

Triaxial CCLD Accelerometer Types 4529-B and 4529-B-001

The family of Triaxial CCLD* Accelerometer Type 4529 replaces the extremely popular Type 4506 family, using the same flexible mounting accessories to save set-up time and ensure accurate local coordination. Due to their high dynamic range, the accelerometers cover a wide range of applications, including on-road and modal testing.



Uses and Features

Uses

- Multi-purpose test applications due to a high dynamic range
- Multi-channel modal and structural analysis measurements
- On-road tests

Features

- Five mounting surfaces
- Single axis supply makes single- or bi-axial measurements possible to save channels
- Easily fitted to different test objects using a selection of mounting clips
- Hermetically sealed
- Electrically insulated for ground loop protection
- Robust titanium housing with integrated titanium 4-pin connector
- Transducer Electronic Data Sheet (TEDS) saves test set-up time

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

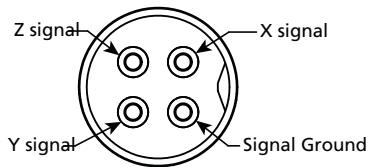
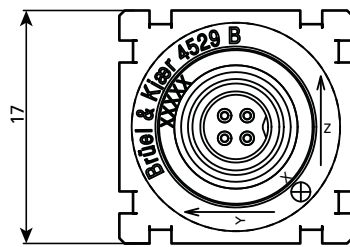
Mounting

Fig. 1
Cable can be fastened
in the mounting clip

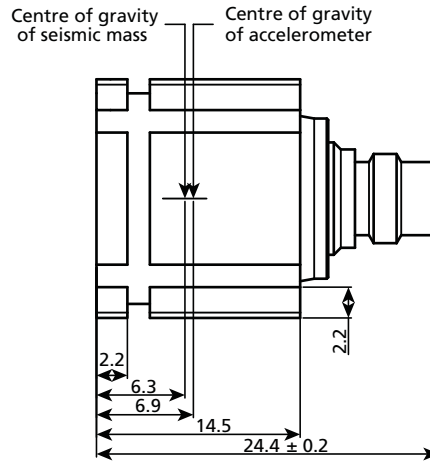


To make mounting as flexible as possible, the accelerometer housing has slots to be used in combination with a selection of mounting clips. The clips are attached to the test object with glue or double-sided, adhesive tape. This design allows the accelerometer to be easily fitted to and removed from a number of different objects, for example, during calibration. Fig. 2 shows the slots, connector orientation and dimensions of Type 4529.

Fig. 2
Diagram of
Type 4529 showing
connector orientation
and dimensions



Pin designation: Signal isolated from case



All dimensions in millimetres

140180

Mounting Clips

For curved surfaces, there is a mounting clip with a thick base that can be filed down (Fig. 4) to fit. When building a coordinate system for test measurements, the swivel base mounting clip (Fig. 5) and Spirit Level (Fig. 6) allow easy alignment of the accelerometer.

Common Specifications for Mounting Clips

Temperature range:

For brief use (<1 hour):

–54 to +50 °C (–65 to +122 °F)

–54 to +80 °C (–65 to +176 °F)

Maximum acceleration:

10 g peak

Perpendicular to mounting surface:

70 g peak

Material:

Glass reinforced polycarbonate

Fig. 3
Mounting Clip
UA-1408 (set of 100)
Far right: Use the
mounting clip to
secure the cable and
reduce the risk of
cable-induced noise



980499/2



980560/1

Upper limiting frequency, 10%:

1.2 kHz

Weight:

2.1 g (0.07 oz)

Fig. 4
 Mounting Clip
 UA-1474 (set of 100).
Far right: The thick
 base can be filed down
 to suit the mounting
 surface



980480/2



170074

Upper limiting frequency, 10%: 1.2 kHz
Weight: 3.9 g (0.13 oz)

Fig. 5
 Mounting Clip
 UA-1473 (set of 100);
 use the swivelling
 base to set up and
 maintain a coordinate
 system



980558/1



170075

Upper limiting frequency, 10%: 0.8 kHz
 (Mounted with grease and excited along one of the accelerometer's axes of sensitivity
 with the mounting surface of the hemisphere at 45° to the direction of the excitation)
Weight: 5.0 g (0.18 oz)

Fig. 6
 Spirit Level UA-1480;
 use with Mounting
 Clip UA-1473 to set up
 and maintain a
 coordinate system



