ASM-1KCBV, 1KCBH Acceleration Transducer Instruction Manual

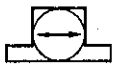
Thank you for purchasing this KYOWA product. Be sure to read the instruction manual carefully before you start to use the transducer. Also retain the manual with care so that you can refer to it whenever the need arises.

1. About [Caution] notes in the manual

Caution Cautions are given to invite the operator's attention, in order to retain the instrument's proper performance and prevent failures.

2. Installation

2.1 When installing the transducer, make sure of the model name and, referring to Fig.2-1 below, take care that it is installed to provide a proper sensing direction. Note: ASM-1KCBV and ASM-1KCBH models can be distinguished by the model name carved on B surface as well as the color of A section and the direction of the arrow mark on the section.

	ASM-1KCBV	ASM-1KCBH
Direction of arrow		
Color of A section	Blue	Red

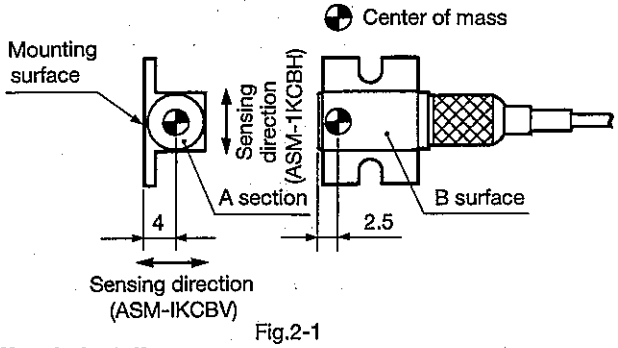


Fig.2-1

2.2 How to install

(1) To install, use M2.5 or M2.6 or No.2-56UNC screws (longer than 6mm). Referring to Fig. 2-2 and 2-3, make holes in the measuring object to provide an effective hole depth longer than 6mm to satisfy $l_1 \leq l_2$. The distance between the holes should be 2.4±0.2.

(2) Clean the mounting area thoroughly.

(3) Also clean the mounting surface of the transducer.

(4) Apply a thin coating of silicon grease between the transducer and measuring object. Then tighten the screws, using torque of 0.27 to 0.3N•m (reference value: app. 2.7 to 3kgf•cm).

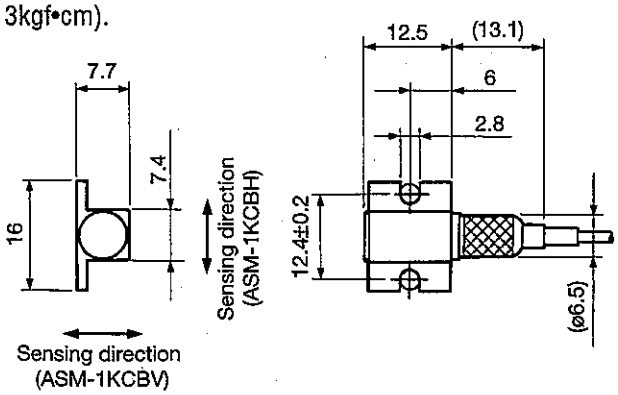


Fig.2-2

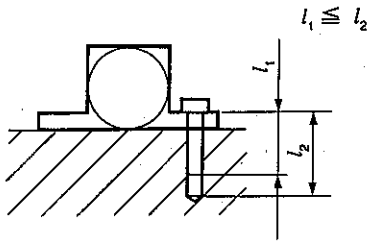


Fig:2-3

Caution

- This transducer is extra sensitive to impact. Avoid, therefore, dropping it or hitting against a hard matter. Avoid impact in excess of its allowable overload rating. If not, the transducer may be damaged. Take great care to handle it properly.
- Note that the frequency characteristic of the transducer may vary according to the condition of installation achieved.

  It is ideal that when installed, the transducer is in complete, close contact with the measuring object. When installing, carefully avoid external force such as bending or twisting to the transducer.

  Fig. 2-4 illustrates the standard installation, in which the bottom surface of the transducer retains close contact with the measuring object. By contrast, Fig. 2-5 illustrates the case where the transducer has to be fixed simply by fixing its flange. In this case the resonance level may grow, calling for the operator's proper care in setting the range.

