

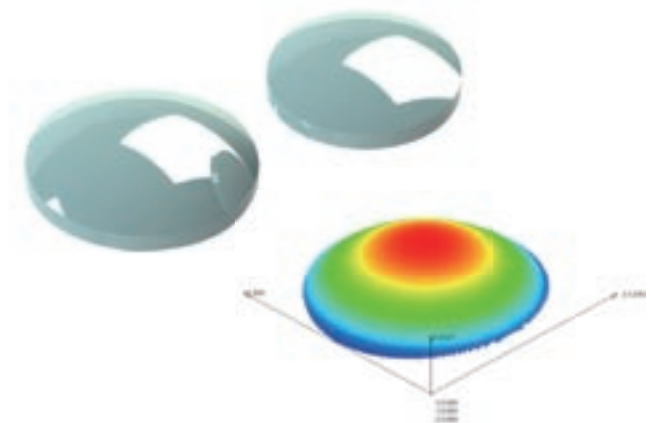
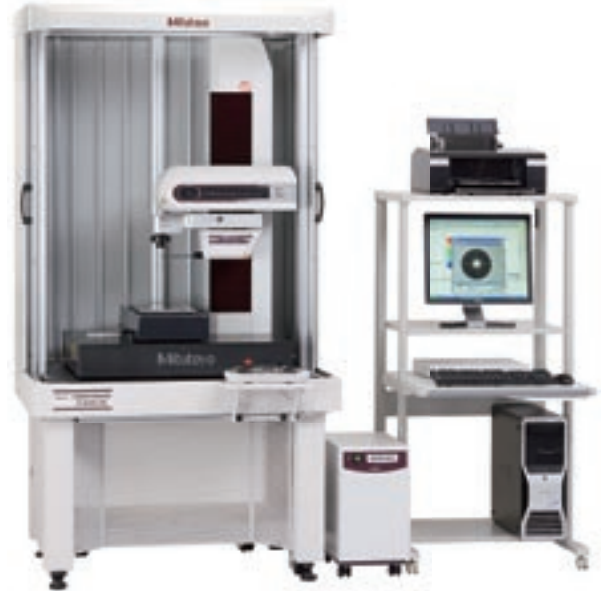
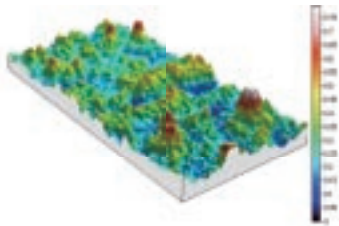
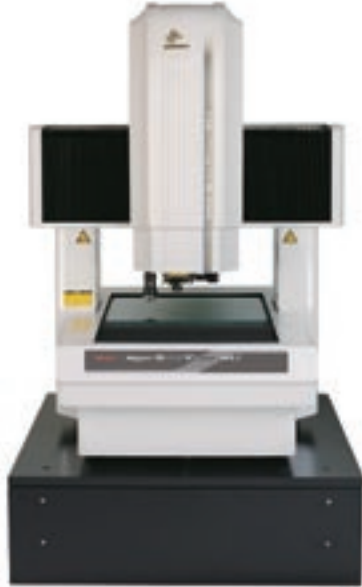
PRECISION IS OUR PROFESSION

Introduction to Precision Measuring Instrument Solutions  
— Lens Industry Measurements —

**Mitutoyo**

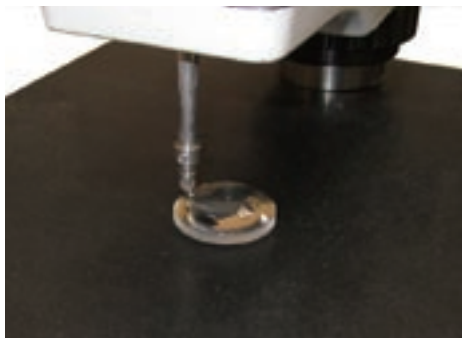
# Mitutoyo Precision Measurement Instruments That

## 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).

### 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.

# Support Development and Production of Lenses

## Lens Mold (Cavity)

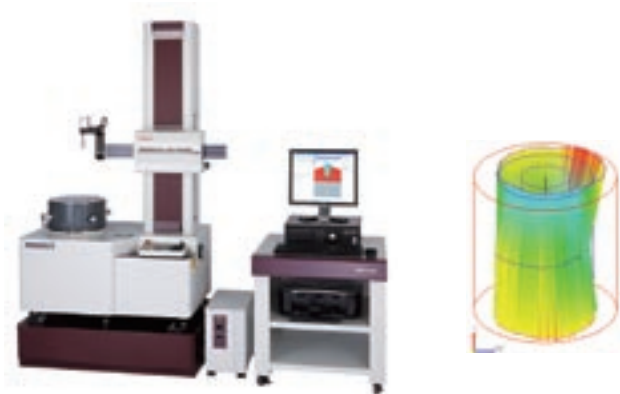


### Ultra-high Accuracy CNC CMM: LEGEX

The accuracy of a mold cavity will affect the deviation from the optical axis on both sides of a lens. Therefore, a mold cavity needs high machining accuracy.

This CMM can evaluate coordinates, positional deviation, diameter, circularity, etc., with an accuracy of 0.28  $\mu\text{m}$ .

