Vision Measuring Systems

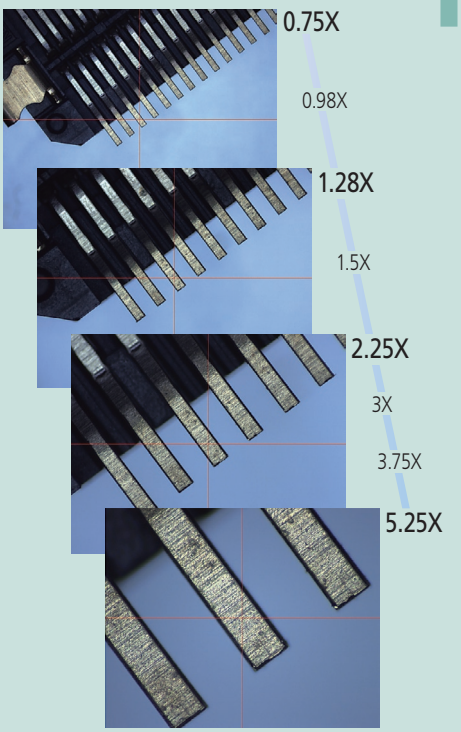
Vision measuring systems for multipurpose use

QV Active
CNC Vision Measuring System

MeasurLink® ENABLED
Data Management Software by Mitutoyo

- Cost effective, multifunction, CNC Vision Measuring System.
- Usability has been improved by adopting a color camera and 8-step zoom optics.
- A touch-probe model can seamlessly perform non-contact and contact measurement.
- The zoom ratio of 7X (14X at maximum by changing the fixed-magnification objective lens) enables a wide range of inspection from wide view measurement at low magnification to micro-measurement at high magnification.
- The 74 mm maximum working distance (1X optional objective) promotes safe working by reducing the risk of collision, and allows greater freedom in fixture design.

QV Active 202



From wide view measurement to micro-measurement

Optical magnification		0.5X	0.65X	0.75X	0.85X	0.98X	1X	1.28X	1.3X	1.5X	1.7X	2X	2.25X	2.5X	3X	3.5X	3.75X	4X	5X	5.25X	7X
View field (mm)	Horizontal (H)	13.60	10.46	9.07	8.00	6.94	6.80	5.31	5.23	4.53	4.00	3.40	3.02	2.72	2.27	1.94	1.81	1.70	1.36	1.30	0.97
	Vertical (V)	10.80	8.31	7.20	6.35	5.51	5.40	4.22	4.15	3.60	3.18	2.70	2.40	2.16	1.80	1.54	1.44	1.35	1.08	1.03	0.77
Total magnification (on the monitor)		13.20	17.10	19.80	22.40	25.80	26.40	33.70	34.30	39.50	44.80	52.70	59.30	65.90	79.10	92.30	98.90	105.50	131.80	138.40	184.50

Objective lens

1X objective (optional) Working distance	74 mm
1.5X objective (standard accessory) Working distance	42 mm
2X objective (optional) Working distance	42 mm

Note: The total magnification indicates the magnification on the monitor when the size of the QVPAK video window is 178.8x143.0 mm (default).

SPECIFICATIONS

Model		QV Active 202	QV Active 404
Type		Standard model	Standard model
Measuring range (X×Y×Z)		250×200×150 mm (250×200×118 mm: when 1X objective is used)	400×400×200 mm (400×400×168 mm: when 1.5X objective is used)
Observation unit		Zoom unit (8 positions)	
Imaging device		Color CMOS camera	
Accuracy*	E_{1X}, E_{1Y}	(2+3L/1000)µm	
	E_{1Z}	(3+5L/1000)µm	
	E_2	(2.5+4L/1000)µm	
	Accuracy guaranteed with optics specified	1.5X objective and 5.25X Zoom ratio	
Touch-trigger probe measuring accuracy*	E_{1X}, E_{1Y}, E_{1Z}	—	—
Accuracy guaranteed temperature range		20±1 °C	20±1 °C
Temperature compensation function		—	—

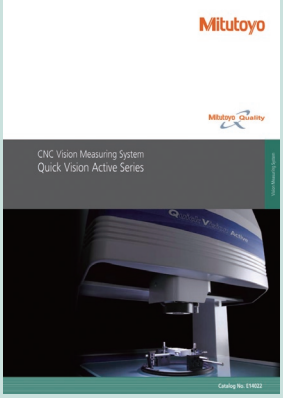
* Inspected to a Mitutoyo standard. L = length between two arbitrary points (mm)

MeasurLink® ENABLED
Data Management Software by Mitutoyo

Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink (refer to page A-5 for details).

PROPRIETARY INSPECTION CERTIFICATE

An inspection certificate is supplied as standard. Refer to page X for details.



Refer to the QUICK VISION Active Catalog (No. E14022) for more details.

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QV Apex / Hyper QV
CNC Vision Measuring System

MeasurLink® ENABLED
Data Management Software by Mitutoyo

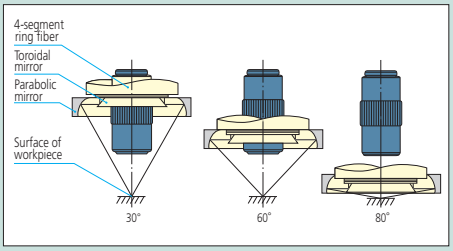
QV Apex302

Hyper QV 404

- A high-productivity CNC Vision Measuring System that can precisely and effectively perform a series of tasks from dimensional calculation to form analysis.
- The part program editing, such as changeover of the workpiece or correcting errors, is easy and straightforward.
- High specifications such as contour measurement or non-contact measurement are covered.
- TAF (Tracking Auto Focus) automatically follows changes in the height of the object being measured. TAF eliminates the the time that otherwise would be wasted in re-establishing focus multiple times, resulting in shorter measurement time.

Programmable ring light

Fine control of obliquity and direction provides illumination optimal for measurement. Obliquity can be arbitrarily set in the range from 30° to 80°. Illumination can be controlled independently in every direction, back and forth, right and left.



The programmable ring light shows the effect of a finely stepped section and the enhanced contrast of an inclined plane.

Refer to the QUICK VISION Catalog (No. E14007) for more details.