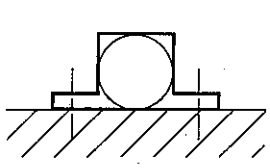


Fig. 2-4

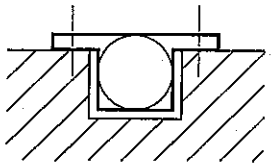


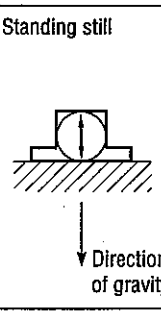
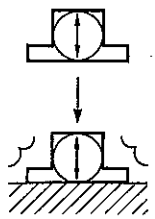
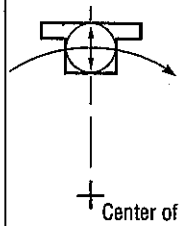
Fig. 2-5

- If the transducer is installed using an adhesive, excessive force applied to remove it can deform the transducer's cabinet. Also at the moment when the cabinet comes off the measuring object, impact will occur to let the internal sensor resonate. This can be the cause of failure of the transducer. If the transducer is to be used repeatedly, be therefore sure to install it using screws.
- The transducer is not waterproof. Take care to avoid water and highly humid (over 85%RH) environment.

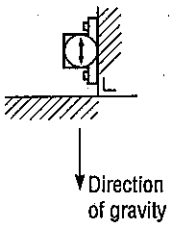
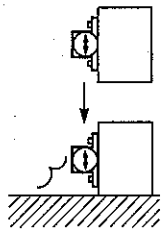
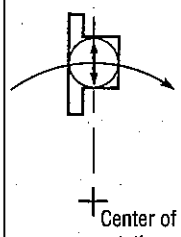
2.3 The polarity of transducer output against acceleration

The relation between the direction of acceleration applied to the transducer and the polarity of transducer output is shown in the following figures.

(1) On ASM-1KCBV

	Gravity acceleration	Collision	Rotation
Acceleration applied	Standing still 		
Polarity of output	(+)	(+)	(+)

(2) On ASM-1KCBH

	Gravity acceleration	Collision	Rotation
Acceleration applied	Standing still 		
Polarity of output	(+)	(+)	(+)

3. Connection

3.1 Connect the connector (R05-PB5M) on the end of transducer cable to the strain amplifier.

3.2 If a strain amplifier other than KYOWA make is used, connection will be made, referring to Fig. 3-1 below.

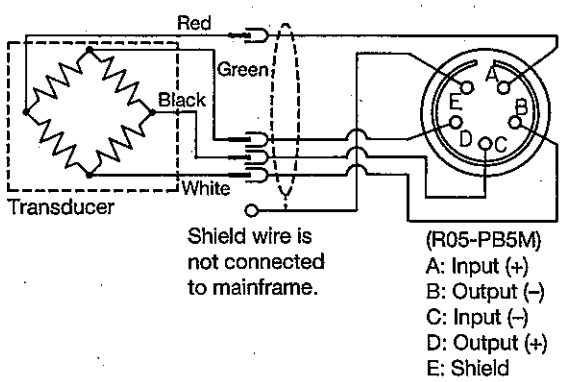


Fig.3-1

Caution

- Use 2V DC to excite the transducer.
  Other DC voltages or AC voltages do not satisfy the specifications.
  For caution's sake, a voltage higher than 2V may cause the transducer to fail.
- Start measuring 5 minutes or longer after the power has been turned on.

3.3 Properly adjust the gain on the measuring system, and perform zero balancing on the amplifier.
*When installded vertically as Fig. 3-2 illustrates, the transducer retains the no-load (0m/s²) condition.

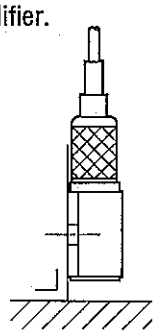


Fig. 3-2

4. Measuring

4.1 This acceleration transducer adopts the no-damping system. Its frequency characteristic is therefore free from the effect of temperature changes. But, on the other hand, the output may come to involve high-level resonant noise inducible to certain components of frequency signals measured.

In this case, use a low-pass filter providing a proper cut-off frequency, and measurement will result in clean waveforms.

Caution

- In case the acceleration level of vibration to be measured is high, and vibration signals contain frequency components approximating a resonant frequency (30kHz or thereabouts), the transducer will come to resonate. The transducer's allowable overload rating can then be exceeded, thereby resulting in damage to the transducer.

* Before measuring, the user should therefore estimate frequency components of vibration signals to be inputted, find the acceleration level from the amplitude ratio by referring to Fig. 4-1 below, then make sure that the level is below the transducer's safe overload rating.

Especially if a low-pass filter is to be used, preliminarily check no-filter waveforms and make sure that output signals are not in excess of the range having been set to the amplifier or of the transducer's safe overload rating.

