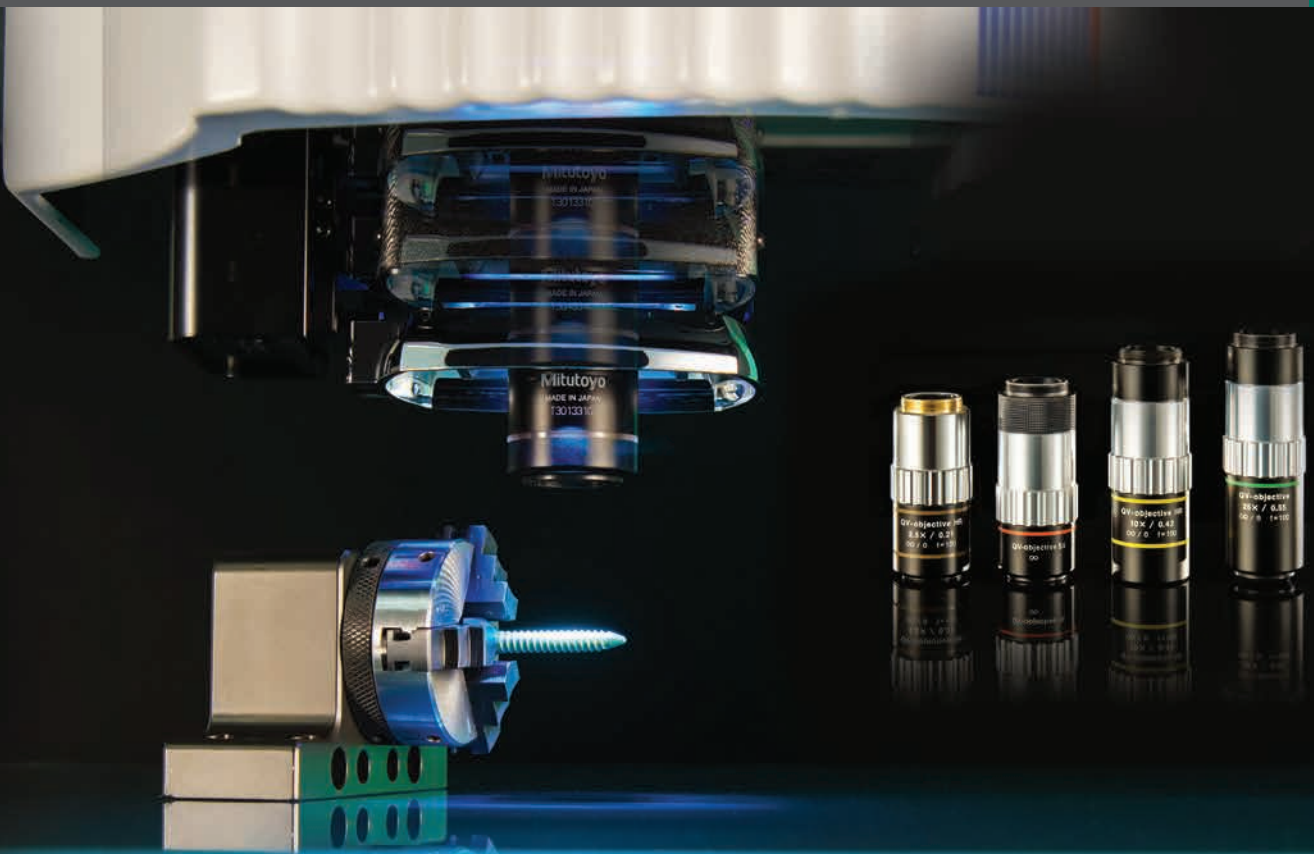


POINTS FROM FOCUS (PFF)

