Mitutoyo

Mitutoyo Quality

CNC Vision Measuring System
QUICK VISION Active Series
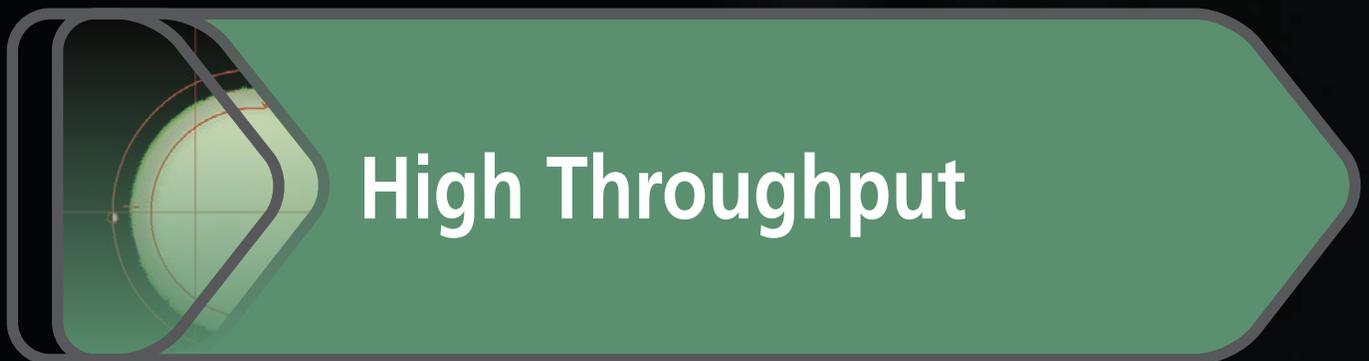
Mitutoyo

QUICK VISION Active

Mitutoyo

Easy-to-operate, space-saving model with advanced functionality to meet various needs
QUICK VISION Active

High Speed

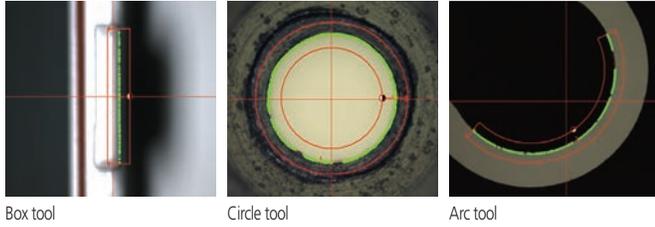### High Accuracy

High Throughput

High Efficiency

## Intelligent and Automated Feature Processing Tools allow unattended inspection

Automatic edge detection
The "automatic edge detection" function provides superior reproducibility of measurements regardless of the skill level of the operator.


Box tool

Circle tool

Arc tool

Image auto focus
Multiple methods of "image auto focus" allows high-speed / high-accuracy height measurements of 3D features

Surface focus tool

Multipoint auto focus tool
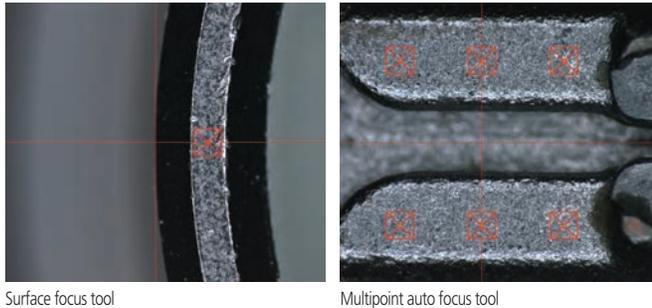
## Easy to use measurement for multiple workpieces and repetitive feature arrays

Step & repeat
The "step & repeat" function will measure a large number of workpieces on the stage or fixture in one easy operation

Measuring stage

Workpiece

Positioning jig

Continuous measurement of multiple workpieces
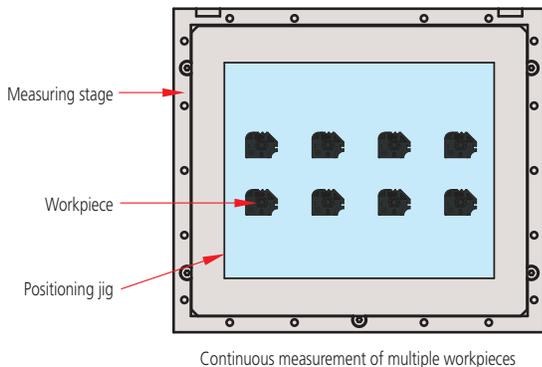
## Automatic measurement routines are available with either a click of a button or with image recognition

Pattern search
The "pattern search" function automatically recognizes image patterns to create part alignment and feature measurement.

