

Can be customized according to the workpiece, the maximum measurement range can reach 9m

| Code        | Maximum measuring range(L) | Measuring depth (H) | Repeatability | Weight |
|-------------|----------------------------|---------------------|---------------|--------|
| 2931-D1000A | 1000mm                     | 0-100mm             | 5μm           | 2.0kg  |
| 2931-D1000B | 1000mm                     | 0-200mm             | 10μm          | 2.3kg  |
| 2931-D1000C | 1000mm                     | 0-300mm             | 15μm          | 2.6kg  |
| 2931-D1500A | 1500mm                     | 0-100mm             | 6μm           | 2.3kg  |
| 2931-D1500B | 1500mm                     | 0-200mm             | 15μm          | 2.6kg  |
| 2931-D1500C | 1500mm                     | 0-300mm             | 25μm          | 2.9kg  |
| 2931-D2000A | 2000mm                     | 0-100mm             | 8μm           | 2.6kg  |
| 2931-D2000B | 2000mm                     | 0-200mm             | 20μm          | 2.9kg  |
| 2931-D2000C | 2000mm                     | 0-300mm             | 35μm          | 3.2kg  |
| 2931-D2500A | 2500mm                     | 0-100mm             | 10μm          | 2.9kg  |
| 2931-D2500B | 2500mm                     | 0-200mm             | 25μm          | 3.2kg  |
| 2931-D2500C | 2500mm                     | 0-300mm             | 45μm          | 3.5kg  |
| 2931-D3000A | 3000mm                     | 0-100mm             | 13μm          | 3.2kg  |
| 2931-D3000B | 3000mm                     | 0-200mm             | 30μm          | 3.5kg  |
| 2931-D3000C | 3000mm                     | 0-300mm             | 60μm          | 3.8kg  |
| 2931-D4000A | 4000mm                     | 0-100mm             | 18μm          | 3.8kg  |
| 2931-D4000B | 4000mm                     | 0-200mm             | 35μm          | 4.1kg  |
| 2931-D4000C | 4000mm                     | 0-300mm             | 70μm          | 4.4kg  |

| Code        | Maximum measuring range(L) | Measuring depth (H) | Repeatability | Weight |
|-------------|----------------------------|---------------------|---------------|--------|
| 2931-D5000A | 5000mm                     | 0-100mm             | 25μm          | 4.4kg  |
| 2931-D5000B | 5000mm                     | 0-200mm             | 40μm          | 4.7kg  |
| 2931-D5000C | 5000mm                     | 0-300mm             | 80μm          | 5.0kg  |
| 2931-D6000A | 6000mm                     | 0-100mm             | 30μm          | 5.0kg  |
| 2931-D6000B | 6000mm                     | 0-200mm             | 45μm          | 5.3kg  |
| 2931-D6000C | 6000mm                     | 0-300mm             | 95μm          | 5.6kg  |
| 2931-D7000A | 7000mm                     | 0-100mm             | 80μm          | 5.6kg  |
| 2931-D7000B | 7000mm                     | 0-200mm             | 90μm          | 5.9kg  |
| 2931-D7000C | 7000mm                     | 0-300mm             | 110μm         | 6.2kg  |
| 2931-D8000A | 8000mm                     | 0-100mm             | 100μm         | 6.2kg  |
| 2931-D8000B | 8000mm                     | 0-200mm             | 120μm         | 6.5kg  |
| 2931-D8000C | 8000mm                     | 0-300mm             | 130μm         | 6.8kg  |
| 2931-D9000A | 9000mm                     | 0-100mm             | 120μm         | 6.8kg  |
| 2931-D9000B | 9000mm                     | 0-200mm             | 130μm         | 7.1kg  |
| 2931-D9000C | 9000mm                     | 0-300mm             | 150μm         | 7.4kg  |

1. Measure outer diameter, inside diameter, holes distance and cylindrical workpiece length

2. Install the comparator. When measuring the inner diameter, the installation method is shown in fig 1, and when measuring the outer diameter, the installation method is shown in fig 2.



