

Precision Measurement Tools

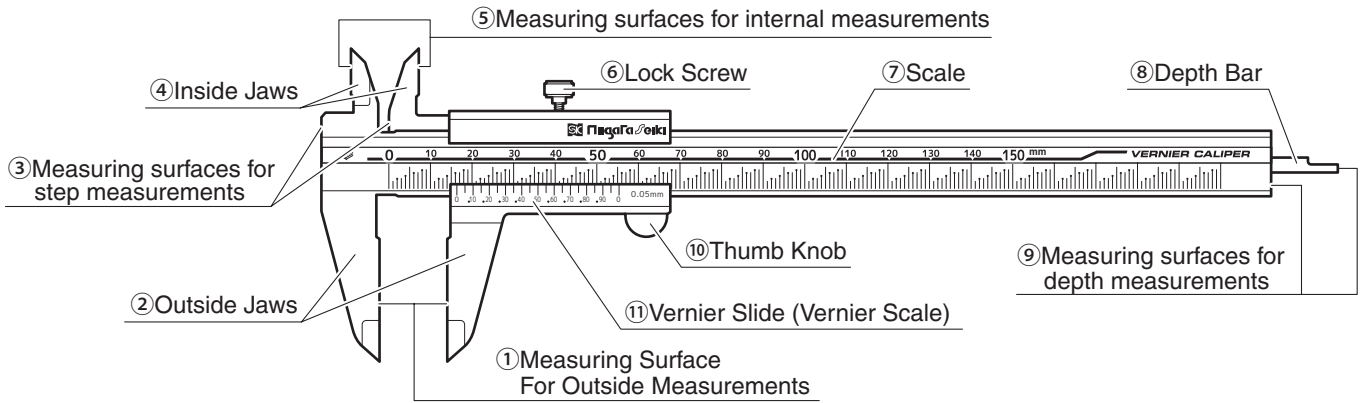
KAIDAN (Ziggurat) VERNIER CALIPERS

Thank you for purchasing the KAIDAN (Ziggurat) VERNIER CALIPERS.

This product is a precision measurement tool with a main scale and vernier scale graduations to indicate the measured value.

- For safe and proper use of this product, please read this instruction manual before use and follow the procedures described. Please keep manual where it is accessible to user for future reference.
- Keep this manual with the instrument if transferred or leased to a third party.
- For inquiries about this product, please contact dealer or Niigata Seiki at the address listed on the following page.

Part Identification and Description



- ① Measuring Surface For Outside Measurements ... Object to be measured is positioned between these surfaces.
- ② Outside Jaws Measures extremal dimensions. Slide vernier to open and close.
- ③ Measuring surfaces for step measurements Measures the height of steps.
- ④ Inside Jaws Measures internal dimensions. Slide vernier to open and close.
- ⑤ Measuring surfaces for internal measurements ... Position surfaces inside object to be measured.
- ⑥ Lock Screw Locks the vernier slide in place.
- ⑦ Scale Indicates measured value in 1mm graduations.
- ⑧ Depth Bar Bar for measuring depth. Bar moves in and out with vernier slide.
- ⑨ Measuring surfaces for depth measurements Depth is measured between these two surfaces.
- ⑩ Thumb Knob Position thumb on knob to move vernier slide with accurate control.
- ⑪ Vernier Slide (Vernier Scale) Scale for measuring with a resolution of 0.05mm. Refer to following page for instructions on use.

Safety Precautions

Please Observe

Always follow the proper operating procedures in order to prevent harm to yourself or others, and to prevent damage to property.



Denotes a PROHIBITION- You MUST NOT do



Denotes a REQUIREMENT- You MUST do



Caution Indicates risk of **personal injury** or **property damage** if not followed.



Read the instruction manual and follow the instructions.

- Use of product other than as described in the manual may cause accident.



Use only for measuring.

- Use for any purpose other than measuring may damage or wear the instrument. Improper use may also cause accident.



Handle with care.

- Do not drop or subject instrument to excessive shock. Do not place under heavy objects. Improper handling may cause damage or poor accuracy.
- Do not scratch instrument, for example by writing ID number.



Use in proper environment.

- Please do not use instrument in rain or locations with excessive humidity. Do not use at extreme high or low temperatures. Keep out of direct sunlight.



Jaw tips are sharp -- Handle with care.

- Careless handling may cause injury.



When lock screw is tightened, do not attempt to move the vernier slide.

- Excessive force to vernier slide will cause damage or cause poor accuracy.



Do not disassemble or modify.

- Do not remove the vernier slide. Please do not attempt to disassemble or modify as it may cause damage or poor accuracy.

PREPARATION FOR USE

Before using the caliper, please perform the following:

● **Loosen the lock screw.**

Moving the vernier slide with the lock screw tightened may cause unnecessary force to the slide which will damage the caliper and affect accuracy.

