

The header features the word "Altraco" in a large, green, sans-serif font. Below it, the words "OPERATION INSTRUCTIONS" are written in a smaller, bold, brown font. The background is a light green gradient with faint, semi-transparent images of various measuring tools, including a dial indicator and a caliper.

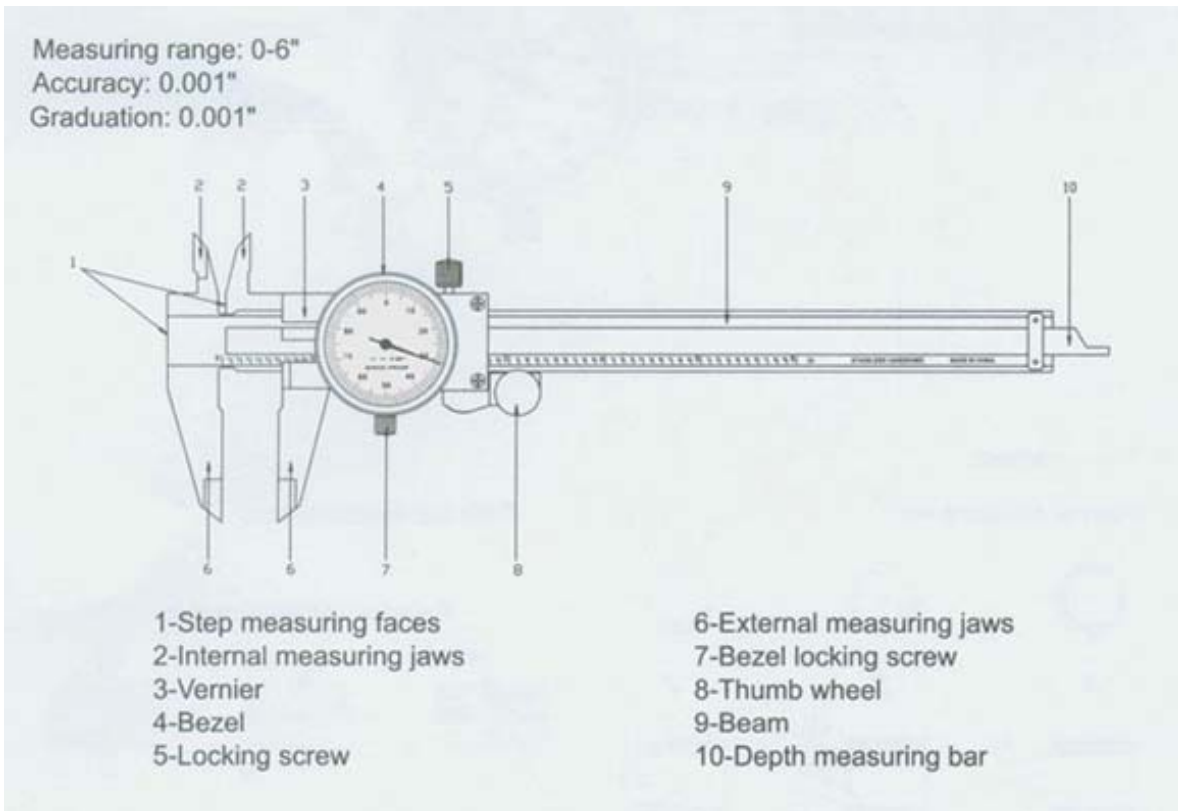
# Altraco

## OPERATION INSTRUCTIONS

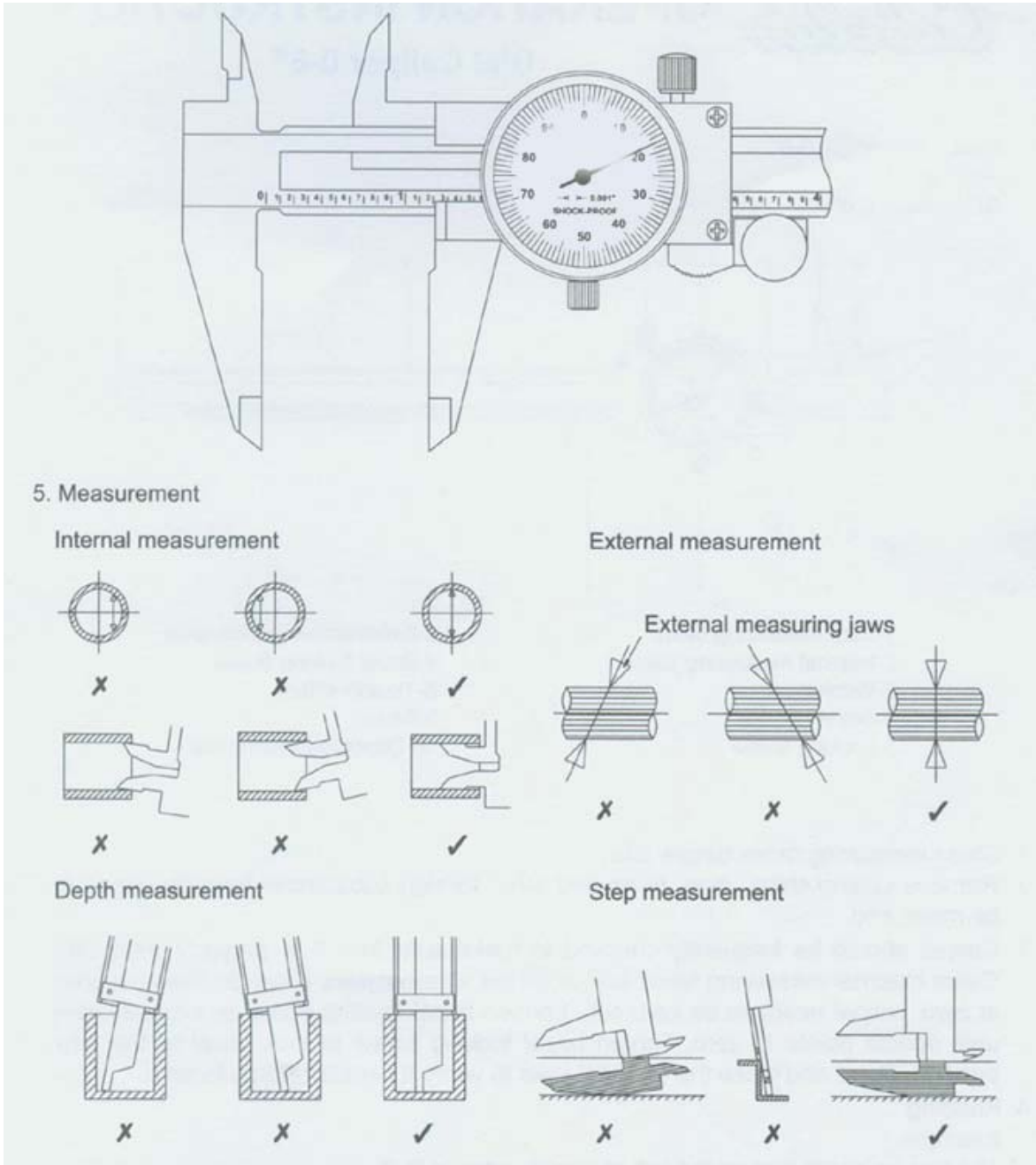
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# DIAL CALIPER 0 – 6”



