

PRISMS INDIA PRIVATE LIMITED

C-92, 16th Cross, Pipdic Mettupalayam Industrial Estate, Pondicherry-605009, India
sales@prismsindia.in; www.prismsindia.in; Tel: 0413-2277059, 2271289, 4204060

AUTOCOLLIMATOR

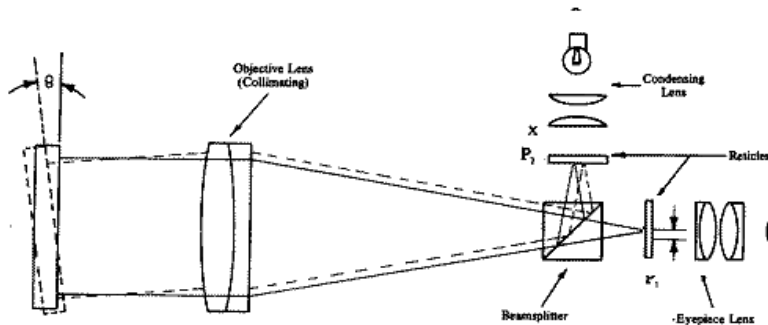
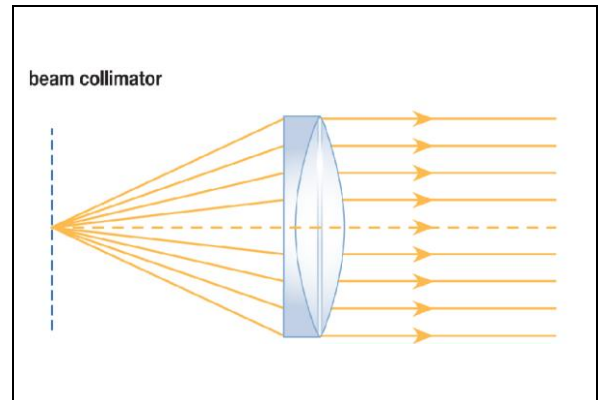
Autocollimator is a precise instrument for small angular tilt measurements, micro optic visual Autocollimator resolution ranging from 3 arc sec to 0.5 arc sec for straightness, sureness, flatness, rotary table calibration in machine tool industry. Wide range of stands and accessories are offered to suit various applications, Autocollimator with camera attachment available for easy to take measurements.

Definition

The Autocollimator is an instrument that functionally combining of a collimator and a telescope. It is used for measurement of small angular displacements of a mirror by means of its own collimated light.

A typical electronic autocollimator is constructed with a light source, a reticule, a beam-splitter, a objective lens and an image sensor or an eyepiece.

Visual Autocollimator



- Tube mounted Objective Lens
- Cube Beam splitter mount
- Reference Eyepiece reticule
- Illuminated Projecting reticule
- Eyepiece
- Auto-collimation is an optical technique of projecting an illuminated reticule to infinity and receiving the reticule image back after reflection on a flat mirror surface, due to the conjugation of the reticule plane and the sensor plane/eyepiece focal plane, the received image is still sharp and clear. When the flat mirror is tilted by an angle θ , the received beam is deflected by 2θ . The image of reticule will have a displacement of "d" with reference to the eyepiece reticule, the tilt angle can be calculated from the equation shown below.

$$\bullet \quad \theta = \text{inv tan} \frac{d}{2f}$$

- f is the effective focal length of the collimating Objective lens of the Autocollimator.

ANGLE DEKKOR

Description

This is also a type of Autocollimator, there is an illuminated reticule in the focal plane of the collimating lens. This illuminated reticule is projected as a parallel beam by the collimating lens which after striking a polished surface or reflector below the instrument is refocused by the lens in the field of view of the eyepiece. In the eyepiece there is another/reference graduated reticule fixed. The reflected image of the illuminated reticule is received at cube beam splitter to the fixed graduated reference reticule. Thus, the changes in angular position of the reflector in two planes are indicated by changes in the point of intersection of the two reticules.



