



4x
the measurement
volume

INSTANT MEASUREMENT

Instant Measurement

means that anyone can easily take measurements in seconds

The basic concept of speed, accuracy, and simplicity remains unchanged

NEW

4× the measurement volume p. 16

Supports large and tall objects.

NEW

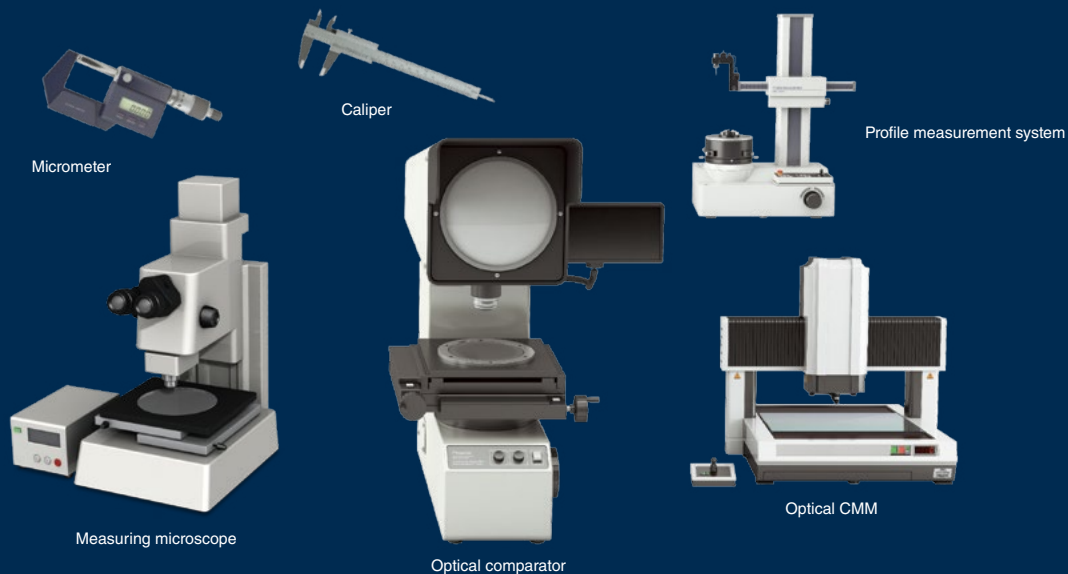
Measure previously obscured areas p. 20

Newly-developed "light probe"



Image Dimension
Measurement System
IM-7000 Series

Common Problems with Dimensional Measurements



SLOW

Measurements take a long time

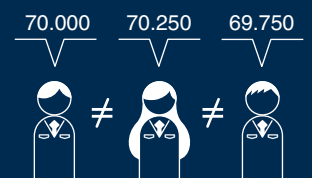
- | Adjusting complex fixtures for part placement and datum setup is time consuming
- | Parts requiring custom fixtures introduce additional time and component costs
- | An increase in measurements and parts can mean an exponential increase in required time
- | Data management and creating inspection reports can be tedious processes



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 judgment and experience



COMPLICATED

A limited number of people can operate the device

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



IM-7000 Series

Image Dimension Measurement System



FAST

Drastically reduced measurement and recording times

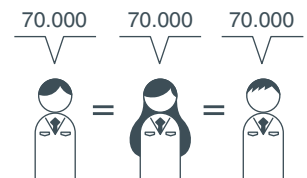
- | Automatic recognition of position and orientation
- | Measure up to 99 dimensions on up to 100 parts with a single button press
- | Automatically saves measurement results
- | Create inspection reports with a single click



CONSISTENT

Eliminating operator error

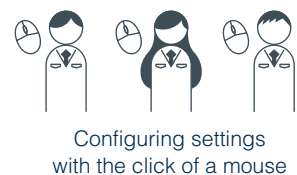
- | Automated focus adjustment
- | Automated lighting settings
- | Automatic edge detection



EASY

Intuitive interface that anyone can use

- | Easily set up measurements with just a few clicks
- | Radius and curved surface measurements are also easy
- | Set up complicated virtual line settings by simply clicking

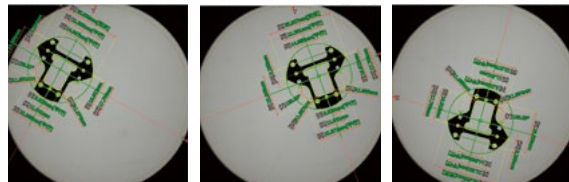




Drastically Reduced Measurement and Recording Times

Automatic recognition of position and orientation

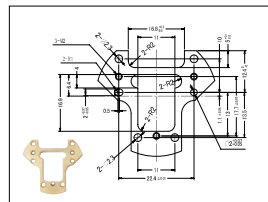
The location and orientation of the target placed on the measurement stage are automatically detected. By finding the part and comparing against the recorded shape, it is possible to perform accurate measurements without the need for precise positioning of the part.



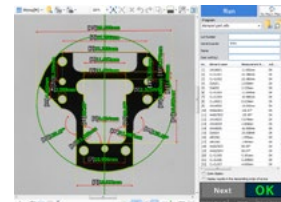
Targets can be measured no matter where they are placed within the field of view

Measurement of up to 99 points with a single button press

Identifies and measures up to a maximum of 99 points with a single button press. Even if the number of measurement points is increased, the measurement time remains the same.



Multiple measurement points specified with a diagram



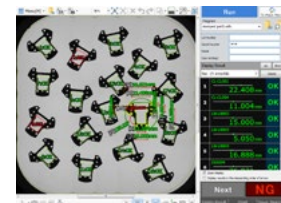
Measures up to 99 points with a single button press

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.



Judgments can be made at a glance thanks to the OK/NG display



Measurement results can also be viewed just by clicking with a mouse

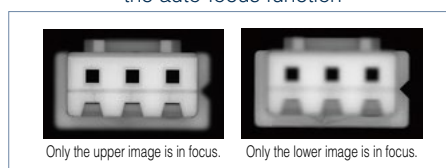


Eliminating Operator Error

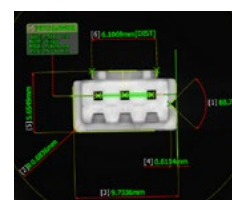
Automated focus adjustment

The IM-7000 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.

Automatic focus adjustment with the auto-focus function



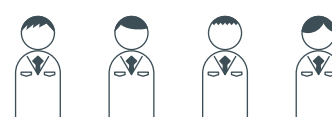
Even when the target is out of focus due to height differences



The focus is automatically adjusted for measurement

Automated lighting settings

The IM-7000 Series automatically optimizes and saves the lighting conditions so anyone can easily take accurate, consistent measurements.



MEASUREMENTS CAN BE PERFORMED USING THE SAME SETTINGS



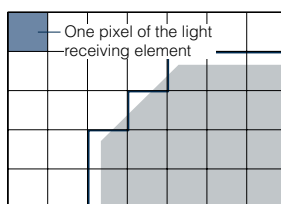
Automatic edge detection

Unparalleled image processing technology

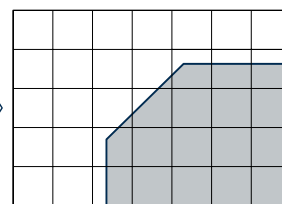
Sub-pixel processing

By splitting each pixel into 100 or more sub-pixels, the IM-7000 Series is able to provide a wide field-of-view while maintaining its high-precision measurement capability.