Normal position

Position is automatically compensated
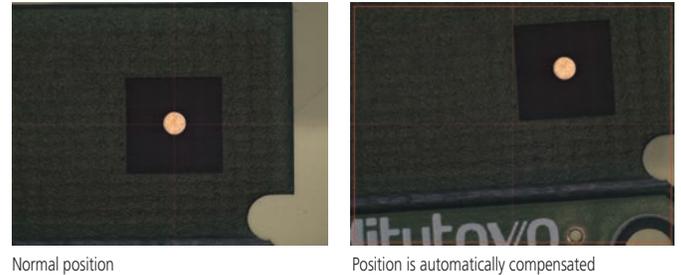
Manual tool
By incorporating a "manual tool" sequence to a CNC measurement routine, automatic measurement sequencing can be performed. This "One-Click" method reduces the need for fixtures as the workpiece can be placed anywhere on the stage.

2nd workpiece
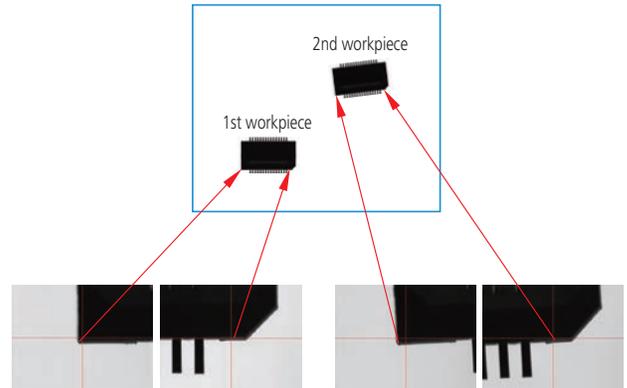
1st workpiece

Integrated Multi-Sensor probe models enhance measurement functionality

Touch probe equipped models   **Field retrofit capable**

With the Touch probe enabled system the measurement of the side faces of the workpiece are easily performed. Dimensional features such as perpendicularity, parallelism are possible. Internal side features hidden from the camera can be accessed with the star probe configuration.

Superior Flexibility with Color Zoom Optical System

From wide field of view measurement to micro-measurement

Interchangeable objective lens zoom unit
The newly designed zoom unit and interchangeable objectives provide 13x – 183x on-screen optical magnification. Thus providing a viewing range from low magnification, wide field of view, to high magnification micro measurements.

Z-objective 1x

0.5X   2X   3.5X

Z-objective 1.5x

0.75X   3X   5.25X

Z-objective 2x

1X   4X   7X
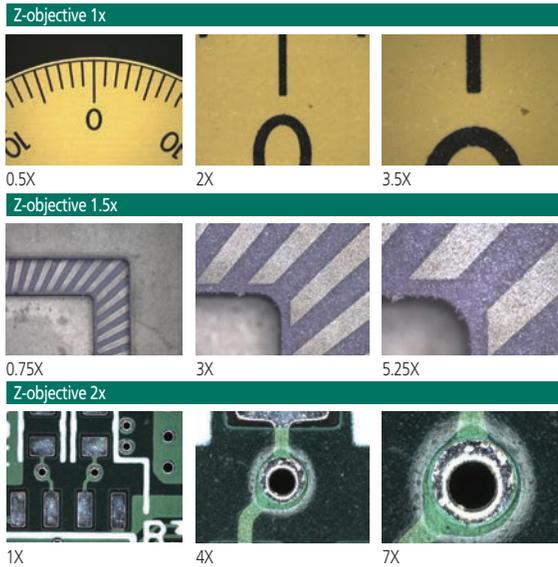
1x Objective (optional)   **Objective 1.5X (Standard accessory)**   2x Objective (optional)

	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 Working distance	74 mm
	1.5X objective Working distance	42 mm
	2X objective Working distance	42 mm

