

Unrivaled by optical comparators or measurement microscopes!

2D Image Dimension Measurement Summary Guide

that meets the "complete needs" of
your customers

Without the IM-8000, measurement takes a long time due to complicated target shapes...

Without the IM-8000, measurement is difficult and the results vary depending on the operator...

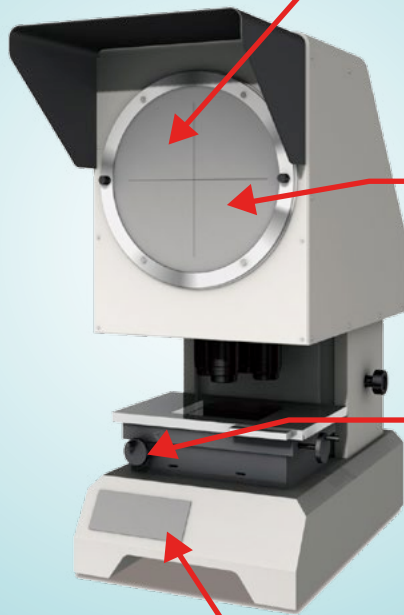
With the IM-8000, these dimension measurement problems can be completely solved.



We asked measurement managers about...

Problems with conventional measurement systems-1

Projector or measuring microscope



Individual user variation in measurement results

NG

Since stage positioning and measurement points are made with the human eye, measurement results vary depending on the user.

Point-by-point measurement takes time

NG

A lot of time is required since measurements are performed at each point by moving the XY stage and tracing parts.

Requires skilled operation to position the measurement points

NG

Precise positioning of the reticle and target is necessary for accurate measurement, which requires skill to perform the operation properly.

Manual entry of results on input sheet

NG

The measurement results must be entered manually unless dedicated software is used to summarize the measurement results. This may result in mistakes in reading the scale or input errors.

Totally new measurement system

New-concept Image Dimension Measurement System **IM-8000 Series**

IM-8000

No individual user variation in measurement results

OK

Since the dedicated CMOS extracts measurement points automatically, there are no errors in the measurement results.

Instant measurements are possible

OK

The double telecentric lens with a large diameter captures the whole image and can measure all inspection points simultaneously. Up to 300 measurement points can be measured in just a few seconds.

Easy to use

OK

Once the measurement items are set, simply place the target and press the button. Positioning is no longer required and repeated measurements can be performed easily.

Automatic summary of results during measurement

OK

The IM-8000 saves the measured results while performing the measurement. Statistical analysis of past measurement results and the output of reports in CSV format are also possible. Operations such as checks of variations in distribution using trend graphs can also be performed easily.



We asked measurement managers about...

Problems with conventional measurement systems-2

Caliper or micrometer

It's difficult to know what was actually measured

NG

Since only the person taking the measurement knows the location measured between the jaws, others cannot judge whether or not the measurement was actually taken at the desired location.

Results vary between operators

NG

Because measurement values are altered by slight differences in the gripped position, results can vary depending on the person taking the measurements.

Contact-type measurements mean that values change with applied pressure

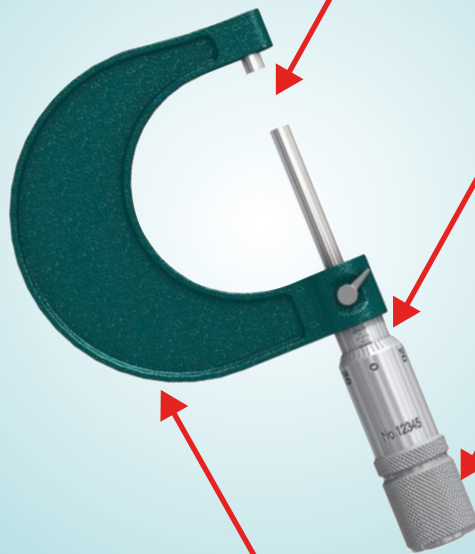
NG

For example, when the target object is soft, values change according to the gripping pressure. This means that the ratchet settings of the constant pressure mechanism must be determined separately for each target object.

Measured values vary with temperature

NG

The body temperature of the person taking the measurements can cause the caliper or micrometer to expand, changing the measurement results.



Totally new measurement system

New-concept Image Dimension Measurement System **IM-8000 Series**

IM-8000

Measured values and locations are retained in the image!

OK

Measurement details, measured locations, and measurement values can be recorded in an image. It is then possible to check against the drawings for errors in the measured locations and create clear inspection reports.

No individual user variation in measurement results

OK

Since the dedicated CMOS extracts measurement points automatically, there are no errors in the measurement results.

Non-contact, instant measurements!

OK

The double telecentric lens with a large diameter captures the whole picture and can measure all inspection points simultaneously. Up to 300 measurement points can be measured in just a few seconds.

Built-in temperature sensor allows the system to adapt to conditions!

