

## CCLD Triaxial Seat Accelerometer Types 4515-B and 4515-B-002

Piezoelectric Accelerometer

### Uses

- Field measurement of human whole-body vibration
- Test and measurement of passenger and work vehicles

### Features

- Complies with ISO 2631, ISO 7096 and ISO 10326-1
- Removable triaxial accelerometer built into rubber pad
- Low impedance output
- High resolution (100 mV/g) with <0.4 mg residual noise
- Transducer electronic data sheet (TEDS)
- Exceptional lower limiting frequency



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### Description

Accelerometer Type 4515-B is specially designed for the measurement of whole-body vibration. It consists of a triaxial accelerometer housed in a semi-rigid nitrile rubber disc and complies with ISO 7096, ISO 2631 and ISO 10326-1. It can be placed under a seated person, on a vibrating surface with a suitable weight on top, or strapped onto the body. It detects vibration in directions along the body, back-to-front, and side-to-side.

Type 4515-B includes transducer electronic data sheet (TEDS), which contains sensor- and application-specific information, including frequency response. The built-in accelerometer is mounted inside the rubber pad by means of a clip facilitating easy removal, calibration, and subsequent remounting.

For Type 4515-B, the 3 m integral cable terminates in 3 × 10–32 UNF connectors. Furthermore, 3 × JP- 0145 adapters (10–32 UNF to BNC) are supplied for flexible connectivity.

Type 4515-B-002 terminates in a 4-pin LEMO connector.

### Characteristics

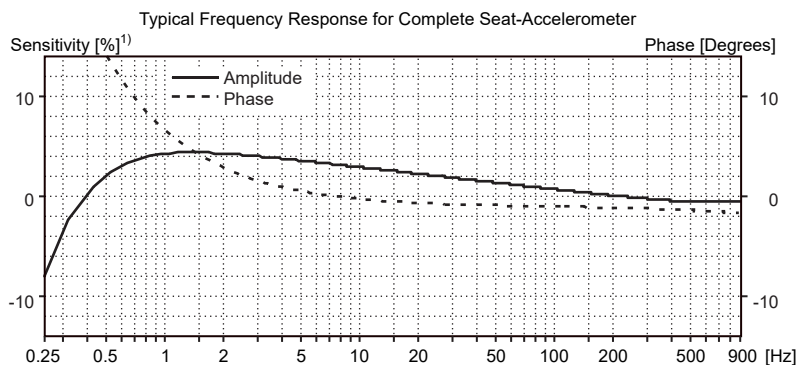
Type 4515-B has a CCLD\* built-in preamplifier providing a low-impedance output. The sensitivity is expressed in voltage per unit acceleration ( $\text{mV}/\text{ms}^{-2}$ ).

The OrthoShear™ design used in Type 4515-B is built around a common seismic mass. This uni-mass design results in a very compact triaxial accelerometer with excellent low-frequency response. All the axes have the same point of reference and the design also ensures accurate and consistent measurements, even when the accelerometer is exposed to complex vibration patterns.

### Calibration

Prior to mounting the accelerometer in the rubber pad it is individually calibrated, providing an 800-point, high-resolution calibration (magnitude and phase) giving a unique characterisation and securing the integrity of the typical frequency response of the seat pad.

\* CCLD: Constant Current Line Drive, also known as DeltaTron®. ICP and IEPE compatible



¹) Deviation from Reference Sensitivity

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	Unit	4515-B and 4515-B-002*
<b>Dynamic Characteristic</b>		
Voltage Sensitivity (@ 160 Hz)	mV/ms <sup>-2</sup> (mV/g)	10 ±5% (100 +3/-7%)
Measuring Range	ms <sup>-2</sup> (g)	±500 (±50)
Frequency Response		See typical amplitude response
Mounted Resonance Frequency	Hz	>2700
Amplitude Response ±10%	Hz	0.25 to 900
Residual Noise	mg	<0.4
Transverse Sensitivity†	%	<5
<b>Electrical Characteristics</b>		
DC Output Bias Voltage	V DC	13 ±1
Output Impedance	Ω	<30
Grounding	V	Case insulated
<b>Power Requirements (All three axes must be powered during operation)</b>		
Constant Current Supply	mA	2 to 10
Supply Voltage (unloaded)	V DC	24 to 30
Warm-up Time (90% of stabilized bias)	s	10
<b>Environmental Characteristics</b>		
Temperature Range	°C (°F)	-10 to +70 (-14 to +158) -60 to +100 for short periods
Humidity		Hermetic
Max. Operational Sinusoidal Vibration (peak)	ms <sup>-2</sup> (g)	5000 (500)
Max. Operational Shock (peak)	ms <sup>-2</sup> (g)	50000 (5000)
Thermal Transient Sensitivity	Equiv. ms <sup>-2</sup> /°C (g/°F)	0.1 (0.005)
Magnetic Sensitivity (50 Hz – 0.03 Tesla)	ms <sup>-2</sup> T (g/T)	20 (2)
<b>Physical Characteristics</b>		
Dimensions		See outline drawing below
Weight	gram (oz)	345 (14.1)
Base Disc		Nickle-plated Brass
Seat Pad Material		Oil-resistant Nitrile Rubber Hardness: ~80 RHD
Cable		Integral Cable, 3 m
Connector		4515-B: 3 × 10–32 UNF 4515-B-002: 4-pin LEMO
Mounting		Strapped, adhesive or pressed

**Type 4515-B** CCLD Triaxial Seat Accelerometer, with 3 m integral cable to 3 × 10–32 UNF

**Type 4515-B-002** CCLD Triaxial Seat Accelerometer, with 3 m integral cable to 4-pin LEMO

both include the following accessories:

- Carrying box
  - Calibration Chart
  - Straps for body mounting
- Type 4515-B also includes
- 3 × 10–32 UNF adapters

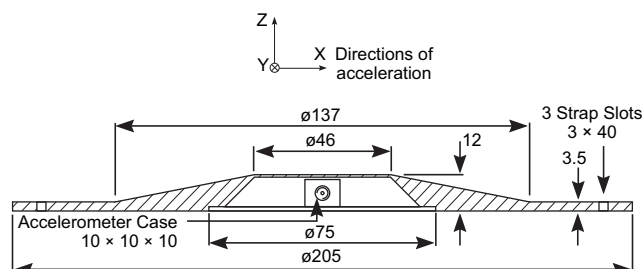
<b>Optional Accessories*</b>	
JJ-0032	Extension Connector 10–32 UNF
AO-0527	Cable with 4-pin to 3 × 10–32 UNF Connectors, 85 °C (185 °F)
UA-2074	Replacement Rubber Pad for Type 4515-B, incl. 5 m cable
JP-0145	BNC to 10–32 UNF Plug Adapter
<b>Calibration Services</b>	
ACC-T-CAF	Accredited Calibration
ACC-T-CAI	Accredited Initial Calibration
ACC-T-CFF	Factory Standard Calibration with calibration chart
ACC-T-CTF	Traceable Calibration

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

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 WEEE mark indicates compliance with the EU WEEE Directive

\* All values are typical at 25 °C (77 °F) unless otherwise specified  
 † Associated with approximately 4% uncertainty from electrical noise of the test equipment



All dimensions in millimetres

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