Vision Measuring Systems
QUICK SCOPE QS-L
High-intensity 4-quadrant LED ring light generates shadows to highlight edges that otherwise would be practically invisible.

High-speed image auto focus achieving height measurement now standard equipment. Measurements previously performed using an optical measuring instrument and an indicator are now integrated into one machine.

Reliable small-parts measurement

High-speed 7X optical zoom with an interchangeable objective lens unit provides sharp and bright images and measures details that cannot even be recognized when using digital zoom.

Highlights hard-to-see edges

High-intensity 4-quadrant LED ring light generates shadows to highlight edges that otherwise would be practically invisible.

Vision Measuring Systems

QUICK SCOPE QS-L
**Problems with simple dimensional measuring devices**

### Problems

1. **Hard to measure reliably using regular microscope lighting**
   - Some edges cannot be accurately detected and captured when using only the ring light as edge height and shape are so variable.

2. **Cannot measure micro dimensions due to low magnification**
   - Some micro forms cannot be measured with only a digital zoom.
   - Measurement of the width of micro-recessed forms cannot be accurately performed due to low magnification.

3. **Edge measurement of a stepped feature cannot be performed correctly**
   - Some desired edge contrast cannot be obtained with a simple dimension measuring device that has generally low magnification due to deep focus depth.

4. **Height measurement results are not stable**
   - Height measurement with a contact probe

5. **Unsure about the integrity of measurement results to be submitted to customers**

### QS-L solutions

1. **Edge measurement using a combination of co-axial light, ring light and transmitted light**
   - Indistinct image using ring light
   - Positive edge detection with co-axial light

2. **7X optical zoom unit with interchangeable objective lenses enables measuring small parts**
   - Measurement with optimized optical zoom is available
   - Edge capture with the ideal magnification is always available

3. **Edges can easily be captured with the interchangeable objective lens zoom unit**
   - Measurement of micro radii is easy with the correct magnification

4. **Image auto focus function is equipped as standard**
   - Image auto focus offers reliable and highly accurate measurement of target height with the minimum clamping of a workpiece

5. **Mitutoyo provides inspection/calibration services using reference instruments that are traceable to NIST**
Generic technology realizes accurate measurement

**7X optical zoom unit with interchangeable objective lenses** offers reliable small-part measurement

Newly designed 7X optical zoom unit with interchangeable objective lenses accurately captures measurement targets from wide-field to micro form. In addition, 4X digital zoom is available using software.

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<thead>
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<tbody>
<tr>
<td>1X</td>
<td>0.5X</td>
<td>0.65X</td>
<td>0.75X</td>
<td>0.85X</td>
<td>0.98X</td>
<td>1X</td>
<td>1.28X</td>
<td>1.3X</td>
<td>1.5X</td>
<td>2X</td>
<td>2.25X</td>
<td>2.5X</td>
<td>3X</td>
<td>3.75X</td>
<td>4X</td>
<td>5X</td>
<td>5.25X</td>
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<td>View field</td>
<td>Horizontal (H) Vertical (V)</td>
<td>13.10</td>
<td>10.08</td>
<td>9.84</td>
<td>8.73</td>
<td>7.71</td>
<td>6.72</td>
<td>6.55</td>
<td>5.14</td>
<td>5.04</td>
<td>4.37</td>
<td>3.85</td>
<td>3.28</td>
<td>2.91</td>
<td>2.62</td>
<td>2.19</td>
<td>1.97</td>
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<td>Total magnification</td>
<td>on the monitor</td>
<td>19</td>
<td>25</td>
<td>29</td>
<td>33</td>
<td>38</td>
<td>38.5</td>
<td>49.5</td>
<td>50</td>
<td>58</td>
<td>65.5</td>
<td>77</td>
<td>87</td>
<td>96</td>
<td>116</td>
<td>135</td>
<td>145</td>
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</table>

Note: The total magnification indicates the magnification on the monitor when the QSPAK video window size is the default 252.7 x 214.9 mm.
High-speed image auto focus enables highly accurate height measurement

Since non-contact measurement requires only minimal clamping of the workpiece, height measurement can be performed efficiently. Also, in contrast with laser-equipped measuring devices, height measurement is less influenced by the surface roughness of the workpiece.