Measurement example of IC package terminal bottom width

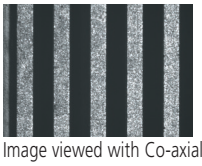


Image viewed with Co-axial light

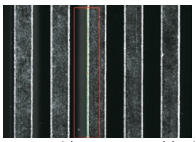
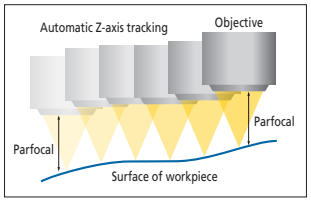


Image with programmable ring light

Tracking Auto Focus (TAF)

The TAF feature focuses continuously, adjusting to changes in the height of the object being measured. Automatic tracking of surface waves and warpage (in the Z-axis height direction) improves measurement throughput. The feature also cuts out the hassle of focusing during manual measurement, reducing the work burden for measuring system operators.
Note: Continuous measurement of displacement is not performed.

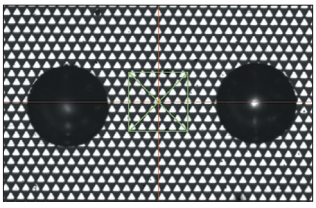


Laser source	Semiconductor laser (peak wavelength: 690 nm)
Laser safety	Class 2 (JIS C6802:2014, EN/IEC 60825-1:2014)
Auto focus system	Objective coaxial autofocusing (knife-edge method)

High-Performance Multi-Auto Focus

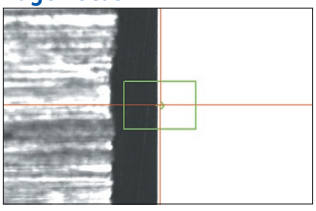
The QV Series is equipped with a high-performance image auto focus function as standard. Image auto focus is used to guarantee accuracy.
Thanks to the availability of various auto focus tools, the optimal focus for each surface texture and measured feature can be selected, which makes it possible to perform highly reliable height measurements.

Pattern Focus



The pattern focus reticule enables focusing on low contrast or mirrored surfaces, or transparent objects.

Edge Focus



Robust edge detection methods for multiple lighting techniques are available with edge focus.

Surface Focus

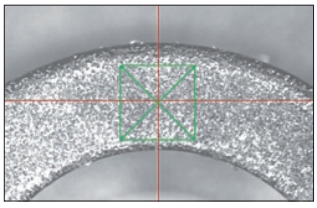


Image auto focus can be used to measure the height of a chosen area, which makes it possible to perform stable height measurements that are minimally affected by the roughness of machined surfaces and other similar surfaces.

SPECIFICATIONS

QV Apex

Model		QV Apex 302	QV Apex 404	QV Apex 606
Measuring range (X×Y×Z)		300×200×200 mm	400×400×250 mm	600×650×250 mm
Observation Unit		PPT1X-2X-6X		
Imaging Device		B&W CCD (1/2 inch) or 3CCD color (1/3 inch)		
Accuracy*	E_{1X}, E_{1Y}	(1.5+3L/1000)μm		
	E_{1Z}	(1.5+4L/1000)μm		
	E_{2XY}	(2+4L/1000)μm		

Hyper QV (Specifications other than as quoted in the table are the same as the QV Apex specifications.)

Model		Hyper QV302	Hyper QV404	Hyper QV606
Imaging Device		B&W CCD (1/2 inch)		
Accuracy*	E_{1X}, E_{1Y}	(0.8+2L/1000)μm		
	E_{1Z}	(1.5+2L/1000)μm		
	E_{2XY}	(1.4+3L/1000)μm		

* Inspected to a Mitutoyo standard. L = length between two arbitrary points (mm)

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Mitutoyo

Vision Measuring Systems

Vision measuring systems for multipurpose use

QV STREAM PLUS
Non-stop CNC Vision Measuring System

MeasurLink® ENABLED
Data Management Software by Mitutoyo

- This non-stop CNC Vision Measuring System has achieved a reduction of measurement time compared with the normal measurement mode.
- QV STREAM PLUS employs an image capturing method that operates without stopping the stage to achieve significant throughput improvement.
- In the XY measurement, the throughput has improved 5 times compared to the conventional model, achieving a major reduction in measurement time.

QV STREAM PLUS 606

SPECIFICATIONS

Model No.		QV STREAM PLUS302	QV STREAM PLUS404	QV STREAM PLUS606
Measuring range (X×Y×Z)		300×200×200 mm	400×400×250 mm	600×650×250 mm
Observation unit		PPT1X-2X-6X		
Imaging device		B&W CCD (1/2 inch)		
Accuracy *	E_{1X}, E_{1Y}	(1.5+3L/1000)μm		
	E_{1Z}	(1.5+4L/1000)μm		
	E_{2XY}	(2.0+4L/1000)μm		
Tracking auto focus device		Optional		

* Only one of the illumination functions (reflected, transmitted, and PRL illumination) can be set in STREAM mode. The 4-way PRL illumination can be set to 4-direction lighting or single-direction lighting.

MeasurLink® ENABLED
Data Management Software by Mitutoyo

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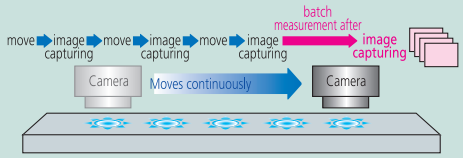
PROPRIETARY INSPECTION CERTIFICATE

An inspection certificate is supplied as standard. Refer to page X for details.

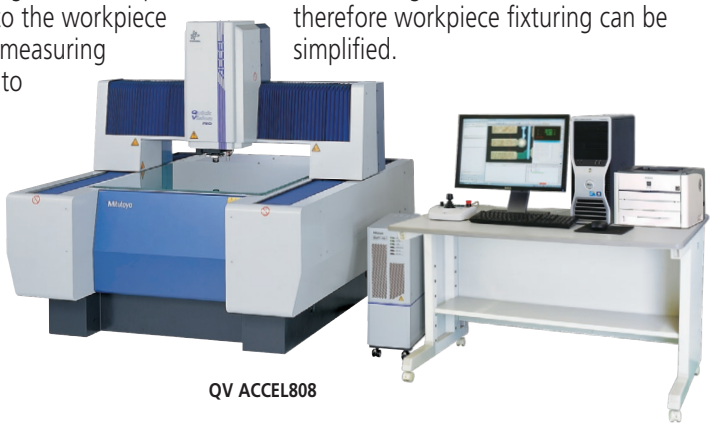
Flow of non-stop measurement



QV ACCEL
Large CNC Vision Measuring System

MeasurLink® ENABLED
Data Management Software by Mitutoyo

- A large CNC Vision Measuring System suitable for measuring large, thin workpieces.
- The model best suited to the workpiece can be selected from a measuring range of 800×800 mm to 1500×1750 mm.
- In measurement, high-speed acceleration and deceleration is achieved by adopting the center drive method.
- Thanks to the moving gantry design of QV ACCEL, the stage does not need to move, therefore workpiece fixturing can be simplified.



