

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

VISION MEASURING SYSTEM



# The 2-D Measuring System Designed and Manufactured by Mitutoyo

Superior addition to your quality control system

Simple to operate with easy-to-use measurement functionality

Reliability

Usability

Efficiency

Outstanding improvement in operational efficiency and productivity

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



Mit

Mitutoyo  
QUICK  
IMAGE  
TELECENTRIC LENS SYSTEM

Mitutoyo  
QUICK  
IMAGE



Mitutoyo  
QUICK  
IMAGE

QUICK RE



## Superior Addition to Your Quality Control System

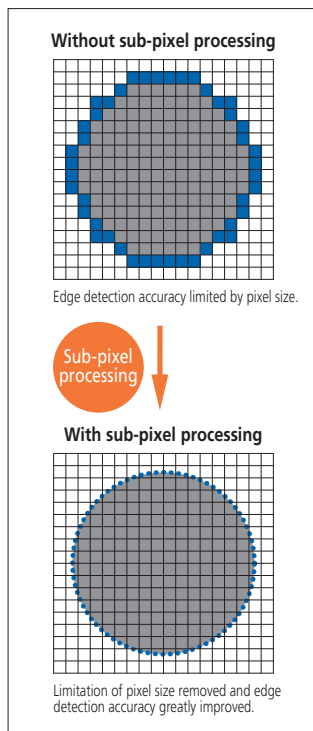
### Perform Stable, Highly Accurate Measurements Anywhere Within the Screen

#### The highest level of measuring accuracy within the screen in its class Patent registered (Japan)

- Accuracy of  $\pm 4.0\mu\text{m}$  within the screen, repeatability of  $\pm 1.0\mu\text{m}$  in high-resolution mode (QI-B Series) and the ability to focus through a wide range of applications.

#### Both a wide view field and high accuracy

- Sub-pixel processing enables high-accuracy edge detection.



Sub-pixel processing image

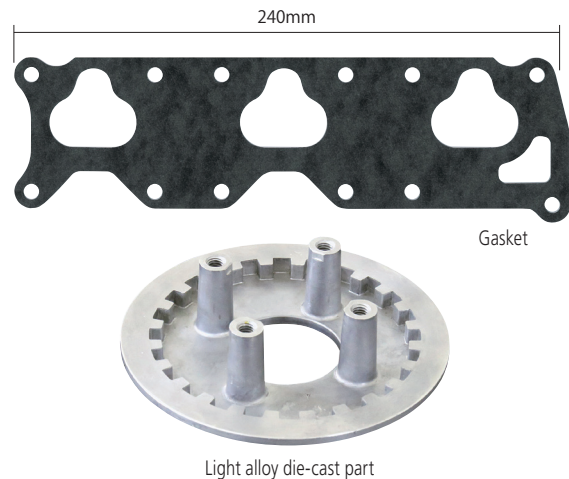
### Stable and Highly Accurate Measurement of Large Workpieces

#### Highly accurate stages

- Stages come in various sizes with an accuracy of  $\pm (3.5 + 0.02L)\mu\text{m}$ , letting you perform highly accurate and stable measurements and obtain reliable data for any kind of workpiece.

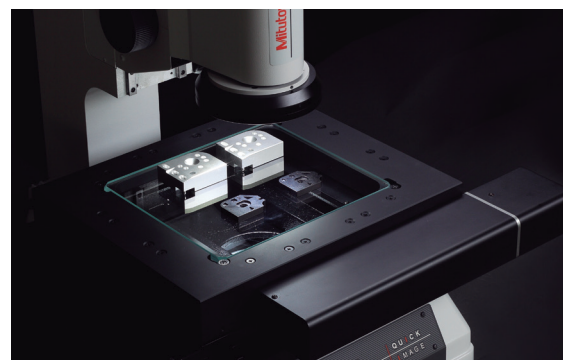
#### Rigid construction

- Robust construction with a maximum load capacity of 20kg (approx. 44 lbs.) and a vertical stroke of 100mm allows large workpieces to be measured.



#### Ultra-long Working Distance of 90 mm

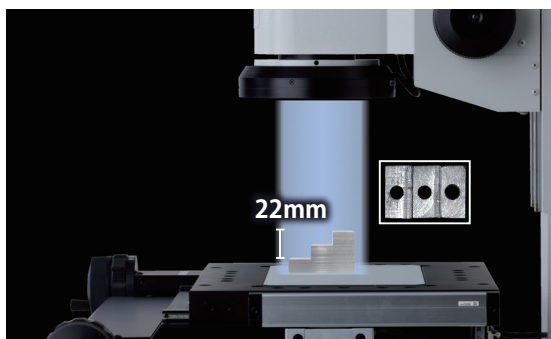
- The 90mm working distance ensures you can focus, even with stepped workpieces, without worrying about collisions.