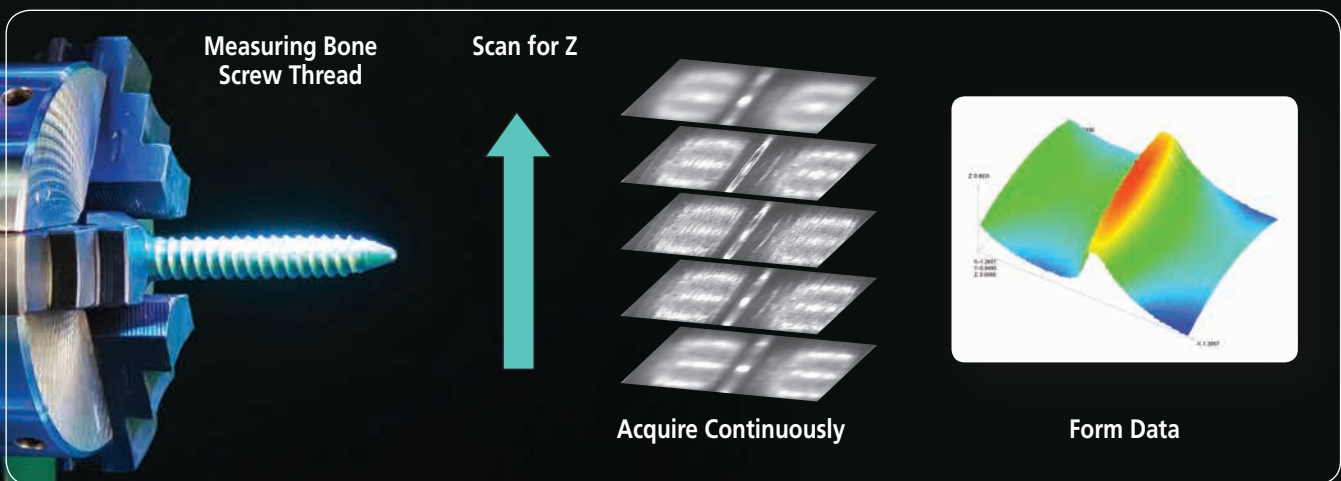
Optical data collection method



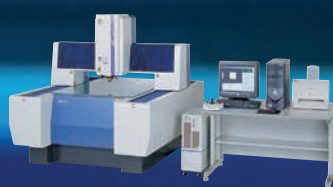


Innovative Optical Data Collection Method

Points From Focus (PFF) is a Mitutoyo-developed optical data collection method that captures point data by focusing in the Z axis. The measurement principle of PFF utilizes contrast detection. The objective lens is moved in the Z direction as PFF detects the peak of each pixel's contrast from the continuously changing image data. Focus image stack technology stitches images together within the high-resolution Z axis data across multiple fields of view (FOV). A combination of power turret positions and objective magnifications result in various field of view sizes.



QV Apex606PRO



QV ACCEL808PRO



Hyper QV404PRO



ULTRA QV404 PRO

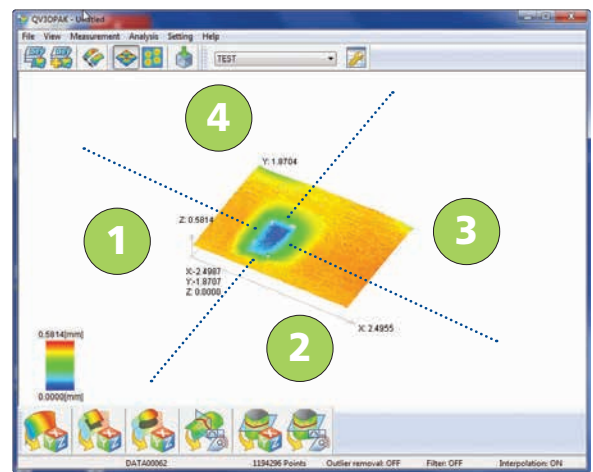
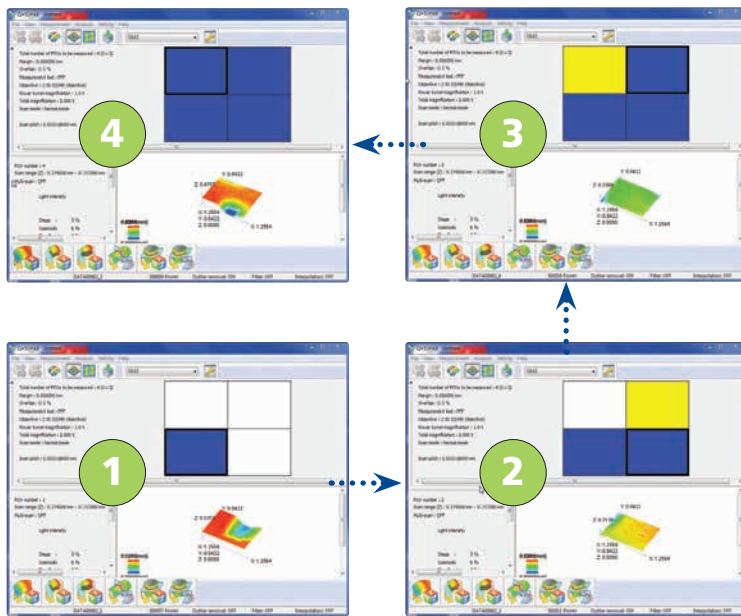
PFF is an economical add-on to enhance the Mitutoyo Quick Vision platform via an objective lens. PFF enables non-contact scanning on a multitude of components and surface attributes. Whether it is used to measure small feature form or surface topography, it is also a viable option for measuring medical device components, electronics, EDM, plastics parting lines, and more. (See Page 4 and 5).

