REWritIng the book
On dimensional
measurements

Image Dimension Measurement System

Optical comparator  Measuring microscope  Optical CMM  Hand caliper/micrometer  GD&T and profile measurement system

Programmable ring-illumination unit •
INDEX

1 Why use the IM Series?

2 Measurement time

3 Error elimination

4 Easy operation

5 Data management

6 Precise optics

7 Programmable ring-illumination unit

8 High-precision stage

9 Software

10 Contact height measurement unit

11 Measurement support tools

12 Performance and reliability

13 Application examples

14 Applications

15 Global support

16 System configuration

17 Specifications
COMMON PROBLEMS WITH DIMENSIONAL MEASUREMENTS

SLOW

Measurements take a long time
- Fiddling with jigs for part placement and datum setup is time consuming
- Parts requiring custom jigs introduce additional time and component costs
- An increase in measurements and parts can mean an exponential increase in required time

INCONSISTENT

Varying measurement results depending on the operator
- Changes in focus due to setup by different operators results in inconsistent measurements
- Variation in lighting setup between stations affect the measurement
- Measurements rely heavily on operator judgement and experience

COMPLICATED

Limited number of people can operate the device
- Learning how to operate the measuring instrument takes time
- Features requiring virtual lines or points add a layer of complexity
- Operator error easily occurs in the measurements of items such as rounded parts and curved surfaces

REstricted

Complicated data management
- Requires a PC or other device to perform separate management of measurement results
- May not readily provide data formats such as process capability and trend graphs
- Can be tedious when attempting to compile inspection documentation
### FAST

**Measurements performed in seconds**
- Automatic recognition of position and origin
- Perform hundreds of measurements with a single press
- Easily perform over 100 measurements simultaneously

### CONSISTENT

**Uniform measurement results regardless of the operator**
- Automated focus adjustment every time
- Automated lighting settings every time
- Automated routine applied every time

### EASY

**Intuitive interface that anyone can use**
- Easily set up measurements with just a few clicks
- Virtual elements such as center lines are automatically extracted
- Dedicated tools make it easy to inspect any shape

### FLEXIBLE

**Easy data management**
- Measurement results are automatically recorded
- Get immediate feedback on trends and variations
- Complete inspection reports in seconds

WITH THE IM SERIES
STEP 1
Place a target

STEP 2
Press the button
DRASTICALLY REDUCED MEASUREMENT TIME

MEASUREMENTS PERFORMED IN SECONDS

Automatic recognition of position and orientation

The location and orientation of the target placed on the measurement stage are automatically detected. By finding the part and comparing against the recorded shape, it is possible to perform accurate measurements without the need for precise positioning of the part.

TARGETS CAN BE MEASURED NO MATTER WHERE THEY ARE PLACED WITHIN THE FIELD OF VIEW

Measurement of up to 99 points with a single button press

Hundreds of measurements can be easily performed on a part with just one press of the button. Even if the number of measurement points is increased, the measurement time remains the same.

Easily perform over 100 measurements simultaneously

The dimensions of all targets on the stage are measured simultaneously. There is no need to measure each target individually.
Automated focus adjustment

The IM Series is equipped with a specifically designed optical lens with a large depth of field. It is also equipped with an auto-focus function that automatically brings measurement points into focus. This is useful for targets with uneven surfaces for which all the measurement points cannot be brought into focus at the same time.

Automated lighting settings

The IM Series automatically epitomises and saves the lighting conditions so anyone can easily take accurate, consistent measurements.

Automatic edge detection

Sub-pixel processing

By splitting each pixel into 100 or more sub-pixels, the IM Series is able to provide a wide field-of-view while maintaining its high-precision measurement capability.

Shape processing

Lines and circles are extracted using a least squares fitting of 100 or more points.

*There may be less than 100 points depending on the shape.

Automatic identification of burrs and chips

Burr and chips found in the detection area are automatically recognized and excluded from the fitting processing as abnormal locations. It is also possible to set the system to interrupt measurement when burrs or chips are found.
Easy operations performed with a few clicks
CONFIGURING SETTINGS WITH THE CLICK OF A MOUSE

INTUITIVE INTERFACE THAT ANYONE CAN USE

Easily set up measurements with just a few clicks

Just select the desired tool from the menu and use the mouse to define a general search region. The tool will then automatically find and snap to the edge.

Easily create virtual figures

Features such as centre lines and virtual lines can also be created just with the click of a mouse. The IM Series will automatically find any necessary features and perform any calculations to ensure accurate feature placement every time.