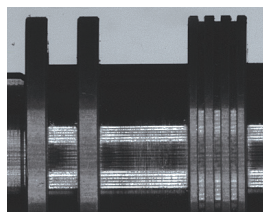
## Human Errors Due to Focusing are Eliminated

**Utilizes our in-house-developed Telecentric Optical System** Patent registered (Japan, the U.S.A. and Europe)

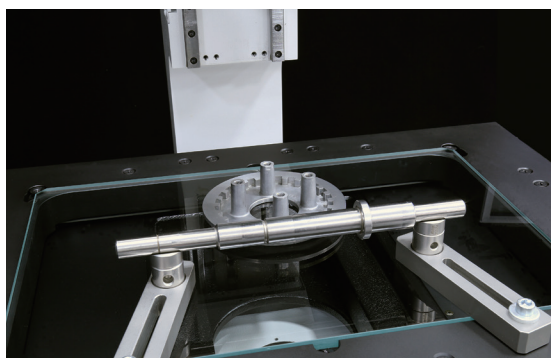
- Errors due to height are greatly minimized within a depth of focus with steps of up to 22mm. Measurement errors due to human focusing are eliminated.



Measuring a stepped workpiece



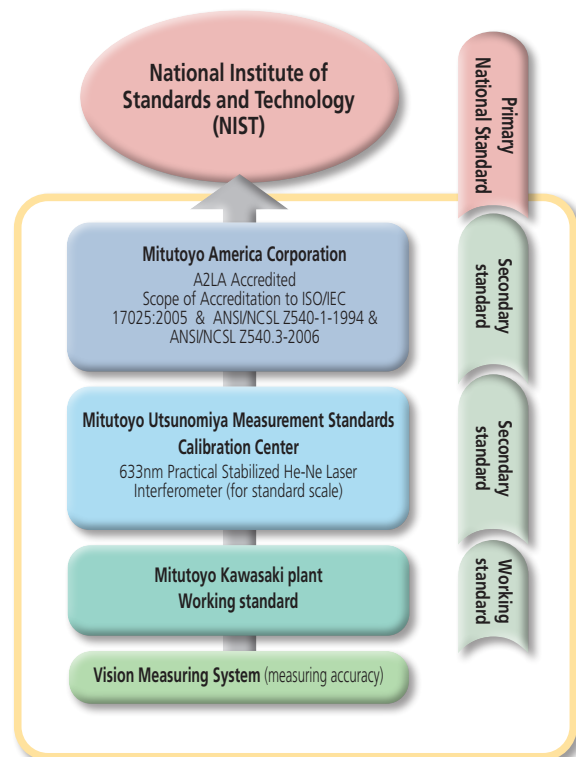
Measuring of a cylindrical workpiece



## Traceability to National Standards

**Mitutoyo... Uses calibration artifacts traceable to national standards**

- Mitutoyo has a large collection of standard artifacts whose dimensions are traceable to the national length standards of Japan and the USA. These artifacts are used to calibrate the specialized equipment used in the calibration of Mitutoyo's measuring tools and instruments so traceability to international length standards is established and maintained. Mitutoyo also provides a temperature calibration service that is absolutely essential to high-accuracy length measurement.



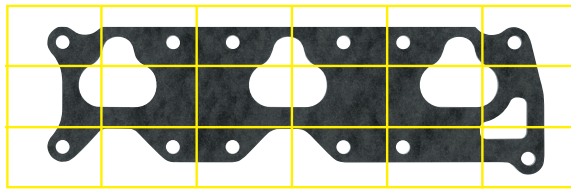
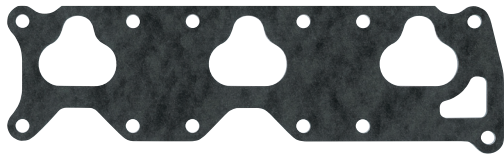


Simple to Operate with Easy-to-Use Measurement Functionality

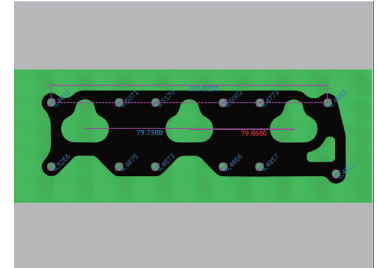
Entire View of a Large Workpiece Drastically Improves Ease of Operation and Measurement Efficiency

Stitching Function

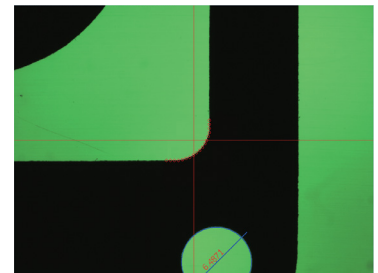
- A feature stitches multiple images together (multiple image-to-image coupling) while maintaining high-accuracy measurements. After a stitching operation, measurement is easily processed without the need to move the stage.



Multiple view-field stitching image



Full (single image) multiple field of view measurement processing and programming

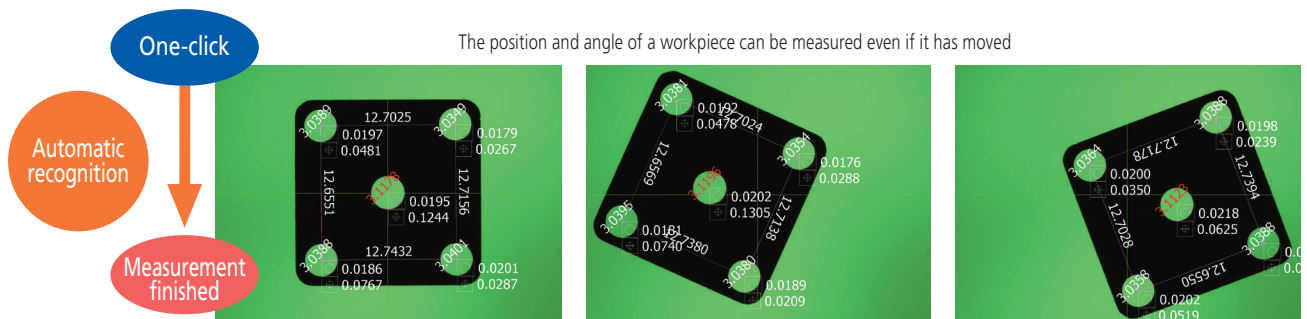


High-accuracy measurement of a small feature is achieved by the image zoom function

