CATALOG No. E4125-359

Mitutoyo

Quick Vision®

CNC Vision Measuring System

Quick

There's a family of powerful visual measuring systems from Mitutoyo. The Quick Vision allows high-speed, highly accurate CNC visual measurement with the state-of-the-art mechanical, optoelectronics and image processing technologies.

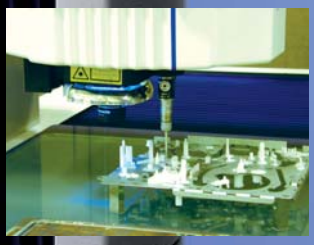
Quick Vision®

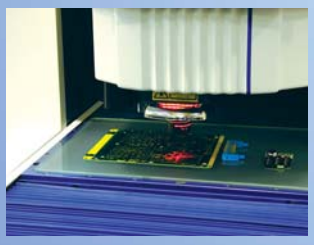
CNC Vision Measuring System

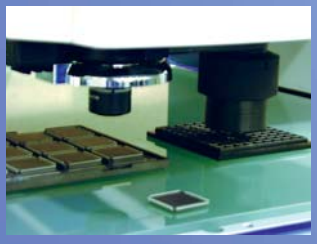
Quick Vision ELF

Quick Vision Hyper Apex

Quick Vision Hyper Apex HYBRID







Mitutoyo Quick Vision® Series moves your vision measurement and inspection productivity to higher levels with advanced features!

Example of Workpieces
Hybrid chassis, IC chip, lead frame, IC package, video cassette electric connector, etc.

What's different?

Variety of models available

Mitutoyo offers a great variety of models offering different optical/oblique illumination systems, degrees of accuracy and ranges of measurement. The Programmable Ring Light illumination and the Pattern Focusing function give you a focused edge even on a mirror-finish surface. Also, the Programmable Power Turret Tube Lens (or Programmable Power Zoom Lens) provides automatic zooming for a wider field of view and a highly detailed image. At last, you can choose the best visual measuring system for precision workpieces, without the need to compromise.

CHOICE 1: Measuring accuracy

Quick Vision ELF

Normal (E_{1XY}/E_{1Z}): (2.2+3L/1000)µm/ (4+5L/1000)µm

Quick Vision

Apex (E_{1XY}/E_{1Z}): ((1.5+3L/1000)µm/(3+4L/1000)µm
Hyper (E_{1XY}/E_{1Z}): (0.8+2L/1000)µm/ (3+2L/1000)µm

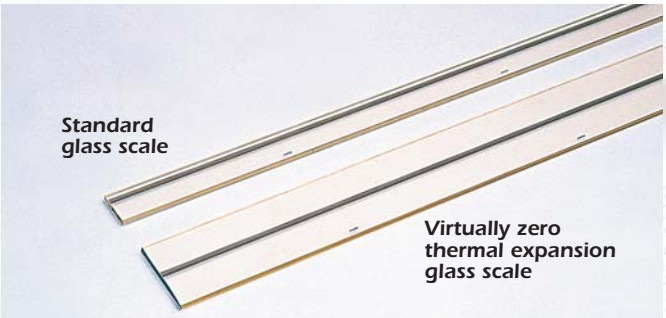
Quick Vision Hybrid

Apex (E_{1XY}/E_{1Z}): (1.5+3L/1000)µm/ (3+4L/1000)µm
using laser head (E_{1Z})*: (2.5+4L/1000)µm
Hyper (E_{1XY}/E_{1Z}): (0.8+2L/1000)µm/ (3+2L/1000)µm
using laser head (E_{1Z})*: (2.5+2L/1000)µm

	Quick Vision ELF	Quick Vision	Quick Vision Hybrid
Normal	4	4	4
Hyper	——	4	4

Linear glass scale with virtually zero thermal expansion coefficient

The Hyper Quick Vision is equipped with a new crystallized glass scale having a resolution of 0.02µm and linear expansion coefficient of 0.08x10-6/K. This virtually zero thermal expansion coefficient means the Hyper Quick Vision can minimize accuracy fluctuation resulting from thermal changes.



CHOICE 2: Oblique illumination system

R/F Most simplified configuration with halogen ring-fiber illumination

P/T With programmable power turret tube lens and **RGB LED*** ring light
*Quick Vision ELF: Halogen light

PRO With programmable power turret tube lens and programmable **RGB LED*** ring light
*Quick Vision ELF: White LED

Z/M With programmable zoom lens and halogen ring-fiber illumination

PRO-II With programmable power zoom lens and programmable halogen ring light

PRO-III With programmable power turret tube len, programmable halogen ring light and color CCD camera

	Quick Vision ELF	Quick Vision	Quick Vision Hybrid
R/F	4	——	——
P/T	4 (halogen)	4 (RBG LED)	——
PRO	4 (white LED)	4 (RBG LED)	4 (RBG LED)
Z/M	——	4* (halogen)	——
PRO-II	——	4* (halogen)	——
PRO-III	——	4* (halogen)	——

*Not available for Hyper models

CHOICE 3: Measuring range (XxYxZ)

Quick Vision ELF

200 200x200x100mm (8"x8"x4")
250 200x250x100mm (8"x10"x4")

Quick Vision/Quick Vision Hybrid

202 200x200x200mm (8"x8"x8")
302 300/176*x200x200mm (12"/7"*x8"x8")
404 400/276*x400x250mm (16"/11"*x16"x10")
606 600/476*x650x250mm (24"/19"*x26"x10")
*using laser head (Quick Vision Hybrid)

	Quick Vision ELF	Quick Vision	Quick Vision Hybrid
200	4	——	——
250	4	——	——
202	——	4	——
302	——	4	4
404	——	4	4
606	——	4	4

Optional Touch-Probe System

A retrofit touch-probe system allows you to integrate the touch-probe measurement function into the Quick Vision*. The measurement can be continued by automatically switching the detecting sensor from video camera to touch probe and vice versa in CNC mode. The stylus-module changeover system is also available to further expand the range of measurement application.
Mitutoyo offers a special master ball unit and offset ring to produce a seamless measurement between the video camera and touch probe in one coordinate system.
Note: Not available for Quick Vision Hybrid models

PH6 probe head with TP20 touch-signal probe

- **Master ball unit with calibration ring**
- **Stylus-module changer (MCR20 rack with 2 or 3 module ports)**

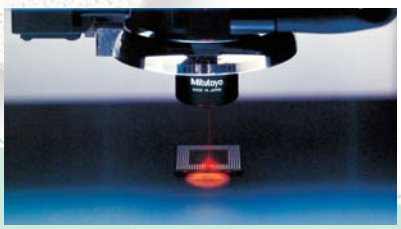
Accessories

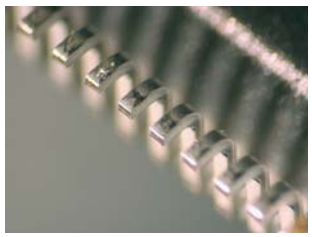
02ANT850: PH1 set for Quick Vison ELF
02ANT860: PH1 set for Quick Vison 202/302/404/606
02ANT830: PH6 set for Quick Vison ELF
02ANT840: PH6 set for Quick Vison 202/302/404/606
02ANL920: Calibration ring
02ANT790: Master ball unit for Quick Vision ELF
02ANT720: Master ball unit for Quick Vision 202
02ANT780: Master ball unit for Quick Vision 302/404/606

Laser-Probe System

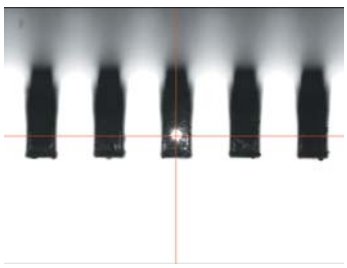
Laser auto-focus system (factory-set option for Quick Vision)

The laser auto-focus system, a built-in laser trigger probe can accelerate the throughput of Z-axis (height) measurement. Since the TTL visible laser beam is employed, you can see a point to be focused with a laser pointer for quick workpiece positioning.





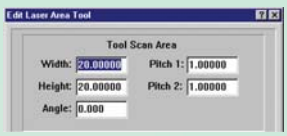
Height measurement of the terminals on the connector



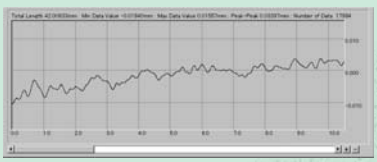
Laser scanning system (for Quick Vision Hybrid)

The scanning laser system for the Quick Vision Hybrid adds 3-D profiling capability. The laser indicator with 0.01µm resolution Laser Holoscale continuously scans the workpiece surface and records its displacement, enabling the evaluation of surface conditions, contours, peak heights, etc. The double pinhole detection method is adopted to avoid being affected by the color, reflection factor, etc. of surface conditions. Additionally, the small laser spot of 1.5µm in diameter ensures the accurate measurement of fine and intricate contours.

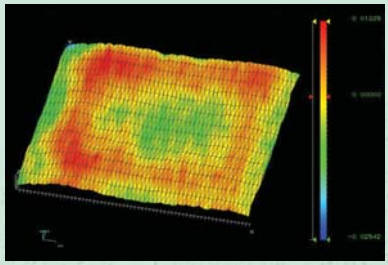
Tools for laser measurement



Setting of scan conditions



Scanning result (profile viewer)



Evaluation result (optional MSHAPE-QV)

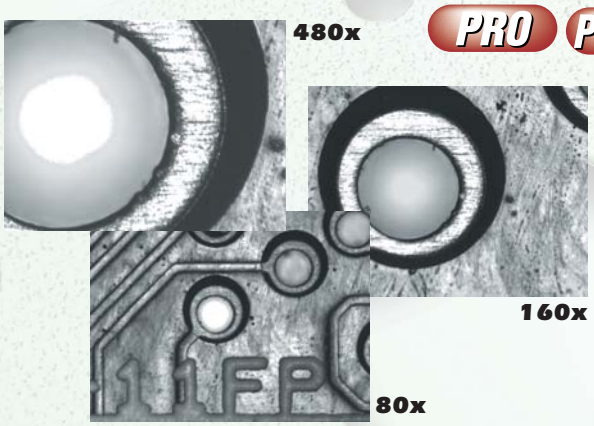
What's different?

