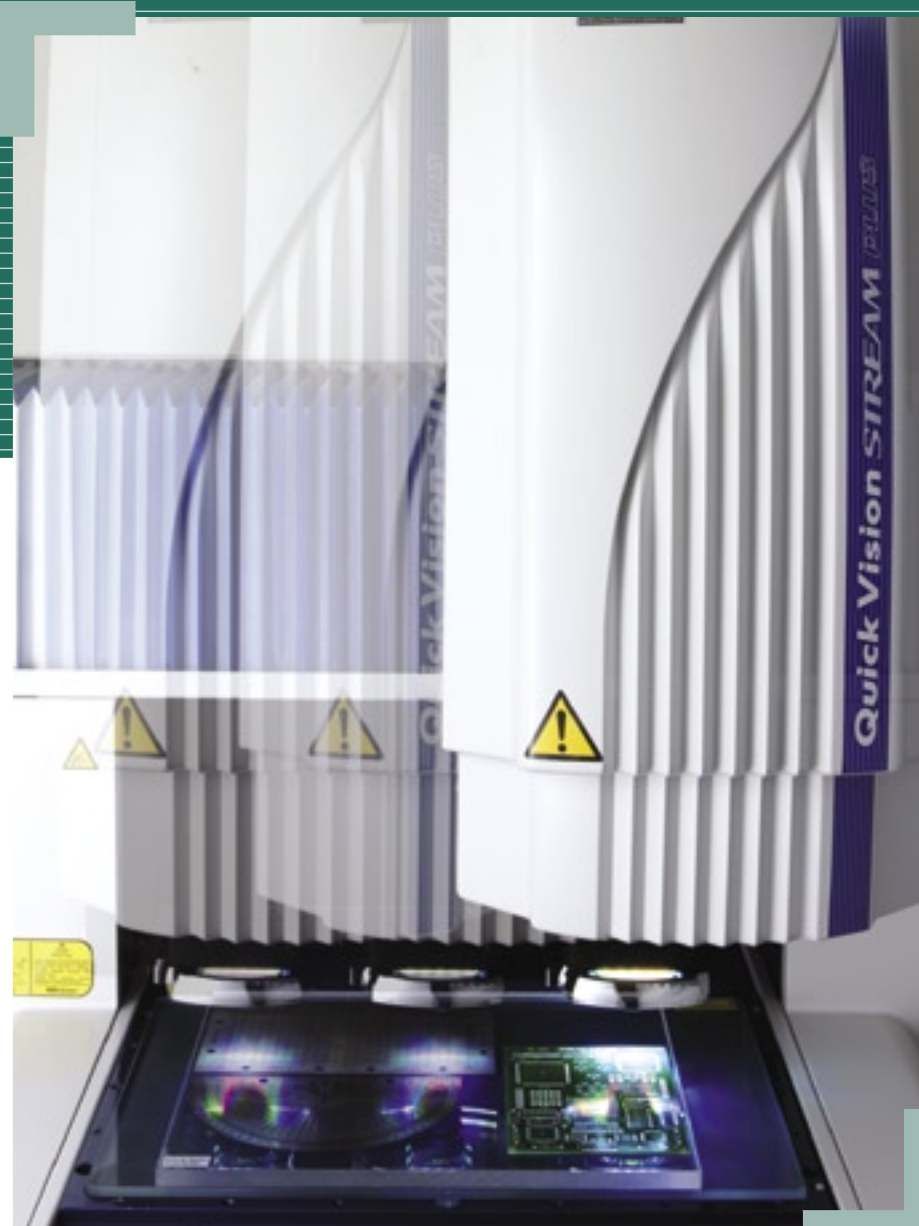


Non-Stop CNC Vision Measuring System

QUICK VISION STREAM SERIES

Bulletin No. 1874

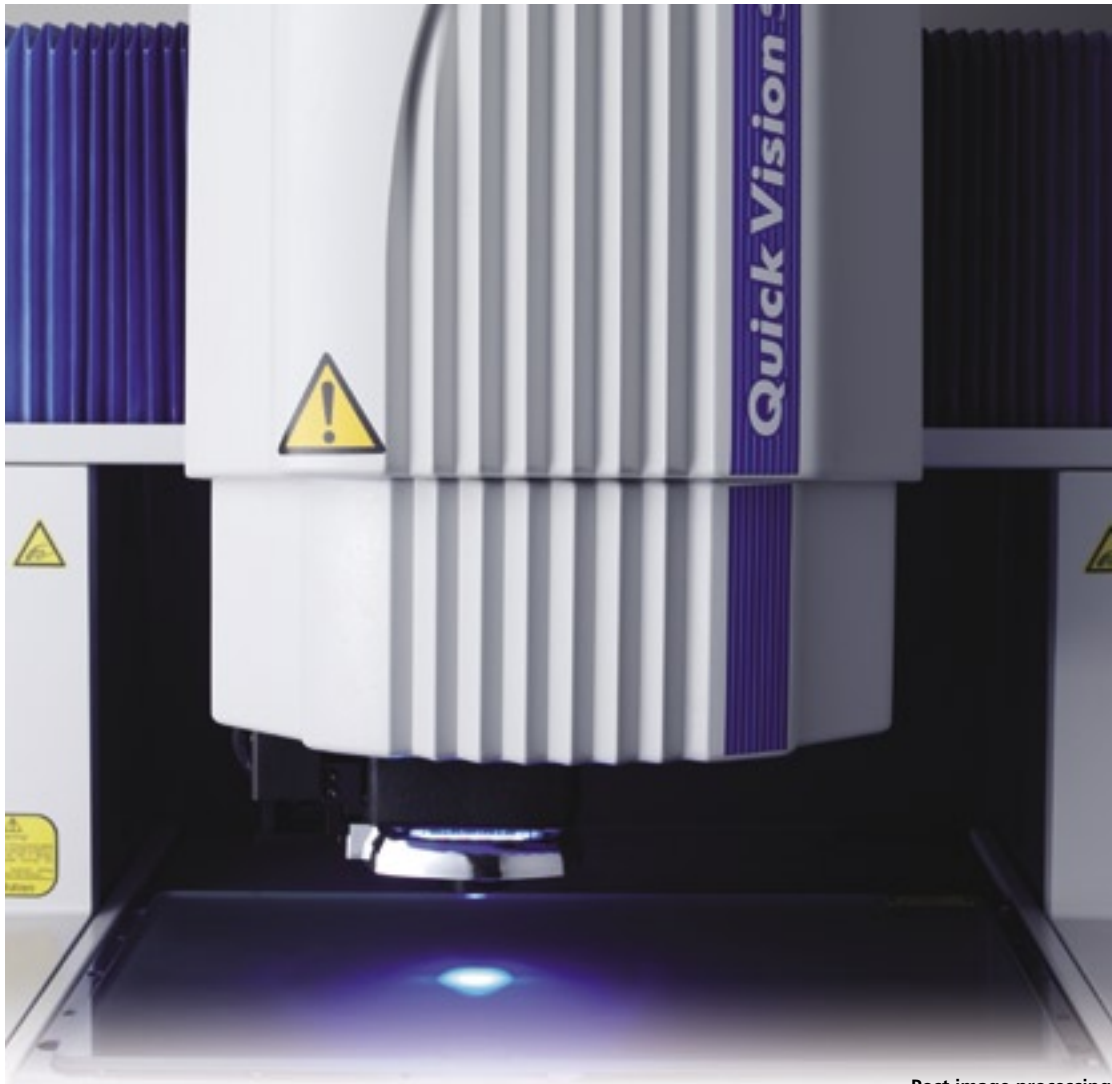


Stroboscopic illumination system and post image processing technology enable continuous vision measurement for a remarkable increase in measurement throughput.

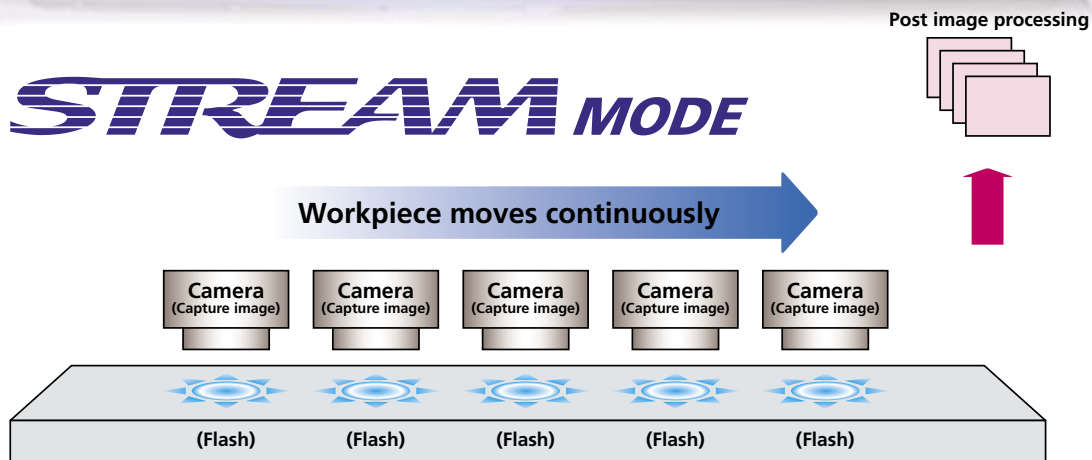
Mitutoyo

Don't stop at the measurement point!

Stroboscopic illumination system & post image processing technology enable continuous vision measurement during stage movement



STREAM MODE



Innovation

Streaming vision measurement

Dramatic Improvement in Throughput

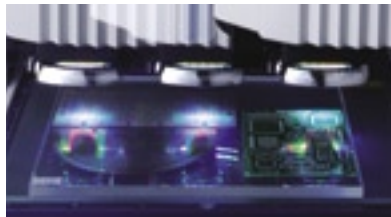
Conventional vision measuring systems endlessly repeat the cycle of stage displacement, stage stop, measurement, stage start and stage displacement again. This mode of operation places fundamental limits on measurement throughput.

In contrast, the Quick Vision Stream system uses an innovative image capture technique that avoids the need to repeatedly stop the stage so measurement can be continuous, while measuring accuracy is retained. Eliminating the time needed to accelerate, decelerate and then hold the stage motionless while a measurement is made achieves a dramatic improvement in productivity.

Measurement Throughput Comparison: QV STREAM vs. Conventional System

QV Stream Plus Series: more than 5x throughput*
QV Stream Series: 3x throughput*

* Comparing identical workpieces measured on Mitutoyo systems.



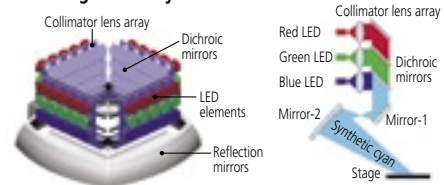
Strobe-LED Illumination

Newly Developed Illumination System

It was the development of a high-intensity LED flash illuminator that enabled non-stop vision measurement to be achieved. At the precise moment the stage reaches a measurement point the illuminator creates an extremely short, high-intensity flash that effectively freezes all motion. The illuminator turns on and off so fast that no image blur occurs and the image is captured in full and accurate detail.

