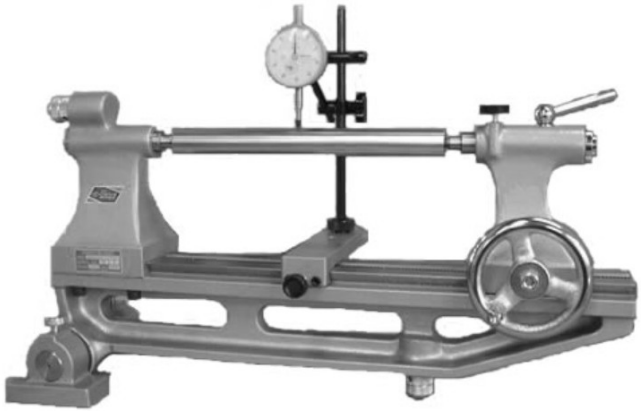
# Deflection Tester

# Combination Bench Centers

## 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.<br><br>The symbols and their meanings are as follows.<br><br>● Please read the text after fully understanding the symbols and their meanings.<br>● After reading, be sure to keep this manual in a place where anyone using the product can easily refer to it at any time.<br>● 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.<br>(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.<br>(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.<br>(The figure on the left is used for general mandatory actions or instructions without specifying details.)</td></tr>
</table>

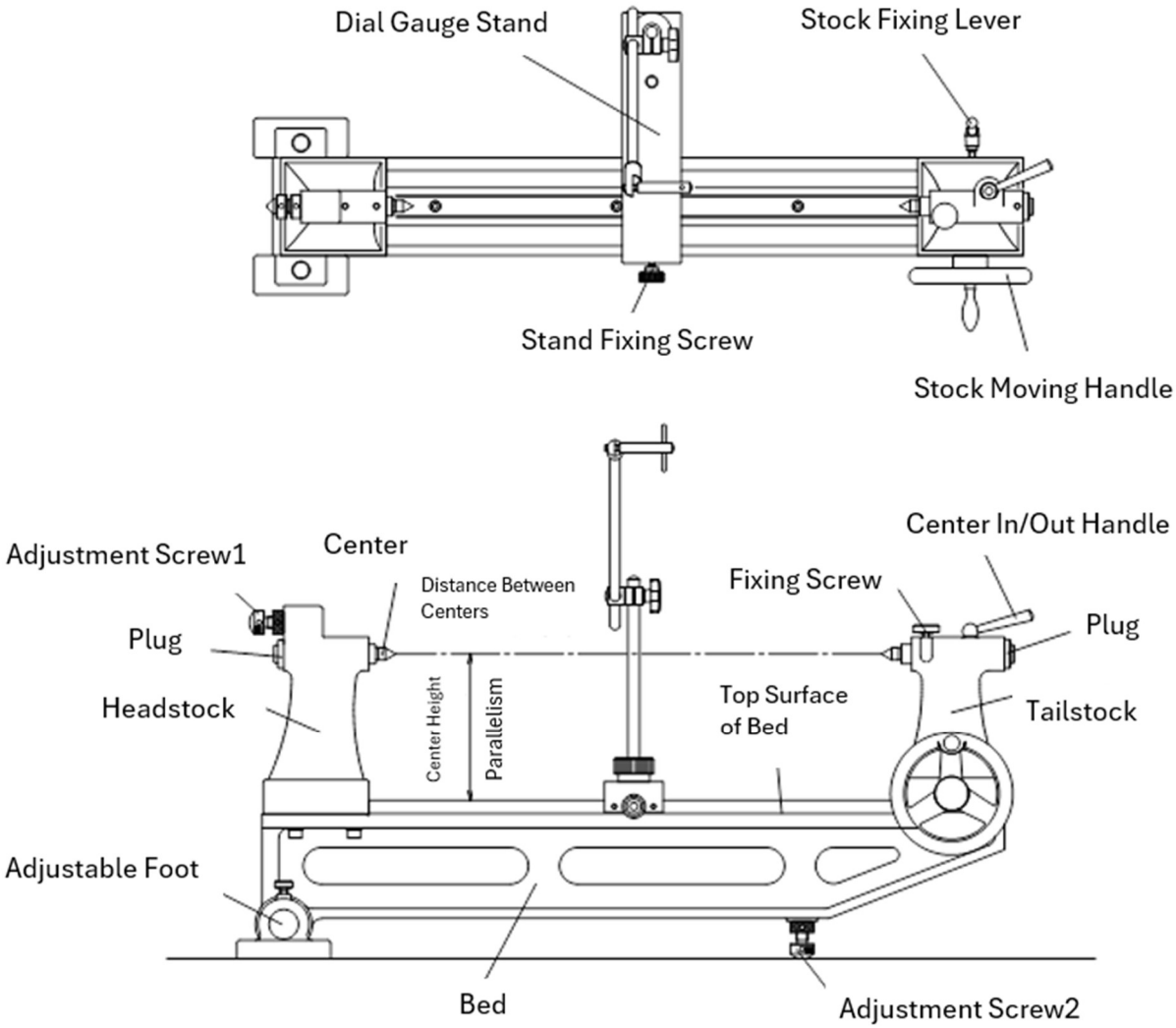
Combination Bench Centers Instruction Manual