One pixel is divided into 100 or more squares



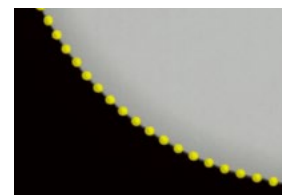
Without sub-pixel processing
The target is measured by one pixel of the light receiving element



With sub-pixel processing
The target is measured by one hundredth or less of a pixel of the light receiving element

Shape processing

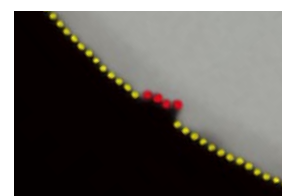
Lines and circles are detected using a least squares fitting of 100 or more* detection points. *There may be less than 100 points depending on the shape.



Automatic detection of 100 or more points

Automatic identification of burrs and chips

Burrs 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 that are larger than the threshold.



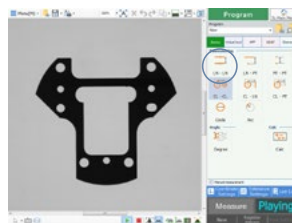
Burrs and chips are recognized automatically

Easily set up
measurements with
just a few clicks

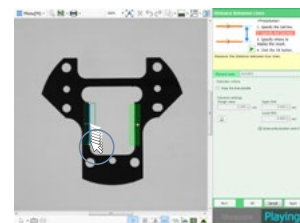
Intuitive Interface That Anyone Can Use

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 setting region. Settings are easy to make with intuitive mouse operations while verifying the image of the entire target.



Select the measurement area from the menu



Specify the general measurement points with the mouse

A wide range of auxiliary functions make it easy for anyone to operate

Easy-to-use measurement menu

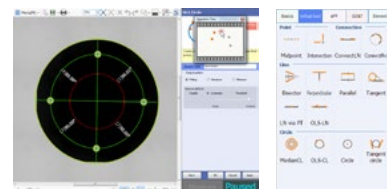
Frequently used line, point, circle, and arc measurements are brought together in a single tab that also includes angles and other measurement items. Video explanations are available for each measurement item, making it easy for even first-time users to operate right away.



Frequently used measurement items are brought together in a single tab

Full array of measurement auxiliary tools

Even complicated measurements using center lines and other virtual lines that are difficult to handle with conventional measurement systems can be set with intuitive clicks while viewing the screen.



Even previously troublesome PCD measurements are easy



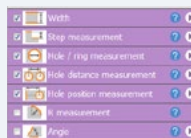
This function brings new meaning to Place and Press inspection.

Automatic measurement function makes settings unnecessary

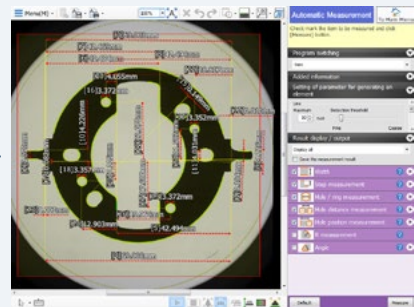
This new function truly achieves "just place and press" operation. Simple dimensions can be measured without any prior setup by simply selecting the types of measurements expected. Anyone can use it right away as they would use a caliper or micrometer.



Just place the target on the stage...



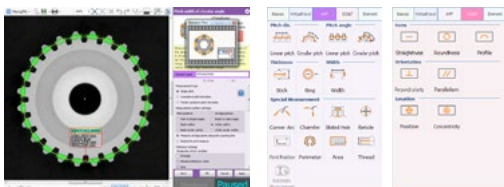
and select the measurement condition check boxes



Measurements can be performed easily with just a few clicks

Wide range of application and GD&T tools

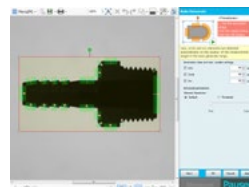
A large number of application-specific tools designed for measuring extremely small rounded corners and curved surfaces, pitch measurements, screw measurements, and others improve operation efficiency. In addition, GD&T tools are provided for concentricity, true position, and other functions.



Use GD&T measurement such as gear pitch measurement, circularity, concentricity, and others by simply clicking

Automatic element extraction function

The hassle of making settings is further reduced with the automatic extraction of elements. Simply specify targets by selecting around them to automatically extract lines, circles, and arcs.



Simply select around an area with the mouse to extract edges



Advanced Technologies for Achieving Place-and-Press Measurement

Large diameter telecentric lenses

No extreme focus adjustment or
positioning required

Large 200×200 mm stage

4× the measurement volume

Programmable ring-illumination unit

Accurately extracts edges with optimal
lighting conditions

Light probe unit

New principle enables measurement in
previously obscured areas

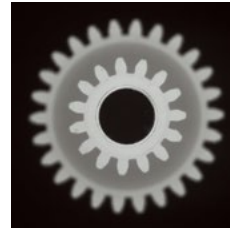


Large diameter telecentric lens

No Extreme Focus Adjustment or Positioning Required

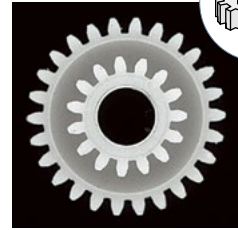
Clear focus regardless of height differences

The IM-7000 Series is equipped with a specially designed lens with a large depth of field. This ensures accurate measurements despite height differences on the part.



Zoom lens

The image is out of focus due to height differences



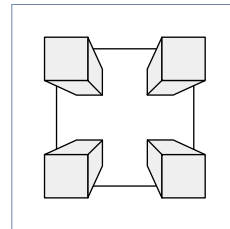
IM-7000 Series

The image is in focus regardless of height differences



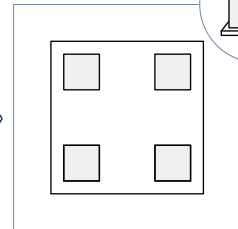
Apparent feature size not affected by height differences

The IM-7000 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.



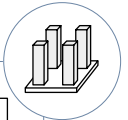
Zoom lens

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



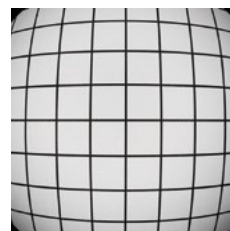
IM-7000 Series

Accurate measurements can be performed even for targets with uneven surfaces



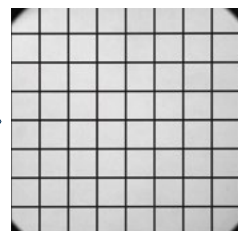
Less distortion throughout the entire field of view

The IM-7000 Series is equipped with a low distortion lens designed to not only minimize distortion near the center, but also at the outer reaches of the field of view. This allows parts to be measured accurately despite its location on the stage.



