Piezoelectric Charge Accelerometer Types 4370 and 4370-V

Uses

- General purpose vibration testing and analysis
- Low-level, low-frequency measurements
- Measurements in high-temperature environments

Features

- High sensitivity
- Low sensitivity to environmental factors

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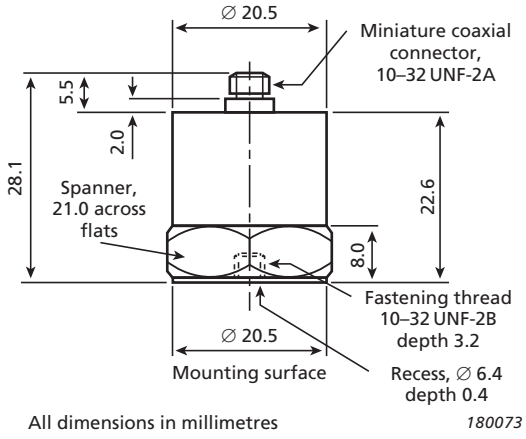
Description

Type 4370 is a DeltaShear™ Unigain* accelerometer. It features a 10–32 UNF-2A top connector and a 10–32 UNF-2B threaded hole for mounting. Type 4370-V† has the same specifications and long-term stability as Type 4370, but it has a relaxed sensitivity tolerance.

Fig. 1 *Dimensions of Type 4370*



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*).

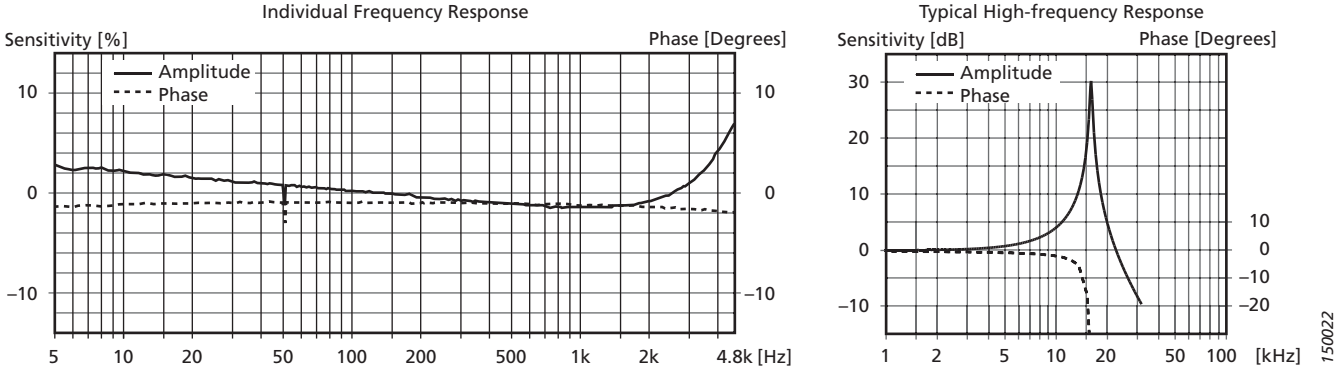
The DeltaShear design consists of three piezoelectric elements and three seismic masses arranged in a triangular configuration around a triangular centre post. They are held in place by a clamping ring that isolates the configuration from the base. The ring also prestresses the piezoelectric elements to give a high degree of linearity. This design provides a high sensitivity-to-mass ratio, a relatively high resonance frequency and high isolation from base strains and temperature transients.

The piezoelectric element used is a PZ 23 lead zirconate titanate element, and the housing material is stainless steel.

Calibration

The sensitivity is calibrated to a convenient value such as 1, 3.16 or 31.6 pC/ms^{-2} for Unigain accelerometers. The sensitivity given in the calibration chart has been measured at 159.2 Hz with 95% confidence level, using the coverage factor k = 2.

