2-D Color Vision Measuring System
QUICK IMAGE Series
The 2-D Measuring System Designed and Manufactured by Mitutoyo

Simple to operate with easy-to-use measurement functionality

Superior addition to your quality control system

Reliability

Usability

Efficiency

Outstanding improvement in operational efficiency and productivity

2-D Color Vision Measuring System

QUICK IMAGE Series
Perform Stable, Highly Accurate Measurements Anywhere Within the Screen

The highest level of measuring accuracy within the screen in its class

- Accuracy of ±1.5μm within the screen, repeatability of ±0.7μm 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.

Stable and Highly Accurate Measurement of Large Workpieces

Highly accurate stages

- Stages come in various sizes with an accuracy of ± (3.5 +0.02L) μm, 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.

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

Stitching Function

- A newly developed correction algorithm 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.

Simple Execution of Multiple Measurements

One-click tool

- With just one click, anyone can easily perform multiple measurements. The outlier removal function automatically eliminates unnecessary measurement points, thus enabling accurate and stable multipoint measurement.

Easy-to-Operate Without Instruction

EZ mode  Design application pending (Japan)

- This mode provides an operation guidance display to guide the operator even if it’s their first time performing measurements. This removes the need for continual reference of the instruction manual during operation.
No Troublesome Positioning is Required

One-click execution function  Patent pending (Japan)

- 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.

The position and inclination of a workpiece can be measured even if it has moved.

An Intuitive OK/NG Judgment of Measurement is Provided

Template comparison test function

- The test function compares workpieces against their templates to enable OK/NG judgments to be made at a glance. The function lets you utilize a drawing and CAD model for templates. Standard template shapes can also be created.

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.

Capable of Visually Capturing an Entire Image

Graphics function

- The current position, coordinate system, measuring item and measurement result are automatically displayed in a graphics window. The graphics window prevents omissions and errors with the measurements from occurring. 2-D CAD model data can be imported (optional) in order to better capture the actual full image.

Perform Quick Measurements Even on Large Workpieces

Quick release mechanism on the XY stage  *QI-A series, QI-B 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.
New User-friendly and Convenient XY Stage Movement

New 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.

Motor-driven stage

Dedicated remote box

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.
- 100mm 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 click

- Use pattern search for multiple workpieces within the screen view, and measure them all in one operation with the one-click execution function. 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.

Simple "OK/NG Judgment" of Multiple Workpieces

Tolerance judgment result display function

- OK/NG judgment can be seen at a glance for faster operation.
- OK/NG judgment can be done for each measurement item, and judgment can be passed on each workpiece.
- Prevents NG data omissions.

Simple Execution of Stored Measurement Programs

Program launcher

- A measurement procedure program can be stored under a dedicated icon along with a photo and comments to enable the required programs to be started easily.
- 10 icons are available and programs can be managed for each operator or workpiece.

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

- 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.
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 QIPAK

QIPAK (Two Modes) Enables Quick and Easy Measurement

**EZ Mode**  
(Simple measurement mode)

**PRO Mode**  
(General purpose measurement mode)

Simple Execution and Editing of Programs

**Smart editor**
This function allows XY-stage target position, illumination condition, etc., to be separately displayed as icons or labels in the list of part programs (automatic measurement procedure programs), thereby simplifying program editing.

Powerful Edge Detection Functionality Enables Fast Measurement

**Outlier removal**
Removes outliers caused by anomalies such as debris, burrs and chips.

**Auto trace tool**
Automatically detects the edges of unknown contours and obtains point group data.  
Point group data lets you perform contour form analysis and design value comparison using FORMTRACEPAK-AP (optional).
Optional Accessories

Easy Handling of Sophisticated Dimension and Contour Evaluations

Contour evaluation and analysis software: FORMTRACEPAK-AP
FORMTRACEPAK-AP is data processing software for advanced form analysis that carefully reads point group data acquired via tools such as the auto trace tool.
- A contour measurement is easy to make. Perform contour matching against the design value data.
- You can define virtual circles of a given diameter enabling over-pin diameter analysis to be performed.

Example of gear contour matching, and an over-pin diameter analysis

CAD Model Import

Measurement support software: QS-CAD I/F
2-D CAD model data (DXF-, or IGES-formatted) can be imported into QIPAK. Conversely, QIPAK measurement results can be converted into 2-D CAD model data. The design value for each measurement item is automatically entered. Since the graphics window makes the present location easy to identify, the operator can quickly move the stage to a given point in the 2-D CAD model.

Example of 2-D CAD model data and QIPAK measurement results

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

Holder with Clamp
Clamping of thin workpieces such as PCBs and pressed parts.
Order No.: 176-107
Maximum clamp length: 35mm
Dimensions: 620(W)×1520(D)×3800(Dmm
Mass: 0.4kg
Note: An adapter set is required.

V-block with Clamp
Clamping of cylindrical objects
Order No.: 172-378
Max. supportable diameter: ø25mm
Center height from mounting face: 38-48mm
Dimensions: 117(H)×90(W)×49(D)mm
Mass: 0.8kg
Note: An adapter set is required.

