

# PRODUCT DATA

## Piezoelectric Accelerometer Piezoelectric Charge Accelerometer — Type 4505-A

### FEATURES

- Low weight
- Low sensitivity to environmental factors
- High resonance frequency
- Electrically insulated for ground-loop protection
- High transverse resonance frequency > 20 kHz
- Operating temperature range  $-54$  to  $+230^{\circ}\text{C}$  ( $-65$  to  $+446^{\circ}\text{F}$ )

### Description

Type 4505-A is a piezoelectric accelerometer, which provides low sensitivity to extraneous environmental effects, a feature achieved through the ThetaShear<sup>®</sup> design. Type 4505-A has a top-mounted Microdot (10–32 UNF) connector for attaching cables and a 10–32 UNF-2A mounting stud on its base. The piezoelectric element used, is the PZ 23 lead zirconate titanate element.

### Characteristics

This piezoelectric accelerometer may be treated as a charge source. Its sensitivity is expressed in terms of charge per unit acceleration (pC/g).

The ThetaShear design involves a slotted cylindrical stanchion holding a central seismic mass, flanked by two piezoelectric plates. This assembly is clamped rigidly by the cover. To ensure optimum accuracy and reliability, no bonding agent other than molecular adhesion is required to hold the assembly together. The ThetaShear design provides for a combination of highest measurement stability, excellent sensitivity-to-weight ration and low sensitivity to extraneous environmental effects.

A remarkable feature of the ThetaShear principle is the fact that the transverse resonance frequency is always outside the 10% frequency limit. This ensures minimum interference from orthogonal vibration components in the useful frequency range of the accelerometer. The ThetaShear design also provides excellent immunity to other environmental effects such as base strains, magnetic sensitivity and acoustic fields.

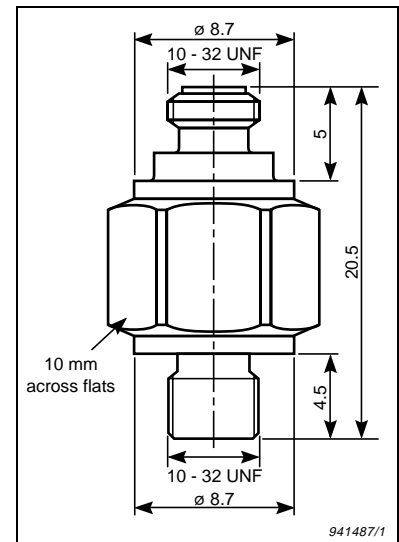


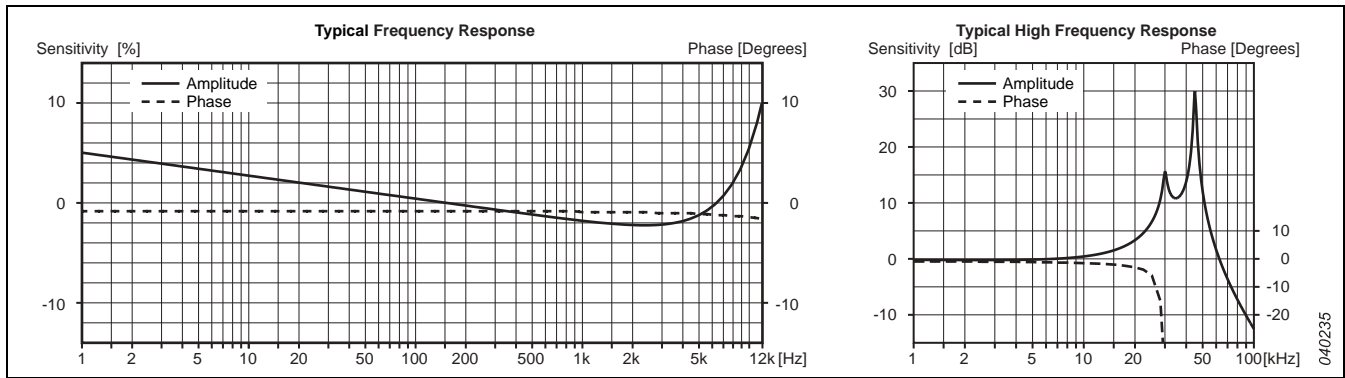
### Calibration

The sensitivity given in the calibration chart has been measured at 159.2 Hz with an acceleration of 10 g. For a 99.9% confidence level, the accuracy of the factory calibration is  $\pm 2\%$ .