Points From Focus (PFF) Benefits

- ▶ Vision system and profiler in one package
- ▶ Reduce cost, increase throughput and flexibility
- ▶ A typical FOV takes less than seven seconds
- ▶ No need to purchase additional scanning equipment
- ▶ Stitch up to 1200 fields of view (34 x 34 mm)
- ▶ Single image or multiple fields of view
- ▶ Up to 300,000 points per field of view
- ▶ Up to 40 mm Z-scan range
- ▶ Objectives provide a range of measurement options
- ▶ Proven accurate base system

Multiple Fields of View Stitched Together

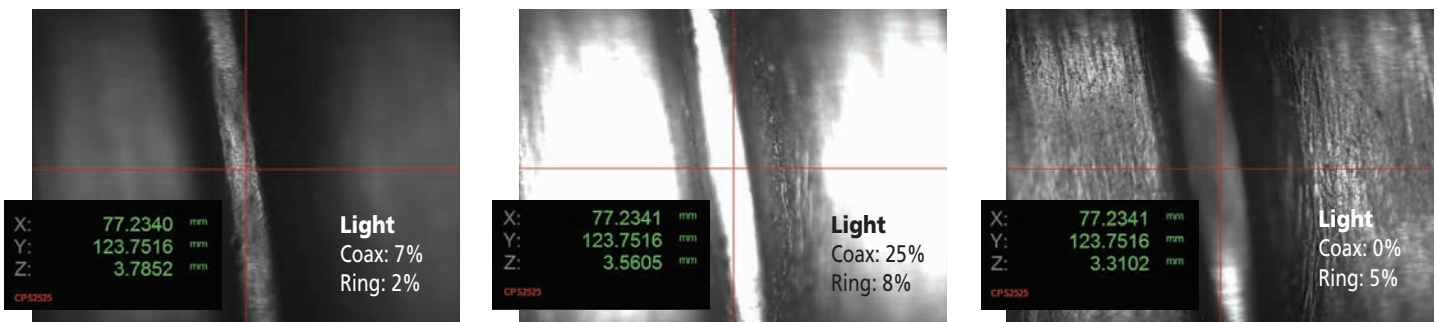
- ▶ For large workpieces
- ▶ Easy to select areas for stitching