No Troublesome Positioning is Required

One-click execution function

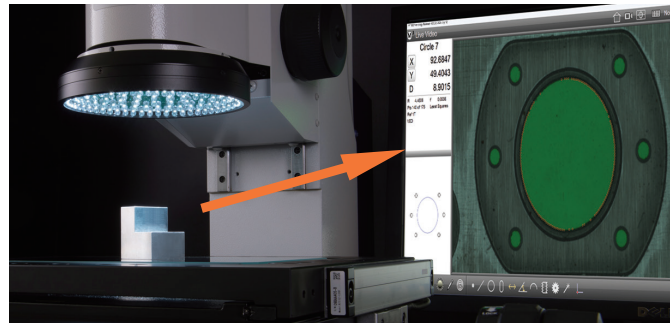
- After placing the workpiece within the field of view, the machine automatically recognizes the position and angle using a pattern search function and then finishes the measurements. There is no need for positioning and axially-aligning the workpiece.



## Simple Focusing

### Wide focus range

- Our specifically designed optical system achieves the long focal depth of 22mm. This allows measurement without the time-consuming focusing task, supporting an efficient measurement operation.

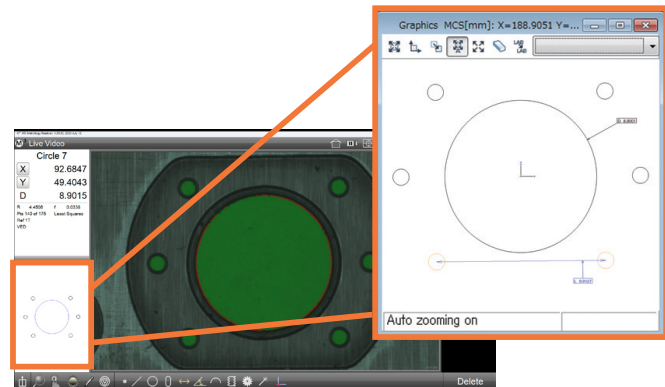


Focusing in on a stepped workpiece like the one shown above is unnecessary with the telecentric objective.

## Easy Measurements

### Part view screen

- The Part View screen displays a drawing of probed, constructed or created features and the measurement datum. Distances, angles, etc. can be measured directly from this view of the part.

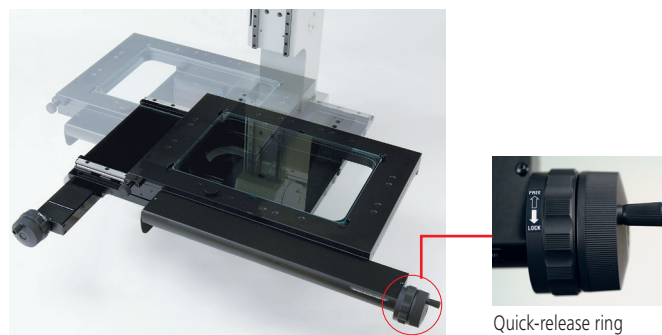


## Perform Quick Measurements Even on Large Workpieces

### Quick release mechanism on the XY stage

\*QI-A series

- Quick-release mechanisms are built into both fine feed controls on the XY stage. This allows the stage to be moved rapidly to bring the next measuring point into view no matter where it is on the workpiece.



Quick-release ring



# Outstanding Improvement in Operation Efficiency and Productivity

## User-friendly and Convenient XY Stage Movement

### Lineup of Motor-driven Stage Models \*QI-C series

- The joystick provides an easy, convenient control for coarse and fine feed of the stage. This effortless moving of the XY stage demonstrates outstanding performance in long-length measurement. The motor-driven stage automatically moves for stitching by specifying its start and end points.



Dedicated remote box

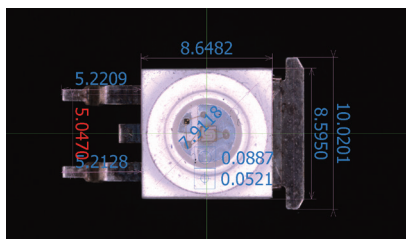


Motor-driven stage

## Confirm Measurement Results Quickly and Easily

### Video window measurement result display function

- Measurement results can be understood intuitively just by looking at a measurement image. Any out-of-tolerance result data is easily identified by changing its display color.
- A graphic image with measurement data also leads to creation of a user-friendly report.
- Each OK/NG result is color-coded with its operator selectable display color.

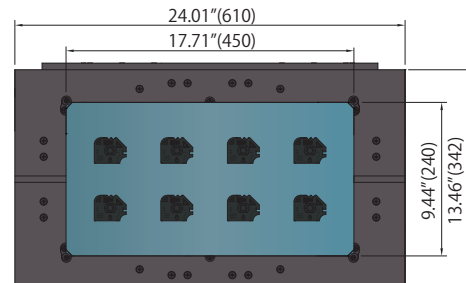


The measurement results display for OK/NG can be color-coded to meet your requirements.