Note: The total magnification indicates the magnification on the monitor when the size of the QVPAK video window is 178.8×143.0 mm (default).
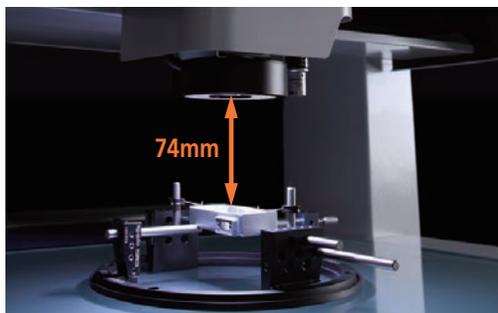
74mm

## Exceptional objective working distance handles the tallest part measurement requirements

Best in class working distance
A working distance of 74 mm* reduces the risk of damaging the objective or workpiece by accidental collision.

* Using the 1X objective.

3D Vision and Touch-Probe with 3D measurement on the same workpiece

The QV Active Series can perform complex measurements that are usually made using a multitude of measurement tools. The QV Active supports 3D features such as: Planes, Cylinders, Cones along with feature profile scanning.

Vision measurement

Touch-probe measurement
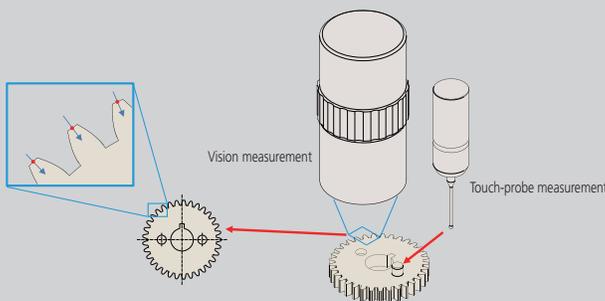
Module change rack, MCR20

Two and three probe rack configurations are available. Various touch-probe module configurations can be mounted in this rack to meet a variety of needs. Automatic probe changing is supported as well as both the TP-20 and TP-200 probes.
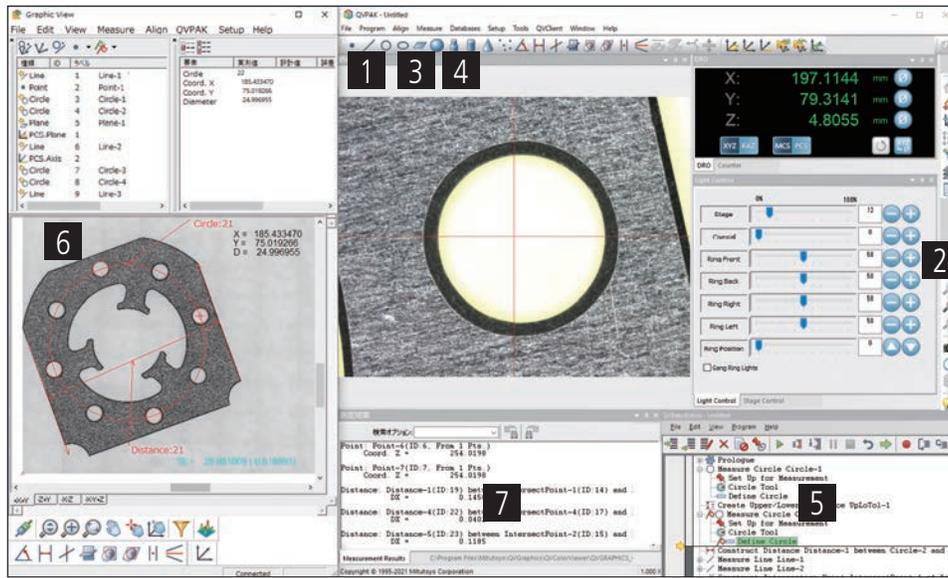

Master ball (optional)
Used for diameter compensation of the stylus
Calibration ring (optional)
Used for offset calibration of the image and the touch probe

MCR20 (optional)

Simple but Advanced Platform

1 Large screen with high-definition color image for less eye fatigue

**High-definition color camera**

Measurement and observation is performed using high-quality and high-definition images, which prevents operator fatigue even over long periods of observation.
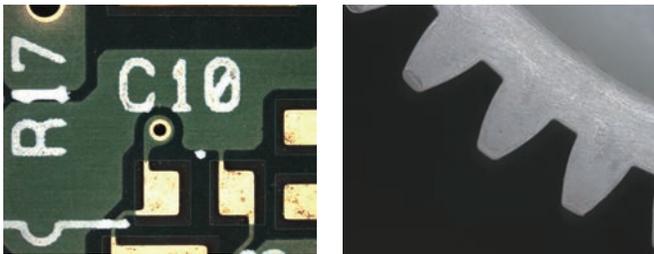
2 Clear edges ensure reliable measurement

