

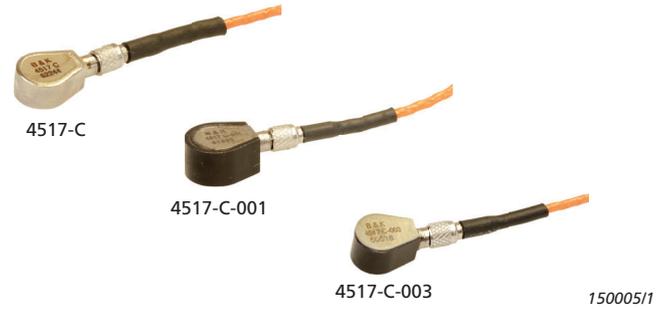
Piezoelectric Charge Accelerometer Types 4517-C, 4517-C-001 and 4517-C-003

Uses

- Measurements in confined spaces
- Measurements on delicate structures

Features

- Ground insulated (excluding Type 4517-C)
- Low weight
- High resonance frequency
- Adhesive mounting
- Robust, detachable cable included
- Hermetically sealed (excluding Type 4517-C-003)



Description

Types 4517-C, 4517-C-001 and 4517-C-003 are miniature shear accelerometers, each with a 3–56 side connector. Their low weight is ideal for measurements on delicate structures and small objects.

Type 4517-C has titanium housing and Type 4517-C-001 has titanium housing with an anodized aluminium case for electrical insulation. The housing material of Type 4517-C-003 is anodized aluminium which gives electrical insulation.

Characteristics

These piezoelectric accelerometers may be treated as charge sources. Their sensitivity is expressed in terms of charge per unit acceleration (pC/ms^{-2} , pC/g).

In the shear design, the piezoelectric element undergoes shear deformation. The piezoelectric elements in the accelerometers are mounted on the broad sides of a rectangular centre post. This design gives a high degree of linearity and immunity to base bending and temperature fluctuations. The piezoelectric material used in the accelerometers is ceramic.

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 $k = 2$.

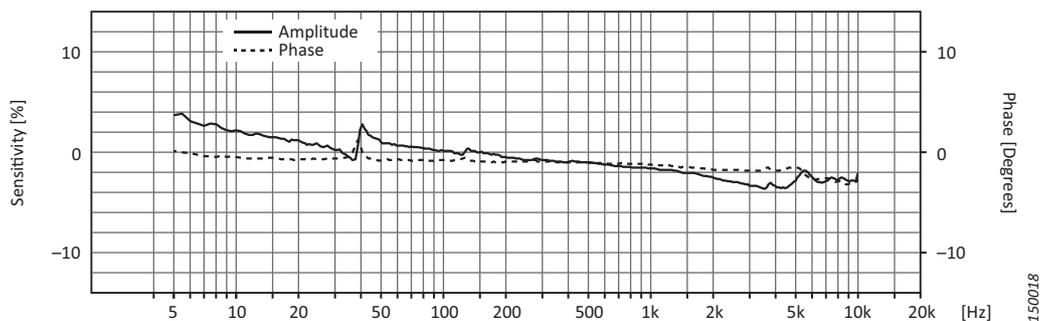
The upper frequency limits given on the calibration chart are frequencies where the deviation from the reference sensitivity at 159.2 Hz is within $\pm 10\%$. The upper frequency limit is approximately 30% of the mounted resonance frequency. This assumes that the accelerometer is correctly mounted on 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 $\pm 10\%$.

Mounting

The accelerometers are mounted with adhesive, and a wrench is supplied for easy removal. Note that, due to its small size, careful mounting is required in order to ensure correct operation over the entire frequency range of the accelerometer.

Fig. 1 Individual frequency response curve for Type 4517-C, as from a calibration chart



Type Number			4517-C	4517-C-001	4517-C-003
General					
Weight (excluding cable)		g (oz)	0.6 (0.021)	1 (0.035)	0.85 (0.03)
Charge Sensitivity (at 159.2 Hz)		pC/ms ⁻²	0.18 ±20%		
		pC/g	1.77 ±20%		
Frequency Range	±10% limit	Hz	1 to 10000	1 to 20000	1 to 9000
	±5% limit		1 to 3000	1 to 12500	1 to 7000
Mounted Resonance Frequency		kHz	80	75	30
Max. Transverse Sensitivity (at 30 Hz, 100 ms ⁻²)		%	<5		
Transverse Resonance Frequency		kHz	10		
Max. Operational Continuous Sinusoidal Acceleration (peak)		kms ⁻²	10		
		g	1000		
Electrical					
Residual Noise Level (measured with NEXUS Type 2692-001 in the specified frequency range)		mms ⁻²	5.0		
		mg	0.5		
Capacitance (excluding cable)		pF	730		760
Min. Leakage Resistance (at 20 °C)		GΩ	>20		
Environmental					
Operating Temperature Range		°C (°F)	-51 to +177 (-60 to +350)		
Temperature Coefficient of Sensitivity		%/°C	0.11		
Temperature Transient Sensitivity (3 Hz Low. Lim. Freq. (-3 dB, 6 dB/octave))		ms ⁻² /°C	4.0		2.0
		g/°F	0.2		0.1
Base Strain Sensitivity (at 250 µε in the base plane)		ms ⁻² /µε	5.0	0.50	0.010
		g/µε	0.5	0.05	0.001
Magnetic Sensitivity (50 Hz, 0.038 T)		ms ⁻² /T	5.600	5.00	
		g/kG	0.056	0.05	
Max. Non-destructive Shock (± peak)		kms ⁻²	50		
		g	5000		
Mechanical					
Housing Material			Titanium	Anodized Aluminium	
Piezoelectric Sensing Element			Ceramic		
Construction			Planar Shear		
Sealing			Hermetic	Epoxy sealed	
Electrical Connector			Coaxial 3-56		
Mounting			Adhesive		

Type 4517-C

Type 4517-C-001

Type 4517-C-003

All types include the following accessories:

- Carrying box
- Calibration chart
- Low-noise cable with 3–56 UNF connector to 10–32 UNF female connector, 0.9 m (3 ft)
- Wrench for removal

Optional Accessories*	
AO-0638-x-yyy [†]	Low-noise coaxial cable, 3–56 UNF to 10–32 UNF, 200 °C (392 °F)
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)
UA-0186	Extension connector, 10–32 UNF (set of 25)
QS-0007	Tube of cyanoacrylate adhesive
YJ-0216	Beeswax for mounting
Type 4294	Calibration Exciter
Calibration Services	
ACC-M-CAF	Accredited calibration
ACC-M-CAI	Accredited initial calibration

* Additional accessories and cables are available (see www.bksv.com)

† x = D (decimetres) or M (metres)

yyy = length in decimetres or metres

Please specify cable length when ordering

COMPLIANCE WITH STANDARDS



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

Fig. 2 Dimensions of Type 4517-C-001 (left), dimensions of Types 4517-C and 4517-C-003 (right)



All dimensions in millimetres

180084

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