This innovative design takes full advantage of high-density, high-intensity LED arrays aided by collimating lenses and dichroic mirrors to produce ultra bright, directional and efficient illumination.

High-density mounting of ultra-high intensity LED elements



Choice of models



Moving stage type

- Quick Vision STREAM Plus
Stream mode: 40mm/s
Standard Type
Hybrid Type1
Hybrid Type2
- Quick Vision STREAM
Stream mode: 5mm/s
Standard Type
Hybrid Type1
Hybrid Type2

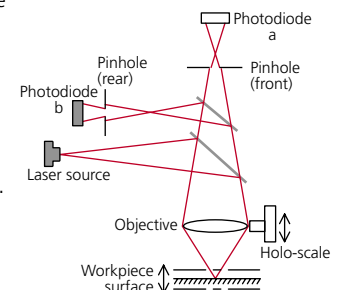


Gantry type

- Quick Vision ACCEL STREAM Plus
Stream mode: 40mm/s
Standard Type
Hybrid Type1
- Quick Vision ACCEL STREAM
Stream mode: 5mm/s
Standard Type
Hybrid Type1

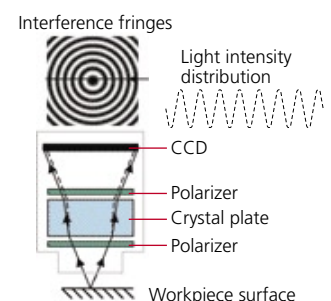
Features of Hybrid Type1

- This type uses a focusing method that suppresses effects due to surface reflection coefficient variation to provide high measurement reproducibility.
- A proprietary laser holoscale reads displacement to enable high-accuracy, high-resolution measurement.
- The double pinhole method with minimum directivity has been adopted as the measurement principle. This method suppresses the influence of diffused light and hence allows stable data collection even on ceramic or machined surfaces.



Features of Hybrid Type2

- This type is equipped with a non-contact laser probe that uses the interference fringe principle to make scanning measurements that are unaffected by workpiece surface inclination angle up to 85°.
- Optimal for form measurement of workpieces with low reflection coefficient, such as plastic or rubber molded parts.
- Single-point measurements are possible.
- The principle of operation is that a CCD camera detects interference fringes generated by emitting a laser beam through a crystal plate and polarizer system onto a surface; the distance from that surface is obtained by analyzing the number of fringes.



