2-D Color Vision Measuring System
QUICK IMAGE

Bulletin No. 2017

Two-Dimensional Vision Measuring Machine Enables Wide Field Measurements at Large Focal Depth

Mitutoyo

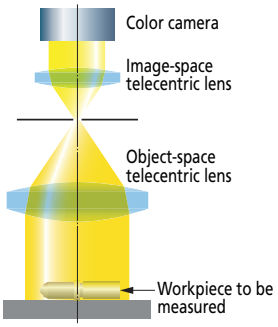
TELECENTRIC LENS SYSTEM

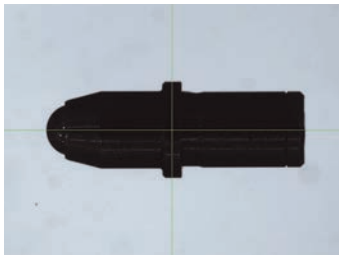
2-D Color Vision Measuring System **QUICK IMAGE** Series

Make Wide Field Measurements on Batches of Stepped Workpieces in Full Color

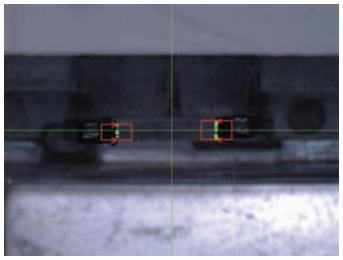
Double-telecentric optics enable highly efficient measurement with a wide field of view

Batch measurement with a wide view field 1.259" x 0.945" (32 x 24mm) realized using a 0.2X magnification model can substantially improve measurement efficiency.
With a 0.5X magnification model, dimensions of very small workpieces and stepped workpieces can be easily measured.





Actual image acquired with a 0.2X magnification model



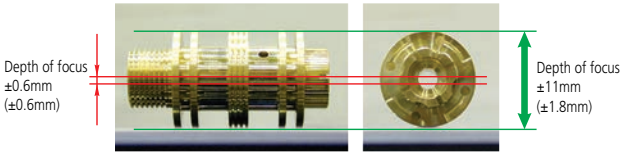
Actual image acquired with a 0.5X magnification model

Large-focal-depth Mode and High-Resolution Mode are Available at the turn of a Switch

Quick Image features a large-focal-depth mode (Normal) that supports measurement of stepped workpieces, and a high-resolution mode that provides more accurate measurement. The user can change from one mode to the other just by turning a single control.

High-Resolution mode (High Resolution)

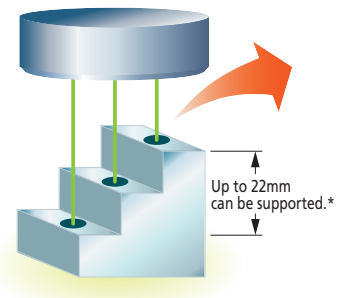
Large focal depth mode (Normal)



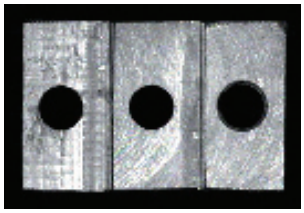
For 0.2X magnification models. Figures for 0.5X models in parentheses.

Focus Over a Wide Range While Keeping the Image Size the Same

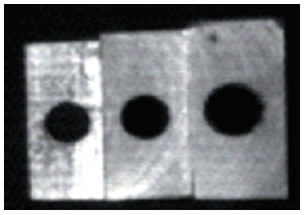
The large focal depth allows one-time focusing on a stepped, or cylindrical, workpiece and the double-telecentric optical system reduces measurement error.



* Large-focal-depth mode (Normal) with 0.2X magnification.



View with telecentric optics



View with non-telecentric optics

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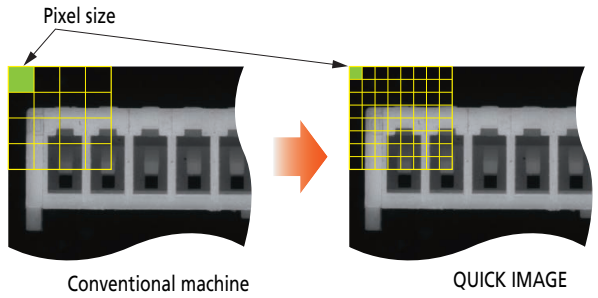
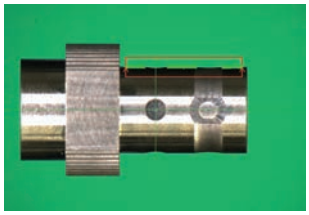
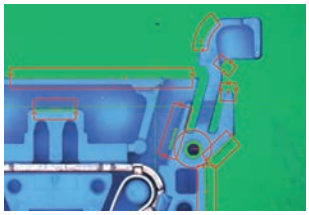
Mega-pixel Color Camera

