

AS-A,-B,-TA,-TB Acceleration Transducers AS-HA,-HB Acceleration Transducers

INSTRUCTION MANUAL

Thank you for purchasing this KYOWA product. Before using it, read this instruction manual carefully. Also, keep the manual within easy reach so that you can refer to it whenever necessary.

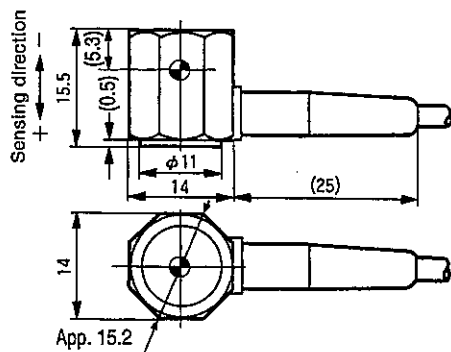
1. [Notes] calling the operator's attention

Notes In order to avoid instrument failure or malfunction, be sure to observe the accompanying instructions.

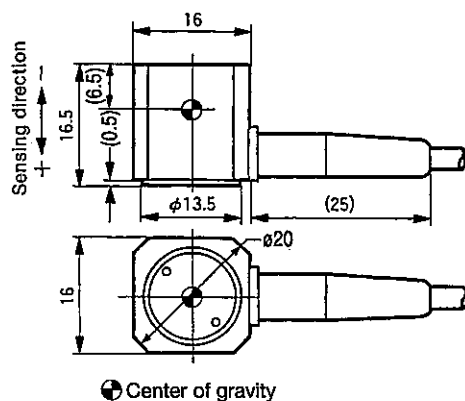
2. Mounting

- 2.1 The dimensions of each transducer are illustrated below.
To mount the transducer, carefully align its sensing direction with the direction of acceleration.
Use an adhesive to mount AS-A, -B, -HA or -HB. Use screws to mount AS-TA or -TB.
- 2.2 To bond the transducer with the adhesive (CC-33A), thoroughly clean the bonding area of the measuring object. Remove dust, oil and rust from the area using sandpaper and acetone.
Also, thoroughly clean the bonding area of the transducer itself.
- 2.3 To bond the transducer, apply drops of the adhesive to the bonding surface of the transducer, and press it onto the measuring object for 30 seconds. Then leave the transducer installation as it is for 30 minutes for adhesive strength to develop.
- 2.4 Be sure to fix the cable to the measurement object as much close as possible to the transducer mainframe. If circumstances do not allow to fix the cable to the measurement object, let the cable to slack in such a manner that it will not be pulled after mounting.
- 2.5 The transducer cannot be mounted to a curved surface. Use a jig or prepare a flat mounting area on the curved surface.