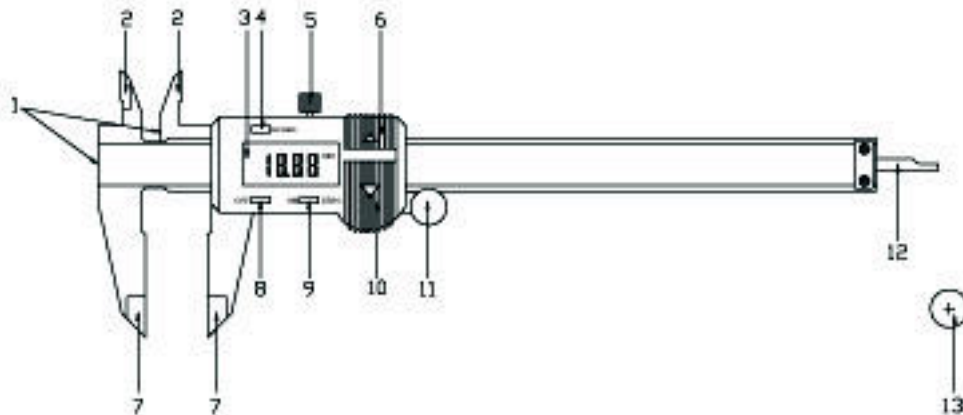
1. **Clean measuring faces before use.**
2. **Remove cutting chips, dust, burrs and other foreign substances from the piece to be measured.**
3. **Caliper should be frequently checked to make sure that it is properly zero set. Clean external measuring faces and close the external jaws. If needle does not point at zero, caliper needs to be zero set. Loosen bezel locking screw and rotate bezel at the new position. Open and close the external jaws to verify if needle returns to zero.**
4. **Reading.**  
**Example:**  
 The line on beam and on the left of vernier edge is '1.2'.....=1.2"  
 The point of needle is close to line '18' of graduation on dial face.....=0.018"  
 -----  
**The reading is...1.128"**



6. **Always apply constant force on thumb wheel during measurement and zero setting.**
7. **Tighten locking screw to hold reading.**
8. **Measuring faces should be carefully protected from being scratched or damaged. Do not operate abruptly, drop or strike caliper.**

# ELECTRONIC DIGITAL CALIPER

Measuring range: 0-150mm/0-6"(part no. 2313)  
0-200mm/0-8"(part no. 2351)  
0-300mm/0-12"(part no. 2352)  
Accuracy:  $\pm 0.03\text{mm}/0.0012"$  (0-200mm)  
 $\pm 0.04\text{mm}/0.0016"$  (200-300mm)  
Resolution:  $0.01\text{mm}/0.0005"$   
Battery: SR44W or SR44

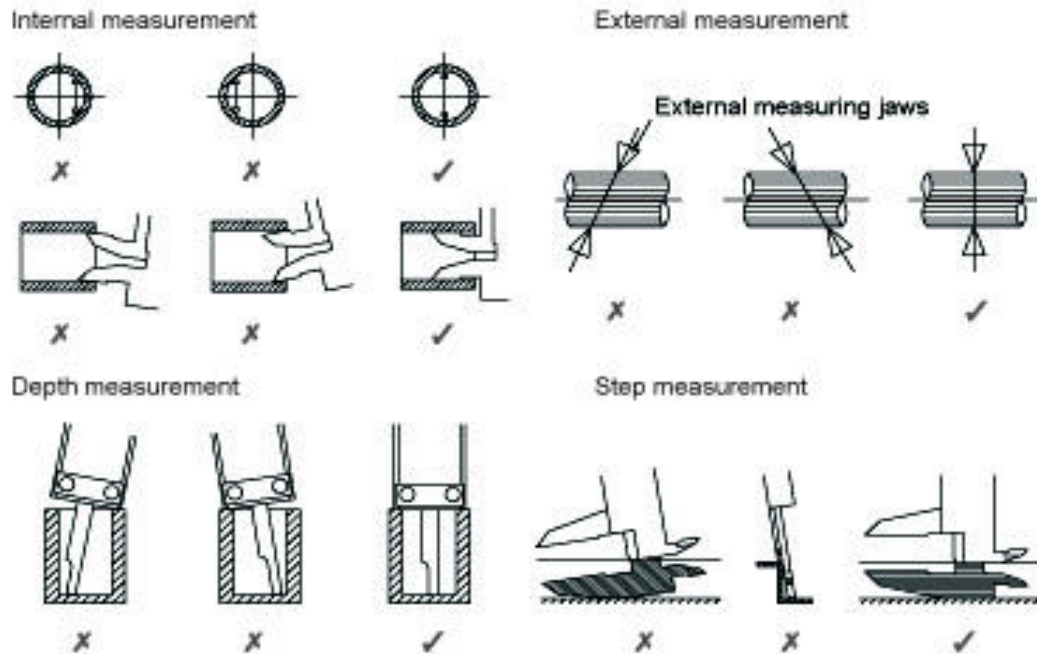


1-Step measuring faces  
2-Internal measuring jaws  
3-LCD display  
4-'inch/mm' button  
5-Locking screw  
6-RS232 output  
7-External measuring jaws

8-'OFF' button  
9-'ON-ZERO' button  
10-Battery cover  
11-Thumb wheel  
12-Depth measuring bar  
13-Battery(SR44 or SR44W)