Superior Lighting with automated feature illumination

Transmitted, co-axial and 4-quadrant ring lighting is provided so workpiece illumination can be set independently from the front, rear, right and left directions. This enables more reliable measurement by enhancing the sharpness of the edge of the feature to be measured.
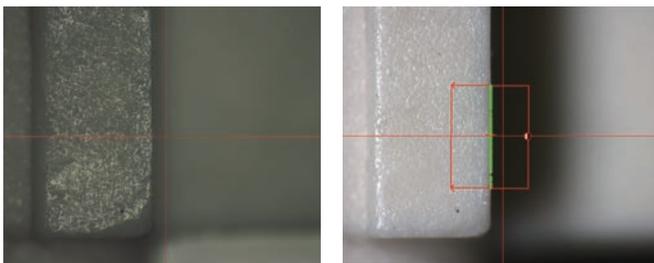

A feature viewed by co-axial light only.

The same feature viewed with the measured edge sharpened by ring lighting from the left.

3 Easily locate the part with the wide wide field of view

Zoom lens

Using Mitutoyo's proprietary high-quality zoom system and objective lenses the feature field of view is expanded. Multiple objectives allow increased operator image viewing flexibility.


Magnification of 0.5X

10.8 mm

13.6 mm
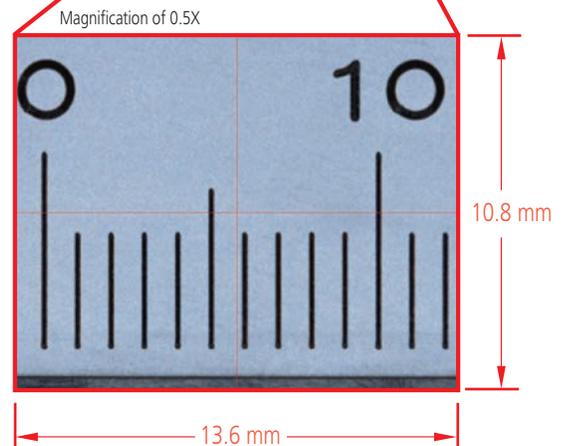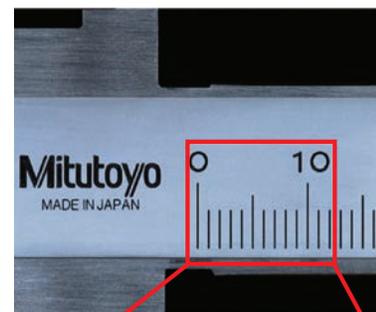
4 Easy-to-operate across all skill levels

One-click tool for feature measurements

Select the element type, and with just one click on an edge, a highaccuracy measurement is taken regardless of the proficiency level of the operator. The embedded outlier removal filter automatically excludes bad data caused by burrs and dust.
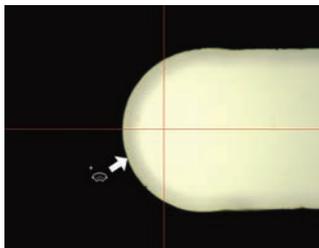

Move the mouse to the edge and click once.
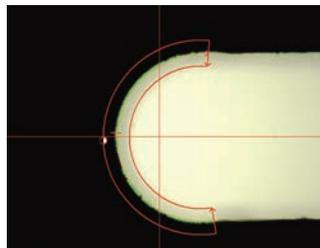
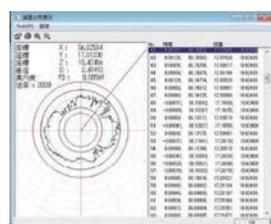Executes high-accuracy multi-point measurement and removes the outlier

5 The embedded intelligence of Easy Editor makes programing and editing simpler

QVEasyEditor

QVEasyEditor is an intuitive interface for editing and running part programs. While measuring a part, the steps are automatically recorded into the program. The tree structure allows for easy editing, inserting, and deleting of the part program. The program list also displays error icons to quickly find out of tolerance measurements or errors. QVBasic is also available for powerful, flexible programming.