## Capable of Supporting a Variety of Workpieces

### Large-stage model and extensive line up of stages

- The large stage allows you to arrange multiple workpieces and measure them in a single setup, thereby saving valuable time that would otherwise be spent in loading and unloading the stage.
- XY measurement range: Measure workpieces up to 400x200mm (16" x 8").
- 100mm (4") Z-stroke allows you to measure tall workpieces.
- A maximum load capacity of 44 lbs (20Kg) allows you to measure heavy workpieces.



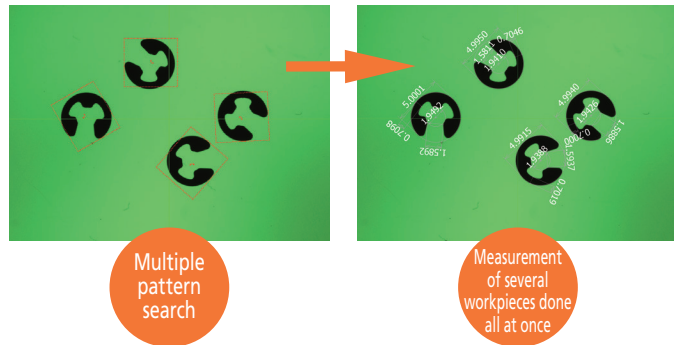
Take advantage of the largest stage by performing multiple measurements at one setup.



## Measure Multiple Workpieces Within the Field of View All at Once

### Locate and measure multiple workpieces with just one touch

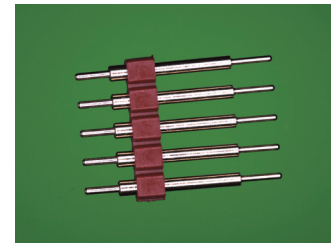
- Use pattern search for multiple workpieces within the screen view, and measure them all in one operation with a single touch or mouse click. This eliminates the need for accurate positioning of workpieces and cumbersome setup of fixtures.



## Generate Reports and Observe All On One Machine

### High-definition color camera

- This camera provides high-resolution color images for effective use in high-accuracy measurement and workpiece surface observation. Bright color measurement images are easily stored as a file and can be used for creating an easily understood measurement report.



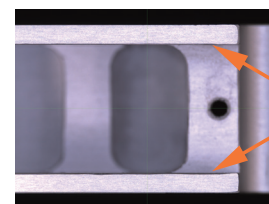
## High Accuracy Measurement with Bright and Clear Images

### Wide field of view / high-resolution mode

- The high resolution mode produces the same wide field of view as the normal mode that operates with a deep focal depth. This allows you to share a single measurement procedure so that you can execute seamless measurements.
- The shallow depth of focus in high resolution mode shows the edges of stepped workpieces more clearly, making measurements highly accurate.

### Enhanced illumination Patent registered (Japan)

- The enhanced illumination function of the high-resolution mode enables measurements of low reflectivity workpieces like rubber and black resin moldings to be performed with a clear image.



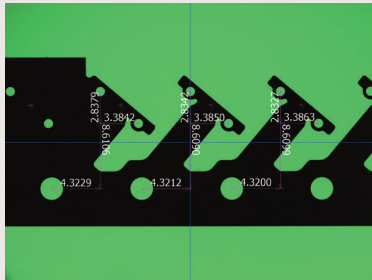
Edge measurement of a stepped workpiece (high resolution mode)



Surface observation of black rubber

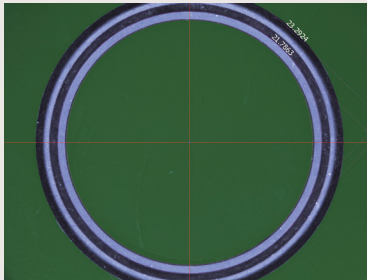
# Measurement Examples

## Progressive Die-pressed Parts



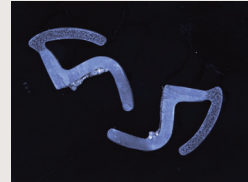
Measure the diameter and difference in coordinates of each hole.

## O-ring / Seals



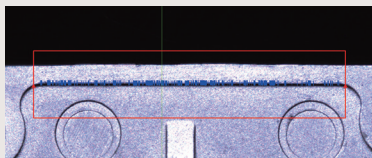
Enhanced illumination is very effective for low reflectivity materials such as rubber and black resin. (Use ring illumination in high-resolution mode + enhanced illumination)

## Weatherstrip



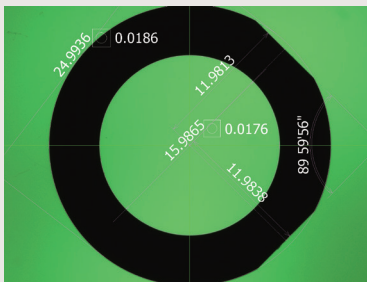
Execute a pattern search unrelated to position and finish measuring in one click.

## Measuring a Small Stepped Workpiece



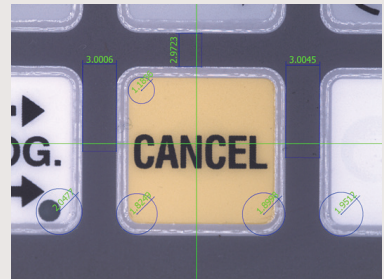
You can see and measure edges easily with just one quadrant of the ring light providing illumination.

