Piezoelectric Accelerometer Types 4507 and 4508

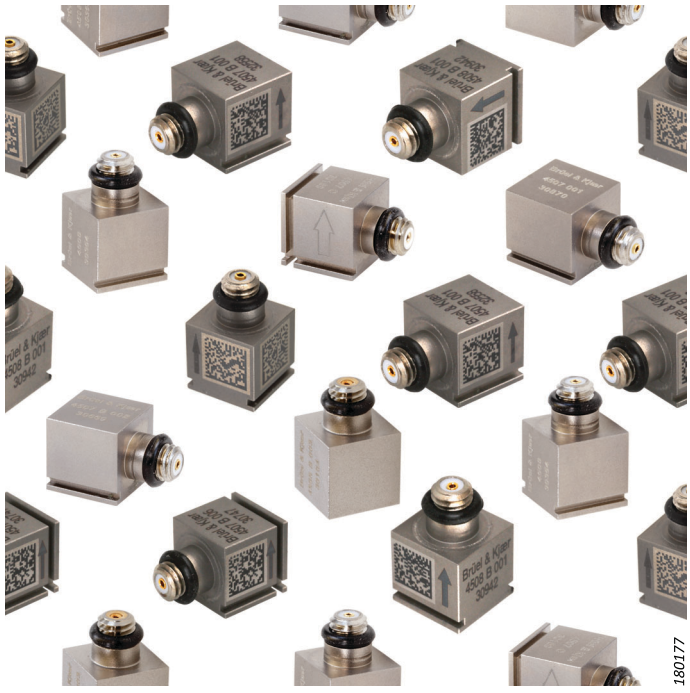
Accelerometer families that include both CCLD and charge variants

This family of small ThetaShear accelerometers is perfect for structural analysis applications. Each accelerometer has a lightweight titanium housing with an integrated 10–32 UNF coaxial connector, which is located on either the top (Type 4508 family) or the side (Type 4507 family). Types 4507 and 4508 are available in charge or CCLD versions, and CCLD variants are equipped with TEDS (transducer electronic datasheet).*

CCLD variants have an engraved data matrix code for use with the Brüel & Kjær app for multichannel test set up: Transducer Smart Setup.

***CCLD accelerometers** offer the following advantages:*
- *Connect directly to power supply*
- *Use inexpensive cables*
- *Use long cables*
- *>100 dB dynamic range*
- *Sensitivities from 10 mV/g to 1 V/g*
- *Hermetic connector*

***Charge accelerometers** offer the following advantages:*
- *Sensitivity of 5 pC/g*
- *Operating temperature up to 250 °C (482 °F)*



Uses and Features

Uses
- Structural analysis measurements
- Multichannel measurements
- General purpose

Features
- Titanium housing
- Integrated titanium connector with hermetic sealing
- Excellent low-frequency response
- Low sensitivity to RF (radio frequency) electromagnetic fields
- Low magnetic sensitivity
- ThetaShear design providing:
  - High sensitivity-to-weight ratio
  - Low sensitivity to environmental factors
- Mounting clips (for most variants)
- Triaxial mounting facility
- Engraved data matrix codes (on CCLD variants with TEDS only)

* CCLD: Constant current line drive, also known as DeltaTron® (ICP® and IEPE compatible)

Brüel & Kjær

Applications

These accelerometers are specifically designed to withstand rough environments. A combination of high sensitivity, low mass and small physical dimensions makes them ideal for modal analysis on large, composite structures that require multiple measurement points, such as ground vehicles, aircraft and satellites. The accelerometers are easy to handle, reliable, and rugged enough for use in a wide range of environments. They can be calibrated quickly, and they have a low sensitivity to temperature transients, which is advantageous when it comes to making measurements at low frequencies.

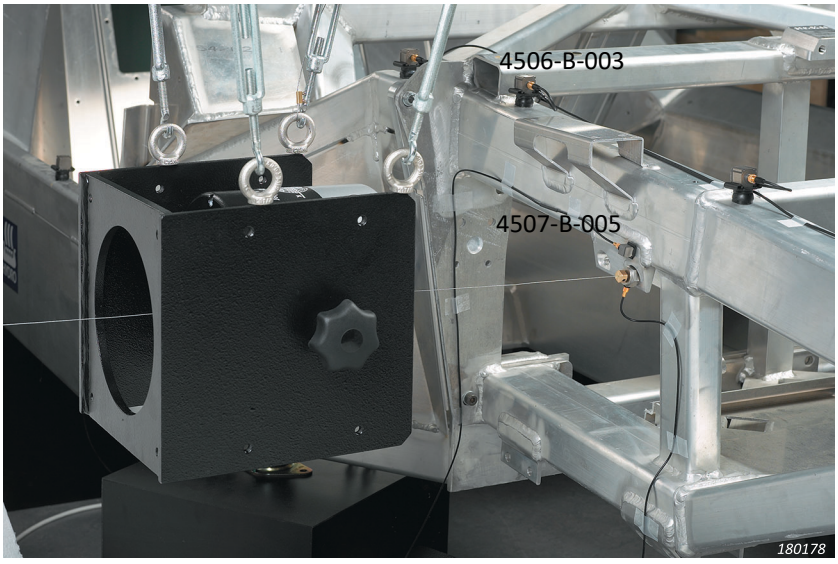


Fig. 1
Test setup for modal analysis. Note the size of Type 4507-B-005 as compared to Type 4506-B-003