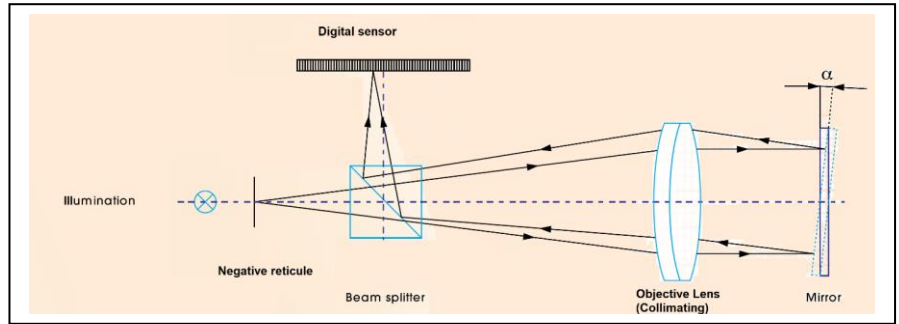
Autocollimator / Angle Dekkor Specifications

Model No	Autocollimator	ACT-01S/01D	ACT-02D/03D	ACT-04D
	Angle Dekkor	ADK-01	ADK-02	ADK-04
Focal Length		287 mm	430 mm	860 mm
Clear Aperture		25 mm	35 mm	55 mm
Resolution 1 division in reticule		30 sec	20 sec	10 sec
Resolution 1 division in micrometer		3 sec	1 sec	0.5 sec
Accuracy over 1-minute Range		6 sec	2 sec	1 sec
Accuracy over full Range		30 sec	10 sec	5 sec
Measurement Axis		Single/Dual	Dual	Dual
Range of Measurement		± 30 minutes	± 20 minutes	± 10 minutes
Magnification		16 X	24 X	48 X
Field of View		2° 24'	1° 35'	47'
Max working distance		3 Mts	4.5 Mts	9 Mts
Illumination		LED	LED	LED
Overall Length		365 mm	410 mm	520 mm
Weight		4 Kgs	5.5 Kgs	11 Kgs

Electronic Autocollimator

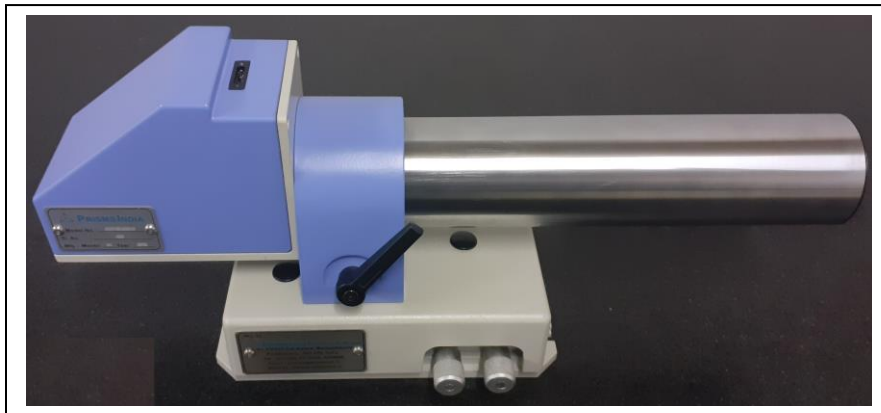
Overview

In an electronic autocollimator the eyepiece is replaced by an electronic camera with discrete sensor pixels (e.g. CCD or CMOS sensor type). The digital camera is usually connected to a PC which calculates the measured angle from the image by using image analysis software. The high resolution of electronic autocollimators is due to the evaluation of gray scale levels in the image which allows for sub pixel interpolation of the image position.



Electronic autocollimator are specially designed for following measurement tasks.

- measurement of small angles
- precision angular adjustment and calibration
- quality control of machine tools and optics industries