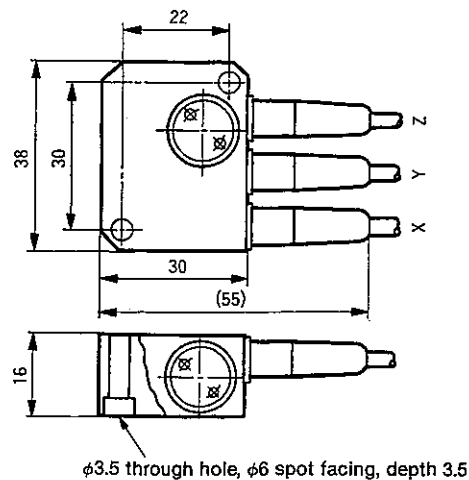
• AS-A, -HA



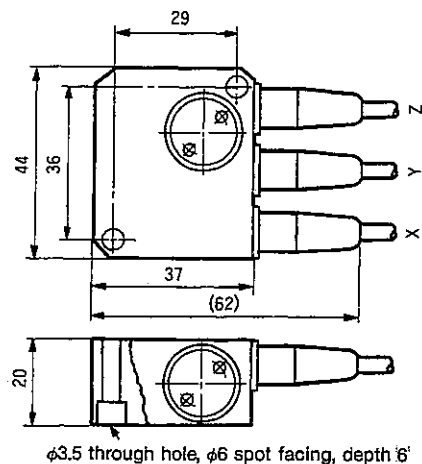
• AS-B, -HB



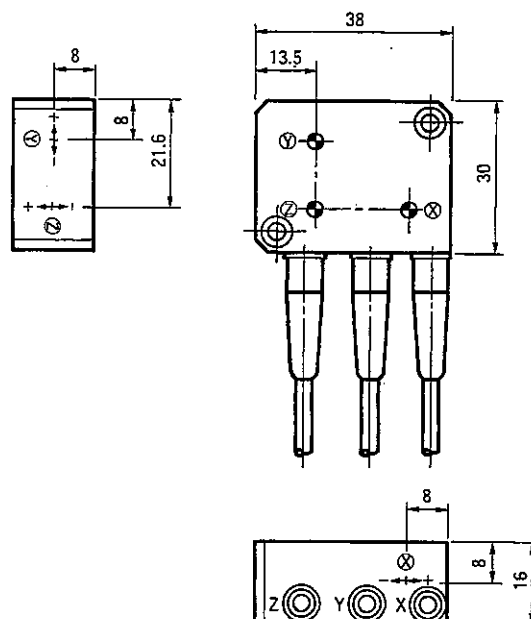
• AS-TA



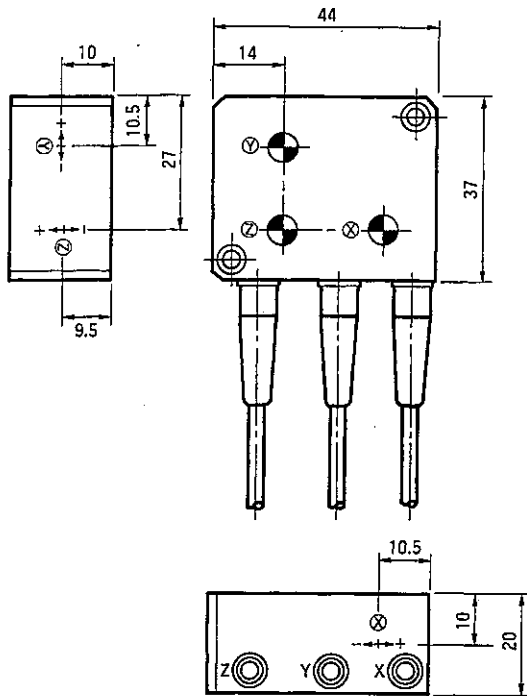
• AS-TB



• AS-TA



•AS-TB

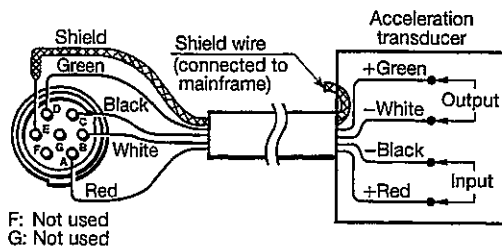


Notes

- This transducer is very sensitive to shocks. If the transducer is dropped or hit by a hard matter, thus receiving impact in excess of the allowable overload rating, damage may be caused. To avoid harm, be sure to handle it very carefully.
- Install the transducer carefully because its frequency characteristics may vary depending on the state of installation. The ideal installation is such that the transducer completely and firmly adheres to a measuring object. Avoid such manners as to subject the transducer to a bending or twisting force.
- The transducer is not waterproof, therefore avoid using it where it may be exposed to water or in environments whose humidity is over 85%RH.

3. Connection

- 3.1 Connect the transducer to a strain amplifier.
- 3.2 Observe the pin assignment of the connector illustrated below.



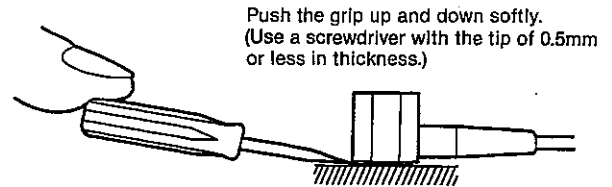
Notes

- A bridge excitation voltage should be in a range of 1 to 3V.
- A voltage other than 1 to 3V does not satisfy the specifications.
- Be sure to start measurement 5 minutes or a longer time after power was switched on.

- 3.3 By directing the [+] arrow mark, which indicates the sensing direction, to the centrosphere (the direction of gravitational acceleration), the transducer's output will possess the positive polarity.

4. Dismounting

- 4.1 To dismount the transducer which was bonded with the adhesive, apply a solvent (dimethylformamide), to the bonding area then leave it as it is for about 2 minutes. Next, apply the tip of a screwdriver to the bonding position and softly push the screwdriver grip up and down. If this does not work, apply the solvent anew and repeat the same procedure. Avoid forcible dismounting, or deterioration of the transducer characteristics or breakdown may be caused.



