

Calipers

Introduction

Calipers are precision measuring instruments used to determine the distance between two opposite sides of an object. They are commonly used in engineering, machining, metalworking, and scientific applications to measure dimensions with high accuracy. Calipers come in various types, including vernier calipers, digital calipers, and dial calipers, each suited for different levels of precision and ease of use.

Structure of Calipers

1. Main Components

Fixed Jaw & Sliding Jaw: Used to hold the object being measured.

Main Scale: Marked with standard measurements (inches or millimeters).

Vernier, Dial, or Digital Scale: Provides fine readings beyond the main scale.

Depth Gauge: Extends from the end for depth measurements.

Locking Screw: Holds the sliding jaw in position for stable readings.

2. Types of Calipers

Vernier Calipers: Uses a sliding vernier scale for precise manual readings.

Dial Calipers: Features a mechanical dial for easier reading.

Digital Calipers: Displays measurements on an electronic screen, offering quick and accurate readings.

Inside & Outside Calipers: Used for measuring internal and external diameters.

Micrometer Calipers: High-precision instruments for very small measurements.

Working of Calipers

1. How to Use a Vernier Caliper

Zero the Scale: Close the jaws and ensure the reading is at zero.

Place the Object: Adjust the jaws around the object to be measured.

Read the Main Scale: Note the value before the vernier scale's zero mark.

Read the Vernier Scale: Find the mark that aligns with the main scale and add it to the reading.

Calculate the Final Measurement: Sum the main and vernier scale values for the total measurement.

2. Using a Digital Caliper

Turn On & Zero the Display: Ensure accurate calibration.

Measure the Object: Adjust the jaws and observe the digital reading.

Switch Units if Needed: Most digital calipers allow switching between mm and inches.

Applications of Calipers

1. Engineering & Machining

Used to measure metal parts, screws, and components with high precision.

Essential for quality control in manufacturing.

2. Medical & Scientific Research

Used in biology and anatomy to measure bone structures and specimens.

Helps in dental and orthopedic applications.

3. Automotive & Mechanical Repairs

Measures brake disc thickness, engine parts, and shafts for proper fitting.

4. Woodworking & Metalworking

Ensures accurate cutting, drilling, and fitting of materials.

Caliper Maintenance and Care

Keep clean and dry: Avoid dust and moisture that can affect accuracy.

Zero before use: Always reset to ensure precise measurements.

Avoid dropping: Dropping can misalign the jaws and affect precision.

Store properly: Keep in a protective case when not in use.

Conclusion

Calipers are essential measuring tools for engineering, machining, automotive, and scientific applications,

providing precise internal, external, and depth measurements. With proper handling and maintenance, they ensure accuracy and efficiency in various technical fields.