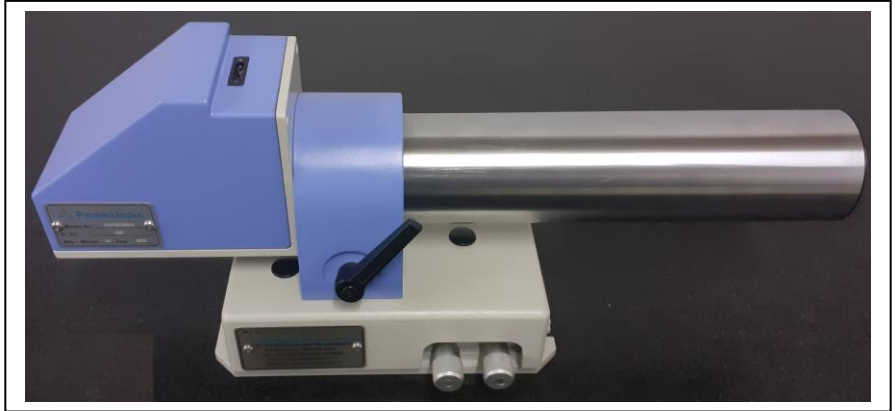
Electronic Autocollimator Specification

Model	ACT-300-50C
Effective focal length	300 mm
Clear aperture	45-48 mm
Recommended Resolution	0.01/0.1 arc sec
Accuracy	+/- 1 arc sec
Measuring range	2000 x 1600 arc sec
Tube diameter	57 mm
Sensor type	CCD/CMOS
Computer interface	USB 3.0
Illumination	LED
Max Measuring distance in meter	10
Power	220V, 50 Hz

Software:

COMEF ANGLE 3.0

- The software represents and image processing system with specialized measuring function for use in connection with autocollimators and telescopes. The hair cross position is detected highly accurate with subpixel algorithms. The software was designed to retrofit visual autocollimators with a CCD-Camera and reach by this means objective measuring results in the accuracy level of electronic autocollimators. Windows Image processing software for highly accurate angle measurements with autocollimators. Autocollimation head with direct connection of the USB-camera for data acquisition.



General functions:

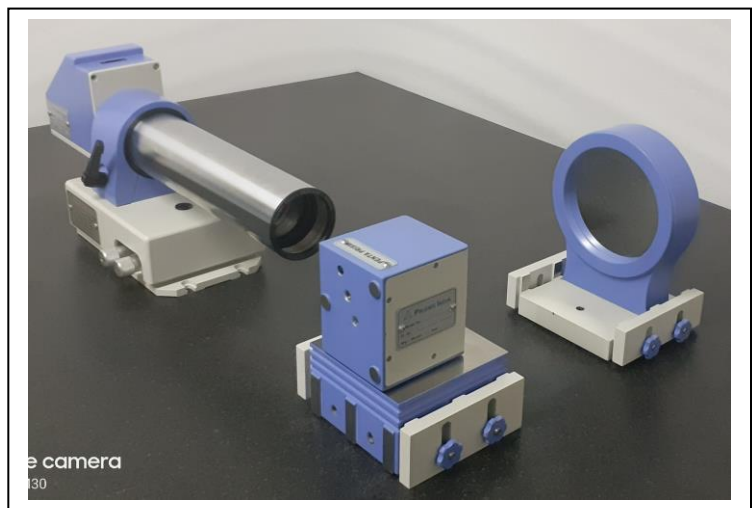
- Real time representation of live camera image on monitor
- Calibration function with subpixel algorithm
- Freezing, printing and saving of image (bmp, jpg)
- Comfortable lettering of images with measuring marks, texts, scales.
- Creation, saving printout of freely configurable measuring protocols.
- Copy to/insert from clip board
- Insertion of scaled grid
- Insertion of fixed hair cross (as reference)

Measuring Functions

- Autocollimation 1D/2D
- Wedge angle measurement in reflection and transmission
- Deflection angle (collimator-Telescope)
- Centering measurement

ELCOWIN/ELCOLEVEL

- Software for the measurement of straightness, squareness, parallelism and flatness.