Example of QV3DPak Stitching together 4 FOVs

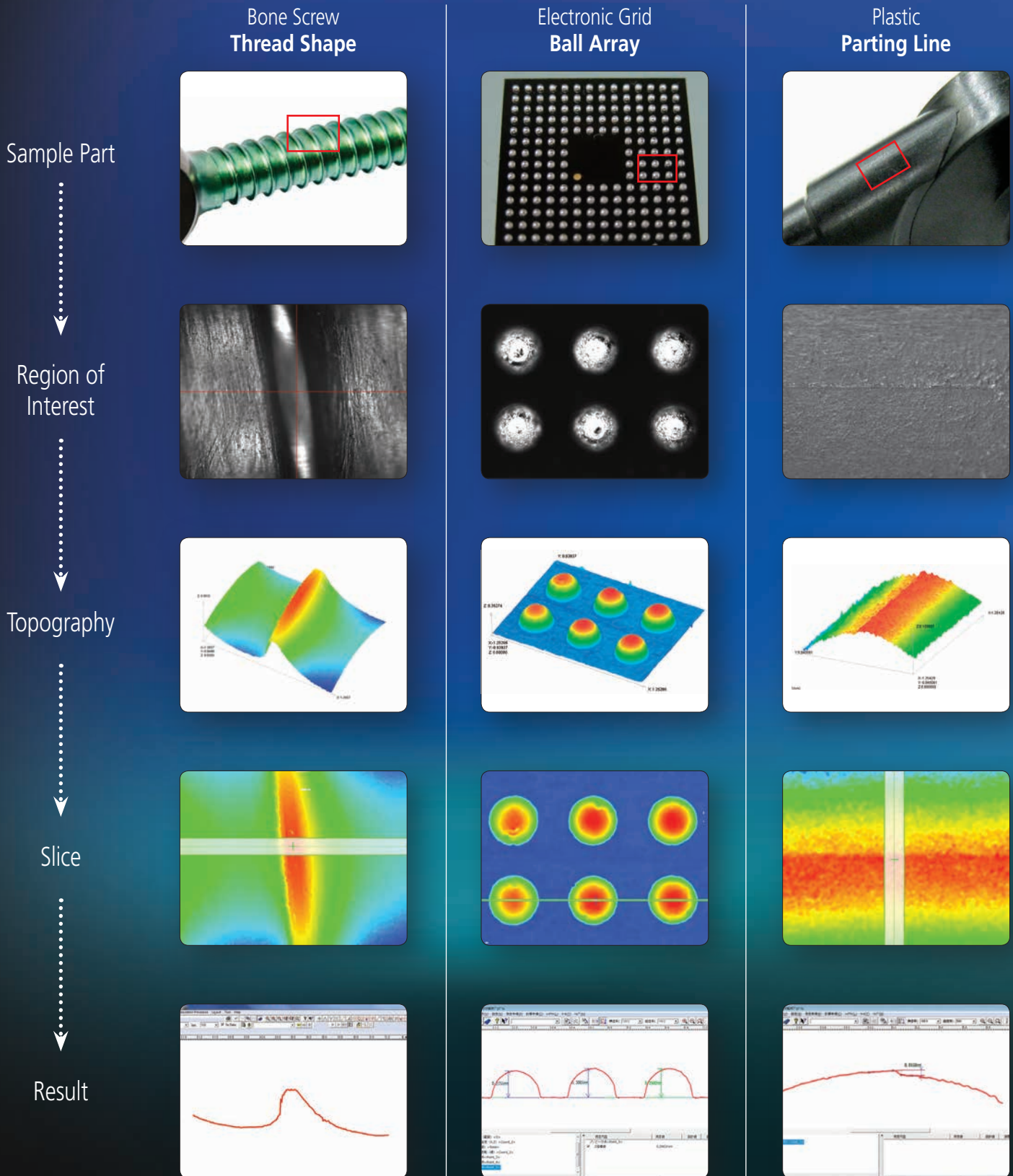
Automatic Light Adjustment

- ▶ Each light source can be adjusted in real-time
- ▶ Decrease illumination when portions of the image are saturated
- ▶ Increase illumination when portions of the image are too dark



As the Z axis is moving to scan the workpiece the Automatic Light Adjustment can be active. The images illustrate the DRO changing in the Z axis. The light values change based on the image appearance.

Points From Focus (PFF) enables non-contact scanning on a multitude of components, surface attributes and industries.