990010/3



170076

Max. dimensions: 85 × 23 × 17 mm (3.3 × 0.9 × 0.6 in)
Material: Black, anodized aluminium

Calibration Clip

Fig. 7
 Calibration Clip
 DV-0460



140132

Material
 Base: Hardened stainless steel
 Spring: Stainless steel
Mounting surface diameter: 29 mm (1.14)
Mounting thread: 10–32 UNF
Weight: 44 g (1.55 oz)

Each accelerometer is individually calibrated and comes with a comprehensive calibration chart. Artificial ageing during the production process ensures long-term stability and reliability. Field checking and system calibration is straightforward using hand-held Vibration Calibrator Type 4294, see Product Data: [BP 2101](#).

Clip for High-temperature Conditions

A high-temperature mounting clip is available (Fig. 8) for testing in environments that exceed 50 °C (122 °F).

Fig. 8
High-temperature
Mounting Clip
UA-1563 (set of 5)



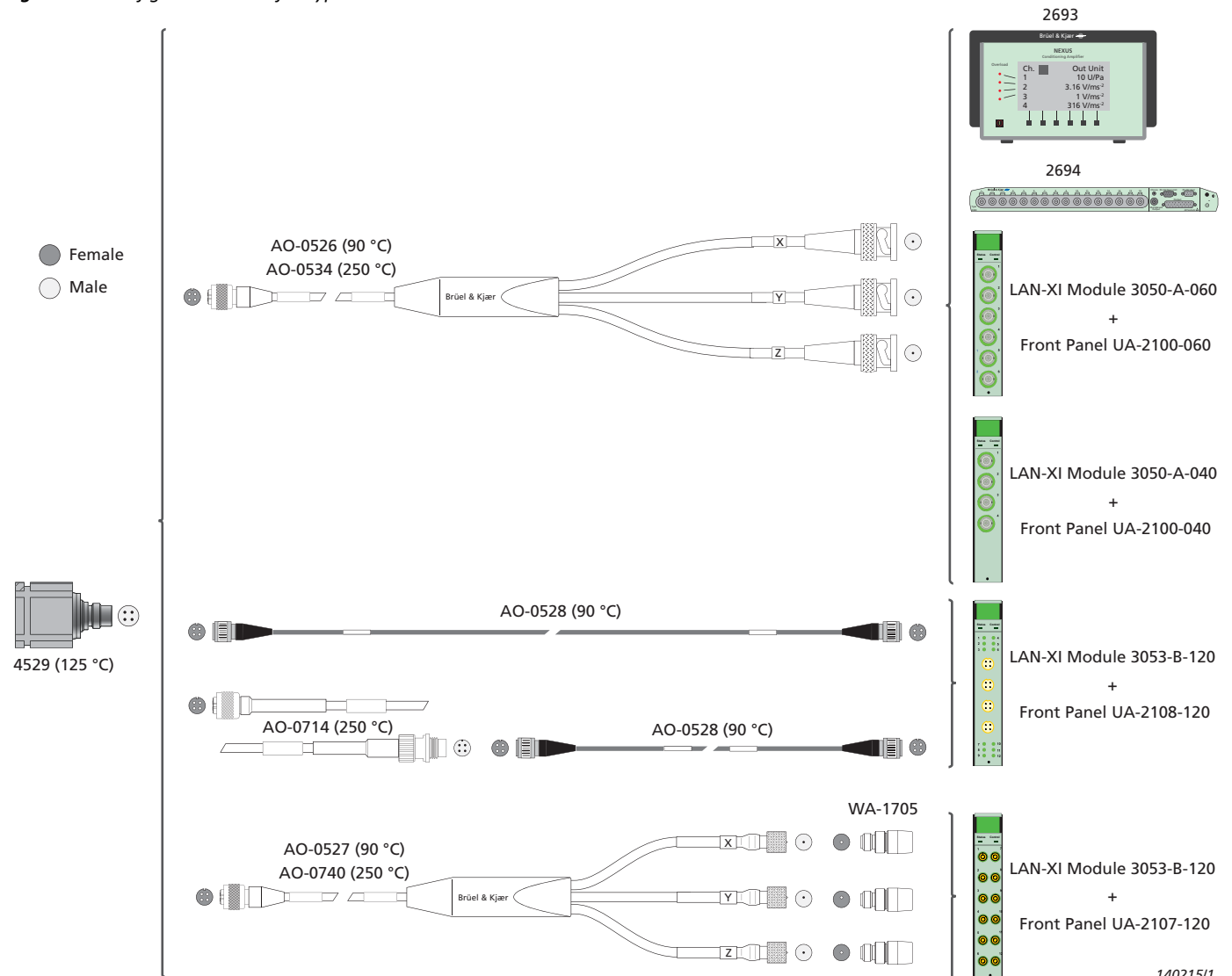
160220

Temperature range:	-55 to +175 °C (-67 to +347 °F)
If discolouring is acceptable:	-55 to +250 °C (-67 to +482 °F)
Weight:	11 g (0.83 oz)
Maximum acceleration	
With a 17 g accelerator:	10 g peak
Perpendicular to mounting surface:	50 g peak
Material	
Base:	Black, anodized aluminium
Spring:	Stainless steel

Cables and Connectors

Triaxial Accelerometer Type 4529 requires a cable with a 4-pin Microtech connector. Brüel & Kjær can supply cables with connector configurations of two 4-pin Microtech connectors, 4-pin Microtech to 3 × BNC connectors and 4-pin Microtech to 3 × 10–32 UNF connectors for a range of temperatures. For powering two accelerometers from a D-range subconnector, cable AO-0536 is available.

Fig. 9 Cable configuration chart for Type 4529



Maximum Cable Length

The maximum output voltage of a CCLD accelerometer when driving long cables depends on the supply current at which it is operating, the frequency, and on the capacitance of the connecting cable.

The maximum cable length in metres (for distortion $\leq 1\%$) is given by:

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

where:

I_s = supply current (mA)

f = highest frequency to be measured (kHz)

V_o = output voltage (V_{peak})

C_m = cable capacitance (pF/m)

Brüel & Kjær's Triaxial CCLD Accelerometer Family

Types 4529-B and 4529-B-001 are part of a family of triaxial CCLD accelerometers. From dedicated modal testing to high-temperature applications, Brüel & Kjær has an accelerometer to meet your needs – including a family of triaxial charge accelerometers for measurements at temperatures higher than 180 °C.

Table 1 Overview of Brüel & Kjær's family of triaxial CCLD accelerometers. (More variants can be found on bksv.com)

	4524-B-001	4520	4535-B	4528-B	4527	4529-B
Application	Modal test	General purpose	General purpose	High-temperature, general purpose	High-temperature, general purpose	General purpose
Temperature (°C)	-54 to +100	-51 to +121	-60 to +125	-60 to +165	-60 to +180	-60 to +125
Weight (grams)	4.4	2.9	6	6	6	14.5
TEDS	Yes	No	Yes	Yes*	No	Yes
Isolation	Yes by design	Yes with insulated adaptor	Yes with insulated adaptor	Yes with insulated adaptor	Yes with insulated adaptor	Yes by design
Frequency Range (Hz)	X: 0.20 to 5.5k Y: 0.25 to 3.0k Z: 0.25 to 3.0k	X: 2 to 7k Y: 2 to 7k Z: 2 to 7k	X: 0.3 to 10.0k Y: 0.3 to 10.0k Z: 0.3 to 12.8k	X: 0.3 to 10.0k Y: 0.3 to 10.0k Z: 0.3 to 12.8k	X: 0.3 to 10.0k Y: 0.3 to 10.0k Z: 0.3 to 12.8k	X: 0.3 to 12.8k Y: 0.3 to 6.0k Z: 0.3 to 6.0k
Mounting	Clip or adhesive	Adhesive	M3, clip or adhesive	M3, clip or adhesive	M3, clip or adhesive	Clip or adhesive
Sensitivity (mV/ms⁻²)	1	1	1	1	1	10
Noise Floor (mm/s⁻²)	50	70	9	9	9	3
Product Datasheet	BP-2076	BP-2072	BP-2465	BP-2451	BP-2447	BP-2517


* The TEDS data retention can work up to 165 °C. High-temperature usage can reduce the lifetime of the TEDS chip. This does not have any impact on the specifications of the accelerometer. TEDS is only recommended for use during the measurement setup phase