Fig. 2 *Frequency response curves for Type 4370*



* Unigain: The individual measured sensitivity is within ±2% of the specified sensitivity

† V-type: The individual measured sensitivity is within ±15% of the specified sensitivity

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Specifications – Charge Accelerometer Types 4370 and 4370-V

Type No.			4370	4370-V
General				
Weight		g	54	
		oz	1.9	
Charge Sensitivity (at 159.2 Hz)		pC/ms^{-2}	10 ± 2%	10 ± 15%
		pC/*g*	98 ± 2%	98 ± 15%
Frequency Range (±10% limit)		Hz	0.1 to 4800	
Mounted Resonance Frequency		kHz	16	
Max. Transverse Sensitivity (at 30 Hz, 100 ms^{-2})		%	4	
Transverse Resonance Frequency		kHz	4	
Max. Operational Continuous Sinusoidal Acceleration (peak)		kms^{-2}	20	
		g	2000	
Electrical				
Residual Noise Level (measured with NEXUS Type 2692-001 in the specified frequency range)		mms^{-2}	0.2	
		m*g*	0.02	
Capacitance (excluding cable)		pF	1100	
Min. Leakage Resistance (at 20 °C)		GΩ	20	
Environmental				
Operating Temperature Range		°C	–74 to +250	
		°F	–101 to +482	
Temperature Coefficient of Sensitivity		%/ °C	0.05*	
Temperature Transient Sensitivity (3 Hz Low. Lim. Freq. (–3 dB, 6 dB/octave))		ms^{-2}/ °C	0.02	
		g/ °F	0.001	
Base Strain Sensitivity (at 250 με in the base plane)		$ms^{-2}/\mu\varepsilon$	0.003	
		$g/\mu\varepsilon$	0.0003	
Magnetic Sensitivity (50 Hz, 0.038 T)		ms^{-2}/T	1	
		g/kG	0.01	
Max. Non-destructive Shock (± peak)		kms^{-2}	20	
		g	2000	
Mechanical				
Housing Material			Stainless Steel, AISI 316	
Piezoelectric Sensing Element			PZ 23	
Construction			DeltaShear	
Sealing			Welded	
Electrical Connector			10–32 UNF-2A	
Mounting			10–32 UNF-2B × 3.2 mm threaded hole	
Mounting Torque	Max.	Nm (lbf·in)	3.5 (31)	
	Min.		0.5 (4.4)	

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

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

COMPLIANCE WITH STANDARDS

Ordering Information

Type 4370
includes the following accessories:
- Carrying box
- Calibration chart
- AO-0038: Low-noise coaxial cable, 10–32 UNF, length 1.2 m
- 10–32 UNF threaded steel stud, length 12.7 mm

Type 4370-V
includes the following accessories:
- Carrying box
- Calibration chart
- 10–32 UNF threaded steel stud, length 12.7 mm

Optional Accessories	
AO-0038-x-yyy*	Low-noise coaxial cable, 10–32 UNF connectors, 250 °C (482 °F)
AO-0122-x-yyy*	Super low-noise cable, 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-1382-x-yyy*	Flexible double-screened coaxial cable, 10–32 UNF connectors, 250 °C (482 °F)
DB-0544	Probe with round tip, 10–32 UNF
JJ-0207	Plug adaptor, 10–32 UNF to TNC (female)
JP-0162	Plug adaptor, 10–32 UNF to TNC (male)
QA-0013	Hexagonal key for 10–32 UNF studs
QA-0029	Tap for 10–32 UNF thread
UA-0078	Accelerometer accessory set
UA-0553	Mechanical filter (set of five)
UA-0641	Extension connector, 10–32 UNF to TNC
UA-0642	Mounting magnet and two insulating discs
UA-0866	Cementing stud, 10–32 UNF, dia. 14 mm (set of 25)
YG-0150	Steel stud, double-ended with flange, 10–32 UNF, length 5.3 mm
YJ-0216	Beeswax for mounting
YP-0080	Probe with sharp tip, 10–32 UNF
YP-0150	Insulated stud, fully threaded, 10–32 UNF, length 13 mm
YQ-2960	Set screw, 10–32 UNF × 1/2" (12.8 mm)
YQ-2962	Set screw, 10–32 UNF × 5/16" (7.7 mm)
Type 4294	Calibration Exciter
Calibration Services	
ACC-M-CAI	Accredited initial calibration
ACC-M-CAF	Accredited calibration
ACC-M-CFF	Factory standard calibration
ACC-M-CTF	Traceable calibration

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

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