Environmental Sensitivity

Some of the most troublesome environmental factors encountered when using piezoelectric accelerometers are temperature transients. However, by careful choice of materials, mechanical design and the shear concept, the influence of these factors has been reduced to a minimum. Special effort has also been made to minimize interference from RF electromagnetic fields.

High humidity is another environmental factor that can influence the accuracy of piezoelectric transducers. Careful design and manufacturing have reduced this effect to a minimum for the Type 4507 and 4508 families. Furthermore, all CCLD variants are equipped with hermetically sealed (glass) connectors, that make them completely independent of humidity and aggressive gases.

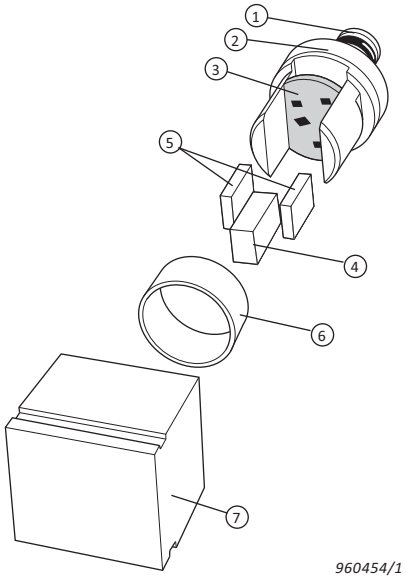


Fig. 2
Exploded view of Type 4508-B showing the ThetaShear design and built-in CCLD preamplifier:
*(**1**) 10–32 UNF connector*
*(**2**) Top*
*(**3**) Preamplifier*
*(**4**) Seismic mass*
*(**5**) Piezoelectric plates*
*(**6**) Clamping ring*
*(**7**) Titanium housing*

ThetaShear Design

The connector is an integrated part of the accelerometer, as is the preamplifier (CCLD variants only). A slotted cylindrical stanchion holds the central seismic mass which is flanked by two piezoelectric plates and the assembly is clamped rigidly by a ring. The parts are firmly held together without the use of any bonding agent other than friction, a principle that has proved extremely reliable in Brüel & Kjær DeltaShear™ accelerometers. The entire assembly is hermetically welded to the titanium housing.

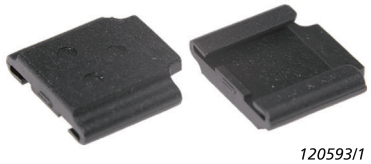
Data Matrix Codes

Data matrix codes are engraved on CCLD variants with TEDS. The codes contain information about the transducer and its orientation, and provide access to product documentation. The codes can be used with Transducer Smart Setup, a free app for iOS devices that simplifies setting up tests with multiple channels.

Mount Types 4507 and 4508 with adhesive, with or without the use of mounting clips.

The various mounting clips are designed to suit a variety of mounting surfaces and are attached to the test object with glue or double-sided adhesive tape. The accelerometer is mounted in a clip via grooves in its housing, making the accelerometer easy to fit or remove.

Fig. 3
Mounting Clip UA-1407 (set of 100)

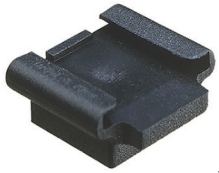

120593/1

Upper limiting frequency (±10%):

Type 4507 mounted with grease:	3.0 kHz
Type 4507 dry mounting:	1.5 kHz
Type 4508 mounted with grease:	4.0 kHz
Type 4508 dry mounting:	2.0 kHz

Weight: 0.4 g (0.014 oz)

Fig. 4
Mounting Clip with Thick Base UA-1475 (set of 100). The base can be filed down to suit the mounting surface


150070

Upper limiting frequency (±10%):

Type 4507 mounted with grease:	3.0 kHz
Type 4507 dry mounting:	1.5 kHz
Type 4508 mounted with grease:	4.0 kHz
Type 4508 dry mounting:	2.0 kHz

Weight: 0.7 g (0.02 oz)

Fig. 5
Mounting Clip with Swivel Base UA-1478 (set of 100)


120594/1

Upper limiting frequency (±10%):

Type 4507 or Type 4508 is mounted with grease and excited along accelerometer's main axis of sensitivity with the mounting surface of the hemisphere:

Perpendicular to the direction of excitation:	2.3 kHz
At 45° to the direction of excitation:	1.7 kHz

Weight: 0.8 g (0.028 oz)

Fig. 6
Spirit Level UA-1480. Use to align and maintain multichannel coordinate system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Max. dimensions: 85 × 23 × 17 mm
Material: Black, anodized aluminium

Specifications for High-temperature Mounting Clip

Fig. 7
High-temperature Mounting Clip UA-1564 (set of 5)

160220

Temperature range:	–55 to +175 °C (–67 to +347 °F)
If discolouring can be accepted:	–55 to +250 °C (–67 to +482 °F)
Maximum acceleration:	10 *g* peak
Perpendicular to mounting surface:	250 *g* peak
Material	
Base:	Anodized aluminium
Spring:	Stainless steel
Weight:	5.7 g
Mounting:	10–32 UNF threaded hole

Mounting for Triaxial Measurements

Types 4507-B-004, 4507-B-005, 4507-B-006 and 4507-C have three pairs of mounting slots. When making measurements on non-variant systems, it is possible to simulate triaxial measurements by successively mounting these accelerometers in three directions that are perpendicular to each other.

CCLD Accelerometers

CCLD is a generic name identifying accelerometers and signal-conditioning products that operate on a constant-current power supply and give output signals in the form of voltage modulation on the power supply line. One of the advantages of this system is that it allows you to use inexpensive cables.

CCLD variants have built-in, low-noise preamplifiers that are made using thick-film technology. The preamplifiers comprise ASICs (application-specific integrated circuit) including a special reference voltage that ensures very stable bias voltage over the entire operating temperature range.

The low-output impedance allows the use of long cables for connection between the accelerometer and the data acquisition hardware, for example LAN-XI Input Module Type 3050.

Cables and Connectors

For general, non-critical use, the following cables are recommended for use with CCLD variants:

- **AO-0463**: Flexible, single-screened cable with coaxial connectors (male, 10–32 UNF), –20 to +80 °C (–4 to +176 °F)
- **AO-0531**: Flexible cable with coaxial (male, 10 – 32 UNF) to BNC (male) connectors, –20 to +80 °C (–4 to +176 °F)
- **AO-1382**: Low-noise, double-screened cable with coaxial connectors (male, 10–32 UNF), max. temperature 250 °C (482 °F)

In order to distinguish individual accelerometers in a multichannel measurement setup, numbered cable markers (UA-1243) are available to fit cables that are 1.6 mm in diameter and coloured cable markers (UA-1244) are available to fit cables that are 1.9 to 2.2 mm in diameter.

Maximum Cable Length for CCLD Accelerometers

The maximum output voltage of a CCLD accelerometer when driving long cables depends on the supply current at which it is operating, and on the capacitive load due to the connecting cable. The maximum cable length in metres (for distortion ≤1%) is given by:

$$L = 140000 \times \frac{I_s - 1}{f \times V_o \times C_m}$$

where:
I_s = supply current (mA)
f = frequency (kHz)
V_o = output voltage (V_{peak})
C_m = cable capacitance (pF/m)

Accelerometer Types 4507-C and 4508-C can be used in high-temperature applications up to 250 °C (482 °F), and the use of an external conditioning amplifier allows variable amplification for optimum signal-to-noise ratio. Brüel & Kjær has a wide range of equipment to support piezoelectric charge accelerometers, and Types 4507-C and 4508-C can be connected to the following:

- Charge to CCLD Converter **Type 2647** (with TEDS), which enables charge accelerometers to be used with CCLD power supplies
- LAN-XI Front Panel **UA-2105-060** for LAN-XI Module Type 3050-060, with six slots for Type 2647
- NEXUS™ Charge Conditioning Amplifier **Type 2692** for conditioning the signal

Cables and Connectors

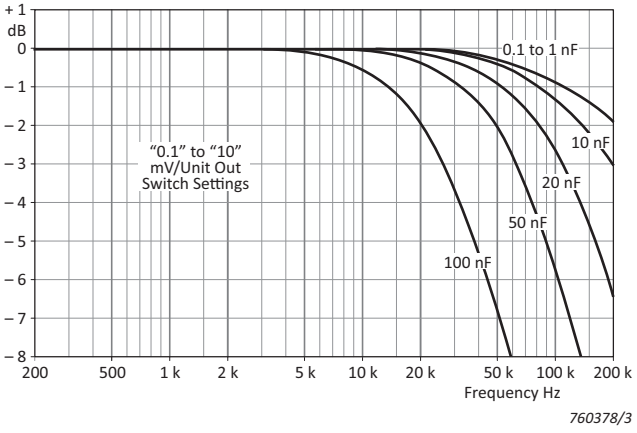
For Types 4507-C and 4508-C, the following low-noise or super low-noise cables are recommended:

- **AO-0038**: Super low-noise single-screened cable with coaxial connectors (male, 10–32 UNF), max. temperature 250 °C (482 °F)
- **AO-0122**: Super low-noise, double-screened cable with coaxial connectors (male, 10–32 UNF), max. temperature 250 °C (482 °F)
- **AO-0406**: Low-noise double-screened cable with coaxial connectors (male, 10–32 UNF), max. temperature 250 °C (482 °F). This cable comes with Adapter JP-0145 (BNC to 10–32 UNF).
- **AO-1382**: Low-noise, double-screened cable with coaxial connectors (male, 10–32 UNF), max. temperature 250 °C (482 °F)

In order to distinguish individual accelerometers in a multichannel measurement setup, numbered cable markers (UA-1243) are available to fit cables that are 1.6 mm and coloured cable markers (UA-1244) are available to fit cables that are 1.9 to 2.2 mm in diameter.

Maximum Cable Length for Charge Accelerometers

Fig. 8
Influence of the input load capacitance on the high-frequency response of a Brüel & Kjær charge amplifier



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 $k = 2$.

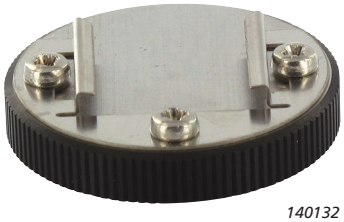
The upper frequency limits given on the calibration chart are frequencies where the deviation from the reference sensitivity at 159.2 Hz is within ±10%. The upper frequency limit is approximately 30% of the mounted resonance frequency. This assumes that the accelerometer is correctly mounted on the test structure − poor mounting can have a marked effect on the mounted resonance frequency.

For CCLD variants, 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 ±10%. For charge variants, the lower frequency limits and phase response are determined by the amplifier used.

Clip for Calibration

For field checking and system calibration, Calibration Clip DV-0459 can be used in combination with Vibration Exciter Type 4294.



140132

Fig. 9
Calibration Clip DV-0459

Material	
Base:	Hardened stainless steel
Spring:	Stainless steel
Mounting surface diameter:	21 mm
Mounting thread:	10–32 UNF
Weight:	17 g (0.59 oz)

Frequency Response

The following frequency response information is included on each accelerometer's accompanying calibration chart. However, certain accelerometers have this information built in electronically (TEDS) as well.

The relative frequency response, including amplitude and phase, is given by:

$$S_{rel}(f, T) = (\text{Sign}) \times (1 + b(T - T_{ref})) \times \frac{j\frac{f}{f_{hp}}}{\left(1 + j\frac{f}{f_{hp}}\right)} \times \frac{1}{\left(1 + j\frac{f}{f_{lp}}\right)} \times \frac{1}{\left(1 + \left(j\frac{f}{f_{res}}\right)^2 + j\frac{f}{Qf_{res}}\right)} \times \left(j\frac{f}{f_{ref}}\right)^{\frac{a}{\ln 10}}$$

where:

Sign = Polarity
T = Temperature
f = Frequency
f_{lp} = Low-pass Cut-off Frequency
f_{ref} = Reference Frequency
a = Amplitude Slope/Decade
b = Temperature Coefficient
T_{ref} = Reference Temperature
f_{hp} = High-pass Cut-off Frequency
f_{res} = Resonance Frequency
Q = Quality Factor

Combining this equation with the amplitude sensitivity S_{ref}, f_{ref} and T_{ref} gives you:

$$S(f, T) = S_{ref} \times \frac{S_{rel}(f, T)}{\left|S_{rel}(f_{ref}, T_{ref})\right|}$$

Implementation of this formula in either real-time data acquisition systems or in post-processing will support an automatic update of amplitude and/or phase.

Specifications – CCLD Accelerometer Type 4507 Family (side connector)