QV ACCEL808

SPECIFICATIONS

Model No.			QV ACCEL808	QV ACCEL1010
Measuring range (X×Y×Z)			800×800×150 mm	1000×1000×150 mm
Observation unit			PPT1X-2X-6X	
Imaging device			B&W CCD (1/2 inch)	
Accuracy*	E_{1X}, E_{1Y}		(1.5+3L/1000)μm	
	E_{1Z}		(1.5+4L/1000)μm	
	E_{2XY}		(2.5+4L/1000)μm	
Repeatability*	Short dimensions	XY axis	3σ=0.2 μm	
	Long dimensions		3σ=0.7 μm	
Tracking auto focus device			Optional	

* Inspected to a Mitutoyo standard. L = length between two arbitrary points (mm)

MeasurLink® ENABLED
Data Management Software by Mitutoyo

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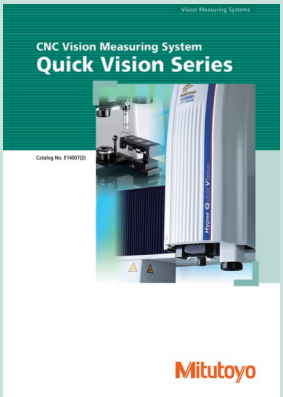

Refer to the QUICK VISION Catalog (No. E14007) for more details.

MeasurLink ENABLED
Data Management Software by Mitutoyo

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Refer to the QUICK VISION Catalog (No. E14007) for more details.

ULTRA QV404
Ultra-High Accuracy CNC Vision Measuring System

MeasurLink ENABLED
Data Management Software by Mitutoyo

ULTRA QV404

- ULTRA QV404 PRO is an ultra-high accuracy CNC vision measuring system that offers the world's highest level of measurement accuracy, E_{1XY}: (0.25+L/1000)µm.
- A high-rigidity, fixed-bridge moving table design is adopted for the Y axis, and the X- and Y-axis guides have excellent wear resistance. The base is granite for high thermal stability.
- The high-precision scales are made of a crystallized glass whose expansion coefficient is almost zero, and feature a high resolution of 0.01 µm. A vibration absorption system and floating ball-screw mechanism ensure a highly accurate Y-axis drive.

SPECIFICATIONS

Model No.		ULTRA QV404
Measuring range (X×Y×Z)		400×400×200 mm
Observation unit		PPT1X-2X-6X
Imaging device		B&W CCD (1/2 inch)
Accuracy (E_1)*1	E_{1X}, E_{1Y}	(0.25+L/1000)µm
	E_{1Z} (Full stroke)	(1.5+2L/1000)µm (Range 200 mm)
	E_{1Z} (50 mm stroke)*2	(1.0+2L/1000)µm (Range 10 to 60 mm)
Accuracy (E_2)*1	E_{2XY}	(0.5+2L/1000)µm
Tracking auto focus device		Optional

*1: Inspected to a Mitutoyo standard. L = length between two arbitrary points (mm)
*2: Verified at shipment from factory.

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MeasurLink ENABLED
Data Management Software by Mitutoyo

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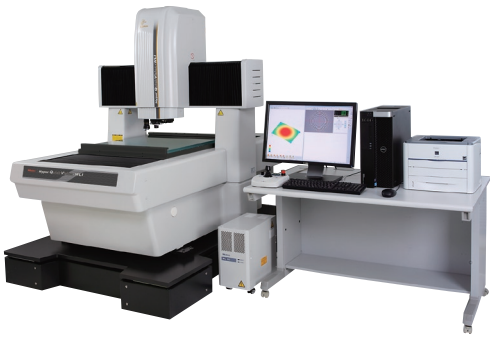
Refer to the QUICK VISION Catalog (No. E14007) for more details.

Hyper QV WLI
Non-contact 3D measuring system

MeasurLink ENABLED
Data Management Software by Mitutoyo



Hyper QV WLI 606

- The best-ever efficiency and accuracy are achieved by combining imaging with the WLI optical head.
- High accuracy, dual-head vision measuring system equipped with a white light interferometer.
- For measurement that requires dimensional measurement and height/surface texture evaluation, high efficiency is offered by performing all tasks with one machine.

SPECIFICATIONS

Model No.		Hyper QV WLI 302	Hyper QV WLI 404	Hyper QV WLI 606
Measuring range (X×Y×Z)	Vision measuring area	300×200×190 mm	400×400×240 mm	600×650×220 mm
	WLI measuring area*1	215×200×190 mm	315×400×240 mm	515×650×220 mm
WLI optical head unit				
View field (H×V)		5X lens: approx. 0.64×0.48 mm / 10X lens: approx. 0.32×0.24 mm / 25X lens: approx. 0.13×0.10 mm		
Repeatability		$2\sigma \leqq 0.08$ µm		
Vision optical head unit				
Observation unit		PPT1X-2X-6X		
Imaging device		B&W CCD (1/2 inch)		
Accuracy*2	E_{1X}, E_{1Y}	(0.8+2L/1000)µm		
	E_{1Z}	(1.5+2L/1000)µm		
	E_{2XY}	(1.4+3L/1000)µm		

*1: Movable range of WLI optical head.
*2: Inspected to a Mitutoyo standard. L = length between two arbitrary points (mm)

Mitutoyo

Vision Measuring Systems

Vision measuring systems for multipurpose use

QV TP
CNC Vision Measuring System equipped with a Touch Trigger Probe

MeasurLink® ENABLED
Data Management Software by Mitutoyo

Non-contact and contact measurement on one machine

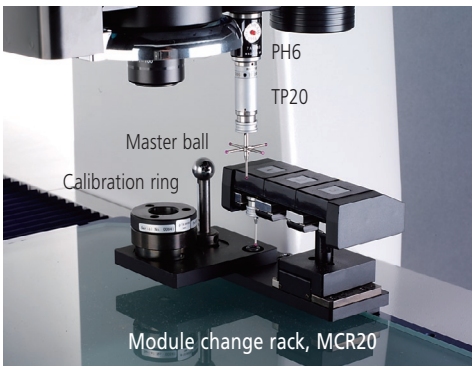
QV touch-trigger probe unit enables both vision measurement and touch-trigger probe measurement.