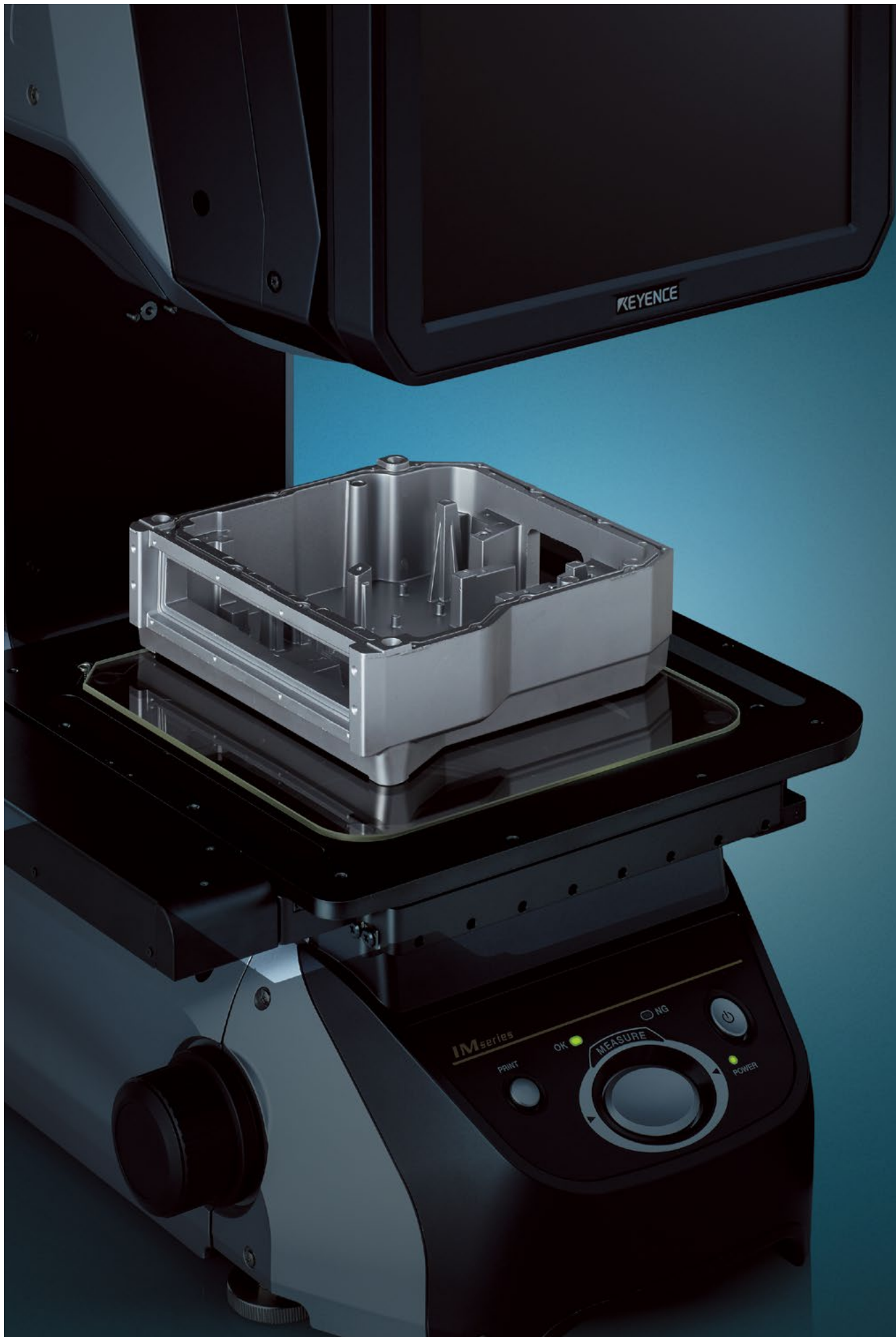
Zoom lens

The area along the outer edge is shown distorted



IM-7000 Series

The image minimizes distortion throughout the field of view

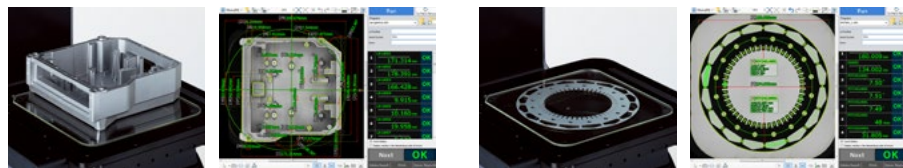


Large 200 × 200 mm stage

4× the Measurement Volume

Measurement field of view is twice as large as for conventional systems, and speed is three times as fast during binding

The newly developed high-speed and high-precision stage offers a measurement field of view that is 200 × 200 mm in size. Also, thanks to the high speed of the stage, twice the field of view can be measured at three times the speed of a conventional system.



Tall targets are also supported

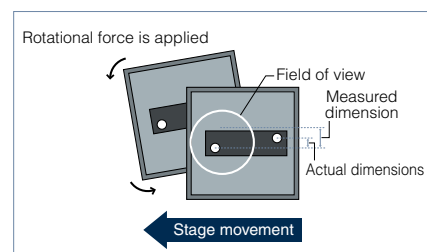
Innovations in the structures of the stage system and lens unit have dramatically improved support for the measurement of tall targets.



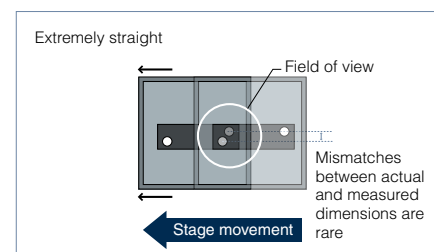
Targets 2 times as tall as those supported by conventional systems can be measured

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.



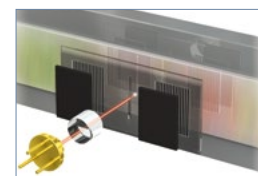
Without adjustment



IM-7000 Series

Custom high-precision linear scale

A high-precision linear scale designed specifically for the IM-7000 Series allows the stage movement to be tracked in micron increments. This makes it possible to perform accurate measurements, even on large parts.



Linear scale module



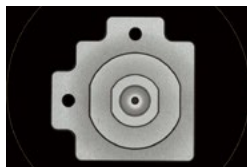
Programmable ring-illumination unit

Accurately Extracts Edges with Optimal Lighting Conditions

Multiple illumination units all in one

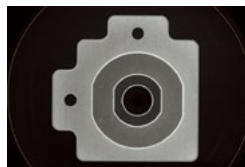
The programmable ring-illumination unit integrates multiple ring illumination functions into a single unit. This allows a wide variety of features to be inspected without the need for lighting changeover to maximize efficiency.

MULTI-ANGLE ILLUMINATION, HIGH



Light strikes all parts of the target in a uniform manner

MULTI-ANGLE ILLUMINATION, LOW



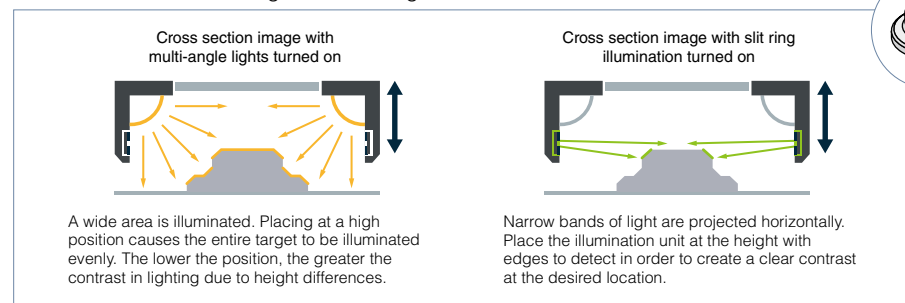
Contrasts form between the different height elevations of the target

SLIT RING ILLUMINATION



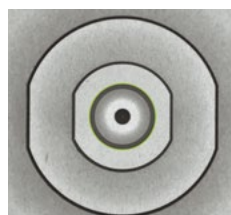
A contrast forms between the target and the edge of its outer circumference

Programmable ring-illumination unit mechanism

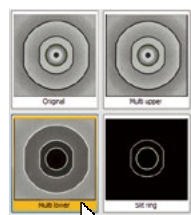


[Optimum lighting search function] automatically finds the optimal lighting settings

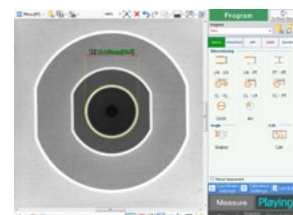
It is often difficult to determine the correct lighting settings for a given feature. The optimum lighting search function simplifies this by showing you the actual images using different lighting techniques so you can simply select the one you want.