LED light unit offers a high degree of freedom for reliable edge measurement

The view may vary depending on the type of method used for lighting the workpiece. The QS-L can capture edges accurately by switching between transmitted lighting, co-axial lighting and ring lighting.

Lighting tool (Contrast and brightness)

The lighting tool offers automatic adjustment of the ideal light intensity so that constant brightness can be maintained. It also eliminates data dispersion caused by lighting conditions.
Software enables easy operation and reliable measurement

QSPAK

Large screen makes detailed operations easy
All the functions needed for measurement are displayed on one screen; measurements can be performed by simply moving the mouse. Large images enable users to measure details with ease.

Eliminates confusion between results and points
Since measurement result images are displayed, confusing results that can occur with just showing measuring points can be eliminated.

Detection tools matched to targets
Detection tools can be located relative to stored patterns in order to capture edges with high accuracy.

One-click edge detection
Circles, lines and points around the measurement can be read out instantly with one click of the mouse.

User-friendly operation guidance
When a command is selected, an explanation of the corresponding operation method is provided.

Many commands enable fast measurement
A wide choice of commands including various distance and intersection point measurements enable easy and reliable measurement.
**Remove influence from cracks and burrs by excluding abnormal points**

Erroneous measurement points caused by dust adhering to a workpiece including cracks and burrs are automatically removed. The removal threshold can also be set easily.

**Template function**

The template function overlays a grid in rectangular, circular, or custom shapes.

**Form tolerance is also supported**

The auto trace tool measures complex contours on the screen automatically.

**Identifies desired measured points quickly**

Measured points can be quickly found in the graphical window. Operations on measured elements using graphics can also be performed easily.

**Multiple measurement runs can easily be combined**

CSV output of measurement results can be used for statistical data processing with Excel.

**Option**

Optional FORMTRACEPAK-AP analysis software can provide advanced dimensional analysis.

**In addition**

The optional MeasurLink® software provides statistical process control (SPC) control charts, histograms and process capability indexes.

Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>QS-L2010Z/AFC</th>
<th>QS-L3017Z/AFC</th>
<th>QS-L4020Z/AFC</th>
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<tbody>
<tr>
<td>Order No.</td>
<td>359-713-10</td>
<td>359-714-10</td>
<td>359-715-10</td>
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<tr>
<td>Drive method</td>
<td>X Y axes: Manual</td>
<td>2 axis: CNC with Auto focus</td>
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<tr>
<td>Measuring volume</td>
<td>8x4x6&quot; (200x100x150 mm)</td>
<td>12x6.7x6&quot; (300x170x150 mm)</td>
<td>16x8x6&quot; (400x200x150 mm)</td>
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<tr>
<td>Resolution / Scale type</td>
<td>0.1 µm / Linear encoder</td>
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<td></td>
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<tr>
<td>Accuracy <em>1</em>2</td>
<td>X axis, Y axis</td>
<td>(2.2+0.02L) µm</td>
<td>(4.5+0.006L) µm</td>
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<tr>
<td>Accuracy guaranteed temperature range</td>
<td>20±1 ºC</td>
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<tr>
<td>Observation unit *3</td>
<td>7X zoom (8 steps) interchangeable objective lenses (1X objective 0.5X - 3.5X; 1.5X objective 0.75X - 5.25X; 2X objective 1X - 7X)</td>
<td></td>
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<tr>
<td>Image sensor</td>
<td>3 Megapixel, CMOS color camera</td>
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<td></td>
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<tr>
<td>Illumination</td>
<td>Transmitted light white LED</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Co-axial light white LED</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Ring light 4-quadrant ring light (LED)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions (main unit, WxDxH)</td>
<td>24.5x28x29&quot; (624x711x729 mm)</td>
<td>27x34x33&quot; (692x857x837 mm)</td>
<td>30x34x33&quot; (757x867x837 mm)</td>
</tr>
<tr>
<td>Stage glass size</td>
<td>10x6&quot; (250x150 mm)</td>
<td>14.5x9&quot; (370x240 mm)</td>
<td>18x9&quot; (450x240 mm)</td>
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<tr>
<td>Maximum stage loading</td>
<td>22 lbs (10 kg)</td>
<td>44 lbs (20 kg)</td>
<td>33 lbs (15 kg)</td>
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<tr>
<td>Mass (main unit)</td>
<td>154 lbs (70 kg)</td>
<td>353 lbs (60 kg)</td>
<td>368 lbs (167 kg)</td>
</tr>
</tbody>
</table>