3D workpiece measurement

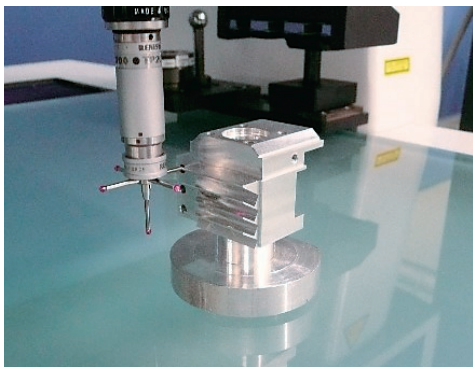
Measures three-dimensional workpieces such as light-alloy molded products, plastic molded products, machined products, and more.

Module change rack available

Easily change between vision and touch-trigger probe measurement using a module change rack.



Module change rack, MCR20



Specifications with touch-trigger probe options mounted

Model No.		QVTP Active 202	QVTP Apex 302 Hyper QVTP302	QVTP Active 404	QVTP Apex 404 Hyper QVTP404	QVTP Apex 606 Hyper QVTP606
Measuring range*1 (X×Y×Z)	Vision	250×200×150 mm	300×200×200 mm	400×400×200 mm	400×400×250 mm	600×650×250 mm
	Common to Touch-trigger Probe	184×200×150 mm	234×200×200 mm	334×400×200 mm	334×400×250 mm	534×650×250 mm
Measuring accuracy*2 (Touch-trigger probe)	E_{1X}, E_{1Y}, E_{1Z}	(2.4+3L/1000)µm	QVTP Apex: (1.8+3L/1000)µm Hyper QVTP: (1.7+3L/1000)µm	(2.4+3L/1000)µm	QVTP Apex: (1.8+3L/1000)µm Hyper QVTP: (1.7+3L/1000)µm	

*1: When a module change rack, a master ball, and a calibration ring are mounted, the measurement ranges are smaller than those in the table. Other specifications are the same as those for QV Apex, Hyper QV, and QV ACCEL. Please contact our sales office for more details.
*2: Inspected by Mitutoyo standard. L = length between two arbitrary points (mm)

MeasurLink® ENABLED
Data Management Software by Mitutoyo

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Data Management Software by Mitutoyo

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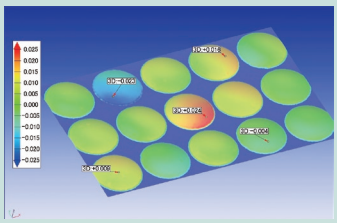
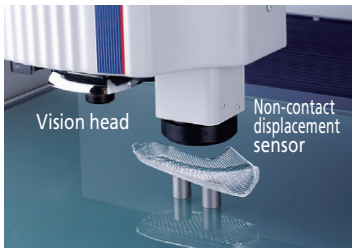
Example of 3D form comparison



QVH Apex / Hyper QVH / QVH ACCEL / QVH STREAM PLUS
CNC Vision Measuring System equipped with Non-contact displacement sensor

MeasurLink® ENABLED
Data Management Software by Mitutoyo

- A multi-sensor measuring machine equipped with an imaging optical head and non-contact displacement sensor. Both vision measurement and non-contact form measurement are possible.
- The laser probe equipped HYBRID TYPE1 and CPS probe equipped HYBRID TYPE4 are available.



QVH4 606

Features: HYBRID TYPE1
- The focusing point method minimizes the difference in the measuring face reflectance and achieves high measurement reproducibility.
- Capable of measuring detailed shapes in high resolution.

Features: HYBRID TYPE4
- Enables detection of high inclination angles for both mirror and diffused Surfaces.
- The automatic lighting adjustment function allows for high accuracy measurements.
- Surface roughness or thickness measurement of thin and transparent objects such as film.

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COMMON SPECIFICATIONS for TYPE1/TYPE4

Apex / Hyper / STREAM PLUS (Specifications other than as described below are the same as for models: **QV Apex, Hyper QV, and QV STREAM PLUS.**)

Model No.			QVH Apex302 QVH STREAM 302	Hyper QVH302	QVH Apex404 QVH STREAM 404	Hyper QVH404	QVH Apex606 QVH STREAM 606	Hyper QVH606
Measuring range (XxYxZ)	by vision probe		300×200×200 mm		400×400×250 mm		600×650×250 mm	
	by displacement sensor	TYPE1	180×200×200 mm		280×400×250 mm		480×650×250 mm	
		TYPE4	176×200×200 mm		276×400×250 mm		476×650×250 mm	
Measuring accuracy* (Vision)	E_1	E_{1X}, E_{1Y}	(1.5+3L/1000)µm	(0.8+2L/1000)µm	(1.5+3L/1000)µm	(0.8+2L/1000)µm	(1.5+3L/1000)µm	(0.8+2L/1000)µm
		E_{1Z}	(1.5+4L/1000)µm	(1.5+2L/1000)µm	(1.5+4L/1000)µm	(1.5+2L/1000)µm	(1.5+4L/1000)µm	(1.5+2L/1000)µm
	E_2	E_{2XY}	(2.0+4L/1000)µm	(1.4+3L/1000)µm	(2.0+4L/1000)µm	(1.4+3L/1000)µm	(2.0+4L/1000)µm	(1.4+3L/1000)µm
Displacement sensor accuracy*	E_1	E_{1Z}	(1.5+4L/1000)µm	(1.5+2L/1000)µm	(1.5+4L/1000)µm	(1.5+2L/1000)µm	(1.5+4L/1000)µm	(1.5+2L/1000)µm

* Inspected to a Mitutoyo standard. L = length between two arbitrary points (mm)

CLASS 1 LASER PRODUCT

Safety precautions regarding QV HYBRID TYPE1

This product uses a low-power visible laser (780 nm) for measurement. The laser is a CLASS 1 EN/IEC 60825-1 device. A warning and explanation label, as shown above, is attached to the product as appropriate

