

Precision Measurement Instruments That Support Development and Production of New Lenses

The following introduce Mitutoyo's precision measurement instruments suitable for various applications.

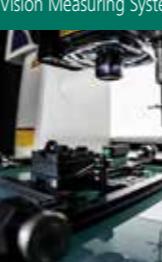
Workpiece	Aspheric lens	Lens barrel	Lens mold (cavity)	Lens mold (core)	Electrode (for electrical discharge machining)
Measuring machine					
Surface Roughness and Contour Measuring System CS-H5000CNC	✓ Aspheric contour ✓ SAG ✓ Fit distance ✓ Fit angle			✓ Aspheric contour ✓ SAG ✓ Fit distance ✓ Fit angle	
Surface Roughness and Contour Measuring System Customized CS-H5500CNC Top/bottom measuring system	✓ Aspheric contour ✓ SAG ✓ Fit distance ✓ Fit angle ✓ Thickness	✓ Peak diameter ✓ Valley diameter ✓ Pitch diameter ✓ Pitch ✓ Angular evaluation		✓ Aspheric contour ✓ SAG ✓ Fit distance ✓ Fit angle	
Micro Form Measuring System UMAP	✓ Optical axis eccentricity	✓ Diameter ✓ Concentricity ✓ Parallelism			
CNC Vision Measuring System QUICK VISION	✓ Diameter				✓ External setup
Non-contact 3D Measuring System HQV-WLI	✓ 3D surface roughness	✓ 3D surface roughness		✓ 3D surface roughness	
High-accuracy Digital Measuring Machine VL-50	✓ Thickness				
Aspheric Contour Measuring Instrument ROUNDTRACER ASPHERIC (customized)	✓ Aspheric contour ✓ SAG ✓ Fit distance ✓ Fit angle ✓ Optical axis inclination		✓ Aspheric contour ✓ SAG ✓ Fit distance ✓ Fit angle ✓ Optical axis inclination		
Vision Measuring Machine with Micro-Form Scanning Probe MISCAN Vision System		✓ Diameter ✓ Circularity ✓ Coaxiality ✓ Parallelism		✓ Optical axis inclination	
Ultra-high Accuracy CNC CMM LEGEX			✓ Coordinates ✓ True position ✓ Diameter ✓ Circularity ✓ Cylindricity ✓ Cylindricity	✓ Diameter ✓ Circularity ✓ Cylindricity ✓ Cylindricity ✓ Coaxiality	
CNC Roundness/Cylindricity Measuring System RA-H5200CNC			✓ Circularity ✓ Squareness ✓ Coaxiality ✓ Cylindricity	✓ Circularity ✓ Cylindricity ✓ Coaxiality	
Ultra-high Accuracy CNC Vision Measuring System ULTRA QV					✓ Coordinates ✓ True profile
CMM with External Setup System STARATO-Apex					✓ External setup
Outside diameter Laser Scan Micrometer				✓ Diameter	
Post-wound Form Tester MDH-25M				✓ Diameter	



Coordinate Measuring Machines



Vision Measuring Systems



Form Measurement



Optical Measuring



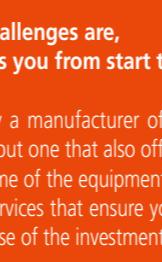
Sensor Systems



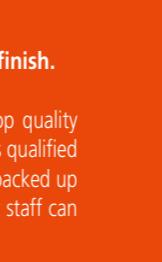
Test Equipment and Seismometers



Digital Scale and DRO Systems



Small Tool Instruments and Data Management



Whatever your challenges are, Mitutoyo supports you from start to finish.

Mitutoyo is not only a manufacturer of top quality measuring products but one that also offers qualified support for the lifetime of the equipment, backed up by comprehensive services that ensure your staff can make the very best use of the investment.

Apart from the basics of calibration and repair, Mitutoyo offers product and metrology training, as well as IT support for the sophisticated software used in modern measuring technology. We can also design, build, test and deliver bespoke measuring solutions and even, if deemed cost-effective, take your critical measurement challenges in-house on a sub-contract basis.