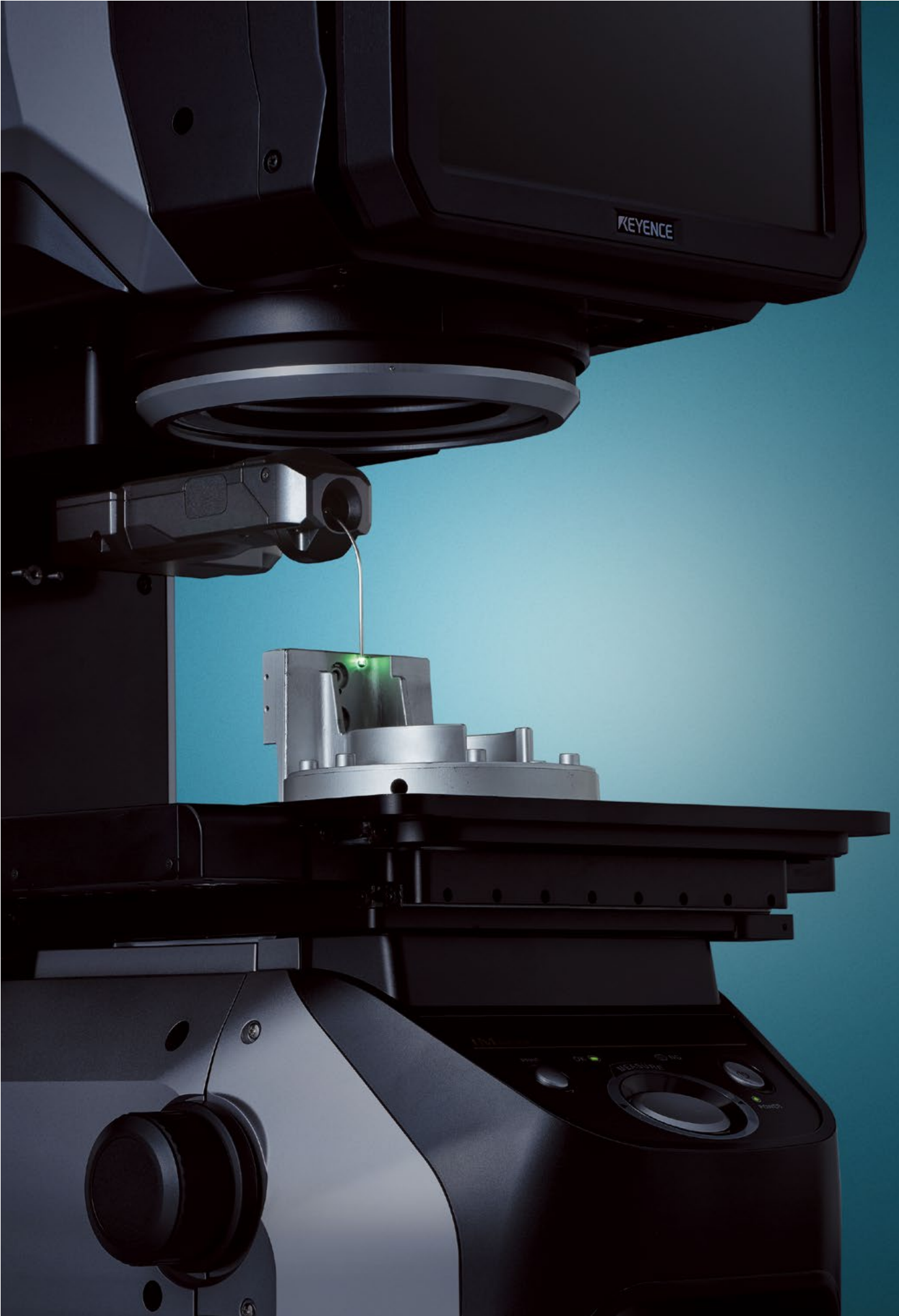
Select the feature to optimize



Select the settings from the automatically captured results



Measurements can be performed easily with the optimum settings

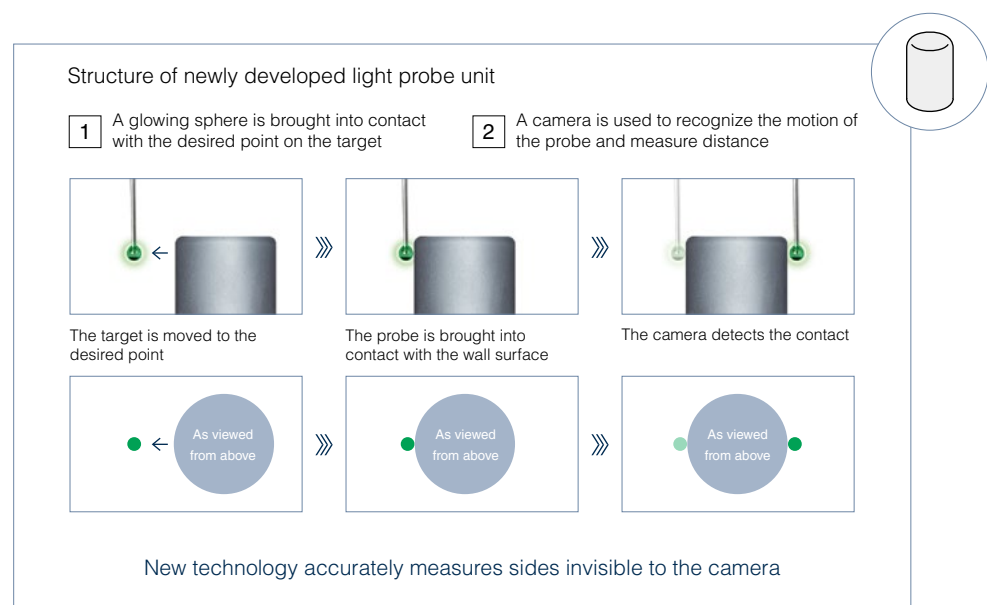


Light probe unit

New Principle Enables Measurement in Previously Obscured Areas

Accurate detection is possible even in locations where conventional ring illumination has trouble detecting

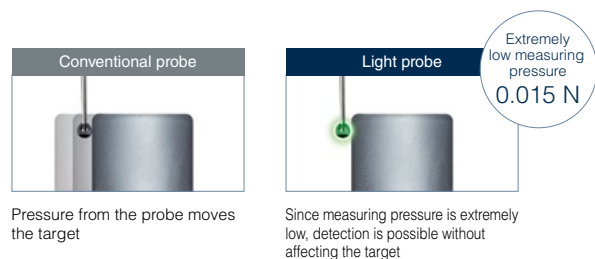
The newly developed light probe unit has a deep-set shape and rounded corners that allow for easy and accurate measurement even of targets with shapes and processing states that made them difficult to measure for measurement systems using conventional images.



The ultra-low measurement force allows for accurate measurement of even light and small targets

Measurement with ultra-low force is made possible through the spherical bearing mechanism that slides with low friction. Conventional contact-type measurement systems use a strong measuring force that can cause misalignment due to the pressure applied to small and light targets. The light probe unit uses an extremely low measuring force of 0.015 N to accurately take measurements without the hassle or cost of fixturing targets. This also eliminates the concern of deformation when soft targets are measured.

*Spherical bearing mechanism: A joint mechanism that slides with equalized low pressure by coming in contact with the probe in all directions.

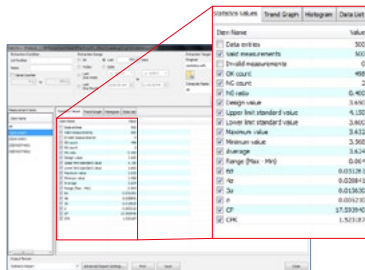


Statistical Analysis



Statistical values such as σ and Cpk are automatically aggregated

The system can automatically calculate and display key statistical values for each measurement item including OKs, NGs, maximum point, minimum point, average, σ , 3σ , 6σ , Cp, Cpk, and others. Processing capability management by lot is also easy.