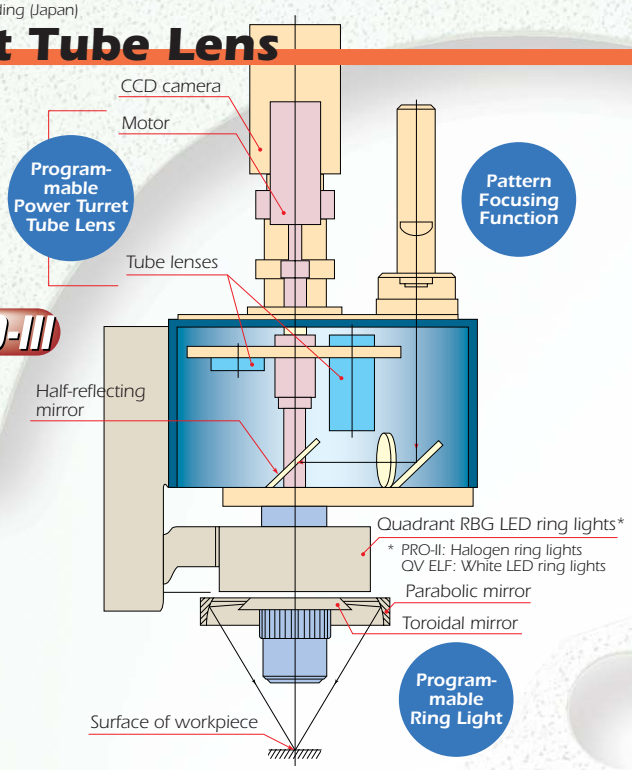
Patent pending (Japan)

Programmable Power Turret Tube Lens

Mitutoyo Programmable Power Turret Tube Lens provides three-step power zooming for wider field of view and highly detailed image by switching the internal tube lenses (1x, 2x and 6x). Every time the built-in tube lenses rotate, the pixel size is automatically calibrated and the light intensity and image aberration are also adjusted. Furthermore, the Programmable Power Turret Tube Lens is absolutely free from mechanical backlash.

P/T PRO PRO-III



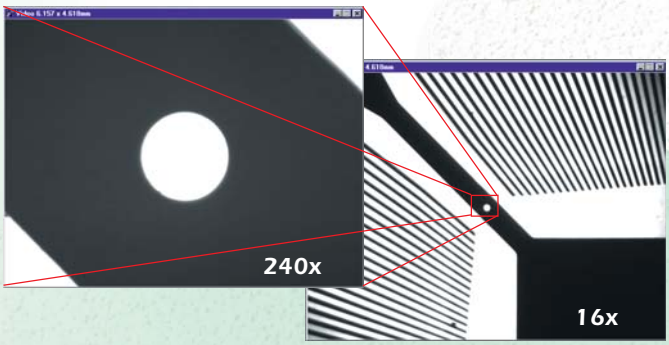


Patent pending (Japan)

Programmable Power Zoom Lens

- Mitutoyo's programmable power zoom lens allows continuous measurement in 15 magnification settings from 16x to 240x (zoom ratio 1:15) with 92mm (3.6") working distance.
- The zoom lens also features a built-in absolute scale. The lens position is continuously fed back to the controller to reproduce accurate magnification. This not only improves repeatability under different magnifications but also provides high-accuracy measurement, which rivals that of the turret system.

Z/M PRO-II

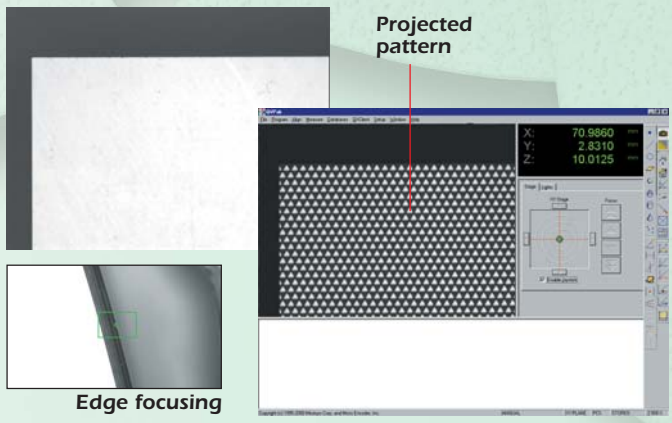


Patent pending (U.S.A.)

Pattern Focusing Function

In addition to standard Surface and Edge focusing functions, Quick Vision provides one other choice. The Pattern focusing function offers the best advantage in focusing on highly reflective/mirrored, low-contrast/black and translucent surfaces. Generally, visual measuring machines are weak and almost impossible to focus on these surfaces. This function generates and projects triangular patterns onto the surface to be focused, and the focusing is carried out by targeting the projected pattern.

R/F P/T PRO PRO-II Z/M PRO-III

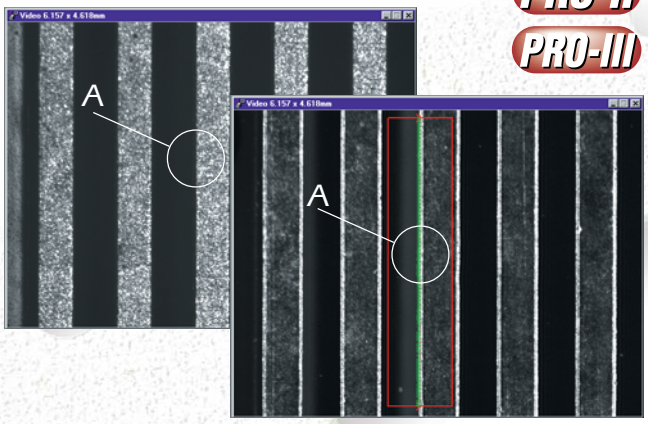


Programmable Ring Light (PRL)

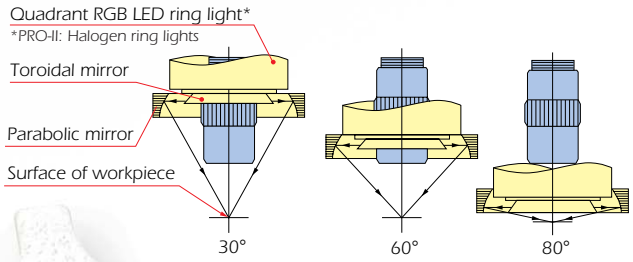
Mitutoyo unique 4-quadrant **RGB LED***, Programmable Ring Light (PRL) allows you to customize part illumination to maximize its effectiveness. Light intensity in each of four-quadrants is independently controlled. So, you can create the most effective light pattern for the part. A 30° - 80° angle of incidence lets you create the right amount of shadow for measuring. *PRO-II: Halogen, QV ELF: White LED

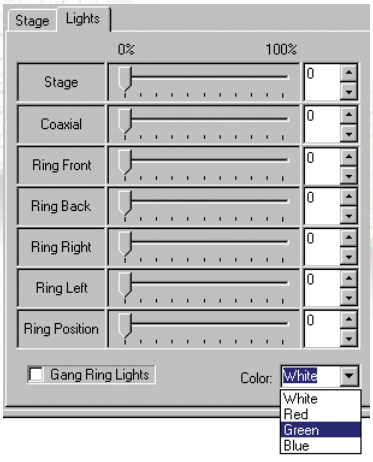
PRO
PRO-II
PRO-III

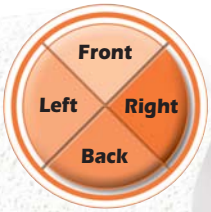
Under **ordinary surface illumination**
– The edge at "A" is not clear.



Under **PRL illumination**
– The edge at "A" can be readily seen.





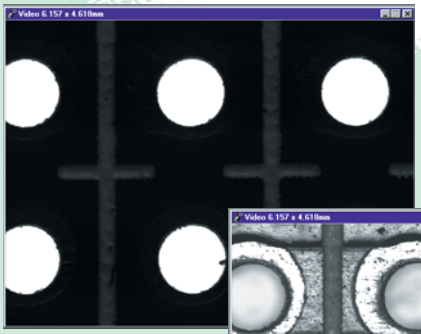


Basic Illuminations

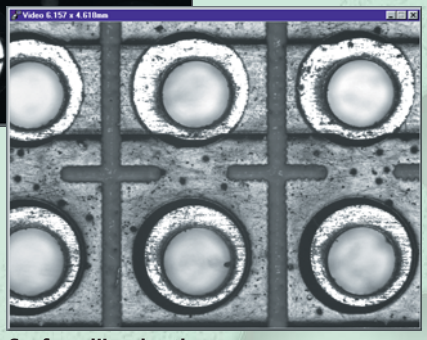
- **4-quadrant RGB LED* ring light**
  The 4-quadrant RGB LED ring light featured in the Quick Vision offers effective illumination of your workpiece from desired directions, preventing unwanted shadows. The RGB light color control clears the edge problem caused by the color of your workpiece.
  *Quick Vision ELF: Halogen ring light

R/F
P/T
Z/M

- **LED* coaxial light for surface Illumination**
  The surface illumination function, standard in all models, is used for the measurement and observation of surface patterns. *Quick Vision ELF: Halogen coaxial light
- **LED* stage light for contour Illumination**
  The contour illumination function, standard in all models, is for the measurement of frame shape, hole pitch and similar features. *Quick Vision ELF: Halogen stage light



Contour illumination



Surface illumination

What's different?