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 (1 piece): 500(W)×340(D)×150(0mm
Note: The stage adapter B is 280(D).
Mass: Stage adapter: 1.5kg
Stage adapter B: 1.2kg

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 ±10°, in minimum increments of 1°
Max. supportable dimensions:
- When horizontally positioned: ø80×140mm
- When tilted at 10°angle: ø65×140mm
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

Holder with Clamp
Clamping of thin workpieces such as PCBs and pressed parts.
Order No.: 176-107
Maximum clamp length: 35mm
Dimensions: 620(W)×1520(D)×3800(Dmm
Mass: 0.4kg
Note: An adapter set is required.

V-block with Clamp
Clamping of cylindrical objects
Order No.: 172-378
Max. supportable diameter: ø25mm
Center height from mounting face: 38-48mm
Dimensions: 117(H)×90(W)×49(D)mm
Mass: 0.8kg
Note: An adapter set is required.

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 (1 piece): 500(W)×340(D)×150(0mm
Note: The stage adapter B is 280(D).
Mass: Stage adapter: 1.5kg
Stage adapter B: 1.2kg

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 ±10°, in minimum increments of 1°
Max. supportable dimensions:
- When horizontally positioned: ø80×140mm
- When tilted at 10°angle: ø65×140mm
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

<table>
<thead>
<tr>
<th>Optional Accessories</th>
<th>0.2X Model</th>
<th>0.5X Model</th>
<th>Manual stage model</th>
<th>Motorized stage model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>QI-A1010D</td>
<td>QI-A2010D</td>
<td>QI-A3017D</td>
<td>QI-C2010D</td>
</tr>
<tr>
<td>Model</td>
<td>QI-B1010D</td>
<td>QI-B2010D</td>
<td>QI-B3017D</td>
<td>QI-C2017D</td>
</tr>
<tr>
<td>Model</td>
<td>QI-A1017D</td>
<td>QI-A2017D</td>
<td>QI-A3017D</td>
<td>QI-C2017D</td>
</tr>
<tr>
<td>Model</td>
<td>QI-A4020D</td>
<td>QI-B4020D</td>
<td>QI-B4020D</td>
<td>QI-C3017D</td>
</tr>
<tr>
<td>Measuring range (XxY)</td>
<td>3.94” x 3.94”</td>
<td>7.87” x 3.94”</td>
<td>11.8” x 6.69”</td>
<td>15.7” x 7.87”</td>
</tr>
<tr>
<td>Effective stage glass size</td>
<td>100x100mm</td>
<td>200x100mm</td>
<td>300x170mm</td>
<td>400x200mm</td>
</tr>
<tr>
<td>Maximum stage loading *1</td>
<td>Approx. 22 lbs.</td>
<td>Approx. 44 lbs.</td>
<td>Approx. 33 lbs.</td>
<td>Approx. 22 lbs.</td>
</tr>
<tr>
<td>Main unit mass</td>
<td>Approx. 142 lbs.</td>
<td>Approx. 102 lbs.</td>
<td>Approx. 330 lbs.</td>
<td>Approx. 158 lbs.</td>
</tr>
</tbody>
</table>

*1 Does not include extremely offset or concentrated loads

<table>
<thead>
<tr>
<th>QI-A / QI-C</th>
<th>QI-B</th>
</tr>
</thead>
<tbody>
<tr>
<td>View field</td>
<td>1.26” x 0.94” (32x24mm)</td>
</tr>
<tr>
<td>Measurement mode</td>
<td>High resolution mode / Normal mode *4</td>
</tr>
<tr>
<td>Travel range (Z axis)</td>
<td>3.94”(100mm)</td>
</tr>
<tr>
<td>Accuracy</td>
<td></td>
</tr>
<tr>
<td>Measurement accuracy within the screen *1</td>
<td>High resolution mode</td>
</tr>
<tr>
<td>Normal mode</td>
<td>±1.5μm</td>
</tr>
<tr>
<td>Repeatability within the screen (±2σ) *2</td>
<td>High resolution mode</td>
</tr>
<tr>
<td>Normal mode</td>
<td>±3μm</td>
</tr>
<tr>
<td>Measurement accuracy (E1xy) **1</td>
<td>±(3.5+0.02)μm</td>
</tr>
<tr>
<td>Monitor magnification *3</td>
<td>7.6X</td>
</tr>
<tr>
<td>Optical system</td>
<td>Magnification (Telecentric Optical System)</td>
</tr>
<tr>
<td>Depth of focus</td>
<td>High resolution mode</td>
</tr>
<tr>
<td>Normal mode</td>
<td>±11mm</td>
</tr>
<tr>
<td>Working distance</td>
<td>3.54”(90mm)</td>
</tr>
<tr>
<td>Camera</td>
<td>3 million pixels, 1/2”, full color</td>
</tr>
<tr>
<td>Illumination</td>
<td>Transmitted light: Green LED telecentric illumination</td>
</tr>
<tr>
<td>Power supply</td>
<td>100-240VAC, 50/60Hz</td>
</tr>
<tr>
<td>Accuracy guaranteed temperature range</td>
<td>19-21°C</td>
</tr>
</tbody>
</table>

*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

QI-A1010D/B1010D

QI-A2010D/B2010D

QI-A2017D/B2017D

QI-A3017D/B3017D

QI-A4020D/B4020D

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

The mounting stand (02ATX190) is optional.
Motorized Stage Model

QI-C2010D

QI-C2017D

QI-C3017D

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

The mounting stand (02ATX190) is optional.
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.