

Precision Level

Inclination Level -A100

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.

For Safe and Proper Use		
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.		
	Danger	This indicates situations where incorrect handling could result in imminent risk of death or serious injury.
	Warning	This indicates situations where incorrect handling could potentially result in death or serious injury.
	Caution	This indicates situations where incorrect handling may result in injury to persons or only property damage.
Examples of symbols		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.)
		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.)
		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.)

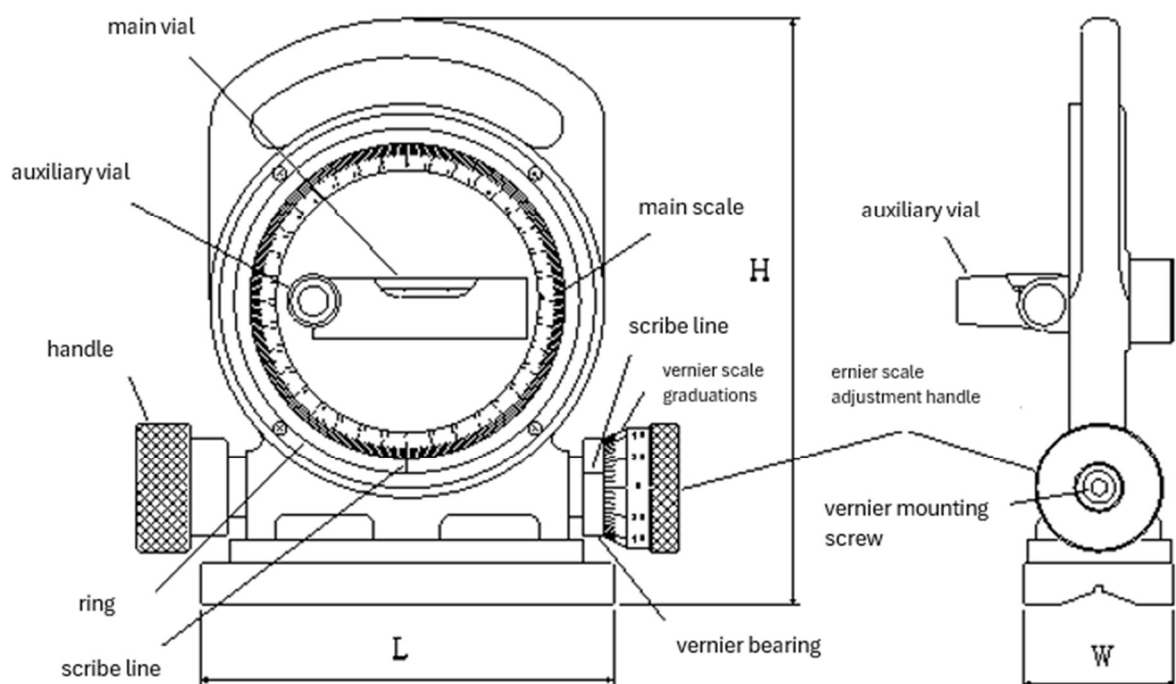
Inclination Level -A100 Instruction Manual

1. Product Features

- The main scale is graduated over 360° ($\pm 180^\circ$) in 1° increments.
- The vernier (micrometer head) advances 2° per revolution, with a minimum reading of 2 minutes.
- The main body is made of light alloy, with the base section hardened, and is equipped with a handle.
- Place the instrument on the workpiece and rotate the micrometer head to align the bubble with the center of the reference line. By reading the main scale in degrees and the micrometer head in minutes, the inclination angle of the workpiece can be determined.
- This instrument is suitable not only for precision industries but also for a wide range of fields such as construction, civil engineering, and automotive applications.
- With a V-groove, it can also be used for measuring cylindrical parts such as pipes.
(The auxiliary vial can be used to check horizontality in the roll direction when the instrument is placed on cylindrical parts such as pipes.)

Note: A version with a magnetic base can also be manufactured upon request.

