Vision Measuring Systems
QUICK SCOPE QS-L
High-speed image auto focus achieving height measurement now standard equipment. Measurements thus far performed separately 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. 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

<table>
<thead>
<tr>
<th>Problems</th>
<th>QS-L solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>✔️ Hard to measure reliably using regular microscope lighting</strong></td>
<td><strong>Edge measurement using a combination of co-axial light, ring light and transmitted light</strong></td>
</tr>
<tr>
<td>Some edges cannot be accurately detected and captured when using only the ring light as edge height and shape are so variable.</td>
<td>Positive edge detection with co-axial light</td>
</tr>
<tr>
<td><strong>✔️ Cannot measure micro dimensions due to low magnification</strong></td>
<td><strong>7X optical zoom unit with interchangeable objective lenses enables measuring small parts</strong></td>
</tr>
<tr>
<td>Some micro forms cannot be measured with only a digital zoom.</td>
<td>Edge capture with the ideal magnification is always available</td>
</tr>
<tr>
<td>Measurement of the width of micro-recessed-forms cannot be accurately performed due to low magnification.</td>
<td>Measurement of micro radii is easy with the correct magnification</td>
</tr>
<tr>
<td><strong>✔️ Edge measurement of a stepped feature cannot be performed correctly</strong></td>
<td>Edges can easily be captured with the interchangeable objective lens zoom unit</td>
</tr>
<tr>
<td>Some desired edge contrast cannot be obtained with a simple dimension measuring device that has generally low magnification due to deep focus depth.</td>
<td>Measurement with optimized optical zoom is available</td>
</tr>
<tr>
<td><strong>✔️ Height measurement results are not stable</strong></td>
<td><strong>Image auto focus function is equipped as standard</strong></td>
</tr>
<tr>
<td>Height measurement with a contact probe</td>
<td>Image auto focus offers sure and highly accurate measurement of target height with the minimum clamping of a workpiece</td>
</tr>
<tr>
<td><strong>✔️ Unsure about the integrity of measurement results to be submitted to customers</strong></td>
<td><strong>Mitutoyo provides inspection/calibration services using reference instruments that are traceable to the national standard</strong></td>
</tr>
</tbody>
</table>
**Generic technology realizes accurate measurement**

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

### Optical zoom magnification

<table>
<thead>
<tr>
<th>Magnification</th>
<th>0.5X</th>
<th>0.65X</th>
<th>0.75X</th>
<th>0.85X</th>
<th>0.98X</th>
<th>1X</th>
<th>1.28X</th>
<th>1.3X</th>
<th>1.5X</th>
<th>1.7X</th>
<th>2X</th>
<th>2.25X</th>
<th>2.5X</th>
<th>3X</th>
<th>3.5X</th>
<th>3.75X</th>
<th>4X</th>
<th>5X</th>
<th>5.25X</th>
<th>7X</th>
</tr>
</thead>
<tbody>
<tr>
<td>View field (mm)</td>
<td>13.10</td>
<td>10.08</td>
<td>8.73</td>
<td>7.71</td>
<td>7.22</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>2.18</td>
<td>1.87</td>
<td>1.75</td>
<td>1.64</td>
<td>1.31</td>
<td>1.23</td>
<td>0.98</td>
</tr>
<tr>
<td>Horizontal (H)</td>
<td>9.84</td>
<td>7.57</td>
<td>6.56</td>
<td>5.79</td>
<td>5.05</td>
<td>4.92</td>
<td>3.86</td>
<td>3.78</td>
<td>3.28</td>
<td>2.89</td>
<td>2.46</td>
<td>2.19</td>
<td>1.97</td>
<td>1.64</td>
<td>1.41</td>
<td>1.31</td>
<td>1.23</td>
<td>0.98</td>
<td>0.94</td>
<td>0.70</td>
</tr>
<tr>
<td>Vertical (V)</td>
<td>13</td>
<td>10.08</td>
<td>8.73</td>
<td>7.71</td>
<td>7.22</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>
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<td>1.75</td>
<td>1.64</td>
<td>1.31</td>
<td>1.23</td>
<td>0.98</td>
</tr>
<tr>
<td>Total magnification (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>
<td>154</td>
<td>193</td>
<td>202</td>
<td>270</td>
</tr>
</tbody>
</table>