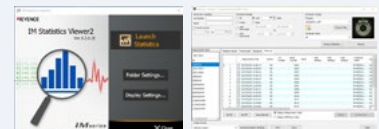


Covers all main items necessary for inspection reports

Statistics/analysis viewer

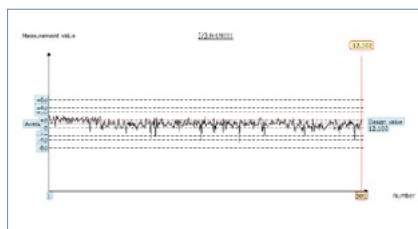
IM-H2V

The IM-7000 Series measurement results can be used to perform statistical analysis, create reports, and do other aggregation work on the PC.

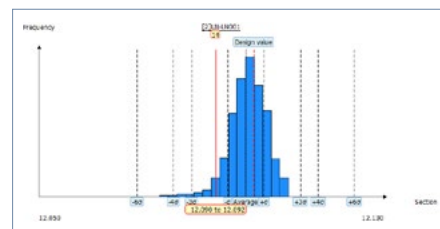


Get immediate feedback on trends and variations

Built-in trend graph and histogram functions allow verification of trends and variations in each measured item using graphs. This makes it easy to visualize trends such as "measured values are gradually decreasing," "variation is growing larger," or "measured values are fluctuating in a cyclical manner."



The trend graph shows tendencies of a product at a quick glance



Histogram settings can be adjusted as required

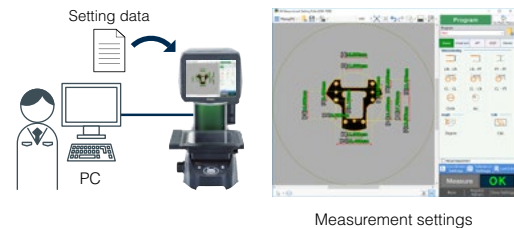
Network Functions and Software

Measurement setup editor

Set on the PC

Optional: IM-H2EE

A PC can be used to add or change measurement locations in a setting file created by the IM-7000 Series system, or in data created with the CAD import module.



CAD import module

Import CAD data

Optional: IM-H2C

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.

*Measurement setup editor (IM-H2EE) is also required.



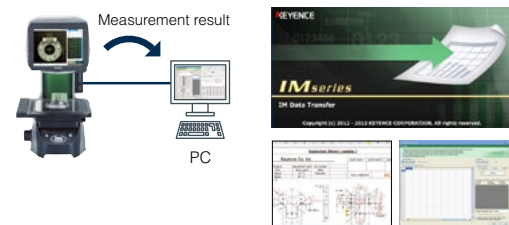
Load CAD drawing data in DXF format and convert it to the IM-7000 Series measurement setting file format

Data transfer software

Creating inspection reports

Optional: IM-H1T

IM Series measurement results can be automatically transferred to specific cells in spreadsheet software on a specified PC.

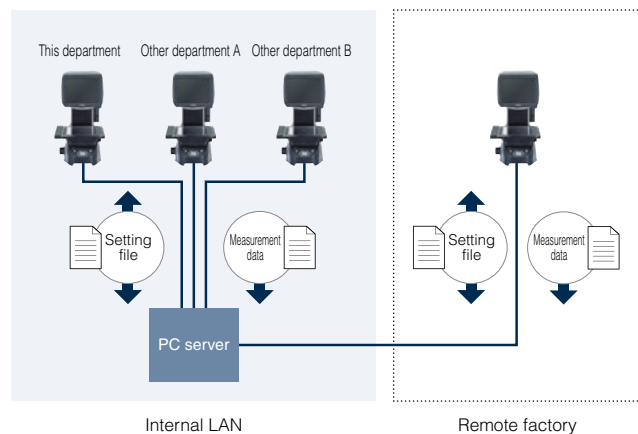


Spreadsheet software

Data transfer over a LAN connection

Communicating with PCs

It is easy to transfer a setting file created on a PC or an IM Series system to an IM Series system in another location.



Shop Floor Ready Performance and Reliability

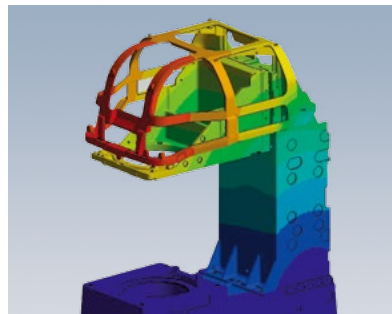
Traceability system diagram

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.

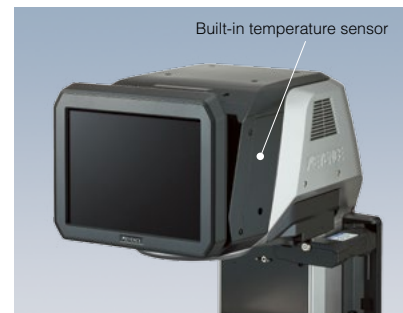
International standard	National Metrology Institute of Japan (NMIJ) of National Institute of Advanced Industrial Science and Technology
JCSS accredited calibration laboratory	Reference scale
Secondary standard	Precision coordinate measuring instrument
Common standard	Reference scale
Measuring instrument to be calibrated	IM-7000 Series image dimension measurement system

Includes a highly rigid body and temperature sensor

Highly rigid body and temperature sensor ensures practical installation anywhere. The design was optimized using topological and strength analyses in order to develop the housing stiffness necessary for the required accuracy. Temperature compensation ensures accurate measurement in the field.



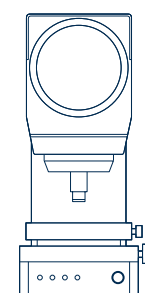
Frame strength analysis diagram



Temperature sensor ensures more stable measurement

Space-saving design and a small footprint

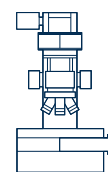
In addition to the compact body, the built-in monitor saves significant space. This allows the IM-7000 Series to be installed anywhere.