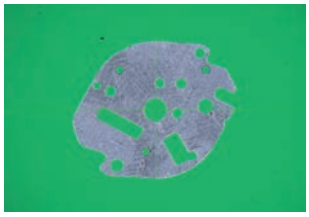
All models use a high-resolution (1.3-mega-pixel) color camera that ensures high repeatability even at low magnification.



The color display is ideal for observation and all image data can be saved in BMP and JPEG formats.


Cylindrical workpiece


Plastic item (connector)


Press-molded item

Plastic item (keyboard)

Quadrant LED Ring Light

A quadrant LED ring light and incident co-axial lighting to support surface measurements are standard equipment in addition to the stage lighting provided for contour measurement.

LED ring light is switchable by quadrant to help enhance surface feature contrast.

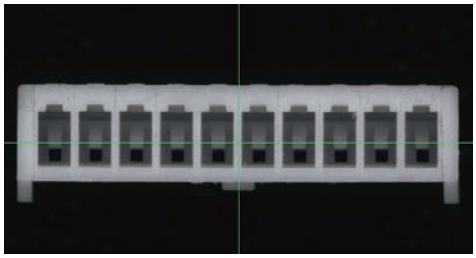
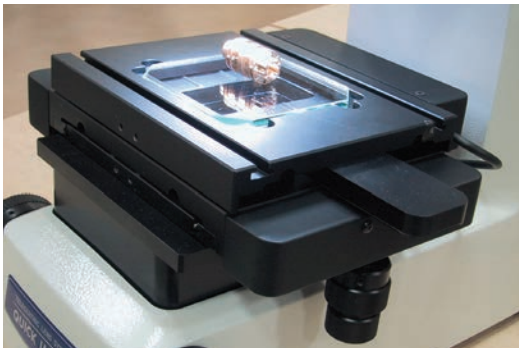
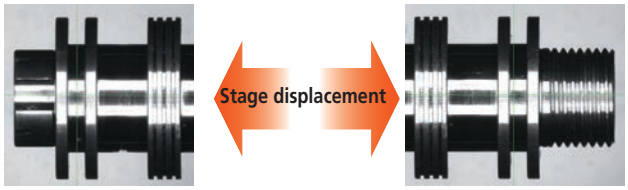


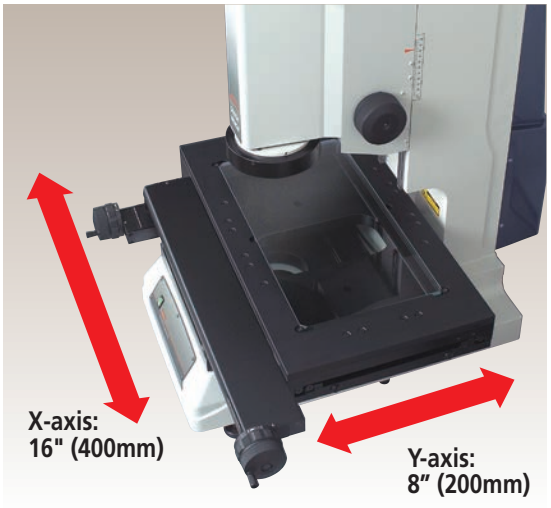
Image of surface of a plastic part acquired using the LED ring light.

Rich Lineup of XY Stages

Models with XY precision stages of various sizes are available for extending measurement to the area outside the field of view. The largest stage 16″ x 8″ (400 x 200mm) is suitable for measuring one large workpiece or a number of small workpieces at the same time.



