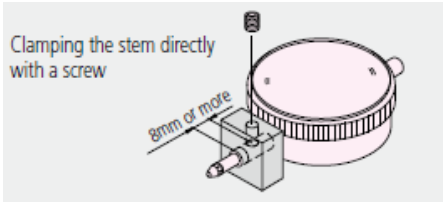
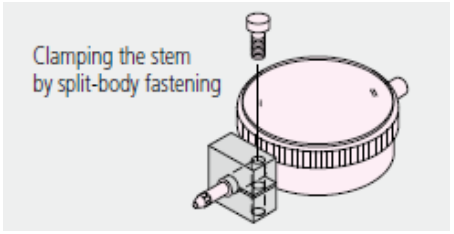
linear Measurements Instruments – Height Gages

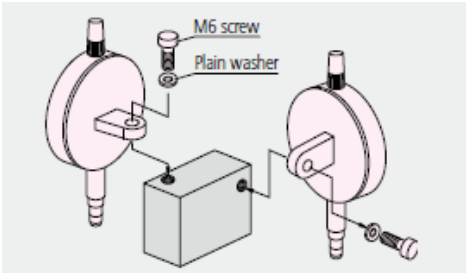
Digimatic Height Gage

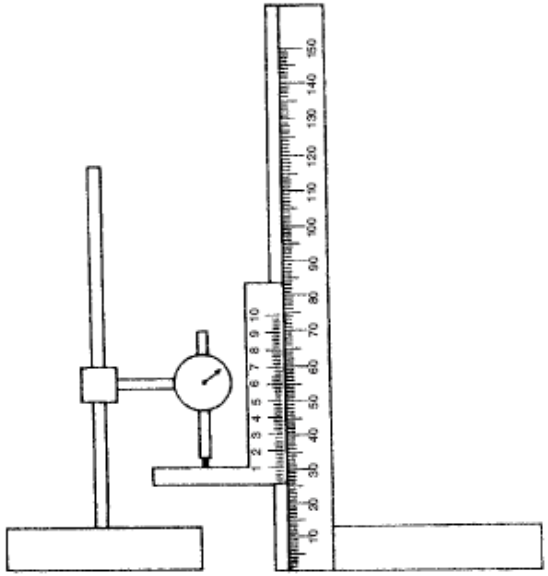
Dial Indicators/Dial Test Indicators

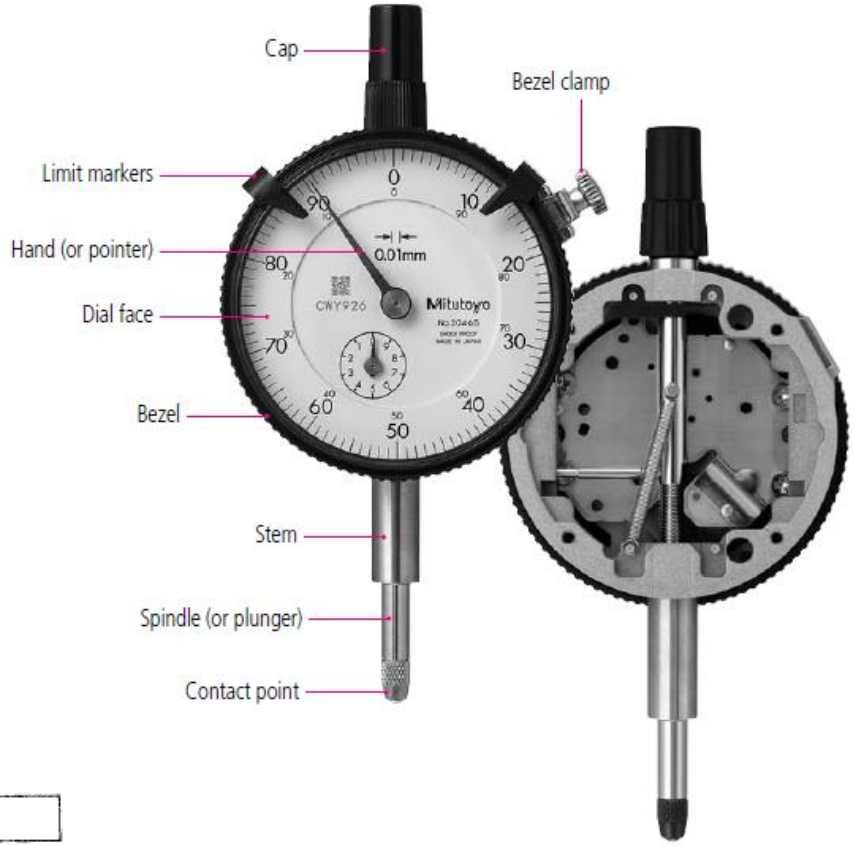
Mounting a Dial Indicator



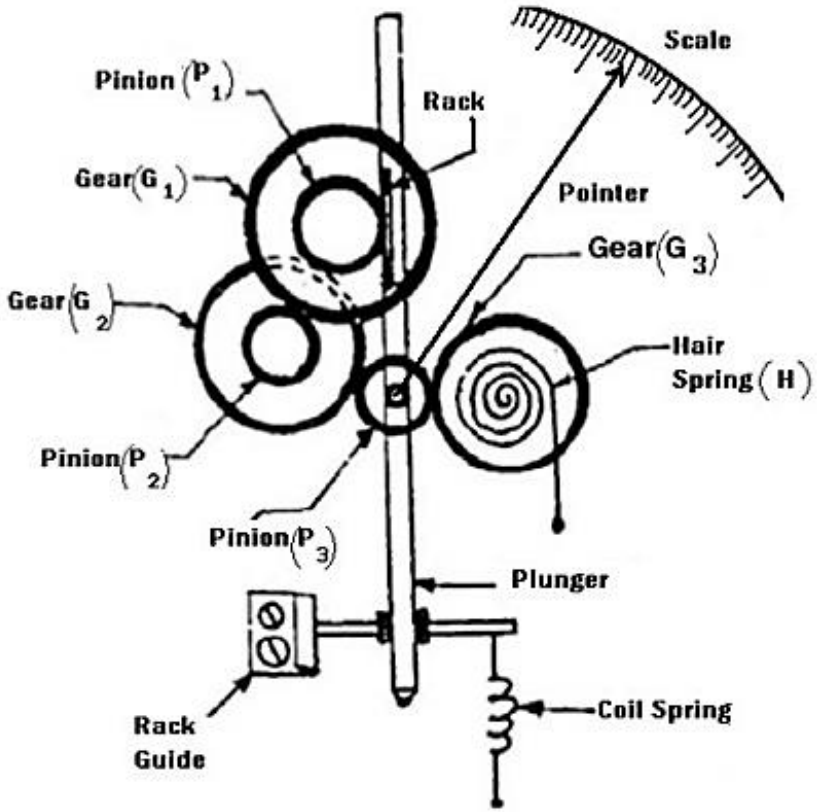


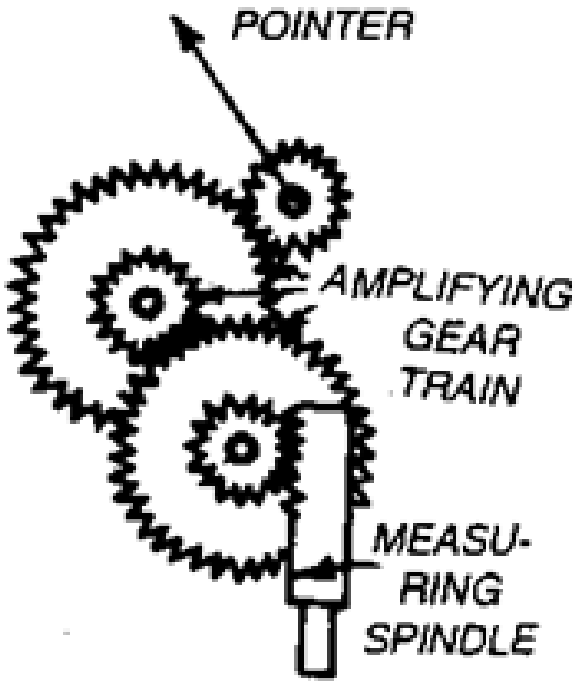




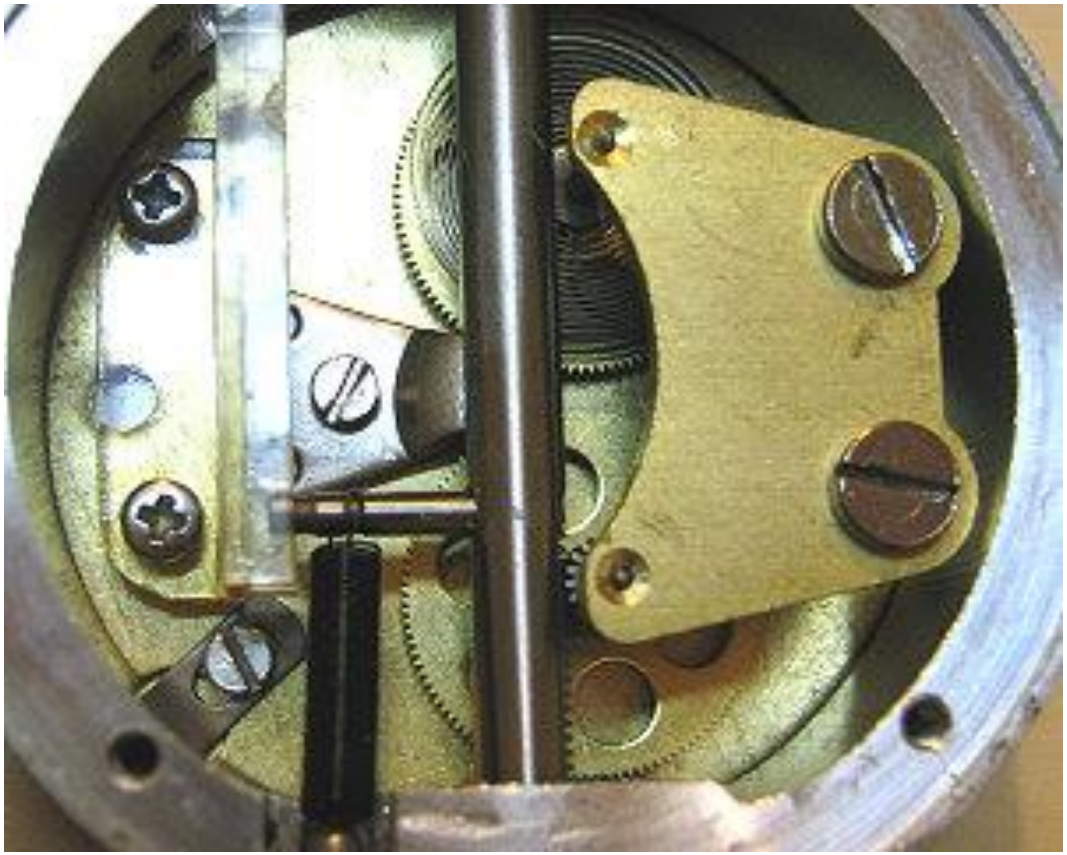


Dial indicators movement mechanism





Dial indicators movement mechanism



Dial indicators movement mechanism

It operates on the principle, that a very slight upward pressure on the spindle at the contact point is multiplied through a system of gears and levers. It is indicated on the face of the dial by a dial finger. Dial indicators basically consists of a body with a round graduated dial and a contact point connected with a spiral or gear train so that hand on the dial face indicates the amount of movement of the contact point. They are designed for use on a wide range of standard measuring devices such as dial box gauges, portal dial, hand gauges, dial depth gauges, diameter gauges and dial indicator snap gauge. Corresponds to a spindle movement of 1 mm. The movement mechanism of the instrument is housed in a metal case for it's protection. The large dial scale is graduated into 100 divisions. The indicator is set to zero by the use of slip gauges representing the basic size of part.

Requirements of Good Dial Indicator

1. It should give trouble free and dependable readings over a long period.
2. The pressure required on measuring head to obtain zero reading must remain constant over the whole range.
3. The pointer should indicate the direction of movement of the measuring plunger.
4. The accuracy of the readings should be within close limits of the various sizes and ranges
5. The movement of the measuring plunger should be in either direction without affecting the accuracy.
6. The pointer movement should be damped, so that it will not oscillate when the readings are being taken.

