KEYENCE

Image Dimension Measurement System
IM-6015/IM-6025 Series
General-purpose Model

NEW

INSTANT MEASUREMENT
IM Series Image Dimension Measurement System

Ø100 mm
General-purpose Model
FASTER AND MORE PRECISE

Just Place and Press
A Completely New Way of Inspecting Parts

Image dimension measurement system IMseries

How can functionality be improved while retaining the advantages of conventional measurement systems? After facing this question squarely and thoroughly, we have reached an answer: Combine revolutionary technology with a cutting edge user interface.

By providing both overwhelming measurement speed and high measurement accuracy, the IM Series image dimension measurement system changes your measurement operations dramatically.

Comparison with various measurement systems

<table>
<thead>
<tr>
<th></th>
<th>Measurement time</th>
<th>Individual differences</th>
<th>User friendliness</th>
<th>Data management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optical comparator</td>
<td>×</td>
<td>×</td>
<td>✓</td>
<td>×</td>
</tr>
<tr>
<td>Measuring microscope</td>
<td>×</td>
<td>✓</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>Optical CMM</td>
<td>×</td>
<td>✓</td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td>GD&amp;T and Profile Measurement System</td>
<td>×</td>
<td>✓</td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td>Hand caliper</td>
<td>✓</td>
<td>×</td>
<td>✓</td>
<td>×</td>
</tr>
<tr>
<td>IM Series</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
Drastically Reduced Measurement Time

**Conventional**

Manual part positioning and focus adjustment are required. The more the measurement points, the longer the time required for measurement.

Example:
When 300 or more seconds are required to measure 10 points with an optical comparator

- **Positioning time:** 5 seconds or less
- **Focus adjustment time:** 5 seconds or less
- **Measurement time:** 300 seconds or more

**IM Series**

Measurement requires only placing a target on the stage and pressing the measurement start button. This simple operation enables 99 features to be measured in seconds, leading to significant reduction in time required for dimension measurement.

Eliminating Operator Error

**Conventional**

Measurement results vary depending on habits and skill levels of individual operators such as a measurement point selection, part alignment procedure, and focus position.

Different results among different operators...

- Operator A: 78.4 mm
- Operator B: 78.6 mm
- Operator C: 78.8 mm

**IM Series**

No individual differences!

- Operator A: 78.6 mm
- Operator B: 78.6 mm
- Operator C: 78.6 mm

The location and orientation of a target are automatically adjusted and measurement is performed using the specified points. Manual operations, which used to cause measurement differences are not required such as measurement point selection, edge alignment, and focus adjustment.
Easy Data Management

Conventional

Data management requires time and effort such as recording results on paper and entering data into a PC.

1. MEASUREMENT COMPLETE
2. FILL OUT AN INSPECTION RECORD
3. INPUT DATA TO A PC
4. PROCESS WITH SPREADSHEET SOFTWARE
5. PREPARE AN ANALYSIS/INSPECTION REPORT

IM Series

1. MEASUREMENT COMPLETE
2. PREPARE AN ANALYSIS/INSPECTION REPORT

Measurement results are saved automatically in the controller. Manual operations such as statistics management of measurement results and data transfer to a PC can also be done easily.

Easy Operation for Everyone

Conventional

The higher the magnification, the narrower the field of view, which decreases operation efficiency and user friendliness.

Partial view of a target, requiring point-by-point measurement

IM Series

Industry first

Captures the entire image of a target and measures simultaneously

The IM Series enables you to set measurement points while checking the entire image of a target. In addition, measurement points can be selected simply with the mouse. This ensures simple operation for everyone.
Optical Technologies for Achieving “Place-and-Press” Measurement
Clear Focus Regardless of Height Differences

KEYENCE’s specifically designed lens provides a super wide field of view which ensures that the part is always in focus regardless of height differences. This allows for optimal accuracy at all times without worrying about setup.

Apparent Feature Size not Affected by Height Differences

A telecentric lens maintains a constant image size regardless of height differences of a target. This allows accurate measurement of targets with uneven surfaces.

Less Distortion even Along Circumference

A lens with a low distortion even for the area along the outer edge of the field of view. Targets can be measured without concerns of their placement.
Measurement Time Drastically Reduced through Unparalleled Speed

Just Place and Press to Complete Dimension Measurement
**Pattern search for automatic location and orientation correction**

The location and orientation of the target placed on the measurement stage are automatically detected and measured based on the recorded shape of the target. There is no need for positioning of the target or preparation of a jig at the beginning of measurement.

**Simultaneous measurement of 99 features by capturing an entire part**

This is a completely new measurement system which measures by capturing the entire image of a target within the field of view. Measurement is completed in a short time because all features are measured after the entire image is captured.