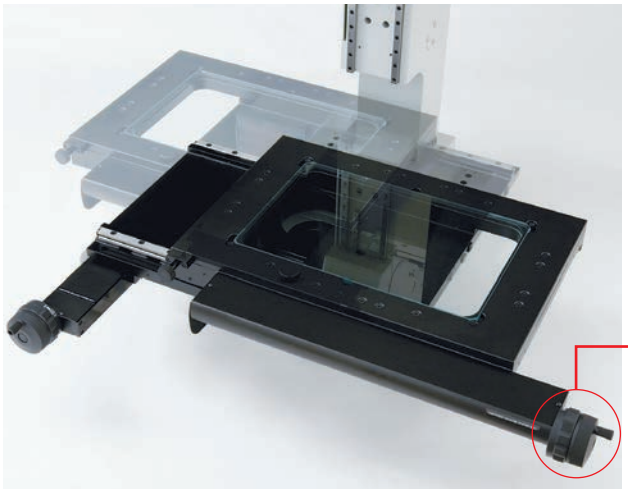




Large XY stage

Quick Release Mechanism on the XY Stage

In many models there is a quick-release system built into the stage to allow fast XY positioning. This feature is easily operated from the adjustment wheels for convenience and is especially useful when needing to switch rapidly between the working area and a reference position on the workpiece.



Quick-release control incorporated in models QI-1010 to -4020

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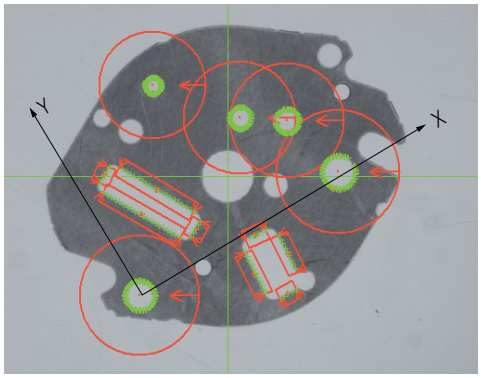
Powerful Software "QIPAK"

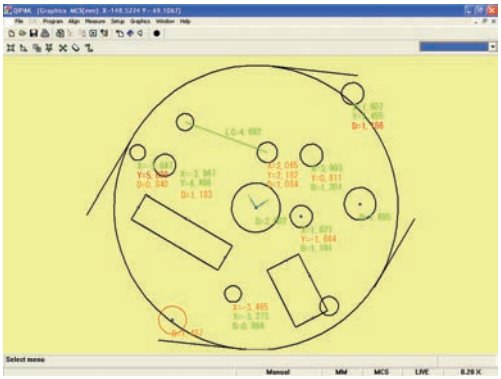
Single-Click Specification for Measuring Point

The measuring point can be specified simply by clicking in its vicinity. Automatic detection of the optimal edge eliminates human error, making it possible to obtain highly repeatable results.



Recording and Repeating Measurement Procedures

Procedures once used for measurement can be recorded and run again, further improving measurement efficiency when multiple workpieces are measured.



Coordinate System Alignment Function

The coordinate system of any workpiece can be mathematically aligned with the machine's system using any convenient workpiece features, thus avoiding the need to perform a difficult physical alignment operation.

Graphic Display Function Helps Calculations

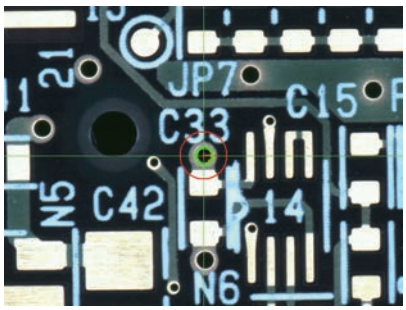
Measurement results displayed in the graphics window can be used to make pitch dimension calculations, for example. This function is also helpful for reporting measurement results.

Digital Zoom Eases Measurement on Small Features

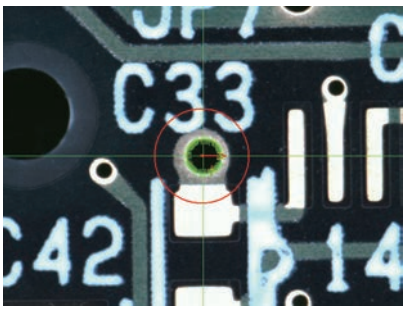
A 1X to 4X digital zoom is included, allowing easier measurement on small features due to improved visibility.