5. Conversion of output

- 5.1 To convert output, use the calibration factor stated in the calibration sheet.
- 5.2 When a strain amplifier is used, a measurement value reads in $\epsilon \times 10^{-6}$ strain. This reading together with the calibration factor stated in the calibration sheet enable to find the acceleration value.

$$\text{Acceleration (m/s}^2\text{)} = \text{Reading of strain amplifier } (\epsilon \times 10^{-6}) \times \text{Calibration factor, (m/s}^2 / 1 \times 10^{-6}\text{)}$$

- 5.3 If you use an amplifier of other type, it is necessary to measure the applied bridge exciting voltage accurately. The calibration sheet states the acceleration value which corresponds to 1 μ V output against 1V bridge voltage applied.

$$\text{Acceleration (m/s}^2\text{)} = \frac{\text{Bridge output voltage } (\mu\text{V})}{\text{Bridge excitation voltage (V)} \times \text{Calibration factor, (m/s}^2 / 1 \mu\text{V/V)}}$$

6. Storing precautions and inspection

- 6.1 Avoid water, oil and dust on the connector.
- 6.2 After use, clean the transducer and store in the accessory case.
- 6.3 If the initial value and/or reading value are found abnormal, measure input/output resistance and insulation resistance (which should be 100M Ω). If the measured values differ from the calibration sheet, the cause may be failure of the sensing element. In this case, contact your KYOWA representative for necessary inspection and repair by the manufacturer.

CAUTION: In measuring insulation resistance, do NOT apply a voltage exceeding 50V to the insulation tester.

Reference

The relation between acceleration vibration and amplitude is as follows.

$$\text{Acceleration (m/s}^2\text{)} = a4\pi^2f^2 \quad \text{where } a: \text{Amplitude (m)} \\ f: \text{Vibration (Hz)}$$

Note

- Do NOT disassemble the transducer.

7. Specifications

•AS-A, -B

Model	Rated capacity	Response freq. range (23°C)	Resonant freq. range
AS-10B	$\pm 98.07 \text{ m/s}^2$ ($\pm 10\text{G}$)	DC~350Hz Sensitivity Deviation: $\pm 5\%$	App. 0.49kHz
AS-20B	$\pm 196.1 \text{ m/s}^2$ ($\pm 20\text{G}$)	DC~500Hz Sensitivity Deviation: $\pm 5\%$	App. 0.75kHz
AS-50B	$\pm 490.3 \text{ m/s}^2$ ($\pm 50\text{G}$)	DC~1kHz Sensitivity Deviation: $\pm 5\%$	App. 1.4kHz
AS-100A	$\pm 980.7 \text{ m/s}^2$ ($\pm 100\text{G}$)	DC~1.2kHz Sensitivity Deviation: $\pm 5\%$	App. 2.0kHz
AS-200A	$\pm 1961 \text{ m/s}^2$ ($\pm 200\text{G}$)	DC~2.1kHz Sensitivity Deviation: $\pm 5\%$	App. 2.8kHz
AS-500A	$\pm 4903 \text{ m/s}^2$ ($\pm 500\text{G}$)	DC~3kHz Sensitivity Deviation: $\pm 10\%$	App. 4.8kHz
AS-1000A	$\pm 9807 \text{ m/s}^2$ ($\pm 1000\text{G}$)	DC~5kHz Sensitivity Deviation: $\pm 10\%$	App. 7.5kHz

Note: The unit and numerical value in parentheses depned on the conventional unit expression and are just for reference.

Rated output: AS-A: 0.5mV/V(1000 × 10⁻⁶ strain) or higher
AS-B: 0.5mV/V(1000 × 10⁻⁶ strain) $\pm 20\%$ (10B: $\pm 25\%$)

Non-linearity: $\pm 1\% \text{RO}$
Hysteresis: $\pm 1\% \text{RO}$
Bridge resistance: 120 $\Omega \pm 5\%$
Recommended bridge voltage: 1 to 3V, AC or DC
Safe bridge voltage: 6V, AC or DC
Lateral sensitivity: $\pm 2\%$ or better
Safe temp. range: -10 to 60°C
Damping ratio: App. 0.64 (23°C)
Safe overload rating: 300%
Cable: 0.08mm² 4-conductor shielded vinyl 5m, $\phi 3.2\text{mm}$, terminated in connector plug
Weight: AS-A: App. 6.5g (excl. cable)
AS-B: App. 13g (excl. cable)

■ Accessories: Calibration sheet 1
Instruction manual 1
Guarantee 1

•AS-HA, -HB

Model	Rated capacity	Response freq. range (23°C)	Resonant freq. range
AS-10HB	$\pm 98.07 \text{ m/s}^2$ ($\pm 10\text{G}$)	DC~500Hz Sensitivity Deviation: $\pm 5\%$	App. 0.85kHz
AS-20HB	$\pm 196.1 \text{ m/s}^2$ ($\pm 20\text{G}$)	DC~650Hz Sensitivity Deviation: $\pm 5\%$	App. 1.3kHz
AS-50HB	$\pm 490.3 \text{ m/s}^2$ ($\pm 50\text{G}$)	DC~1.5kHz Sensitivity Deviation: $\pm 5\%$	App. 2.3kHz
AS-100HA	$\pm 980.7 \text{ m/s}^2$ ($\pm 100\text{G}$)	DC~2kHz Sensitivity Deviation: $\pm 5\%$	App. 4.0kHz
AS-200HA	$\pm 1961 \text{ m/s}^2$ ($\pm 200\text{G}$)	DC~3.5kHz Sensitivity Deviation: $\pm 5\%$	App. 6.0kHz
AS-500HA	$\pm 4903 \text{ m/s}^2$ ($\pm 500\text{G}$)	DC~5kHz Sensitivity Deviation: $\pm 10\%$	App. 9.0kHz
AS-1000HA	$\pm 9807 \text{ m/s}^2$ ($\pm 1000\text{G}$)	DC~7kHz Sensitivity Deviation: $\pm 10\%$	App. 12kHz

Note: The unit and numerical value in parentheses depned on the conventional unit expression and are just for reference.