2. Names of Parts and External View



3. Specifications

Code No.	Nominal	Size (L × W × H mm)	Measurement Range (degrees)	Minimum Reading (minutes)	Sensitivity (mm/m)	Mass (kg)
AH101	A100	110 × 40 × 158	360	2	2	1.4

4. Preparation Before Use

【Zero Adjustment of Main Scale and Vernier Scale】

- ① Turn the handle to align the “0” of the main scale with the scribed line on the ring.
- ② Hold the handle to prevent it from rotating, and loosen the vernier scale mounting screw.
- ③ Align the “0” of the vernier scale graduations with the scribed line on the vernier bearing.
- ④ While holding the vernier scale adjustment handle to prevent it from turning, tighten the vernier mounting screw.
- ⑤ Check the zero point.
- ⑥ If the zero setting is not aligned, perform the adjustment again.

5. Instructions for Use

- ① The inclination is measured using the main scale, the vernier scale graduations, and the main vial.
- ② The main scale is graduated in 1° increments, with zero at the top and bottom, 90° to the left and right, and allows measurement up to 360° with one full rotation.
- ③ Large angles are measured using the main scale, while fine angles are measured with the vernier scale graduations.

【How to Read the Scale】

- ① Set the instrument on the inclined surface and turn the handle until the bubble in the main vial is centered.
- ② The method of reading the scale when the bubble in the main vial is centered is shown in Figure 2.
- ③ Each graduation on the vernier scale represents 2 minutes. One full revolution of the vernier scale graduations corresponds to 2 degrees on the main scale.

- ④ As shown in Figure 2, when the left side is higher and when the right side is higher, the reading of the same vernier scale graduations will differ. This is because the direction of rotation of the vernier scale graduations is reversed.