OK

Ambient temperature data is used to correct measurement values. This prevents changes in measurement values due to differences in ambient temperature.



The IM-8000 Image Dimension Measurement System offers a substantial improvement in accuracy and measurement time over conventional dimension measurement systems. Moreover, this new measurement method allows what were once "difficult" or "impossible" measurements to be taken with ease.


The following pages show some specific examples of measurements

The IM-8000 makes it possible to do **easy** and **highly-accurate** dimension measurements

instead of conventional methods which require a lot of time and effort.

Innovative and cutting edge

Breakthrough measurement system



Measurement in just a few seconds!

No variation among operators!

Not only transparent but also reflective (epi-) illumination can be used!

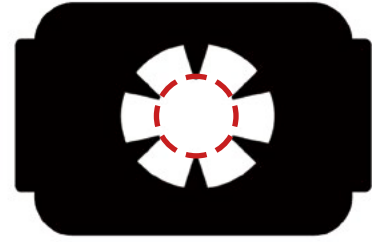
Automatic result statistics!

Just place and press.

Take a look at the features which dramatically reduce labor hours for measurement!

Difficult measurement 1

Inner diameter measurement based on tangent points



[Plastic molded part]

The inner diameter is calculated by locating the tangent points on each claw tip.



Example: Company A

Device used: Measurement microscope
Measuring a single diameter requires the measurement of the coordinates of each claw. Even skilled operators require an extremely long time...

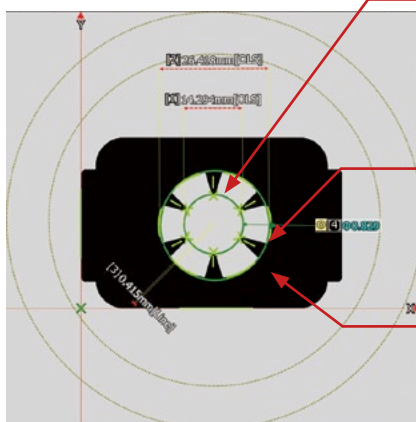


Example: Company B

Device used: Pin gauge
Since the claws are thin and soft, the evaluation result varies depending on the operator...



With the IM-8000, this difficult measurement can be done as follows:



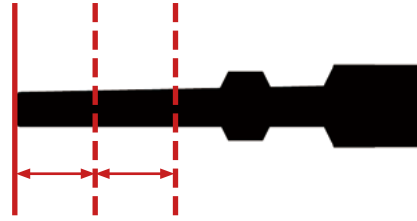
An inner tangent circle is automatically recognized from the image!
The inner diameter can be measured accurately.

To improve the accuracy, it is also possible to recognize the center positions of the claws and measure the inner diameter based on their vertices!

The circle center deviation from the outer circle can also be measured simultaneously!

Difficult measurement 2

Measurement at constant intervals from the reference line



[Metal processed part]

The pin diameter is measured at 1 mm intervals from the reference position.



Example: Company A

Device used: Optical comparator
There are variations among operators including the interval setting. We have problems with our customers because our **measurement values do not agree** with the values of their acceptance test...

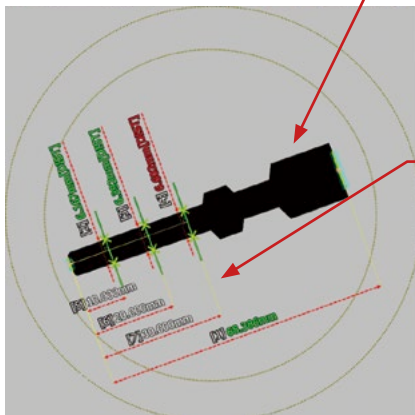


Example: Company B

Device used: Hand micrometer
Since there are many items to measure, we use it for a long time. The problem is that the measurement values are **different between the morning and evening** because the ambient temperature in the facility changes.



With the IM-8000, this difficult measurement can be done as follows:

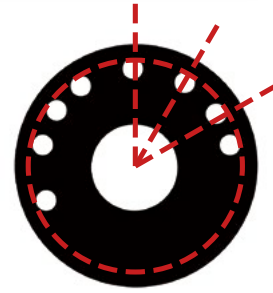


The pattern search eliminates the necessity for positioning. Even when the target is placed at an angle, the measurement will be performed normally.

The reference position and the distance from that position can also be recognized automatically! Every operator can achieve the same measurement results.

Difficult measurement 4

Measurement from a circle center



[Metal processed part]

The angles between the lines connecting circle centers as well as the concentricity are measured.



