.1.1	Voltage Sensitivity	mV/g			
8.1.1.2	Frequency Response	dB	20 Hz to 30 KHz	NA	NA
8.1.2	Models 2255B-01 and -005 [3]				
8.1.2.1	Voltage Sensitivity [4]	mV/g	NA	1000 g half-sine shock pulse.	

9.0 NOTES

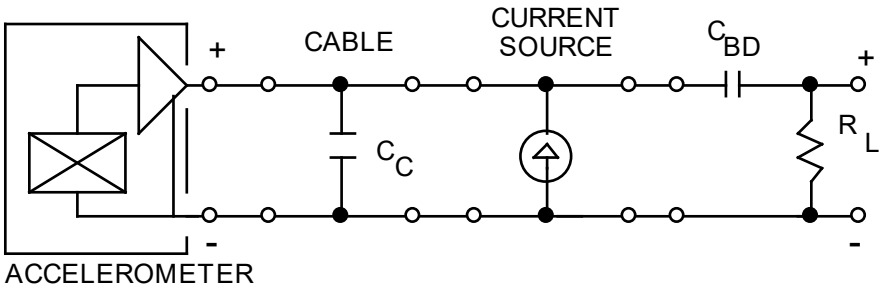
[1] Resonances due to different modes of vibration occur between 120 kHz and 310 kHz. They are completely suppressed by the built-in low pass filter and will not affect linear response of the accelerometer.
[2] Putting small shrink tubing over the solder joints is recommended.
[3] All models subjected to 50 000 g proof shock prior to calibration.
[4] Unit is calibrated by the comparison shock method described in Section 5 of S2.2-1959, American Standards Institute, on ENDEVCO Model 2965C Shock Motion Calibrator.

5 Model Number Definition

2255B – XXX – R

- R — Indicates replacement unit.
- XXX — Denotes typical sensitivity in mV/g
- 2255B — Basic model number

CONNECTION DIAGRAM, EACH CHANNEL



- Range is dependent on the sensitivity of the unit and bias, and the compliance voltage of the constant current power source. The positive range is limited to the difference between the compliance voltage and the unit's bias, divided by the unit's sensitivity. The negative range is limited to approximately 2 volts less than the bias voltage divided by the unit's sensitivity.

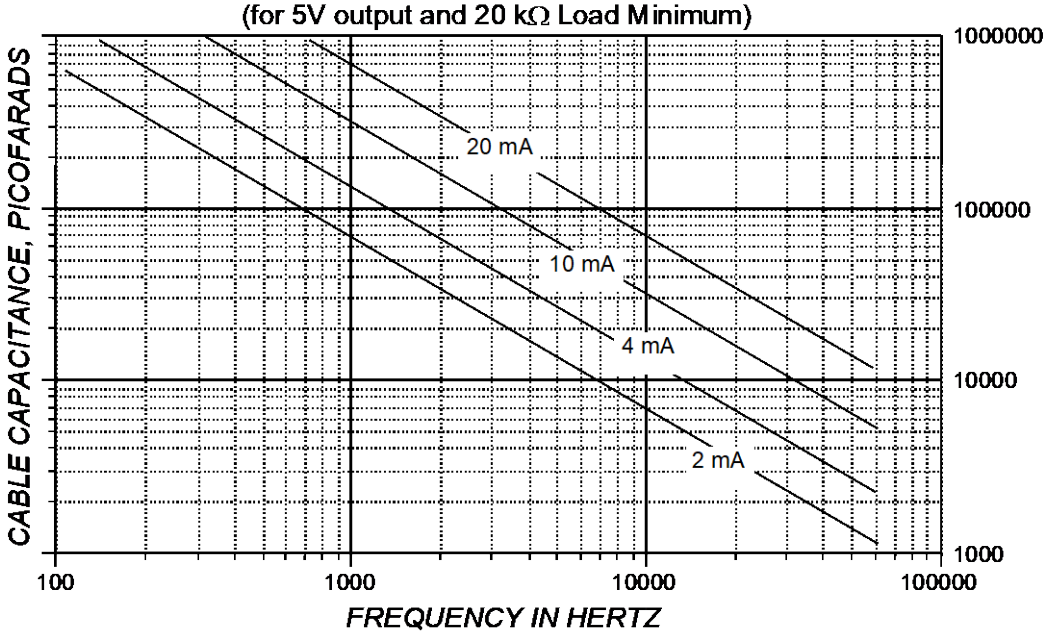
- Cable capacitance C_C will load the accelerometer output, affecting frequency response, and is dependent on the magnitude of constant current, as shown in Load Capacitance vs. Frequency Plot.

- Bias decoupling capacitor C_{BD} and load resistor R_L can be determined from: where f is the lowest frequency of interest.

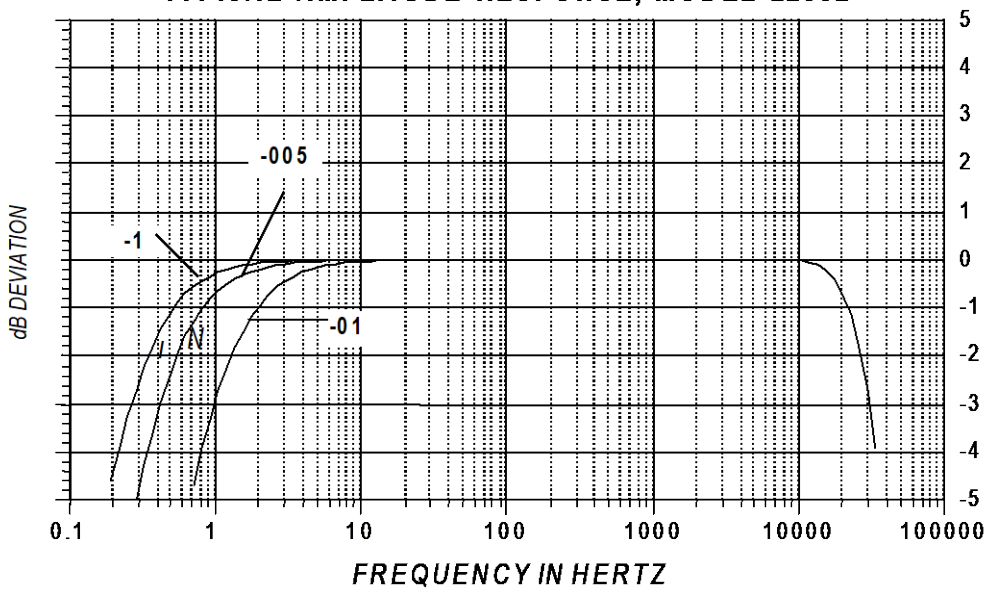
$$f_{-3\,dB} = \frac{1}{2\pi R_L C_{BD}}$$

THEORETICAL LOAD DIAGRAM

(for 5V output and 20 kΩ Load Minimum)



TYPICAL AMPLITUDE RESPONSE, MODEL 2255B



TYPICAL TEMPERATURE RESPONSE, MODEL 2255B