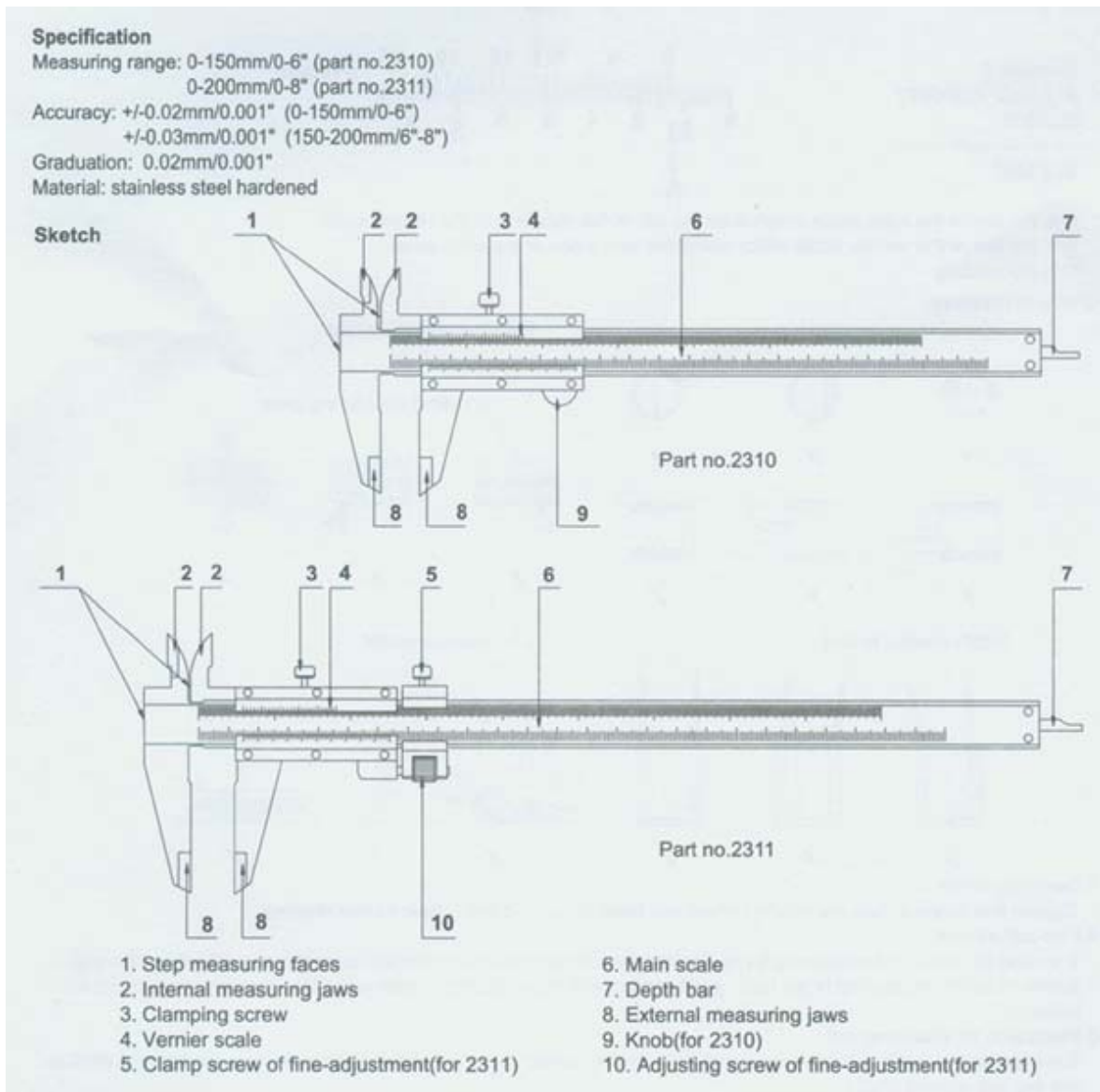
1. Clean measuring faces before use.
2. Remove cutting chips, dust, burrs and other foreign substances from the piece to be measured.
3. Buttons:
  - 'inch/mm' is for mm and inch conversion.
  - 'OFF' button is to turn off display.
  - 'ON-ZERO' is to turn on display or set the reading on display to be zero.
4. Caliper should be checked before each use to make sure that it is properly zero set. The reading should be zero when the external jaws are closed, otherwise press 'ON-ZERO' to set zero reading. Open and close the external jaws to verify if reading returns to zero.

**5. Measurement:**



6. **One battery will last for one year of continuous use. If there is nothing on the display or the digits flash, battery voltage is too low, please replace battery (the positive side of the battery should face out). If digits do not change when buttons are pressed or vernier is moved, take out battery and put it back after 1 minute. Remove the battery if the caliper is not going to be used for a long period of time.**
7. **Always apply constant force on thumb wheel during measurement and zero setting.**
8. **Tighten locking screw to hold reading.**
9. **Working temperature is 0-40°C. Do not put caliper near strong magnetic field. Keep caliper dry, liquid getting into the caliper will damage electronics. Do not apply voltage on caliper like engraving with electric pen.**
10. **Measuring faces should be carefully protected from being scratched or damaged. Do not operate abruptly, drop or strike caliper.**

# VERNIER CALIPER



## PRECAUTION:

1. Clean the caliper before use. Make sure the measuring faces are clean.
2. Remove cutting chips, dust, burrs and other foreign substances from the piece to be measured.
3. Make sure that the zero lines of the vernier scale coincide with the zero lines of the main scale when the external jaws are closed.
4. Make sure that no slit is observed between two external jaws when they are closed.
5. Vernier caliper body should be lubricated with a small amount of clock oil.
6. Measuring faces should be carefully protected from being scratched, hit or rusty. Do not operate abruptly, drop or shake caliper.

1. How to read

Example 1

A: 32

B: 0.54

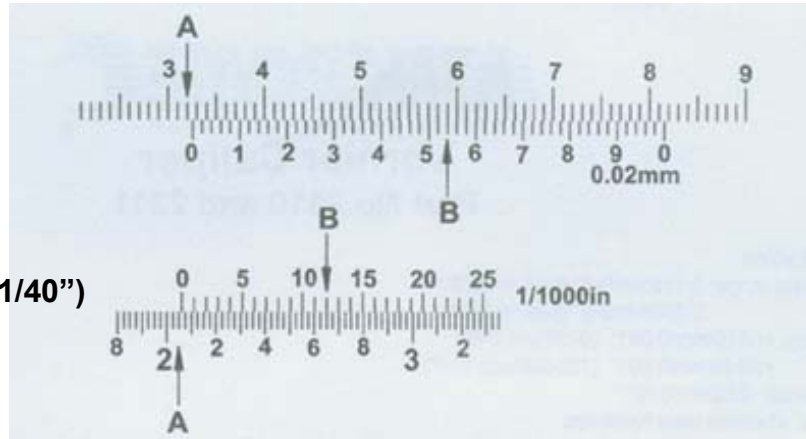
-----  
C: 32.54mm

Example 2

A: 2.05 (2" + 2 X 1/40")

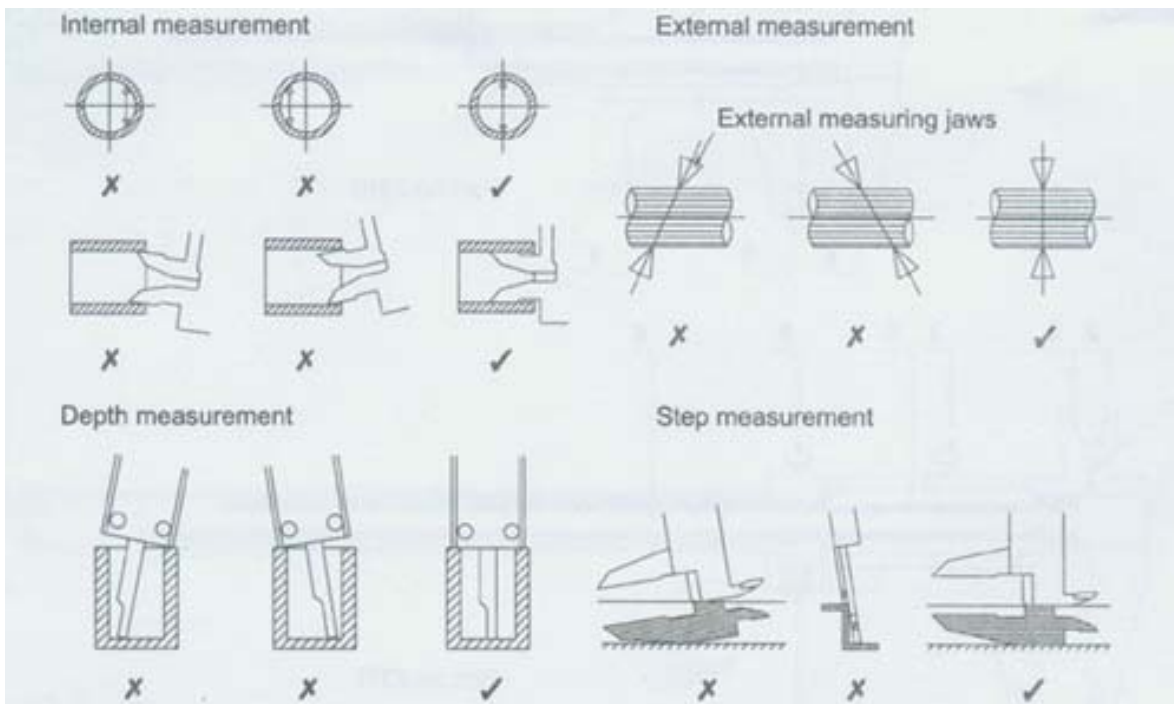
B: 0.012

-----  
C: 2.062"