Edge detection error icon

Out-of-tolerance judgment icon

Element measurement error icon

Easy-to-read tree-structure view

6 Highly sophisticated analysis can be performed simply by clicking

QVGraphics

Simple to operate, just clicking a measured element shown in the window creates or changes a coordinate system. Clicking also displays measurements and illustrates deviation of roundness, flatness, etc. A program can be created simply by dragging a pitch measurement element.
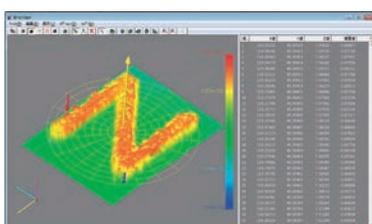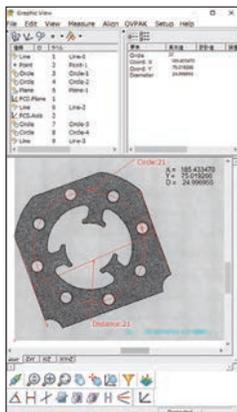
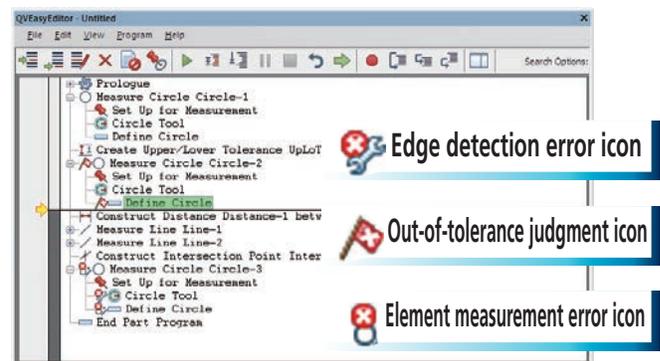

Geometric deviation of a plane surface

Geometric deviation of a circular feature

7 Direct output of measurement report

MiCAT Reporter

MiCAT Reporter is equipped as standard with a purpose to create reports from the QVPAK measurement results. The software can output data into PDF directly, allowing you to create medical component reports and other reports requiring reliability.

Optional accessories

FORMTRACEPAK-AP

This is contour analysis software that can perform sophisticated analyses, such as tolerancing and form analysis on the basis of the point cloud data obtained via **QVPAK** measurement tools.

Contour tolerancing function
- Creating design data
  CAD data conversion, master work conversion, function assignment, text file conversion, creating spherical surface design data
- Verification of design data
  Verification of normal line direction, axial direction, and best fit
- Result display
  Result list, error diagram, error development diagram, error coordinate values, analysis results

Form analysis
- Analysis items: Point measurement, line measurement, circle measurement, distance measurement, intersection point measurement, angle measurement, origin point setting, axis rotation
- Arithmetic operation items: Maximum value, minimum value, mean value, standard deviation, area
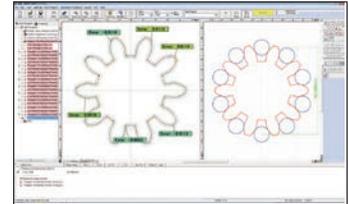
Report creation function
- Measurement results, error diagram, error development diagram

Other functions
- Record/execution of analysis procedure
- External output function
  CSV format output, text output, DXF/IGES format output
- Fairing
- Quadratic curve approximating function
- Pseudo roughness analysis function
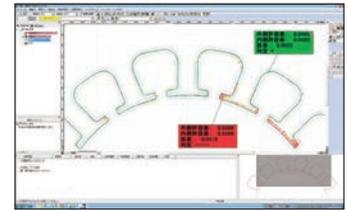

Tolerancing example

Example of gear contour matching and over-pin measurement

QV3DCAD

QV3DCAD creates a QVPAK part program from a 3D CAD model.