Objective & Calibration Glass Chart

Technical Data

- 17" on-monitor magnification and view field

Fixed magnification objectiv (R/F models)

	1x objective	2.5x objective	5x objective
1x tube lens	32x 6.27x4.7mm	80x 2.5x1.88mm	160x 1.25x0.94mm

Programmable power turret (P/T, PRO and PRO-III models)

	1x objective	2.5x objective	5x objective
1x tube lens	32x 6.27x4.7mm	80x 2.5x1.88mm	160x 1.25x0.94mm
2x tube lens	64x 3.13x2.35mm	160x 1.25x0.94mm	320x 0.62x0.47mm
6x tube lens	192x 1.04x0.78mm	480x 0.41x0.31mm	960x 0.2x0.15mm

Programmable power zoom lens (Z/M and PRO-II models)

	0.5x	0.6x	0.75x	0.85x
1x tube lens	16x 61.28x9.6mm	19x 10.7x8.0mm	24x 8.5x6.4mm	27x 7.5x5.6mm

	1x	1.25x	1.5x	2x
1x tube lens	32x 6.4x4.8mm	40x 5.1x3.8mm	48x 4.3x3.2mm	64x 3.2x2.4mm

	2.3x	3x	3.5x	4x
1x tube lens	74x 2.9x2.1mm	96x 2.1x1.6mm	112x 1.8x1.4mm	128x 1.6x1.2mm

	5x	6x	7.5x
1x tube lens	160x 1.3x1.0mm	192x 1.1x0.8mm	240x 0.85x0.64mm

Calibration glass chart

Coating process in hi-house lens production

- Working distance
  1x objective: 34mm (SL super-long type: 52.5mm)
  2x objective: 34mm (SL super-long type: 60mm)
  5x objective: 34mm
  Zoom lens: 92mm

Order No.

02ALA400: 1x objective
02ALA150: 1x objective (SL type)
02ALA410: 2.5x objective
02ALA170: 2.5x objective (SL type)
02ALA420: 5x objective
02AKN020: Calibration glass chart

Temperature Correction System - Factory-set option -

With real-time (automatic) temperature correction from both the scales and workpiece, the Quick Vision can adjust to a wide temperature range from 16°C (60.8°F) through 26°C (78.8°F), yielding accurate measurements even on the shop floor. This capability drastically expands the range of Quick Vision applications.
*Not available for Quick Vision ELF

Technical Data

Temperature range		16°C to 26°C (60.8°F to 78.8°F)
Temperature variation	by 1 hour	0.5K
	by 24 hours	5.0K
Temperature gradient	Vertical	1.0K/m
	Horizontal	1.0K/m

QV Index - horizontal rotary table -

The QV Index, optional horizontal rotary table rotates a part to different angles to bring hidden features into view. Moreover, all the collected data is processed in one coordinate system.

Multiple faces can now be measured easily with a single setup, especially for the measurement of connectors, plastic cases, hybrid chassis, etc. *Not available for Quick Vision ELF

Technical Data

- Max. workpiece diameter: 140mm (5.5")
- Max. workpiece load: 2kg (4.4 lbs.)
- Min. rotation angle: 0.1°
- Positioning accuracy: ±0.5°
- Max. rotation speed: 10rpm (variable)
- Dimensions: 122 x 150 x 105mm (head unit)

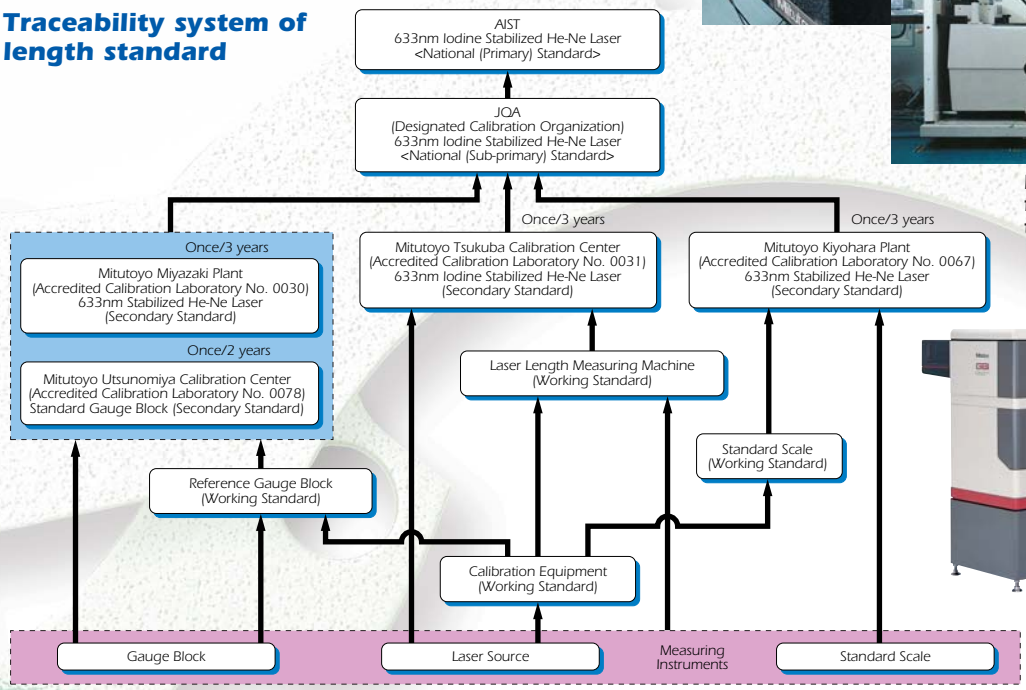
Traceability System

Mitutoyo, a manufacturer of precision measuring instruments, offers Quick Vision and a range of other measuring machines and instruments that are in full compliance with the national standards of various countries. They're traceable to the national standards through physical standards, which are calibrated via specified secondary standards owned by Mitutoyo. Our calibration laboratories are accredited to provide calibration services in three fields of length-measurement: length-measuring laser units, gauge blocks and linear scales.

Iodine Absorption Stabilized HE-Ne Laser as the standard for length measurement (at Tsukuba Calibration Center)

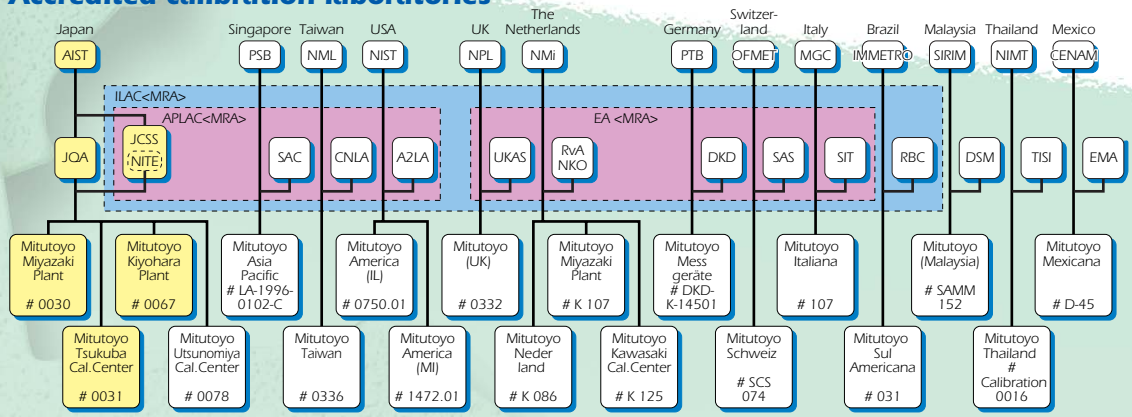
Interferometer as the standard for Linear Scale calibration (at the Kiyohara plant)

Traceability system of length standard



Interferometer as the standard for gauge block calibration (at the Miyazaki plant)

Accredited calibration laboratories



: Accreditation No.

AIST: National Institute of Advanced Industrial Science and Technology
JCSS: Japan Calibration Service System
JQA: Japan Quality Assurance Organization
NITE: National Institute of Technology and Evaluation
PSB: Singapore Productivity and Standards Board
SAC: Singapore Accreditation Council
NML: National Measurement Laboratory
CNLA: Chinese National Laboratory Accreditation
NIST: National Institute of Standards and Technology
A2LA: American Association for Laboratory Accreditation
NPL: National Physical Laboratory

UKAS: United Kingdom Accreditation Service
NMi: Nederlands Meetinstituut
NKO: Nederlandse Kalibratie Organisatie
PTB: Physikalisch-Technische Bundesanstalt
DKD: Deutscher Kalibrierdienst
OFMET: Swiss Federal Office of Metrology
SAS: Swiss Accreditation Service
IMGC: Istituto di Metrologia GUSTAVO COLONNETTI
SIT: Servizio di Taratura in Italia
INMETRO: Instituto Nacional de Metrologia Normalização e Qualidade Industrial

RBC: Rede Brasileira de Calibração
SIRIM: Standards and Industrial Research Institute of Malaysia
DSM: Department of Standards Malaysia
NIMT: National Institute of Metrology Thailand
TISI: Thailand Industrial Standard Institute
CENAM: Centro Nacional de Metrología
EMA: Entidad Mexican de Acreditación, a.c.
(ILAC): International Laboratory Accreditation Corperation
(APLAC): Asia-Pacific Laboratory Accreditation Corperation
(EA): European Accreditation Corperation
(MRA): Mutual Recognition Agreement

Variety of Quick Vision

Quick Vision ELF

Hight-price/performance ratio desktop models

	Quick Vision ELF
R/F	4
P/T	4
PRO	4

- **XYZ measuring range**
  QVE200: 200 x 200 x 100mm (8" x 8" x 4")
  QVE250: 200 x 250 x 100mm (10" x 10" x 4")
- **Measuring accuracy (E_{1XY})**
  (2.2+3L/1000)μm
- **Resolution**
  0.0001mm

Quick Vision ELF 200

Quick Vision Hyper Apex

Standard model of vision measurement

Quick Vision Hyper Apex HYBRID

Laser probe installed for scanning

	Quick Vision		Quick Vision Hybrid	
	Apex	Hyper	Apex	Hyper
P/T	4	4	——	——
PRO	4	4	4	4
Z/M	4	——	——	——
PRO-II	4	——	——	——
PRO-III	4	——	——	——

▪ XYZ measuring range

QV202: 200 x 200 x 200mm (8" x 8" x 8")
QV302: 300 x 200 x 200mm (12" x 8" x 8")
QVH302: 300 x 200 x 200mm (12" x 8" x 8")
176 x 200 x 200mm (7" x 8" x 8")*
*using laser head