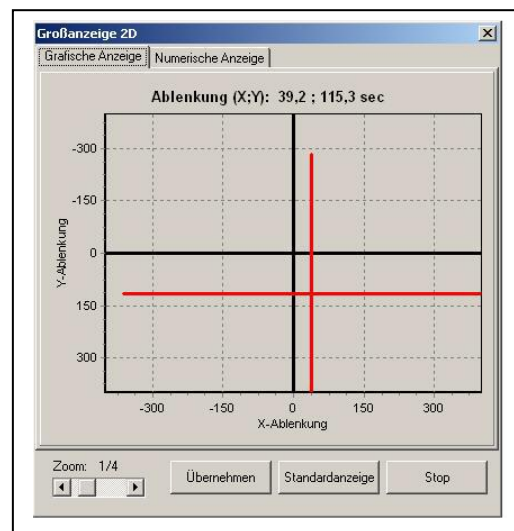
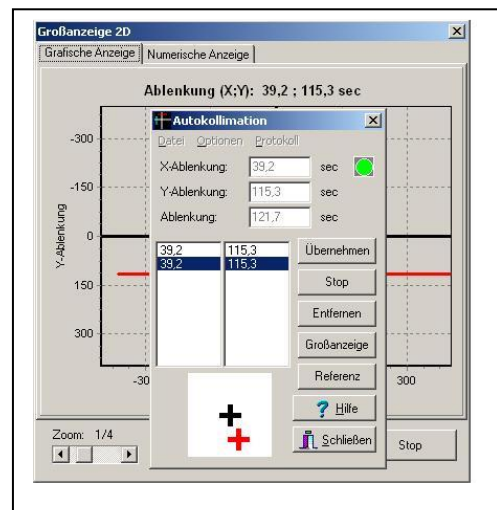
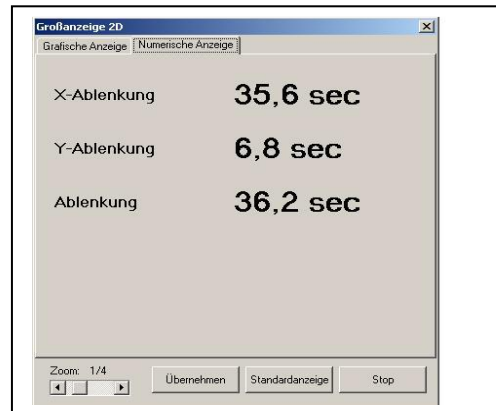


Measuring Range and Distance

The measuring range of any autocollimator decreases as the measuring distance increases. The measuring accuracy, ignoring environmental influences, is independent of the distance. The electronic autocollimator measuring range is constant up to a certain distance and then decreases with increasing distance between autocollimator and reflector.

Software Features

- Real time display of the current hair cross position in relation to the reference position as numerical value (reference position freely selectable)
- Real time representation of the current hair cross position in relation to the reference position (reference position can set on any point)
- Simultaneous real time display of hair cross position, reference position and numerical values.



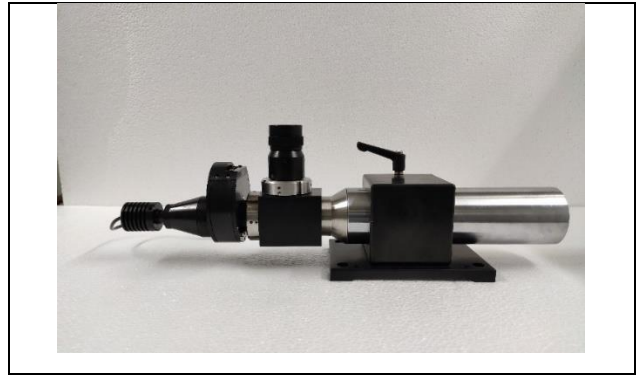
AUTOCOLLIMATOR WITH RETICULE TURRET

Description

The Autocollimator with reticule turret provides 4 selectable collimator reticules. The reticule turret allows a quick change or reticule for different measurement applications.

Construction

- Tube mounted Objective Lens
- Beam splitter mount
- Reference reticule
- Projecting reticule changer with 4 position
- Eyepiece
- Illumination device with green filter



PINHOLE AUTOCOLLIMATOR

Model	PACT-140
Pin hole diameter	50 micron
Objective lens clear Aperture	26 mm
Focal Length	140 mm
Eyepiece Magnification	14 X
Light source	LED
Power Supply	240 Volts, 50 Hz
Center height	30 mm
Eyepiece cross line width	15 micron



The Pinhole Autocollimator is a precision instrument for measuring exceedingly small angular displacement of polished reflective surface.

The pinhole Autocollimator differs from the Autocollimator in the way it is used. It is more specific in usage. The Autocollimator can be used in a variety of measurements principle of operation for both the instruments is the same.