Type Number			4507-B	4507-B-003	4507-B-004	4507-B-001	4507-B-002	4507-B-005	4507-B-006
General									
Weight		gram	4.8	4.9	4.6	4.8	4.8	4.6	4.6
		oz	0.17	0.17	0.16	0.17	0.17	0.16	0.16
Voltage Sensitivity (at 159.2 Hz, 4 mA supply current)		mV/ms^{-2}	10 ± 5%			1 ± 5%	100 ± 10%		50 ± 5%
		mV/g	98 ± 5%			9.8 ± 5%	980 ± 10%		490 ± 5%
Frequency Range	**Amplitude (±10%)**	Hz	0.3 to 6000			0.1 to 6000	0.4 to 6000		0.2 to 6000
	Phase (±5°)		2 to 5000			0.5 to 5000	2 to 5000		1 to 5000
Mounted Resonance Frequency		kHz	18			18	18		18
Max. Transverse Sensitivity (at 30 Hz, 100 ms−2)		%	<5			<5	<5		<5
Transverse Resonance Frequency		kHz	>18			>18	>18		>18
Max Operational Continuous Sinusoidal Acceleration (± peak)		kms^{-2}	0.7			7	0.07		0.14
		g	70			700	7		14
TEDS			Yes			Yes	Yes		Yes
Electrical									
Bias Voltage (at full temp. and curr. range)		V	13 ±1			13 ±1	13 ± 2		13 ±2
Power Supply	**Constant current**	mA	2 to 20			2 to 20	2 to 20		2 to 20
	Unloaded supply voltage	V	24 to 30*			24 to 30*	24 to 30*		24 to 30*
Output Impedance		Ω	30			30	30		30
Start-up time (to final bias ±10%)		s	<5			< 50	<5		<5
Residual Noise (inherent rms broadband noise in the specified frequency range)		µV	<35			<8	<150		<80
		µg	<350			<800	<150		<160
Noise (spectral)	**10 Hz**	$mms^{-2}/\sqrt{Hz}$ (µg/√Hz)	0.15 (15)			0.25 (25)	0.08 (8)		0.08 (8)
	100 Hz		0.035 (3.5)			0.06 (6)	0.02 (2)		0.02 (2)
	1000 Hz		0.02 (2)			0.035 (3.5)	0.01 (1)		0.01 (1)
Environmental									
Operating Temperature Range		°C	−54 to +121			−54 to +121	−54 to +100		−54 to +100
		°F	−65 to +250			−65 to +250	−65 to +212		−65 to +212
Temperature Coefficient of Sensitivity		%/ °C	0.09			0.09	0.18		0.18
Temperature Transient Sensitivity 3 Hz Lower Limiting Freq. (–3 dB, 6 dB/octave)		ms^{-2}/ °C	0.2			0.2	0.2		0.2
		g/ °F	0.011			0.011	0.011		0.011
Magnetic Sensitivity (50 Hz, 0.038 T)		ms^{-2}/T	3			3	3		3
		g/kG	0.03			0.03	0.03		0.03
Base Strain Sensitivity (at 250 µε in base plane)		$ms^{-2}/µε$	0.005†			0.005†	0.005†		0.005†
		$g/µε$	0.0005†			0.0005†	0.0005†		0.0005†
Max. Non-destructive Shock (± peak)		kms^{-2}	50			50	50		50
		g	5000			5000	5000		5000
Mechanical									
Case Material			Titanium ASTM Grade 2						
Piezoelectric Sensing Element			PZ 23			PZ 23	PZ 27		PZ 27
Construction			ThetaShear						
Sealing			Hermetic						
Electrical Connector			Side, 10–32 UNF-2A						
Mounting Slots (pairs)			1	0	3	1	1	3	3
Dimensions (excluding connector)		mm (in)	10 × 10 × 10 (0.4 × 0.4 × 0.4)						

* Min. +18 V DC (reduced measuring range)
† Mounted on adhesive tape 0.09 mm thick

Note: All values are typical at 25 °C (77 °F), unless measurement uncertainty is specified. All uncertainty values are specified at 2σ, that is, expanded uncertainty using a coverage factor of 2)
Polarity: Positive (for an acceleration in the direction of the engraved arrows)

Specifications – CCLD Accelerometer Type 4508 Family (top connector)