A is the line of the main scale which is on the left of the zero line of the vernier scale.  
B is the line of the vernier scale which coincides with a line of the main scale.  
C is the reading

2. Measurement:



3. Clamping Screw:

Tighten the screw to lock the reading when you have to remove the caliper before reading.

4. Fine Adjustment:

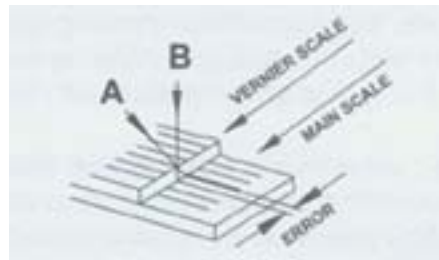
This is used to control the measuring force. Tighten the clamping screw of the fine adjustment, rotate the adjusting screw to let the

measuring faces be in good contact with the workpiece, meanwhile the clamping screw must be loose.

**5. Precaution for measurement:**

It is important to apply suitable measuring force on the caliper to get accurate reading. Always use knob of 2310 or the fine adjustment of 2311.

Take care to avoid parallax error when reading the vernier scale. Parallax error is caused when viewing from A direction. Please view from B direction.

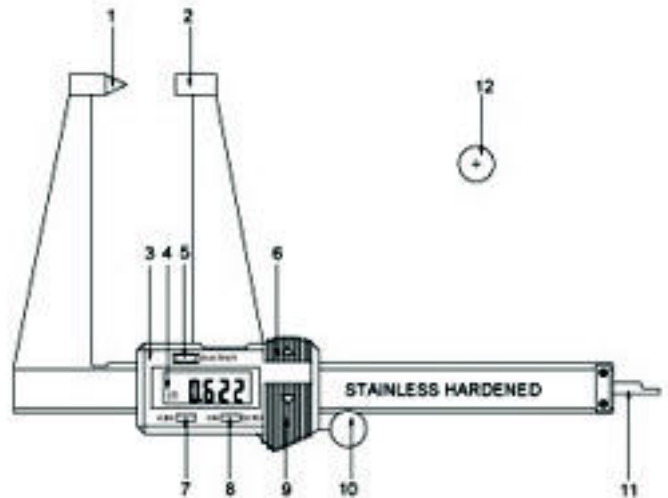


In order to get smooth sliding, rotate the adjusting screw of the fine adjustment to make the fine adjustment close to the vernier before sliding.



# ELECTRONIC DISC BRAKE CALIPER

Measuring range: 0-2.25"/0-57mm  
Resolution: 0.0005"/0.01mm  
Measuring depth: 3.25"/82mm



- |                         |                                |
|-------------------------|--------------------------------|
| 1-Pointed measuring tip | 7-'ABS' button                 |
| 2-Flat measuring face   | 8-'ON-ZERO' button             |
| 3-Vernier               | 9-Battery cover                |
| 4-LCD display           | 10-Thumb wheel                 |
| 5-'mm/inch' button      | 11-Depth measuring bar         |
| 6-RS232 output          | 12-Battery(part no. DRG6059-1) |

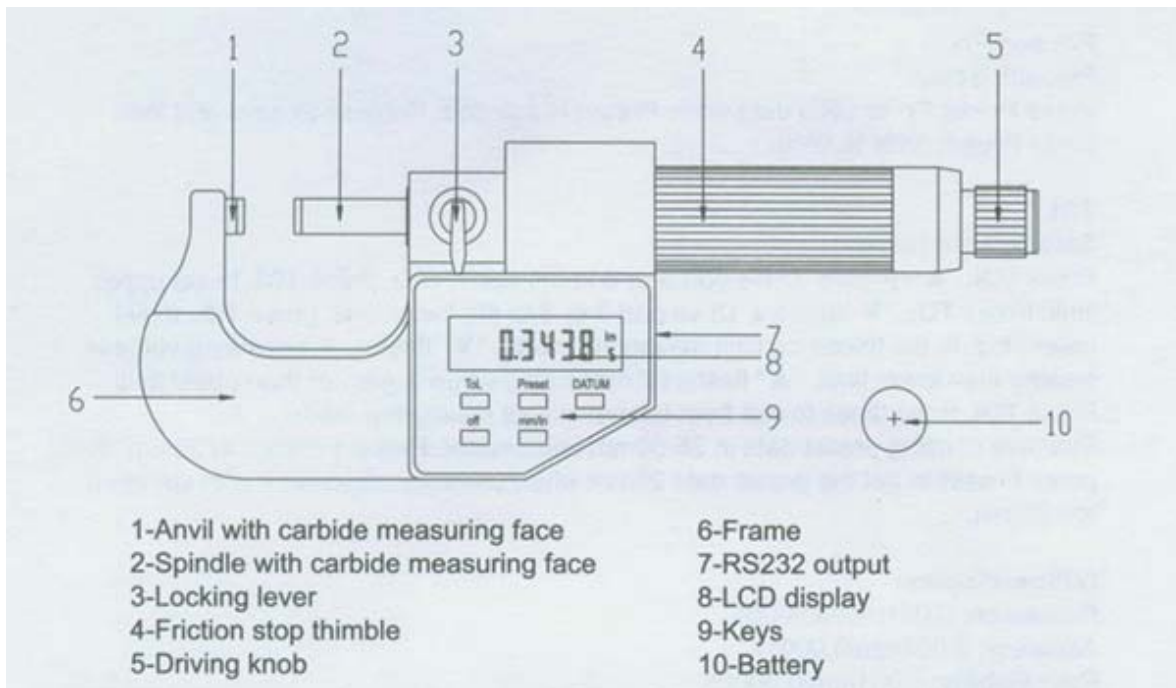
repair part number:

DRG6059-2 RS232 computer interface cable (optional)  
DRG6059-3 fitted case

1. Clean measuring tip and face before use. Remove cutting chips, dust, burrs and other foreign substances from the rotor to be measured.
2. Buttons:
  - 'mm/inch' is for metric and inch reading conversion.
  - 'ABS' button is for absolute and relative measuring mode conversion. The normal mode is absolute measuring mode. Press 'ABS' to enter into relative measuring mode, 'INC' appear on display. Press 'ON ZERO' button at any point (this point is called 'relative zero point'), the reading is zero. In this mode, the reading at a point is the difference between the actual value of this point and the value of relative zero point. Press 'ABS' to exit from relative measuring mode and enter into absolute measuring mode, the reading is absolute value. Press 'ABS' button to enter into relative measuring mode