▪ Measuring accuracy (E_{1XY})

Apex model: (1.5+3L/1000)μm
Hyper model: (0.8+2L/1000)μm

▪ Resolution

Apex model: 0.0001mm
Hyper model: 0.00002mm

Quick Vision Apex 302

Variety of Quick Vision

Quick Vision Hyper Apex

Standard model of vision measurement

Quick Vision Hyper Apex **HYBRID**

Laser probe installed for scanning

	Quick Vision		Quick Vision Hybrid	
	Apex	Hyper	Apex	Hyper
P/T	4	4	——	——
PRO	4	4	4	4
Z/M	4	——	——	——
PRO-II	4	——	——	——
PRO-III	4	——	——	——

▪ XYZ measuring range

QV404: 400 x 400 x 250mm (16" x 16" x 10")
QVH404: 400 x 400 x 250mm (16" x 16" x 10")
276 x 400 x 250mm (11" x 16" x 10")*
*using laser head

▪ Measuring accuracy (E_{1XY})

Apex model: (1.5+3L/1000)μm
Hyper model: (0.8+2L/1000)μm

▪ Resolution

Apex model: 0.0001mm
Hyper model: 0.00002mm

Quick Vision Apex 404

Quick Vision Hyper Apex

Standard model of vision measurement

Quick Vision Hyper Apex HYBRID

Laser probe installed for scanning

	Quick Vision		Quick Vision Hybrid	
	Apex	Hyper	Apex	Hyper
P/T	4	4	——	——
PRO	4	4	4	4
Z/M	4	——	——	——
PRO-II	4	——	——	——
PRO-III	4	——	——	——

▪ XYZ measuring range

QV606: 600 x 650 x 250mm (24" x 26" x 10")
QVH606: 600 x 650 x 250mm (24" x 26" x 10")
476 x 650 x 250mm (19" x 26" x 10")*
*using laser head

▪ Measuring accuracy (E_{1XY})

Apex model: (1.5+3L/1000)μm
Hyper model: (0.8+2L/1000)μm

▪ Resolution

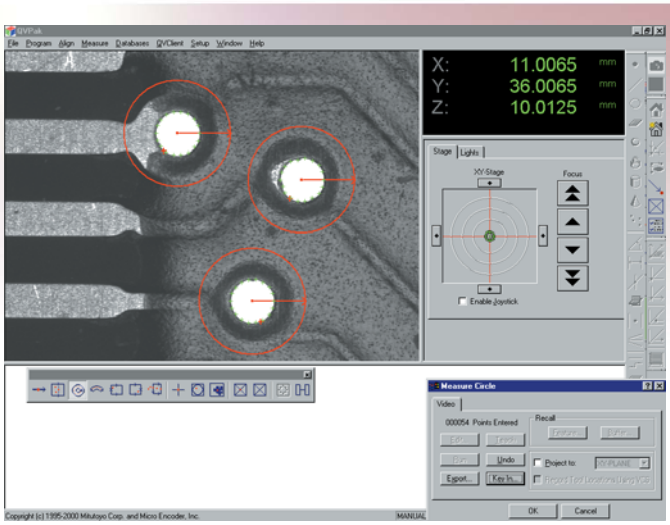
Apex model: 0.0001mm
Hyper model: 0.00002mm

Quick Vision Apex 606

QVPAK® Standard Software
Sophisticated GUI and Powerful Function

All new QVPAK software

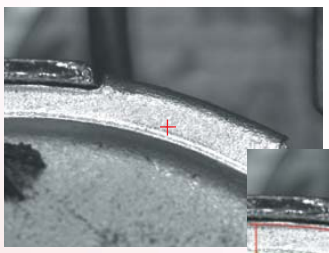
The QVPAK primary software component for all Quick Visions is making a step forward in function and operation. The QVPAK provides various new features, including refined GUI, extended 3-D data-processing function, complete support of touch-probe system with video/TP calibration, and two additional illumination tools. The QVPAK delivers reliability and operation, thereby reducing the uncertainty of measurement and enhancing productivity.



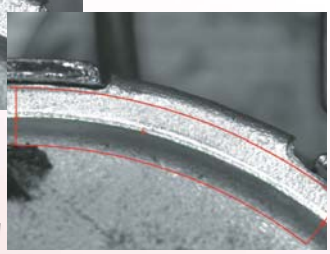
Single Mouse-Click Edge-Detection Tools

With the single click of a mouse button the Point, Circle, Line and Arc tools can be automatically set with the measuring conditions–including threshold value, tool size and direction, and contrast level–optimized for the workpiece. This allows very constant measurement with minimal differences between operators.

Select an edge-detection tool according to the workpiece edge.

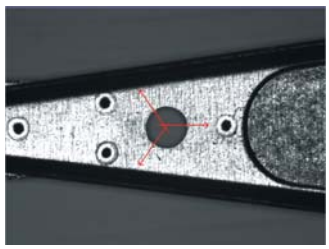


Bring the cursor near the target edge and click the mouse button.

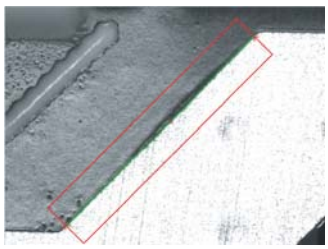


Arc Tool

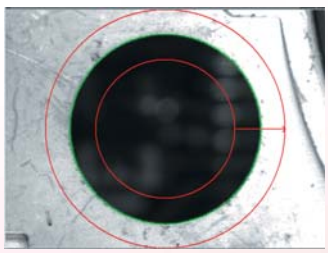
The tool is automatically located with the optimized tool size, direction and contrast level.



Point Tool

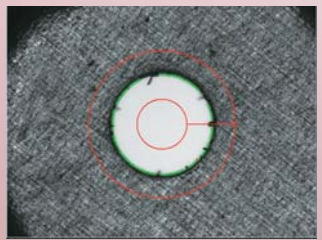


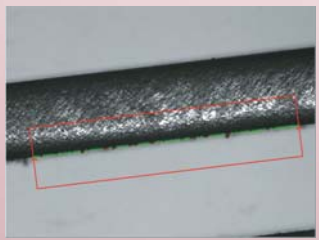
Box Tool



Elimination of Abnormal Data

This function eliminates any point data that is not consistent with the majority of measured data, thereby ensuring measurement accuracy for workpieces with burrs, nicks and other flaws.





Noise Filters

The QVPak offers a choice of three different noise filters according to the workpiece edge conditions. It filters out image noise for enhanced reliability in edge detection.

- Moving-average filter
- Gaussian filter
- Medium filter

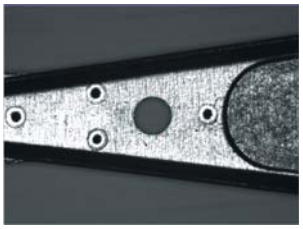
Tools for Effective Measurement

Maximum/Minimum Tool

Measures the maximum or minimum point in the selected area.

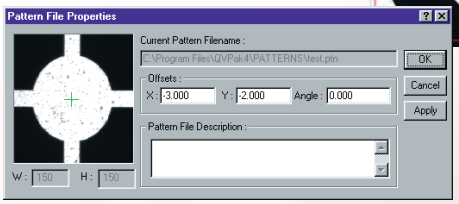
Manual Points Tool

Measures the point specified with a mouse click.



Pattern Search Tool

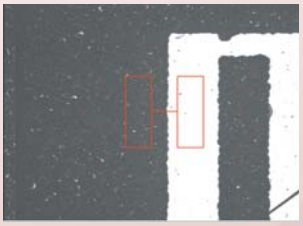
Searches for a predefined pattern within the video image. This function is suitable to detect an alignment mark.



Patent pending (U.S.A.)

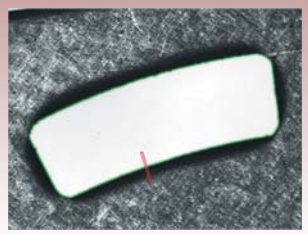
Dual Area Contrast Tool

Measures a contrast level between two different regions and adjusts the brightness of the light automatically to maximize the contrast level. This enhances the edge-detection capability.

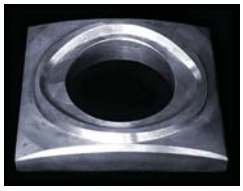


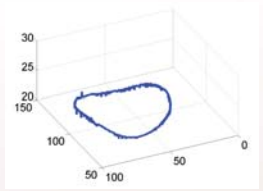
2-D/3-D AutoTrace Tool

By setting a starting point and tracing pitch, even with an unknown 3-D profile the QVPAK can perform automatic scanning. This is very effective for contour evaluation.

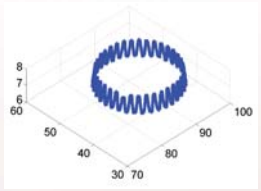


3-D auto-tracing: Metal parts



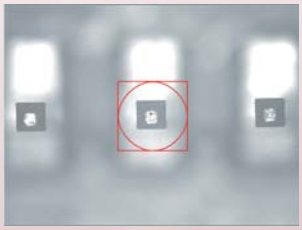


3-D auto-tracing: Gear



Centroid Tool

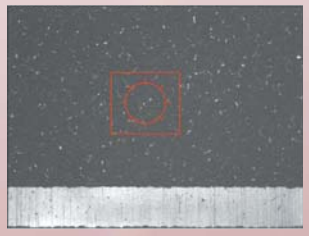
Detects the center of gravity. This is very useful for measuring the tip of a terminal.



Patent pending (U.S.A.)

Brightness Tool

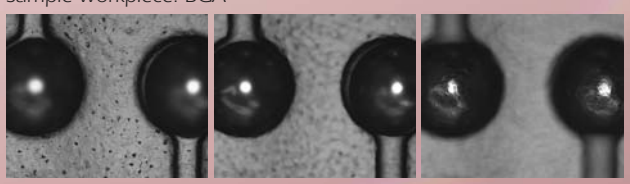
The Brightness Tool is available for the enhancement of measurement reproductivity and reliability. It is set to measure a reference brightness level in Learn mode for part programming. Then, at program execution the light source is adjusted so that the brightness level of the same region is equal to the reference. This minimizes the effect of the variance between the systems and changes in brightness over time.