Quick Vision STREAM PLUS

Quick Vision STREAM



QV STREAM PLUS 302

Observation Unit

B&W CCD
camera

Programmable
power turret

Pattern focus
unit

Laser focus
unit

Software

QVPAK

LED Illumination Unit

Hi-intensity
surface
illumination

Hi-intensity
contour
illumination

Hi-intensity
programmable
ring light

Standard
programmable
ring light

QV STREAM PLUS

QV STREAM

Computer

CPU
Frame grabber
Motion controller

Mouse

Keyboard

Monitor

Laser Unit

Laser head (LI-HU)
B&W camera

Hybrid Type 1

Laser head

Hybrid Type 2

Control Unit

QV controller

QV remote box

LI-HU display unit

Hybrid Type 1 & 2

LI-HU display unit

Hybrid Type 1

Optional accessory
(not available
for Hybrid Type 1 & 2)

Specifications

Inch/(mm)

Model			QV STREAM PLUS 302 QV STREAM 302	QV STREAM PLUS 404 QV STREAM 404	QV STREAM PLUS 606 QV STREAM 606
Measuring range (XxYxZ-axis)	Normal mode camera		11.81"x7.87"x7.87" (300x200x200mm)	15.75"x15.75"x9.84" (400x400x250mm)	23.62"x25.59"x9.84" (600x650x250mm)
	Normal mode (laser)	Hybrid Type 1	6.93"x7.87"x7.87" (176x200x200mm)	10.87"x15.75"x9.84" (276x400x250mm)	18.74"x25.59"x9.84" (476x650x250mm)
		Hybrid Type 2	6.38"x7.68"x7.87" (162x195x200mm)	10.31"x15.55"x9.84" (262x395x250mm)	18.19"x25.39"x9.84" (462x645x250mm)
	STREAM mode [camera]		11.81"x7.87"x7.87" (300x200x200mm) [11.81"x7.87"x1.97" (300x200x50mm)] ⁻¹	15.75"x15.75"x9.84" (400x400x250mm) [15.75"x15.75"x1.97" (400x400x50mm)] ⁻¹	23.62"x25.59"x9.84" (600x650x250mm) [23.62"x25.59"x1.97" (600x650x50mm)] ⁻¹
Resolution			0.1µm		
Scale type			Reflective linear encoder		
Image detection method			B&W progressive scan CCD camera		
Illumination system	Surface illumination ⁻²		Continuous (composite white, R, G, B) / stroboscopic (B) hi-intensity LED illumination, switchable		
	Contour illumination ⁻²		Continuous (B) / stroboscopic (B) hi-intensity LED illumination, switchable		
	Programmable ring light ^{-2, -3}		Continuous (composite white, R, G, B) / stroboscopic (B) Hi-intensity LED illumination, switchable Continuous (composite white, R, G, B) standard LED illumination		
Observation unit			Programmable power turret		
Measuring accuracy L=Measured length (mm), at 20°C±1°C	E1XY		(1.5+3L/1000)µm	(1.5+3L/1000)µm	(1.5+3L/1000)µm
	E1Z	Camera	(3.0+4L/1000)µm	(3.0+4L/1000)µm	(3.0+4L/1000)µm
		Laser (Hybrid Type 1 & 2)	(2.5+4L/1000)µm	(2.5+4L/1000)µm	(2.5+4L/1000)µm
	E2XY		(2.5+4L/1000)µm	(2.5+4L/1000)µm	(2.5+4L/1000)µm
Maximum measuring speed (X-axis, Y-axis, Z-axis)			11.81"/s(300mm/s)		
Maximum measuring speed in STREAM mode			1.60"/s, .20"/s (40mm/s, 5mm/s)		
Stage glass size			15.71"x10.67" (399x271mm)	19.41"x21.69" (493x551mm)	27.44"x29.84" (697x758mm)
Maximum stage loading			44 lbf.(20kgf)	88 lbf.(40kgf)	110 lbf.(50kgf)
Dimensions ⁻⁴	Standard & Hybrid Type 1		30.87"x33.86"x60.43" (784x860x1535mm)	40.94"x48.03"x69.49" (1040x1220x1765mm)	51.57"x73.27"x71.69" (1310x1861x1821mm)
	Hybrid Type 2		30.87"x33.86"x62.91" (784x860x1598mm)	40.94"x48.03"x69.49" (1040x1220x1765mm)	51.57"x73.27"x71.69" (1310x1861x1821mm)
Main unit mass ⁻⁴			844 lbs.(383kg)	1,459 lbs.(662kg)	4,074 lbs.(1848kg)
Air supply for Hybrid Type 1 & 2			0.4MPa		

-1: When using contour illumination

-2: Only one illumination (surface / contour / programmable ring light) is available in the STREAM mode.

-3: 4-quadrant lighting or 1-quadrant lighting is available in the STREAM mode.

-4: Including machine stand

Optional Accessories

Touch probe system, Refer to page 10.

- PH6 set: **02ANT840**
- PH1 set: **02ANT860**
- MCR rack/2-port: **02ANT30A**
- MCR20 rack/3-port: **02ANT30B**
- MCR mounting plate: **02ANT770**
- Calibration ring: **02ANL920**
- Master ball stand: **02ANT720**

Machine stand

Calibration plate, Refer to page 11.

- For Hybrid Type 1: **02AND770**
- For Hybrid Type 2: **02AKQ520**
- For Hybrid Type 2: **02AKQ550**^{*1}

Laser focus unit^{*2}, Refer to page 11.

Objective, Refer to page 11.

- QV-1x: **02ALA400**
- QV-2.5x: **02ALA410**
- QV-5x: **02ALA420**
- QV-SL1x: **02ALA150**
- QV-SL2.5x: **02ALA170**
- QV-0.5x: **02ALG000**^{*3}
- QV-10x: **02ALG010**^{*3}
- QV-25x: **02ALG020**^{*3}

Calibration chart: **02AKN020**, Refer to page 11.

*1: For the objectives of QV-0.5x, QV-10x and QV-25x.

*2: Not available for Hybrid Type 1 and 2.