● **Wipe off any corrosion, dirt or oil from measuring surfaces and slide.**

Contamination of surfaces may cause measurement error.

● **Allow the caliper and object to be measured time to reach the same temperature.**

A temperature difference between the object to be measured and the caliper may cause measurement error. Allow enough time for the temperatures to equilibrate.

● **How to perform accuracy check.**

① **Jaw Alignment**

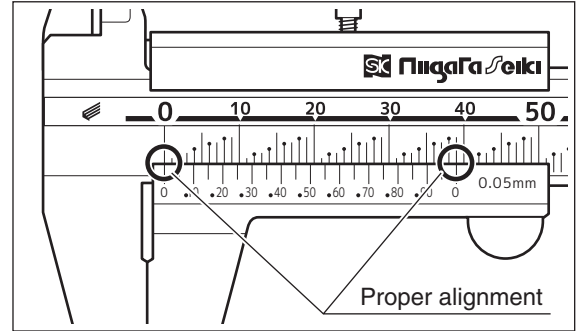
In closed position, make sure the measuring surfaces on the outside jaws align properly and there is no gap (no light should leak past.)

② **Confirm "0" points on scale (ref. diagram at right)**

With jaws closed as in step ① above, make sure the reading is zero and the vernier scale graduations align at the "0" and "39" positions as shown.

③ **Depth Confirmation**

Position caliper on a flat surface for depth measurement. Reading should be "0" as in step ② above, with the vernier graduations aligned at the "0" and "39" positions.

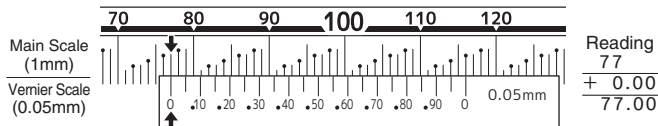


READING THE SCALE

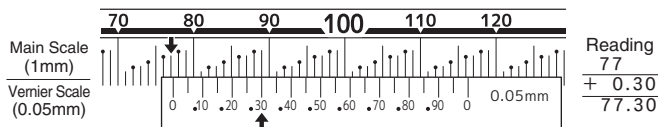
The measured value is determined by reading the main scale, and then adding the vernier scale reading as determined by the position where the vernier and main scale graduations align.

$$\text{Measured value} = \text{Main Scale Reading} + \text{Vernier Scale Reading}$$

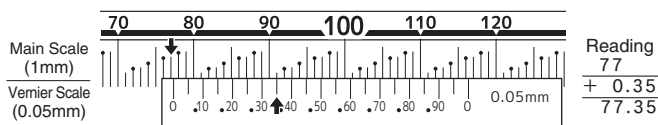
● **EXAMPLE 1 Measured Value: 77.00mm**



● **EXAMPLE 2 Measured Value: 77.30mm**



● **EXAMPLE 3 Measured Value: 77.35mm**



AFTER USE CARE, STORAGE NOTES

● As required, wipe slide and measuring surfaces with a dry cloth treated with anti-corrosive oil.

When not in use, apply anti-corrosive treatment or keep in anti-corrosive bag.

● When not in use, keep jaws slightly open and lock screw slightly loose to prevent over tightening due to thermal expansion which may affect accuracy.

● Store in supplied case when not in use in a cool, dry location.

● Wear of measuring surfaces from repeated use may affect accuracy. We recommend that instrument accuracy is confirmed through calibration on a periodic cycle.

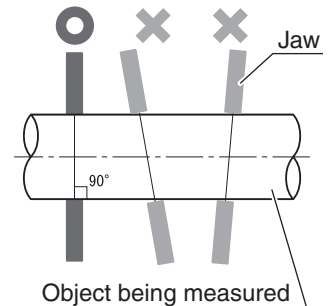
PREVENTING ERRORS

In order to prevent measurement error, please note the following.

HOW TO POSITION CALIPER ON OBJECT FOR MEASUREMENT

Flat surfaces --

When measuring features with flat surfaces, make sure the measuring surface of the jaws are parallel to the surfaces to be measured.

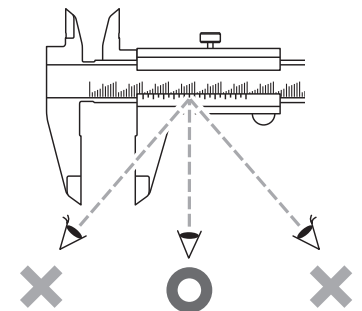


Cylindrical surfaces --

When measuring cylindrical features, make sure the caliper jaws are perpendicular to the cylinder axis as shown.

VIEWING THE SCALE

Scale should be read from directly above the calipers. Due to step in height of vernier scale relative to main scale, if viewing direction is not directly above the reading may have parallax error.



PRODUCT SPECIFICATIONS

- Material : Stainless Steel
- Measuring Range : 0 ~ 150 mm
- Resolution : 0.05 mm
- Accuracy : ± 0.05 mm

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