# 1. Product Features

- It features a lightweight and rational design.
- The stock moves smoothly by a rack gear mechanism.
- When used in the vertical position, a system for adjusting squareness is adopted.
- The centers can be moved in and out with a one-touch lever operation.

Note: A dial gauge and test bar are not included. Please prepare them separately.

# 2. Names of Parts and External View



# 3. Specifications

| Code No. | Model | Length (mm) | Center Distance (mm) | Center Height (mm) | Use Center | Height Parallelism (μm) | Mass (kg) |
|---|---|---|---|---|---|---|---|
| SP101 | SP-1 | 565 | 270 | 110 | MT-1 | 8 | 23 |
| SP102 | SP-2 | 785 | 500 | 150 | | 10 | 43 |

# 4. Instructions for Use

**Installation Method**

・When using the stand of this instrument for measurement, install it on a stable base so that the instrument is approximately level and vertical.

・For measurements requiring high accuracy, install it on a reference surface plate or equivalent according to the procedure below.

**＜When Placed Horizontally＞**

① Place the instrument on a reference surface plate or equivalent.
Note: To avoid scratching the surface plate, place spacers under the adjustment screws.

② Attach the test bar to the instrument.

③ Place the stand with the dial gauge on the reference surface plate.

④ Using the dial gauge, check both ends of the test bar and turn Adjustment Screw 2 until both sides are at the same height.

⑤ Tighten the nut of Adjustment Screw 2, then check both ends of the test bar again.

**＜When Placed Vertically＞**

① Place the instrument vertically on a reference surface plate or equivalent.
Note: To avoid scratching the surface plate, place spacers under the adjustment screws.

② Attach a flanged test bar to the instrument.

③ Place the stand with the dial gauge on the reference surface plate.

④ Using the dial gauge, check the top surface of the flanged test bar and turn Adjustment Screw 1 until the height is uniform.

⑤ Tighten the nut of Adjustment Screw 1, then check the top surface height of the test bar again.

**Workpiece Mounting Procedure**

① Loosen the fixing screw of the tailstock and operate the center in/out handle to confirm that the center moves in and out.

② Operate the stock fixing lever to release the lock.

③ Using the stock moving handle, move the tailstock according to the length of the workpiece and fix it securely.

④ Insert one end of the workpiece center hole into the headstock (fixed side) center.

⑤ While supporting the workpiece, operate the center in/out handle and keep the center retracted.

⑥ Align the center hole on the workpiece with the tailstock (movable side) center, and slowly operate the center in/out handle to insert the center into the center hole.

⑦ When the workpiece is securely held, tighten the fixing screw.

⑧ After measurement, support the workpiece to prevent it from falling, then slowly operate the center in/out handle to remove the workpiece. (Follow steps 4–7 in reverse order.)