Note: Product illustrations are without obligation. Product descriptions, in particular any and all technical specifications, are only binding when explicitly agreed upon.
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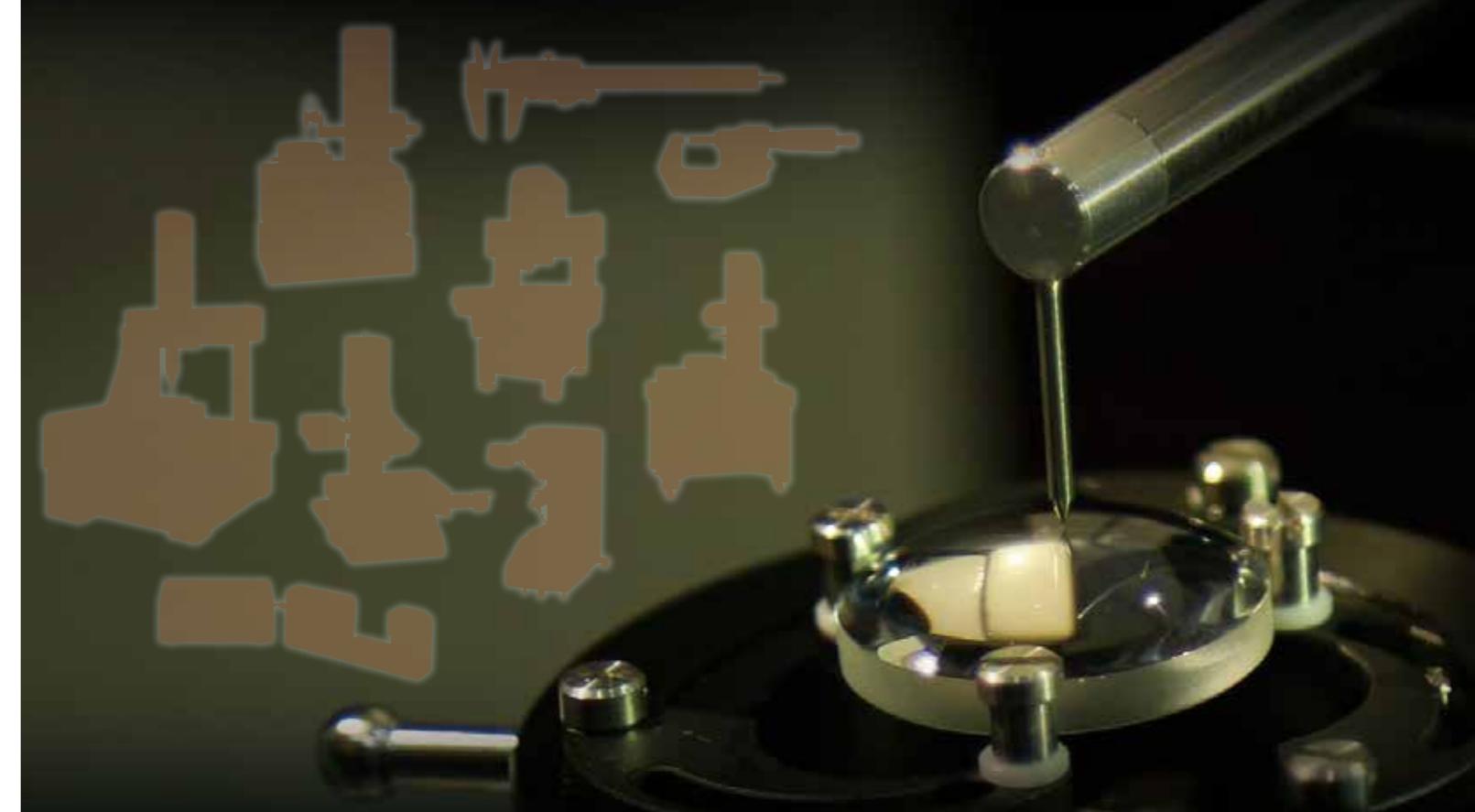
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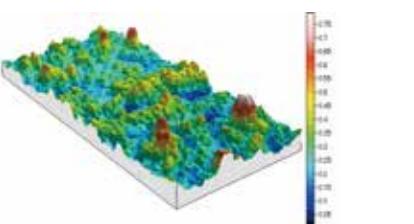
Introduction to Precision Measuring Instrument Solutions

Lens Industry Measurements



Mitutoyo Precision Measurement Instruments That Support Development and Production of Lenses

Aspheric Lens



Non-contact 3D Measuring System: HQV-WLI

Allows non-contact 3D surface roughness evaluation of a lens surface. This system can also evaluate in 2D.