A Wide Variety of Edge Detection Functions Strongly Supports Measurement

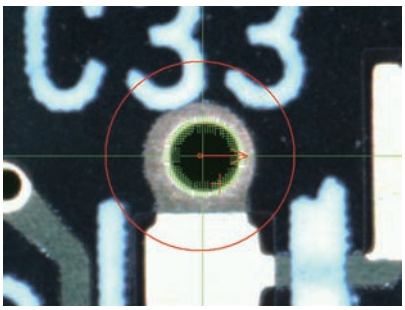
- **Outlier Removal**
  Outliers such as dirt, burrs, and cracks are removed.
- **Auto Trace Tool**
  An edge of unknown shape is automatically detected and point group data is acquired.
  FORMPAK-QV (optional) supports form analysis and tolerance zone measurement of point group data.
- **Dual Area Contrast Tool** (Patented Feature)
  The level of illumination is automatically set to maximize the contrast between two areas.
  Even a beginner can set the optimal illumination level.



1X



2X

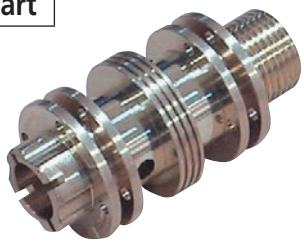


4X

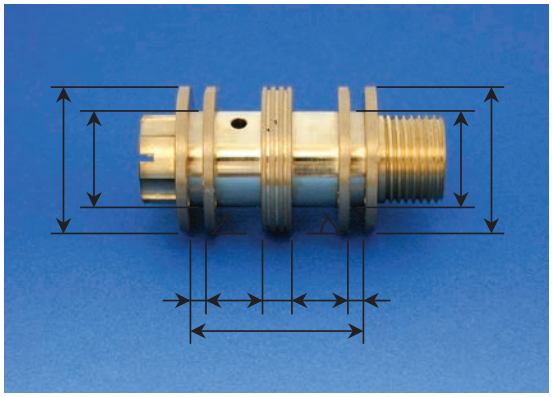
Measurement Examples Using QUICK IMAGE

Workpiece 1 Cylindrical part

Telecentric optics minimizes focus flare on the vertical direction.



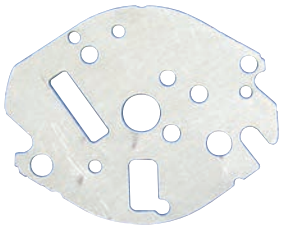
The double-telecentric optical system enables more accurate measurement of outside diameter, groove width and flank angle of cylindrical workpieces than can be achieved with conventional optical systems.



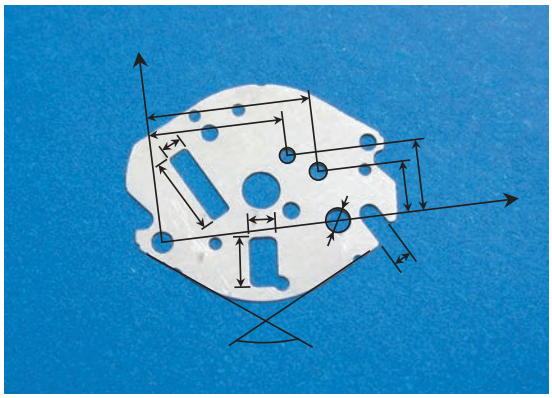
Example of measurement items

Workpiece 2 Pressed part

Movement is unnecessary as any item in the field of view is measured simultaneously.



A large focal depth allows batch measurement using a wide field of view, even on distorted workpieces. In addition, the XY stage models can measure on multiple screens at different positions.

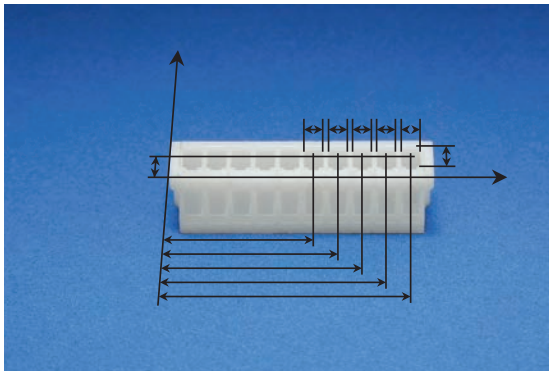


Example of measurement items

Workpiece 3 Plastic part

Multiple light sources allow automatic selection of programmed light for full feature measurement.