Type Number			4508-B	4508-B-003	4508-B-001	4508-B-002	4508-B-004
General							
Weight		gram	4.8	4.9	4.8	4.8	4.8
		oz	0.17		0.17	0.17	0.17
Voltage Sensitivity (at 159.2 Hz, 4 mA supply current)		mV/ms^{-2}	10 ± 5%		1 ± 5%	100 ± 10%	50 ± 5%
		mV/g	98 ± 5%		9.8 ± 5%	980 ± 10%	490 ± 5%
Frequency Range	**Amplitude (±10%)**		0.3 to 8000		0.1 to 8000	0.4 to 8000	0.2 to 8000
	Phase (±5°)	Hz	2 to 5000		0.5 to 5000	2 to 5000	1 to 5000
Mounted Resonance Frequency		kHz	25		25	25	25
Max. Transverse Sensitivity (at 30 Hz, 100 ms^{-2})		%	<5		<5	<5	<5
Transverse Resonance Frequency		kHz	>18		>18	>18	>18
Max Operational Continuous Sinusoidal Acceleration (± peak)		kms^{-2}	0.7		7	0.07	0.15
		g	70	71	700	7	14
TEDS / Data Matrix Code			Yes		Yes	Yes	Yes
Electrical							
Bias Voltage (at full temp. and curr. range)		V	13 ±1		13 ±1	13 ±2	13 ±2
Power Supply	**Constant current**	mA	2 to 20		2 to 20	2 to 20	2 to 20
	Unloaded supply voltage	V	24 to 30*		24 to 30*	24 to 30*	24 to 30*
Output Impedance		Ω	30		30	30	30
Start-up time (to final bias ±10%)		s	<5		<50	<5	<5
Residual Noise (inherent rms broadband noise in the specified frequency range)		µV	<35		<8	<150	<80
		µg	<350		<800	<150	<160
Noise (spectral)	**10 Hz**	$mms^{-2}/\sqrt{Hz}$ (µ$g/\sqrt{Hz}$)	0.15 (15)		0.25 (25)	0.08 (8)	0.08 (8)
	100 Hz		0.035 (3.5)		0.06 (6)	0.02 (2)	0.02 (2)
	1000 Hz		0.02 (2)		0.035 (3.5)	0.01 (1)	0.01 (1)
Environmental							
Operating Temperature Range		°C	−54 to +121		−54 to +121	−54 to +100	−54 to +100
		°F	−65 to +250		−65 to +250	−65 to +212	−65 to +212
Temperature Coefficient of Sensitivity		%/ °C	0.06		0.06	0.12	0.12
Temperature Transient Sensitivity (3 Hz Lower Limiting Freq. (−3 dB, 6 dB/octave))		ms^{-2}/ °C	0.3		0.3	0.3	0.3
		g/ °F	0.0165		0.0165	0.0165	0.0165
Magnetic Sensitivity (50 Hz, 0.038 T)		ms^{-2}/T	3		3	3	3
		g/kG	0.03		0.03	0.03	0.03
Base Strain Sensitivity (at 250 µε in base plane)		ms^{-2}/µε	0.005†		0.005†	0.005†	0.005†
		g/µε	0.0005†		0.0005†	0.0005†	0.0005†
Max. Non-destructive Shock (± peak)		kms^{-2}	50		50	50	50
		g	5000		5000	5000	5000
Mechanical							
Case Material			Titanium ASTM Grade 2				
Piezoelectric Sensing Element			PZ 23		PZ 23	PZ 27	PZ 27
Construction			ThetaShear				
Sealing			Hermetic				
Electrical Connector			Top, 10–32 UNF-2A				
Mounting Slots (pairs)			1	0	1	1	1
Dimensions (excluding connector)		mm (in)	10 × 10 × 10 (0.4 × 0.4 × 0.4)				

* Min. +18 V DC (reduced measuring range)

† Mounted on adhesive tape 0.09 mm thick

Note: All values are typical at 25 °C (77 °F), unless measurement uncertainty is specified. All uncertainty values are specified at 2σ, that is, expanded uncertainty using a coverage factor of 2)

Polarity: Positive (for an acceleration in the direction of the engraved arrows)

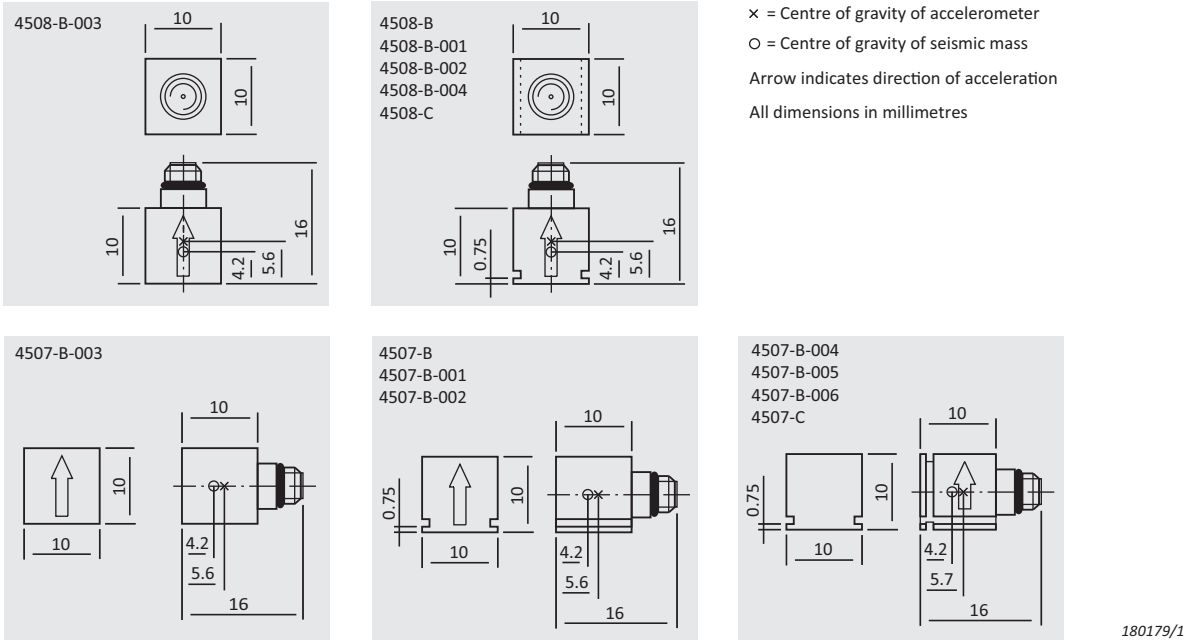
Type Number		4507-C	4508-C
General			
Weight (excluding cable, wherever applicable)	gram	4.5	
	oz	0.16	
Voltage Sensitivity (at 159.2 Hz, 4 mA supply current)	pC/ms^{-2}	0.45 ±15%	
	pC/g	4.41 ±15%	
Frequency Range (±10% limit)	Hz	0.1 to 6000	0.1 to 8000
Mounted Resonance Frequency	kHz	18	25
Max. Transverse Sensitivity (at 30 Hz, 100 ms^{-2})	%	<5	
Transverse Resonance Frequency	kHz	18	
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}	1.7	1.8
	mg	0.17	0.18
Capacitance (excluding cable)	pF	360	
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	0.1*	
Temperature Transient Sensitivity (3 Hz Low. Lim. Freq. (–3 dB, 6 dB/octave))	ms^{-2}/°C	0.2	0.6
	g/°F	0.011	0.033
Base Strain Sensitivity (at 250 με in the base plane)	$ms^{-2}/\mu\varepsilon$	0.005	
	$g/\mu\varepsilon$	0.0005	
Magnetic Sensitivity (50 Hz, 0.038 T)	ms^{-2}/T	1	
	g/kG	0.01	
Max. Non-destructive Shock (± peak)	kms^{-2}	50	
	g	5000	
Mechanical			
Housing Material		Titanium ASTM Grade 2	
Piezoelectric Sensing Element		PZ 23	
Construction		ThetaShear	
Sealing		Welded	
Electrical Connector		10–32 UNF-2A	
Mounting Slots (pairs)		3	1
Dimensions (excluding connector)	mm (in)	10 × 10 × 10 (0.4 × 0.4 × 0.4)	

