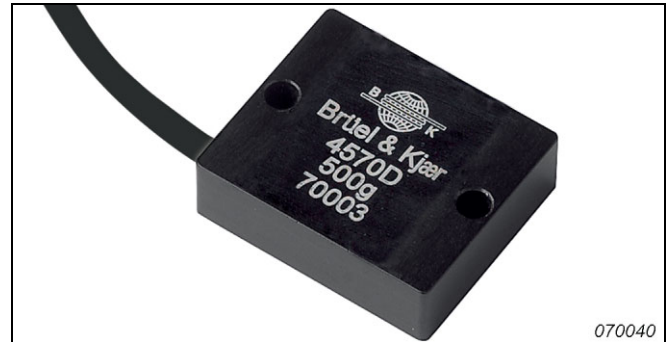


PRODUCT DATA

DC Response Accelerometers — Types 4570, 4571, 4572, 4573, 4574, and 4575

The DC Response Accelerometers are designed to measure low-frequency vibration down to DC. The gas-damped sensing element offers a wide dynamic range and very stable frequency response even after subjection to high shock levels. The accelerometer has built-in conditioning, where the sensing element and electronics are shielded, sealed and insulated from the housing.

D-versions are available offering high thermal stability from -55 to $+121^{\circ}\text{C}$.



USES AND FEATURES

USES

- Low-frequency, motion and tilt measurements
- Flight testing
- Road load testing
- Transportation
- Modal analysis

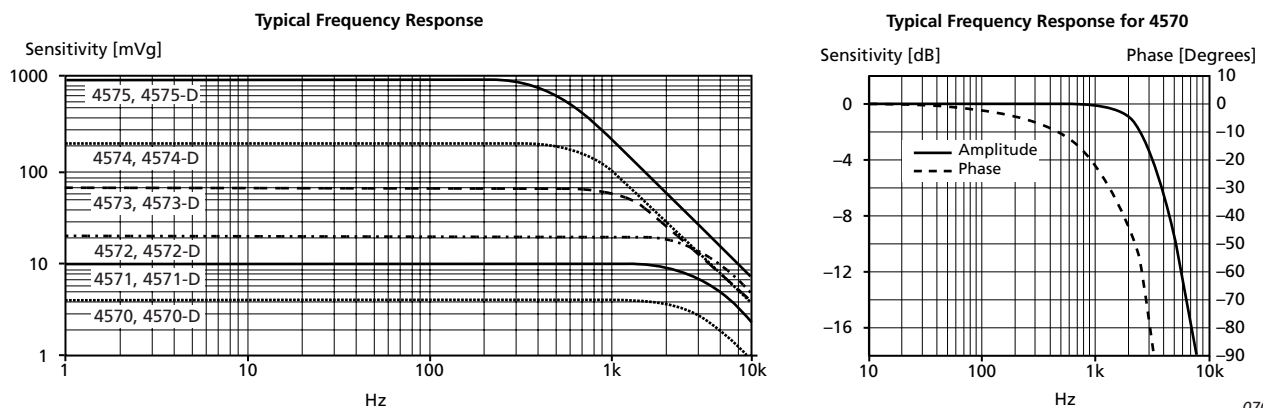
FEATURES

- High temperature stability
- Hermetically sealed
- 2 to 500 g full scale
- 10000 g shock survivability
- Low power consumption

Characteristics

The DC response accelerometers are gas-damped, resulting in minimal influence of thermal changes. These low-impedance units operate with a supply voltage from 8 to 24 V DC, and a supply current of 5 mA. The ± 2 volt differential output is DC-coupled at a bias voltage of 2.5 V DC, and a 2.5 V reference is built-in for differential measurements. The units can be used with either differential or single-ended input.

Fig. 1 Typical frequency response



The units feature an internal temperature compensation (updated at intervals of 40 ms) that minimises thermal zero shift and sensitivity shift over a wide temperature range. All types will operate from -55° to $+121^{\circ}\text{C}$. For standard versions, the thermal zero shift and thermal sensitivity shift are specified in the temperature range -20° to $+85^{\circ}\text{C}$. For high thermal stability the D-versions are compensated from -55° to $+121^{\circ}\text{C}$.

Calibration

The transducers are individually calibrated providing a 1600-point, high-resolution calibration in the specified frequency range (magnitude and phase), ultimately giving a unique characterisation and securing the integrity of the vibration measurement. Transducer sensitivity is provided at 159.2 Hz and the zero g output is in mV. The individual values for thermal zero shift and sensitivity shift at compensation limits are provided.