Mitutoyo

Vision Measuring Systems

Vision measuring systems for multipurpose use

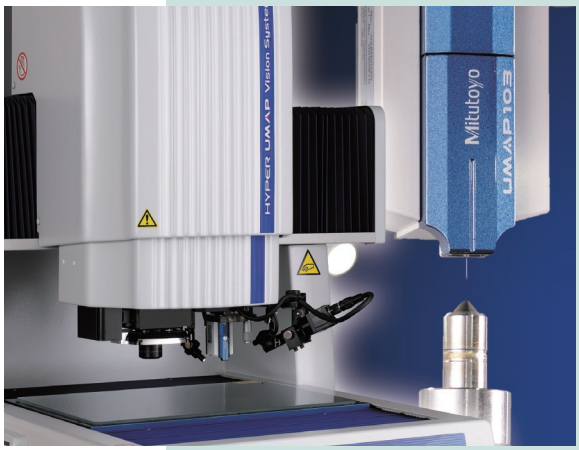
UMAP Vision System TYPE2
Micro Form Measuring System

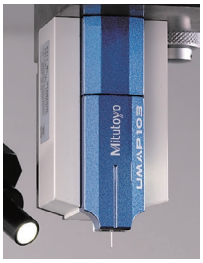
MeasurLink® ENABLED
Data Management Software by Mitutoyo

Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink (refer to page A-5 for details).

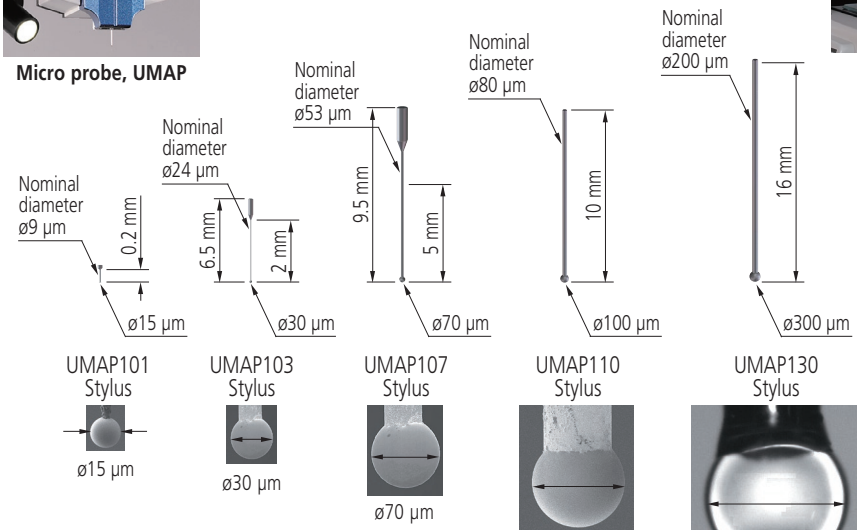
An inspection certificate is supplied as standard. Refer to page X for details.

Contact measurement of a small hole's diameter, its section, or contour is possible, which is difficult with a conventional Vision Measuring System or CMM. Capable of high accuracy, sophisticated, non-contact and contact measurement on one machine. With a measuring force of 1 μN, measurement of a workpiece that is easily deformed or is very light can be measured without using holding fixtures.

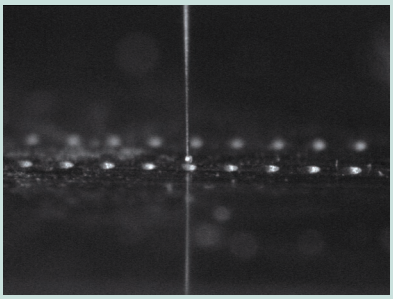




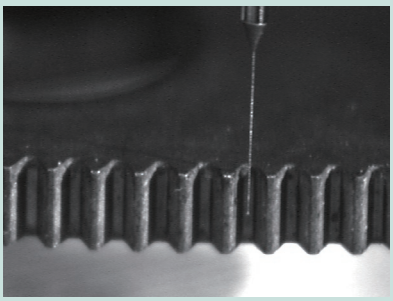
Micro probe, UMAP



Application example

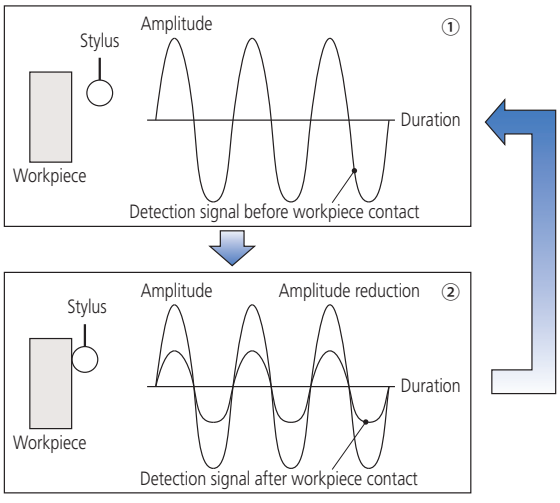


Contour measurement of a ø0.125 hole



Measuring form of micro gear teeth

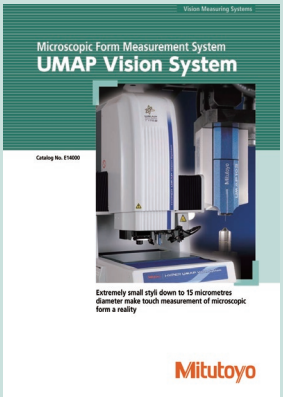
Detection of surface principle



① In this drawing, the stylus is vibrating with micro amplitude. If it does not come into contact with the workpiece the vibration state is maintained.
② As the stylus comes into contact with the workpiece surface the vibration amplitude decreases as the contact increases. When the decreasing amplitude falls below a certain level, a touch-trigger signal is generated.

SPECIFICATIONS

Model No.		TYPE2	
		Hyper UMAP302	ULTRA UMAP404
Measuring range (common to vision and UMAP)	X axis × Y axis	185×200 mm	285×400 mm
	Z axis	175 mm: UMAP101/103 180 mm: UMAP107/110 185 mm: UMAP130	
Measuring accuracy (Vision)	E_{1X}, E_{1Y}	(0.8+2L/1000)μm	(0.25+L/1000)μm
	E_{1Z}	(1.5+2L/1000)μm	
Repeatability	UMAP 101/103/107	σ = 0.1 μm	σ = 0.08 μm
	UMAP 110/130	σ = 0.15 μm	σ = 0.12 μm



Refer to UMAP Vision System Catalog (No. E14000) for more details.