Included in the lineup are models equipped with a co-axial light and an LED quadrant ring light. These direct illumination methods allow measurement on surfaces and are therefore useful for measuring opaque plastic items and similar workpieces.



Example of measurement items

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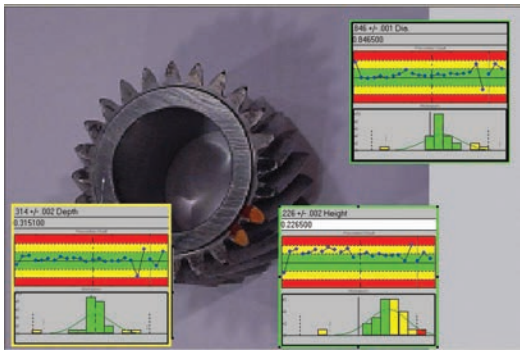
Additional evaluation and analysis are possible using the QIPAK functions and software together.



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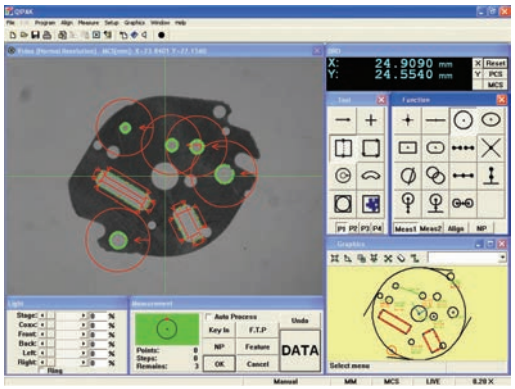
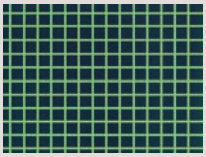
An Integrated Solution for Quality Data Management

A real-time display of measurement results and statistical analysis on the shop floor, with data saved in a database. Includes SPC and statistical analysis, data filtering and reporting systems for complete control of your manufacturing processes. MeasurLink includes modules for shop floor data collection, QC room data analysis and reporting, gage R&R studies, and gage tracking.



Basic template



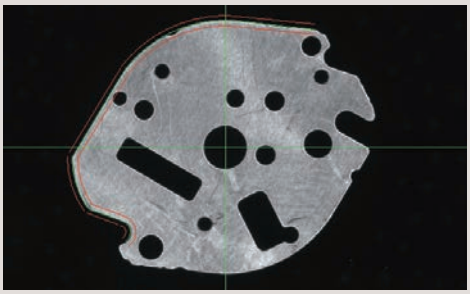
Grid

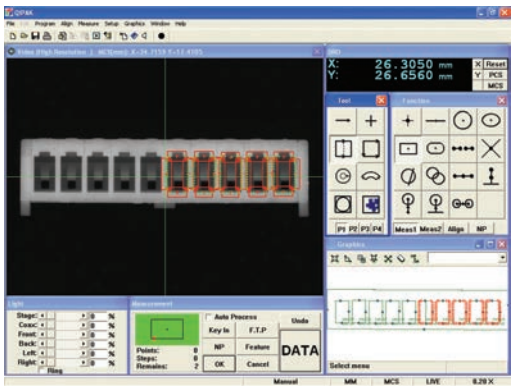
Concentric circles

User template

Using the user template function allows visual verification of the measured workpiece against the master workpiece. In addition, the "CAD user template" allows the creation of a template from CAD data.

* CAD data must be separately imported and exported.