* In the temperature range –25 to +125 °C

Note: All values are typical at 25 °C (77 °F), unless measurement uncertainty is specified. All uncertainty values are specified at 2σ, that is, expanded uncertainty using a coverage factor of 2)

Dimensions

Fig. 10 *Dimensions of the variants, grouped by dimensions and arranged by family (**top**: Type 4508 family, **bottom**: Type 4507 family) and mounting slots (**left**: no mounting slots, **middle**: one pair of mounting slots, **right**: three pairs of mounting slots)*



Compliance with Standards

CE RCM e China RoHS WEEE	The CE marking is the manufacturer's declaration that the product meets the requirements of the applicable EU directives RCM mark indicates compliance with applicable ACMA technical standards – that is, for telecommunications, radio communications, EMC and EME China RoHS mark indicates compliance with administrative measures on the control of pollution caused by electronic information products according to the Ministry of Information Industries of the People's Republic of China WEEE mark indicates compliance with the EU WEEE Directive
Safety	EN/IEC 61010−1: Safety requirements for electrical equipment for measurement, control and laboratory use ANSI/UL 61010−1: Safety requirements for electrical equipment for measurement, control and laboratory use
EMC Emission	EN/IEC 61000−6−3: Generic emission standard for residential, commercial and light industrial environments EN/IEC 61000−6−4: Generic emission standard for industrial environments CISPR 22: Radio disturbance characteristics of information technology equipment. Class B Limits FCC Rules, Part 15: Complies with the limits for a Class B digital device This ISM device complies with Canadian ICES−001 (standard for interference-causing equipment)
EMC Immunity	EN/IEC 61000−6−1: Generic standards – Immunity for residential, commercial and light industrial environments EN/IEC 61000−6−2: Generic standards – Immunity for industrial environments EN/IEC 61326: Electrical equipment for measurement, control and laboratory use – EMC requirements **Note:** The above is only guaranteed using accessories listed in this document Types 4507-B, 4507-B-003, 4507-B-004, 4508-B and 4508-B-003: <60 mV Types 4507-B-001 and 4508-B-001: <10 mV Types 4507-B-002, 4507-B-005, 4507-B-006, 4508-B-002 and 4508-B-004: <100 mV
Temperature	IEC 60068−2−1 & IEC 60068−2−2: Environmental Testing. Cold and Dry Heat Operating Temperature: • Types 4507-B, 4507-B-001, 4507-B-003, 4507-B-004, 4508-B, 4508-B-001 and 4508-B-003: −54 to +121 °C (−65 to +250 °F) • Types 4507-B-002, 4507-B-005, 4507-B-006, 4508-B-002 and 4508-B-004: −54 to +100 °C (−65 to +212 °F) • Types 4507-C and 4508-C: −74 to +250 °C (−101 to +482 °F)
Mechanical	Non-operating: IEC 60068−2−6: Vibration: 0.3 mm, 20 m/s^2, 10 – 500 Hz IEC 60068−2−27: Shock: 1000 m/s^2 IEC 60068−2−29: Bump: 1000 bumps at 250 m/s^2