Automatic measurement function eliminates need for setup

This function brings new meaning to Place and Press inspection. Simple dimensions can be measured without any prior setup by simply selecting the types of measurements expected. This makes it possible for even the most novice users to start taking fast, accurate measurements.
Measurement results are automatically recorded

All measurement results and critical identifiers are automatically recorded to simplify data management. The IM Series then automatically calculates and displays critical statistical values such as average, $\sigma$, $3\sigma$, $6\sigma$, and Cpk.

Get immediate feedback on trends and variations

Built-in trend graph and histogram functions allow on site analysis of production trends and variations. Instant feedback lets you stay ahead of your process to prevent quality problems before they start.

Complete inspection reports in seconds

Complete inspection and analysis reports can be generated at the click of a button. Print reports directly from the IM Series or easily export data in a convenient CSV format for additional processing.
PRECISE OPTICS

Clear focus regardless of height differences

The IM Series is equipped with a specially designed lens with a large depth of field to ensure accurate measurements despite height differences on the part.

Zoom lens
The image is out of focus due to height differences.

IM series
The image is in focus regardless of height differences.

Apparent feature size not affected by height differences

The IM Series is equipped with a telecentric lens, which means that the image size is not affected by the height differences between different parts of the target. This enables accurate measurements of targets with uneven surfaces.

Zoom lens
Accurate measurements cannot be performed due to height differences between different parts of the target.

IM series
Accurate measurements can be performed even for targets with uneven surfaces.

Less distortion throughout the entire field of view

The IM Series is equipped with a low distortion lens designed to not only minimize distortion near the centre, but also at the outer reaches of the field of view. This allows parts to be measured accurately despite placement on the stage.

Zoom lens
The area along the outer edge is shown distorted.

IM series
The image minimizes distortion throughout the field of view.
Multiple illumination units all in one

The programmable ring-illumination unit integrates multiple ring illumination functions into a single unit. This allows a wide variety of features to be inspected without the need for lighting changeover to maximize efficiency.

- **MULTI-ANGLE ILLUMINATION, HIGH**
- **MULTI-ANGLE ILLUMINATION, LOW**
- **SLIT RING ILLUMINATION**

- Light strikes all parts of the target in a uniform manner.
- Contrasts form between the different height elevations of the target.
- A contrast forms between the target and the edge of its outer circumference.

Automatically find the optimal lighting settings

**Optimum lighting search function**

It is often difficult to determine the correct lighting settings for a given feature. The optimal lighting search function simplifies this by showing you the actual images using different lighting techniques so you can simply select the one you want.

- Select the feature to optimize.
- Select the settings from the automatically captured results.
- Measurements can be performed easily with the optimum settings.
HIGH-PRECISION STAGE

ø100 × 200 mm field of view

A newly developed high-precision stage enables multiple images to be combined. You can measure a large target even when it is not contained in the same field of view.

High-precision stage with high linearity

By utilizing precision cross-roller bearings, we are able to offer high accuracy while maintaining increased durability. This eliminates measurement errors due to stage movement.

Custom high-precision linear scale

A high-precision linear scale designed specifically for the IM Series allows the stage movement to be tracked in micron increments. This makes it possible to perform accurate measurements, even on large parts.
SOFTWARE FURTHER IMPROVES
IM SERIES USABILITY

IMPORT CAD DATA

The data required for measurements can be acquired from CAD
drawing data in DXF format. Even when a target is not at hand, it is
still possible to quickly create measurement setting files.

Optional: IM-H1C

Measurement settings

CONFIGURING SETTINGS FROM A PC

Measurement setup editor

Programs can be easily created and modified from your desk with the measurement setup editor. Programming from your desk allows the IM to be used for measuring without interruption.

Optional: IM-H1EE

Measurement setting data
COMMUNICATING WITH PCs

Data transfer over a LAN connection
A LAN connection can be used to easily synchronize settings files and measurement data to a PC, other IM’s, or even units at remote locations.

CUSTOMIZING INSPECTION RECORDS

Data transfer software
Measurement results can be automatically sent to Microsoft® Excel in a user-defined, custom format.