## Measuring a Stepped Workpiece



Measure with simple focusing.

## Sheet Switch Measurement

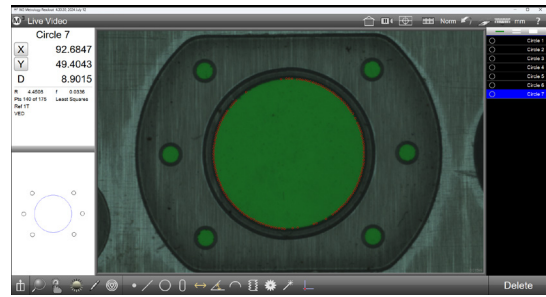


The color camera allows enhanced observation and measurement of workpieces. It is best suited to the inspection of printed materials and creation of a report.

# Standard Software M3

## Metlogix M3 Software

An intuitive and thoughtful icon driven user interface, a flexible probe library, and a powerful tolerancing and programming make the M3 the perfect solution for the Quick Image systems.

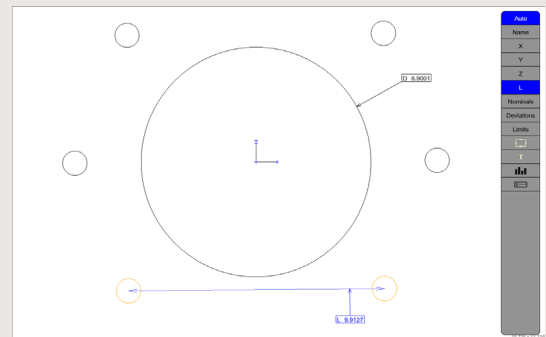


## Graphics-based Part View Constructions

Generate popular construction types, like Distances and Tangent Lines, from within the graphical part view itself. The *Gesture Menu* can be used within the part view to provide access to on-the-fly feature creation and manipulation tools.

Supported tolerances include:

- Average
- Intersections
- Shortest/Farthest Distances
- Perpendicular/Parallel lines
- Mid/Center/End Points
- Angle compliments
- Bolt/Gage Circles
- Tangent/Gage Lines

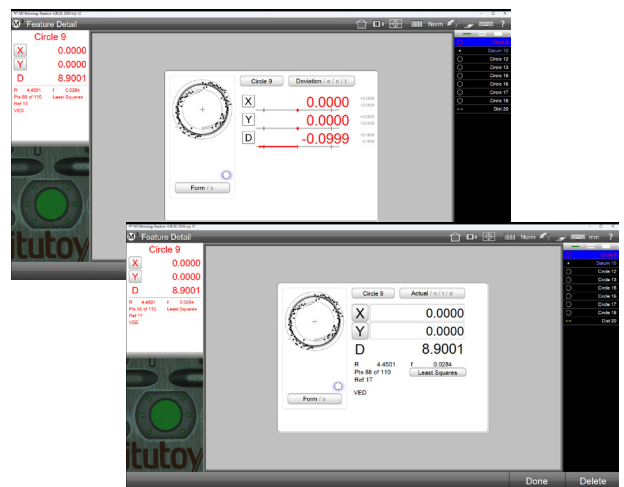


## Geometric Tolerancing

Measure features, set nominals, apply tolerances and view deviation results with only a few quick clicks. You may also apply a variety of popular tolerance types to features in the standard feature-to-feature fashion, or utilize the place tolerancing system for applications where tolerances are specified in a block tolerance style call out. Universal tolerance values are applied according to your feature resolution groupings.

Supported tolerances include:

- X/Y/Z positional
- True position
- Size
- Form
- Orientation
- Angularity
- Concentricity
- Runout



## Part Programs Playback

Playback or edit groups of measured, constructed, and created features from a saved part program file. Part program files, when loaded, will prepare the M3 software to repeat a sequence of recorded steps including measuring features, printing reports, and exporting measurement data. Playback guidance graphics provides helpful onscreen assistance for successful playback of your part programs.



# Optional Accessories

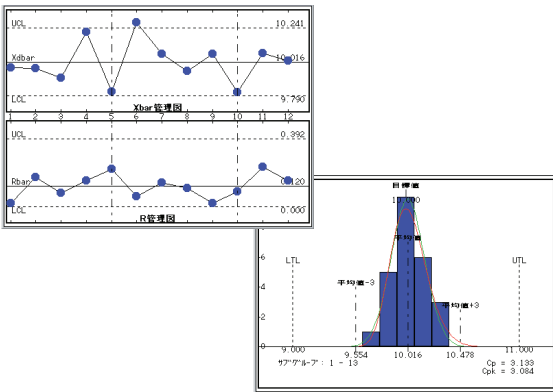
## Early Detection of Process Irregularities

### Centralized process management software: MeasurLink

Statistical data can be displayed in real-time, making early detection of process irregularities possible. Early identification of an out-of-control situation enables rapid remedial action to be taken when necessary.

#### Examples of remedial action

- Mold repair or cycle-timing change
- Cutting tool adjustment or replacement



## Stage Adapter Sets

These are used when connecting some optional peripherals to the measuring device.