Specifications – Types 4529-B and 4529-B-001

General			4529-B	4529-B-001
Weight		gram (oz)	14.5 (0.51)	14.5 (0.51)
Voltage Sensitivity (at 159.2 Hz and 4 mA supply current)		mV/ms ⁻² (mV/g)	10 ±10% (98 ±10%)	1 ±10% (9.8 ±10%)
Frequency Range	Amplitude (±10%)	Hz	X: 0.3 to 12800, Y, Z: 0.3 to 6000	
	Phase (±5°)	Hz	X, Y, Z: 2 to 5000	
Mounted Resonance Frequency		kHz	X: 39, Y, Z: 19	
Max. Transverse Sensitivity (at 30 Hz, 100 ms ⁻²)		%	<5	<5
Measuring range (±peak)		ms ⁻² (g)	700 (71)	7000 (710)
Electrical				
Bias Voltage	At full temperature and current range	V _{DC}	+13 ±1	+13 ±1
Power Supply	Constant current	mA	2 to 20	2 to 20
	Unloaded supply voltage	V _{DC}	+22 to +30	+22 to +30
Output Impedance		W	<50	<50
Start-up time (to final bias ±10%)		s	<10	<10
Broadband Noise (RMS)	0.3 – 10000 Hz	μV (μg)	X, Y, Z: 60 (600)	X, Y, Z: 90 (900)
	1 – 10000 Hz		X, Y, Z: 30 (300)	X, Y, Z: 50 (500)
	2 – 10000 Hz		X, Y, Z: 20 (200)	X, Y, Z: 40 (400)
Noise Spectral	10 Hz	mms ⁻² /√Hz (μg/√Hz)	X, Y, Z: 0.2 (20)	X, Y, Z: 0.3 (30)
	100 Hz		X, Y, Z: 0.04 (4)	X, Y, Z: 0.06 (6)
	1000 Hz		X, Y, Z: 0.02 (2)	X, Y, Z: 0.04 (4)
Insulation Resistance (signal ground to case)		GΩ	>1	
Environmental				
Operating Temperature Range		°C (°F)	-60 to +125 (-76 to +257)	
Temperature Coefficient of Sensitivity		%/°C	+0.1	+0.1
Temperature Transient Sensitivity (3 Hz Low.Lim.Frq. (-3 dB, 6 dB/oct))		ms ⁻² /°C (g/°F)	0.32 (0.0176)	0.32 (0.0176)
Magnetic Sensitivity (50 Hz, 0.038 T)		ms ⁻² /T (g/kG)	8 (0.08)	15 (0.15)
Base Strain Sensitivity (at 250 με in base plane)		ms ⁻² /με (g/με)	0.0014 (0.00014)	0.0014 (0.00014)
Humidity			100% RH	
Max. Non-destructive Shock (peak)		kms ⁻² (g)	50 (5100)	50 (5100)
Mechanical				
Case Material			Titanium ASTM Grade 5	
Piezoelectric Sensing Element			Piezoelectric, PZ23	Piezoelectric, PZ23
Construction			Shear	
Sealing			Hermetic	
Electrical Connector			4-pin receptacle, ¼" – 28 UNF (titanium)	
Mounting			1 × 1.6 mm slots for clip mounting on five sides	

All values are typical at 25 °C unless measurement uncertainty is specified.

Compliance with Standards

	<p>The CE marking is the manufacturer's declaration that the product meets the requirements of the applicable EU directives</p> <p>RCM mark indicates compliance with applicable ACMA technical standards – that is, for telecommunications, radio communications, EMC and EME</p> <p>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</p> <p>WEEE mark indicates compliance with the EU WEEE Directive</p>
<p>Safety</p>	<p>EN/IEC 61010–1: Safety requirements for electrical equipment for measurement, control and laboratory use.</p> <p>ANSI/UL 61010–1: Safety requirements for electrical equipment for measurement, control and laboratory use.</p>
<p>EMC Emission</p>	<p>EN/IEC 61000–6–3: Generic emission standard for residential, commercial and light industrial environments.</p> <p>EN/IEC 61000–6–4: Generic emission standard for industrial environments.</p> <p>CISPR 22: Radio disturbance characteristics of information technology equipment. Class B Limits.</p> <p>EN/IEC 61326: Electrical equipment for measurement, control and laboratory use – EMC emission requirements.</p>
<p>EMC Immunity</p>	<p>EN/IEC 61000–6–1: Generic standards – Immunity for residential, commercial and light industrial environments.</p> <p>EN/IEC 61000–6–2: Generic standards – Immunity for industrial environments.</p> <p>EN/IEC 61326: Electrical equipment for measurement, control and laboratory use – EMC immunity requirements.</p> <p>Note 1: The above is only guaranteed using accessories listed in this Product Data.</p> <p>Note 2: Sensitivity to RF (in accordance with EN 50082–2) < 50 μV.</p>
<p>Temperature</p>	<p>IEC 60068–2–1 & IEC 60068–2–2: Environmental Testing. Cold and Dry Heat.</p>