<table>
<thead>
<tr>
<th>Connection method</th>
<th>Output format</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAN</td>
<td>CSV File, HTML, QDAS Format</td>
</tr>
<tr>
<td>RS-232C</td>
<td>ASCII Format</td>
</tr>
</tbody>
</table>

Statistics/analysis viewer
Easily view results, analyse trends, and generate inspection reports from any PC with the statistics/analysis viewer.
Place-and-press measurement system

This contact height measurement unit reduces the time spent using separate measuring instruments for different measurement points and the effort spent in recording measurement results. The pattern search function can be used to automatically recognize and measure the height (depth) measurement points specified in advance. This function greatly reduces the time spent performing tasks related to measurement, such as the creation of operating procedures and the training of operators. In addition, strengthening measurement results can lead to improvements in the overall efficiency of measurement work.

### SPECIFICATIONS

<table>
<thead>
<tr>
<th></th>
<th>Standard probe</th>
<th>Wide-range probe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring force</td>
<td>0.3 N</td>
<td></td>
</tr>
<tr>
<td>Measurable area (XY)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wide field</td>
<td>45 × 95 mm</td>
<td>95 × 95 mm</td>
</tr>
<tr>
<td>High precision</td>
<td>7.5 × 25 mm</td>
<td>60 × 25 mm</td>
</tr>
<tr>
<td>Repetition accuracy</td>
<td>±2.0 μm</td>
<td>±5.0 μm</td>
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</tbody>
</table>
MEASUREMENT SUPPORT TOOLS

INCREASING MEASUREMENT STABILITY

Precision fixturing base

Use these jigs to secure the target in place. These options are useful when measuring targets such as those that sit at an angle when placed on the measurement stage.

- **Optional: OP-87761** (for long objects)
- **Optional: OP-87501**

**OP-87761**
Precision fixturing base
(for long measurement targets)

**OP-87501**
Precision fixturing base

PERIPHERAL EQUIPMENT

EXTERNAL ILLUMINATION

Coaxial illumination

This dedicated coaxial illumination unit has been designed to match the stage movement function of the wide-field and programmable ring-illumination model. The coaxial light is effective when attempting to measure features on glossy targets.

- **Optional: IM-DXW12**

Plastic moulding (ring illumination)
Plastic moulding (coaxial illumination)
PERFORMANCE AND RELIABILITY

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, allowing the IM Series to be installed anywhere. These important features allow you to take your lab to the production line for immediate part feedback.
VARIOUS PROCESSING METHODS

IM SERIES APPLICATION EXAMPLES

LATHE PROCESSING AND CUTTING

PRESSING

RESIN MOLDING

SINTERING

COLD FORGING

OTHER PROCESSING
HIGHER PRODUCTIVITY AND RELIABILITY THROUGH THE INSTALLATION OF THE IM SERIES

1. IN-PROCESS INSPECTIONS

- **MEASUREMENT SPEED**
  - Spend less time taking measurement and more time optimizing your process.

- **EASY SETUP**
  - Give everyone the capability to perform accurate inspections.

2. PRECISE QUALITY INSPECTIONS IN LABORATORIES

- **EASY DATA MANAGEMENT**
  - Utilize automatic data recording to optimise your quality control system.
  - Eliminate the risk of being caught without proper inspection reports.

- **MEASUREMENT ACCURACY**
  - Quality can be guaranteed with uniform standards.
  - Accuracy can be guaranteed by way of the calibration certificate.

**PRODUCTIVITY IMPROVEMENT**

**RELIABILITY IMPROVEMENT**

Shortened inspection time leads to an increase in the number of products made.

Improved reliability leads to your customers trust and continued business.
3 PRE-SHIPPING INSPECTIONS

Reduce inspection time and free up personnel to improve your process.

EASY SETUP
• Inspection time can be shortened.
• The time spent training inspectors can be reduced.

EASY DATA MANAGEMENT
• The time and effort spent creating inspection records can be reduced.
• The time and effort spent aggregating information and creating databases can be reduced.

4 INCOMING INSPECTIONS

REDUCED LABOUR COSTS

MEASUREMENT ACCURACY
• When handling incoming inspection of a variety of parts, the IM Series eliminates variations between operators and provides uniform standards.

MEASUREMENT SPEED
• Inspect more parts without spending more time.
• Inspect parts you previously didn’t have time for.