Order No.: **Stage adapter : 176-304**

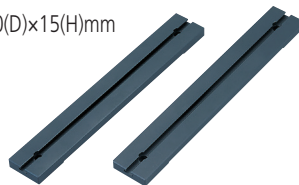
**Stage adapter B : 176-310**

Dimensions (1piece): 50(W)×340(D)×15(H)mm

Note: The stage adapter B is 280(D).

Mass: Stage adapter: 1.5Kg

Stage adapter B: 1.2Kg



|                |                 | Stage size |      |
|----------------|-----------------|------------|------|
|                |                 | 1010       | 2017 |
|                |                 | 2010       | 3017 |
|                |                 |            | 4020 |
| <b>176-304</b> | Stage adapter   | —          | ○    |
| <b>176-310</b> | Stage adapter B | ○          | —    |

Note: One set consists of two adapters.

## Holder with Clamp

Clamping of thin workpieces such as PCBs and pressed parts.

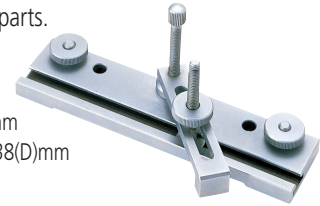
Order No.: **176-107**

Maximum clamp length: 35mm

Dimensions: 62(H)×152(W)×38(D)mm

Mass: 0.4kg

Note: An adapter set is required.



## V-block with Clamp

Clamping of cylindrical objects

Order No.: **172-378**

Max. supportable diameter:  $\phi$ 25mm

Center height from mounting face: 38-48mm

Dimensions: 117(H)×90(W)×45(D)mm

Mass: 0.8kg

Note: An adapter set is required.



## Swivel Center Support

Clamping of the workpiece between centers for effective thread diameter and depth measurements.

Order No.: **172-197**

Can be set to an inclined angle of  $\pm 10^\circ$ , in minimum increments of  $1^\circ$

Max. supportable dimensions:

When horizontally positioned:  $\phi 80 \times 140$ mm

When tilted at  $10^\circ$  angle:  $\phi 65 \times 140$ mm

Mass: 2.5kg

Note: An adapter set is required.



## Foot Switch

Quick data entry while gripping the handle.



Standard type  
Order No.: **937179T**



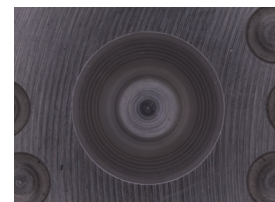
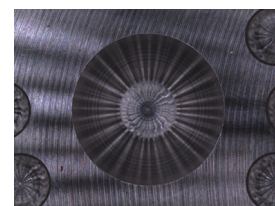
Rigid type  
Order No.: **12AAJ088**

# Optional Accessories

## Ring Light Diffusion Plate

Order No.: **02ATX180**

Effective on a diffusely reflective workpiece such as a machined surface. This plate makes the surface appear smooth to obtain an image suited to measurement. The working distance is 76mm.



# Specifications

|                            |             | Manual stage model         |                            |                            |                            |                            | Motorized stage model      |                            |                            |
|----------------------------|-------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| 0.2X                       | Model No.   | QI-A1010D                  | QI-A2010D                  | QI-A2017D                  | QI-A3017D                  | QI-A4020D                  | QI-C2010D                  | QI-C2017D                  | QI-C3017D                  |
|                            | Order No.   | 361-850A                   | 361-851A                   | 361-852A                   | 361-853A                   | 361-854A                   | 361-860A                   | 361-861A                   | 361-862A                   |
|                            | Package No. | 361-850M3Pk                | 361-851M3PK                | 361-852M3PK                | 361-853M3PK                | 361-854M3PK                | 361-860APK                 | 361-861APK                 | 361-862APK                 |
| Measuring range (XxY)      |             | 3.94" x 3.94"<br>100x100mm | 7.87" x 3.94"<br>200x100mm | 7.87" x 6.69"<br>200x170mm | 11.8" x 6.69"<br>300x170mm | 15.7" x 7.87"<br>400x200mm | 7.87" x 3.94"<br>200x100mm | 7.87" x 6.69"<br>200x170mm | 11.8" x 6.69"<br>300x170mm |
| Effective stage glass size |             | 6.69" x 6.69"<br>170x170mm | 9.53" x 5.51"<br>242x140mm | 10.2" x 9.06"<br>260x230mm | 14.2" x 9.06"<br>360x230mm | 17.3" x 9.13"<br>440x232mm | 9.53" x 5.51"<br>242x140mm | 10.2" x 9.06"<br>260x230mm | 14.2" x 9.06"<br>360x230mm |
| Maximum stage loading *1   |             | Approx. 22 lbs.(10kg)      |                            | Approx. 44 lbs.(20kg)      |                            | Approx. 33 lbs.<br>15kg    | Approx. 22 lbs.<br>10kg    | Approx. 44 lbs.(20kg)      |                            |
| Main unit mass             |             | Approx. 143 lbs.<br>65kg   | Approx. 152 lbs.<br>69kg   | Approx. 330 lbs.<br>150kg  | Approx. 348 lbs.<br>158kg  | Approx. 361 lbs.<br>164kg  | Approx. 158 lbs.<br>72kg   | Approx. 337 lbs.<br>153kg  | Approx. 354 lbs.<br>161kg  |