MEDICAL

Implants
Bone screws
Syndrome

DENTAL

Drills
Implants
Abutment
Screws

PHARMA

Pills
Packaging
Dies
Inks

AEROSPACE

Blade radius
Cooling holes
Sheet metal

AUTOMOTIVE

Gears
Step grooves
Sintered metals

PLASTICS

Parting lines
Flash
Draft angles
Connectors

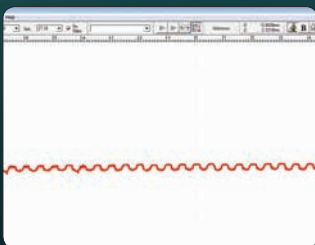
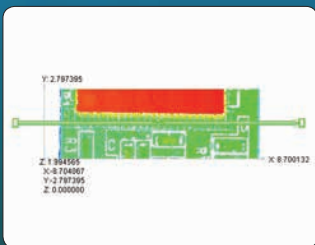
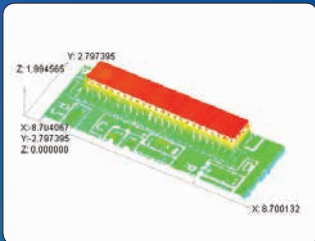
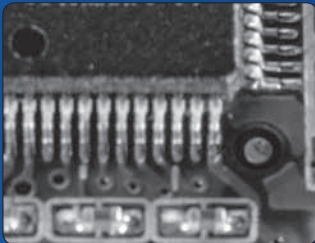
ELECTRONICS

Circuit traces
Flex circuits
BGA, LGA
Solder paste

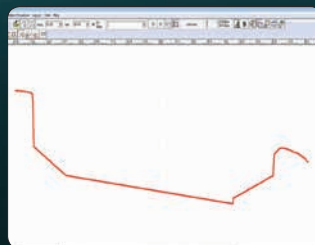
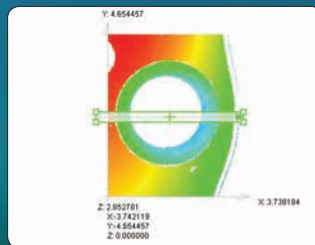
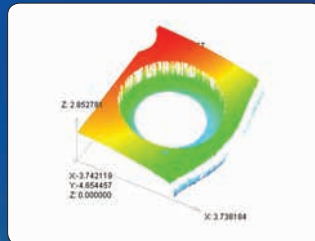
TOOLING

Cutters
Inserts
Saw blades
Electrodes
Abrasives

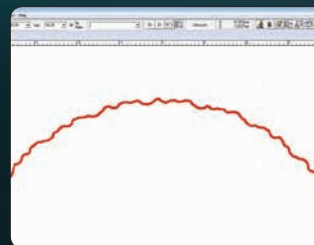
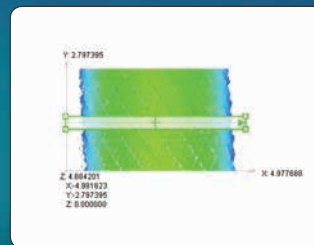
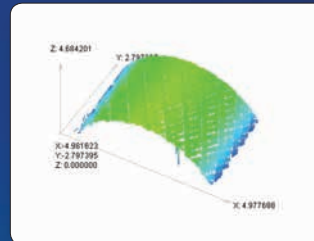
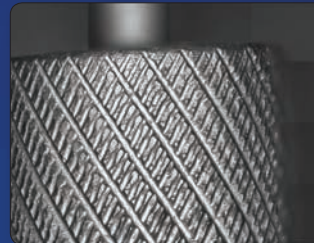
Circuit Board Leads



