



FORK MEASURING COMPANY
Vavdi Sr.No. 17, Plot No 55B, Rani Industrial Estate
Gondal Road, Rajkot-360002

INSTRUCTION MANUAL DIAL INDICATOR (304-001)

➤ Dial Indicator (Extract form JIS/Japanese Industrial Standards)

No.	Item	Calibration method	Tools for calibration
1	Indication error	Holding the dial indicator with its spindle set vertically downward follow the procedure prescribed below and determine the error of indication with reference to the dial graduations.	
2	Adjacent error		
3	Retrace error	First ,displace the spindle upward over the entire measuring range while plotting errors at every 1/10 revolution of the pointer for the first two revolutions from the zero point,at every half revolution for the next five revolution,and at every revolution after the fifth revolutionthen reverse the spindle displacement at the end of measuring range of the dial indicator and plot errors at the same points measured during upward spindle displacement error form a bidirectional error curve the thus obtained.	For 0.001 mm or 0.002 mm graduation dial indicators with a 2mm measuring range or less:A micrometer head or dila calibration tester with 0.5 μm graduation or less and instrumental error of $\pm 1 \mu\text{m}$ and a supporting stand,For dial indicators other then the above: A micometer head or dial calibration tester with 1 μm instrumental error and supporting stand.
4	Repeatability	Apply the contact point of the dial indicator perpendicularity to the upper face of measuring stage ,displace the spindle quickly and slowly five times at a desired position within the measuring rangee and determine the maximum difference between the five indications obtained.	Measuring step Supporting stand
5	Measuring force	Holding a dial indicator with its spindle set vertically downward,displace the spindle upward and the downward continuously and gradually and take measurments of the measuring force at the zero ,middle,and end points in the measuring range in both the upward and downward directions.	Supporting stand Top pan type spring scale (graduation:2gf or less) Or Force gage (sensitivity:0.02N or less)

➤ Maximum permissible error of indication

		Graduation and measuring range			Unit: μm		
		0.001 mm	0.002 mm		0.001 mm		
Measuring range		10 mm or less	2 mm or less	Over 2 mm up to 10 mm	1 mm or less	Over 1 mm up to 2 mm	Over 2 mm up to 5 mm
Retrace error		5	3	4	3	3	4
Repeatability		5	0.5	1	0.5	0.5	1
Indication error	1/10 revolution *1	8	4	5	2.5	4	5
	1/2 revolution	± 9	± 5	± 6	± 3	± 5	± 6
	One revolution	± 10	± 6	± 7	± 4	± 6	± 7
	Two revolution	± 15	± 6	± 8	± 4	± 6	± 8
	Entire measuring range	± 15	± 7	± 12	± 5	± 7	± 10

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➤ Using a Dial Indicator

Points to note

- Dial indicators are used in many types of service jobs. They are particularly useful in determining run-out on rotating shafts and rotors.
- Run-out is the side-to-side variation of movement when a component is turned.
- Dial indicators normally have two separate scales. The needle is able to move numerous times around the outer scale.
- Dial indicators can measure with an accuracy of 0.01mm & 0.001 mm.
- You expect from the component you are measuring.
- They must be fitted so that there is no movement between the dial indicator and the component to be measured.
- Most dial indicator sets contain various attachments and support arms so they can be attached to the component. There are other attachments available. These attachments allow the dial indicator to be configured specifically for the measuring task.
- When attaching a dial indicator, keep support arms as short as possible. Make sure that all attachments are tightened to prevent unnecessary movement between the indicator and the component.
- Make sure the dial indicator pointer is positioned at 90° to the face of the component to be measured.
- Always read the dial, face on or straight on. A view from the side can give a considerable "parallax" error. Parallax error is a visual error caused by viewing measurement markers at an incorrect angle.
- The outer face of the dial indicator can be moved so that the zero can be positioned over the pointer.

Systematic instruction

1. **Select the correct gauge and attachment**
Select the gauge type, size, attachment and bracket, which fit the part you're measuring. Mount the dial indicator on a firm surface to keep it still.
2. **Ensure plunger is at 90 degrees**
Adjust the indicator so that the plunger is at 90 degrees to the part you're measuring.
3. **Press the plunger halfway in**
Press the dial indicator gently against the part, and rotate the part—in this case a brake rotor-- one full turn. Keep pressing until the plunger settles about halfway into the indicator.

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5. Lock into position

Lock the indicator assembly into position.

6. Rotate and read

Carefully rotate the brake rotor a couple of times, while you observe the dial readings face on

7. Record any movements

if the pointer hovers around a single graduation on the dial, the part has minimal run out, or surface distortion. If it moves significantly left and right, you should note these variations. Find the point of maximum movement to the left and move the dial so that zero is over this point. Continue to rotate the brake rotor. Find the point of maximum movement to the right, and note the reading. This will indicate the run out value. Continue this rotation several times to confirm the points of maximum variation.

8. Check your results

Check your readings against the manufacturer's specifications. If the deviation is greater than the specifications allow, consult your supervisor.

Applications

In a quality environment to check for consistency and accuracy in the manufacturing process