\*1 Does not include extremely offset or concentrated loads

|                                       |  | QI-A / QI-C  |        |
|---------------------------------------|--|--|--------|
| View field                            |  | 1.26" x 0.94" (32x24mm)  |        |
| Measurement mode                      |  | High resolution mode / Normal mode *4  |        |
| Travel range (Z axis)                 |  | 3.94"(100mm)   |        |
| Accuracy                              | Measurement accuracy within the screen *1  | ±4μm   |        |
|                                       | Repeatability within the screen (±2σ) *2   | High resolution mode   | ±1μm   |
|                                       |  | Normal mode  | ±2μm   |
| Measurement accuracy (E1xy) *1        |  | ±(3.5+0.02L)μm L: arbitrary measuring length (mm)  |        |
| Monitor magnification *3              |  | 7.6X   |        |
| Optical system                        | Magnification (Telecentric Optical System) | 0.2X   |        |
|                                       | Depth of focus                             | High resolution mode   | ±0.6mm |
|                                       |  | Normal mode  | ±11mm  |
| Working distance                      |  | 3.54"(90mm)  |        |
| Camera                                |  | 3 million pixels, 1/2", full color   |        |
| Illumination                          |  | Transmitted light: Green LED telecentric illumination<br>Co-axial light: White LED<br>Ring light: 4-quadrant white LED |        |
| Power supply                          |  | 100-240VAC 50/60Hz   |        |
| Accuracy guaranteed temperature range |  | 19-21°C  |        |

\*1 Inspected to Mitutoyo standards by focus point position.

\*2 The measuring accuracy is guaranteed to be accurate within the depth of focus.

\*3 For 1X digital zoom (when using the 22-inch-wide monitor)

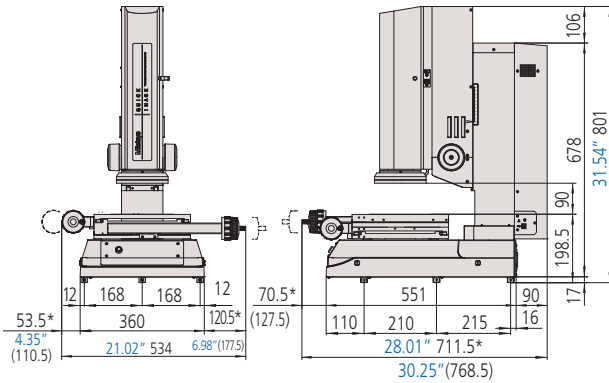
\*4 Patent registered (Japan)