*3: Only for Hybrid Type 2

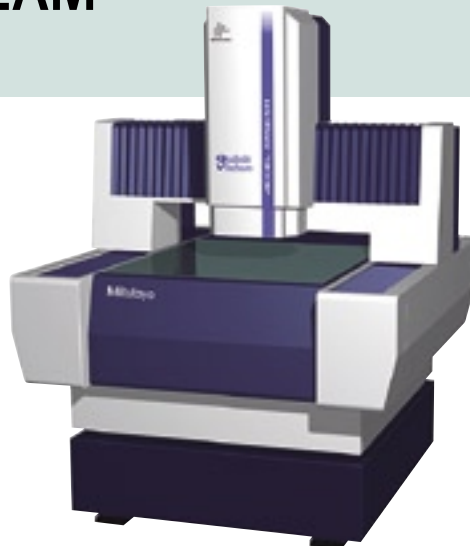
Quick Vision ACCEL STREAM PLUS

Quick Vision ACCEL STREAM

**QV ACCEL
STREAM PLUS 404**



**QV ACCEL
STREAM 606**



Observation Unit

B&W CCD
camera

Programmable
power turret

Pattern focus
unit

Laser focus
unit

Software

QVPAK

LED Illumination Unit

Hi-intensity
surface
illumination

Hi-intensity
contour
illumination

Hi-intensity
programmable
ring light

Standard
programmable
ring light

QV STREAM PLUS

QV STREAM

Computer

CPU
Frame grabber
Motion controller

Mouse

Keyboard

Monitor

Laser Unit

Laser head (LI-HU)
B&W camera

Hybrid Type 1

Control Unit

QV controller

QV remote box

LI-HU display unit

Hybrid Type 1

Optional accessory
(not available
for Hybrid Type 1 & 2)

Space-saving Design

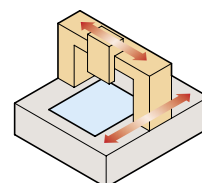
The QV Accel features a compact design; compared to their QV Series equivalents, the QVA 404 requires 16% less workspace, the QVA 606 29% less.

Comparison of QV ACCEL
workspace with that
needed for stage-moving
structure type models



Optimal for Measuring a Light and Thin, or Short Life-cycle Workpiece

The stationary stage of the QV ACCEL series adopts the moving-bridge structure that not only allows simplification of workpiece holding fixtures and reduction of manufacturing time, but is also optimal for measuring a light and thin, or short life-cycle workpiece.



Moving-bridge structure

Mitutoyo

Specifications

Inch/(mm)

Model		QV ACCEL STREAM PLUS 404 QV ACCEL STREAM 404	QV ACCEL STREAM PLUS 606 QV ACCEL STREAM 606
Measuring range (XxYxZ-axis)	Normal mode (camera)	15.74"x15.74"x5.91" (400x400x150mm)	23.62"x25.59"x5.91" (600x650x150mm)
	Normal mode (laser, Hybrid Type 1)	11.02"x15.74"x5.91" (280x400x150mm)	18.90"x25.59"x5.91" (480x650x150mm)
	STREAM mode [camera]	15.74"x15.74"x5.91" (400x400x150mm) [15.74"x15.74"x1.97" (400x400x50mm)] ⁻¹	23.62"x25.59"x5.91" (600x650x150mm) [23.62"x25.59"x1.97" (600x650x50mm)] ⁻¹
Resolution		0.1µm	
Scale type		Reflective linear encoder	
Image detection method		B&W progressive scan CCD camera	
Illumination system	Surface illumination ⁻²	Continuous (composite white, R, G, B) / stroboscopic (B) hi-intensity LED illumination, switchable	
	Contour illumination ⁻²	Continuous (B) / stroboscopic (B) hi-intensity LED illumination, switchable	
	Programmable ring light ^{-2, -3}	Continuous (composite white, R, G, B) / stroboscopic (B) Hi-intensity LED illumination, switchable Continuous (composite white, R, G, B) standard LED illumination	
Observation unit		Programmable power turret	
Measuring accuracy L=Measured length (mm), at 20°C±1°C	E1xy	(1.5+3L/1000)µm	(1.5+3L/1000)µm
	E1z	Camera	(3.0+4L/1000)µm
		Laser (Hybrid Type 1)	(2.5+4L/1000)µm
	E2xy	(2.5+4L/1000)µm	(2.5+4L/1000)µm
Repeatability (X, Y-axes)	Short length	3σ=0.2µm	
	Long length	3σ=0.7µm	
Maximum measuring speed		11.81"/s(300mm/s) X-axis, Y-axis, 5.91"/s(150mm/s) Z-axis	
Maximum measuring speed in STREAM mode		1.60"/s, .20"/s (40mm/s, 5mm/s)	
Stage glass size		19.41"x20.12" (493x511mm)	27.44"x29.57" (697x751mm)
Maximum stage loading		22 lbf.(10kgf)	22 lbf.(10kgf)
Dimensions ⁻⁴		38.66"x43.11"x62.13" (982x1095x1578mm)	46.57"x52.60"x62.13" (1183x1336x1578mm)
Main unit mass ⁻⁴	Standard	1,466 lbs.(665kg)	2,112 lbs.(958kg)
	Hybrid Type 1	1,477 lbs.(670kg)	2,123 lbs.(963kg)
Air supply for Hybrid Type		0.4MPa	

-1: When using contour illumination

-2: Only one illumination (surface / contour / programmable ring light) is available in the STREAM mode.

-3: 4-quadrant lighting or 1-quadrant lighting is available in the STREAM mode.

-4: Including machine stand

Optional Accessories

Touch probe system, Refer to page 10.

- PH6 set: **02ANT840**
- PH1 set: **02ANT860**
- MCR rack/2-port: **02ANT30A**
- MCR20 rack/3-port: **02ANT30B**
- MCR mounting plate: **02ANT770**
- Calibration ring: **02ANL920**
- Master ball stand: **02ANT720**

Machine stand

Calibration plate: **02AND770**, Refer to page 11.

Laser focus unit: Refer to page 11.

Objective, Refer to page 11.

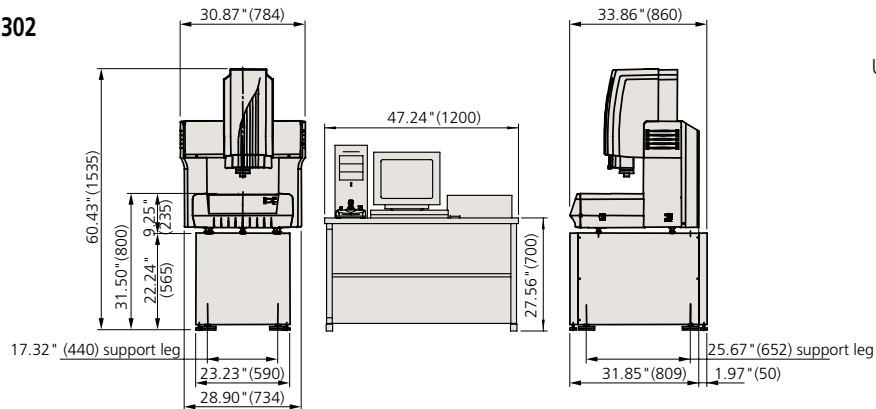
- QV-1x: **02ALA400**
- QV-2.5x: **02ALA410**
- QV-5x: **02ALA420**
- QV-SL1x: **02ALA150**
- QV-SL2.5x: **02ALA170**
- QV-0.5x: **02ALG000**
- QV-10x: **02ALG010**
- QV-25x: **02ALG020**

Calibration chart: **02AKN020**, Refer to page 11.