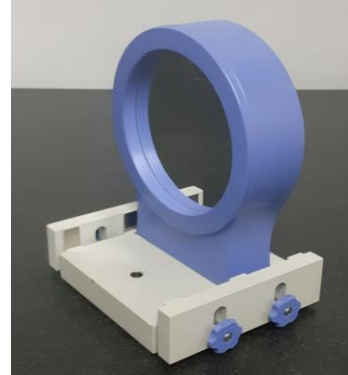
Pinhole Autocollimator can be used for evaluating alignment of machine surfaces, surface plate flatness and squareness of the surface to another, straightness of shaft and a variety of other orientation measurements.

Accessories

Guideway Mirror Mount

Model: GMM-95

Description	Parameters
Material	BK-7
Reflector	65/100 mm diameter
Reflector (CA)	62/95 mm diameter
Flatness of the Mirror	Lambda/6 (0.1 μ)
Centre Height	85/105 mm
Mirror Mount	Hardened Steel
Base Size	100 X 100 mm



Standard Reflector Mount

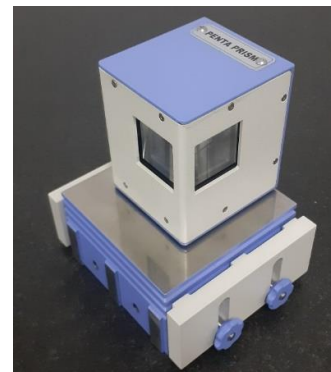
Model: SRM-65 or SRM-95

Description	Parameters
Material	BK-7
Reflector	95 mm dia X 15 mm
Clear Aperture	90 mm diameter
Flatness of the Mirror	Lambda/6 (0.1 μ)
Centre Height	85 mm
Mirror Mount	Hardened Steel
Base Size	100 X 100 mm



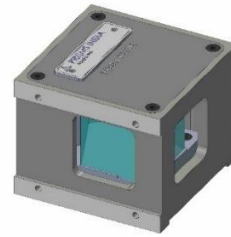
Penta Prism Mount with guideway

Description	Parameters
Material	BK-7
Angle Deviation	5"
Centre Height	105 mm
Base Dimensions	116 X 116 X 119 mm
Base material	Hardened Steel



Penta Prism Mount

Description	Parameters
Material	BK-7
Angle Deviation	5" / 10" / 30"
Centre Height	33 mm
Base Dimensions	75 X 75 X 60 mm
Base Material	Hardened Steel



Alignment cube

Description	Parameters
Material	BK-7
Orthogonal Angle	<2 sec
Five Face Coating	Al + Sio Coated
Clear Aperture	35 mm
Centre Height	75 mm
Base Dimensions	100 X 100 mm



Laser Alignment Tool



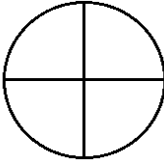
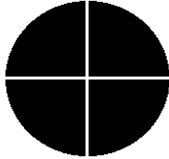
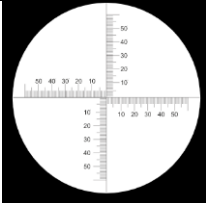
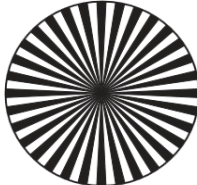
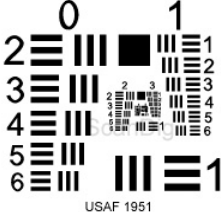
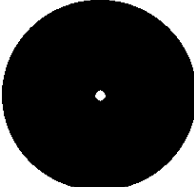
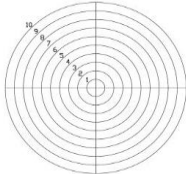
CCD Camera Adaptors



Suitable for Collimating Tube
 Max working distance: 25 m
 Aiming precision: 100 arc sec

The camera lens transfer the eyepiece reticule to CCD Camera Sensor.
 The camera adaptor has mechanical interface from eyepiece to CCD Camera Lens