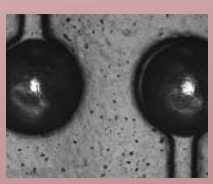
Extended Depth of Field Tool

Multi-plane focus with micro-step Z-axis mortion is a feature in this tool that acquires a stack of images. With the EDF tool, you can take multiple in-focus Z-stack images and combine the images into one in-focus composite image. The EDF tool will be useful for workpieces that cannot be completely in focus with one plane when observed through a monitor.

Sample workpiece: BGA



Z-stack images



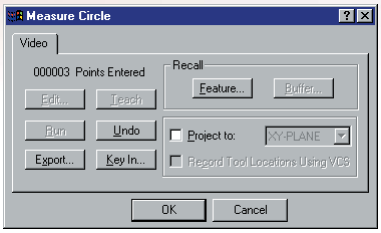
In-focus composite image

QVPAK® Standard Software

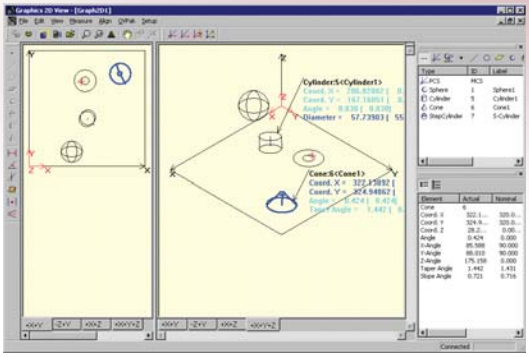
Sophisticated GUI and Powerful Function

Graphic Display

- The measurement results of part features are displayed with the 2-D/3-D graphics, so that the user can check measurement progress and results at a glance.
- The measured features in the Measurement Results pane can be selected with mouse to create a new feature, or measure dimensions such as the distance and angle.

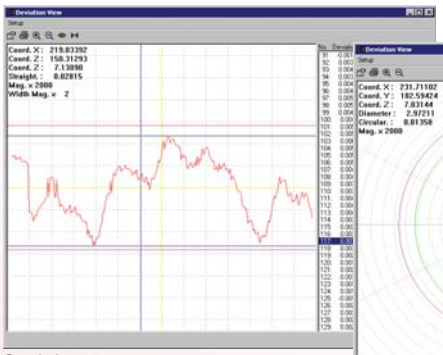


Showing with the 2-D and 3-D graphics.

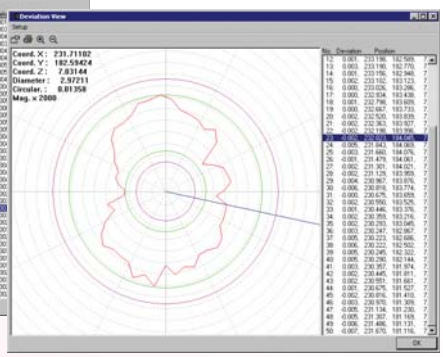


Graphic display of measured features

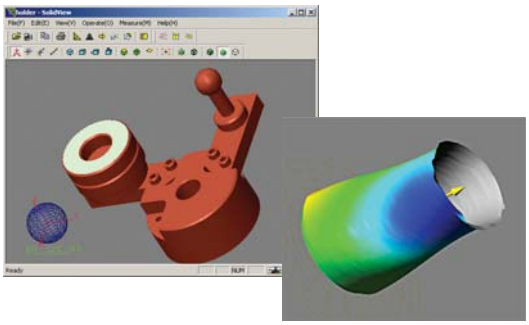
- The deviation of measured features from the nominal dimensions can be displayed in a larger scale. Thus, any geometrical deviation in straightness or roundness can be easily checked.



Straightness



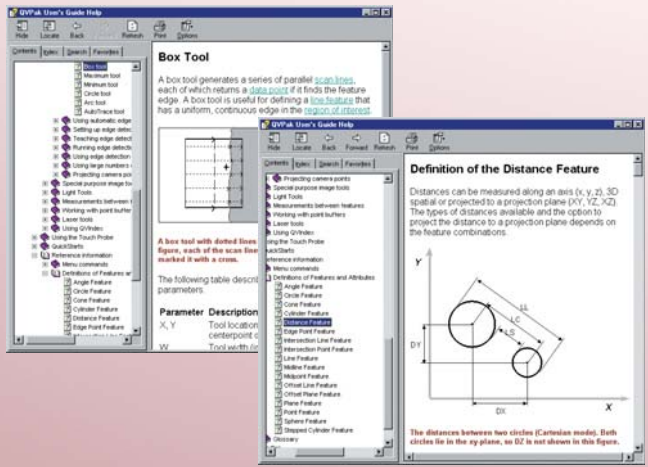
Roundness



3-D graphic indication using CAD data imported with the CAD Import software (option)

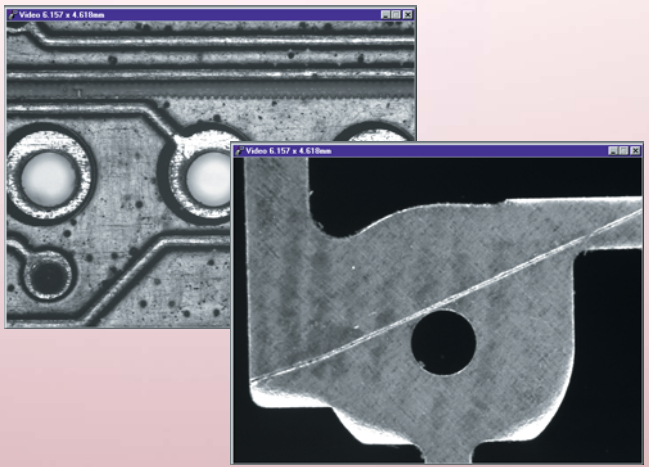
Online Help

The substantial online help quickly provides solutions to an operator's problem.



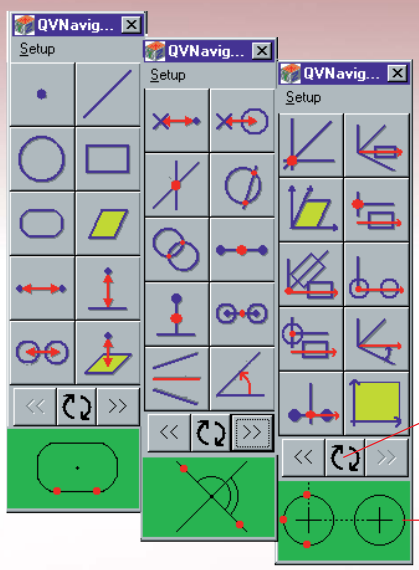
Video Image Capture

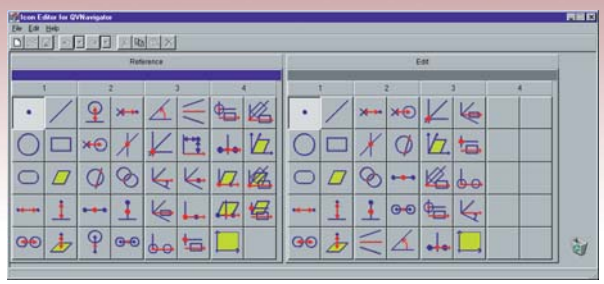
Images displayed on the monitor can be stored in the TIFF file format to be used for reporting.



QV Navigator — Macro Function

- Patterns of distance measurement, intersection measurement and coordinate system settings are accessible via icons for greater ease of operation.
- Measurement icons can be rearranged or replaced as desired (via the QV Navigation Icon Editor function).





Icon editor window

- The continuous-measurement function allows repeat measurements by automatically selecting the same series of commands.
- The measurement icons have been enlarged for greater visibility.

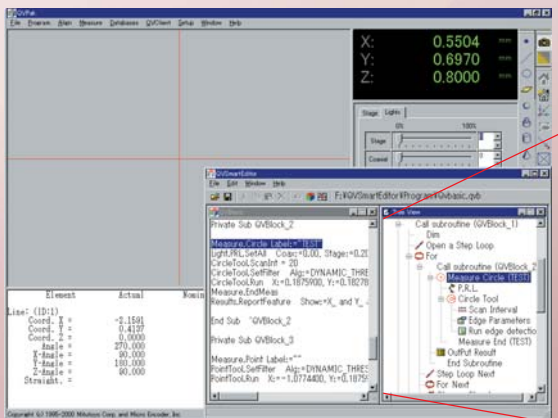
SmartEditor for QVBasic

The SmartEditor represents the part program (QVBasic scripting language) with icon and tree-chart structure to simplify program editing.

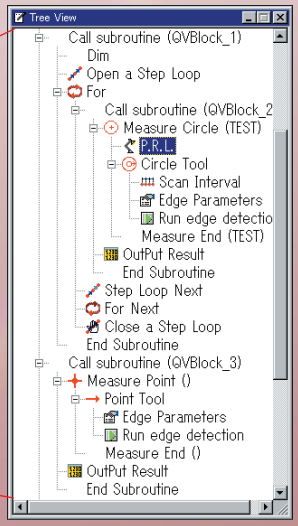
- The tree-chart indication lets you easily edit the QVBasic (high-level macro language).
- Representation with icon and tree-chart makes it easy to check the part program.
- Through the command represented in the SmartEditor window the corresponded script in the part program can be specified (highlighted). This allows you to quickly search the script of interest on the part program.
- When editing the part program, the dialogue box will be come up on the monitor with a simple click of the command to be edited.

