

Product Data

Hand-Arm Transducer Set — Type 4392 and Triaxial Seat-Accelerometer — Type 4322

FEATURES (Type 4392):

- Small, low mass accelerometer, Type 4374
- Handle adaptor with two orthogonal mounting holes
- Hand adaptor with three orthogonal mounting holes

USES (Type 4392):

- Field measurement of human hand-arm vibrations

FEATURES (Type 4322):

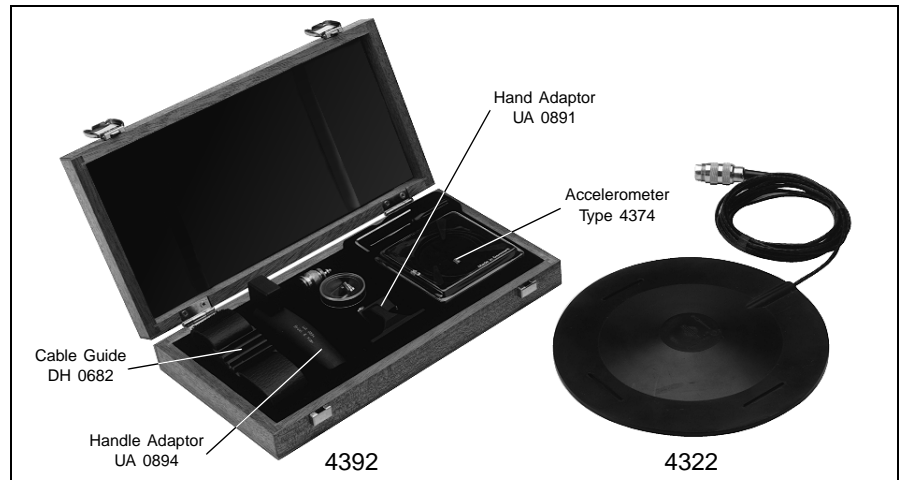
- Triaxial accelerometer built into rubber pad
- Complies with SAE J 1013 and ISO 7096

USES (Type 4322):

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

Hand-Arm Transducer Set Type 4392 includes an Accelerometer Type 4374 and two adaptors, Handle Adaptor UA 0894 and Hand Adaptor UA 0891. The accelerometer is mounted on the adaptors, which transmit the vibration from the hand to the accelerometer directly. This avoids the problem of mounting accelerometers on tool handles.

Triaxial Seat-Accelerometer Type 4322 is specially designed for measuring whole-body vibration and is well suited for field and laboratory use. It is housed in a rubber pad which is shaped for comfortable seating.



Hand-Arm Transducer Set Type 4392

Accelerometer Type 4374

Accelerometer Type 4374 is a low-mass piezoelectric transducer with integral cable. A full description is contained in Product Data Sheet "Piezoelectric Accelerometers".

Handle Adaptor UA0894

Handle Adaptor UA 0894 is placed on the tool handle where the hand grips the tool. It is a curved metal strip with a mounting block on one end which accommodates two Accelerometers Type 4374 (see Fig. 1). One mounting hole is aligned parallel to the tool handle, the other perpendicular. The mounting block is covered

with a protective cap and the cables are channelled along the underside of the adaptor.

Transmission of vibration through the adaptor is largely independent of frequency in the range specified by ISO 5349 (Fig. 1). Since tools with very high peak acceleration at high frequencies can overload accelerometers, butyl rubber sheets are supplied for use as mechanical filters. They will not usually affect the response in the frequency range of interest.

Hand Adaptor UA0891

Hand Adaptor UA 0891 is held between two fingers and the base plate is placed in contact with the tool surface. Three mutually perpendicular mounting holes accommodate Accelerometer Type 4374 (see Fig. 2). The

accelerometer cables are guided through the wrist strap with a cable guide (DH0682).

Transmission of the vibration is independent of frequency through most of the frequency range specified in ISO 5349 although there is some resonance at higher frequencies (Fig. 2). Consequently, when assessing tools with dominating vibrations in the high frequency region, such as percussive drills, it is preferable to use the handle adaptor. The hand adaptor is recommended for tools with low frequency vibrations such as chain saws.

