PRODUCT DATA

Piezoelectric Charge Accelerometer Types 4374 and 4374-L

Uses

- High-level, high-frequency measurements
- Measurements in confined spaces
- Measurements on delicate structures
- Vibration testing and analysis
- Measurements in high-temperature environments

180070

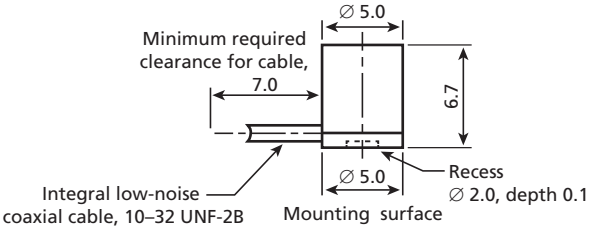
Features

- Very low weight
- Integral cable
- Flat base
- Extremely high resonance frequency
- Small size

Description

Type 4374 is a subminiature planar shear accelerometer with extremely low weight and high resonance frequency. It features an integral side cable that terminates with a 10–32 UNF connector and is mounted on the test object with an adhesive. The housing material is titanium.

Fig. 1 *Dimensions of Type 4374*



All dimensions in millimetres

791003/7

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*).

The planar shear design consists of two rectangular slices of piezoelectric material and two seismic masses arranged on the broad sides of a rectangular centre post. They are held in position using a high tensile strength clamping ring that isolates the piezoelectric elements from the base. The ring also prestresses the piezoelectric elements to give a high degree of linearity. During vibration, the charge produced by the piezoelectric elements is collected between the housing and the clamping ring.

The difference between Type 4374 and Type 4374-L is the piezoelectric element. PZ 27 is the piezoelectric element used in Type 4374 and PZ 23 is used in Type 4374-L.

Calibration

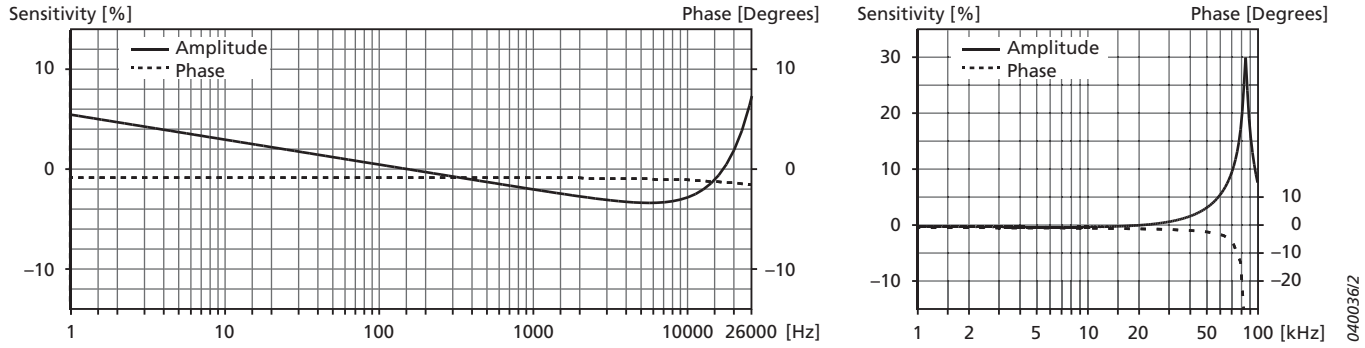
Each accelerometer is calibrated using random excitation and 1600-line FFT transformation to provide a high-resolution (amplitude and phase) frequency response. This yields a unique characterization and secures the integrity of your vibration measurements.

The sensitivity given on the calibration chart is measured at 159.2 Hz with 95% confidence level using coverage factor $k = 2$.

The upper frequency limits given on the calibration chart are frequencies where the deviation from the reference sensitivity at 159.2 Hz is within ±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 within ±10%.

***Fig. 2** Typical frequency (**left**) and high-frequency (**right**) response curves for Type 4374*



Specifications – Charge Accelerometer Types 4374 and 4374-L

All values are typical at 25 °C (77 °F) unless measurement uncertainty is stated

Type Number		4374	4374-L
General			
Weight (excluding cable)	g (oz)	0.75 (0.026)	
Charge Sensitivity (at 159.2 Hz)	pC/ms^{-2}	0.15 ±20%	0.11 ±15%
	pC/*g*	1.47 ±20%	1.08 ±15%
Frequency Range (±10% limit)	Hz	1 to 26000	
Mounted Resonance Frequency	kHz	85	
Max. Transverse Sensitivity (at 30 Hz, 100 ms^{-2})	%	<5	
Transverse Resonance Frequency	kHz	21	
Max. Operational Continuous Sinusoidal Acceleration (peak)	kms^{-2}	50	
	g	5000	
Electrical			
Residual Noise Level (measured with NEXUS Type 2692-001 in the specified frequency range)	mms^{-2}	18.5	
	m*g*	1.85	
Capacitance (excluding cable)	pF	800	700
Min. Leakage Resistance (at 20 °C)	GΩ	20	
Environmental			
Operating Temperature Range	°C (°F)	–74 to +250 (–101 to +482)	
Temperature Coefficient of Sensitivity	%/°C	0.11	0.05†
Temperature Transient Sensitivity (3 Hz Low. Lim. Freq. (–3 dB, 6 dB/octave))	ms^{-2}/°C	10	
	g/°F	0.57	
Base Strain Sensitivity (at 250 με in the base plane)	ms^{-2}/με	0.01	
	g/με	0.001	
Magnetic Sensitivity (50 Hz, 0.038 T)	ms^{-2}/T	30	
	g/kG	0.3	
Max. Non-destructive Shock (± peak)	kms^{-2} (*g*)	250 (25000)	
Mechanical			
Housing Material		Titanium ASTM Grade 2	Titanium ASTM Grade 3
Piezoelectric Sensing Element		PZ 27	PZ 23
Construction		Planar Shear	
Sealing		Sealed	
Electrical Connector		Integral cable, 10–32 UNF-2B	
Mounting		Adhesive	

† In the temperature range –25 to +125 °C (–13 to +257 °F)

Ordering Information

Type 4374
Type 4374-L
Both types include the following:

- Carrying box
- Calibration chart
- AO-0038-D-012: Low-noise coaxial cable, 10–32 UNF connectors, length 1.2 m
- JJ-0032: Adapter, 10–32 UNF (F) connectors

Optional Accessories	
AO-0038-x-yyy†	Super low-noise, single-screened cable, 10–32 UNF (M), 250 °C (482 °F)
AO-0122-x-yyy†	Super low-noise, double-screened cable, 10–32 UNF (M), 250 °C (482 °F)
AO-1382-x-yyy†	Flexible double-screened coaxial cable with 10–32 UNF connectors, 250 °C (482 °F)
JJ-0032	Adapter, 10–32 UNF (F) connectors
JJ-0207	Plug adapter, 10–32 UNF to TNC (female)
JP-0162	Plug adapter, 10–32 UNF to TNC (male)
QS-0007	Tube of cyanoacrylate adhesive
UA-1079	Accelerometer accessory set
YJ-0216	Beeswax for mounting
Type 4294	Vibration Exciter
Calibration Services	
ACC-M-CFF	Factory standard calibration
ACC-M-CAF	Accredited calibration
ACC-M-CAI	Accredited initial calibration
ACC-M-CTF	Traceable calibration

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

COMPLIANCE WITH STANDARDS

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