Optical comparator



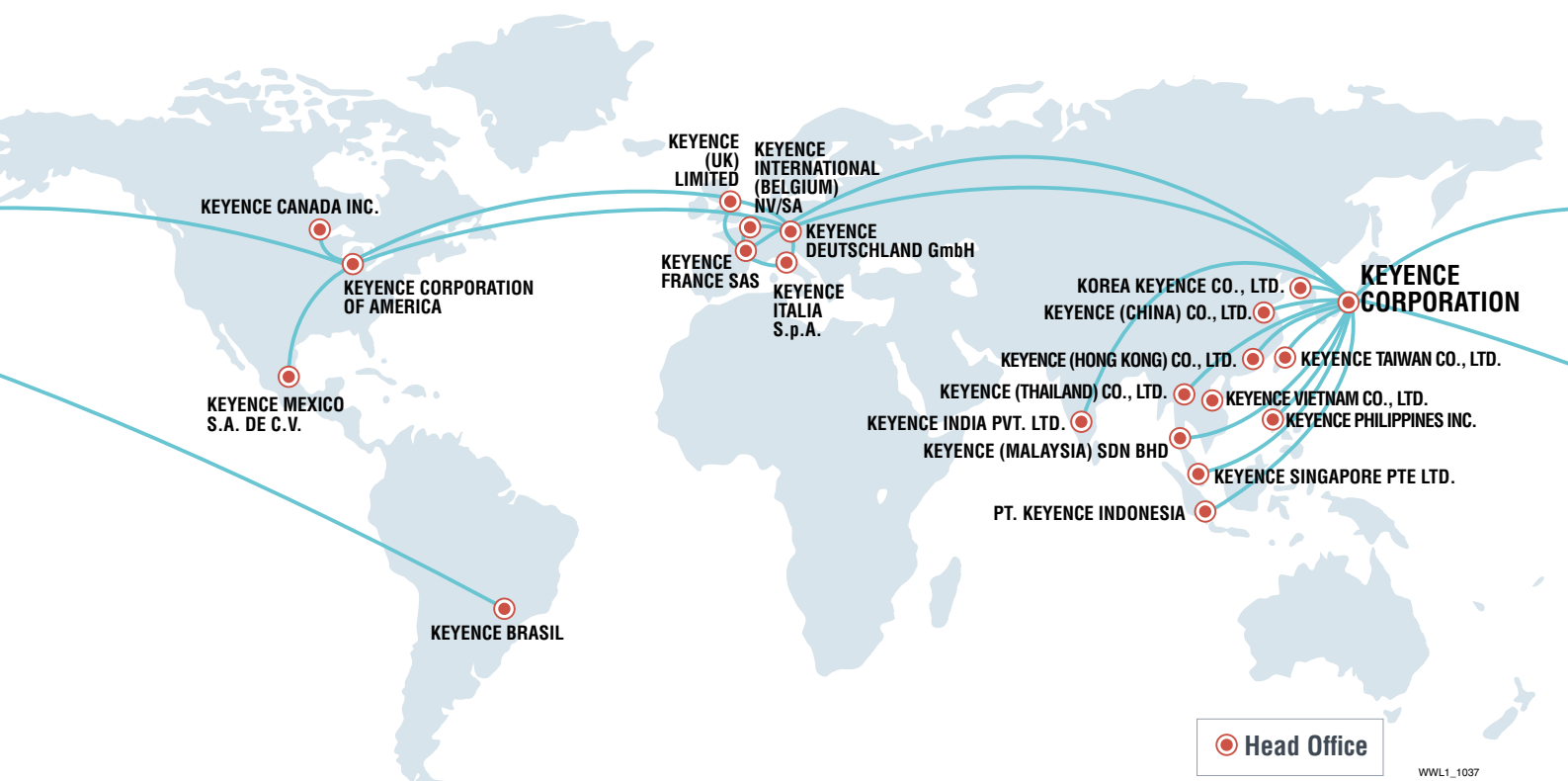
IM-7000 Series



Measuring microscope

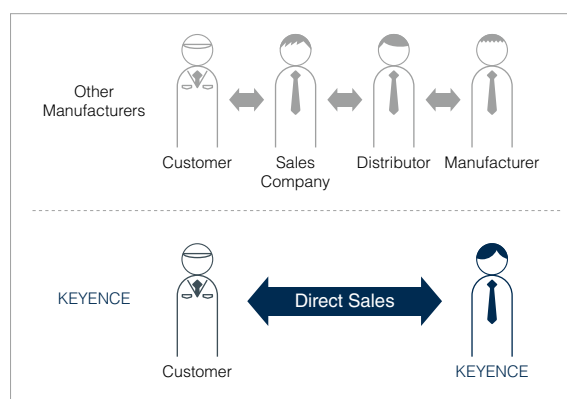
Comprehensive Coverage All Over the World

Global Support System



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 for multiple languages

In addition to the system's control screen, manuals and other documentation are also provided in a wide range of languages. Local staff can easily use KEYENCE's products after they are installed at international manufacturing bases.

Languages

English	German	French
Italian	Simplified Chinese	Traditional Chinese
Spanish	Thai	Korean

*To be released periodically

Instant delivery system also available internationally

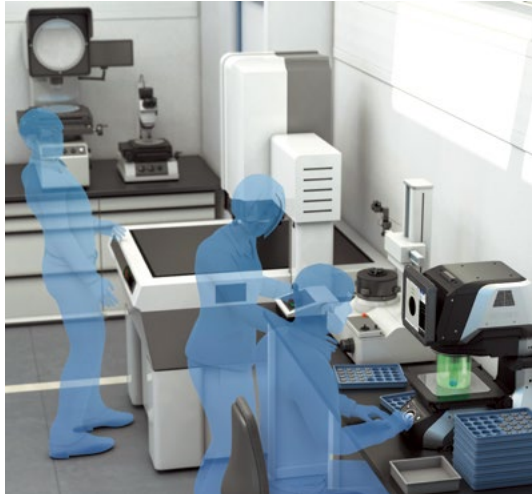
KEYENCE's product inventories are not limited to Japan. A wide variety of products are stocked at distribution sites in each country so that they can be delivered promptly on the day we receive your order. You do not need to worry about if it may take considerable effort and time to obtain a product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



IM Series Application Examples

For every inspection need...

Inspections of prototypes and first off-tool parts

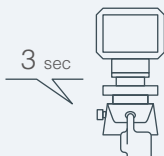


- Improvement of productivity through reductions in launch periods
- Measurement that does not depend on the inspector's experience level
- Measurement based on the traceability of international standards

Inspections of samples and parts during processes



- Improvement of equipment availability through reductions in setup time
- Improvement of yield rates through better accuracy in equipment adjustment
- Since inspection can be performed by other operators in addition to the original inspector, this reduces the workload of the quality department.
- Symptom management within processes



Reduction of inspection time

Reductions in inspection time can improve manufacturing efficiency and reduce cost.



Reduction of recording time

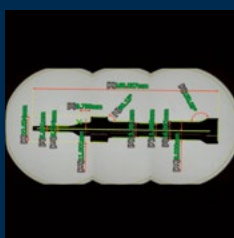
Reductions in the work required to record inspection data can lead to reductions in data management cost.



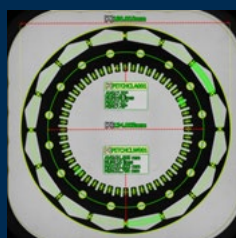
Operators other than inspectors can also perform inspections

Reductions in the workload placed on the quality department can also lead to improvements in equipment availability.

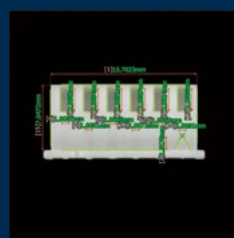
In a wide variety of applications...



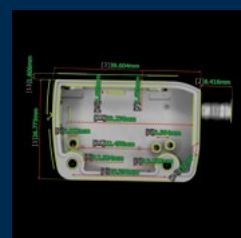
Lathe processing and cutting



Pressing



Plastic molding



Sintering

Pre-shipping inspections

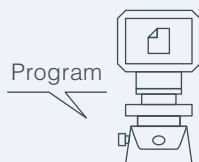


- | Allows for shipping inspections with shortened delivery schedules
- | Reduction of the work required to create inspection report tables
- | Reduction of training time and labor costs associated with inspectors

Incoming inspections

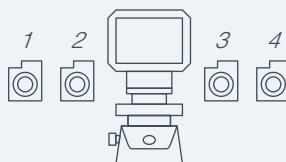


- | Can manage acceptance inspections for multiple types with constant standards
- | Reduction of the risk of defects even when the quantity of inspections is increased
- | Improved quality through measurement of previously uninspected points



Constant inspection standards

The use of constant inspection standards enables manufacturing with more stable quality levels.



Increased quantity of inspections

Since it is easy to increase the quantity of inspections, the risk of defects is decreased.

