

Auto-collimator

By: Er. SHIVANI TIWARI



T100 autocollimator

An **autocollimator** is an **optical instrument** for non-contact measurement of **angles**. They are typically used to align components and measure **deflections** in optical or mechanical systems. An autocollimator works by projecting an image onto a target **mirror** and measuring the deflection of the returned image against a scale, either visually or by means of an electronic detector. A visual autocollimator can measure angles as small as 1 arc-second (4.85 micro-radians), while an electronic autocollimator can have up to 100 times more resolution.

Auto-collimator

Visual autocollimators are often used for aligning **laser rod** ends and checking the face parallelism of optical windows and wedges. Electronic and digital autocollimators are used as angle measurement standards, for monitoring angular movement over long periods of time and for checking angular position repeatability in mechanical systems. Servo autocollimators are specialized compact forms of electronic autocollimators that are used in high-speed servo-feedback loops for stable-platform applications. An electronic autocollimator is typically calibrated to read the actual mirror angle.

Types of Autocollimator

1 Electronic Autocollimator

The **electronic autocollimator** is a high precision angle measurement instrument capable of measuring angular deviations with accuracy down to fractions of an arc-second, by electronic means only, with no optical eye-piece.



uses of electronic Autocollimator

Measuring with an electronic autocollimator is fast, easy, accurate, and will frequently be the most cost effective procedure. Used extensively in workshops, tool rooms, inspection departments and quality control laboratories worldwide, these highly sensitive instruments will measure extremely small angular displacements, squareness, twist and parallelism.

2

^ Laser Analyzing Autocollimator

Today, a new technology allows to improve the Autocollimation instrument to allow direct measurements of incoming laser beams. This new capability opens a gate of inter-alignment between optics, mirrors and lasers. This technology fusion between a century-old technology of Autocollimation with recent laser technology offers a very versatile instrument capable of measurement of inter-alignment between multiple line of sights, laser in respect to mechanical datum, alignment of laser cavity, measurement of multiple rollers parallelism in roll to roll machinery, laser divergence angle and its spatial stability and many more inter-alignment applications.

Applications of Autocollimator

An Electronic Autocollimator is seldom used in the measurement of straightness of machine components (like guide ways) or the straightness of lines of motion of machine components. Flatness measurement is usually performed by measuring straightness of multiple lines along the flat surface. By correlation, it is possible to determine the flatness error of the plane. Recent advancements in applications allow angular orientation measurement of wafers. This could also be done without obstructing line of sights to the wafer's surface itself. It is applicable in wafer measuring machines and wafer processing machines. Other applications include:

Applications of Autocollimator

cont'd.....

- Aircraft assembly jigs
- Satellite testing
- Steam and gas turbines
- Marine propulsion machinery
- Printing presses
- Air compressors
- Cranes
- Diesel engines
- Nuclear reactors
- Coal conveyors
- Shipbuilding and repair
- Rolling mills
- Rod and wire mills
- Extruder barrels

Applications of Autocollimator

cont'd....

Optical measurement Applications:

- Retro reflector Measurement
- Roof prism Measurement
- Optical assembly procedures
- Alignment of beam delivery systems
- Alignment of laser cavity
- Testing perpendicularity of laser rods in respect to its axis
- Real time measurement of angular stability of mirror elements.

page : 08

By: Er. SHIVANI TIWAR

End of Autocollimator