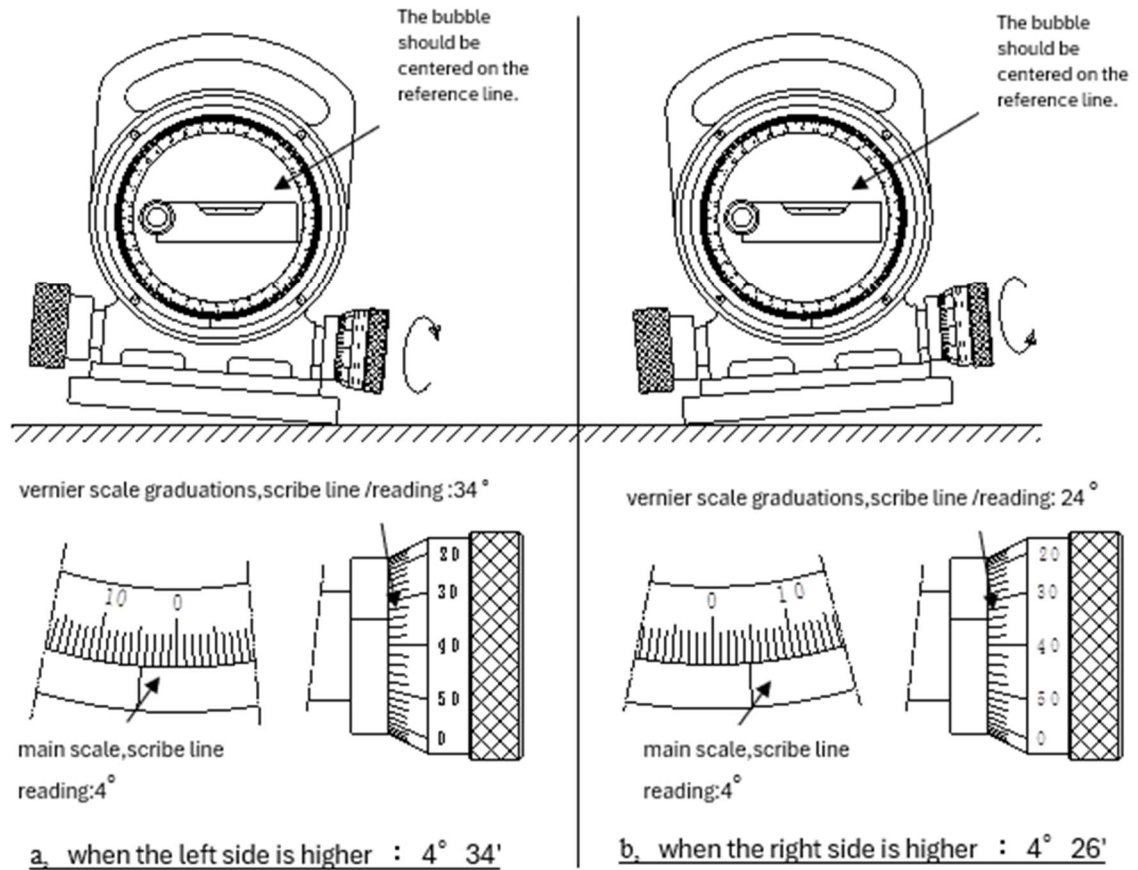


Figure 2. Reading the Graduations of the Inclination Level – The Indicated Value May Differ Even for the Same Graduation

【How to Calculate Height from Inclination Angle】

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

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

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

Example:

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

$$\begin{aligned}\theta &= 4^\circ 34' \therefore t = \sin(4^\circ 34') \times 1(\text{m}) \\ &= 0.0796 \times 1000(\text{mm}) = 79.6(\text{mm})\end{aligned}$$

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

In addition, in Figure 3-b, the value of t is 77.3 mm.

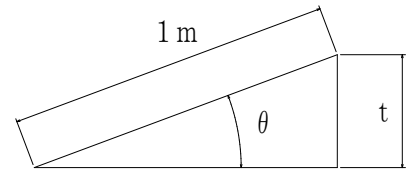


Figure 3. Method of Determining Height Dimension

【Method for Determining Height (t) from the Movement of the Main Vial Bubble】

- ① As shown in Figure 4, this inclinometer level uses a vial with a sensitivity of 2 mm per 1 m, corresponding to approximately 7 minutes of arc for one division of bubble movement. For example, if the bubble shifts one division to the left, the height t is 2 mm.

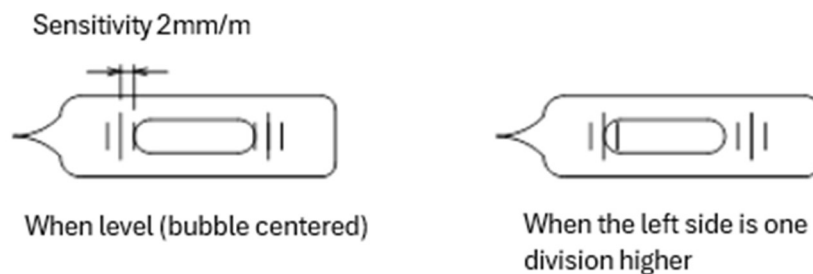


Figure 4. Determining Height by the Main Vial

【How to Use the Auxiliary Vial】

- ① The auxiliary vial is used to check the inclination perpendicular to the measuring direction of the inclinometer level. Place the instrument so that the bubble of the auxiliary vial is centered on the reference line (see Fig. 5).

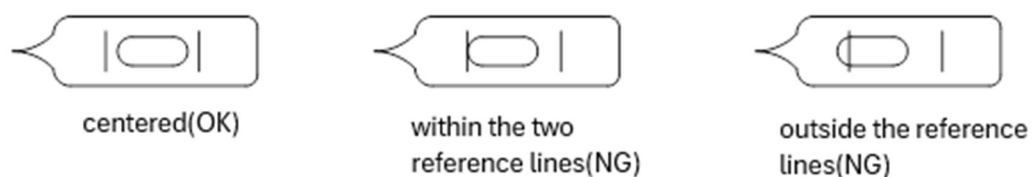


Figure 5. Bubble position in the auxiliary vial

6. 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 $+40^{\circ}\text{C}$ 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).