Output tab

Light tab with PRL

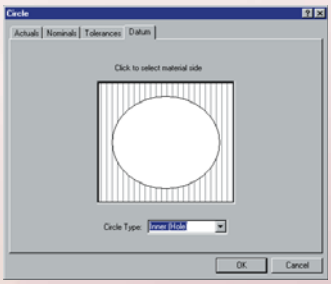


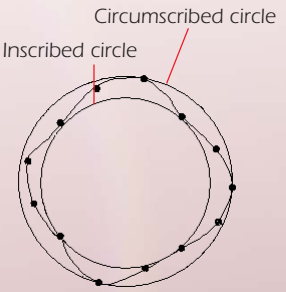
SmartEditor window (tree-chart structure)



Datum Fit

A datum line, circle or plane can be generated automatically.

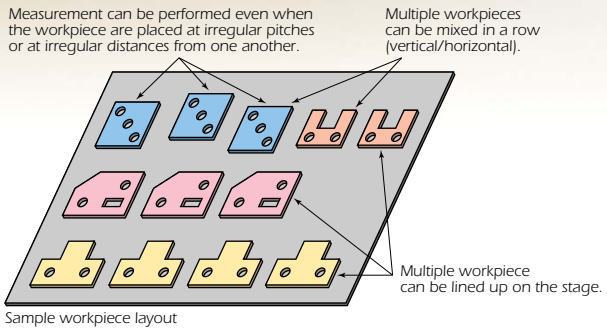




Optional Software
Extends the Function of Standard QVPAK

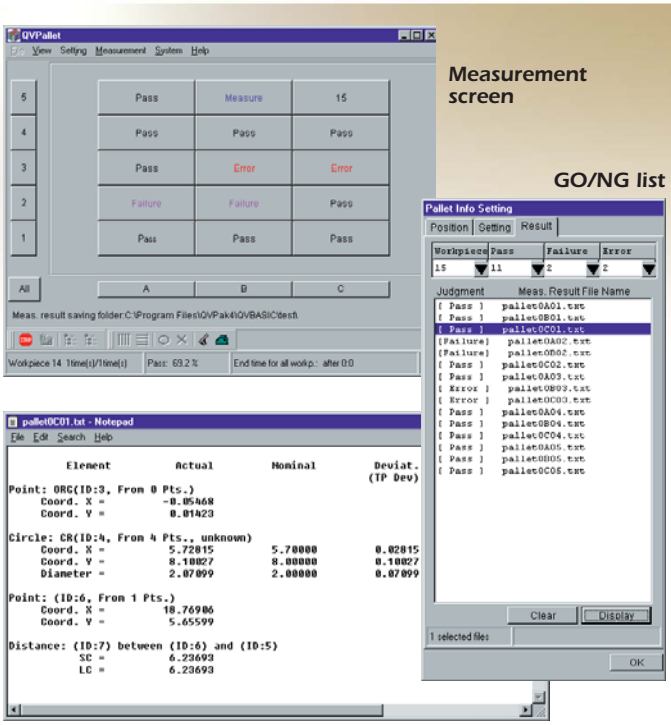
Part Program Management
QVPartManager

QVPartManager is an optional software package that allows multiple workpieces lined up on the stage to be measured at once using a part program.



Sample workpiece layout

- When an error occurs during a measurement, that portion is skipped and measurement continues.
- Workpieces that are out of tolerance can be measured again automatically.
- Even when the target workpieces include different types, they can be measured all at once by specifying the part programs corresponding to the respective types.



Measurement screen

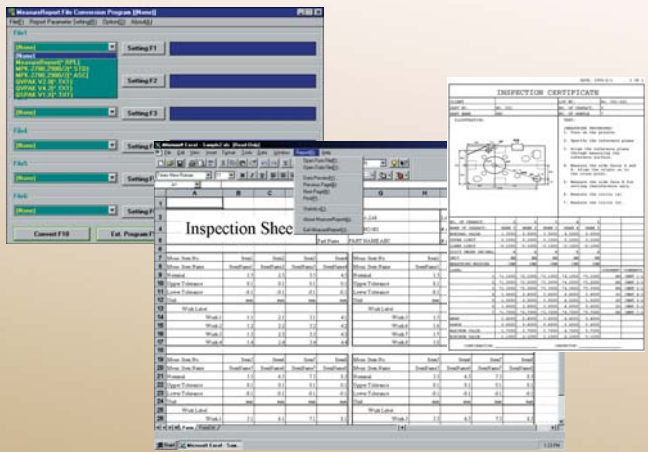
GO/NG list

Individual result display

Inspection Report Generation
MeasureReport/E

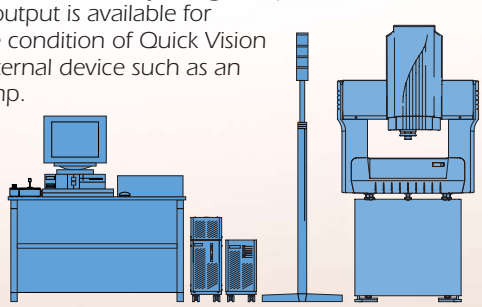
MeasureReport/E is a Microsoft Excel® V5.0-based inspection report creation software that's capable of formatting the measured data from Quick Vision into an inspection report that can be automatically printed out. Statistical calculation, GO/NG assessment and printing out can be dealt with macro commands. Thus, the time and cost involved in creating an inspection report can be reduced dramatically over conventional methods. Furthermore, the layout of inspection report forms can be arranged as required with graphical/image paste functions.

Note: MeasureReport/E does not include Microsoft Excel V5.0. It needs to be provided by the user.

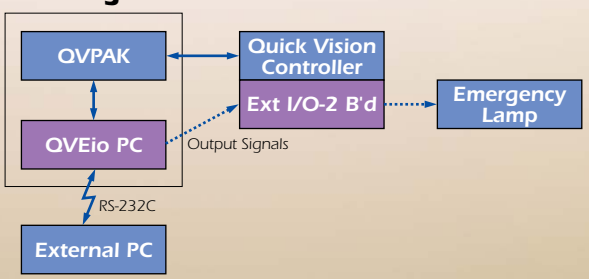


External Machine Control
QVEio, QVEio PC

QVEio provides easy control of Quick Vision through an external device such as a sequencer, enabling automatic in-line measurements. In the same way, QVEio PC provides external control through a personal computer equipped with an RS-232C interface. In addition, by using an optional I/O board, analog signal output is available for monitoring the condition of Quick Vision through an external device such as an emergency lamp.



System diagram



Laser Probe Scanning Pass Generation

QVTraceMaker

QVTraceMaker generates a scanning pass for the laser probe (Quick Vision Hybrid) by capturing a workpiece image.

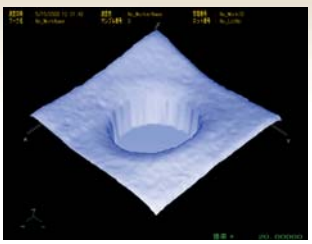
Workpiece image capture

Scanning pass generation for the laser probe

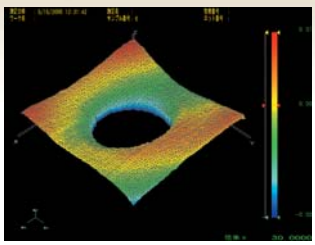
3-D form-evaluation program

MSHAPE-QV

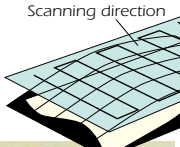
The MSHAPE-QV visually expresses surface contour based on the coordinate data acquired by the laser probe (Quick Vision Hybrid) and analyzes curved profiles. Contour lines, fill areas, etc. can be displayed.

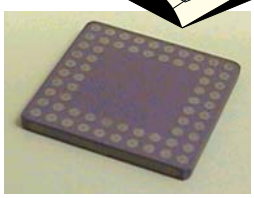


3-D topography (shaded)

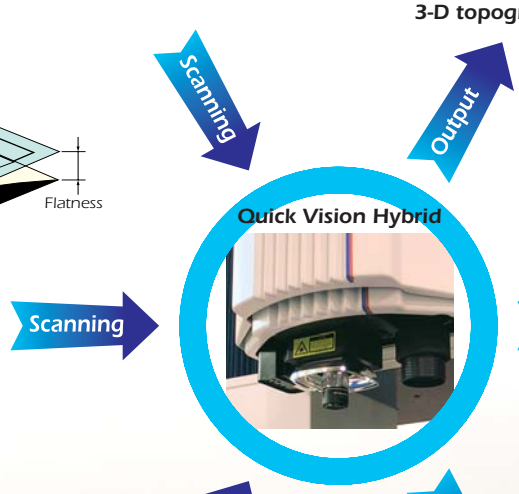


3-D topography (area filled)

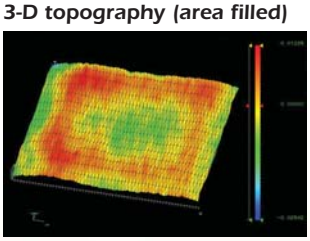


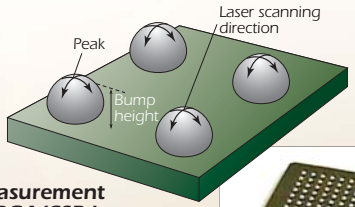


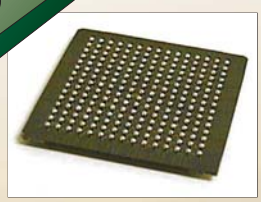
Measurement of flatness and runout



3-D topography (area filled)

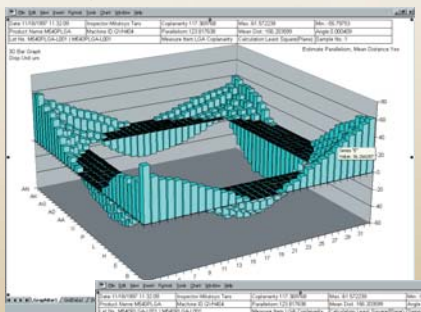


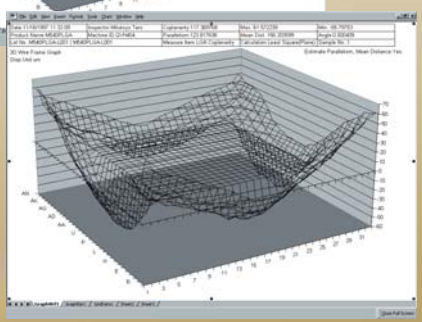




Measurement of BGA/CSP bump heights and coplanarities

3-D bar graph





3-D wire frame

3-D graph generation program

QV-GRAPH

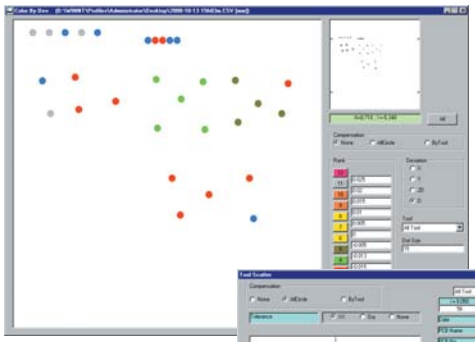
QV-GRAPH uses the graphing functions of MS-Excel® as a basis for the three-dimensional graphic representation of coordinate data obtained by the laser probe (Quick Vision Hybrid). In addition to providing three-dimensional representations of bar graphs, contour lines and wire frames, the program enables the verification of numerical data on the MS-Excel® worksheet.