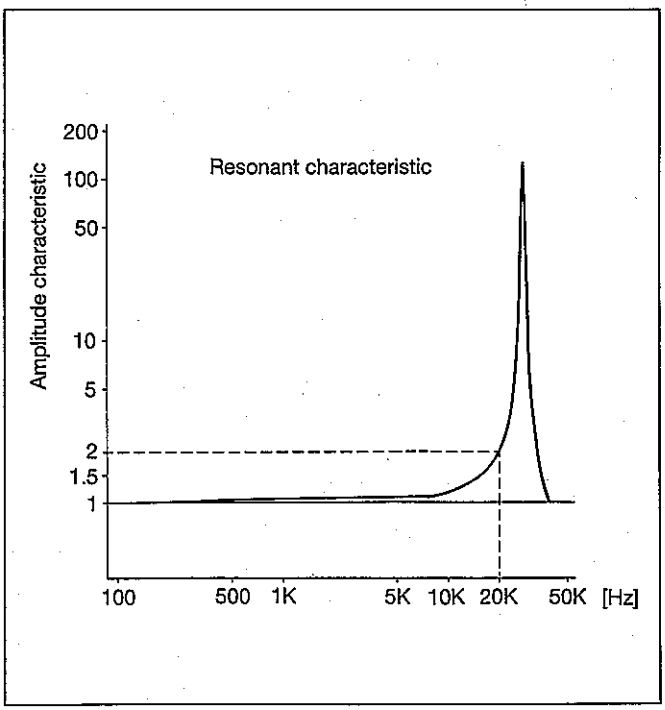


Fig. 4-1

Example: Suppose that the maximum vibration value of a measuring object is 3000m/s², 21kHz. In Fig. 4-1 the amplification ratio of the acceleration transducer is found to be approximately 2 against a frequency of 21kHz. An estimate of the maximum acceleration level is 3000m/s². The transducer will then be subjected to 6000m/s² (3000m/s² x 2) by resonance. This however remains below the safe overload rating so that the transducer can be used safely.

5. Conversion of output

5.1 Use the calibration coefficient described in the calibration sheet.

5.2 When a strain amplifier is in use, acceleration can be found by calculation using the output value expressed in equivalent strain and the calibration coefficient described in the calibration sheet.

$$\text{Acceleration } (m/s^2) = \text{Amplifier's output } (\varepsilon \times 10^{-6}) \times \text{Calibration coefficient } (m/s^2/1 \times 10^{-6})$$

If a measuring instrument other than a strain amplifier is in use, it is necessary to measure a bridge excitation voltage accurately. To calculate, use this voltage value and the acceleration value, which corresponds to 1μV output against a bridge excitation voltage of 1V and which is described in the calibration sheet.

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

6. Storing precations

6.1 After use, clean the transducer with a cloth, and store in the storing case, together with the cable.

6.2 Take care to avoid high and low temperatures, high humidity and vibration.

Caution

- Do NOT disassemble the transducer.

7. Specifications

1.	Rated capacity	±9807m/s² (±1000G)
2.	Rated output	1.5mV/V (3000×10⁻⁶ strain)
3.	Non-linearity	±1%RO (±0.5%, option)
4.	Hysteresis	±1%RO
5.	Bridge resistance	120Ω±20%
6.	Excitation voltage	2V DC
7.	Response frequency range (23°C)	DC to 3500Hz; sensitivity deviation, ±5%
8.	Installation resonant frequency	30kHz±20%
9.	Lateral sensitivity	±3% (1%, option)
10.	Sensitivity difference between positive and negative outputs	1.5% or below
11.	Safe overload rating	120%
12.	Safe temperature range	–20 to 60°C
13.	Compensated temperature range	5 to 40°C
14.	Thermal effect on zero	±2%RO/°C
15.	Thermal effect on output	–0.25 to 0%/°C
16.	Cable	0.035mm², 4-conductor shielded cable, 7m, ø1.7mm, terminated in R05-PB5M connector (MR01-P4F on sensor side)
17.	Weight	4.3g±1g (incl. MR01-P4F; excl. cable)
18.	Auxiliaries	Frequency characteristic data sheet 1 Calibration sheet 1 Warranty 1 Instruction manual 1 Cable 1

Note: The unit and numerical value in brackets in the above rated capacity column depend on the conventional unit expression just for reference.

Export Precautions

This product is classified as a strategic commodity in accordance with the Foreign Exchange Law and the Foreign Trade Control Law. The due legal procedures should therefore be taken including acquisition of the export license whenever the product is to be brought abroad.

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