Ordering Information

Types 4529-B and 4529-B-001 Triaxial CCLD Accelerometers

include the following accessories:

- Carrying Box
- Individual Calibration Chart
- One Mounting Clip

Supported Brüel & Kjær Hardware

CABLING

AO-0714-x-yyy*	Flexible, single-screened coaxial extension cable with:	<ul style="list-style-type: none"> • Four-wire cable • 1/4"–28 UNF 4-pin (F) to 1/4"–28 UNF 4-pin (M) connectors • 250 °C (482 °F)
AO-0528-x-yyy*	Flexible cable with:	<ul style="list-style-type: none"> • 1/4" – 28 UNF 4-pin (F) connectors • 90 °C (194 °F)
AO-0534-x-yyy*	Flexible cable with:	<ul style="list-style-type: none"> • 1/4" – 28 UNF 4-pin (F) connector to 3 × super low-noise cables with BNC (M) connectors • 250 °C (482 °F)[†]
AO-0526-x-yyy*	Flexible cable with:	<ul style="list-style-type: none"> • 1/4" – 28 UNF 4-pin (F) connector to 3 × super low-noise cables with BNC (M) connectors • 90 °C (194 °F)[†]
AO-0740-x-yyy*	Flexible single-screened coaxial cable with:	<ul style="list-style-type: none"> • Four-wire cable • 1/4" – 28 UNF 4-pin (F) to 3 × 10 – 32 UNF (M) connectors • 250 °C (482 °F)
AO-0527-x-yyy*	Flexible cable with:	<ul style="list-style-type: none"> • 1/4" – 28 UNF 4-pin (F) connector to 3 × super low-noise cables with 10 – 32 UNF (M) connectors • 90 °C (194 °F)[†]
AO-0536-x-yyy*	Flexible cable with:	<ul style="list-style-type: none"> • 2 × circular 4-pin (F) to sub-D 37-pin (F) for connecting two triaxial accelerometers • 90 °C (194 °F)

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

† This cable has a splitter with an operating temperature range of – 40 to + 150 °C (– 40 to + 302 °F)

WA-1705 Plug Adaptor, 10–32 UNF (F) to SMB (F)
 JP-0145 Plug Adaptor, 10–32 UNF (F) to BNC (M)

MOUNTING ACCESSORIES

UA-1408 Set of 100 Mounting Clips
 UA-1474 Set of 100 Mounting Clips with thick base
 UA-1473 Set of 100 Swivel Base Clips
 UA-1480 Spirit Level for Swivel Base
 UA-1563 Set of 5 Mounting Clips for High-temperature Calibration Clip
 DV-0460 Set of 25 Dummy Accelerometers for mass loading
 UA-1417 Mounting Wax
 YJ-0216

SIGNAL CONDITIONING AND DATA ACQUISITION

WB-1453 CCLD Power Supply
 Type 3053* 12-ch. Input Module LAN-XI 25.6 kHz
 Type 3050* 4/6-ch. Input Module LAN-XI 51.2 kHz
 UA-2108[†] LAN-XI Triaxial Accelerometer Front Panel, 4-pin connectors
 UA-2107-120[†] LAN-XI High-Density Front Panel, 12 × SMB connectors
 UA-2100[†] LAN-XI General Purpose Front Panel, BNC connectors

CALIBRATION

Type 4294 Calibration Exciter

Calibration Services

ACC-T-CAF Accredited Calibration
 ACC-T-CAI Accredited Initial Calibration
 ACC-T-CFF Factory Standard Calibration with Calibration Chart
 ACC-T-CTF Traceable Calibration

* See Product Data: [BP 2215](#) for information about LAN-XI input modules

† See Product Data: [BP 2421](#) for information about LAN-XI front panels

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