Precision Level

Inclination Level

Instruction Manual

To ensure correct use, please read this instruction manual carefully before use. After reading, keep it in a safe place where the user can always refer to it.

OBISHI KEIKI SEISAKUSHO Co., Ltd.

Safety Precautions

※Before use, please read this instruction manual carefully and use the product correctly.

※The precautions shown here are intended to ensure the safe and proper use of the product and to prevent any potential hazards to the user.

※The precautions are categorized into three levels — **Danger, Warning, and Caution** — to clearly indicate the severity and urgency of potential harm or damage that may occur if the product is mishandled.

<table>
<tr><th colspan="3">For Safe and Proper Use</th></tr>
<tr><td colspan="3">This instruction manual includes various symbols and pictograms throughout the text to ensure correct use of the product and to prevent harm or damage to the user.

The symbols and their meanings are as follows.

● Please read the text after fully understanding the symbols and their meanings.
● After reading, be sure to keep this manual in a place where anyone using the product can easily refer to it at any time.
● All of these are safety-related instructions, so please be sure to follow them.</td></tr>
<tr><td colspan="2">⚠ Danger</td><td>This indicates situations where incorrect handling could result in imminent risk of death or serious injury.</td></tr>
<tr><td colspan="2">⚠ Warning</td><td>This indicates situations where incorrect handling could potentially result in death or serious injury.</td></tr>
<tr><td colspan="2">⚠ Caution</td><td>This indicates situations where incorrect handling may result in injury to persons or only property damage.</td></tr>
<tr><td rowspan="3">Examples of symbols</td><td>  </td><td>The △ symbol indicates the presence of danger, warning, or caution messages, with specific precautions described within the figure.
(The left figure is used to indicate general danger, warning, or caution without specifying details.)</td></tr>
<tr><td>  </td><td>The ○ symbol indicates prohibited actions, with specific precautions described within or below the figure.
(The figure on the left is used for general prohibition notices without specifying particular actions.)</td></tr>
<tr><td>  </td><td>The ● symbol indicates mandatory actions, with specific instructions detailed within the figure.
(The figure on the left is used for general mandatory actions or instructions without specifying details.)</td></tr>
</table>

Inclination Level Instruction Manual

1. Product Features

- This inclination level enables precise measurements of both horizontal and vertical angles up to a maximum of 45°
- The vials are positioned in two locations: one for horizontal measurement and one for vertical measurement.
- By pulling the dial knob, the engaging gear is disengaged, allowing quick and easy coarse-feed operation..
- A V-groove is provided on the bottom surface of the base..