Hand-Arm Measurements

Hand-Arm Transducer Set Type 4392 is suited for use with Brüel & Kjær Human-vibration Unit Type 2522

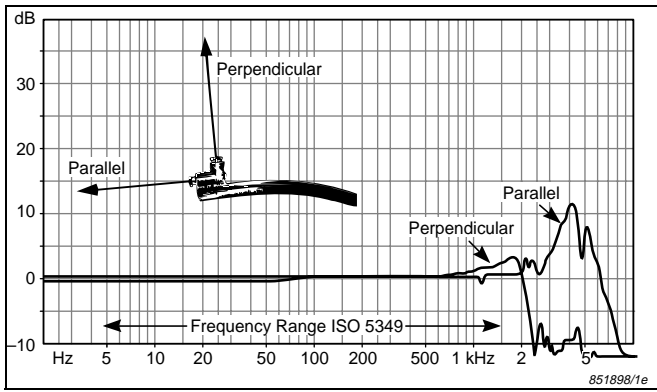


Fig.1 Typical frequency response for Handle Adaptor UA 0894

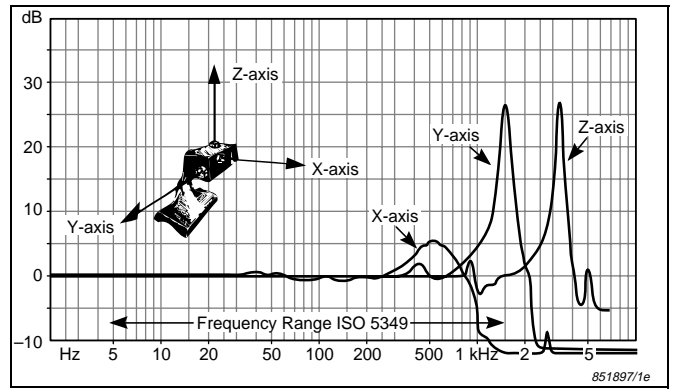


Fig.2 Typical frequency response for Handle Adaptor UA 0891

(used with Types 2231 and BZ 7116) and Integrating Vibration Meters Types 2513 and 2516. All incorporate hand-arm weighting filters which comply with ISO 5349. Type 2522 can also make measurements and store data without the need for other equipment. Types 2513 and 2516 are low-cost, hand-held instruments which are also suitable for general vibration measurements. The special version Type 2513/WH1972 is optimized for hand-arm measurements.

Triaxial Seat-Accelerometer Type 4322

Accelerometer Type 4322 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 SAE Recommended Practice J1013 (1973) and ISO 7096. 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.

Whole-Body Measurements

Together with Types 2231 and BZ 7116, Human-vibration Unit Type 2522 offers simultaneous measurement and recording in all three measurement axes for the assessment of whole-body vibration (ISO 2631). The signal can be recorded using Portable Tape Recorder Type 7007 and Cable Adaptor Type WL0547.

Specifications 4392

<p>ACCELEROMETER TYPE 4374 Charge Sensitivity: -0.11 pC/ms^{-2} Frequency Range: 1 to 26000Hz Capacitance: 600 pF Weight: 0.65g (0.023oz.)</p> <p>HANDLE ADAPTOR UA 0894 Frequency Range: See Fig. 1 Measuring Directions: Parallel and perpendicular to the handle Dimensions: 90.0 × 22.5 mm (3.5 × 0.9in) Weight: 24g (0.85oz.)</p>	<p>Material: Anodized aluminium</p> <p>HANDLE ADAPTOR UA 0891 Frequency Range: See Fig. 2 Measuring Directions: X-, Y-, Z-axes of biodynamic coordinate system Dimensions of Base Plate: 50×11 mm (1.97 × 0.43in) Weight: 20g (0.7oz.) Material: Anodized aluminium</p>	<p>ACCESSORIES INCLUDED:</p> <p>Type 4374: Accelerometer (incl. AO 0038) Handle Adaptor with 3 butyl rubber sheets UA 0894</p> <p>UA 0891: Hand Adaptor with leather strap JP 0162: Input Adaptor (for Type 2513) JJ 0032: Extension Connectors (set of 3) QA 0123: Allen Key DH 0682: Cable Guide</p> <p>ACCESSORIES AVAILABLE:</p> <p>AO 0038: Extension Transducer Cable</p>
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Specifications 4322

<p>BUILT-IN TRIAXIAL ELEMENT: Weight: 50g approx. Charge Sensitivity: $1 \text{ pC/ms}^{-2} \pm 2\%$ Frequency Range: 0.1Hz to 2kHz (+5%) Capacitance: 1200pF (incl. cable)</p> <p>COMPLETE SEAT-ACCELEROMETER: Weight: 400g approx. Frequency Range: 0.1Hz to 100Hz (on simulated seat)</p>	<p>DIMENSIONS: Diameter: 205 mm (8.08in) Height: 3mm (0.12in) at edges increasing to 12 mm (0.47in) in centre</p> <p>MATERIALS: Moulded Cushion: Oil resistant nitrile rubber, hardness ~80 IRHD Base Disc: Nickel-plated brass</p>	<p>OPERATING TEMPERATURE: -10 to $+70^\circ\text{C}$ (-14 to 158°F) -60 to $+150^\circ\text{C}$ for short periods</p> <p>CABLE: JP 0602: 3m, three-in-one, low-noise, Teflon insulated cable with 6 pin DIN plug</p> <p>ACCESSORIES AVAILABLE: WL 0547: Cable Adaptor (for use with 7007)</p>
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