The current version supports two modes: the online mode that allows you to teach while monitoring the actual workpiece by synchronizing the software with the QV system, and the offline mode that allows you to create a part program on a PC not connected to the main unit.
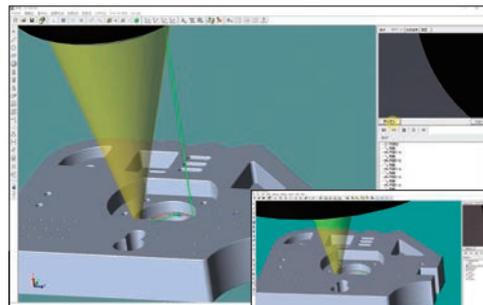
Offline teaching mode
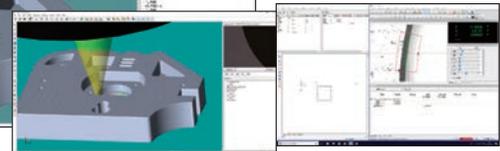
Online teaching mode

QVEio

QVEio is a client application software for external control.
It provides three functions, **QVEio-PLC**, **QVEio-PC**, and **QVEio-Signal**.
Note: These features use QVBasic language commands.

QVEio-PLC is software that can inform a user of the state of an external execution command or an execution command via the RS-232C communication with a PLC. Automation systems such as those that connect with automatic transport robots can easily be constructed.

QVEio-PC can efficiently control QV Active using a GUI that is specific to an external PC via RS-232C communication. It also provides the measurement result output and error state output.

QVEio-Signal informs the PLC of the operating status of the **QV Active**. This function is best suited for displaying the operating status of the QV Active on a signal tower or the like.

MeasurLink® Real-Time Professional

This is a process management program that can perform statistical processing control (SPC) based on measurement results.
Display of control charts in real time enables early detection of machining abnormality, which is effective in preventing defective products.
QVPartManager is required when measuring multiple workpieces and exporting to **MeasurLink**.

Specifications

Model No.		QUICK VISION Active 202		QUICK VISION Active 404	
Model		QV-L202Z1L-D	QVT1-L202Z1L-D	QV-L404Z1L-D	QVT1-L404Z1L-D
Type		Standard model	Touch-probe equipped model	Standard model	Touch-probe equipped model
Measuring range (X×Y×Z)		10x8x6" (250×200×150 mm) (250×200×118 mm: when 1X objective lens is used)		16x16x8 " (400×400×200 mm) (400×400×168 mm: when 1X objective lens is used)	
Resolution		0.1 µm			
Scale type		Linear encoder			
Observation unit		Zoom unit (8 positions)			
Imaging device		Color CMOS camera			
Illumination Unit	Co-axial Light	White LED			
	Transmitted Light	White LED			
	PRL	4-quadrant fixed white LED			
Accuracy[*1]	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	Objective: 1.5X, Optical magnification: 5.25X			
Touch-trigger probe measuring accuracy[*1]	E_{1X}, E_{1Y}, E_{1Z}	—	(2.4 + 3L/1000) µm	—	(2.4 + 3L/1000) µm
Accuracy guaranteed temperature range		20±1 °C	18 to 23 °C	20±1 °C	18 to 23 °C
Size of stage glass		311×269 mm		466×480 mm	
Maximum stage loading[*2]		22 lbs (10 kg)		44 lbs (20 kg)	
Dimensions		570×767×1468 mm		776×1303×1529 mm	
Mass (including machine stand)		341 lbs (155 kg)		714 lbs (324 kg)	
Temperature compensation function		—	Manual	—	Manual

*1 Inspected to a Mitutoyo standard. L=length between two arbitrary points (mm)
*2 Does not apply for unbalanced or concentrated loads.

Option

Calibration chart

This chart is used to correct the pixel size of image elements, correct the accuracy of automatic focusing at each magnification, and correct optical axis offset.
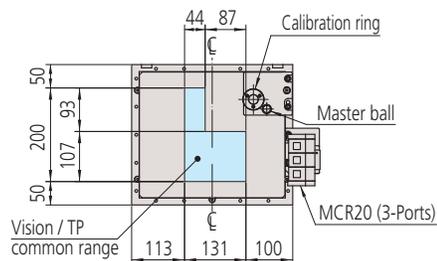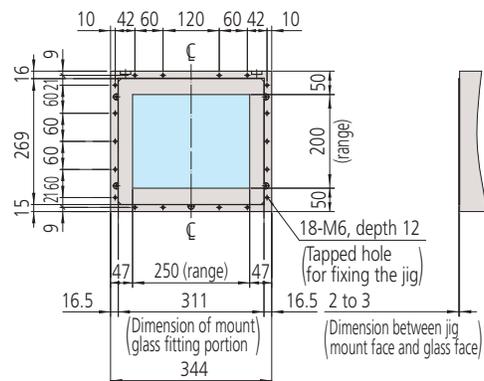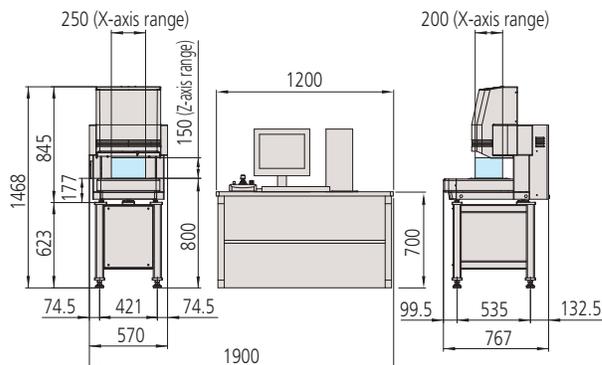
QUICK VISION Active 202