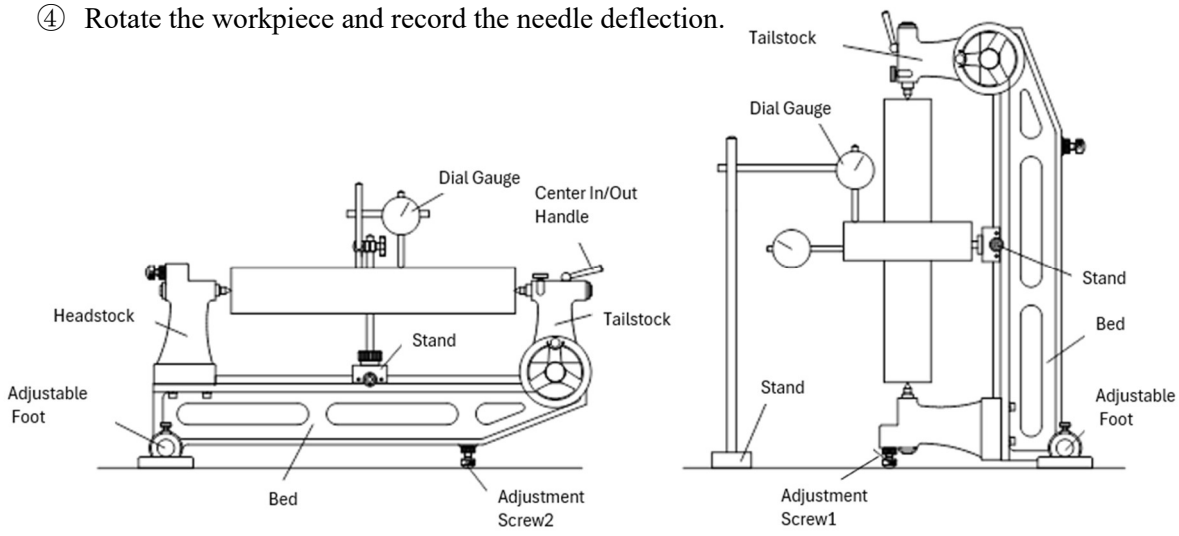
**Measurement Method**

① Mount the workpiece on the instrument.

② Place the dial gauge on the instrument stand or on the reference surface plate.

③ Lightly bring the stylus of the dial gauge into contact with the workpiece.

④ Rotate the workpiece and record the needle deflection.




# 5. Adjustment Method

**Adjustment of the Center In/Out Handle**

① As shown in Figure 3, loosen the set screw for fixing the plug and remove the plug.
Since a spring is inserted, take care not to let the plug fly out.

② Loosen the set screw for fixing the center in/out handle, lift the handle, and remove it.

③ Rotate the center in/out handle to the desired position and insert it so that it meshes with the rack.

④ Move the center in/out handle back and forth and check its position again.

⑤ After confirmation, install the set screw for fixing the center in/out handle.

**Caution: If overtightened, the center in/out handle will not move.**

⑥ Insert the spring, press in the plug, and install the set screw for fixing the plug.

⑦ If readjustment is required, repeat steps 1–6.

The figure shows the standard SA type, and the shape may differ slightly from this instrument.

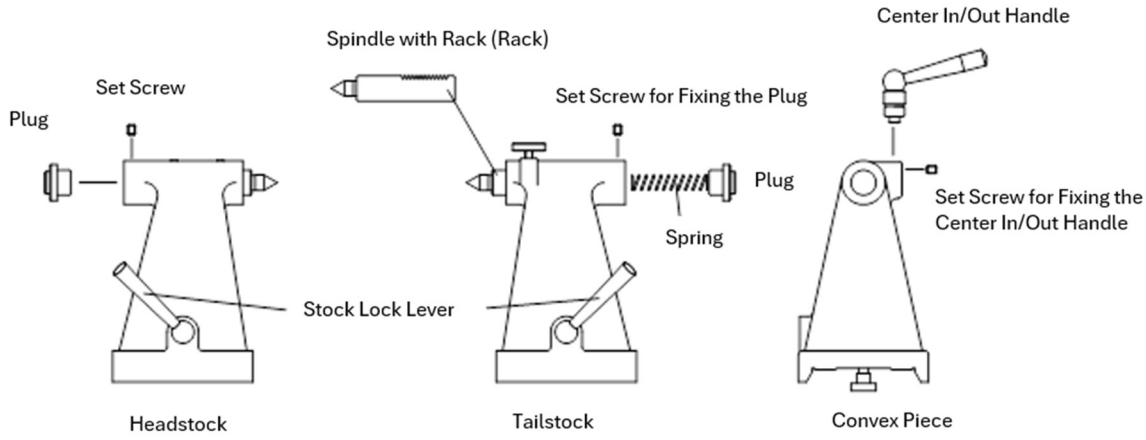



Figure 3. Adjustment of the Convex Piece and the Center In/Out Handle

# 6. Replacement of the Center

**If damage (such as chipping or wear) is found on the tip of the center, replace the center with a new one immediately.**

Headstock Side

① Loosen the set screw and remove the plug.

② Prepare a push rod and insert it into the stock to remove the center.

③ Insert a new center.

④ To protect the tip of the center, place a wooden block or similar material against it and tap lightly with a plastic hammer.

⑤ Reattach the plug and set screw.

Tailstock Side

① Remove the fixing screw.

② Loosen each set screw and remove the plug and the Center In/Out Handle.

Caution: Since a spring is inserted, take care not to let the plug fly out.

③ Pull out the spindle with rack.