About the PFF (Points From Focus) Function

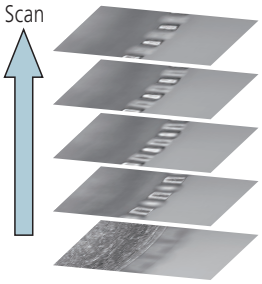
- PFF (Points From Focus) is an application that can use the image contrast of the Quick Vision Series to perform non-contact 3D form measurements. The Mitutoyo inspection method guarantees the Z-direction repetition accuracy, so it is possible to perform highly accurate form measurements.

PFF Principle

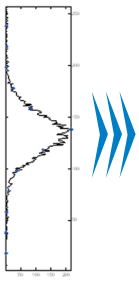
QV optical system

Workpiece: crown gear

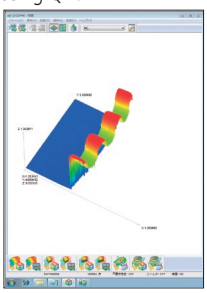
Consecutive acquisition of images



Contrast

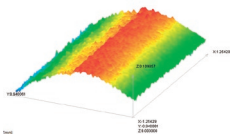


3D form data composition using QV3DPAK

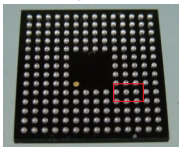


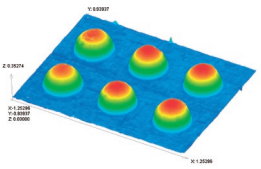
PFF Measurement Example

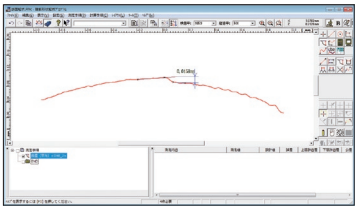
Partition line of a molded product

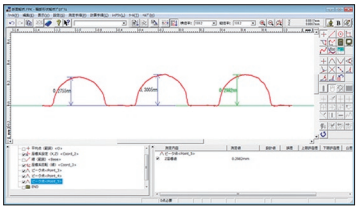


IC package BGA









PFF Measurement Performance

PFF guarantees, by way of the Mitutoyo inspection method, the Z-direction repetition accuracy.

Model No.	QV Apex/QV ACCEL	Hyper QV	ULTRA QV
Z-direction repetition accuracy	2σ≦1.5 µm	2σ≦1.5 µm	2σ≦0.7 µm
Optical magnification guaranteed to be accurate	QV-HR2.5X + PT2X	QV-HR2.5X + PT2X	QV-5X + PT2X

Note 1: When using the PFF function, employ the QV3DPAK software and a PFF-compatible objective.
Note 2: The PFF-compatible models are the PRO versions of the machines listed in the table above (including TP, HYBRID and UMAP machines).

K

Vision Measuring Systems

Vision measuring systems for multipurpose use

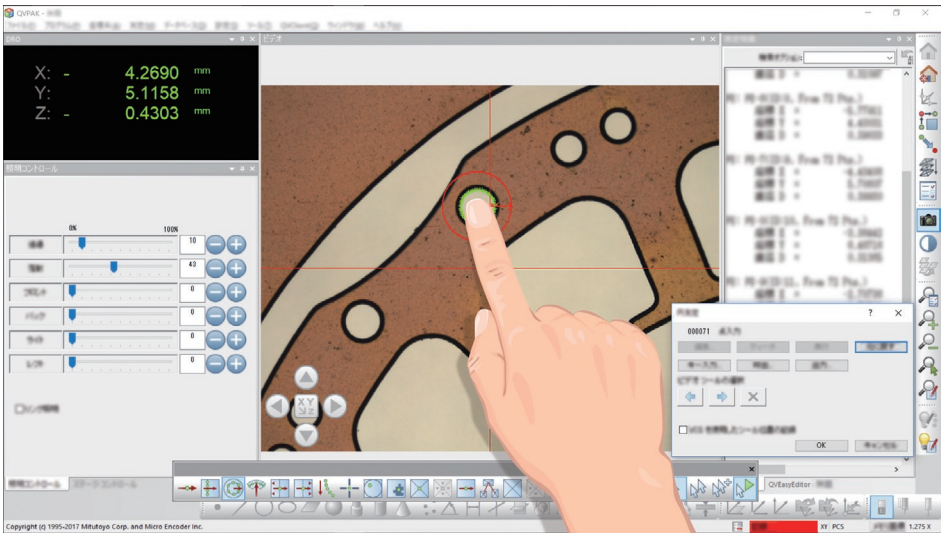
QVPAK
Data Processing Software for QUICK VISION

MeasurLink® ENABLED
Data Management Software by Mitutoyo

Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink (refer to page A-5 for details).

MiCAT
Mitutoyo Intelligent Computer Aided Technology
the standard in world metrology software
VISION

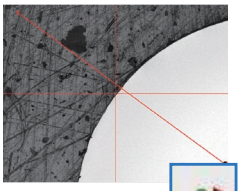
- The X, Y, and Z position data is detected from the measurement data gathered by the Quick Vision system and the arithmetic processing of coordinates and dimensions is performed immediately.



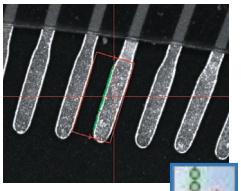
Gesture operation, like operating a smartphone, enables easy tool layout or stage shifting on systems with touch screens.

K

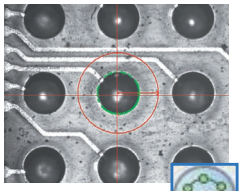
Edge Detection Tools



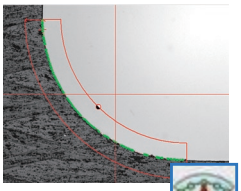
Point Tool
This is a basic tool for detecting one point.



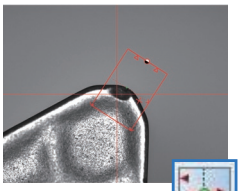
Line Tool
This tool detects linear edges with a minimum of one pixel space. Compared to the point tool, the line tool can perform averaging and remove abnormal points, which enables stable measurements.



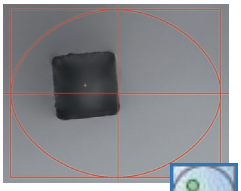
Circle Tool
This tool detects circular edges with a minimum of one pixel space. Edges can be specified easily with a single click.



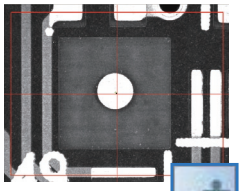
Arc Tool
This tool is suited to detection of arcs and corner radii.