### Cabling

When using miniature accelerometers, the cable can affect the measurement result because of forces exerted by the cable on the accelerometer's connector. This causes amplitude irregularities in the output from the accelerometer at frequencies up to approximately 200 Hz. However, this problem can be reduced by using a flexible cable. To effectively reduce the problem at low frequencies, it is recommended that you clamp the cable. One way of doing this is to make a small loop in the cable close to the accelerometer (maximum diameter 30 mm) and to clamp the cable beside the base of the accelerometer with mounting wax or double-sided tape. This also reduces the possibility of dynamically induced noise being generated by the cable.





## Specifications – Piezoelectric Charge Accelerometer Type 4505-A

	Units	4505-A
<b>Dynamic Characteristics</b>		
Charge Sensitivity (@ 160 Hz)	pC/g	3 ± 25%
Frequency Response		See typical Amplitude Response
Mounted Resonance Frequency	kHz	45
Amplitude Response ±10% [1]	Hz	1 to 12000
Transverse Sensitivity	%	<5
Transverse Resonance Frequency	kHz	>20
<b>Electrical Characteristics</b>		
Min. Leakage Resistance @ 20°C	GΩ	>20
Capacitance	pF	1000
Grounding		Insulated from signal ground (>10 MΩ)
<b>Environmental Characteristics</b>		
Temperature Range	°C (°F)	-54 to 230 (-65 to 446)
Humidity		Sealed
Max. Operational Shock (± peak)	g pk	3000
Base Strain Sensitivity	Equiv. g/μ strain	0.002
Thermal Transient Sensitivity	Equiv. g/°C (g/°F)	0.06 (0.033)
Magnetic Sensitivity (50 Hz–0.03 Tesla)	g/T	0.5
<b>Physical Characteristics</b>		
Dimensions		See outline drawing
Weight	gram (oz.)	4.9 (0.15)
Case Material		Titanium
Connector		10–32 UNF
Mounting		10–32 UNF-2A, 4.5 mm stud

[1] Low-end response of the transducer is a function of its associated electronics

## Ordering Information

### Type 4505-A includes the following accessories:

- Carrying box
- Calibration chart

### OPTIONAL ACCESSORIES

- AO-0038: Super low-noise cable, Teflon-insulated, length 1.2 m (4 ft.), 250°C (482°F)
- AO-0122: Super low-noise reinforced cable, double screened, Teflon-insulated, length 3 m (10 ft.), 250°C (482°F)
- AO-0231: Teflon low-noise cable, 10–32 UNF/TNC, length 3 m (10 ft.), 260°C (500°F)

- AO-0406: Double-screened low-noise cable, 10–32 UNF, 5 m (16 ft.), 250°C (482°F), including Adaptor JP-0145
- AO-1382: Teflon low noise cable, double screened 10–32 UNF, 1.2 m (4 ft.)
- AO-1419: Low-noise cable AC-0066 with 10–32 UNF connectors, 1.2 m (4 ft.), 250°C (482°F)
- UA-1243: Red/green/yellow cable markers, 3 × 30 pieces
- UA-0130: 10–32 UNF Microdot connectors JP-0012, set of 25

- UA-0186: 10–32 UNF extension adaptors JJ-0032, set of 25
- QA-0035: Connector Assembly Tool for cable AC-0005 and connector JP-0012

### SERVICE PRODUCTS:

#### Accredited Calibration:

4505-A CAF: Accredited Calibration

#### Traceable Calibration:

4505-A CFF: Factory Standard Calibration (included with delivery)

Brüel & Kjær reserves the right to change specifications and accessories without notice

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