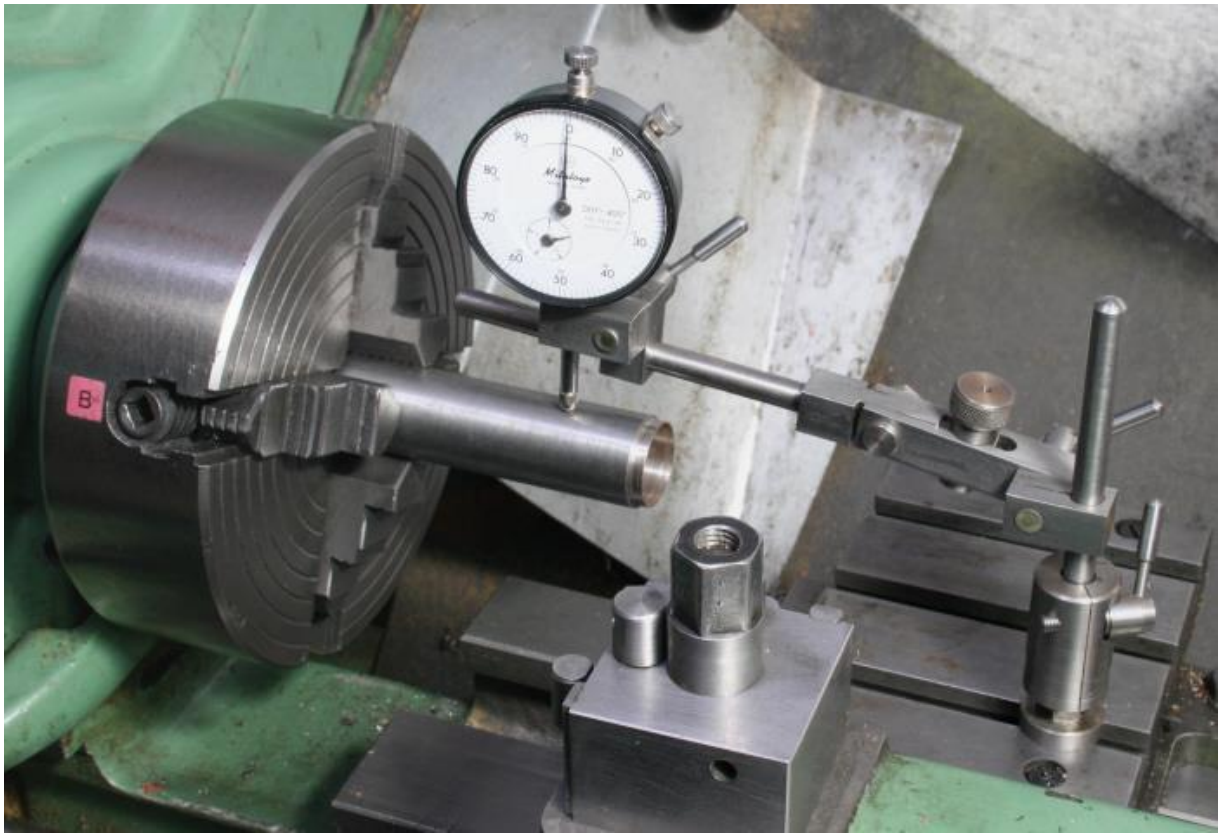
Applications of Dial Indicators

1. Comparing two heights or distances between narrow limits.
2. To determine the errors in geometrical form such as ovality, roundness and taper.
3. For taking accurate measurement of deformation such as intension and compression.
4. To determine positional errors of surfaces such as parallelism, squareness and alignment.
5. To check the alignment of lathe centers by using suitable accurate bar between the
6. centers.
7. To check trueness of milling machine arbors and to check the parallelism of shaper arm with table surface or vice.