Reticles

Part No	Diameter	Thickness	Line Thickness		 <p style="text-align: center;">Positive reticle</p>
	15 ± 0.10 mm	1.5 ± 0.10 mm	10 microns		
	12 ± 0.10 mm	1.5 ± 0.10 mm	10 microns		
Part No	Diameter	Thickness	Line Thickness		 <p style="text-align: center;">Negative Reticle</p>
	12 ± 0.10 mm	1.5 ± 0.10 mm	10 microns		
Part No	Diameter	Line Thickness	Graduations		 <p style="text-align: center;">Angle Graduated Reticle</p>
	15 ± 0.10 mm	10 ± 2 microns	10 mm/100		
	15 ± 0.10 mm	10 ± 2 microns	10 mm/120		
	15 ± 0.10 mm	10 ± 2 microns	10 mm/240		
Part No	Diameter	Type			 <p style="text-align: center;">Siemens star reticle</p>
	12 ± 0.10 mm	Siemens star 2X36 segment			
Part No	Diameter	Type			 <p style="text-align: center;">USAF 1951</p>
	12 ± 0.10 mm	USAF Resolution chart			
Part No	Diameter	Type			 <p style="text-align: center;">Pin hole</p>
	12 ± 0.10 mm	Pin hole diameter is 50 microns			
Part No	Diameter	Type			 <p style="text-align: center;">Concentric Circle</p>
	6 ± 0.10 mm	6 concentric circle Line thickness 25 micron Each circle 2 mm diameter			

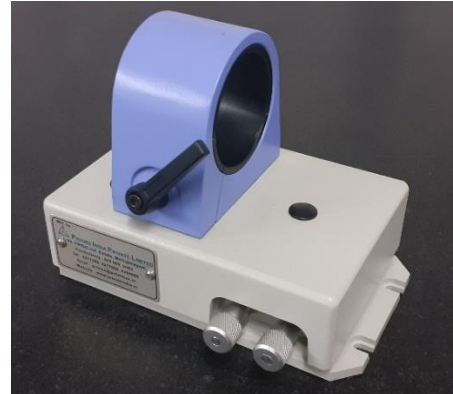
Autocollimator Stands

Simple Horizontal Stand (SHS)



Alignment with three levelling screws
Autocollimator axis
Centre height 85 mm

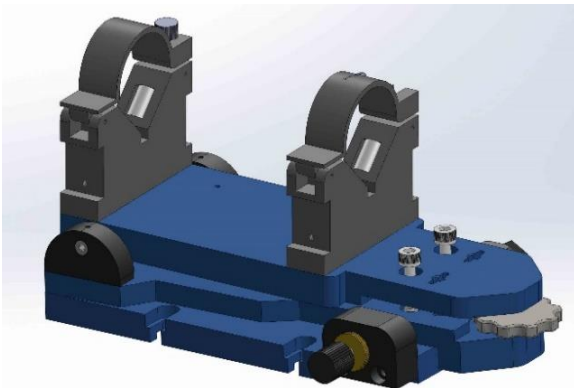
Adjustable Horizontal Stand (AHS)



Two Axis Tilt (Azimuth & elevation)
Range of tilt: $\pm 2^\circ$

Autocollimator axis
Centre height 85/105 mm

Precision Horizontal Stand (PHS)



Model No	Autocollimator Model
PHS-01	ACT-01S & ACT-01D
PHS-02	ACT-02D & ACT-03D
PHS-04	ACT-04D
PHS-57	EACT-300-50

Two Axis Tilt (Azimuth & elevation)
Range of tilt: $\pm 2^\circ$

Angle Dekkor Disc Stand



Model No	Autocollimator Model
ADS-01	ADK/ACT-01S & ACT-01D
ADS-02	ADK/ACT-02D & ACT-03D
ADS-57	EACT-300-50

Two Axis Tilt (Azimuth & elevation)
Range of tilt: $\pm 2^\circ$

Pillar Stand-PLS



Pedestal Stand-PDS



Tripod -TPS



Model No: PLS
Vertical Motion: 300 mm
Vertical Axis Rotation: 360°
Horizontal Axis Rotation: 360°
Fine Tilting: $\pm 2^\circ$
Fine Linear Movement: 5 mm

Model No: PDS
Vertical Motion: 24" to 42"
Vertical Axis Rotation: 360°
Vertical Axis fine tilt range: 2°
Horizontal axis fine movement: 5 mm
Horizontal axis fine tilt range: 2°
Rollers with pedal locking