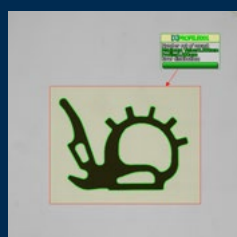


Increased measurement points

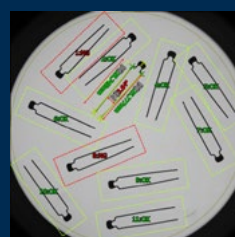
Since it is possible to measure uninspected points without an increased workload, this leads to improvements in quality.



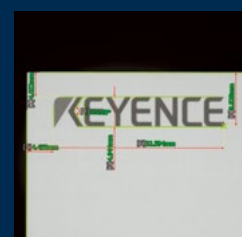
Forged parts



Molded object
(profile tolerance)

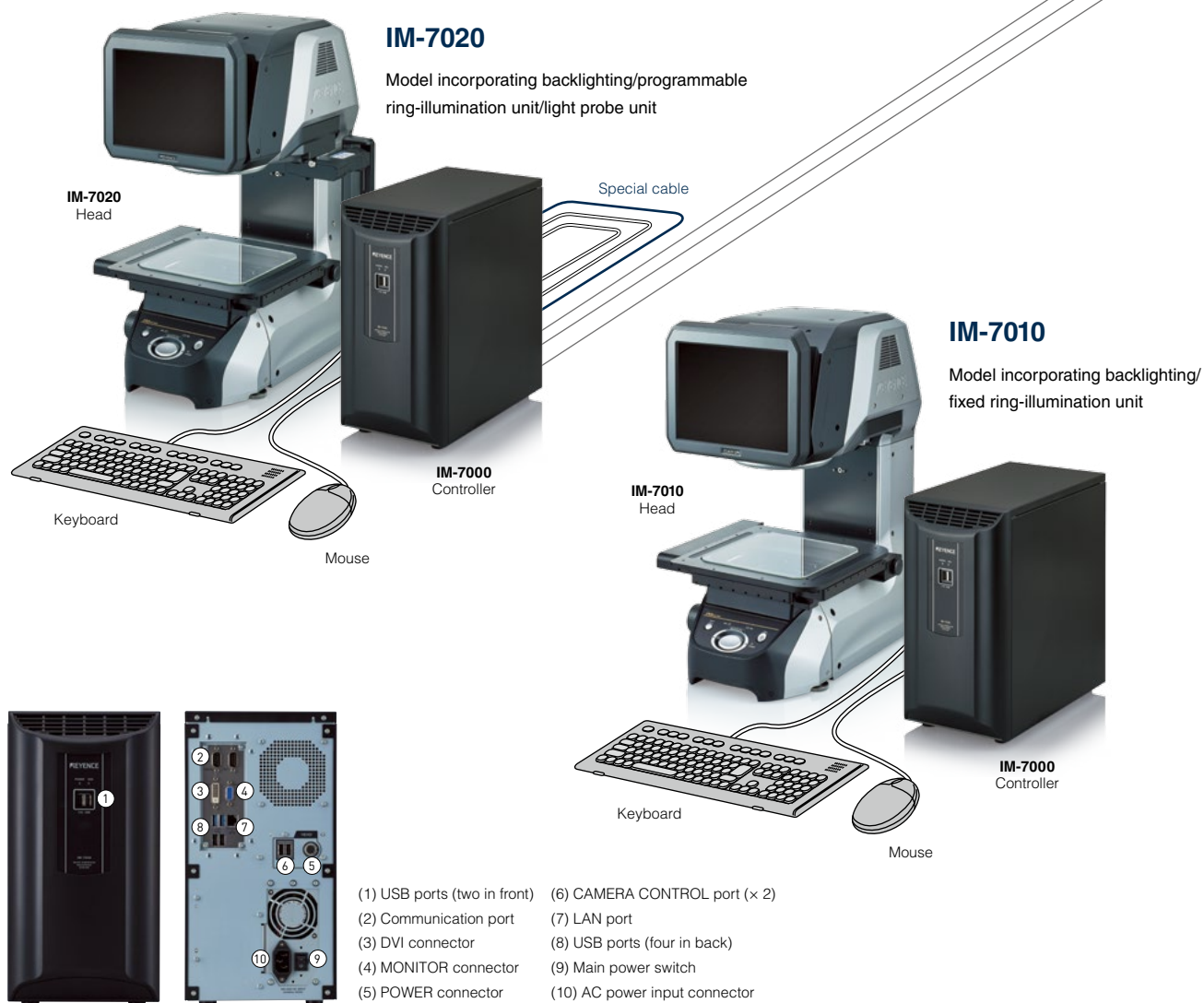


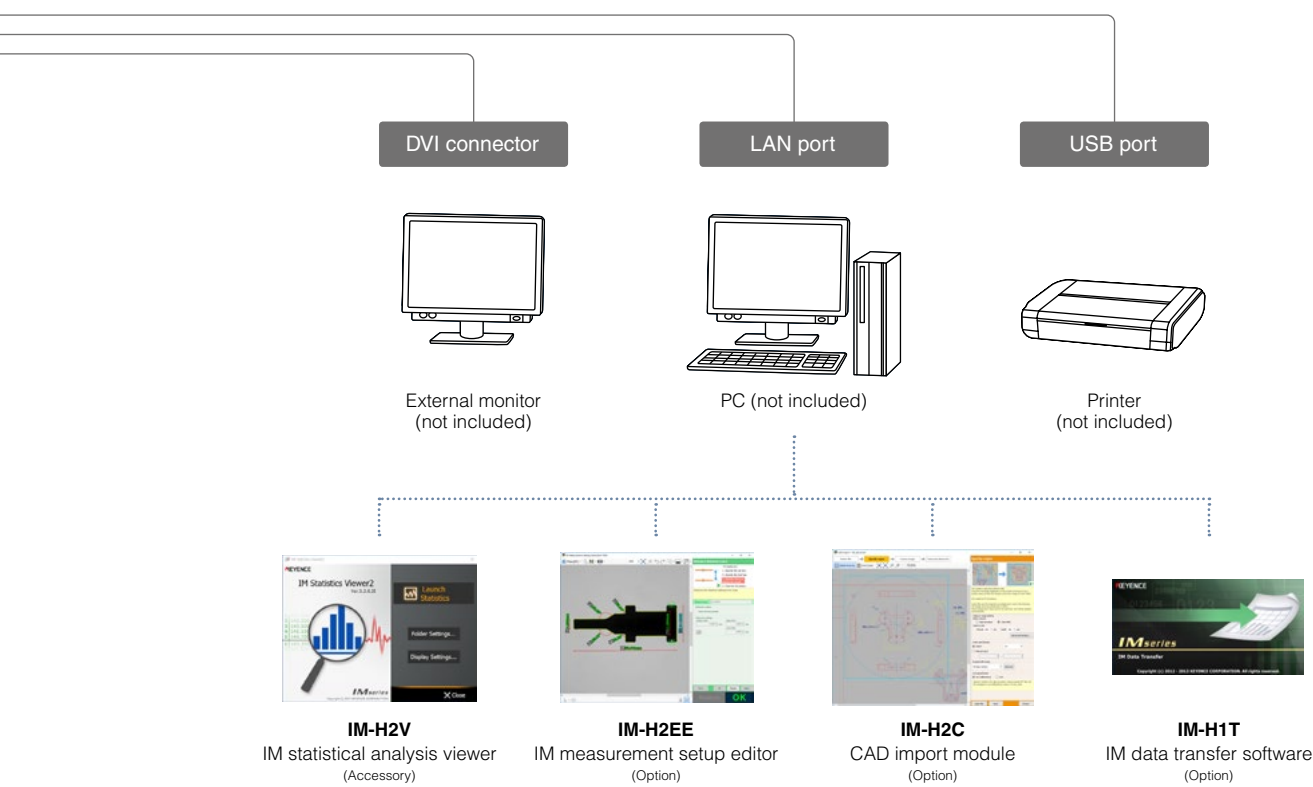
Electronic parts



Printing

System Configuration





Supported OS	Windows 7 Ultimate/Professional/Home Premium (64-bit version) Windows 8.1/Windows 8.1 Pro (64-bit version) Windows 10 Home/Pro/Enterprise (64-bit version)
Required free space on hard disk	5 GB or more

- Windows® is a trademark or registered trademark of Microsoft Corporation in the United States and other countries.
- The formal name of Windows is Microsoft Windows® operating system.

