

Calibration Chart for DeltaTron® Accelerometer Type 4397 A

Serial No.: 2258426

Reference Sensitivity ¹⁾ at 159.2 Hz ($\omega = 1000 \text{ s}^{-1}$), 20 ms^{-2} RMS,
4 mA supply current and 22 °C: 1.010 mV/ ms^{-2} (9.90 mV/g)

Frequency Range: Amplitude ($\pm 10\%$): 1 Hz to 25 kHz
Phase ($\pm 5^\circ$): 4 Hz to 2.5 kHz

Mounted Resonance Frequency: 53 kHz

Transverse Sensitivity ²⁾:
Maximum (at 30 Hz, 100 ms^{-2}): 1.9 % re Reference Sensitivity
Angle of minimum, α : (see drawing) 130 °

Transverse Resonance Frequency: 17 kHz

Calculated values for TEDS ³⁾: Resonance frequency: 50.7 kHz
Quality factor @ f_{res} : 98
Amplitude slope: -2.0 %/decade
High pass cut-off frequency: 0.04 Hz
Low pass cut-off frequency: 4.2 kHz

Measuring Range: T < 100°C: $\pm 7500 \text{ ms}^{-2}$ peak ($\pm 750 \text{ g}$ peak)
T < 125°C: $\pm 5000 \text{ ms}^{-2}$ peak ($\pm 500 \text{ g}$ peak)

Polarity of the electrical signal is positive for an acceleration in the direction of the arrow on the drawing.



Electrical:

Bias Voltage: at 25°C and 4 mA: +12 V \pm 0.5 V
at full temperature and current range: +8 V to +15 V

Power Supply requirements: Constant Current: T < 100°C: +2 to +20 mA
T < 125°C: +2 to +10 mA
Unloaded Supply Voltage: +24 V to +30 V

Output Impedance: 10 Ω

Start-up time (to final bias $\pm 10\%$): 5 s

Inherent Noise (RMS):
Broadband (1 Hz to 22 kHz): < 15 μV
corresponding to < 0.015 ms^{-2} (< 1500 μg)

Spectral: 10 Hz: 7.9x10⁻⁴ $\text{ms}^{-2}/\sqrt{\text{Hz}}$ (79 $\mu\text{g}/\sqrt{\text{Hz}}$)
100 Hz: 2.1x10⁻⁴ $\text{ms}^{-2}/\sqrt{\text{Hz}}$ (21 $\mu\text{g}/\sqrt{\text{Hz}}$)
1000 Hz: 1.4x10⁻⁴ $\text{ms}^{-2}/\sqrt{\text{Hz}}$ (14 $\mu\text{g}/\sqrt{\text{Hz}}$)

Ground Loops can introduce error signals. These can be avoided by insulating the accelerometer from the mounting surface using Insulating Stud UA 1216.

Recommended cable: AO 1381

Environmental:

Temperature Range: -50 to +125°C (-58 to +257°F)

Temperature Coefficient of Sensitivity: +0.05%/°C

Temp. Transient Sensitivity (3 Hz Low Lim. Frq. (-3 dB, 6 dB/oct)): 2 $\text{ms}^{-2}/^\circ\text{C}$

Magnetic Sensitivity (50 Hz, 0.038 T): 50 ms^{-2}/T

Acoustic Sensitivity (154 dB SPL): 0.01 ms^{-2}

Base Strain Sensitivity (at 250 μe in base plane): 0.005 $\text{ms}^{-2}/\mu\text{e}$

Max. Non-destructive Shock: Axial: 100 kms^{-2} peak (10000 g peak)
Transverse: 50 kms^{-2} peak (5000 g peak)

Humidity: 90 % RH non-condensing

Mechanical:

Case Material: Titanium ASTM Grade 2

Sensing Element: Piezoelectric, Type PZ 23

Construction: Delta Shear®

Sealing: Welded

Weight: 2.4 gram (0.085 oz)

Electrical Connector: Coaxial M3

Mounting Thread: M3. Depth 2.4 mm

Mounting Surface Flatness: < 3 μm

Mounting Torque: Max. 0.6 Nm (5.3 lbf-in). Min. 0.2 Nm (1.8 lbf-in)

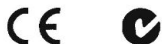
¹⁾ This calibration is obtained on a modified Brüel & Kjær Calibration System Type 9610 System No.: 152117.3 and is traceable (amplitude only) to the National Institute of Standards and Technology, USA and Physikalisch-Technische Bundesanstalt, Germany.
The expanded uncertainty 5 Hz to 4 kHz: 1.0%, 4 kHz to 7 kHz: 1.4% and 7 kHz to 10 kHz: 2.0% is determined in accordance with EAL-R2. A coverage factor k=2 is used. This corresponds to a coverage probability of 95% for a normal distribution.

²⁾ The uncertainty is 0.3% of Reference Sensitivity and 5° on the angle.

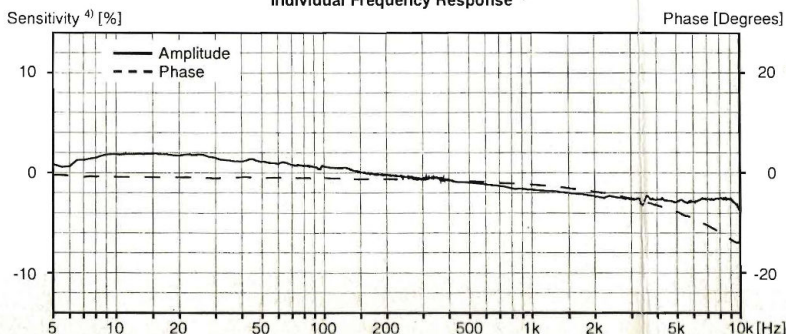
³⁾ Transducer Electronic Data Sheet according to IEEE P1451.4. Built-in ID-information not included.

⁴⁾ Deviation from Reference Sensitivity.

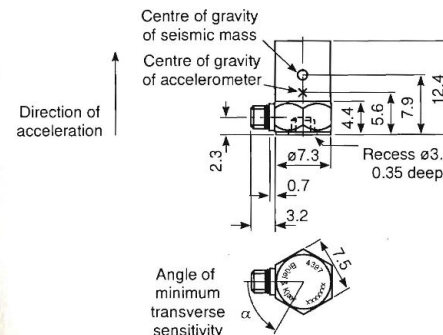
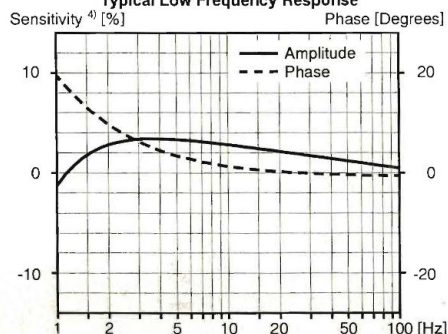
For further information, please see <http://www.bksv.com> and Product Data Sheet BP 1288 and BP 1849.



Individual Frequency Response ¹⁾



Typical Low Frequency Response



All dimensions in millimetres

Date 31 May 2001 Operator CJ

Specifications obtained in accordance with ANSI S2.11-1969 and parts of ISO 5347.

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

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