QUICK VISION Active 404

External dimensions and measurement stage dimensions

QUICK VISION Active 202

Unit: mm
25.4mm = 1"

250 (X-axis range)
200 (X-axis range)
1200
150 (Z-axis range)
845
177
1468
623
800
700
74.5 421 74.5
570
99.5 535 132.5
767
1900

10 42 60 120 60 42 10
16 9
269
60 60 60
15 21 60
9
50 200 (range) 50
18-M6, depth 12
(Tapped hole for fixing the jig)
47 250 (range) 47
16.5 311 16.5
(Dimension of mount glass fitting portion)
344
2 to 3
(Dimension between jig mount face and glass face)

44 87
Calibration ring
50 200 93 107 50
Master ball
Vision / TP common range
113 131 100
MCR20 (3-Ports)

QUICK VISION Active 404

Unit: mm
25.4mm = 1"

400 (X-axis range)
400 (Y-axis range)
1200
200 (Z-axis range)
1004
285
1529
525
810
700
120 536 120
776
287 722 294
1303
2100

10 79 50 86 50 86 50 79 10
24
30
86 50 86 50 86 50 86
482
30
24
79
400 (range)
63
50 400 (range) 50
16 468 16
(Dimension of mount glass fitting portion)
500
2 to 3
(Dimension between jig mount face and glass face)
24-M6, depth 12
(Tapped hole for fixing the jig)

197 87
79 144 400 256 63
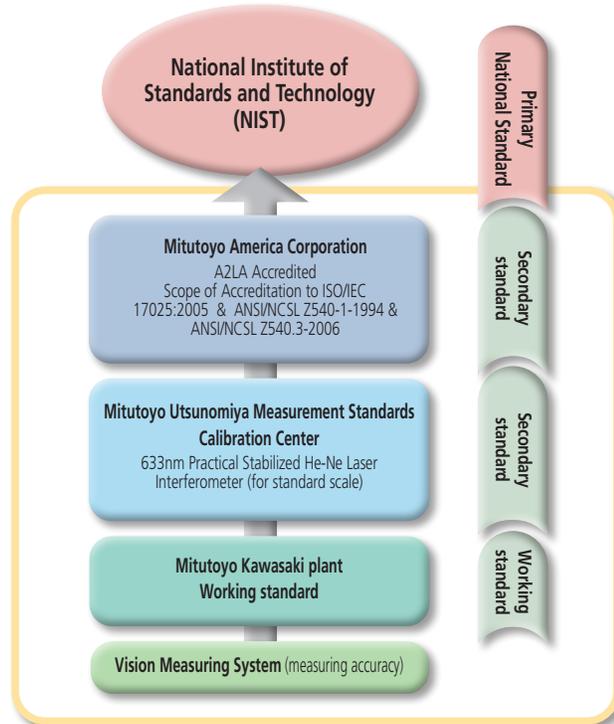Calibration ring
Master ball
Vision / TP common range
116 284 100
MCR20 (3-Ports)

Excellent reliability

Traceability to national standards

Mitutoyo's calibration artifacts and instruments that are used to establish machine accuracy specifications are maintained in a continuous chain of traceability to national dimensional standards. This is our customers' assurance of reliable measurement.