**Batch measurement for further reduction in measurement time**

The dimensions of all targets on the stage are measured simultaneously. Even when the targets are placed randomly, their locations and orientations are detected and measured automatically.
Same Results no Matter who Carried Out the Measurement

Latest Image Processing Technology Eliminates Individual Differences
Sub-pixel processing for measurement down to one hundredth or less of one pixel

Sub-pixel processing allows one pixel on the light receiving element to essentially be processed as 100 or more pixels. This allows for high-resolution measurement even with a wider field of view.

A line or circle is recognised using 100 or more points*

The shape of a line or circle used for measurement is recognised by the least square fit algorithm using approximately 100 points detected automatically. Using many points ensures stable measurement.

* The exact number of points is user adjustable for optimal detection.

Eliminating discrepancies in results caused by burrs and chips

During the extraction of a line or circle, the system eliminates the influence of burrs or chips by ignoring points at abnormal locations in comparison with other points. It is also possible to set the system to interrupt measurement when burrs or chips are found.
The measurement values are saved automatically and can be easily organised and processed with the statistics/analysis function to create analysis of a statistical index, trend, variations or to prepare inspection records.

Conventional method
(Hand caliper, Digital micrometer, Optical comparator)

Considerable time and effort required for recording and processing
Manual recording of results was necessary every time the operator completed measurement of one point. There were other tasks such as PC data entry and processing which required considerable time and effort. In addition, manual data recording and input sometimes produced additional errors.

Easy data analysis and report preparation
The measurement values are saved automatically and can be easily organised and processed with the statistics/analysis function to create analysis of a statistical index, trend, variations or to prepare inspection records.

IM Series
Automatic calculation of major statistical values. Group extraction is also easy.

Critical statistical values required for inspection reports are automatically calculated and displayed, including maximum, minimum, average, $\sigma$, $3\sigma$ and Cpk. You can also set various conditions for group extraction for statistical, analysis, and inspection records.

Trend graph/histogram functions for on-site analysis of product trends and variations

The trend graph/histogram function allows on-site analysis of production trends and variations. Quick feedback helps quality management prevent production of defective parts.

Statistics/analysis viewer

With the statistics/analysis viewer, the results of measurement with the IM Series can be checked also on a PC. This viewer can also be used for aggregating operations such as statistics/analysis and report preparation.
Easy Operation for Everyone

Easy Setup by Checking the Entire Target

Just click the points to be measured with the mouse

To set up feature inspections, just select the desired tool from the menu and roughly specify the measurement points on the screen with the mouse. Since the entire image of a target is displayed, you can set details intuitively through simple mouse operations.

Easy measurement using centre lines or virtual points

Various options are available for facilitating the measurement using centre lines or virtual points for which complicated setup was required. Moreover, a special menu is available for measuring small rounded corners, curved surfaces, and geometric tolerances such as position or concentricity.

Industry first

Measurement Guide and animated navigation for further ease of use

Each inspection tool built into the onboard software comes with a step by step Measurement Guide displayed at the upper right corner of the screen. Clicking the Play button starts a simple video guide which illustrates the procedure in a few easy steps.
SUPPORT TOOLS FOR INCREASING FUNCTIONALITY

**Automatic element extraction function**

Just specify the points along the perimeter of the target, and the element required for measurement such as a “line”, “circle” or “arc” is automatically extracted. All you have to do now is select an option for measurement and click the extracted element.

**Thread tool**

A special menu is also available for thread measurement. Dimensions required for threading such as outer and effective diameters can be measured easily just by surrounding where to measure with the mouse.

**Consolidate measurement settings**

Separate measurement settings can be bound to one data set. It is also possible to measure multiple points successively on one target and output one collective result.
Performance and Reliability for Field Use

Traceability system diagram

The reference scales used for manufacturing, inspection, and calibration conform to the reference scale of JCSS accredited calibration laboratories to establish traceability back to the national standard.

<table>
<thead>
<tr>
<th>International standard</th>
<th>National Metrology Institute of Japan (NMIJ) of National Institute of Advanced Industrial Science and Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>JCSS accredited calibration laboratory</td>
<td>Reference scale</td>
</tr>
<tr>
<td>Secondary standard</td>
<td>Precision coordinate measuring instrument</td>
</tr>
<tr>
<td>Common standard</td>
<td>Reference scale</td>
</tr>
<tr>
<td>Measuring instrument to be calibrated</td>
<td>IM Series image dimension measurement system</td>
</tr>
</tbody>
</table>

Highly rigid body and temperature sensor ensures practical installation anywhere.

The highly rigid body and built-in temperature sensor have enabled “installation anywhere”. Deformation is limited as to not affect measurement and temperature compensation ensures accurate measurement in the field.