YIELD IMPROVEMENT

OK

NG

Defective products do not enter into later processes.
GLOBAL SUPPORT SYSTEM

<table>
<thead>
<tr>
<th>Country</th>
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<tbody>
<tr>
<td>Austria</td>
<td>Belgium</td>
<td>Canada</td>
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<tr>
<td>China &amp; Hong Kong</td>
<td>Czech Republic</td>
<td>France</td>
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<td>Germany</td>
<td>Hungary</td>
<td>India</td>
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<td>Indonesia</td>
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<td>Korea</td>
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<td>Netherlands</td>
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<td>Singapore</td>
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<td>Slovenia</td>
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<tr>
<td>Switzerland</td>
<td>Taiwan</td>
<td>Thailand</td>
</tr>
<tr>
<td>U.S.A.</td>
<td>UK &amp; Ireland</td>
<td>Vietnam</td>
</tr>
</tbody>
</table>
Quality support only possible with a direct sales system

Our comprehensive after-sales support through technical sales representatives can only be achieved by our direct sales system. You can be confident that you will get the support you want immediately, without the hassle and delay of dealing with reps or distributors.

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.

Instant delivery system even for overseas

A wide variety of products are stocked at distribution sites in each country so that they can be delivered promptly on the day we receive your order. You do not need to worry about if it may take considerable effort and time to obtain a product from an overseas factory.
CONNECTIONS TO DIVERSE MACHINES POSSIBLE

SYSTEM CONFIGURATION

OPTIONAL ILLUMINATION

IM-DXW12 Scanning coaxial illumination (optional)
OP-87868 IM illumination bracket (for IM-DXW12) (optional)
IM-DXW12T Scanning coaxial illumination (for IM-6225T) (optional)

STAGE GLASS

OP-8777 Stage glass (optional)
OP-87678 Sapphire glass (optional)
OP-87981 Sapphire glass (for IM-6225T) (optional)
OP-87679 Offset stage (optional)
OP-87965 Offset table (optional)

STYLUS

OP-87979 IM stylus*2 (for IM-6225T) (optional)
OP-88019 IM flat stylus (for IM-6225T) (optional)

PRECISION FIXTURING BASE

OP-87761 Precision fixturing base for long measurement targets (optional)
OP-87501 Precision fixturing base (optional)

IM-H11V Statistics/analysis viewer (included)
IM-H1EE Measurement setup editor (optional)
IM-H1C CAD import module (optional)
IM-H1T Data transfer software (optional)

Supported operating systems

- Windows Vista® Ultimate/Business/Home Premium/ Home Basic SP2 or later (32-bit version),
- Windows® 7 Ultimate/Professional/ Home Premium (32/64-bit version),
- Windows® 8.1/8.1 Pro (32/64-bit version), preinstalled version

HDD free space 2 GB or more

DIMENSIONS

Head IM-6225

Head IM-6225T

Controller IM-6700

*1. One instance of this product is included with the IM-6125, IM-6225 and IM-6225T.
*2. One instance of this product is included with the IM-6225T.
*3. 343 when the stage is moved to its maximum position.
### Specifications

**Model**
- Controller: IM-6700
- Head: IM-6225

**Image pickup device**
- Wide field
- High precision

**Display**
- 7 in. LCD monitor (800 x 600)
- Information display to be viewed from 3 m

**Light receiving lens**
- Double telecentric lens

**Image measurement**
- Field of view:
  - ±0° ±20°/100°/20°/10°/2°/1°/0.1°/0.01°/0.001°/0.0001°
  - 20 x 112 mm
  - 57 x 57

- Repetition accuracy:
  - ±3.5 μm (W/o stage movement)
  - ±2 μm (W/i stage movement)

- Measurement accuracy (σ):
  - Standard probe: ±6 μm/μm²
  - Wide-range probe: ±8 μm/μm²

**Height measurement**
- Standard probe:
  - ±0.5 μm
  - ±3 μm

- Wide range probe:
  - ±0.5 μm
  - ±3 μm

**External remote input**
- 3-30 VDC input

**External output**
- 3-port (opto-isolated, input at 24 VDC, 1.5 A)

**Interface**
- USB 2.0 series A

**Record**
- Hard disk drive: 250 GB

**Resistance to environment**
- Operating ambient temperature: +10°C to 35°C
- Operating ambient humidity: 20% to 80% RH (no condensation)

**Illumination system**
- Transparent: Telecentric transparent illumination (electric)
- Ring: Four divided, multi-angle illumination (electric)

**X stage**
- Moving range:
  - Standard probe: 40 x 90 mm
  - Wide-range probe: 90 x 90 mm

**Y stage**
- Moving range:
  - 30 mm (electric)

**Power supply**
- Voltage: 100 to 240 VAC, 50/60 Hz
- Power consumption: 300 W max.

**Weight**
- Controller: Approx. 33 kg
- Head: Approx. 31 kg

**Measurement points**
- 31 points max. (595 x 569 points possible when the function for consolidating measurement settings is used)