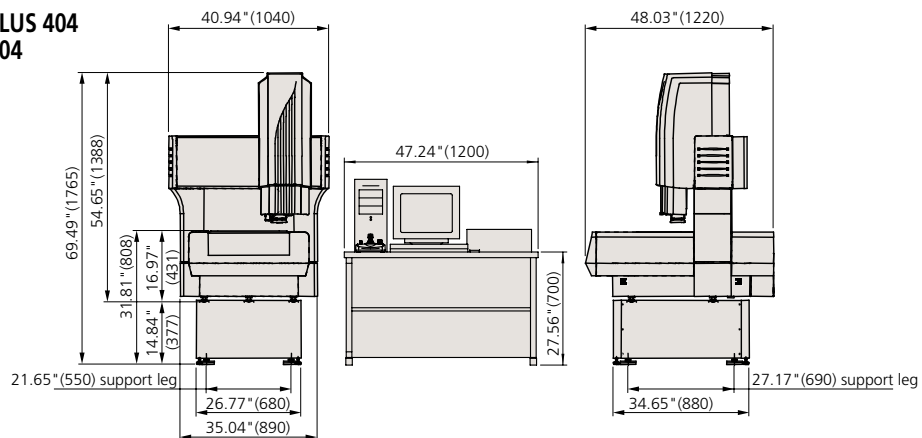
External Dimensions

QV STREAM PLUS and QV STREAM

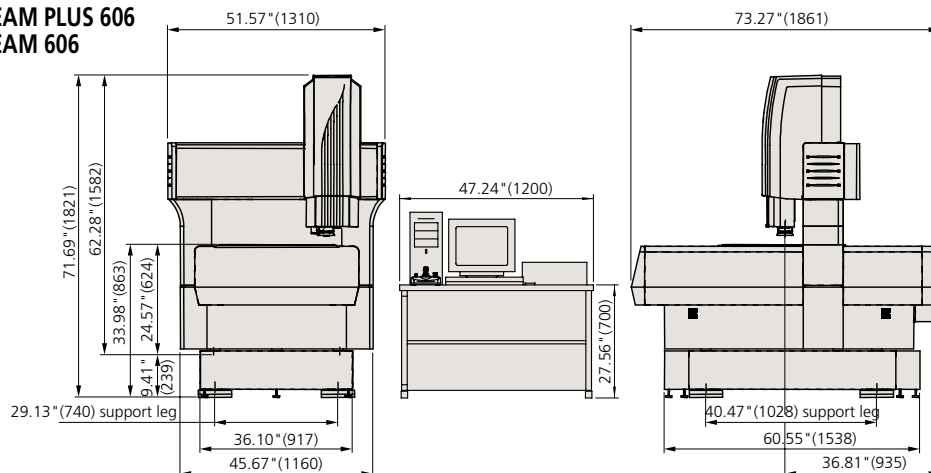
QV STREAM PLUS 302
QV STREAM 302



QV STREAM PLUS 404
QV STREAM 404



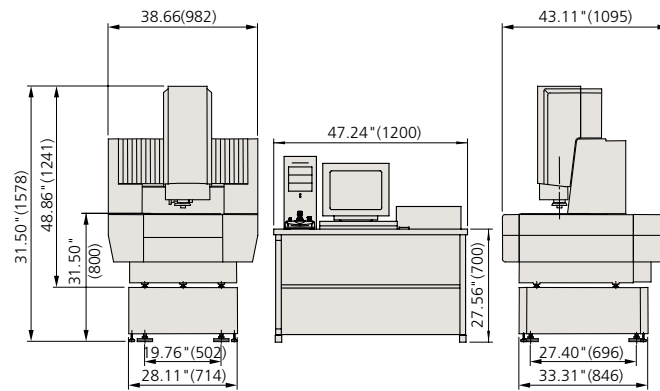
QV STREAM PLUS 606
QV STREAM 606



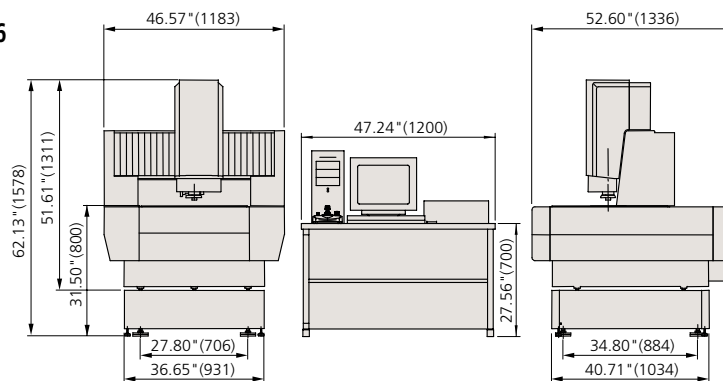
QV ACCEL STREAM PLUS and QV ACCEL STREAM

Unit: inch(mm)

QV ACCEL STREAM PLUS 404
QV ACCEL STREAM 404

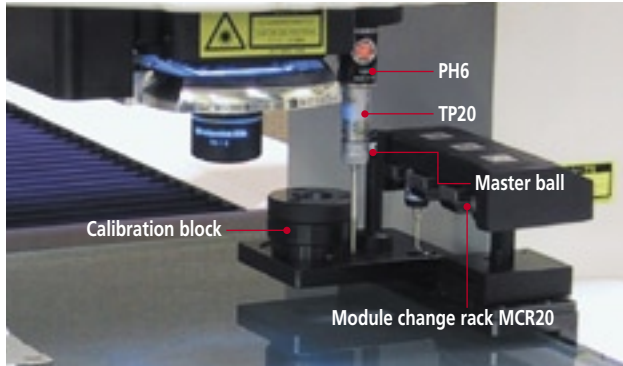


QV ACCEL STREAM PLUS 606
QV ACCEL STREAM 606



Optional Accessories

Touch Signal Probe Unit



Module Change Rack

The module change rack makes it easy to switch between vision-based and touch signal probe measurements during an automatic measurement cycle.