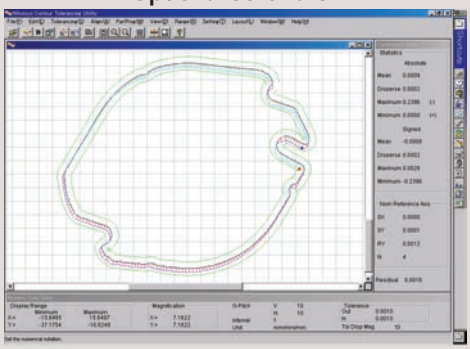




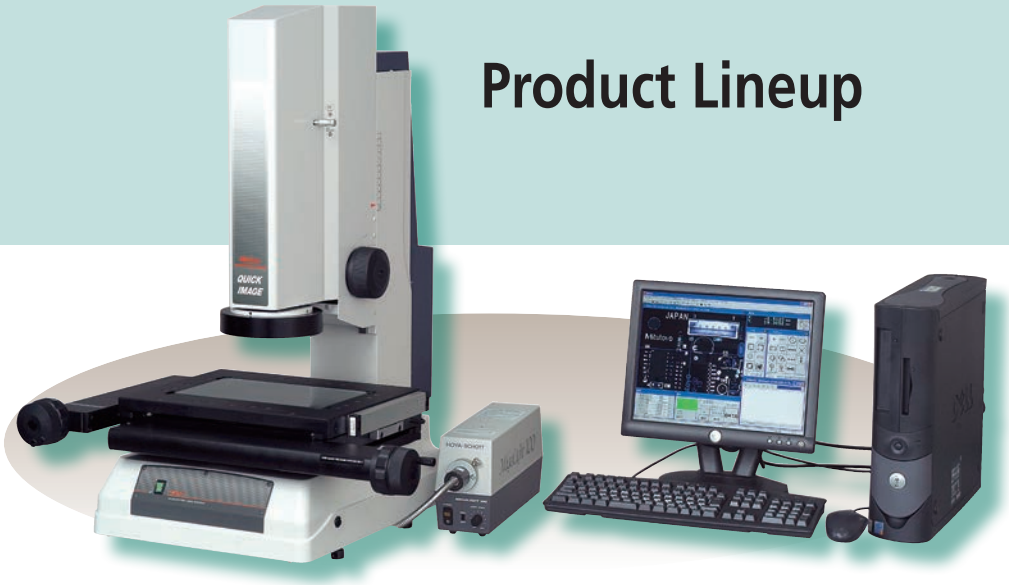
FORMPAK-QV

Form analysis software FORMPAK-QV enables contour form analysis and tolerance value measurement of measured point sequence data.

Optional Software



Product Lineup



QI-A2010B

8" x 4" (200 ×100mm) stage
0.2X double-telecentric optical system

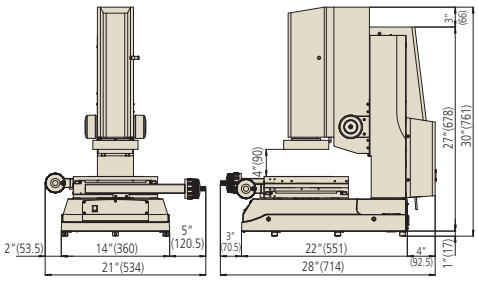
Specifications

Series		QI-A Series	QI-B Series
Lens Magnification		0.2x	0.5x
Field of View		32 x 24 mm (1.260" x 0.945")	12.8 x 9.6mm (0.504" x 0.378")
Lens: Working Distance		90mm (3.54")	
Depth of Focus	High Resolution Mode	±0.6mm	
	Deep Depth of Focus Mode	±11mm	±1.8mm
Measuring Accuracy on FOV	High Resolution Mode	±5 micron	±2.7 micron
	Deep Depth of Focus Mode	±8 micron	±4 micron
Repeatability on FOV	High Resolution Mode	±1 micron	±0.7 micron
	Deep Depth of Focus Mode	±2micron	±1micron
Measuring Accuracy (U1xy)		±(5+0.08L) micron	

External Dimensions

Unit: Inch (mm)