Data is included on the calibration chart for response equalisation with Brüel & Kjær's PULSE Multi-analyzer or post-processing software.

Physical Characteristics

Fig. 2
Accelerometer
dimensions

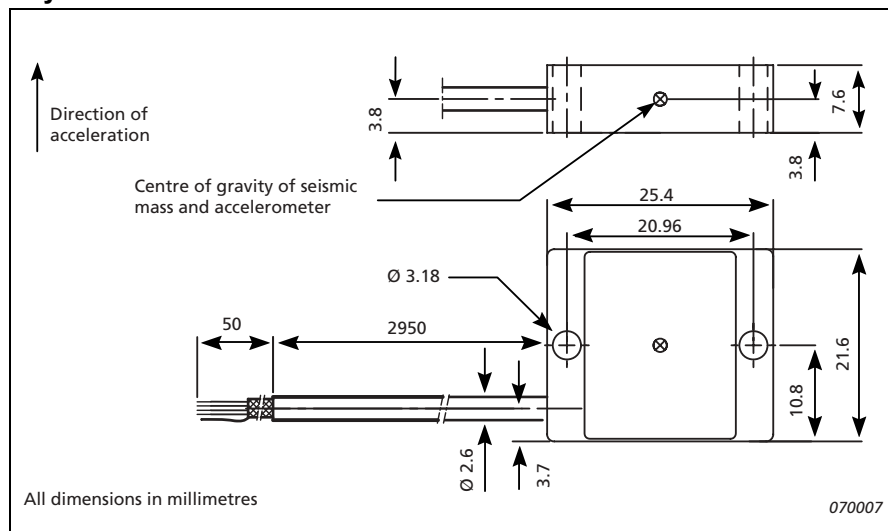
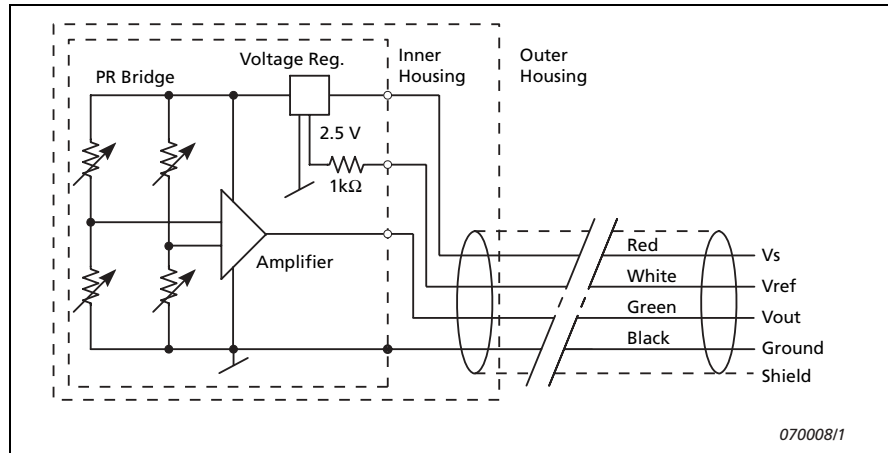


Fig. 3
Accelerometer
electronic schematics



Mounting Options

Clip Mounting

For very flexible and easy mounting, the accelerometers can be bolted to Adaptor for Clip Mounting UA-2083¹ (see Fig. 4), and applied without any change in frequency response. The adaptor has slots that enable the use of mounting clips, such as Large Mounting Clip UA-1408; Mounting Clip with Thick Base UA-1474, which can be filed down to suit the mounting surface; as well as Swivel Base UA-1473 and Spirit Level UA-1480, which make it easy to align the accelerometer to retain the coordinate system used. Finally, a high-temperature mounting clip, such as UA-1563, is available with a 10–32 UNF tapped hole for mounting. The mounting clips can then be attached to the object, with glue or double-sided adhesive tape.