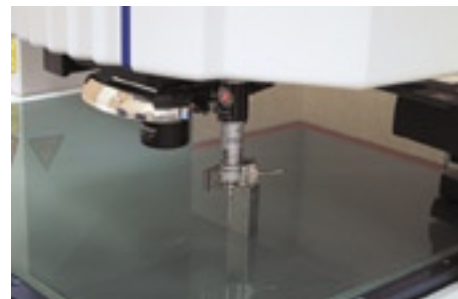


Non-contact and Contact Measurements with the Same System

Adding the optional QV Touch Signal Probe enables performance of contact measurement as well as non-contact vision measurement.

3D Workpiece Measurement

The touch signal probe enables 3D measurement of a workpiece which cannot be measured using image processing alone.



System Specifications after Installation of the Touch Signal Probe

Unit: inch(mm)

Model		QV STREAM PLUS 302 QV STREAM 302	QV STREAM PLUS 404 QV STREAM 404 QV ACCEL STREAM PLUS 404 QV ACCEL STREAM 404	QV STREAM PLUS 606 QV STREAM 606 QV ACCEL STREAM PLUS 606 QV ACCEL STREAM 606
Measuring range	Vision measurement	11.81"x7.87"x7.87" (300x200x200mm)	15.75"x15.75"x9.84" (400x400x250mm) 15.75"x15.75"x5.91" (400x400x150mm)*	23.62"x25.59"x9.84" (600x650x250mm) 23.62"x25.59"x5.91" (600x650x150mm)*
	Vision & touch probe common measuring range	5.28"x7.87"x7.87" (134x200x200mm)	13.15"x15.75"x9.84" (334x400x250mm) 13.15"x15.75"x5.91" (334x400x150mm)*	21.02"x25.59"x9.84" (534x650x250mm) 21.02"x25.59"x5.91" (534x650x150mm)*
Measuring accuracy (vision measurement)	E _{1XY}		(1.5+3L/1000) μm	
	E _{1Z}		(3.0+4L/1000) μm	
	E _{2XY}		(2.5+4L/1000) μm	
Measuring accuracy (touch signal probe measurement)	E _{1XY}		(1.8+3L/1000) μm	
	E _{1Z}		(1.8+3L/1000) μm	
Workpiece maximum height		7.87" (200mm)	9.84" (250mm) / 5.91" (150mm)*	

*QV ACCEL STREAM / STREAM PLUS

Laser Auto Focus (not available for Hybrid Type1 and 2)

The system can be equipped with the Laser Auto Focus unit that allows stable, high-speed height measurement during high-speed travel. This unit provides stable measurement results with minimum dependence on surface inclination since the double pinhole method is adopted in the detection system.



Objective	QV2.5x
Measurement principle	Double pinhole method
Laser spot diameter	3μm
Repeatability	σ=0.4μm



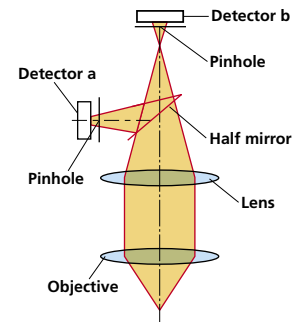
Example: Height of leads from a QFP package



SAFETY PRECAUTIONS — LASER BEAM

This system uses a low-power visible laser beam which corresponds to a CLASS 1 (visible light) of IEC 60825 for measurement. The CLASS 1 laser warning label as shown right is attached to the main unit.

CLASS 1 LASER PRODUCT
クラス1 レーザ製品



Options

Objective lenses

Unit: inch(mm)

Objective	Turret lens magnification	Monitor magnification ^{*4}	Field of view	Working distance
QV-1x	1x	32x	.25"x.19" (6.27x4.70)	1.34" (34)
	2x	64x	.12"x.09" (3.13x2.35)	
	6x	192x	.04"x.03" (1.04x0.78)	
QV-2.5x	1x	80x	.10"x.07" (2.50x1.88)	1.34" (34)
	2x	160x	.05"x.04" (1.25x0.94)	
	6x	480x	.02"x.01" (0.41x0.31)	
QV-5x	1x	160x	.05"x.04" (1.25x0.94)	1.32" (33.5)
	2x	320x	.02"x.02" (0.62x0.47)	
	6x	960x	.008"x.006" (0.20x0.15)	
QV-SL1x	1x	32x	.25"x.19" (6.27x4.70)	2.07" (52.5)
	2x	64x	.12"x.09" (3.13x2.35)	
	6x	192x	.04"x.03" (1.04x0.78)	
QV-SL2.5x	1x	80x	.10"x.07" (2.50x1.88)	2.36" (60)
	2x	160x	.05"x.04" (1.25x0.94)	
	6x	480x	.02"x.01" (0.41x0.31)	
QV-10x ^{*2}	1x	320x	.02"x.02" (0.627x0.470)	1.20" (30.5)
	2x	640x	.01"x.009" (0.313x0.235)	
	6x	1920x	.004"x.003" (0.104x0.078)	
QV-25x ^{*2, *3}	1x	800x	.01"x.007" (0.250x0.188)	.51" (13)
	2x	1600x	.005"x.04" (0.125x0.094)	
	6x	4800x	.002"x.01" (0.041x0.031)	

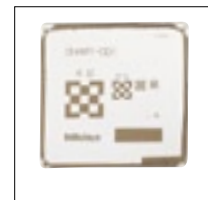
^{*1} The monitor magnification and field of view values are for the PRO machine.

^{*2} Depending on the workpiece the illumination may be insufficient at a turret lens magnification of 2x and 6x.

^{*3} The PRL illumination is restricted in its usable position.

^{*4} With 15" monitor.

Calibration chart



Temperature Compensation Function (Special Order)

The system can output a measurement result as a value converted at the standard temperature of 68°F(20°C) even if the ambient temperature is 73.4°F(23°C). Compensation calculations are performed by inputting the thermal expansion coefficient of the workpiece and using temperature sensors placed on the X, Y, and Z axes and the workpiece.