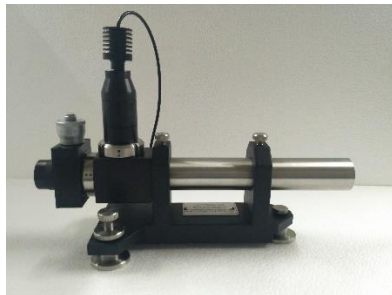
Accessories



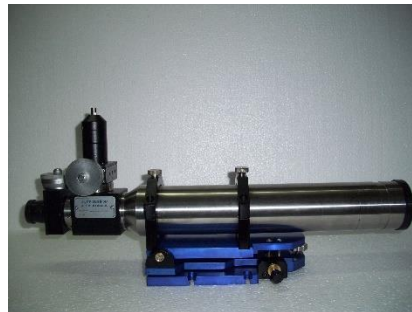
ACT-02/3D + SHS-03



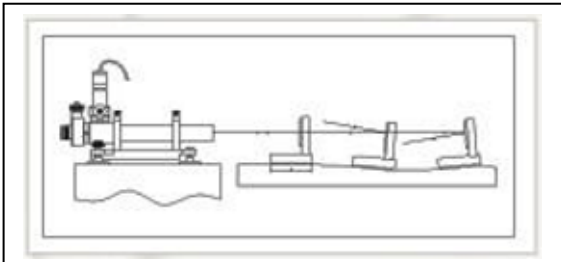
ACT-01S + SHS-01



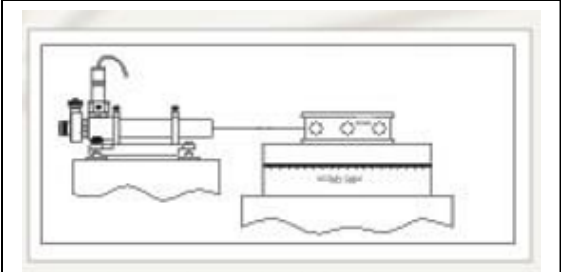
ACT-04D + PHS-04



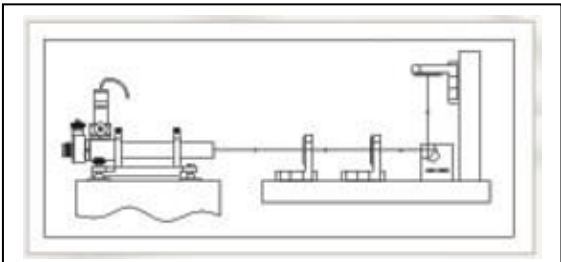
Application



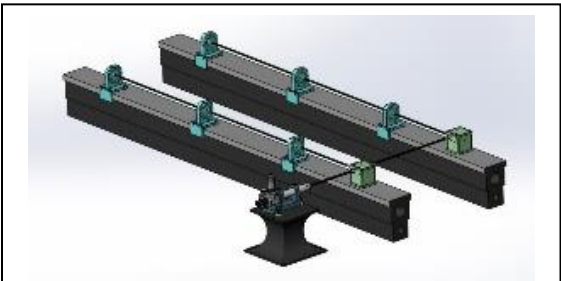
Straightness Measurement



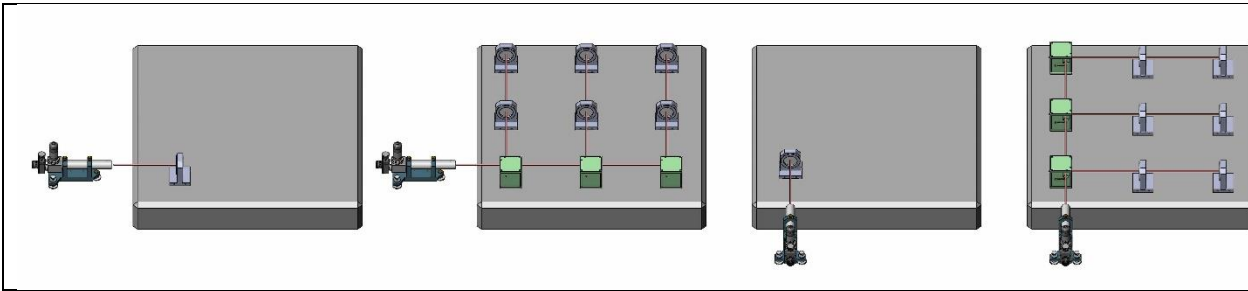
Rotary Indexing Calibration



Squareness Measurement



Parallelism Measurement



Flatness Measurement