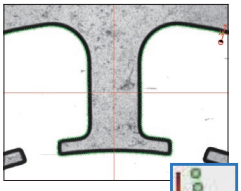
Maximum/ Minimum Tool
This tool detects the maximum or minimum point within the range.



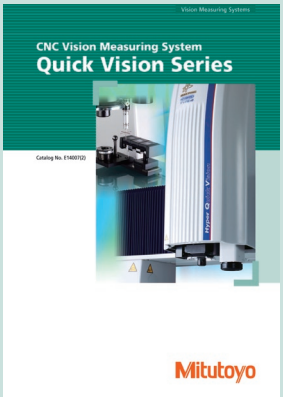
Area Centroid Tool
This tool detects the position of a form's centroid, and is suited to the positioning of different forms.



Pattern Search Tool
This tool performs pattern matching to detect a position, and is optimal for positioning alignment marks and similar tasks.



Auto Trace Tool
This is a shape-measuring tool that automatically tracks a contour with input consisting only of a start point and end point.

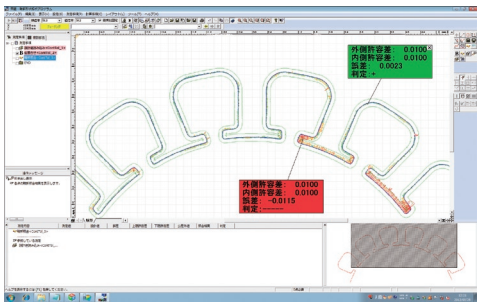


Refer to the QUICK VISION Catalog (No. E14007) for more details.

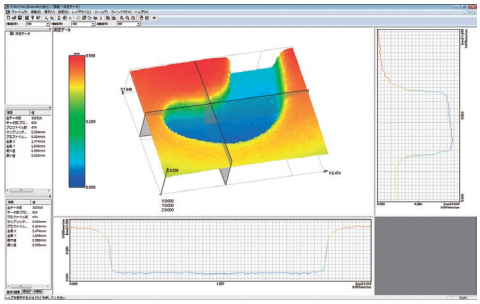
Application software (Options)

QV PartManager
The QV PartManager is execution program management software for multiple workpieces arranged on the measuring stage.

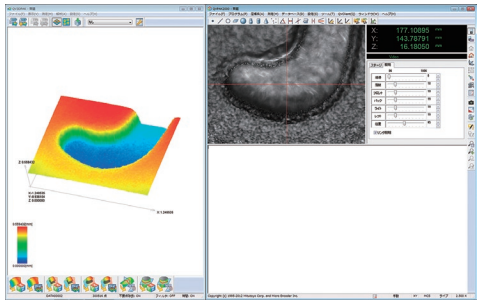
Form assessment/analysis software FORMTRACEPAK-AP
Verification of designed value and form analysis are performed on the basis of the contour data obtained via the QV auto trace tool, non-contact displacement sensor, PFF, and WLI.



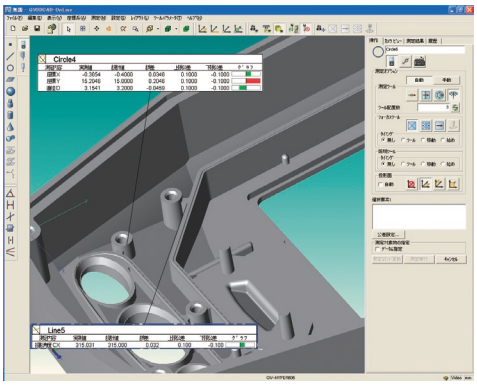
FORMTRACEPAK-PRO
This software performs 3D form analysis from the data obtained via the non-contact displacement sensor of the QV Hybrid series.



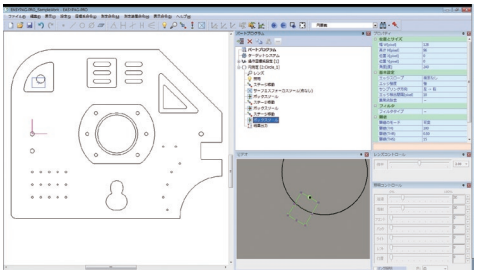
QV3DPAK
This software generates 3D forms from the PFF (Points From Focus) or WLI (White Light Interferometer) data.



Measurement support software QV3DCAD-OnLine
This software creates QVPAK measurement procedure programs using 3D CAD data. This allows users to reduce the program creation man-hours needed and shorten lead times.



QV-CAD I/F
This software displays CAD data in the graphic window to improve measurement operability.



Off-line teaching software EASYPAG PRO
This software creates QVPAK measurement procedure programs using 2D CAD data. This allows users to reduce the program creation man-hours needed and shorten lead times.

Test chart software/Statistical processing software MeasureReportQV
This software creates an inspection report from the QV measurement results.

MeasurLink
This software enables statistical arithmetic processing of measurement results.

External control software QVEio
This is client application software that can externally control QVPAK or provide the operating status of QVPAK by connecting a PLC or remote software on an external PC. This software can be used for connecting an automatic transfer robot to a signal tower.

K

Vision Measuring Systems

Vision measuring systems for multipurpose use

QS-LZ / AFC
Manual Vision Measuring System

MeasurLink® ENABLED
Data Management Software by Mitutoyo

- This is a manual vision measuring machine equipped with a color camera and zoom lens.
- The Quick Release System on the stage enables rapid relocation and fine adjustment of the measuring point, which is a real time saver when working with large dimensions.
- A control box provides convenient access to the frequently used functions including illumination setting, zero-clear of the counter and auto focusing.
- An auto-focus system is fitted and non-contact height measurement is possible. Accuracy of E1z (4.5+6L/1000) µm is guaranteed.

QS-L2010Z/AFC

MeasurLink ENABLED
Data Management Software by Mitutoyo

Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink (refer to page A-5 for details).

PROPRIETARY INSPECTION CERTIFICATE

An inspection certificate is supplied as standard. Refer to page X for details.