- Temperature compensation of the machine main unit
- Workpiece temperature compensation
- Setup function for a temperature compensation reference position

Calibration Plate

- Dedicated to HYBRID Type 1

02AND770

- Dedicated to HYBRID Type 2

02AND770 For QV-1X to QV-5X of objective options

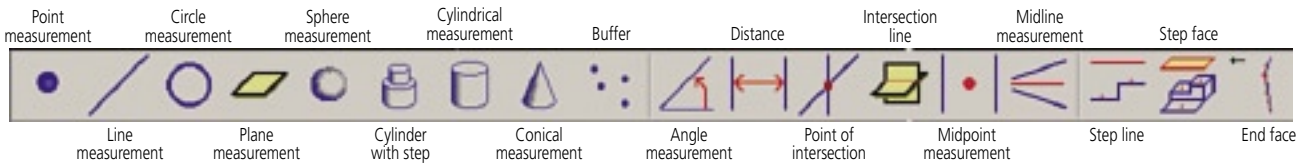
02AKQ550 For QV-10X or QV-25X of objective options

Powerful, Intuitive Software

QVPAK version 7.2

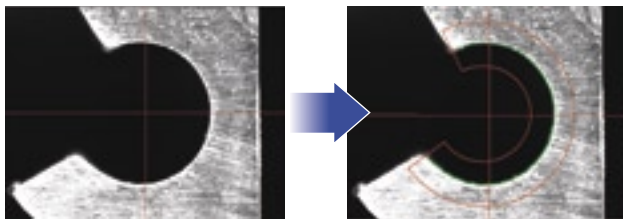


Example Calculation Functions



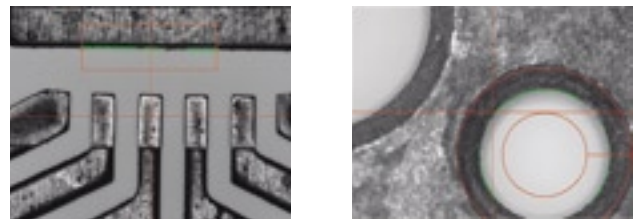
One-click Measuring Tool Set-up

The tool size, orientation, and threshold value of a measuring tool are automatically set with one click of the mouse.



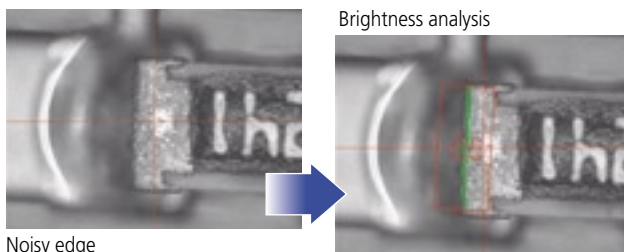
Removal of Abnormal Points

Abnormal points such as dust, burrs, and cracks are removed. The removal level can be set arbitrarily.



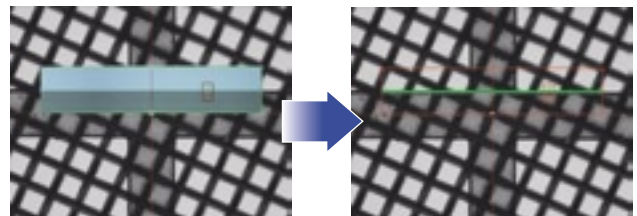
Enhanced Edge-Detection

Edge-detection has been enhanced enabling indistinct edges that exhibit only small brightness or texture changes between different surfaces to be more reliably detected.



Enhanced Filter Function

This function eliminates image noise to allow stable edge detection. Median, Averaging, Gaussian, and Morphology filters are available.



A preview function is provided to check the effect of these filters.

QV Smart Editor Function

This function displays a part program created by QVPAK in a tree structure using icons and titles. It makes it easy to edit programs for factors such as illumination conditions and edge detection conditions.

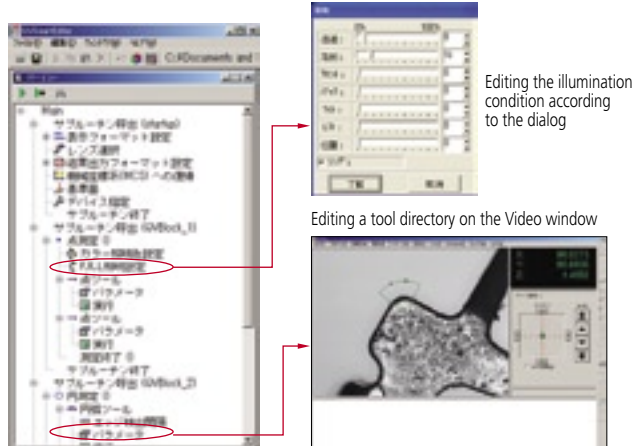
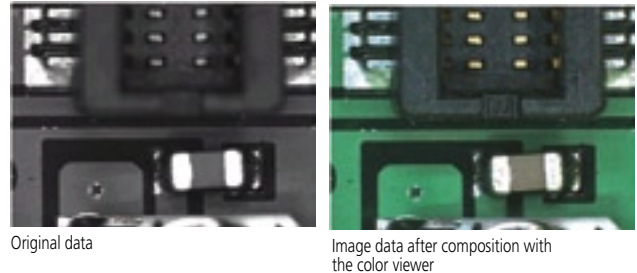


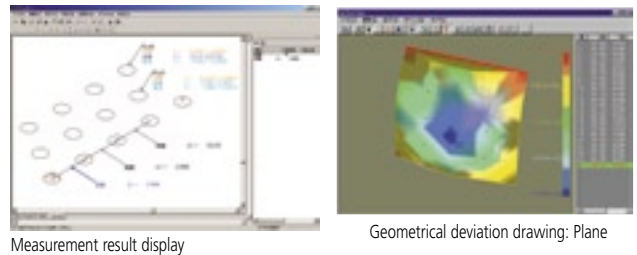
Image Composition and Color Viewer

This function takes multiple images representing different heights and composes them in a display showing them all in focus. It is also possible to create a pseudo color image with a B&W camera using the RGB color illumination.



QV Graphics

QVPAK is capable of 3D graphic display of measurement results, calculation between features (e.g. circle-to-circle distance calculation) from measured forms, and also drawing the geometrical deviation of a circle, line, and cylinder.



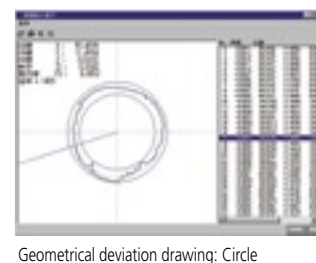
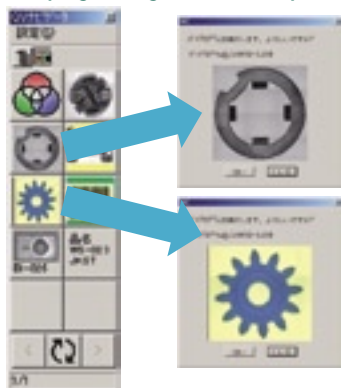
QV Navigator

This function provides a navigated display of calculation procedures between features and a coordinate system setup pattern. It allows you to customize even a complicated pattern at will. Also, a part program can be registered along with workpiece images, thus making repeat measurements easier.

User-macro creation function

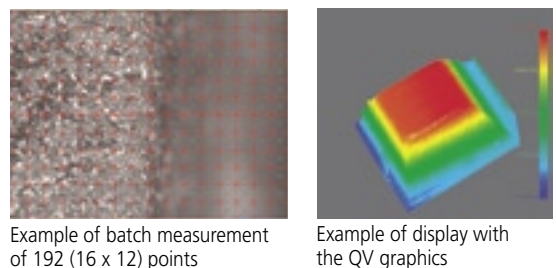


Part-program registration example



Multi-point autofocus

The Auto Focus tool (surface and pattern) can calculate heights at multiple points by dividing the tool into sub areas. The tool can also measure the maximum point, minimum point, and average height.