Space-saving design small footprint

In addition to the compact body, the built-in monitor saves significant space in the installation process. It can be installed anywhere. These important features allow you to take your lab to the production line for immediate part feedback.
Global Service Support System

Global support

We have established our original support system to facilitate your smooth overseas production. For example, products are delivered from our nearest distribution site around the world to your overseas production site. Without any complicated procedure, we help you introduce our system into your overseas production site.

Support system

Our technical sales staff respond promptly to your requests. We offer not only technical support but also advice on export, import, and customs. Even overseas, we maintain our direct sales system from the manufacturer so that you can receive consistent support from selection to startup of a system.

Support in various languages

Not only operation screens on the main unit but also other materials such as the instruction manual are available in various languages. After introduction into overseas production sites, local staff can also use this system smoothly.
Central data management

A LAN connection allows you to easily obtain measurement data or setting files for IM Series units located in remote locations. You can also send the setting files created on a PC or one IM Series unit to another IM Series unit. Managing data centrally on a server reduces the risk of data loss.

Measurement setup editor

Even where no controller is available, measurement settings can be created easily with a PC. This further improves operation efficiency after introduction since a new measurement setting can be created without hindering measurement activities in the field.

Data transfer software

Results measured with the IM Series can be transferred to spreadsheet software on the PC you specify.
**CAD import module**

Even when a target is not at hand, an IM setting file can be created based on CAD diagram data.

**Profile tolerance & perimeter measurement functions included**

The profile tolerance (difference from the reference dimension) or perimeter of a target can be measured. The reference dimension for the profile tolerance measurement can also be created from CAD data.

**Profile statistics**

Based on measurement results, differences between design and actual values at measurement points can be checked visually. This function is ideal for managing product trends.

* Distribution in all measurements/ tolerable distribution/intolerable distribution/ difference distribution/difference inclination

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Two Types of Illumination for a Wide Range of Measurements

One target can be measured with different illumination types.

**Backlighting**
A high intensity green LED light is mounted at the bottom of the head unit. Uniform, parallel light has been achieved through KEYENCE’s accumulated expertise in lens development. Optimised illumination ensures a wide field of view and stable measurement of targets even with significant height differences.

**Ring illumination**
A high intensity white LED ring light surrounds the image pickup lens. The light is divided into four parts along the circumference. These can be turned on/off individually. These settings are then retained as part of the inspection routine, allowing each individual feature to have individually optimised lighting settings.
Optional Illumination

**Coaxial illumination**

With this illumination unit, the light emitted from the LED light source mounted on the side is illuminated straight downward through a half mirror. This is effective for measurement of slanting surfaces such as tapered sections or glossy targets.

**Low-angle illumination**

Using a LED light source to illuminate the target from a low angle, it is possible to effectively light targets with uneven surfaces or diffuse edges.
**OPTIONS**

Precision fixturing base
OP-87501

This is a tool to fix measurement targets. It is useful when you measure targets which will move on the measurement stage.

Coaxial illumination (50 x 50 mm)
CA-DXW7

Coaxial illumination (35 x 35 mm)
CA-DXW5A

IM illumination cable
OP-87097

IM illumination expansion base
OP-87167

IM illumination bracket (for CA-DXW7)
OP-87168

IM illumination bracket (for CA-DXW5A)
OP-87169

Low-angle illumination
CA-DLR12

IM standard glass
OP-86985

IM sapphire glass
OP-86986

IM illumination cable
OP-87097

IM illumination expansion base
OP-87167

IM illumination bracket (for CA-DXW7)
OP-87168

IM illumination bracket (for CA-DXW5A)
OP-87169

**SYSTEM CONFIGURATION**

Operating system environment for PC applications (statistics/analysis viewer, measurement setup editor (IM-H1EE), CAD import module (IM-H1C))