Fig. 4 Side view of the accelerometer bolted to UA-2083 inserted in a mounting clip

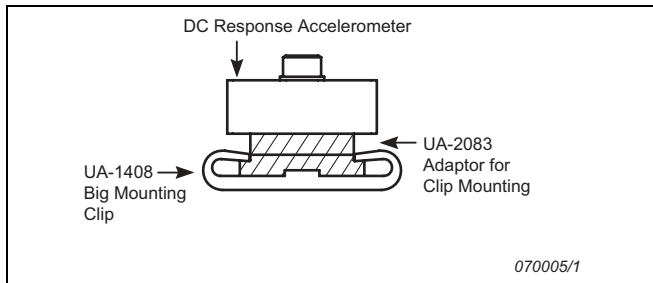
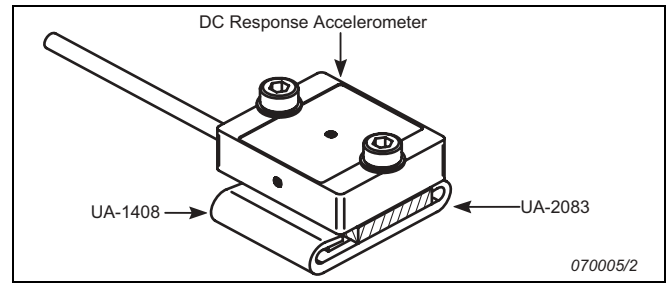


Fig. 5 Top view of the accelerometer bolted to UA-2083 on the mounting clip



Triaxial Measurements

In applications where a triaxial measurement is desired, the accelerometers can be mounted using Triaxial Mounting Block UA-2079² without any change in amplitude response ($\pm 10\%$). The material is clear hard-anodised aluminium and weighs 46 g (1.6 oz.). The block can be mounted using 6–32 UNF bolts, M4 bolts, a 10–32 UNF stud or adhesively. The recommended configuration of the accelerometers is shown in Fig. 7.

Fig. 6 Dimensions of Triaxial Mounting Block UA-2079

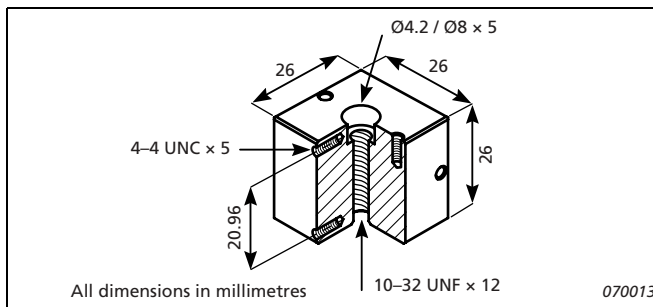
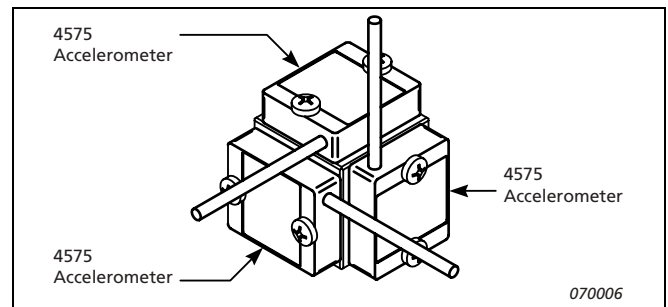


Fig. 7 Mounting configuration for UA-2079

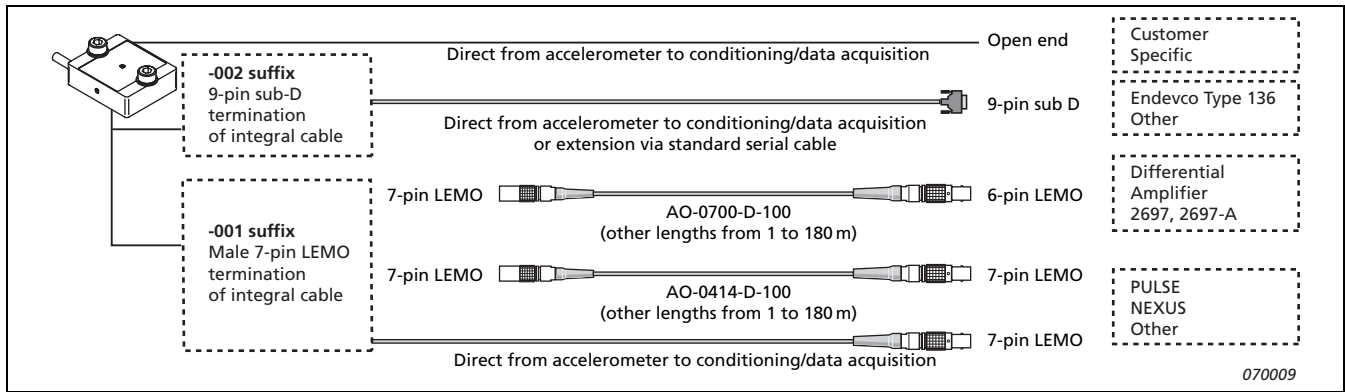


1) Adaptor for Clip Mounting UA-2083 is supplied with five standard (thin-based) clips.