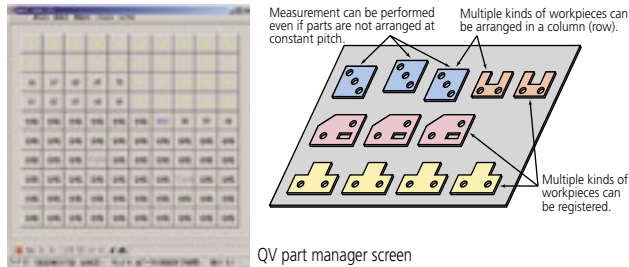


Optional Application Software

Automatic Measurement Management

QV Part Manager

QV Part Manager is the execution program management software for multiple workpieces arranged on the measurement stage.

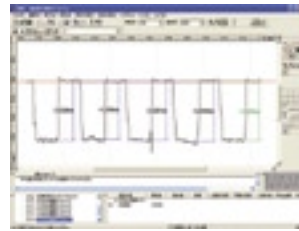


QV part manager screen

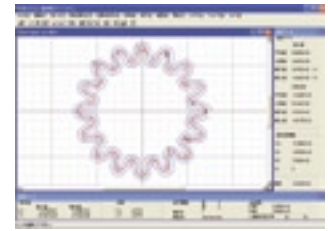
Form Evaluation and Analysis

FORMPAK-QV

This program performs tolerancing to nominal values and form analysis from the form data obtained with the QV Auto Trace tool and the laser probe.



Detailed form analysis screen

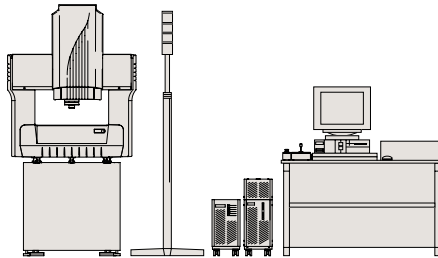


Contour tolerancing screen

External Control

QV Eio-PC

QVPAK can be controlled from an external PC via RS-232C. QV status can be output using an external I/O board.

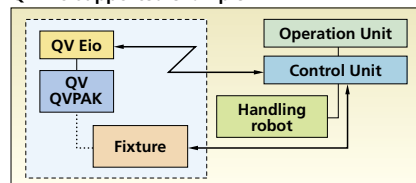


QV Eio-PC usage example (System using PATLITE)

QV Eio

External control can be implemented as the interface between a PC and QVPAK.

QV Eio supported example



QV-JMP™ Export

This software outputs QVPAK measurement results to JMP™ SPC software.



Inspection Report Creation

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

Measure Report-QV

Features

- This program, which is based on Microsoft Excel, can easily customize an inspection report.
- Data from multiple instruments such as calipers and micrometers can be retrieved in addition to Quick Vision data.



MeasurLink StatMeasure Plus



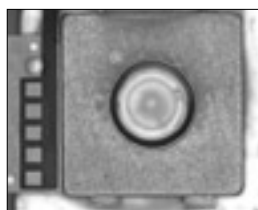
Various statistical calculations can be performed from measurement results. It is also possible to display control charts in real time.

for Hybrid Type1/2 only

Auto-scanning Route Generation

QV Trace Maker

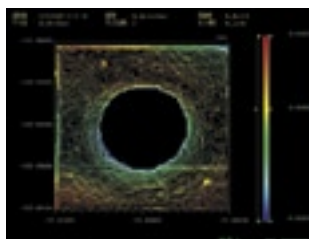
QV Trace Maker is a program that can automatically create a scanning route for the laser probe based on vision information acquired by Quick Vision. Various routes can be created even if the measuring area is outside the viewing field. In combination with MSHAPE-QV the 3D form evaluation of complicated contours can be performed with ease.



Target area image composition



Trace condition setup



MSHAPE-QV evaluation example

for Hybrid Type1/2 only

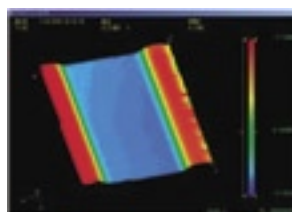
Contour Analysis

MSHAPE-QV

This is the form evaluation support system to perform curved form analysis from data acquired with the laser probe.

Main Functions

- | | |
|---------------|---|
| Display forms | 2D/3D contour lines
2D/3D unfiltered profile
Shadow graph |
| Form analysis | Curved plane analysis
Unfiltered profile analysis, etc. |



2D contour line display



3D display of the 2D contour line display

for Hybrid Type1/2 only

Surface Texture Analysis Software

FORMTRACEPAK-PRO

This is the form evaluation support system software to generate curved form analyses from data acquired with the laser probe.

Display Function

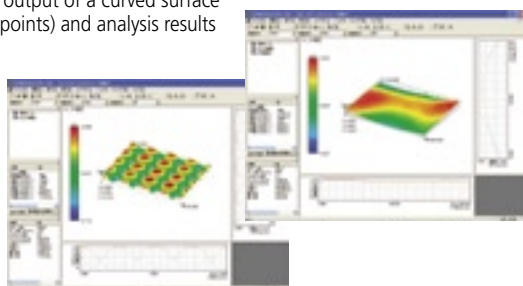
Painting, wire framing, shading, and shading contour

Analysis Function

Cutting surface, BAC, ADC, spectrum, probability distribution, peak height distribution, and slope enhancement

Others

2D form analysis by extracting a 2D section in an arbitrary direction
Original report printout after editing layouts
CSV format output of a curved surface
(a group of points) and analysis results



for Hybrid Type1/2 only

IC Package Evaluation Software

IC Package Measuring Program

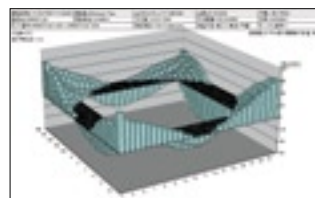
- BGA coplanarity measurement and ball height measurement
- 3D form measurement of package surface
- 2D cross-section measurement of package surface, etc.



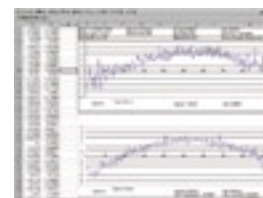
QV-Graph

Main Functions

- | | |
|---------------|---|
| Display forms | 3D bar graph
2D continuous cross-section graph |
|---------------|---|



3D bar graph



2D continuous cross-section graph



Specifications are subject to change without notice.

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