Rated output: 0.5mV/V(1000 × 10⁻⁶ strain) $\pm 20\%$ (10HB: $\pm 25\%$)
Non-linearity: $\pm 1\% \text{RO}$
Hysteresis: $\pm 1\% \text{RO}$
Bridge resistance: Input: 120 $\Omega \pm 8.3\%$
Output: 120 $\Omega \pm 8.3\%$ (AS-HB: 140 $\Omega \pm 7.1\%$)
Recommended bridge voltage: 1 to 3V, AC or DC
Safe bridge voltage: 6V, AC or DC

Lateral sensitivity: $\pm 2\%$ or better
Safe temp. range: -15 to 65°C
Damping Ratio: App. 0.64 (23°C)
Safe overload rating: 300%
Cable: 0.08mm² 4-conductor shielded vinyl 5m, $\phi 3.2\text{mm}$, terminated in connector plug
Weight: AS-HA: App. 6.5g (excl. cable)
AS-HB: App. 13g (excl. cable)

■ Accessories: Calibration sheet 1
Instruction manual 1
Guarantee 1

•AS-TA, -TB

Model	Rated capacity	Response freq. range (23°C)	Resonant freq. range
AS-10TB	$\pm 98.07 \text{ m/s}^2$ ($\pm 10\text{G}$)	DC~350Hz Sensitivity Deviation: $\pm 5\%$	App. 0.49kHz
AS-20TB	$\pm 196.1 \text{ m/s}^2$ ($\pm 20\text{G}$)	DC~500Hz Sensitivity Deviation: $\pm 5\%$	App. 0.75kHz
AS-50TB	$\pm 490.3 \text{ m/s}^2$ ($\pm 50\text{G}$)	DC~1kHz Sensitivity Deviation: $\pm 5\%$	App. 1.4kHz
AS-100TA	$\pm 980.7 \text{ m/s}^2$ ($\pm 100\text{G}$)	DC~1.2kHz Sensitivity Deviation: $\pm 5\%$	App. 2.0kHz
AS-200TA	$\pm 1961 \text{ m/s}^2$ ($\pm 200\text{G}$)	DC~2.1kHz Sensitivity Deviation: $\pm 5\%$	App. 2.8kHz
AS-500TA	$\pm 4903 \text{ m/s}^2$ ($\pm 500\text{G}$)	DC~3kHz Sensitivity Deviation: $\pm 10\%$	App. 4.8kHz
AS-1000TA	$\pm 9807 \text{ m/s}^2$ ($\pm 1000\text{G}$)	DC~5kHz Sensitivity Deviation: $\pm 10\%$	App. 7.5kHz

Note: The unit and numerical value in parentheses depned on the conventional unit expression and are just for reference.

Rated output: AS-TA: 0.5mV/V(1000 × 10⁻⁶ strain) or higher
AS-TB: 0.5mV/V(1000 × 10⁻⁶ strain) $\pm 20\%$ (10TB: $\pm 25\%$)

Non-linearity: $\pm 1\% \text{RO}$
Hysteresis: $\pm 1\% \text{RO}$
Bridge resistance: 120 $\Omega \pm 5\%$
Recommended bridge voltage: 1 to 3V, AC or DC
Safe bridge voltage: 6V, AC or DC
Lateral sensitivity: $\pm 2\%$ or better
Safe temp. range: -15 to 65°C
Damping Ratio: App. 0.64 (23°C)
Safe overload rating: 300% (on each axis)
Cable: 0.08mm² 4-conductor shielded vinyl 5m, $\phi 3.2\text{mm}$, terminated in connector plug
Weight: AS-TA: App. 45g (excl. cable)
AS-TB: App. 95g (excl. cable)

■ Accessories: Calibration sheet 1
Instruction manual 1
Guarantee 1

Notes

Export precautions

The products (1961m/s² or higher in capacity) fall under the export regulations on strategic commodities as provided for in the Foreign Exchange Law and the Foreign Trade Control Law. The necessary legal procedures should therefore be taken, including acquisition of an export license from the Government of Japan, if this product is to be taken abroad.