



1 CNC machining of a well centered lens component.

2 Principle of lens centering:

(A) Compensation of the centering error,

(B) Achieving a coaxiality between the optical axis and the symmetry axis of the lens housing,

(C) Drop-in assembly of the final system.

LENS CENTERING FOR THE ASSEMBLY OF HIGH PRECISION OPTICS

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Motivation

The quality of high precision optics strongly depends on centering and positioning of the lenses.

By machining the lens housing with respect to the optical axis, the precision of the single lens can be ideally implemented into the optical assembly.

The assembly becomes reproducible, extensive adjustments are no longer required.

Parameter

- Centering accuracy:
 - Tilt 0.1 arcmin
 - Decenter < 2 μm
- Machining tolerances regarding vertex height and outer diameter < 2 μm
- Flatness of plane surfaces < 1 μm
- Cylindricity of housing < 0.5 μm

Lens centering machine

The basis of the centering machine provides a vertical lathe from Lehmann Präzision GmbH with a compact and stiff natural granite base, high precision linear slide-ways, and a hydrostatic spindle.

The alignment chuck – developed at Fraunhofer IOF – aligns the optical axis and the spindle axis using impulse drives.

Therefore, the decentration of the lens is measured by a collimator. If the lens is centered, its housing is machined by CNC-controlled turning.

Our offer

We develop customized lens centering machines and assembly technologies for high precision optics.