

Piezoelectric Charge Accelerometer Types 4370 and 4370-V

Uses

- General purpose vibration testing and analysis
- Low-level, low-frequency measurements

Features

- High sensitivity



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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.

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. During vibration, the piezoelectric elements produce a charge that is collected between the housing and the clamping ring. The piezoelectric element used is a PZ 23 lead zirconate titanate element, and the housing material is stainless steel.

Calibration

For Unigain accelerometers, the sensitivity is calibrated to a convenient value such as 1, 3.16 or $31.6 \text{ pC}/\text{ms}^{-2}$. 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. 1 Dimensions of Type 4370

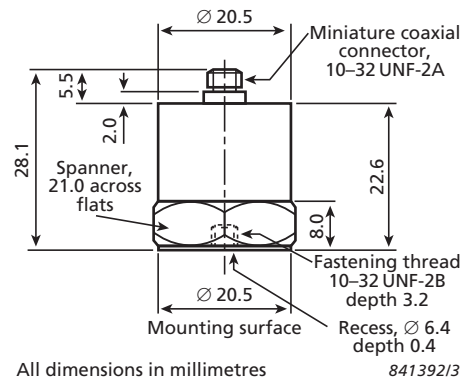
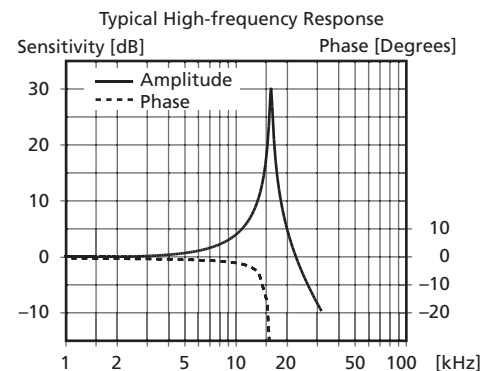
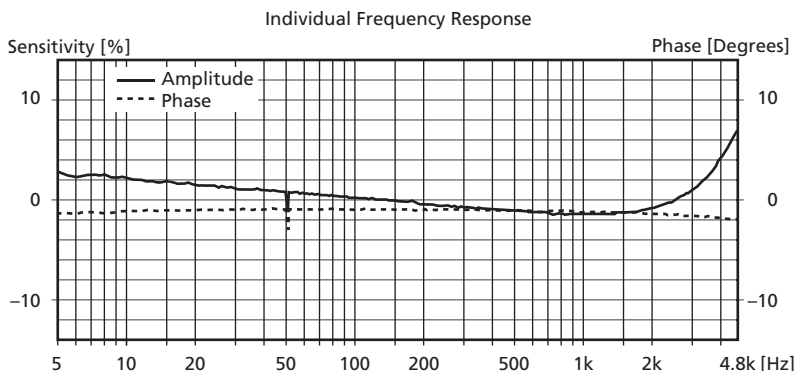


Fig. 2 Frequency response curves for Type 4370



* Unigain: The individual measured sensitivity is within $\pm 2\%$ of the specified sensitivity
 † V-type: The individual measured sensitivity is within $\pm 15\%$ of the specified sensitivity

Specifications – Charge Accelerometer Types 4370 and 4370-V

Type No.		4370	4370-V
General			
Weight (excluding cable, wherever applicable)	gram	54	
	oz	1.9	
Charge Sensitivity (at 159.2 Hz)	$\mu\text{C}/\text{ms}^{-2}$	$10 \pm 2\%$	$10 \pm 15\%$
	$\mu\text{C}/g$	$98 \pm 2\%$	$98 \pm 15\%$
Frequency Range ($\pm 10\%$ 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	
	mg	0.02	
Capacitance (excluding cable)	μF	1100	
Min. Leakage Resistance (at 20 °C)	$\text{G}\Omega$	20	
Environmental			
Operating Temperature Range	°C	-74 to +250	
	°F	-101 to +482	
Temperature Coefficient of Sensitivity	$\%/^{\circ}\text{C}$	0.05*	
Temperature Transient Sensitivity (3 Hz Low. Lim. Freq. (-3 dB, 6 dB/octave))	$\text{ms}^{-2}/^{\circ}\text{C}$	0.02	
	$g/^{\circ}\text{F}$	0.0011	
Base Strain Sensitivity (at 250 μE in the base plane)	$\text{ms}^{-2}/\mu\text{E}$	0.003	
	$g/\mu\text{E}$	0.0003	
Magnetic Sensitivity (50 Hz, 0.038 T)	ms^{-2}/T	1	
	g/kGauss	0.01	
Max. Non-destructive Shock (\pm 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 \times 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)

COMPLIANCE WITH STANDARDS



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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 \times 1/2" (12.8 mm)
YQ-2962	Set screw, 10-32 UNF \times 5/16" (7.7 mm)
Type 4294	Calibration Exciter
Calibration Services	
4370-CAI	Accredited initial calibration
4370-CAF	Accredited calibration
4370-CAF	Factory standard calibration
4370-CTF	Traceable calibration

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

Brüel & Kjær Sound & Vibration Measurement A/S
DK-2850 Nærum · Denmark · Telephone: +45 77 41 20 00 · Fax: +45 45 80 14 05
www.bksv.com · info@bksv.com
Local representatives and service organizations worldwide

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