- again if necessary, the relative zero point is not changed until 'ON-ZERO' is pressed to set a new relative zero point.
- 'ON ZERO' is to turn on/off display and set the reading on display to be zero. Press it to set zero reading. Keep pressing it for three seconds to turn off display. Display is automatically turned off in about 5 minutes if gauge is not used. Press 'ON-ZERO' or move vernier to turn display on.
3. **Gage should be checked to make sure that it is properly calibrated before each use. The reading should be zero when measuring tip and face are in contact, otherwise press 'ON-ZERO' to set zero reading. Separate and return them to be in contact again to verify if reading returns to zero.**
  4. **Take care that gage is perpendicular to the rotor to prevent measurement error. To assure this, keep the flat measuring face in full contact.**
  5. **To measure a rotor in a position where the display cannot be viewed, press 'ON-ZERO' button and remove gage. Move the measuring tip and face to be in contact and the reading is the actual rotor thickness with a '-' in front.**
  6. **One battery will last for one year of continuous use. If there is nothing on the display or the digits flash, battery voltage is too, please replace battery (the positive side of the battery should face out). If digits do not change when buttons are pressed or vernier is moved, take out battery and put it back after 1 minute. Remove the battery if the caliper is not going to be used for a long period of time.**
  7. **Always apply constant force on thumb wheel during calibration and measurement.**
  8. **Tighten locking screw to hold reading.**
  9. **Working temperature is 32-72°F. Do not put gage near strong magnetic field. Keep gage dry, liquid getting into the caliper will damage electronics. Do not apply voltage on gage like engraving with electric pen.**
  10. **Measuring tip and face should be carefully protected from being scratched or damaged. Do not operate abruptly, drop or strike gage.**

# ELECTRONIC DIGITAL MICROMETER



## 1. Keys

0-25mm/0-1"      25-50mm/1-2"  
 50-75mm/2-3"  
 75-100mm/3-4"

**DATUM**  
 Absolute and relative measuring mode conversion  
 Micrometer is in relative measuring mode when INC appears on LCD. Otherwise it is in absolute measuring mode.

**off**  
 Turn power off.

**mm/in**  
 Metric and imperial conversion, turn on power.

**Preset**  
 Change to the preset data(for 0-25mm, the preset data is 0)

### **Pr+ and Pr-**

#### **Presetting data**

Press **Pr+** or **Pr-** to set a data while **Preset** is pressed. Release all keys and then press **Preset** once to finish.

### **TOL**

#### **Set tolerance Limits**

Press **TOL**, **▲** appears. Drive part 5 or 6 to the upper limit, press **TOL** to set upper limit. Press **TOL**, **▼** appears. Drive part 5 or 6 to the lower limit, press **TOL** to set lower limit. In the tolerance limit measuring mode, "**▼**" flashes if measuring value is smaller than lower limit. "**▲**" flashes if measuring value is greater than upper limit. Press **TOL** three times to exit from tolerance limit measuring mode.

Example of using preset data in 25-50mm micrometer: Preset the data to 25mm, then press **Preset** to get the preset date 25mm when calibrate micrometer with standard rod 25mm.

## **2. Specification:**

- **Resolution: 0.001mm / 0.00005"**
- **Accuracy: 0.003mm / 0.00012"**
- **Repeatability: 0.001mm / 0.00005"**
- **Measuring force: 5 – 10n**
- **Power consumption:  $\leq 10 \mu A$**
- **Max. measuring speed: 80mm/s**
- **Operation temperature: 0-40°C**
- **Date Output: RS232C**

## **3. Power:**

- **One silver oxide cell SR44W or SR44 for continuous use of one year.**
- **Display flashes when battery voltage is lower than 1.4V. Please replace battery.**
- **Power will be automatically turn off in five minutes if micrometer is not used.**
- **Press mm/in or move spindle to turn on power.**

## **4. Maintenance:**

- **Calibrate micrometer frequently.**
- **Clean measuring surfaces with soft cloth. Acetone, alcohol and other volatilization cannot be use.**
- **Do not disassemble or drop the micrometer.**
- **Do not put the micrometer near strong magnetic field.**
- **Keep micrometer clean and dry, liquid getting into the caliper will damage electronics.**
- **Remove battery if micrometer is not used for a long time.**

# OUTSIDE MICROMETER

Measuring range:

5606 0-25mm

5607 25-50mm

5608 50-75mm

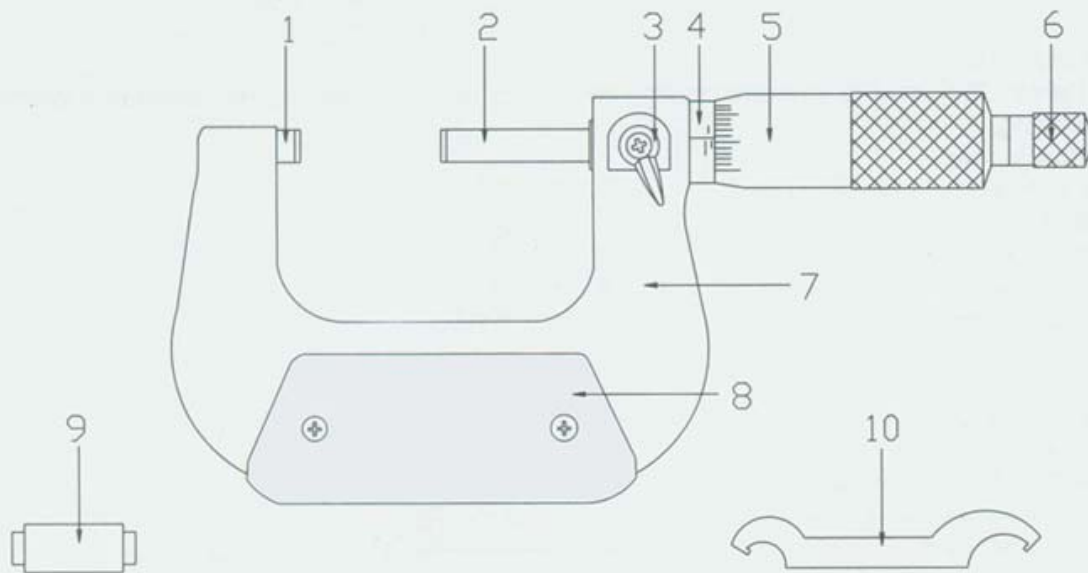
5609 75-100mm

5605 4pcs/set (0-25mm,25-50mm, 50-75mm, 75-100mm)

Graduation: 0.01mm

Accuracy:  $\pm 0.004\text{mm}$  (0-50mm )

$\pm 0.005\text{mm}$  (50-100mm)