2. Names of Parts and External View

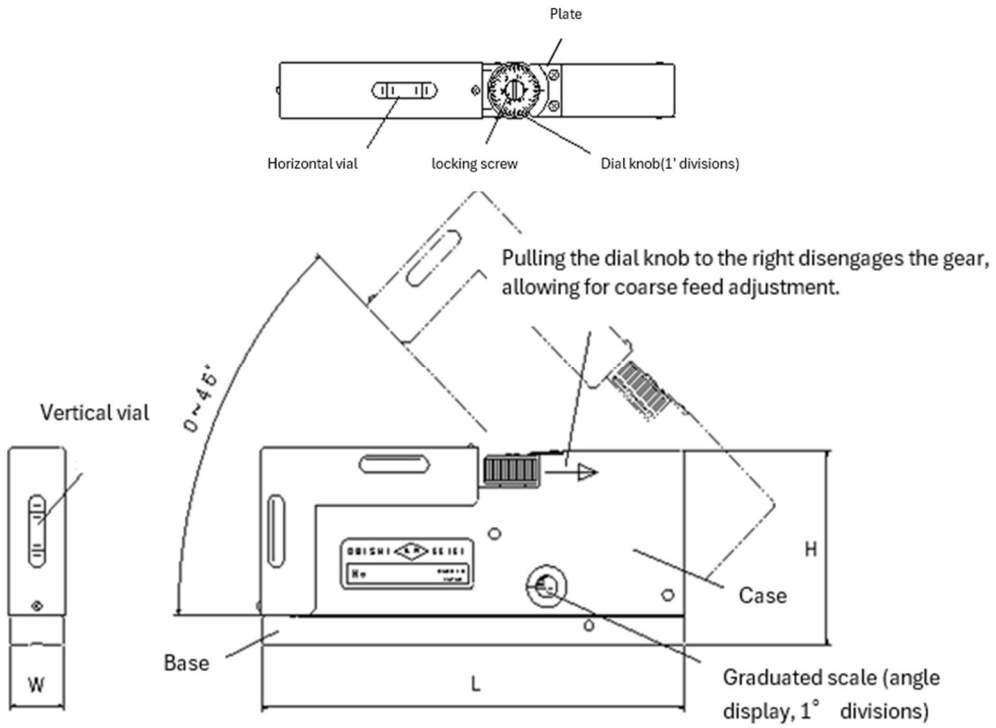


Figure 1

3. Specifications

Code No.	Nominal	Size (L×W×H mm)	Measurement Range (degrees)	Minimum Reading (minutes)	Mass (kg)
AJ101	160	160×20×70	0～45	1	0.8

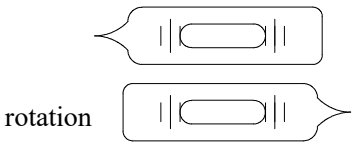
4. Preparation before Use and Periodic Accuracy Check

（1） Place the instrument on the reference surface plate after aligning the zero line of the dial knob with the scale plate, and check the position of the bubble.

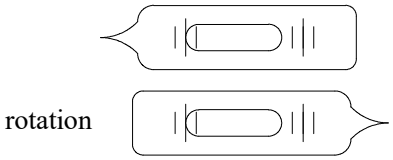
（2） At the same position, rotate the level 180 degrees and check the position of the bubble.

（3） When the bubble is centered, the instrument is level at zero degrees.

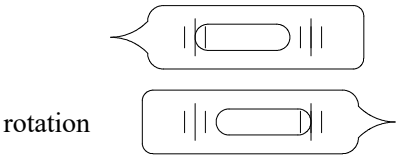
【When both the level and the reference surface plate are horizontal】･･･Usable



【When the level is horizontal but the reference surface plate is not horizontal】･･･Usable



【When the level is not horizontal】･･･stop usıng the ınstrument



The bubble moves equally to the left and right, offset by the same number of graduations from the reference.
The bubble moves irregularly to the left and right.

When the bubble moves slightly to the left or right from the reference, the dial knob may be misaligned and the instrument may not indicate zero degrees.

- On the reference surface plate, turn the dial knob to center the bubble.
- Check that the side scale plate indicates 0°.
- Loosen the set screw of the dial knob, align the zero line of the dial knob with the scale on the plate, and then tighten the set screw.
- Turn the dial knob to confirm that the gear is properly engaged.
- Realign the zero line and check the bubble position again.

5. Basic Operation of This Instrument

① Place the instrument on the surface plate set at 0°, and check that the bubble in the horizontal vial is centered on the graduation line.

※If the bubble is not centered, adjust it according to “4. Method of Level Adjustment.”

② Slowly turn the dial knob to set the desired angle (one full rotation moves 1°).

③ To quickly change to any desired angle, pull the dial knob to the right as shown in Fig. 1, open the upper section while keeping the base on the workpiece, and set the angle using the graduations on the scale plate as a reference. When you release your finger, the dial knob will automatically return to its original position.

※When the dial knob returns to its original position, the set angle may shift by 1 to 2 degrees. In such cases, turn the dial knob again to adjust to the correct angle.

※When returned, the gears may not engage properly. Always turn the dial knob to ensure that the gears are correctly engaged.

6. Instructions for Use

【How to Use the Horizontal Vial】

① Place the instrument on the workpiece to be measured.

② Turn the dial knob to adjust the horizontal vial so that the bubble aligns with the center of the reference line.

