

# PRODUCT DATA

## Piezoelectric Accelerometer Miniature DeltaTron<sup>®</sup> Accelerometers — Types 4517 and 4517-002

### FEATURES AND USES

- Ground insulated (Type 4517-002)
- Hermetically sealed
- High frequency
- Low weight
- Low impedance
- Adhesive mounting
- Detachable cable
- Measurements in confined spaces
- Measurements on delicate structures

### Description

Types 4517 and 4517-002 are piezoelectric Shear accelerometers with a side connection. Their low weight makes them an excellent choice for measurement on delicate structures and small objects. The sensors feature a miniature 3–56 UNF connector supplied with a special, detachable, low-noise cable that terminates in a 10–32 UNF female connector. Types 4517 and 4517-002 are mounted on the object adhesively. A removal wrench is supplied for easy removal of the transducer.

### Characteristics

The piezoelectric accelerometers feature built-in preamplifiers. The sensitivity is expressed in terms of voltage per unit acceleration (mV/g).

In the Shear design, the piezoelectric element undergoes shear deformation as in the DeltaShear<sup>®</sup> design. Two rectangular slices of piezoelectric material are arranged on each side of a rectangular centre post. This design gives a high degree of linearity, and excellent immunity to base bending and temperature fluctuations. The signal is collected and amplified in the built-in amplifier. The housing material is titanium and the sensing element is quartz.

### Calibration

The transducers are individually calibrated using state-of-the-art random FFT technology, providing an 800-point high-resolution calibration (magnitude and phase), ulti-



mately giving a unique characterisation and securing the integrity of the vibration measurement.

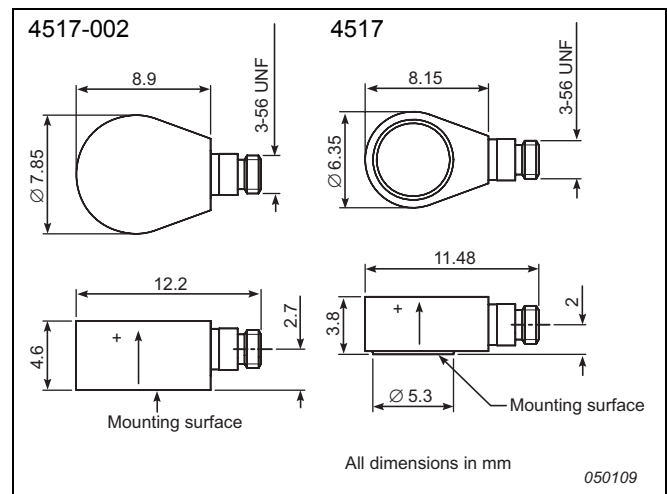
The sensitivity given on the calibration chart has been measured at 159.2 Hz with a 95% confidence level, using a coverage factor  $k = 2$ .

### Versions

Type 4517-002 has an anodized case providing electrical insulation.

### Recommended Mounting

Due to the small size, careful mounting is required to ensure correct operation over the full frequency range of the accelerometer.