1. Anvil with carbide measuring tip
2. Spindle with carbide measuring tip
3. Locking lever
4. Sleeve
5. Thimble

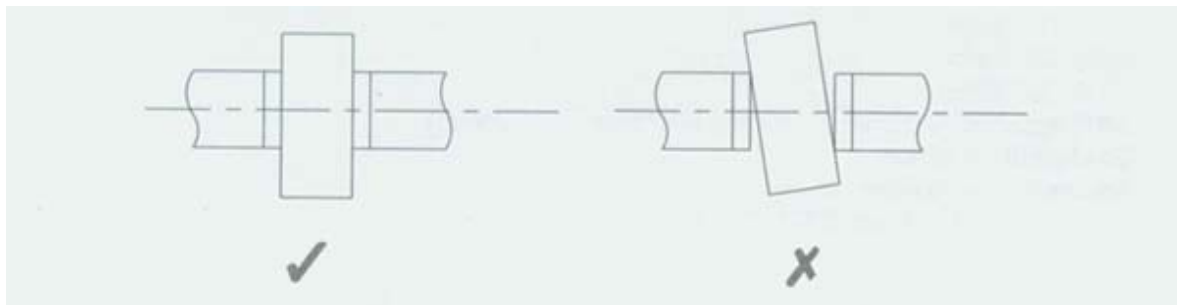
6. Ratchet stop
7. Frame
8. Heat isolation plate
9. Standard rod(except 0-25mm)
10. Adjusting wrench

1. **Clean the micrometer gently before use. Make sure the measuring faces are clean.**
2. **Remove cutting chips, dust, burrs and other foreign substances from the piece to be measured.**
3. **Standard rod and adjusting wrench:**  
**They are used to calibrate micrometers. Micrometers should be calibrated frequently. The length of the standard rod is 25mm for 5607 (25-50mm), 50mm for 5608 (50-75mm) and 75mm for 5609 (75-100mm). 5606 (0-25mm) doesn't have standard rod and it can be regarded as having a standard rod of zero length. The reading must**

be the same as the length of standard rod when the micrometer 'measures' the rod. For example, when 5607 (25-50mm) 'measures' its standard rod 25mm, the reading must be 25mm exactly. Otherwise you should adjust the micrometer. Put the small point of the adjusting wrench into the small hole on the sleeve which is near the locking lever, rotate the sleeve to make the zero line of the thimble align with the horizontal line of the sleeve. Another end of the adjusting wrench is used to fix or unfix the ratchet stop.

**4. How to measure:**

Let the anvil contact with the workpiece first. Rotate the thimble or the ratchet stop till the spindle is close to (but not in contact with) the workpiece. Rotate the ratchet stop until you hear a click from the ratchet stop.



**5. Locking lever:**

Tighten this lever to lock the reading when you have to remove the micrometer before reading.

**6. How to read**

**Example 1**

**A: 35**

**B: 0.12**

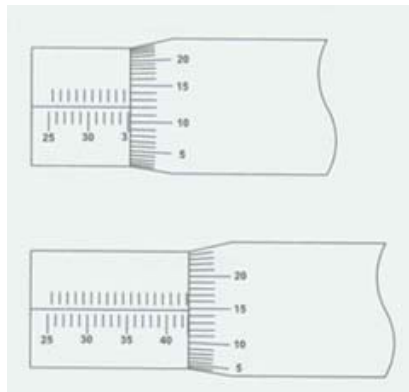
-----  
**C: 35.12mm**

**Example 2**

**A: 42.5**

**B: 0.148 (8 is estimated)**

-----  
**C: 42.648mm**



A is the line of the sleeve which is on the left of the thimble.

B is the point on the thimble which aligns with the horizontal line on sleeve.

C is the reading

The graduation on the sleeve is 0.5mm. One rotation of the thimble makes 0.5mm (1 graduation) step on the sleeve.

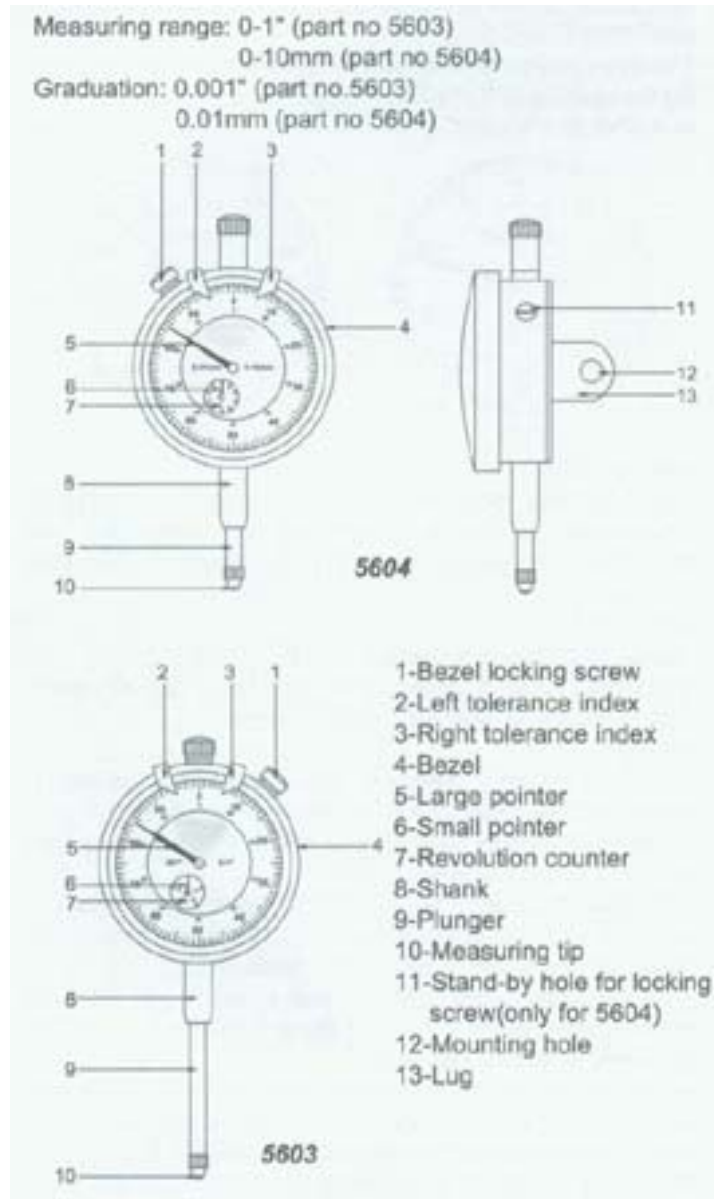
**7. Precaution for measurement:**

**Never rotate the thimble to let the spindle contact with the workpiece, which may damage the precision thread inside the sleeve.**

**Please grip the heat isolation plate if you hold the micrometer for a long time, in order to prevent heat transferring from your hand to the micrometer. If the workpiece and the micrometer are a different temperature, an error of accuracy may be caused.**

- 8. Measuring faces should be carefully prevented from being scratched, hit or rusty. Do not operate abruptly, drop or strike the micrometer. The spindle should be oiled to avoid getting rusty.**

# DIAL INDICATOR



1. **Clean the measuring tip gently before use. Remove cutting chips, dust, burrs and other foreign substances from the piece to be measured.**
2. **Reading 5603:**
  - **Dial face has dual directional graduation of 0.001”.**
  - **Revolution counter is graduated in 0.1”. One full revolution of large pointer is one increment of revolution counter.**