The graduation value at this point represents the measured angle.

③ The relationship between the inclination angle and height is shown in Figure 2 and the following formula.

When the hypotenuse length is assumed to be 1 m, the height *t* is given by the following formula:

$t = \sin\theta \times 1\mathrm{m}(1000\mathrm{mm})$

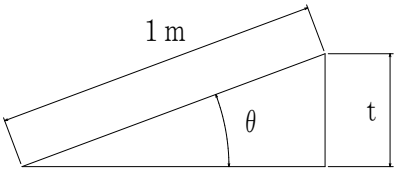


Figure 2. Method of Determining Height Dimension

Example:

From point a in Figure 3, the height *t* is calculated as follows:

$\theta = 4°34' \therefore t = \sin(4°34') \times 1(\mathrm{m})$

$= 0.0796 \times 1000(\mathrm{mm}) = 79.6(\mathrm{mm})$

It can be determined that the left side is 79.6 mm higher.

④ The displacement of the horizontal vial bubble can also be used to determine the height (t).

As shown in Figure 3, this instrument uses a vial with a sensitivity of 0.5 mm per 1 m, where one graduation of bubble displacement corresponds to an inclination of approximately 2 minutes ($\theta \approx 2'$).

For example, if the bubble shifts one graduation to the left, the height t will be 0.5 mm.

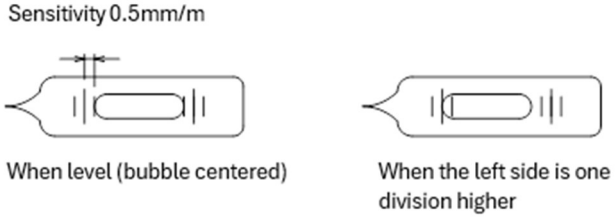


Fig. 3. Method of Determining Height Using the Vial

【How to Use the Vertical Vial】

① Align the zero line of the dial knob with the scale plate of the instrument, place it against a reference square on the reference surface plate, and check that the bubble is centered

② Place the instrument against the workpiece surface to be measured.

③ Turn the dial knob to adjust the vertical vial so that the bubble is centered on the scale line..

④ Measure the inclination in the same way as described in How to Use the Horizontal Vial.

7. Precautions for Use

① Clean the Precision Surface and the measurement surface of the workpiece before use.

● ② Handle the instrument carefully during use and storage to avoid impact or shock.

③ Allow the instrument to acclimate to the ambient temperature before use.

④ When moving the instrument on the workpiece, avoid lifting it unnecessarily and move it by sliding.

⑤ Since the bubble in this instrument moves slowly, always take the reading only after the bubble has come to a complete stop.

△ ⑥ Do not use or store the instrument in locations subject to drastic temperature changes.
Storing or leaving the instrument in environments below −15 °C or above +40 °C may cause damage to the vial, such as breakage.

● ⑦ After use, always apply rust prevention treatment and store the instrument in its storage case.

⑧ Accurate measurement cannot be performed if there is rust, burrs, or scratches on the working surface, so handle with care.
Before use, remove minor scratches on the working surface locally with an Arkansas stone or similar tool.

⑨ When any of the following occurs, check the sensitivity of the instrument before use:
・If the instrument has been dropped.
・If an object has been dropped onto the instrument.

⑩ Check the accuracy regularly before using the product.

△ ⑪ If the product has sharp edges, handle it carefully to avoid injuring your fingers or other parts of your body.

△ ⑫ Wear protective gloves and safety glasses as necessary to prevent injury while working.

△ ⑬ Do not use this product if it is damaged or deteriorated, as it may cause injury or accidents.

△ ⑭ If an injury occurs, give first aid immediately and seek medical attention if necessary.

Contact Information

JIS Certified Factory

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Head Office and Factory

Design, development, manufacturing, and calibration services for precision measuring instruments (levels, surface plates, straight edges, reference measuring instruments, square rulers, blocks, dial gauge stands, comparators, angle measuring instruments, bench centers, squareness measuring instruments).