Applications of Dial Indicators

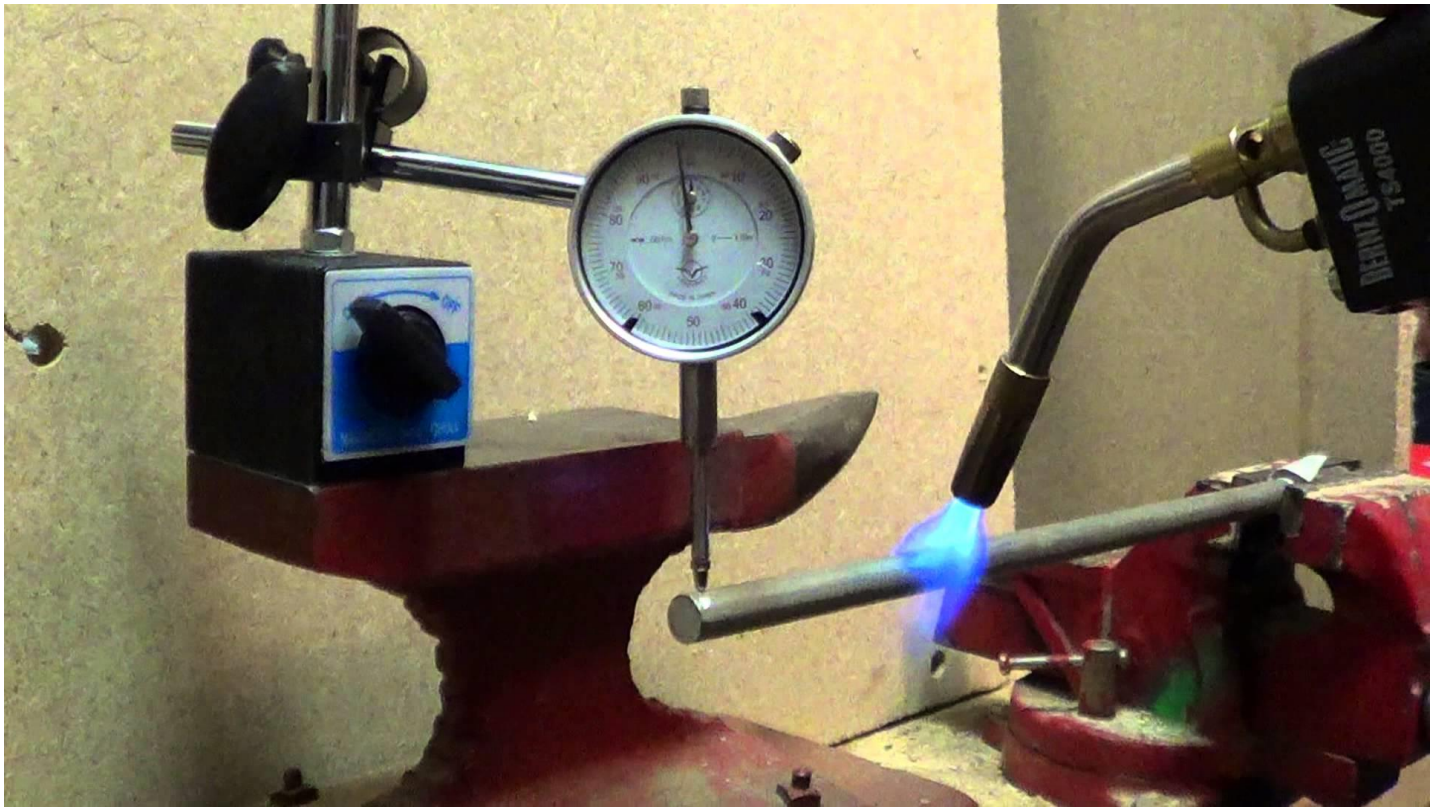
Applications of Dial Indicators

Applications of Dial Indicators



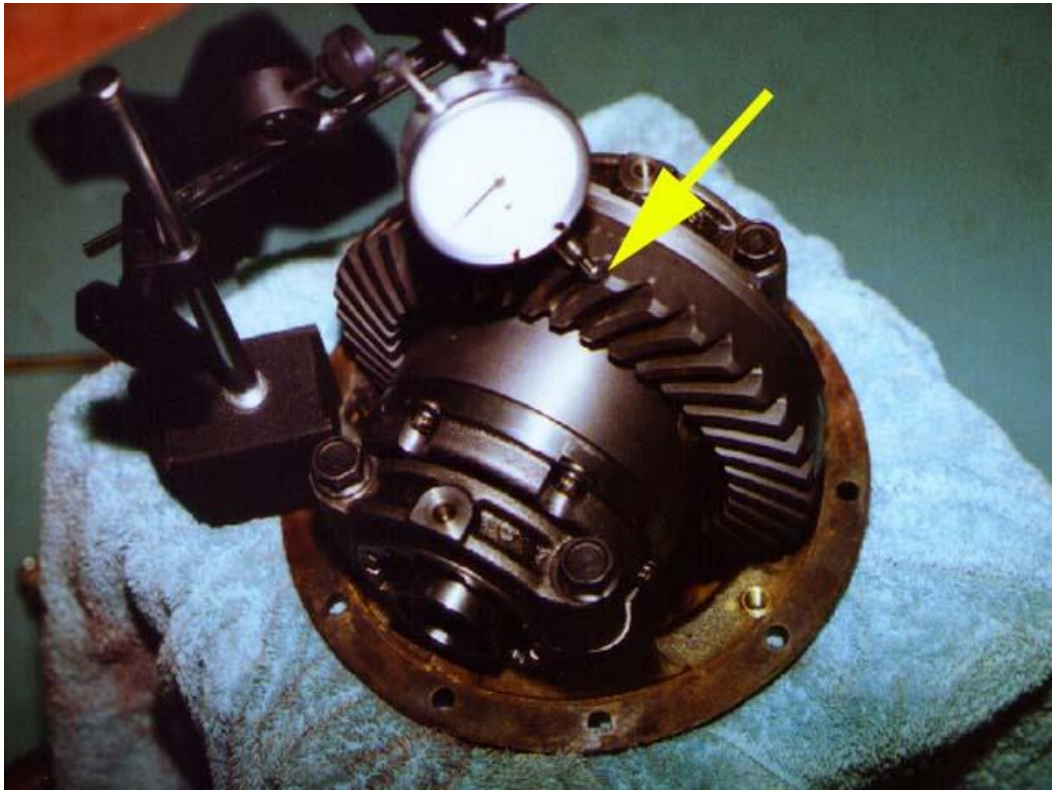
Applications of Dial Indicators

Applications of Dial Indicators



Applications of Dial Indicators

Applications of Dial Indicators



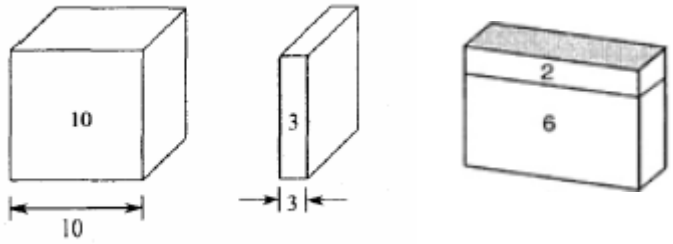
linear Measurements Instruments – Slip Gages

Slip gauges, also known as gauge blocks