Optional Software
Extends the Function of Standard QVPAK

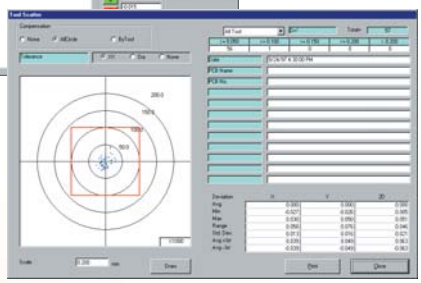
Off-Line Part Programming with CAD/NC Data
PAGPAK

PAGPAK automatically generates a part program based on 2D CAD data (in IGES, DXF or GERBER format) or NC processing data, for measuring discontinuous through-holes in printed circuit boards.

- The Repeat function is available for measuring continuous and identical through-holes.
- The measured results are displayed in various graphic formats, including color-coded GO/NG judgment result, error-tendency display and distribution chart, allowing the at-a-glance verification of large amounts of data. They can be formatted into an inspection report with the Report function.
- The use of this program is not limited to printed circuit boards and through-holes. In fact, it's applicable to any workpiece for which CAD data or NC processing data is available.



Graphic indication of measurement result

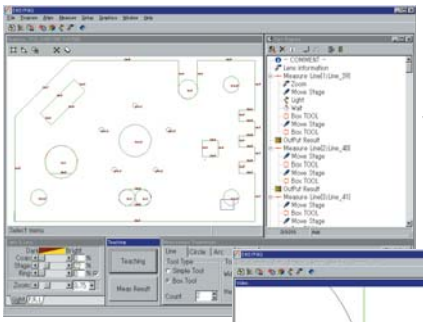


Distribution chart of measurement result

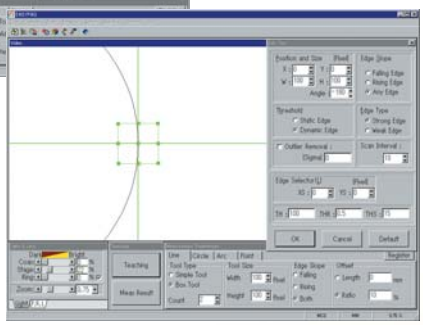
Off-Line Part Programming with 2-D CAD Data
EASYPAG

EASYPAG allows off-line part programming for QVPak by using a two-dimensional CAD data (in IGES or DXF format).

- Features to be measured can be specified by dragging or clicking a mouse on the imported CAD drawing.
- The coordinates system and calculation elements can be set up on the EASYPAG
- The measured results are displayed on the QVPak graphics window and calculation elements can be superimposed directly on the graphics window.
- The part program generated can be simply edited by using the QVSmartEditor.
- Each measurement tool can be set on the imported CAD drawing.



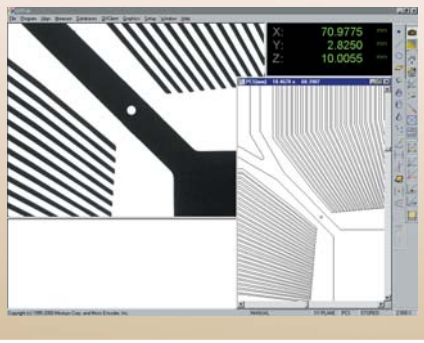
Editing the part program (tool setup) with QVSmartEditor.



CAD Data Transfer Program
CAD Import

CAD Import allows data to be imported from the CAD system. The workpiece CAD data in IGES or DXF format can be imported into the QVPak and displayed on the graphic window. This ensures dramatic time reduction in part programming and joystick operation.

- The tolerance judgment is readily available using nominal values from CAD data.
- The XY table can be quickly moved to a desired position specified via the drawing on the graphic window.
- Dimensional calculations between elements can be performed in the graphic window.

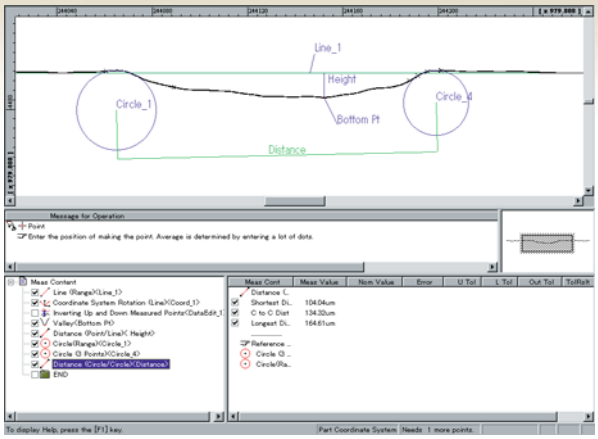


CAD data imported

2-D data-processing program

FORMPAK-QV

FORMPAK-QV performs two-dimensional contour analysis based on measurement data collected by Quick Vision, comparing that data with nominal values.



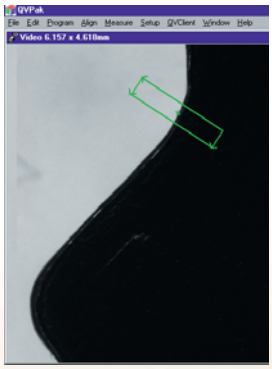
Contour tolerancing

- Nominal value generation through the specification of function (line, circle, aspheric surface, etc.), CAD input (IGES/DXF), or conversion of measured data
- Tolerancing by transferring basic coordinate system, setting tolerance direction (normal, X-direction, Y-direction), or best-fit function

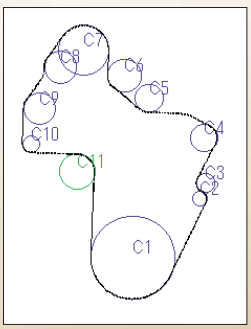
Data analysis

- Points: Peak point, contact point, base of perpendicular line, intersection, midpoint (between elements or measured data).
- Lines: Line, tangential line, perpendicular line, parallel line, center line.
- Circles: Circle (multiple points, range, center and radius), circumference/inner circumference.
- Difference in coordinates, position determination
- Distance, dimensions of groove, step, pitch, angle
- Statistical calculations

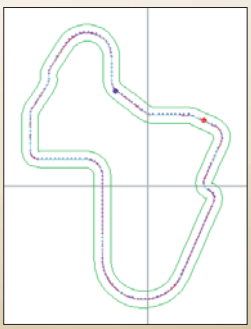
- The automatic scanning tool can automatically follow even an edge located outside the field of view.



Measurement (automatic scanning)

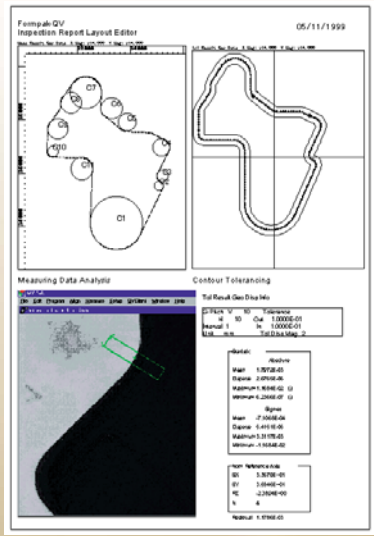


Analysis



Tolerancing

- FORMPAK-QV generates inspection reports along with the analysis and sample comparison of measured data and nominal values.



Inspection report editing window

Technical Data

Specifications: Quick Vision ELF

Model		QVE200	QVE250
Measuring range	X-axis	200mm (8")	200mm (8")
	Y-axis	200mm (8")	250mm (10")
	Z-axis	100mm (4")	100mm (4")
Resolution		0.0001mm	
Length standard		Linear Scale AT111	
Measuring accuracy (at 20°C)		E_{1XY}: (2.2+3L/1000)µm, E_{1Z}: (4+5L/1000)µm	
Max. drive speed		100mm/s	
Tube lens	P/T, PRO	1x/2x/6x (programmable power turret)	
	R/F	1x (fixed magnification)	
Objectives	P/T, PRO	2.5x (1x, 5x: optional)	
	R/F	2.5x (1x, 5x: optional)	
Magnification on 17" monitor		Refer to Page 8.	
Sensor unit		High-resolution B&W CCD camera	
Illumination system	Surface	Coaxial light and fiber-optic ring light (PRO: with PRL system/4-quadrant LED)	
	Contour	Stage light	
Table glass size		269x261mm (10.59"x10.27")	269x311mm (10.59"x12.24")
Workpiece load		10kg (22 lbs.) max.	
Power supply		100-240VAC±10%, 50/60Hz	
Power consumption		600W max.	