2) Triaxial Mounting Block UA-2079 includes a 10–32 UNF steel stud and 25 4–40 UNC screws.

Cable Termination and Connections

Fig. 8 Cable connections



The DC Response accelerometers are available with integral cables with three different terminations dependent on the type number:

- Standard accelerometers, including D-versions, feature an integral cable with an open end
- Accelerometers with a suffix -001 (for example, 4573-001 or 4573-D-001), feature an integral cable with a 7-pin LEMO termination
- Accelerometers with a suffix -002 (for example, 4572-002 or 4572-D-002), feature an integral cable with a 9-pin sub-D terminator

Recommended Conditioning

The standard recommended conditioning available for the DC response accelerometers and lower limiting frequency are outlined in Table 1. Output can either be single-ended or differential.

Table 1

The standard recommended conditioning available for the DC response accelerometers and lower limiting frequency

	Input	AC Measurement	DC Measurement
Nexus Conditioning Amplifiers Types 2690 – 93	Single-ended Grounded	0.7 Hz (HDF)	No
	Single-ended Floating	0.7 Hz (HPF)	No
PULSE Multi-analyzer Type 3560	Single-ended Grounded (all modules)	0.15 Hz (HPF)	Yes ^a
	Single-ended Floating (Input/Output Module Type 3110)	0.15 Hz (HPF)	Yes
Differential Amplifier Type 2697	Differential	Optional	Yes
Differential Amplifier Type 2697-A		50 mHz (HPF)	Yes
Endevco® Type 136	Differential	Yes	Yes

a. Offset unspecified for Input/Output Module Type 3109

Specifications – DC Response Accelerometers Types 4570 – 4575 incl. D-versions

DYNAMIC CHARACTERISTICS

	Units	4570 4570-D	4571 4571-D	4572 4572-D	4573 4573-D	4574 4574-D	4575 4575-D
Voltage Sensitivity (@ 159.2 Hz) $\pm 10\%$	mV/ms ⁻² (g)	0.4(4)	1(10)	2(20)	6.7(67)	20(200)	100(1000)
Measuring Range	ms ⁻² (g)	$\pm 5000(500)$	$\pm 2000(200)$	$\pm 1000(100)$	$\pm 300(30)$	$\pm 100(10)$	$\pm 20(2)$
Frequency Response (typical)		see Fig. 1					
Amplitude Response 5%	Hz	0 to 1500	0 to 1500	0 to 1500	0 to 700	0 to 400	0 to 250
Amplitude Response 10%	Hz	0 to 1850	0 to 1850	0 to 1850	0 to 850	0 to 500	0 to 300
Residual Noise (DC to $f_{10\%}$)	μ V RMS	600	650	450	700	350	500
Residual Noise (0.5 to 100 Hz)	μ V RMS	140	150	100	250	150	300
Resolution (0.5 to $f_{10\%}$)	mg/ $\sqrt{\text{Hz}}$	3.5	1.5	0.5	0.35	0.075	0.03
Transverse Sensitivity	%	<3					
Max. Operational Shock	kms ⁻² (g) pk	100 (10000)					
Non-linearity	%FSO	< ± 1					
Base Strain Sensitivity @ 250 μ ε	ms ⁻²	0.2	0.2	0.2	0.03	0.07	0.07
Thermal Transient Sensitivity	Equiv. ms ⁻² /°C	0.5	0.5	0.5	0.2	0.3	0.3
Magnetic Sensitivity (50 Hz, 0.038 tesla)	ms ⁻² /T	400	120	70	40	20	4

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

Common Specifications

ELECTRICAL CHARACTERISTICS

Bias Voltage (zero g output): 2.5 \pm 0.05 V DC

Full-scale Output Voltage: ± 2 V pk

Output Impedance: <100 Ω

Ref. Voltage: 2.5 V \pm 0.005 V

Output Impedance: (V_{ref}) 1 k Ω

Supply Voltage: 8 to 24 V DC

Current: 5 mA

Insulation Resistance (case to shield): >100 M Ω

PHYSICAL CHARACTERISTICS

Weight (excl. cable): 8 g (0.282 oz.)