*1: Inspected to Mitutoyo standard. L = measuring length (mm)
*2: 3X lens magnification or greater
*3: 1X and 2X objective lenses are optional

Remote box

Adjustment knob for co-axial light, transmitted light and ring light intensity
Emergency stop switch
Speed adjustment knob
Data input button
Zoom switch button
Auto focus button
X-Y-Z-axis reset button
Outer: Jog-shuttle (Z-axis fast feed)
Inner: Jog dial (Z-axis fine acceleration)
External dimensions

**QS-L2010Z/AFC**

- **External dimensions**: 1800(W)×900(D)×740(H) mm
- **Mass**: 60 kg

**Option**

- **Calibration chart**
  - Order No.: 02ATN685
  - **Application**: This corrects the pixel size of the camera, the accuracy of automatic focusing at each magnification and optical axis offset.

- **Foot switch (Solid type)**
  - Order No.: 12AAJ088

- **Turntable with fine adjustment (A), (B)**
  - Order No.: 176-305, 176-306
  - **External dimensions**: 280(W)×280(D)×24(H) mm
  - **Effective glass size (mm)**: ø182
  - **Maximum supportable diameter**: 25 mm
  - **Center height from the mounting surface**: 38 – 48 mm
  - **Application**: Some optional products require this to be mounted on the measuring machine.
  - **Note**: V-block stage, swivel center support and holder with clamp can be fixed on the table.

- **Holder with clamp**
  - Order No.: 176-107
  - **Maximum length of the clamp**: 35 mm

- **V-block with clamp**
  - Order No.: 172-378
  - **Maximum supportable diameter**: 25 mm
  - **Center height from the mounting surface**: 38 – 48 mm

- **Swivel center support**
  - Order No.: 172-197
  - **Application**: Some optional products require this to be mounted on the measuring machine.
  - **Note**: A set consists of 2 sheets.

- **Stage adapter Stage adapter B**
  - Order No.: Stage adapter: 176-304, Stage adapter B: 176-310
  - **Application**: Some optional products require this to be mounted on the measuring machine.
  - **Note**: A set consists of 2 sheets.

- **Exclusive table**
  - Order No.: 02ATE760
  - **External dimensions**: 1800(W)×900(D)×740(H) mm
  - **Mass**: 60 kg
Optional software

**FORMTRACEPAK-AP**

Geometrical tolerance, contour degree evaluation and micro dimension analysis can be performed from the contour data obtained using a quick scope.

**MeasurLink® Real-Time Professional**

MeasurLink® Real-Time is Statistical Process Control (SPC) software that displays statistical processing results including control charts, histograms and process capability indexes in real-time based on data collected through the quick scope and measuring devices and systems. The software helps prevent generating scrap by tracking dimension variation trends so that early preventive action can be taken when a process is seen to be about to produce product outside the tolerance limits.

**QS-CAD I/F**

- Shows the current observation point corresponding to stage position information.
- Can extract design information from graphic elements and skip manual input during verification.
- Output of measurement results as CAD data is available.

**Measure Report**

This software creates inspection sheets from data collected by measuring devices and systems including the quick scope, using a highly customizable layout.
Traceability

Traceability to the national standard of length

- Mitutoyo owns standard scales that are traceable to the national standard of length and are used to calibrate the reference gages used for calibration of measuring instruments, thus establishing and maintaining traceability for each instrument.

Reliable support system

The world’s top-level global network

Following the establishment of MTI Corporation (U.S.) in 1963, Mitutoyo has been expanding its market presence throughout the world. Currently, the company has R&D, manufacturing, sales, and engineering service bases in 29 countries, as well as a network of distributors in some 80 countries. Mitutoyo maintains its rock-solid status as a leading global manufacturer providing services tailored to each regional society.
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.