Optional Accessories

Additional illumination



IM-DXW12N
Coaxial illumination
(Option)

Stage glass



IM-SG2
Tempered stage glass



OP-88179*1
Stage glass

Precision fixturing base



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



OP-87501
Precision fixturing base
(Option)

OP-88185 Fixture sheet (10 pieces) *2

*1 One of these is included with the purchase of the IM-7020 or 7010.
*2 This Sheet is for fixing the object by sticking on the stage glass of the IM-7000 Series.



SPECIFICATIONS

Model		Controller		IM-7000	
		Head		IM-7010	IM-7020
Image sensor				1" 6.6 mega pixel monochrome CMOS	
Display				10. 4" LCD monitor (XGA: 1024 × 768)	
Receiver lens				Double telecentric lens	
Image measurement	Field of view	Wide-field measurement mode		200 mm × 200 mm (4× R50)	
		High-precision measurement mode		125 × 125 mm	
	Minimum display unit		0.1 μm		
	Repeatability	Wide-field measurement mode	W/o stage movement	±1 μm	
			With stage movement	±2 μm	
		High-precision measurement mode	W/o stage movement	±0.5 μm	
			With stage movement	±1.5 μm	
	Measurement accuracy (±2σ)	Wide-field measurement mode	W/o binding	±5 μm ⁻¹	
			With binding	±(7+0.02 L) μm ⁻²	
		High-precision measurement mode	W/o binding	±2 μm ⁻³	
With binding			±(4+0.02L) μm ⁻⁴		
Light probe Measurement	Measurable area (XY)		-	90 × 90 mm	
	Maximum measurement depth		-	30 mm	
	Light probe diameter		-	ø3 mm	
	Measuring force		-	0.015 N	
	Repeatability		-	±2 μm ⁻⁵	
	Measurement accuracy		-	±(8+0.02 L) μm ⁻⁶	
External remote input				Non-voltage input (with and without contact)	
External output		OK/NG/FAIL/MEAS.		PhotoMos output Rated load 24 VDC 0.5 A ON resistance 50 mΩ or lower	
Interface		LAN USB 2.0 series A		RJ-45 (10BASE-T/100BASE-TX/1000BASE-T) 6 ports (front: 2, rear: 4)	
Record		Hard disk drive		500 GB	
Environmental resistance		Operating ambient temperature		+10°C to 35°C	
		Operating ambient humidity		20% RH to 80% RH (no condensation)	
		Pollution degree		2	
		Overvoltage category		II	
Illumination system		Transparent		Telecentric transparent illumination	
		Ring		Four division ring illumination	-
		Ring		-	Four division, multi-angle illumination (electric)
		Ring		-	Slit ring (directivity) illumination (electric)
XY stage		Moving range		100 × 100 mm (electric)	
		Withstand load		5 kg	
Z stage		Moving range		75 mm (electric)	
Power supply		Power voltage		100 to 240 VAC 50/60 Hz	
		Power consumption		430 VA or lower	
Weight		Controller		Approx. 8 kg	
		Head		Approx. 30 ka	Approx. 31 ka

*1. In the range of ø80 mm, within the operating ambient temperature range of +23°C ±1°C at the focused focal point position

*2. In the range of 180 × 180 mm (4× R40), within the operating ambient temperature range of +23°C ±1°C at the focused focal point position, and with a load weighing 2 kg or less on the stage (L = amount of stage movement in mm units)

*3. In the range of ø20 mm within the operating ambient temperature range of +23°C ±1°C at the focused focal point position

*4. In the range of 120 × 120 mm, within the operating ambient temperature range of +23°C ±1°C at the focused focal point position, and with a load weighing 2 kg or less on the stage (L = amount of stage movement in mm units)

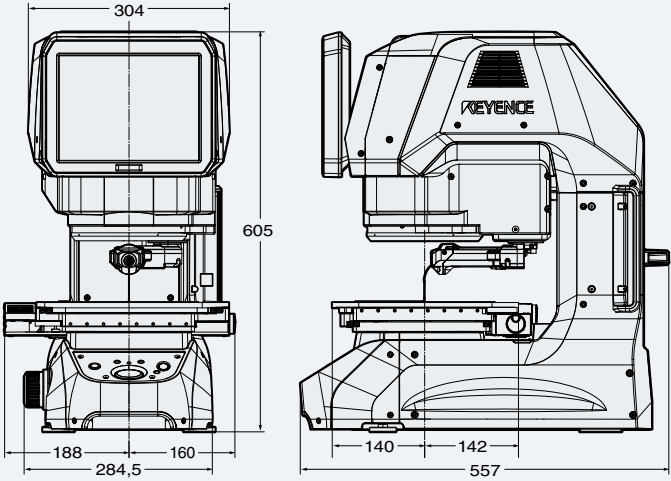
*5. When the detection system is standard. If the detection system is at a deep position, then ±3 μm

*6. When the detection system is standard, and the ambient temperature is 23°C ±1°C, with a stage load weighing 2 kg or less. If the detection system is at a deep position, then ±(10 + 0.02 L) μm with L as the measurement length in mm.

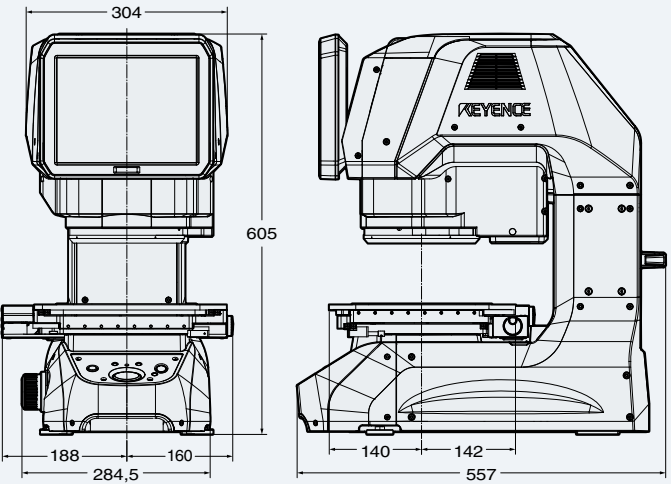
DIMENSIONS

IM-7020 head

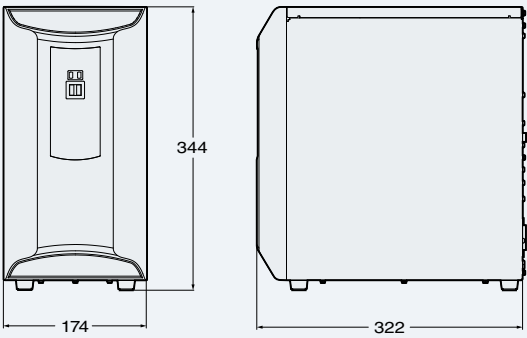
Unit (mm)



IM-7010 head



IM-7000 controller





Please visit: www.keyence.com



SAFETY INFORMATION

Please read the instruction manual carefully in order to safely operate any KEYENCE product.

GLOBAL NETWORK

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