**Pattern search (profile tracking function)**
- 64 points (360° rotary position compensation)

**Pattern recognition**
- ≥8 points per second

**Measurement time**
- 2 seconds

#### Basic measurement function

**Distance measurement**
- 8 types (point-point, line-point, line-line, circle-circle, circle Arc)

**Angle measurement**
- Provided

**Calculation**
- Provided

**Height**
- Focussed

**Virtual line function**

**Point**
- Middle point/intersection

**Conjunction edge**
- Line conjunction/sector conjunction

**Line**
- 8 types (straight/linear, straight/arc, arc/arc, straight/straight, arc/arc, arc/arc, straight/arc, arc/arc)

**Circle**
- Middle circle, approximate circle, circle, circle, circle, circle, circle, circle

#### Application tool

**Pit measurement**
- Linear/linear measurement

**Pit angle**
- Linear/linear measurement

**Height measurement**
- Edge with

**Width measurement**
- Thickness measurement

**Shape tolerance**
- Straightness, roundness, profile

**Orientation tolerance**
- Circularity, runout

**Position tolerance**
- Point/point, centerline/centerline

**Element tool**

**Point**
- Point, center line, and radius measurement

**Line**
- Line, center line, peak line

**Circle**
- Circle, arc, point

**Profile extraction**
- Provided

**Special tool**
- Automatic generation/shape line

**Height**
- Focussed

**Manual measurement**
- Provided

**Coordinate system configuration**
- Provided

**Batch configuration of tolerance**
- Provided

**Element list editing**
- Provided

**Measurement setting data binding function**
- Provided

**DIF export function**
- Provided

**Automatic measurement function**
- Provided

**Q-DAS data save function**
- Provided

**Measurement settings support function**
- Provided

---

1. In the range of ±20 mm from the centre of the stage with the operating ambient temperature of +23°C ±1.0°C at the focused focal point position
2. In the range of ø20 mm from the centre of the stage within the operating ambient temperature range of +23°C ±1.0°C at the focused focal point position
3. In the range of ø80 mm from the centre of the stage within the operating ambient temperature range of +23°C ±1.0°C at the focused focal point position
4. In the range of ø80 mm from the centre of the stage, within the operating ambient temperature range of +23°C ±1.0°C at the focused focal point position, and with a load weighing 1 kg or less on the stage (L = amount of stage movement in mm units)
5. In the range of ø20 × 120 mm from the centre of the stage, within the operating ambient temperature range of +23°C ±1.0°C at the focused focal point position, and with a load weighing 1 kg or less on the stage (L = amount of stage movement in mm units)
6. When the maximum measurement height is set to 30 mm or less; ±12 μm for the standard probe and ±21 μm for the wide-range probe when the maximum measurement height is greater than 30 mm and less than or equal to 60 mm
7. When the maximum measurement height is set to 30 mm or less; ±0.5 μm/μm² if binding
8. When the maximum measurement height is set to 30 mm or less; ±5 μm if w/o binding
9. Up to 1000 patterns or more
10. 3-30 VDC input

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Additional notes:
- *1* Depending on the measurement settings data and number of data pieces being stored
- *2* Without pattern search, applied measurement, and stage movement
- *3* Optional: lighting guide, optional lighting search, automatic edge extraction parameter adjustment function, and multiple edge extraction function
Wide-field and adjustable illumination model of the image dimension measurement system that enables illuminated place-and-press measurement

This model is equipped with an adjustable illumination unit that integrates multiple ring illumination functions into a single unit. The optimal illumination conditions can be reproduced, which enables even stable illuminated measurement.

**Field of view: 200 mm**

Wide-field model of the image dimension measurement system that enables place-and-press measurement with a 200 mm field of view basic illumination features

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.

**Field of view: 200 mm**

Just place and press General-purpose type image dimension measurement system

A dimension measurement system born from a new concept which eliminates the need for X-Y stages. With a built-in ø100 optical lens, this model enables all points in the entire field of view to be measured in a batch.

**Field of view: ø100 mm**

Just place and press even for micro machined parts

High-precision type image dimension measurement system

An innovative stage designed for reducing measurement time achieves place-and-press measurement even for micro machined parts. Perform hundreds of measurements in seconds without worrying about target placement and focus.

**Repetition accuracy: ±0.1 μm**

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