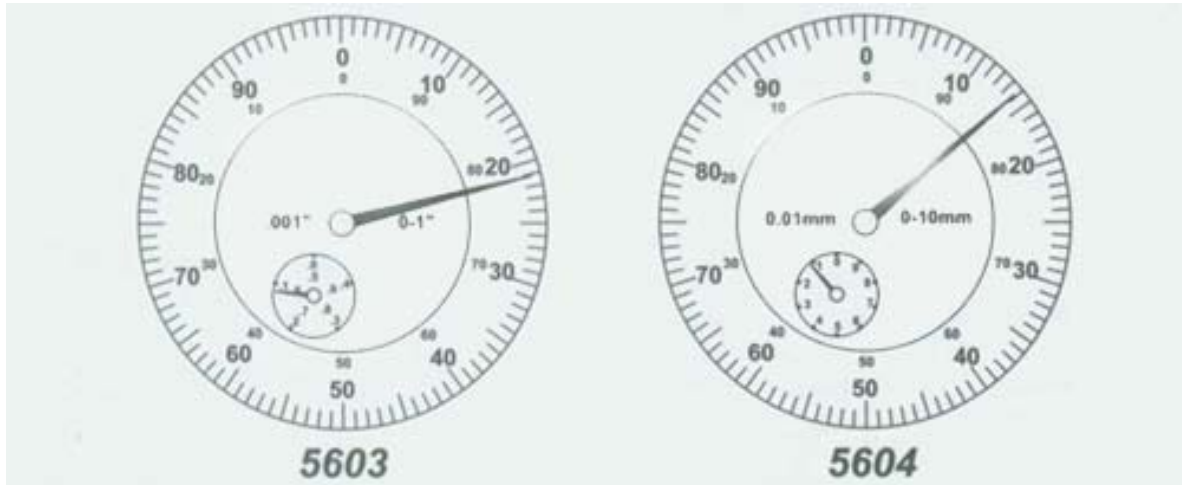
**Example:**

The small pointer is between '.1' and '.2' or between '.6' and '.7'=0.1" or 0.6"

The large pointer is close to line '21' of black digit=0.021"

So the reading is 0.1"+0.021"=0.121"

Or 0.6"+0.021"=0.621"



**3. Reading 5604:**

- Dial face has dual directional graduation of 0.01mm.
- Revolution counter is graduated in 1mm. Once full revolution of large pointer is one increment of revolution counter.

**Example:**

The small pointer is between '1' and '2'=1mm

So the reading is 1mm+0.14mm=1.14mm

**4. Setting up:**

- 5603 has 3/8" diameter shank and 1/4" diameter mounting hole, 5604 has 8mm diameter mounting hole. The shank or the mounting hole can be fixed on magnetic bases.
- Position measuring tip against the piece to be measured so that it is depressed slightly. Plunger should be perpendicular to the surface being measured.
- Loosen bezel locking screw and rotate bezel till large pointer points at zero. Tighten bezel locking screw to lock the bezel at its new position.

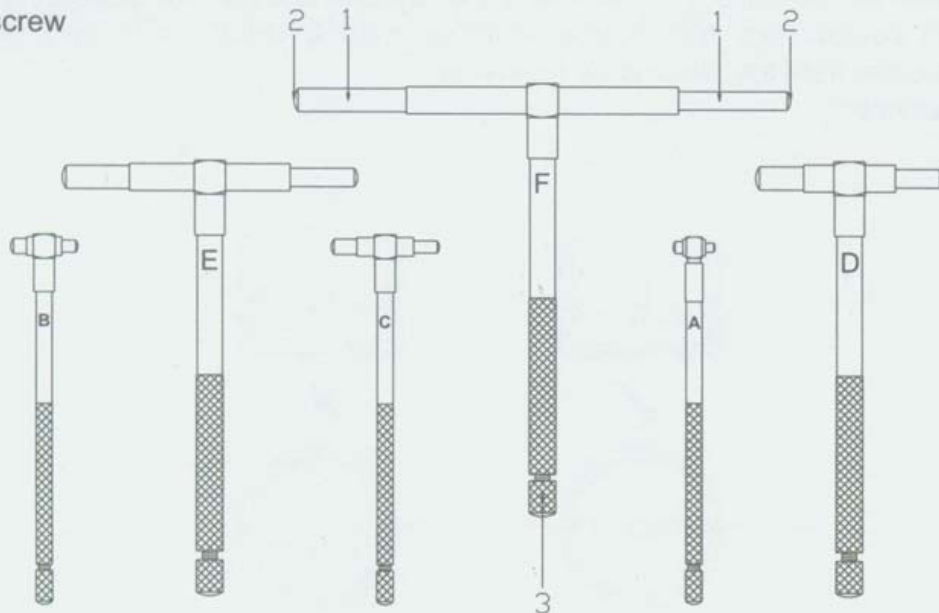
**5. Move the left tolerance index to the position of lower limit and the right tolerance index to the position of upper limit, It can be found easily if the large pointer is out of limit.**

**6. Measuring tip should be carefully prevented from being hit. Do not operate abruptly, drop or strike dial indicators**

# 6 PC TELESCOPING GAGE SET

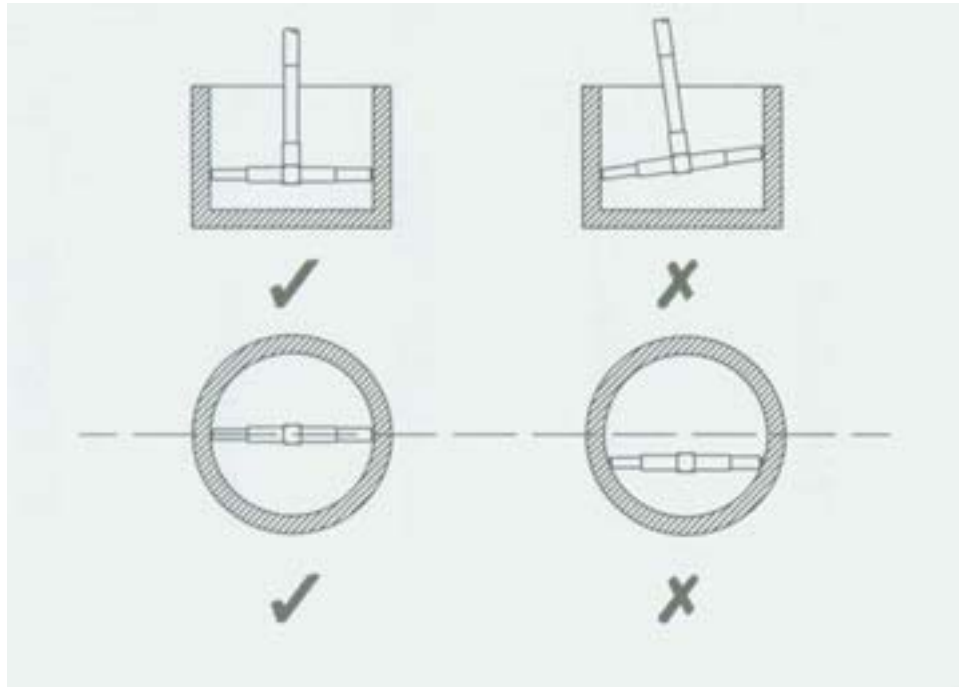
Measuring range: 8-150mm(5/16"-6")