Case Material: Anodized aluminium

Jacket Material: TPE cable

Length of Integral Cable: 3 m (9.8 ft.)

Connector: Dependent on version:

- Open-end
- Accelerometers with -001 suffix: 7-pin LEMO
- Accelerometers with -002 suffix: 9-pin Sub-D

Mounting Provision: Holes for 4–40 UNC, M3 screws or adhesive

Output: Single-ended or differential

Environmental Characteristics

Temp. Range: –55 to +121°C (–67 to +249°F)

Thermal Zero Shift, –20 to +85°C (–4 to +185°F): < ± 40 mV

Thermal Sensitivity Shift, –20 to +85°C (–4 to +185°F): 2.1%

Humidity (sensing element): Hermetic solder seal

Humidity (case): Epoxy seal

TEMPERATURE SPECIFICATIONS (D-VERSIONS)

Temperature Range: –55 to +121°C (–67 to +249°F)

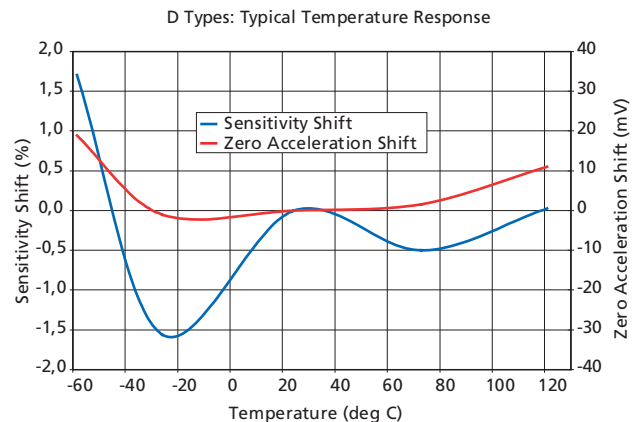
Temperature Range (compensated): –55 to +121°C

(–67 to +249°F)

Thermal Zero Shift (–55 to +121°C): ± 40 mV

Thermal Sensitivity Shift (–55 to +121°C): 3.1%



Fig. 9 Typical thermal behaviour for D-type accelerometers



070039

Other specifications available upon request. Please contact your local Brüel & Kjær representative if you have any specific requirements.

Compliance with Standards

 	CE-mark indicates compliance with: EMC Directive and Low Voltage Directive. C-Tick mark indicates compliance with the EMC requirements of Australia and New Zealand.
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.
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 Product Data sheet, and with a cable length less than 30 meter.
Temperature	IEC 60068-2-1 & IEC 60068-2-2: Environmental Testing. Cold and Dry Heat. Operating Temperature: -55 to +121°C (-67 to +249°F) Storage Temperature: -20 to +60°C (-4 to +140°F)
Humidity	IEC 60068-2-78: Damp Heat: 90% RH (non-condensing at 40°C (104°F)).

Ordering Information

All types include the following accessories:

- Carrying box
- Calibration chart
- 2 × 4-40 UNC socket head cap screw (length: 11 mm) with washer
- QA-0013: Hex wrench

UA-1474	Set of 100 Mounting Clips, Thick Base
UA-1480	Spirit Level for Swivel Bases
UA-1563	Set of 5 High-temperature Clips
UA-2079	Triaxial Mounting Block
UA-2080	25 pcs of 4-40 UNC socket head cap screws (length: 11 mm) with washer
UA-2083	Adaptor for Clip Mounting

Optional Accessories

AO-0414	Extension cable 7-pin LEMO 1B male to female connector
AO-0700	Extension cable 7-pin LEMO 1B to 6-pin LEMO 0B connector
DV-0460	Big Calibration Clip
UA-1408	Set of 100 Mounting Clips
UA-1473	Set of 100 Swivel Bases

Calibration Services

To order Accredited Calibration, specify product type number followed by 'CAF' (for example, 4570-CAF, 4575-CAF, etc.)

To order Factory Standard Calibration, specify product type number followed by 'CFF' (for example, 4570-CFF, 4575-CFF, etc.)

TRADEMARKS

ENDEVCO is a registered trademark of ENDEVCO Corporation

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

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