3. Dial indicator increase measurement force

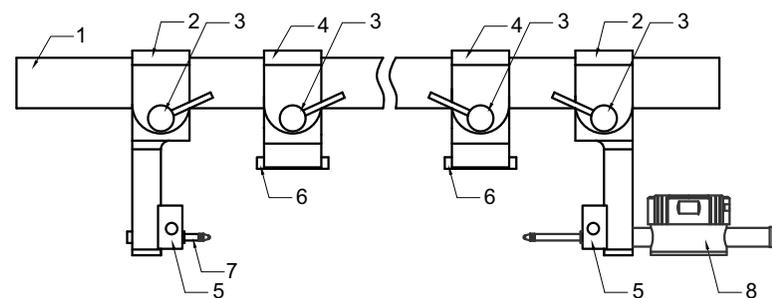
The conventional dial indicator is installed on the carbon fiber comparator. Because the measuring force of the dial indicator is not enough, two people are required to operate the measurement. One person operates the measurement, and the other person assists by pressing the fixed point at the other end to keep it in contact with the surface to be measured.

The carbon fiber comparator is equipped with a spring and a spherical point, which is used to install it on the gage to improve the measuring force of the dial indicator; this way, it can be operated by one person during measurement, and the overall measurement stability of the carbon fiber comparator is better.

When installing, you need to install the dial indicator on the measuring claw first, and then install the spring and spherical point (see fig 3 and fig 4)



carbon fiber comparator measuring depth 0-100mm style



carbon fiber comparator measuring depth 100-300mm style

- 1-carbon fiber round tube
- 2-Fixed jaw
- 3-Measuring jaw eccentric locking wrench
- 4-Positioning jaw
- 5-Mounting seat (adjustable)
- 6-Positioning support rod (adjustable)
- 7-Fixed point
- 8-dial indicator (optional)

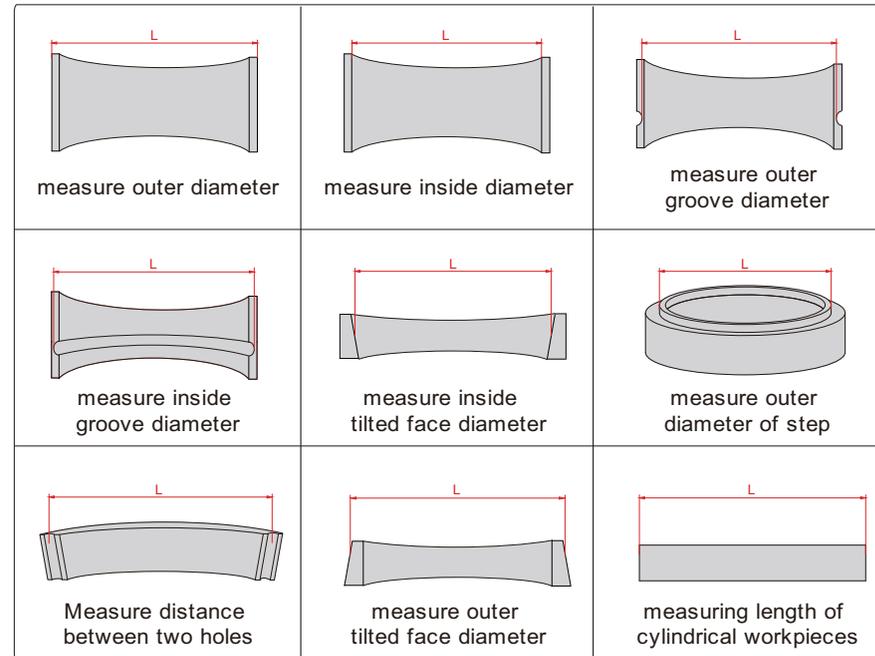


4. Measurement principle:

The length measuring tool for measuring by the relative method is mainly composed of carbon fiber round tube, measuring claw and dial indicator.