Example: Company A

Device used: Measurement microscope
Since the measurement target is complicated, we ask skilled operators to do the job. However, such a complex operation is a heavy burden to them and results in **incorrect measurements due to fatigue...**

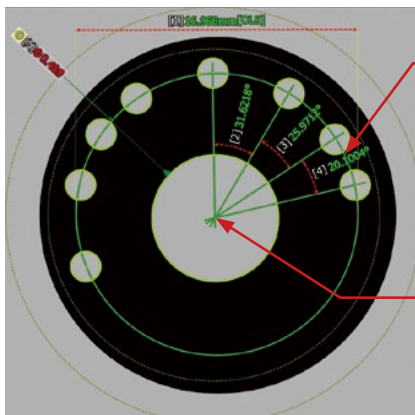


Example: Company B

Device used: CNC image measuring instrument
The measurement is not affected by operators, but the measurement of each item requires significant time. Since we must measure many items, we want to add more machines, but it is **very expensive...**



With the IM-8000, this difficult measurement can be done as follows:



Even items which require significant measurement time with optical comparators or measurement microscopes can be measured instantaneously.

The measurement of circle centers is automatically processed, enabling accurate measurement which is not affected by operators.

Difficult measurement 5

Measurement of soft objects which deform easily



[Plastic molded part]

The distance from the reference line is measured.



Example: Company A

Device used: Hand micrometer
Although we precisely specify the force used to measure the target, sometimes the **result varies depending on the operator...**

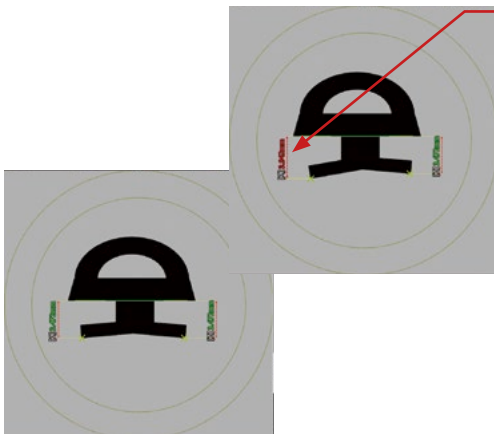


Example: Company B

Device used: CNC image measuring instrument
We use programs to input measurement items, but the soft objects deform easily, resulting in errors during measurement which **often stop the process...**



With the IM-8000, this difficult measurement can be done as follows:



Since pattern matching is possible based on only the partial image of the target shape, accurate measurement is ensured even for the parts which deform easily.

Four advantages of this new, cutting edge method for image measurement

IMseries

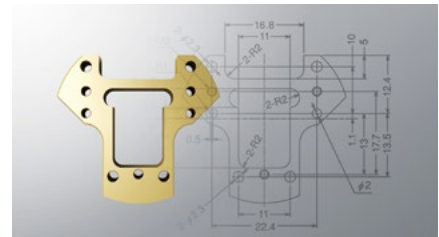


NEW IM-8000 Series Image Dimension Measurement System

Measure the previously unmeasurable

A wide variety of measuring & auxiliary tools

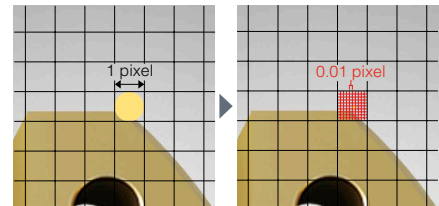
By simply placing a target on the measuring area, anyone can measure anything from inner diameters, circular pitches and angles to complex shapes. All of these were difficult to measure with conventional methods, but can now be measured with ease and accuracy.



Sub-pixel measurement accuracy

The leading-edge sub-pixel processing

KEYENCE's original image processing makes it possible to detect edge positions more accurately than conventional optical systems due to the sub-pixel processing (0.01 pixel).



Conventional vision system IM-8000

Instantaneous batch measurements at 300 points

Industry first^{*1} Measures all of the dimensions in the measuring area at once

The newly developed double telecentric lens with a large diameter of 200 mm 7.87" captures the complete image of the target component, making it possible to simultaneously measure all inspection points. In addition, the obtained measurement data can be saved digitally and output as reports and statistical data.

No.	measurement item	mes. value	units	res.
1	LN-LN001	4.999	mm	OK
2	DIA001	10.001	mm	OK
3	CL-CL001 [CENTER]	13.002	mm	OK
4	ARC001	14.998	mm	OK
5	ANGLE001			OK
Measured in seconds				
82	WD001 [MAX]		mm	OK
82	WD001 [MIN]	1.002	mm	OK
83	LN-LN002	150	mm	NG
84	ARC005	1.999	mm	OK
85	ARC006	2	mm	OK

Positioning is no longer necessary

Simple configuration for automatic measurement using the iPASS² method

The iPASS method executes a pattern search on the target placed in the measuring area for its position and angle based on the target's characteristics. Because of this automatic pattern recognition positioning process, manual positioning is a thing of the past.



*1 As of August 2009, derived by internal market research.

*2 iPASS = Intelligent Pattern Analysis Search System



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SAFETY INFORMATION

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

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