Specifications: Quick Vision 202

Model		QV202
Measuring range	X-axis	200mm (8")
	Y-axis	200mm (8")
	Z-axis	200mm (8")
Resolution	Apex	0.0001mm
	Hyper	0.00002mm
Length standard		Reflective linear encoder
Measuring (at 20°C)	Apex	E_{1XY}: (1.5+3L/1000)µm, E_{1Z}: (3+4L/1000)µm E_{2XY}: (2.5+4L/1000)µm
	Hyper	E_{1XY}: (0.8+2L/1000)µm, E_{1Z}: (3+2L/1000)µm E_{2XY}: (1.4+3L/1000)µm
Max.	Apex	250mm/s
	Hyper	200mm/s
Tube lens	P/T, PRO/-III	1x/2x/6x (programmable power turret)
	Z/M, PRO-II	0.5x to 7x (15-step power zooming)
Objectives	P/T, PRO/-III	2.5x (1x, 5x: optional)
	Z/M, PRO-II	———
Magnification on 17" monitor		Refer to Page 8.
Sensor unit		High-resolution B&W CCD camera*
Illumination system	Surface	Coaxial and 4-quadrant light (RGB LED) (PRO and PRO-II: with PRL system)
	Contour	Stage light (LED)
Table glass size		329x271mm (12.95"x10.66")
Workpiece	Apex	15kg (33 lbs.) max.
	Hyper	10kg (22 lbs.) max.
Power supply		100-240VAC±10%, 50/60Hz
Power consumption		2000W max.

*PRO-III: Color CCD camera

Specifications: Quick Vision/Quick Vision Hybrid 302/404/606

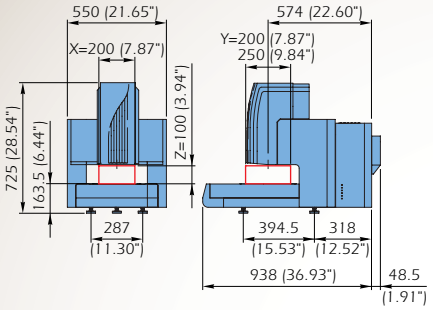
Model		QV302/QVH302	QV404/QVH404	QV606/QVH606
Measuring range	X-axis	300mm (12")/176mm (7")*	400mm (16")/276mm (11")*	600mm (24")/476mm (19")*
	Y-axis	200mm (8")	400mm (16")	650mm (26")
	Z-axis	200mm (8")	250mm (10")	250mm (10")
Resolution	Apex	0.0001mm		
	Hyper	0.00002mm		
Length standard		Reflective linear encoder		
Measuring accuracy (at 20°C)	Apex	E_{1XY}: (1.5+3L/1000)µm, E_{1Z}: (3+4L/1000)µm, E_{2XY}: (2.5+4L/1000)µm		
	Hyper	E_{1XY}: (0.8+2L/1000)µm, E_{1Z}: (3+2L/1000)µm, E_{2XY}: (1.4+3L/1000)µm		
Max. drive speed	Apex	250mm/s		
	Hyper	200mm/s		
Tube lens	P/T, PRO/-III	1x/2x/6x (programmable power turret)		
	Z/M, PRO-II	0.5x to 7x (15-step power zooming)		
Objectives	P/T, PRO/-III	2.5x (1x, 5x: optional)		
	Z/M, PRO-II	———		
Magnification on 17" monitor		Refer to Page 8.		
Sensor unit		High-resolution B&W CCD camera**, Laser probe with 1.5µm laser spot (Quick Vision Hybrid)		
Illumination system	Surface	LED coaxial light and 4-quadrant RGB LED* ring light (Z/M and PRO-II models: halogen ring light)		
	Contour	LED stage light		
Table glass size		399x271mm (15.70"x10.66")	493x551mm (19.40"x21.69")	697x758mm (27.44"x29.84")
Workpiece load	Apex	20kg (44 lbs.) max.	40kg (88 lbs.)	50kg (110 lbs.)
	Hyper	15kg (33 lbs.) max.	30kg (66 lbs.)	40kg (88 lbs.)
Power supply		100-240VAC±10%, 50/60Hz		
Power consumption		2000W max.		

*using laser head (Quick Vision Hybrid)
**PRO-III: Color CCD camera

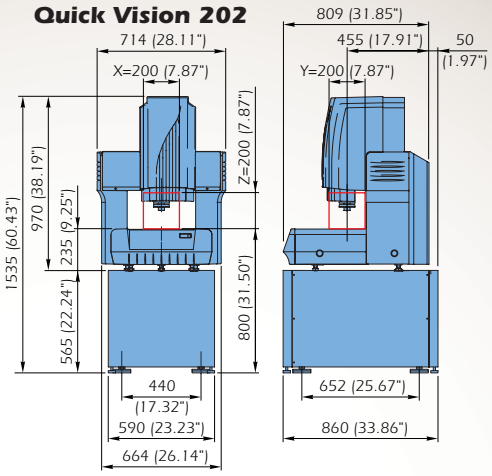
Dimensions

Unit: mm (inch)

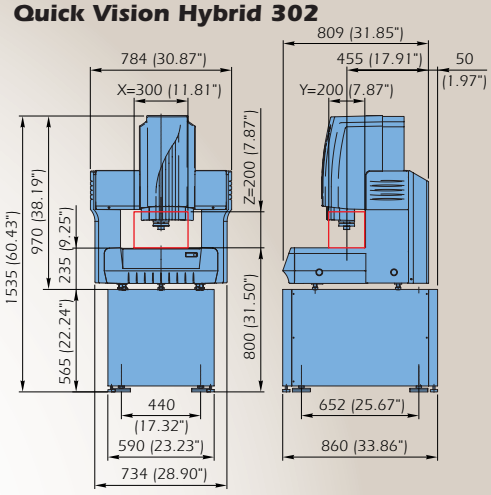
Quick Vision ELF 200/250



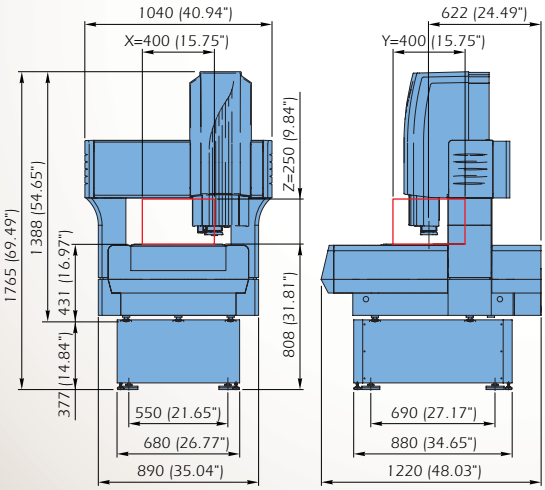
Quick Vision 202



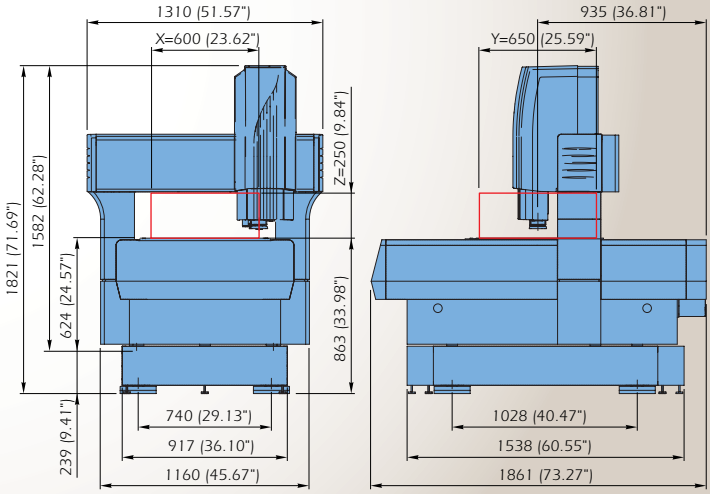
Quick Vision 302
Quick Vision Hybrid 302



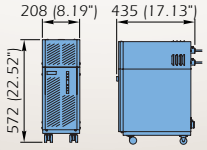
Quick Vision 404
Quick Vision Hybrid 404



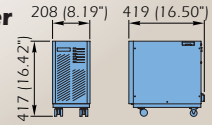
Quick Vision 606
Quick Vision Hybrid 606



PRL Controller



QV Controller



Optional Accessories

Objectives/Calibration chart

02ALA400: 1x objective
02ALA150: 1x objective (SL type*)
02ALA410: 2.5x objective
02ALA170: 2.5x objective (SL type*)
02ALA420: 5x objective
02AKN020: Calibration glass chart
*Super-long working distance type

Worktable/Machine stands

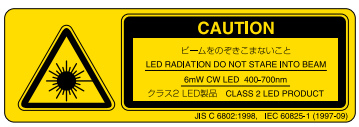
960945: Worktable for Quick Vision ELF
02ANS640: Machine stand for Quick Vision 202/302, Quick Vision Hybrid 202/302
02ANT410: Machine stand for Quick Vision 404, Quick Vision Hybrid 404
02ANT130: Machine stand for Quick Vision 606 Quick Vision Hybrid 606

Touch-probe system*

02ANT850: PH1 set** for Quick Vison ELF
02ANT860: PH1 set** for Quick Vison 202/302/404/606
02ANT830: PH6 set** for Quick Vison ELF
02ANT840: PH6 set** for Quick Vison 202/302/404/606
02ANL920: Calibration ring
02ANT790: Master ball unit for Quick Vision ELF
02ANT780: Master ball unit for Quick Vision 202
02ANT720: Master ball unit for Quick Vision 302/404/606
* Not available for Quick Vision Hybrid models
** TP20 and TP200 touch-signal probe and MCR20 stylus module rack are available.

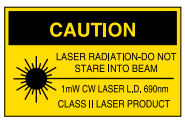
LED safety precaution

Mitutoyo Quick Vision uses a low-power visible laser for measurement. The visible laser is a CLASS 2 IEC 60825-1 device. Warning and explanation labels, as shown right, are attached to the Quick Vision as is appropriate.



Laser safety precaution

The optional laser auto-focus system uses a low-power visible laser for vmeasurement. The visible laser is a CLASS 2 IEC 60825-1 device. Warning and explanation labels, as shown right, are attached to the Quick Vision as is appropriate.



Mitutoyo

PRECISION IS OUR PROFESSION

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