Bone Plate Hole Chamfer



Hardware Knurled Pattern



Scan

QVPak

QV3DPak

QV3DPak

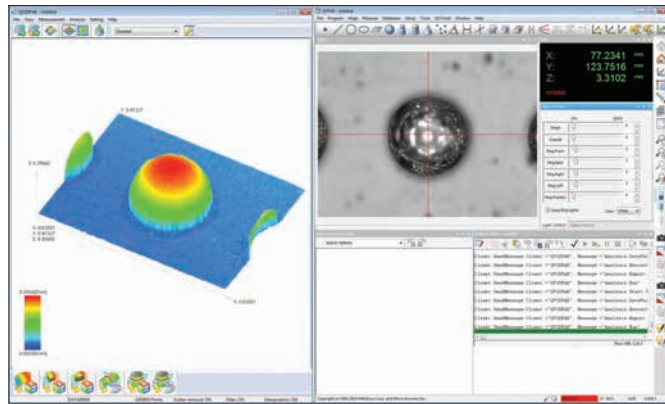
FormPak-AP

Points From Focus (PFF) Components

Software

QV3DPAK

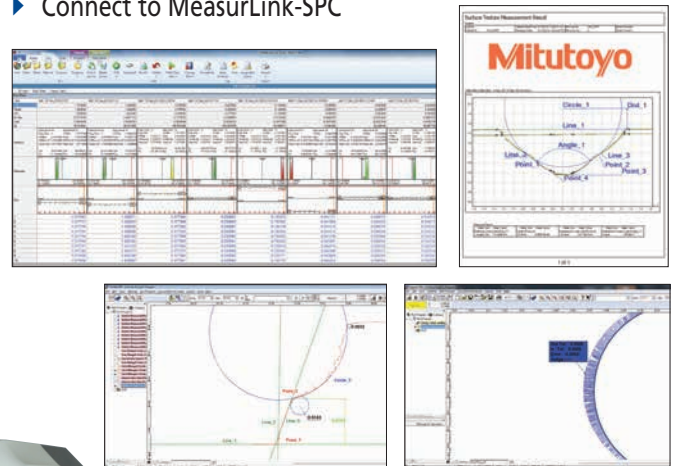
QV3DPak is required to use Points From Focus measurement technology. This software easily guides the operator to acquire data points from single regions of interest or by stitching together multiple fields of view. The software can also be used to automatically adjust the lighting during runtime to obtain the maximum amount of data points within a FOV.



FORMTRACEPAK-AP

FORMTRACEPAK allows for 2D analysis of the 3D data points acquired. The user can choose where to make a slice within the point cloud to generate a 2D profile for easy analysis.

- ▶ Compare results to CAD model for profile analysis
- ▶ Export scan results to CAD with reverse engineering
- ▶ Graphical dimensional measurement and tolerancing
- ▶ Layouts and custom reports
- ▶ Connect to MeasurLink-SPC



Compensation Chart

- ▶ Astigmatism correction- compensate for distortions and aberrations within the optical path.
- ▶ Auto-Focus correction- reduces the focusing error caused by differences in the workpiece surface pattern and texture.



Objective Lenses

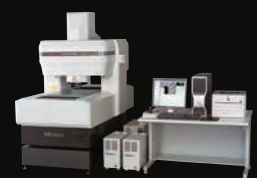
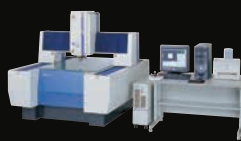
Shown actual size



Code No.	Description	Model	N.A.	W. D. (mm)	Stitched FOV (mm)*	Supported Turret Pos.		
						1x	2x	6x
02AKY705	2.5x HR Objective	(QV-HR2.5x)	0.21	40.6	84.2 x 62.9	●	●	●
02AKY710	5.0x Objective	(QV-5x)	0.28	33.5	42.1 x 31.5	●	●	●
02AKY715	10x HR Objective	(QV-HR10x)	0.42	20.0	21.1 x 15.7	●	●	-
02AKY720	25x Objective	(QV-25x)	0.42	13.0	8.42 x 6.29	●	●	-

*The FOV is expressed for the 1x turret position with 0.5% overlap.

QV Systems and Objective Repeatability



Model	QV Apex	QV ACCEL	QV Hyper	QV ULTRA
Objective	QV-HR2.5x	QV-HR2.5x	QV-5x	QV-5x
Tube Lens	PT2x	PT2x	PT2x	PT2x
Z Repeatability [um]	2σ ≤ 1.5	2σ ≤ 1.5	2σ ≤ 1.5	2σ ≤ 0.7



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 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 measuring solutions and even, if deemed cost-effective, take your critical measurement challenges in-house on a sub-contract basis.



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