Classification of Slip Gauges

Slip gauges are classified into various types according to their use as follows:

1. **Grade 2**
2. **Grade 1**
3. **Grade 0**
4. **Grade 00**
5. **Calibration grade.**



Grade 2: It is a workshop grade slip gauges used for setting tools, cutters and checking dimensions roughly.

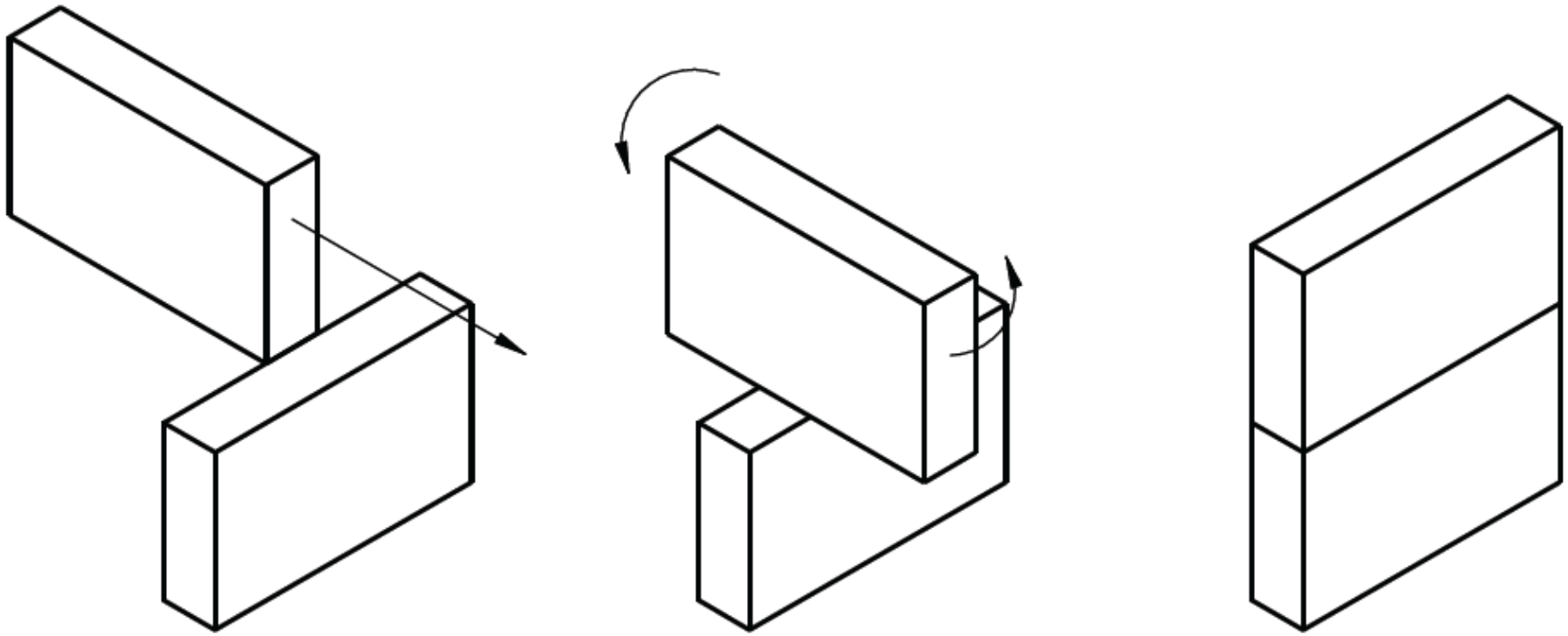
Grade 1: The grade 1is used for precise work in tool rooms.