## 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.:  $\phi 70 \mu\text{m}$ , 5 mm) that enables high-accuracy evaluation of the diameter, circularity and coaxiality of a lens barrel.

An ultra-low measuring force (1  $\mu\text{N}$  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  $\mu\text{m}$ .



### CMM with External Setup System: STRATO-Apex

The use of this CMM allows external setup for measurement of alignment error between an electrical discharge machining electrode for forming a plastic lens mold and a workpiece, thereby improving productivity thanks to increase in machine operating time. The combination with a robot or stocker enables establishment of an automation system.

# 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

## 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 <b>CS-H5000CNC</b>	<ul style="list-style-type: none"> <li>✓ Aspheric contour</li> <li>✓ SAG</li> <li>✓ Fit distance</li> <li>✓ Fit angle</li> </ul>			<ul style="list-style-type: none"> <li>✓ Aspheric contour</li> <li>✓ SAG</li> <li>✓ Fit distance</li> <li>✓ Fit angle</li> </ul>	
Surface Roughness and Contour Measuring System Customized <b>CS-H5500CNC</b> Top/bottom measuring system	<ul style="list-style-type: none"> <li>✓ Aspheric contour</li> <li>✓ SAG</li> <li>✓ Fit distance</li> <li>✓ Fit angle</li> <li>✓ Thickness</li> </ul>	<ul style="list-style-type: none"> <li>✓ Peak diameter</li> <li>✓ Valley diameter</li> <li>✓ Pitch diameter</li> <li>✓ Pitch</li> <li>✓ Angular evaluation</li> </ul>		<ul style="list-style-type: none"> <li>✓ Aspheric contour</li> <li>✓ SAG</li> <li>✓ Fit distance</li> <li>✓ Fit angle</li> </ul>	
Micro Form Measuring System <b>UMAP</b>	<ul style="list-style-type: none"> <li>✓ Optical axis eccentricity</li> </ul>	<ul style="list-style-type: none"> <li>✓ Diameter</li> <li>✓ Concentricity</li> <li>✓ Parallelism</li> </ul>			
CNC Vision Measuring System <b>QUICK VISION</b>	<ul style="list-style-type: none"> <li>✓ Diameter</li> </ul>				<ul style="list-style-type: none"> <li>✓ External setup</li> </ul>
Non-contact 3D Measuring System <b>HQV-WLI</b>	<ul style="list-style-type: none"> <li>✓ 3D surface roughness</li> </ul>	<ul style="list-style-type: none"> <li>✓ 3D surface roughness</li> </ul>		<ul style="list-style-type: none"> <li>✓ 3D surface roughness</li> </ul>	
High-accuracy Digital Measuring Machine <b>VL-50</b>	<ul style="list-style-type: none"> <li>✓ Thickness</li> </ul>				
Aspheric Contour Measuring Instrument <b>ROUNDTRACER ASPHERIC (customized)</b>	<ul style="list-style-type: none"> <li>✓ Aspheric contour</li> <li>✓ SAG</li> <li>✓ Fit distance</li> <li>✓ Fit angle</li> <li>✓ Optical axis inclination</li> </ul>			<ul style="list-style-type: none"> <li>✓ Aspheric contour</li> <li>✓ SAG</li> <li>✓ Fit distance</li> <li>✓ Fit angle</li> <li>✓ Optical axis inclination</li> </ul>	
Vision Measuring Machine with Micro-Form Scanning Probe <b>MiSCAN Vision System</b>		<ul style="list-style-type: none"> <li>✓ Diameter</li> <li>✓ Circularity</li> <li>✓ Coaxiality</li> <li>✓ Parallelism</li> </ul>		<ul style="list-style-type: none"> <li>✓ Optical axis inclination</li> </ul>	
Ultra-high Accuracy CNC CMM <b>LEGEX</b>			<ul style="list-style-type: none"> <li>✓ Coordinates</li> <li>✓ True position</li> <li>✓ Diameter</li> <li>✓ Circularity</li> <li>✓ Cylindricity</li> </ul>	<ul style="list-style-type: none"> <li>✓ Diameter</li> <li>✓ Circularity</li> <li>✓ Cylindricity</li> <li>✓ Coaxiality</li> </ul>	
CNC Roundness/Cylindricity Measuring System <b>RA-H5200CNC</b>			<ul style="list-style-type: none"> <li>✓ Circularity</li> <li>✓ Squareness</li> <li>✓ Coaxiality</li> <li>✓ Cylindricity</li> </ul>	<ul style="list-style-type: none"> <li>✓ Circularity</li> <li>✓ Cylindricity</li> <li>✓ Coaxiality</li> </ul>	
Ultra-high Accuracy CNC Vision Measuring System <b>ULTRA QV</b>					<ul style="list-style-type: none"> <li>✓ Coordinates</li> <li>✓ True profile</li> </ul>
CMM with External Setup System <b>STARATO-Apex</b>					<ul style="list-style-type: none"> <li>✓ External setup</li> </ul>
Outside diameter <b>Laser Scan Micrometer</b>				<ul style="list-style-type: none"> <li>✓ Diameter</li> </ul>	
Post-wound Form Tester <b>MDH-25M</b>				<ul style="list-style-type: none"> <li>✓ Diameter</li> </ul>	







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.



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