National Institute of Standards and Technology (NIST) — Primary National Standard

Mitutoyo America Corporation
A2LA Accredited
Scope of Accreditation to ISO/IEC 17025:2005 & ANSI/NCSL Z540-1-1994 & ANSI/NCSL Z540.3-2006 — Secondary standard

Mitutoyo Utsunomiya Measurement Standards Calibration Center
633nm Practical Stabilized He-Ne Laser Interferometer (for standard scale) — Secondary standard

Mitutoyo Kawasaki plant
Working standard — Working standard

Vision Measuring System (measuring accuracy)

Reliable support system

World's top level of global network

Mitutoyo has expanded its market all over the world since the establishment of the first overseas sales company, MTI Corporation (current Mitutoyo America Corporation) in the USA in 1963. At present, we have R&D, manufacturing, sales, and technical service bases in 29 countries with an agency network connecting over 80 countries.

Company Headquarters in Kawasaki, Japan

● Headquarters
■ Local Sales Office
■ Research and Development Facility
■ Overseas Manufacturing Facility

Mitutoyo Europe GmbH | Mitutoyo (UK) Ltd. | Mitutoyo France S.A.R.L | Mitutoyo America Corporation Head Office | Mitutoyo Italiana S.R.L. | Mitutoyo Asia Pacific Pte. Ltd. Regional Headquarters | MITUTOYO SUL AMERICANA Ltda.

Coordinate Measuring Machines	Vision Measuring Systems	Form Measurement	Optical Measuring
Sensor Systems	Test Equipment	Digital Scale and DRO Systems	Small Tool Instruments and Data Management
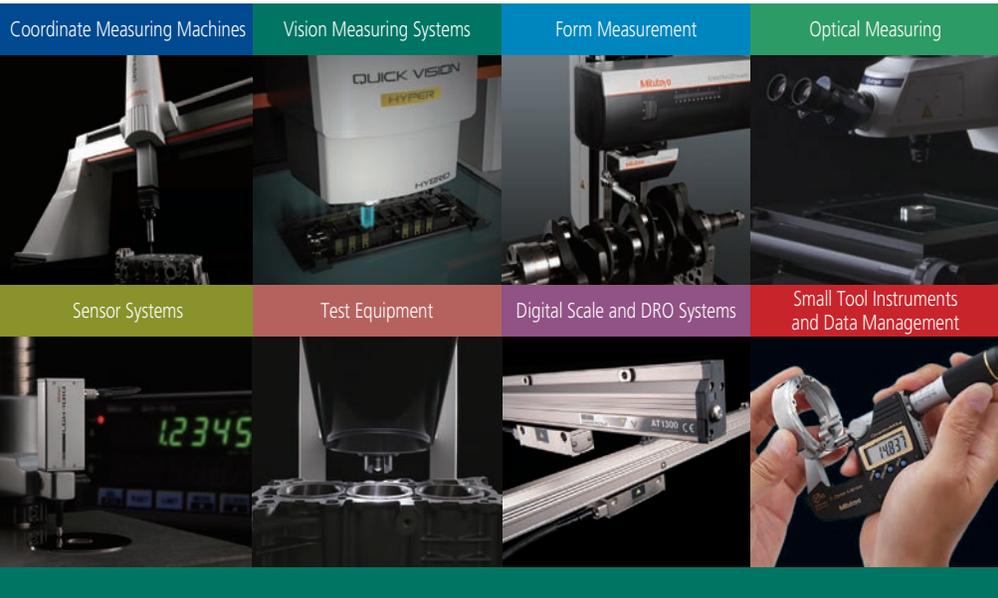
Whatever your challenges are, Mitutoyo supports you from start to finish.

Mitutoyo is not only a manufacturer of top quality measuring products but one that also offers qualified support for the lifetime of the equipment, backed by comprehensive services that ensure your staff can make the very best use of the investment.

Apart from the basics of calibration and repair, Mitutoyo offers product and metrology training, as well as IT support for the sophisticated software used in modern measuring technology. We can also design, build, test and deliver measuring solutions and even, if deemed cost-effective, take your critical measurement challenges in-house on a sub-contract basis.

Find additional product literature and our product catalog

www.mitutoyo.com

Mitutoyo

Mitutoyo America Corporation
www.mitutoyo.com
One Number to Serve You Better
1-888-MITUTOYO (1-888-648-8869)

M³ Solution Centers:
Aurora, Illinois (Headquarters)
Boston, Massachusetts
Charlotte, North Carolina
Cincinnati, Ohio
Detroit, Michigan
Los Angeles, California
Seattle, Washington
Houston, Texas