Grade 0: It is used as inspection grade of slip gauges mainly by inspection department.

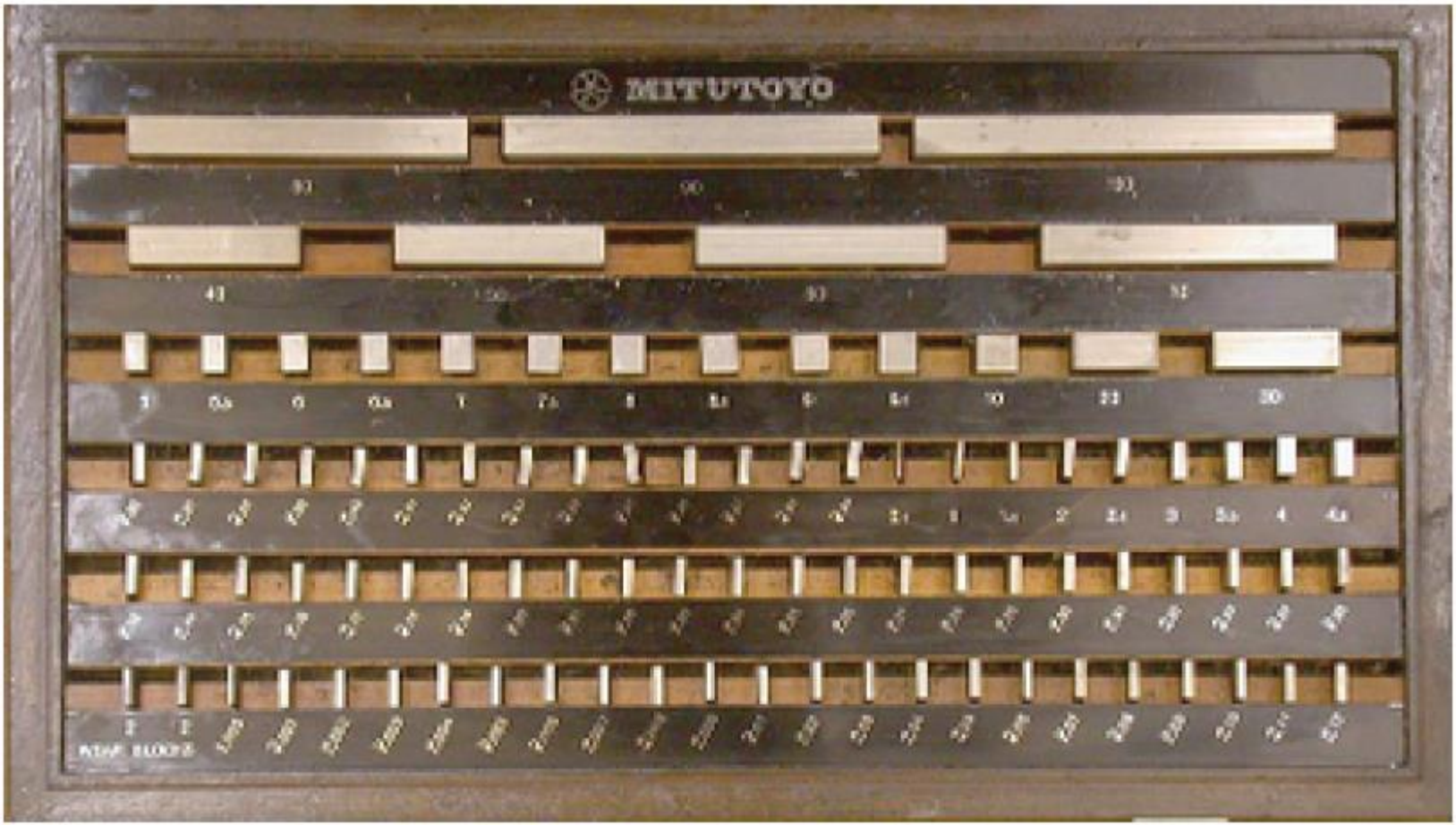
Grade 00: Grade 00 mainly used in high precision works in the form of error detection in instruments.