<table>
<thead>
<tr>
<th>Applicable OS</th>
<th>CPU</th>
<th>Memory capacity</th>
<th>HDD free space</th>
<th>Display colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windows XP Professional/Home Edition SP3 or later (32-bit version), Windows Vista Ultimate/Business/Home Premium/Home Basic SP2 or later (32-bit version), Windows 7 Ultimate/Professional/Home Premium SP1 (32/64-bit version), preinstalled version</td>
<td>Intel Core 2 Duo 1.6 GHz or higher</td>
<td>2 GB or more</td>
<td>2 GB or more</td>
<td>32 bits or more</td>
</tr>
</tbody>
</table>
### Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Controller</th>
<th>IM-6600E</th>
<th>IM-6015</th>
<th>IM-6025</th>
</tr>
</thead>
<tbody>
<tr>
<td>Image pickup device</td>
<td>1&quot; 6.6 mega pixel CMOS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Display</td>
<td>10.4&quot; LCD monitor (XGA: 1024 x 768), external monitor connectable (clone output)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light receiving lens</td>
<td>Double telecentric lens</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Field of view</td>
<td>Wide-field measurement mode: ø100 mm&lt;br&gt;High-precision measurement mode: ø25 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum display unit</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repetition accuracy</td>
<td>Wide-field measurement mode: ±1 μm&lt;br&gt;High-precision measurement mode: ±0.5 μm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measurement accuracy</td>
<td>Wide-field measurement mode: ±5 μm&lt;br&gt;High-precision measurement mode: ±2 μm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External remote input</td>
<td>No-voltage input (with and without contact)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External output</td>
<td>Comparator output (OK/NG/FAIL)&lt;br&gt;Relay output / Rated load: 24 VDC 0.5 A, FOR resistance: 50 mΩ or less</td>
<td></td>
<td></td>
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<tr>
<td>Interface</td>
<td>LAN&lt;br&gt;USB 2.0 series A 6 ports (Front: 2, Rear: 4)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Record</td>
<td>Hard disk drive 250 GB</td>
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<tr>
<td>Resistance to environment</td>
<td>Operating ambient temperature: +10 to 35°C</td>
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<tr>
<td>Illumination system</td>
<td>Transparent&lt;br&gt;Telecentric transparent illumination (green LED)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Z-axis stage</td>
<td>Moving range along Z axis: 30 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply</td>
<td>Power supply voltage: 100 to 240 VAC 50/60 Hz&lt;br&gt;Power consumption: 215 VA max.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>Controller: Approx. 8 kg&lt;br&gt;Head: Approx. 24 kg&lt;br&gt;Total: Approx. 25 kg</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*1 ±2σ in the range of ø80 mm from the centre of the stage at the operating temperature range of +23 ±1°C at the focused focal point position

*2 ±2σ in the range of ø20 mm from the centre of the stage at the operating temperature range of +23 ±1°C at the focused focal point position

### Measurements

- **Measurement points**: 99 points max. (99 x 9 points possible when the measurement setting binding function is used)
- **Pattern search (profile tracking function)**: XY9 (with 360° rotary position compensation)
- **Registration of measurement configuration**: 1000 or more*3
- **Measurement time**: 2 sec*4

### Basic measurement function

- **Point**: Middle point/intersection
- **Conjunction edge**: Line conjunction/circular conjunction
- **Line**: 6 types (midline/perpendicular line/parallel lines/tangent line/line passing through the point/approximate line)
- **Circle**: Middle circle/approximate circle/auxiliary circle/inscribed and circumscribed circle

### Application tool

- **Pitch measurement**: Line/circumference
- **Pitch angle**: Line/circumference
- **Width measurement**: Edge width
- **Thickness measurement**: Thickness measurement/gap measurement between inner and outer diameters
- **Special tool**: Hatched corner/curved surface/oval/rectile/point position/perimeter/area/screw

### GD&T

- **Shape tolerance**: Straightness/circularity/profile
- **Orientation tolerance**: Squareness/parallelism
- **Position tolerance**: Point position/concentricity
- **Point**: Point (on a line or arc) / maximum/minimum (rectangle, circle, arc)
- **Line**: Line/centreline/peak line
- **Circle**: Circle/arc/peak circle/peak arc

### Element tool

- **Profile extraction**: Provided
- **Special tool**: Automatic generation/gauge line

### Manual measurement

- Provided

### Coordinate system configuration

- Provided

### Batch configuration of tolerance

- Provided

### Element list editing

- Provided

### Measurement setting data binding function

- Provided

### DXF export function

- Provided

*3 Depending on the measurement setting data and number of data pieces being stored  
*4 W/o pattern search and applied measurement

### Dimensions

<table>
<thead>
<tr>
<th>Head IM-6015/6025</th>
<th>Controller IM-6600E</th>
</tr>
</thead>
<tbody>
<tr>
<td>240</td>
<td>365.3</td>
</tr>
<tr>
<td>264</td>
<td></td>
</tr>
<tr>
<td>322</td>
<td></td>
</tr>
</tbody>
</table>

*Unit: mm*
Achieves twice as wide a field of view as conventional systems so that large targets can be measured.

Just place and press to complete measurement easily and accurately.

Wide-field Model

Just place and press even for large targets
Wide-field type image dimension measurement system

An innovative stage designed for reducing measurement time achieves place-and-press measurement even for micro machined parts.

99 points can be measured in seconds without concerns of target placement and focus.

Repetition accuracy: ±0.1 μm

High-precision Model

Just place and press even for micro machined parts
High-precision type image dimension measurement system