- 1-Plungers
- 2-Contacts
- 3-Locking screw

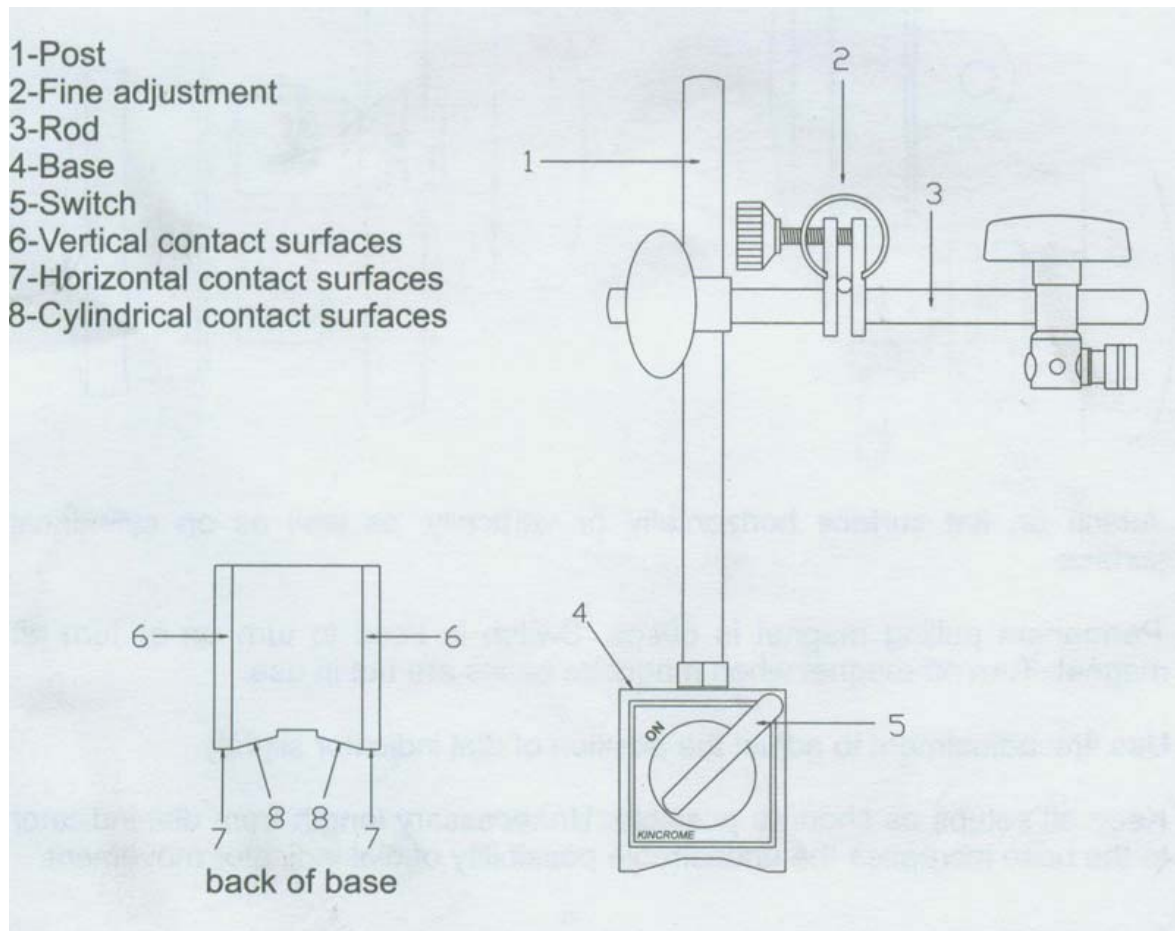


1. The measuring range of each piece is:
  - A: 8 - 12.7mm (5/16" - 1/2")
  - B: 12.7 - 19mm (1/2" - 3/4")
  - C: 19 - 32mm (3/4" - 1 1/4")
  - D: 32 - 54mm (1 1/4" - 2 1/8")
  - E: 54 - 90mm (2 1/8" - 3 1/2")
  - F: 90 - 150mm (3 1/2" - 6")
2. This gage measure diameter of a hole or other inside dimensions. Choose a suitable piece of gage according to the size of dimension to be measured. Loosen locking screw and let the two plungers expand inside the dimension. Lock the plungers by tightening the locking screw and then remove the plungers. Measure the distance between two contacts with micrometers or calipers to obtain the size of the dimension.
3. Clean contact tips before use. Remove cutting chips, burrs and other foreign substances from the piece to be measured.

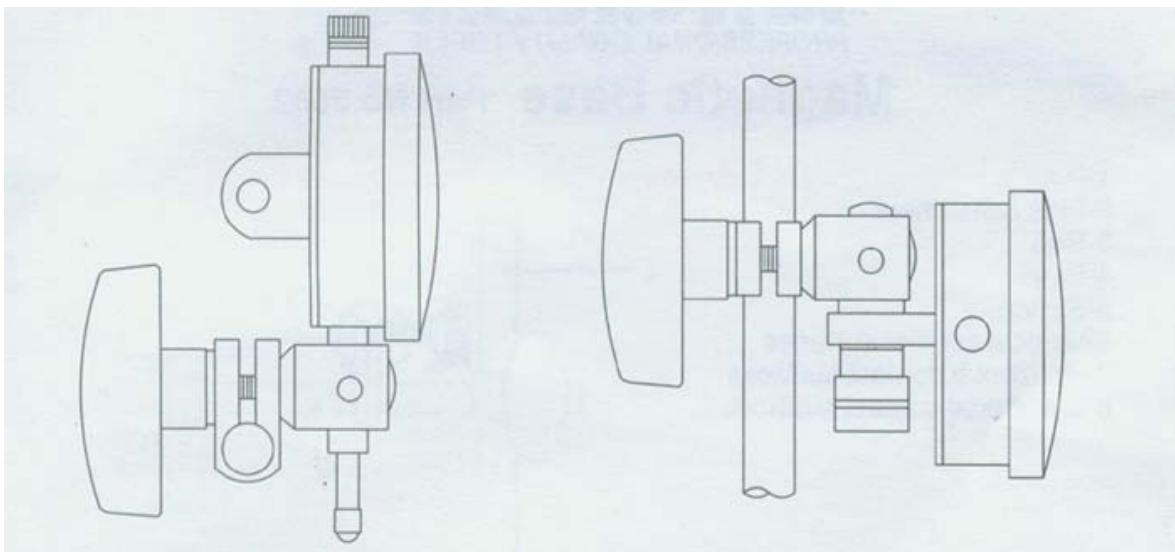
4. Measurement:



# MAGNETIC BASE



1. Fix all dial indicators with 8mm diameter shank and lug back with 6.3mm or 1/4" diameter mounting hole



- 2. Attach on flat surface horizontally or vertically, as well as on cylindrical surface.**
- 3. Permanent pulling magnet is 60 KGS. Switch is used to turn on or turn off magnet. Turn off magnet when magnetic bases are not in use.**
- 4. Use fine adjustment to adjust the position of dial indicator slightly.**
- 5. Keep all setups as short as possible. Unnecessary length from dial indicator to the base increase the undesirable possibility of dial indicator movement.**