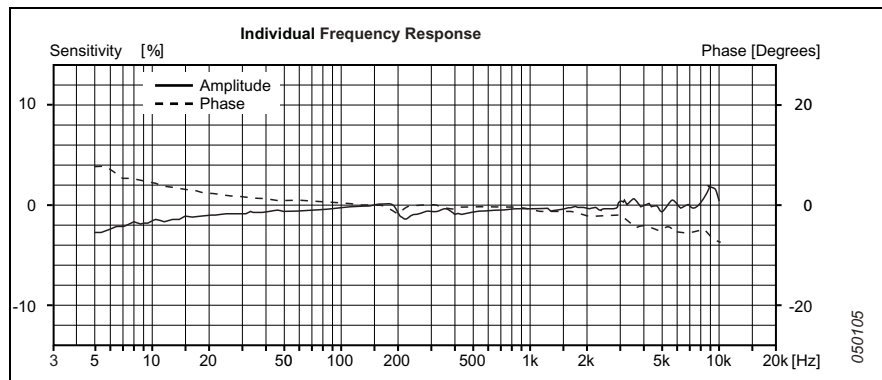


## Specifications – Miniature DeltaTron Accelerometers Types 4517 and 4517-002

|  | Units                      | 4517                           | 4517-002    |
|--|----------------------------|--------------------------------|-------------|
| <b>Dynamic Characteristics</b>                 |                            |                                |             |
| Voltage Sensitivity (@ 160Hz)                  | mV/g                       | 10 ± 10%                       |             |
| Measuring Range                                | g                          | ± 500                          |             |
| Frequency Response                             |                            | See typical amplitude response |             |
| Mounted Resonance Frequency                    | kHz                        | 75                             |             |
| Amplitude Response ±10% (typical) <sup>a</sup> | Hz                         | 1 to 20000                     |             |
| Residual Noise                                 | mg                         | 6                              |             |
| Transverse Sensitivity                         | %                          | <5                             |             |
| <b>Electrical Characteristics</b>              |                            |                                |             |
| Output Impedance                               | Ω                          | < 100                          |             |
| DC Output                                      | At room temperature        | V                              |             |
| Bias Voltage                                   | In specified temp. range   | V                              |             |
| Power Supply                                   |                            | mA                             |             |
| Start-up Time                                  |                            | s                              |             |
| Grounding                                      |                            | Case grounded                  | Insulated   |
| <b>Environmental Characteristics</b>           |                            |                                |             |
| Temperature Range                              | °C (°F)                    | -51 to +121 (-60 to +250)      |             |
| Humidity                                       |                            | Hermetically sealed            |             |
| Max. Operational Shock (peak)                  | g pk                       | 5000                           |             |
| Base Strain Sensitivity                        | Equiv. g/μ strain          | 0.08                           | 0.05        |
| Thermal Transient Sensitivity                  | Equiv. %/°C (%/°F)         | 0.05 (0.03)                    |             |
| Thermal Shock Sensitivity                      | ms <sup>2</sup> /°C (g/°F) | 2.6 (0.15)                     |             |
| <b>Physical Characteristics</b>                |                            |                                |             |
| Dimensions                                     |                            | See outline drawing            |             |
| Weight   | gram (oz.)                 | 0.6 (0.021)                    | 1.0 (0.035) |
| Case Material                                  |                            | Titanium                       |             |
| Connector                                      |                            | 3–56 UNF thread                |             |
| Mounting                                       |                            | Adhesive                       |             |

a. Individual frequency response calibration up to 10 kHz

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



### COMPLIANCE WITH STANDARDS

**CE** Compliance with EMC Directive and Low Voltage Directive of the EU



Compliance with the EMC requirements of Australia and New Zealand

## Ordering Information

Types 4517 and 4517-002 include the following accessories:

- Carrying box
- Calibration chart
- Low noise cable fitted with 3–56 UNF connector to 10–32 UNF female connector, 1.2 m (4 ft)
- Removal wrench

### OPTIONAL ACCESSORIES\*

- AO 0531: PVC insulated flexible cable, 10–32 UNF to BNC, 5 m (16.4 ft), –5 to +70°C (+23 to +158°F)
- AO 0038: 260°C Teflon® low-noise cable, 10–32 UNF, length 1.2 m (4 ft)
- AO 0122: 250°C, reinforced super low noise cable, 10–32 UNF, 3 m (10 ft)
- AO 1382: Teflon low noise cable, double screened 10–32 UNF, 1.2 m (4 ft)
- JP 0145: Plug adaptor, BNC/10–32 UNF
- QS 0007: Tube of cyanoacrylate adhesive
- YJ 0216: Beeswax for mounting
- QA 0230: Removal wrench

### SERVICE

- 4517-CAF: Miniature IEPE Accelerometer, Accredited Calibration
- 4517-CAI: Miniature IEPE Accelerometer, Accredited Calibration Performed as initial
- 4517-CTF: Miniature IEPE Accelerometer, Traceable Calibration
- 4517-CTI: Miniature IEPE Accelerometer, Traceable Calibration Performed as initial
- 4517-EW1: Miniature IEPE Accelerometer, Extended Warranty, one year extension

\* Additional accessories and cables are available (see [www.bksv.com](http://www.bksv.com))

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

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