■QI-A1010B/B1010B

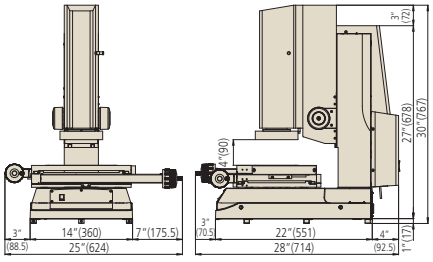


Stage Size (X x Y)	100x100mm (4" x 4")	200x100mm (8" x 6.8")	200x170mm (8" x 6.8)	*300x170mm (12" x 6.8")	*400x200mm (16" x 8")
Z: travel range	100 mm (No scale & DRO)				
Measuring Mode	High Resolution mode / Deep Depth of Focus Mode				
Camera	1.3 MP, 1/2" Color Camera				
Illumination	Contour, Surface, 4-Quadrant Ring Light				
Max Load	5 kg. (11 lbs.)	10 kg. (22 lbs)	20 kg. (44 lbs.)	20 kg. (44 lbs.)	15 kg. (33 lbs.)
Mass	70kg (156 lbs.)	74kg (165 lbs.)	140kg (311 lbs.)	148kg (329 lbs.)	154kg (342 lbs.)
Usable Stage Glass	7" x 7" (170x170)	10" x 6" (242x140)	10" x 9" (260x230)	14" x 9" (360 x 230)	17" x 10 (440 x 232)
Power Supply	AC 100V 50/60Hz				
Accuracy Guarantee Temperature	20 +/- 1 C				
Model Name QI-A	QI-A1010B	QI-A2010B	QI-A2017B	QI-A3017B	QI-A4020B
Code No.	361-822-1A	361-823-1A	361-824-1A	361-825-1A	361-826-1A
Model Name QI-B	QI-B1010B	QI-B2010B	QI-B2017B	QI-B3017B	QI-B4020B
Code No.	361-832-1A	361-833-1A	361-834-1A	361-835-1A	361-836-1A

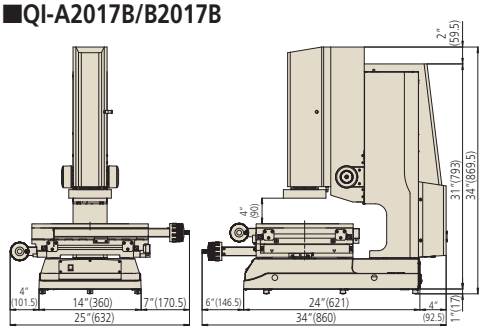
External Dimensions

Unit: Inch (mm)

■QI-A2010B/B2010B



■QI-A2017B/B2017B



■ LED Beam Safety Precautions

This system uses for measurement a low-power LED beam which corresponds to CLASS 2 (visible light) of JIS C6802 "Safety of laser products". The CLASS 2 warning/description label as shown right is attached to the main unit.

Optional Accessories

Dedicated table

Order No.	**02ATE760**
External dimensions (W x D x H)	71″ x 35″ x 29″ (1800 x 900 x 740mm)
Mass	132lb (60kg)

Foot switch

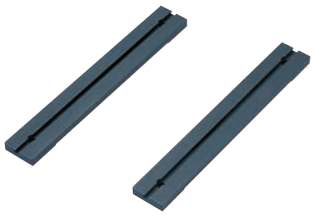
Order No.	**937179T**

Stage adapter

QI 2017 to QI 4020

Stage adapter (B)

QI 2010

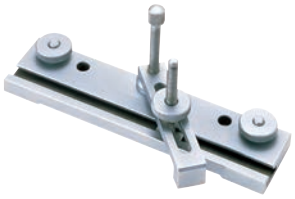


Model	Stage adapter	Stage adapter (B)
Order No.	**176-304**	**176-310**
External dimensions (1) (W x D x H)	2″ x 13″ x 0.591″ (50 x 340 x 15mm)	2″ x 11″ x 0.591″ (50 x 280 x 15mm)
Mass	3lb (1.5kg)	2lb (1.2kg)

*Two items are paired.
*Used when installing a holder with clamp, V-block with clamp, swivel center support and other equipment.

Holder with clamp

QI 1010 to QI 4020



Order No.	**176-107**
Maximum clampable thickness	1.378″ (35mm)
External dimensions (W x D x H)	6″ x 1″ x 2″ (152 x 38 x 62mm)
Mass	1lb (0.4kg)

Swivel center support

QI 1010 to QI 4020

Order No.	**172-197**
	Inclination graduation: 1° Inclination angle: ±10° Optimal for measuring screws and such.
Maximum workpiece dimensions	When horizontally positioned: ø80 x 140mm
Maximum workpiece dimensions	When inclined by 10°: ø65 x 140mm
Mass	6lb (2.5kg)

V-block with clamp

QI 1010 to QI 4020

Order No.	**172-378**
Maximum workpiece diameter	0.984″ (25mm)
Center height from mounting surface	1.50″ to 1.89″ (38 to 48mm)
External dimensions (W x D x H)	4″ x 2″ x 5″ (90 x 45 x 117mm)
Mass	2lb (0.8kg)

- Coordinate Measuring Machines
- Vision Measuring Systems
- Form Measurement
- Optical Measuring
- Sensor Systems
- Test Equipment and Seismometers
- Digital Scale and DRO Systems
- Small Tool Instruments and Data Management

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