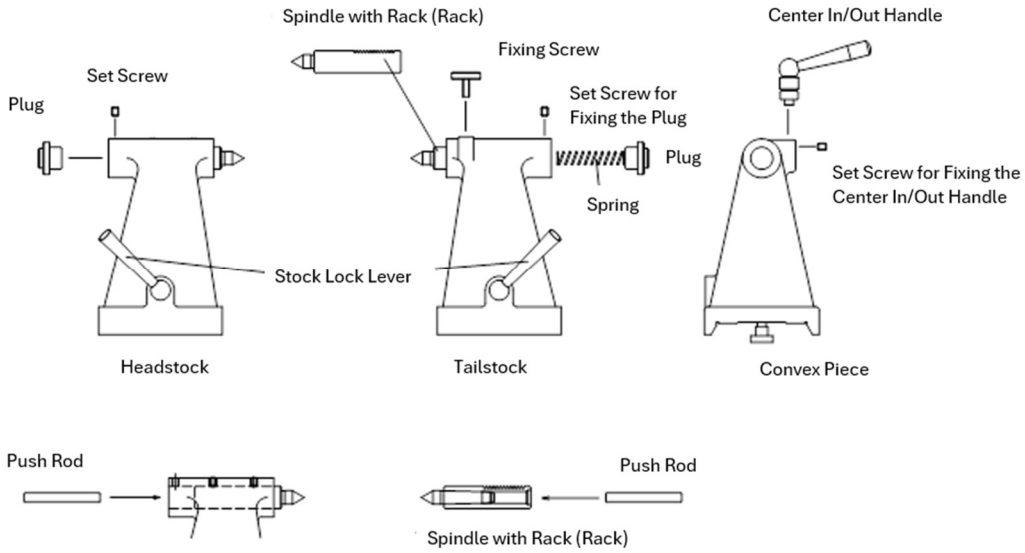
④ Insert a push rod into the spindle with rack and tap lightly to remove the center.

⑤ To protect the tip of the center, place a wooden block or similar material against it and tap lightly with a plastic hammer.

⑥ Insert the spindle and the Center In/Out Handle, and adjust their positions.

⑦ Secure the spindle, insert the spring, attach the plug and set screws, and finally install the fixing screw.

| The figure shows the standard SA type, and the shape may differ slightly from this instrument. |
|---|




## 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 Do not use or store the instrument in places with drastic temperature changes.

⑤ Set this instrument on a stable location with a solid foundation, free from twisting or tilting.
If it is placed on an unstable surface, the accuracy of the bed surface may be affected, and there is a risk of the instrument tipping over or falling due to its weight.

⑥ When installing this instrument on a surface plate, check the load capacity of the surface plate (maximum concentrated load mass, JIS B 7513 Table 5).

⑦ Do not apply excessive load or impact to the bed or centers.

△ ⑧ Before mounting the workpiece, always make sure that the stock is securely fixed.
If the stock is not fixed, the spring force inside the tailstock may cause the stock to move, resulting in the workpiece coming off the centers and falling.

⑨ Check that the center holes of the workpiece are properly engaged with the centers of this instrument.
If they are not properly engaged, the workpiece may fall when released.

⑩ When removing the workpiece, firmly support it with your hand or an equivalent fixture while removing it.

⑪ When moving the stock, always move it gradually and carefully.

If it is moved too much at once, the stock may slip on the bed and collide with the opposite stock, causing damage to the centers.

In particular, when the distance between the centers is narrow, lightly tap the rear of the stock and adjust it slowly.

⑫ The parallelism between the centers and the top surface of the bed, the parallelism between the adjustment screws and the adjustable feet, and the squareness in the vertical position are not ensured in the initial state.

Always perform the necessary adjustments before use.

⑬ When moving this instrument, always move it with the stocks fixed.

Note: When transporting by vehicle, insert cardboard or similar material between the two stocks and secure them firmly with string or other means to prevent movement, even if the fixing handle loosens due to vibration.

⑭ Do not place this instrument in locations subject to vibration or other similar conditions.

● ⑮ After use, always perform rust prevention treatment on the instrument.

⑯ If there are scratches or damage, have the instrument repaired and inspected. Remove minor scratches on the Precision Surface locally with an Arkansas stone or similar before use.

⑰ Check the instrument for abnormalities before use in the following cases:

・When the instrument has been dropped.

・When an object has been dropped onto the instrument.

⑱ Use the instrument only after regularly checking for any abnormalities.

△ ⑲ If the product has sharp edges, handle it carefully to avoid injuring your fingers or other parts of your body.

△ ⑳ For heavy products, handle placement and other operations with two or more people, and take care to avoid injury.

㉑ Use cloth or nylon sleeves for lifting. Do not use hard materials such as metal chains or wires, as they may cause scratches or cracks on the product and pose a risk of injury to the operator.

㉒ Wear protective gloves and safety glasses as necessary to prevent injury while working.

△ ㉓ Do not use this product if it is damaged or deteriorated, as it may cause injury or accidents.

△ ㉔ If an injury occurs, give first aid immediately and seek medical attention if necessary.

# Contact Information

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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).