

Axicon Grating Centering Station Specifications

The Axicon Grating Centering Station uses an Axicon grating to create a reference axis in reflection and transmission rather than using a rotary table to create the reference axis. All alignment and adjustments are simple x-y motions without the need for any rotation of the work during alignment and assembly.



The station comes with a 900 mm vertical motorized stage with positioning and readout with 1 μm resolution. The centering station will accommodate assemblies as large as 250 mm in diameter.

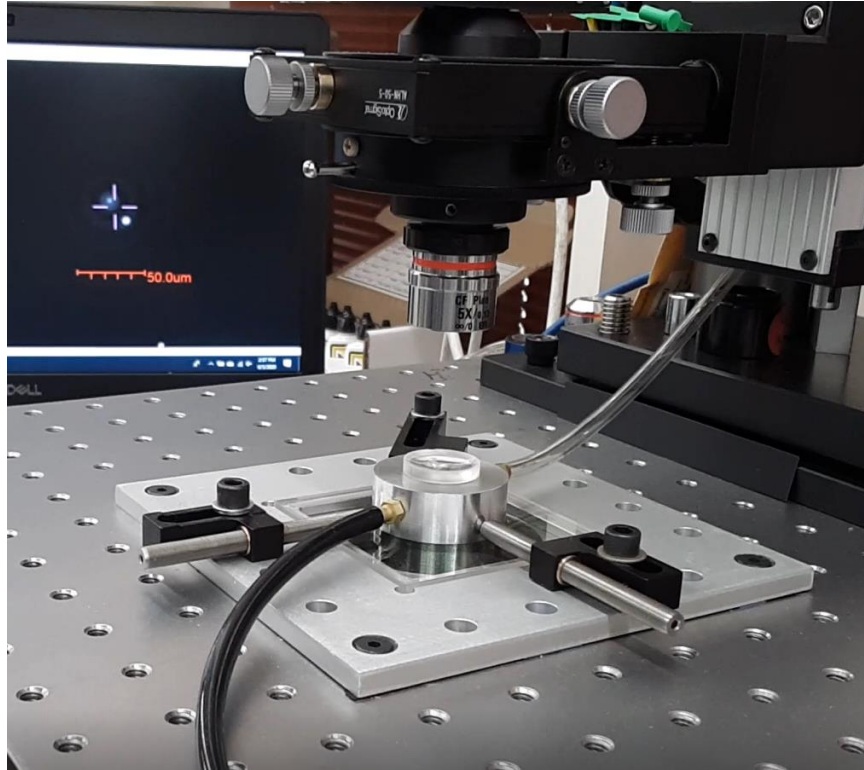
The centration sensor is a Point Source Microscope (PSM) attached to the stage via a 4 axis mount for fine adjustment of lateral position and angle when the PSM is used as an autocollimator. The PSM has a lateral sensitivity of $< 1 \mu\text{m}$ and an angular sensitivity of < 1 second of arc with a FOV of ± 1 degree.

The centering station comes with two fiber coupled laser diode sources @ 635 nm with continuous intensity control up to 3 mW to illuminate the Axicon grating both in reflection from the PSM and from beneath the worktable in transmission.

The worktable is a 450 mm square x 60 mm thick honeycomb, tapped hole breadboard with stainless steel face sheets for flexibility in tooling design. The Axicon grating attaches to the underside of the table to prevent damage and a 5 mm thick plane window at the work surface covers the grating and serves as a reference surface for tooling and vacuum chucks to hold the work.

The Axicon Centering Station comes with LCS-PSM software on a laptop computer that controls the vertical stage motion as well as the PSM. The software has the capability to scan vertically and record the x-y spot position from the PSM along with the vertical stage position. The programs stores the data in csv format for later use.

The centering station also comes with a quiet, oil less vacuum pump, a pressure regulating bleed and pressure gauge to use with vacuum fixturing.



The AutoGain feature of the PSM software works very well with the Bessel beam created by the Axicon grating. If the optic is initially vastly decentered, the rings of the Bessel beam will still be visible even though the bright central core of the beam is outside the PSM field of view. The Bessel beam rings indicate the direction to move the optics to bring the beam into the field of view and the AutoGain reduces the intensity so there are no saturated pixels on the detector in the final stages of centering and alignment. Further, the Bessel beam bright core is visible at any vertical position of the PSM. One does not have to be at a lens conjugate to center the optic once the lens seat is centered. This feature also increases productivity while centering.

For more information on the centering station and techniques of using it view the videos

<https://vimeo.com/818872011/d667c9e61b>

and

<https://vimeo.com/818873649/d7b8444277>

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