Additionally, being provided with the functions of a vision measuring machine, geometrical tolerance evaluations such as diameter and flatness can be made.

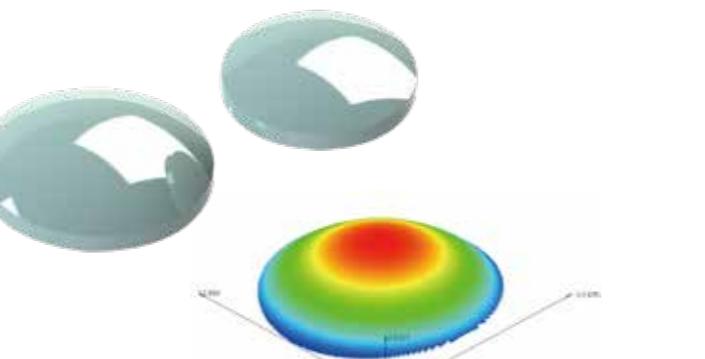
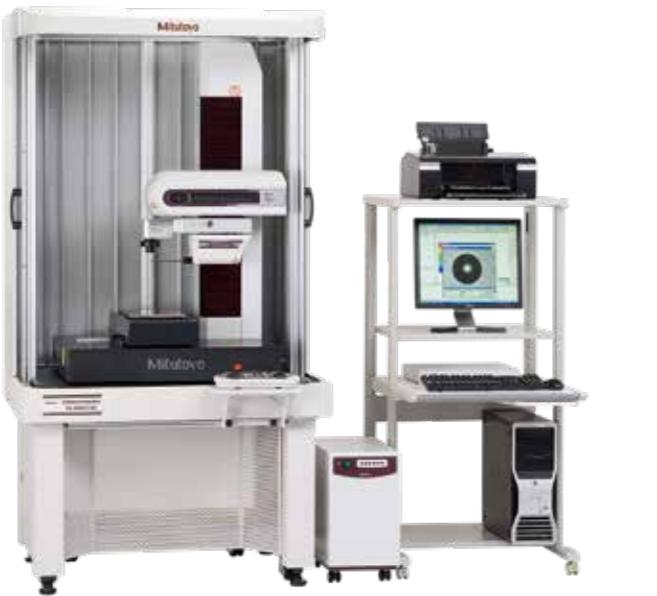
(Dual-role system)



High-accuracy Digital Length Measuring Machine: VL-50

Allows desktop measurement of a lens' thickness. This machine enables measurement of an easily-deformed, thin-walled lens with a low measuring force of 0.01 N (minimum).

Lens Mold (Cavity)



Surface Roughness and Contour Measuring System: CS-H5000CNC

Allows nano-level PV value evaluation of an aspheric lens' contour. This instrument can also evaluate in 3D.

Additionally, since lens alignment is performed mechanically instead of correction by software, this allows correct alignment measurement on the lens' optical axis. The installed dimensional analysis function can also measure the values of distance, angle and step.

Lens Mold (Core)



CNC Roundness/Cylindricity Measuring System: RA-H5200

The coaxiality of a mold core will affect the deviation from the optical axis on both sides of a lens. Therefore, this mold needs a high machining accuracy. This system can evaluate circularity, cylindricity and coaxiality with a rotational accuracy of 20 nm.

Lens Barrel



Minute Form Measuring System: UMAP

This measuring system is a contact type using a high aspect-ratio minute probe stylus (e.g.: $\varnothing 70 \mu\text{m}$, 5 mm) that enables high-accuracy evaluation of the diameter, circularity and coaxiality of a lens barrel.

An ultra-low measuring force (1 μN minimum) eliminates concern about possible workpiece deformation and allows measurement without use of fixtures.

Electrode



Ultra-high Accuracy Vision Measuring System: ULTRA QV

The electrode used in the electrical discharge machining process of a lens molding die needs high machining accuracy with respect to its position and form. This measuring system can evaluate the coordinates and form of a lens electrode with an accuracy of 0.25 μm .

Solutions for Lens Industry Measurements

Mitutoyo offers solutions to measurement of a wide variety of lenses from research and development to preproduction and mass production.



In-vehicle Camera



Monitoring Camera



Smart Phone Camera



Drone Camera



Action Camera