Calibration grade: The actual size of the slip gauge is calibrated on a chart supplied by the manufactures.

linear Measurements Instruments – Slip Gages

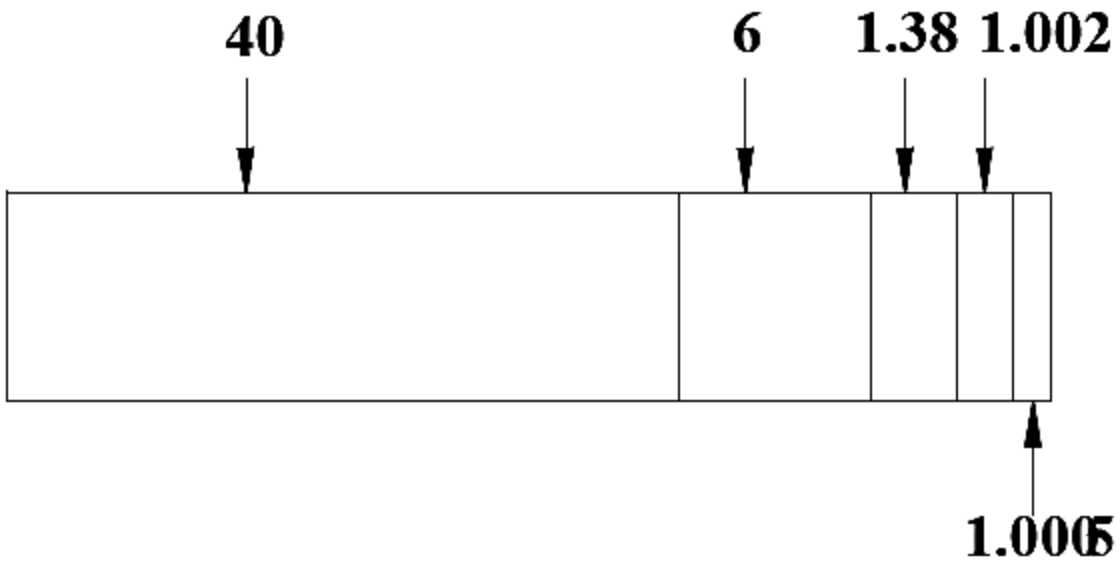


linear Measurements Instruments – Slip Gages



linear Measurements Instruments – Slip Gages

Combination of slips; 40+6+1.38+1.002+1.0005 = 49.3825 mm



linear Measurements Instruments – Limit Gauges

1. A limit gauge is not a measuring gauge. Just they are used as inspecting gauges.
2. The limit gauges are used in inspection by methods of attributes.
3. This gives the information about the products which may be either within the prescribed limit or not.
4. By using limit gauges report, the control charts of P and C charts are drawn to control invariance of the products.
5. This procedure is mostly performed by the quality control department of each and every industry.
6. Limit gauge are mainly used for checking for cylindrical holes of identical components with a large numbers in mass production.

Purpose of using limit gauges

1. Components are manufactured as per the specified tolerance limits, upper limit and lower limit. The dimension of each component should be within this upper and lower limit.
2. If the dimensions are outside these limits, the components will be rejected.
3. If we use any measuring instruments to check these dimensions, the process will consume more time. Still we are not interested in knowing the amount of error in dimensions.
4. It is just enough whether the size of the component is within the prescribed limits or not. For this purpose, we can make use of gauges known as limit gauges.