K

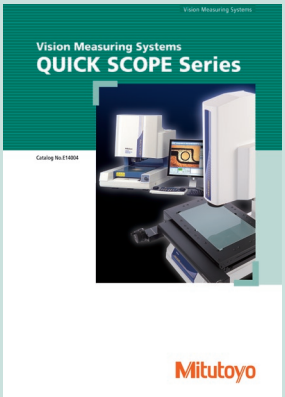
SPECIFICATIONS (QS-LZ / AFC)

Model No.		QS-L2010Z/AFC	QS-L3017Z/AFC	QS-L4020Z/AFC
Drive method		Autofocus equipped, X-, Y-axis: manual; Z axis: motor-operated		
Optical magnification		Zoom 0.5X to 3.5X (8 steps with 1.5X and 2X objectives)		
Illumination		Co-axial light, stage light, 4-quadrant ring light, white LED		
Measuring range (X×Y×Z)		200×100×150 mm	300×170×150 mm	400×200×150 mm
Image detection method		3 megapixel, Color CCD camera		
Indication accuracy*1	X axis, Y axis	(2.2+20L/1000)µm		
	Z axis	(4.5+6L/1000)µm		

*1: Specification applicable to 20°C, zoom magnification 2.5X.

From wide view measurement to micro-measurement

Optical magnification		0.5X	0.65X	0.75X	0.85X	0.98X	1X	1.28X	1.3X	1.5X	1.7X	2X	2.25X	2.5X	3X	3.5X	3.75X	4X	5X	5.25X	7X
View field (mm)	Horizontal (H)	13.60	10.46	9.07	8.00	6.94	6.80	5.31	5.23	4.53	4.00	3.40	3.02	2.72	2.27	1.94	1.81	1.70	1.36	1.30	0.97
	Vertical (V)	10.80	8.31	7.20	6.35	5.51	5.40	4.22	4.15	3.60	3.18	2.70	2.40	2.16	1.80	1.54	1.44	1.35	1.08	1.03	0.77
Objective lens	1X objective (optional) Working distance	74 mm																			
	1.5X objective (standard accessory) Working distance	42 mm																			
	2X objective (optional) Working distance	42 mm																			



Refer to the QUICK SCOPE Catalog (No. E14004) for more details.

MeasurLink ENABLED
Data Management Software by Mitutoyo

Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink (refer to page A-5 for details).

PROPRIETARY INSPECTION CERTIFICATE

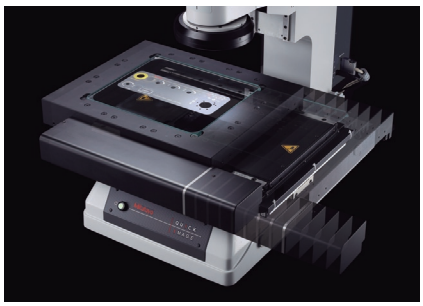
An inspection certificate is supplied as standard. Refer to page X for details.

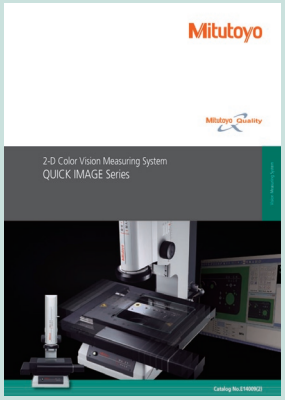
Quick Image
Non-contact 2D Vision Measuring System

MeasurLink® ENABLED
Data Management Software by Mitutoyo

- This series of manual 2D vision measuring machines offers high-efficiency measurement by employing a telecentric optical system that has a deep focal depth and a wide view monitor.
- The stitching function enables the entire display of a large workpiece so that highly accurate and speedy measurement can be performed.
- A model equipped with a motorized stage has been added to the series to offer easy and comfortable stage operation.
- A single click enables multiple measurements in one display. A batch measurement can be applied to multiple workpieces in the display after executing a pattern search based on the workpiece position.
- This series is equipped with a megapixel color camera. Even with low magnification, high repeatability can be obtained.
- The choice of five stage sizes makes it easy to choose a machine to suit the users's application.
- The video window automatically displays the measuring machine, which enables quick verification.

QI-C2017D


A motorized stage



Refer to the QUICK IMAGE Catalog (No. E14009) for more details.

K

SPECIFICATIONS

		Manual stage model					Motorized stage model		
0.2X	Model	QI-A1010D	QI-A2010D	QI-A2017D	QI-A3017D	QI-A4020D	QI-C2010D	QI-C2017D	QI-C3017D
0.5X	Model	QI-B1010D	QI-B2010D	QI-B2017D	QI-B3017D	QI-B4020D			
Measuring range (X×Y)		100×100 mm	200×100 mm	200×170 mm	300×170 mm	400×200 mm	200×100 mm	200×170 mm	300×170 mm
Effective stage glass size		170×170 mm	242×140 mm	260×230 mm	360×230 mm	440×232 mm	242×140 mm	260×230 mm	360×230 mm
Maximum stage loading *		Approx. 10 kg		Approx. 20 kg		Approx. 15 kg	Approx. 10 kg	Approx. 20 kg	
Main unit mass		Approx. 65 kg	Approx. 69 kg	Approx. 150 kg	Approx. 158 kg	Approx. 164 kg	Approx. 72 kg	Approx. 153 kg	Approx. 161 kg

* Does not include extremely offset or concentrated loads

Model			QI-A / QI-C	QI-B
View field			32×24 mm	12.8×9.6 mm
Measurement mode			High resolution mode / Normal mode *4	
Travel range (Z axis)			100 mm	
Accuracy	Measurement accuracy within the screen *1	High resolution mode	±2 µm	±1.5 µm
		Normal mode	±4 µm	±3 µm
	Repeatability within the screen (±2σ) *2	High resolution mode	±1 µm	±0.7 µm
		Normal mode	±2 µm	±1 µm
	Measurement accuracy (E1xy) *1		±(3.5+0.02)µm L: arbitrary measuring length (mm)	
Monitor magnification *3			7.6X	18.9X
Optical system	Magnification (Telecentric Optical System)		0.2X	0.5X
	Depth of focus	High resolution mode	±0.6 mm	±0.6 mm
		Normal mode	±11 mm	±1.8 mm
	Working distance		90 mm	
Camera			3 megapixel, 1/2 inch, full color	
Illumination			Transmitted light: Green LED telecentric illumination Co-axial light: White LED Ring light: 4-quadrant white LED	
Power supply			100-240 VAC 50/60 Hz	
Accuracy guaranteed temperature range			20±1 °C	

*1: Inspected to Mitutoyo standards by focus point position.
*2: The measuring accuracy is guaranteed to be accurate within the depth of focus.
*3: For 1X digital zoom (when using a 22-inch-wide monitor)
*4: Patent registered (Japan)

Mitutoyo