

Piezoelectric Charge Accelerometer Type 8309

Uses

- High-level mechanical shock and vibration measurements
- Automotive crash tests

Features

- Sturdy construction
- Integral cable
- Integral mounting stud



040250

Description

Type 8309 is a robust piezoelectric compression accelerometer. It features an integral M5 mounting stud and an integral cable that terminates with a 10–32 UNF connector.

Characteristics

This piezoelectric accelerometer may be treated as a charge source. Its sensitivity is expressed in terms of charge per unit acceleration (pC/ms^{-2} , pC/g).

Type 8309 is designed for the measurement of very high-level, continuous vibration and mechanical shock up to 150 km/s^{-2} and 1000 km/s^{-2} peak, respectively. It has a sturdy construction and contains a PZ 45 piezoelectric element. This element is a ferroelectric ceramic that is prepared and treated to withstand very high dynamic stress with negligible zero shift problems. The housing material is stainless steel.

Type 8309 has an integral cable to ensure a reliable output connection at very high shock levels. For rigid mounting, the base of Type 8309 has an integral M5 threaded mounting stud. Furthermore, the stud is dimensioned to transmit the full motion of the test object to the piezoelectric element without distortion.

Calibration

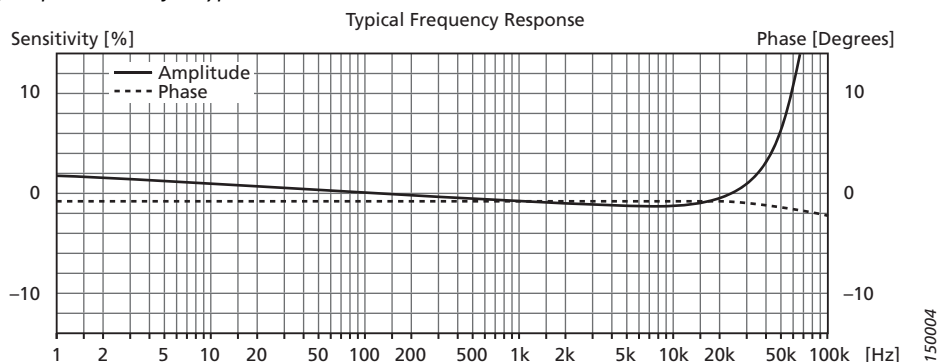
Each accelerometer is individually calibrated using random excitation and 1600-line FFT transformation to provide a high-resolution (amplitude and phase) frequency response, yielding a unique characterization and securing the integrity of the vibration measurement.

The sensitivity given in the calibration chart has been measured at 159.2 Hz with 95% confidence level, using the coverage factor $k = 2$.

The upper frequency limits given on the calibration chart are the frequencies where the deviation from the reference sensitivity at 159.2 Hz is less than $\pm 10\%$. The upper frequency limit is approximately 30% of the mounted resonance frequency. This assumes that the accelerometer is correctly mounted on the test structure – poor mounting can have a marked effect on the mounted resonance frequency.

The lower frequency limits and phase response are determined by the built-in preamplifiers. The lower frequency limits are given in the specifications for deviations from reference sensitivity of less than $\pm 10\%$.

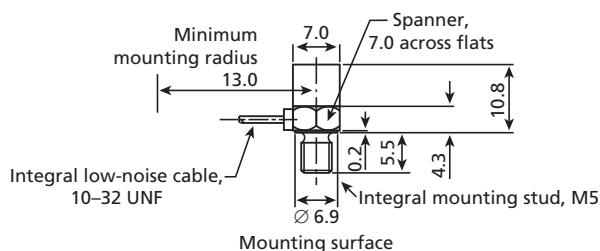
Fig. 1 Typical frequency response curve for Type 8309



Type No.		8309	
General			
Weight	Excluding integral cable	gram	3
		oz	0.105
	Including integral cable	gram	5.1
		oz	0.18
Charge Sensitivity (at 159.2 Hz)		pC/ms ⁻²	0.004
		pC/g	0.04
Frequency Range	±10% limit	Hz	1 to 54000
	±5% limit		1 to 12500
Mounted Resonance Frequency		kHz	180
Max. Transverse Sensitivity (at 30 Hz, 100 ms ⁻²)		%	<5
Transverse Resonance Frequency		kHz	28
Max. Operational Continuous Sinusoidal Acceleration (peak)		kms ⁻²	150
		g	15000
Electrical			
Residual Noise Level (measured with NEXUS Type 2692-001 in the specified frequency range)		mms ⁻²	230
		mg	23
Capacitance (excluding cable)		pF	100
Min. Leakage Resistance (at 20 °C)		GΩ	>20
Environmental			
Operating Temperature Range		°C	-74 to +180
		°F	-101 to +356
Temperature Coefficient of Sensitivity		%/°C	0.043*
Temperature Transient Sensitivity (3 Hz Low. Lim. Freq. (-3 dB, 6 dB/octave))		ms ⁻² /°C	400
		g/°F	22
Base Strain Sensitivity (at 250 µε in the base plane)		ms ⁻² /µε	2
		g/µε	0.2
Magnetic Sensitivity (50 Hz, 0.038 T)		ms ⁻² /T	20
		g/kGauss	0.2
Max. Non-destructive Shock (± peak)		kms ⁻²	1000
		g	100000
Mechanical			
Housing Material		Stainless Steel AISI 316	
Piezoelectric Sensing Element		PZ 46	
Construction		Compression	
Sealing		Epoxy sealed	
Electrical Connector		Integral cable, 10–32	
Mounting		Integral M5 stud	

* In the temperature range -25 to +125 °C (-13 to +257 °F)

Fig. 1 Dimensions of Type 8309



All dimensions in millimetres

750123/6

Type 8309

includes the following accessories:

- Carrying box
- Calibration chart
- AO-0038: Low-noise coaxial cable, 10–32 UNF connectors, length 1.2 m
- Extension connector, 10–32 UNF

Optional accessories	
AO-0038-x-yyy*	Low-noise coaxial cable with 10–32 UNF connectors, 250 °C (482 °F)
AO-0122-x-yyy*	Super low-noise cable with 10–32 UNF connectors, 250 °C (482 °F)
AO-0231-x-yyy*	Super low-noise cable, 10–32 UNF to TNC, 180 °C (356 °F)
AO-0406-x-yyy*	Double-screened low-noise cable, 10–32 UNF, 250 °C (482 °F), includes JP 0145
AO-1382-x-yyy*	Flexible double-screened coaxial cable with 10–32 UNF connectors, 250 °C (482 °F)
AO 1419-x-yyy*	Low-noise cable, 10–32 UNF, 250 °C (482 °F)
JJ-0032	Extension connector, 10–32 UNF
JP-0145	Plug adaptor, 10–32 UNF to BNC
JP-0162	Plug adaptor, 10–32 UNF to TNC
QA-0068	Tap for M5 thread
UA-0186	Extension connector, 10–32 UNF (set of 25)
UA-0415	Accelerometer accessory set
YJ-0216	Beeswax for mounting
Type 4294	Calibration Exciter
Calibration Services	
8309-CAI	Accredited initial calibration
8309-CAF	Accredited calibration
8309-CFF	Factory standard calibration

* x = D (decimetres) or M (metres)
 yyy = length in decimetres or metres
 Please specify cable length when ordering

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