Type 4507 Family Accelerometers with side connector
Type 4508 Family Accelerometers with top connector

Each accelerometer includes the following accessories:
- Carrying box
- Individual calibration chart
- One mounting clip*

Order Number	TEDS	Mounting Slot Pairs	Sensitivity	
Type 4507-B-001	Yes	1	1 mV/ms^{-2}	**CCLD**
Type 4508-B-001				
Type 4507-B-003	Yes	0	10 mV/ms^{-2}	
Type 4508-B-003				
Type 4507-B	Yes	1		
Type 4508-B				
Type 4507-B-004	Yes	3		
Type 4507-B-006	Yes	3	50 mV/ms^{-2}	
Type 4508-B-004				
Type 4507-B-002	Yes	1	100 mV/ms^{-2}	
Type 4508-B-002				
Type 4507-B-005	Yes	3		

Type 4507-C	No	3	0.45 pC/ms^{-2}	**Charge**
Type 4508-C		1		

Brüel & Kjær Accessories

CABLES – CCLD ACCELEROMETERS
Please specify cable length when ordering.†

AO-0038	Super low-noise, single-screened cable with 10–32 UNF connectors (M), max. 250 °C (482 °F)
AO-0122	Super low-noise, double-screened cable with 10–32 UNF connectors (M), max. 250 °C (482 °F)
AO-0406	Low-noise double-screened cable with 10–32 UNF connectors (M), max. 250 °C (482 °F), includes Adapter JP-0145
AO-0463	Flexible, single-screened cable with 10–32 UNF connectors (M), –20 to +80 °C (– 4 to +176 °F)
AO-0531	Flexible cable with 10–32 UNF (M) to BNC (M) connectors, –20 to +80 °C (– 4 to +176 °F)
AO-1382	Low-noise, double-screened cable with 10–32 UNF connectors (M), max. 250 °C (482 °F)
AO-1419	Low-noise, single-screened cable with 10–32 UNF connectors (M), max. 250 °C (482 °F)

CABLES – CHARGE ACCELEROMETERS
Please specify cable length when ordering.†

AO-0038	Super low-noise, single-screened cable with 10–32 UNF connectors (M), max. 250 °C (482 °F)
AO-0122	Super low-noise, double-screened cable with 10–32 UNF connectors (M), max. 250 °C (482 °F)
AO-0406	Low-noise, double-screened cable with 10–32 UNF connectors (M), max. 250 °C (482 °F), includes Adapter JP-0145
AO-1382	Low-noise, double-screened cable with 10–32 UNF connectors (M), max. 250 °C (482 °F)

CABLING ACCESSORIES

UA-1243	Cable markers for cables with 1.6 mm (0.06 in) cable jacket diameter, 3 × 30 pieces marked with 1, 2 or 3 (use with AO-0406 and AO-1382)
UA-1244	Cable markers for cables with 1.9 to 2.2 mm (0.07 to 0.09 in) cable jacket diameter, 3 × 30 pieces in red, green or yellow (use with AO-0038, AO-0463 and AO-0531)
JP-0192	Solder connector adapter
JP-0145	Adapter, 10–32 UNF (F) to BNC (M)

MOUNTING

QS-0007	Cyanoacrylate adhesive
UA-1407	Mounting clip, set of 100
UA-1418	Dummy accelerometers for mass loading, set of 25
UA-1475	Mounting clip with thick base, set of 100
UA-1478	Mounting clip with swivel base, set of 100
UA-1564	Mounting clip for high-temperatures, set of 5
YJ-0216	Mounting wax

CONDITIONING AND DATA ACQUISITION

Type 2647	Charge to CCLD Converter
UA-2105-060	LAN-XI Front Panel for Input Module Type 3050-060, 6 slots for Type 2647
Type 3050-A-060	LAN-XI Module, 6 input channels, 51.2 kHz, includes LAN-XI Front Panel UA-2100-060 (BNC)
WB-1372	CCLD Signal Conditioner

CALIBRATION

DV-0459	Mounting clip for calibration
Type 4294	Vibration Exciter

Brüel & Kjær Services

CALIBRATION SERVICES

ACC-M-CAF	Accredited calibration
ACC-M-CAI	Accredited initial calibration
ACC-M-CFF	Factory standard calibration
ACC-M-CTF	Traceable calibration

* Types 4507-B-003 and 4508-B-003 do not include a mounting clip because the accelerometers do not have mounting slots

† Example: AO-0038-x-yyy
x = D (decimetres) or M (metres)
yyy = length in decimetres or metres