When measuring, first set the length calibration tool such as a measuring block or a length setting instrument to the same size as the basic size to be measured, and then calibrate it to zero with the carbon fiber comparator. After completion, use the carbon fiber comparator to measure the workpiece to be measured. The displayed value is the deviation value of the measured size.

application (L is the measuring range)



#### 5. Preparation before calibration:

According to the measured size to be measured on the workpiece to be measured

- Adjust the setting of the proofing tool (gage block/length setting meter, etc.) to the same size.
- Select the appropriate measuring jaw, install and fix the point and dial indicator with an allen wrench.
- Use an allen wrench to adjust the mounting seat of the measuring jaw to the appropriate depth position, and refer to the depth marking on the measuring jaw, so that the mounting seats of the measuring jaw on both sides are at the same height.
- Install the positioning jaw and measuring jaw on the carbon fiber tube and adjust to the appropriate position.
- Place the positioning jaws on both sides naturally on the two end faces of the calibration workpiece, and place the measuring jaws on both sides on the calibration contact surfaces at both ends of the calibration workpiece.
- Adjust the measuring jaw with the dial indicator, so that the dial indicator is in contact with the calibration contact surface, and leave a certain amount of preload.
- Turn the measuring jaw eccentric locking wrench to lock the positioning jaw and measuring jaw.

Note 1: The installation positions of the positioning jaw and the measuring jaw are shown in the above diagram.

Note 2: The installation position of the positioning jaw and the measuring jaw on the same side should not be too far apart, and it is recommended not to exceed 60mm.

Note 3: Confirm whether the installation and locking of each part of the carbon fiber comparator are firm.

Note 4: After locking, it is necessary to control the positioning jaw and the measuring jaw to be on the same center line, and ensure that there is no deviation by visual inspection.

#### 6. Carbon fiber comparator calibration:

- When calibrating, keep the fixed point in contact with the calibration contact surface of the calibration workpiece and keep it stationary.
- Then perform the calibration operation, and move the lower half of the positioning jaw laterally to find the point.
- Move the calibration confirmation back and forth several times to find its minimum point.
- zero the dial indicator
- Calibration complete

Note 1: When moving the positioning jaw, it should be noted that the force applied by the moving operation should be stable and even, to avoid the applied force being suddenly large and small. If the applied force is not stable and uniform, it will affect the measurement accuracy.

Note 2: When moving the positioning jaw to find a point, the direction of the applied force should always be controlled to be back and forth horizontally. If a longitudinal force is applied to the positioning jaw during operation, it will affect the measurement accuracy.

Note 3: The operation of moving the positioning jaw to find the point is unilateral. After pushing the positioning jaw to one side (inward or outward) to measure, you need to return to the origin and push it again to measure again. The value measured by reverse pushing is inaccurate.

Note 4: Since the installation position of the dial indicator is in the suspended state, need to hold the dial indicator by hand to set the zero, and the direct zero setting will exert force on the dial indicator and affect the accuracy of the carbon fiber comparator.

#### 7. Measure workpiece:

- When measuring, keep the fixed point in contact with the calibration contact surface of the calibration workpiece and keep it fixed.
- Then carry out the operation measurement, move the lower half of the positioning jaw laterally to find the point by operation
- When the measured size is the inner and outer diameter size, the dial indicator can be set to the maximum tracking mode (refer to the instruction manual of the dial indicator). In this mode, the maximum measured size can be recorded when the tracking movement positioning jaw is measured.
- After the value displayed on the dial indicator and the calibration setting size are accumulated and calculated, the actual measured value of the workpiece to be measured is obtained.

Note 1: The above points of caution when calibrating also apply to measuring workpieces.

Note 2: After the calibration is completed, each part of the carbon fiber comparator cannot be moved and adjusted, and the calibration and measurement must be consistent.

Note 3: After long-term use, the carbon fiber comparator needs to be calibrated again to prevent the zero position of the scale from changing due to external force during the measurement process.

8. Avoid direct sunlight when using. after use, the metal surface needs to be oiled for protection.

9. Optional accessory: cylinder gage blocks (code 4001)