# Dimensions Chart

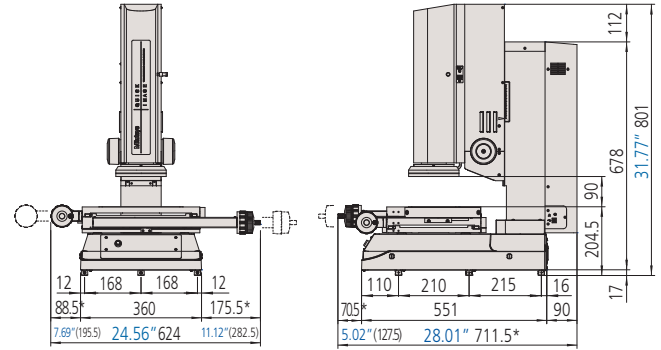
## Manual Stage Model

Unit: Inch mm

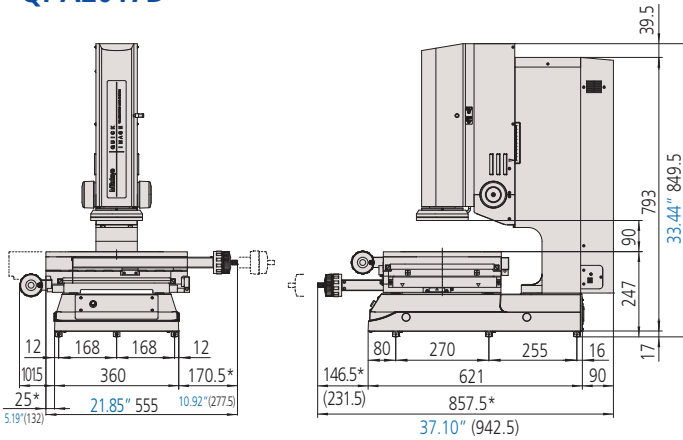
QI-A1010D



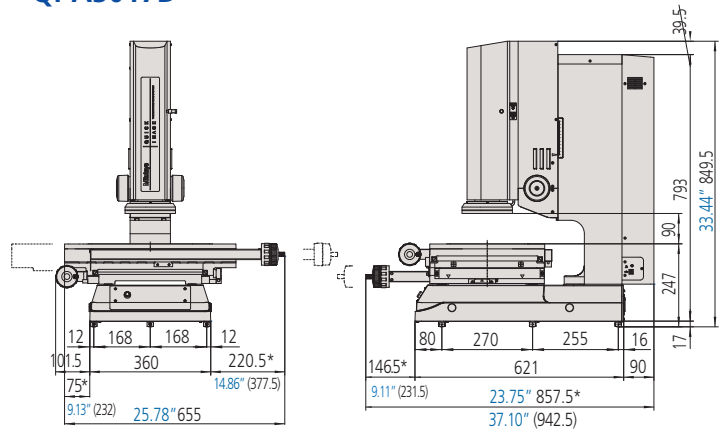
QI-A2010D



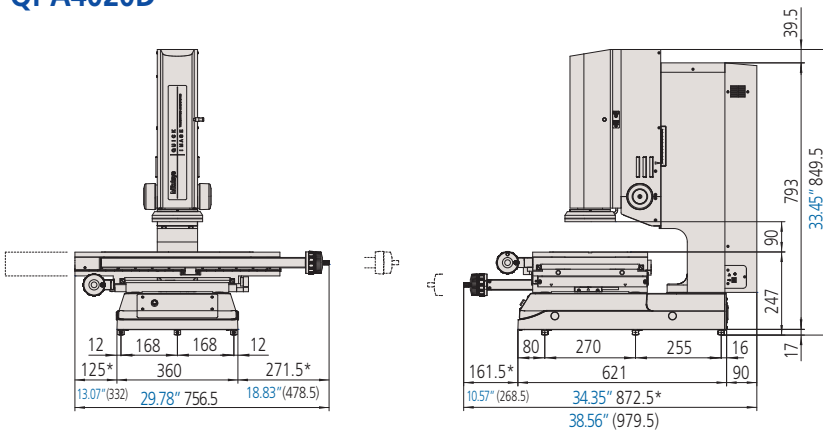
QI-A2017D



QI-A3017D



QI-A4020D



QI-A series  
QI-A2010D  
Manual stage model

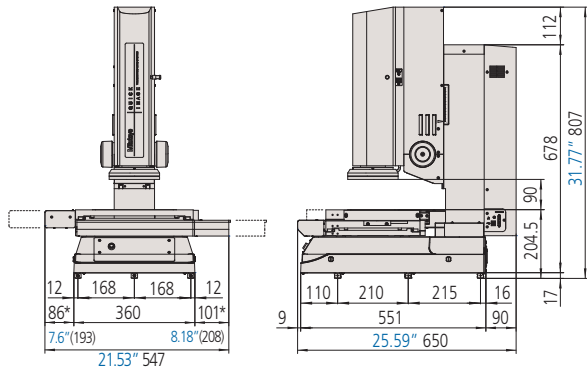


\*Varies depending on position of XY stage.  
Values in parentheses indicate maximum size.

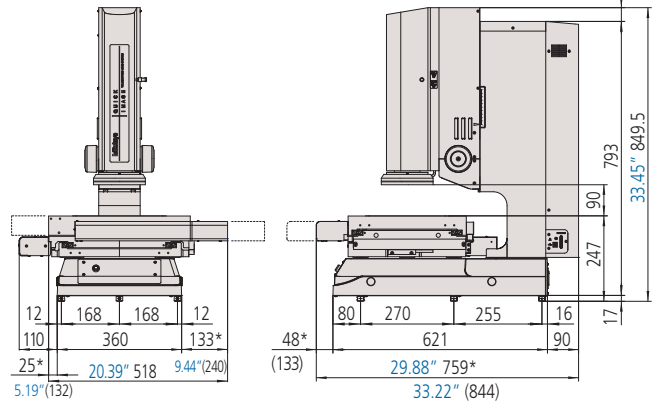
# Motorized Stage Model

Unit: mm

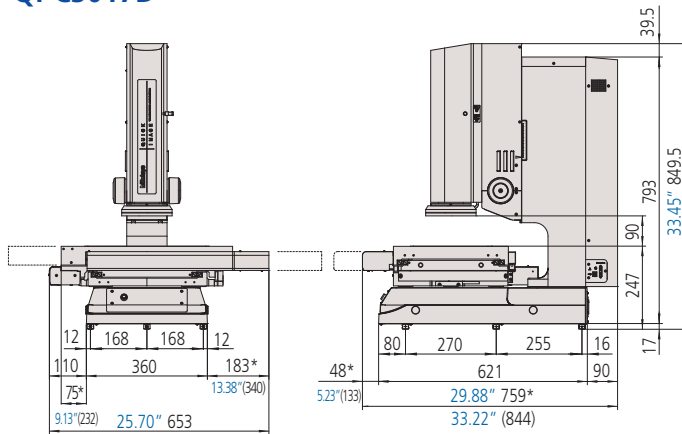
QI-C2010D



QI-C2017D



QI-C3017D



QI-C series  
QI-C2017D  
Motorized stage model



\*Varies depending on position of XY stage.  
Values in parentheses indicate maximum size.



**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](http://www.mitutoyo.com)

**Note:** All information regarding our products, and in particular the illustrations, drawings, dimensional and performance data contained in this printed matter as well as other technical data are to be regarded as approximate average values. We therefore reserve the right to make changes to the corresponding designs. The stated standards, similar technical regulations, descriptions and illustrations of the products were valid at the time of printing. In addition, the latest applicable version of our General Trading Conditions will apply. Only quotations submitted by ourselves may be regarded as definitive. Specifications are subject to change without notice.

Mitutoyo products are subject to US Export Administration Regulations (EAR). Re-export or relocation of our products may require prior approval by an appropriate governing authority.

**Trademarks and Registrations**

Designations used by companies to distinguish their products are often claimed as trademarks. In all instances where Mitutoyo America Corporation is aware of a claim, the product names appear in initial capital or all capital letters. The appropriate companies should be contacted for more complete trademark and registration information.



**Mitutoyo America Corporation**

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**M<sup>3</sup> Solution Centers:**

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- Charlotte, North Carolina
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