### Optical zoom

- **1X objective (optional)**
- **1.5X objective (standard accessory)**
- **2X objective (optional)**

### LED device

- **1X**
- **1.3X**
- **1.7X**
- **2X**
- **3X**
- **5X**
- **7X**

### Cutting tool

- **0.75X**
- **0.98X**
- **1.28X**
- **1.5X**
- **2.25X**
- **3X**
- **3.75X**
- **5.25X**

### Plastic molded article

- **0.5X**
- **0.65X**
- **0.85X**
- **1X**
- **1.5X**
- **2X**
- **2.5X**
- **3.5X**

### Objective lens

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

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 the minimum 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 setting 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; measurement 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.

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

Detection tools matched to targets
Detection tools can be selected according to the measuring point in order to capture edges with high accuracy.

User-friendly operation guidance
When a command is selected, an explanation of the corresponding operation method is provided.
Remove influence from breakage and burrs by excluding abnormal points
Erroneous measurement points caused by dust adhering to a workpiece including breakage and burrs are automatically removed. The removal threshold can also be set easily.

Form tolerance is also supported
The auto trace tool enables tracking and acquiring contours on the screen by copying automatically.

Identifies desired measuring points quickly
Measuring points can be quickly found in the graphical window. Operations on measured elements using graphics can also be performed easily.

Totalization of daily measurements can be easily performed
CSV output of measurement results is available so that they can be used for statistical data processing with Excel.

Template function
The template function making forms visible is featured for the first time.

Concentric circle template
User template

Option
The FORMTRACEPAK-AP optional analysis software can provide advanced dimensional analysis.

In addition

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

## Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Order No.</th>
<th>Drive method</th>
<th>Measuring volume</th>
<th>Resolution / Scale type</th>
<th>Accuracy *1+2</th>
<th>Accuracy guaranteed temperature range</th>
<th>Observation unit *3</th>
<th>Image sensor</th>
<th>Illumination</th>
<th>Lighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>QS-L2010Z/AFC</td>
<td>359-713-10</td>
<td>X/Y axes: Manual</td>
<td>200×100×150 mm</td>
<td>0.1 µm / Linear encoder</td>
<td>(2.2±0.02L) µm</td>
<td>20±1 ºC</td>
<td>7X zoom (8 steps)</td>
<td>3 Megapixel, CMOS color camera</td>
<td></td>
<td></td>
</tr>
<tr>
<td>QS-L3017Z/AFC</td>
<td>359-714-10</td>
<td>Z axis: CNC with Auto focus</td>
<td>300×170×150 mm</td>
<td>(4.5±0.006L) µm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>QS-L4020Z/AFC</td>
<td>359-715-10</td>
<td></td>
<td>400×200×150 mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></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**

<table>
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<tr>
<th>1800</th>
<th>900</th>
</tr>
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**External dimensions**

**QS-L3017Z/AFC**

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**External dimensions**

**QS-L4020Z/AFC**

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</table>

**External dimensions**

**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)**

- **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

- **Stage adapter**
  - Stage adapter: 176-304
  - Stage adapter B: 176-310
  - Application: Some optional products require this 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 on the basis of the contour data obtained using a quick scope.

MeasurLink Real-Time Professional

MeasurLink Real-Time is the 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

- Specifies the current observation point corresponding to stage position information.
- Can extract design information from graphic elements and omit key 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 layout offering a high degree of freedom.
Traceability

Traceability to the national standard of length

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

• Our calibration organizations are accredited by JIAJapan, a signatory to the Mutual Recognition Arrangement (MRA) of the International Laboratory Accreditation Cooperation (ILAC), and approved of as having measurement skills equivalent to those of overseas organizations.

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 up 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 bespoke measuring solutions and even, if deemed cost-effective, take your critical measurement challenges in-house on a sub-contract basis.

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If the purchased product is exported, even though it is not a regulated item (Catch-All controls item), the customer service available for that product may be affected. If you have any questions, please consult your local Mitutoyo sales office.

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