

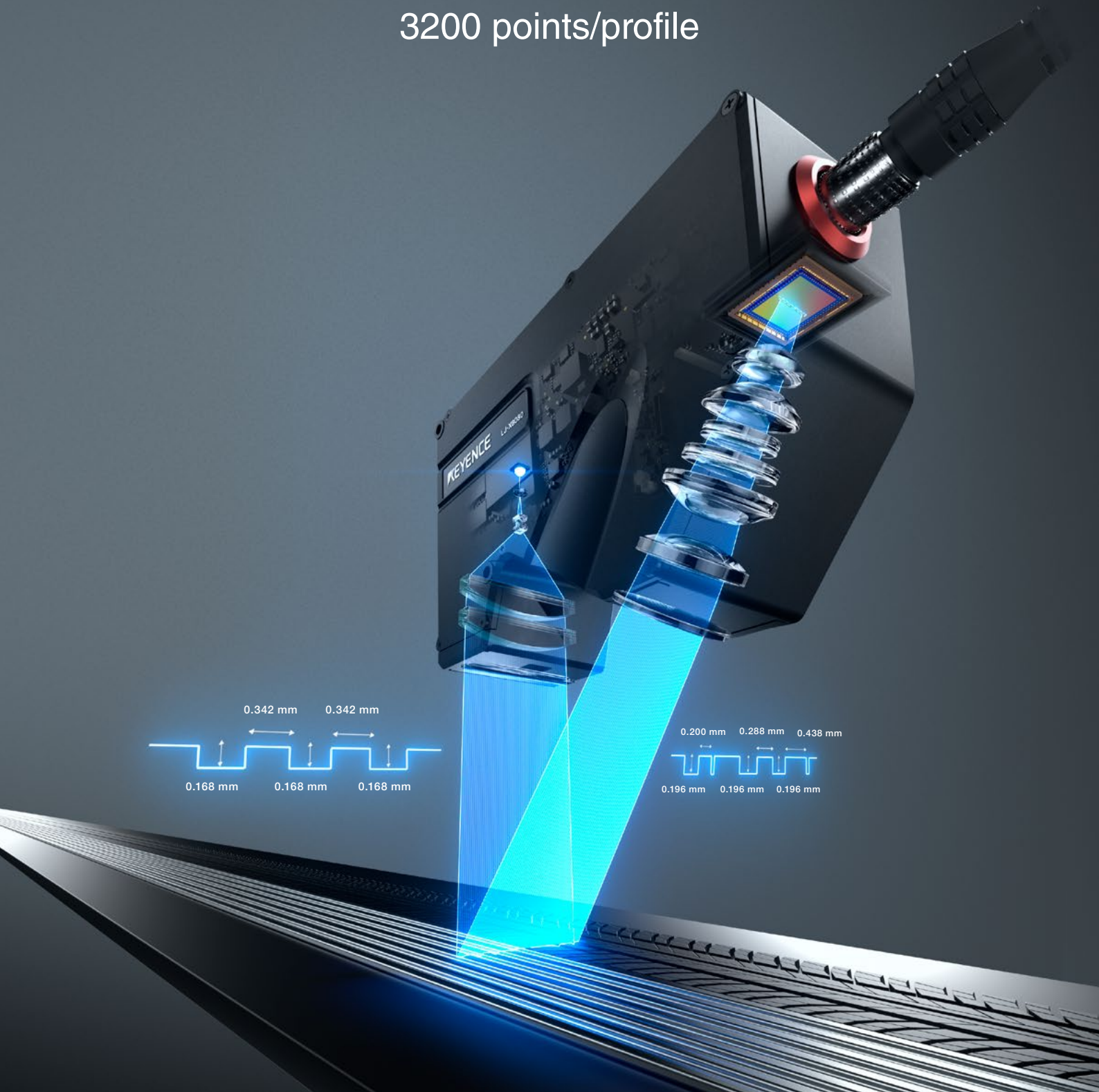
KEYENCE

2D/3D Laser Profiler

NEW LJ-X8000 Series

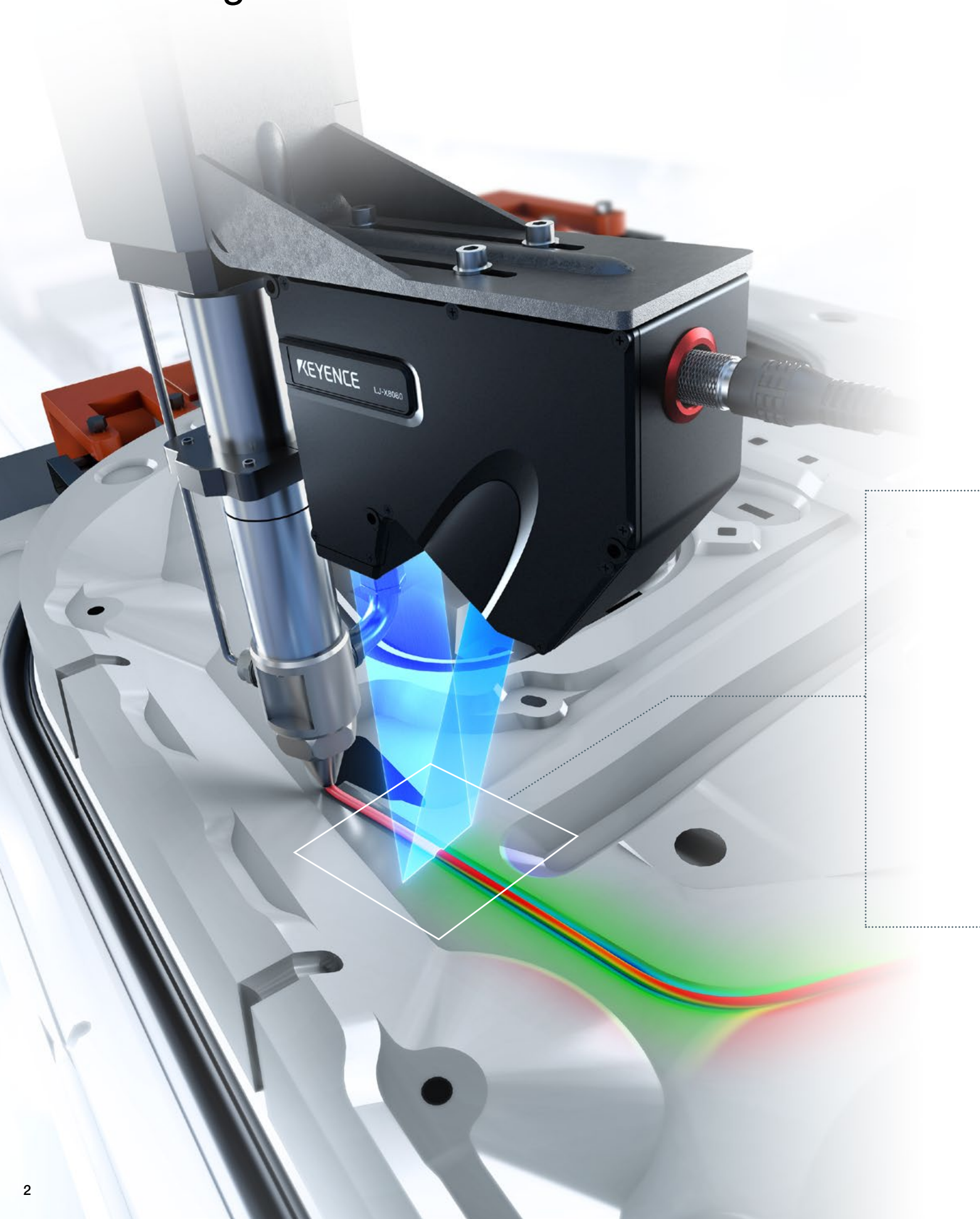
High-Resolution Inline Measurement

3200 points/profile



LJ-X8000 Series

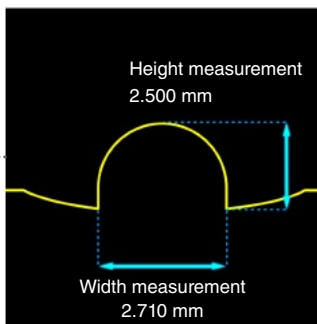
Measure Any Target with High Precision



Designed to handle a wide-range of applications, from profile measurement to 3D inspection.

2D

Measurement



3D

Inspection



High precision measurements performed inline

Capture the shape of targets in exceptional detail with the new standard in high-resolution measurement, 3200 points/profile.

Compatible with all materials

Capture stable profiles from any target, regardless of colour, material, or shape.

Set up in 3 easy steps

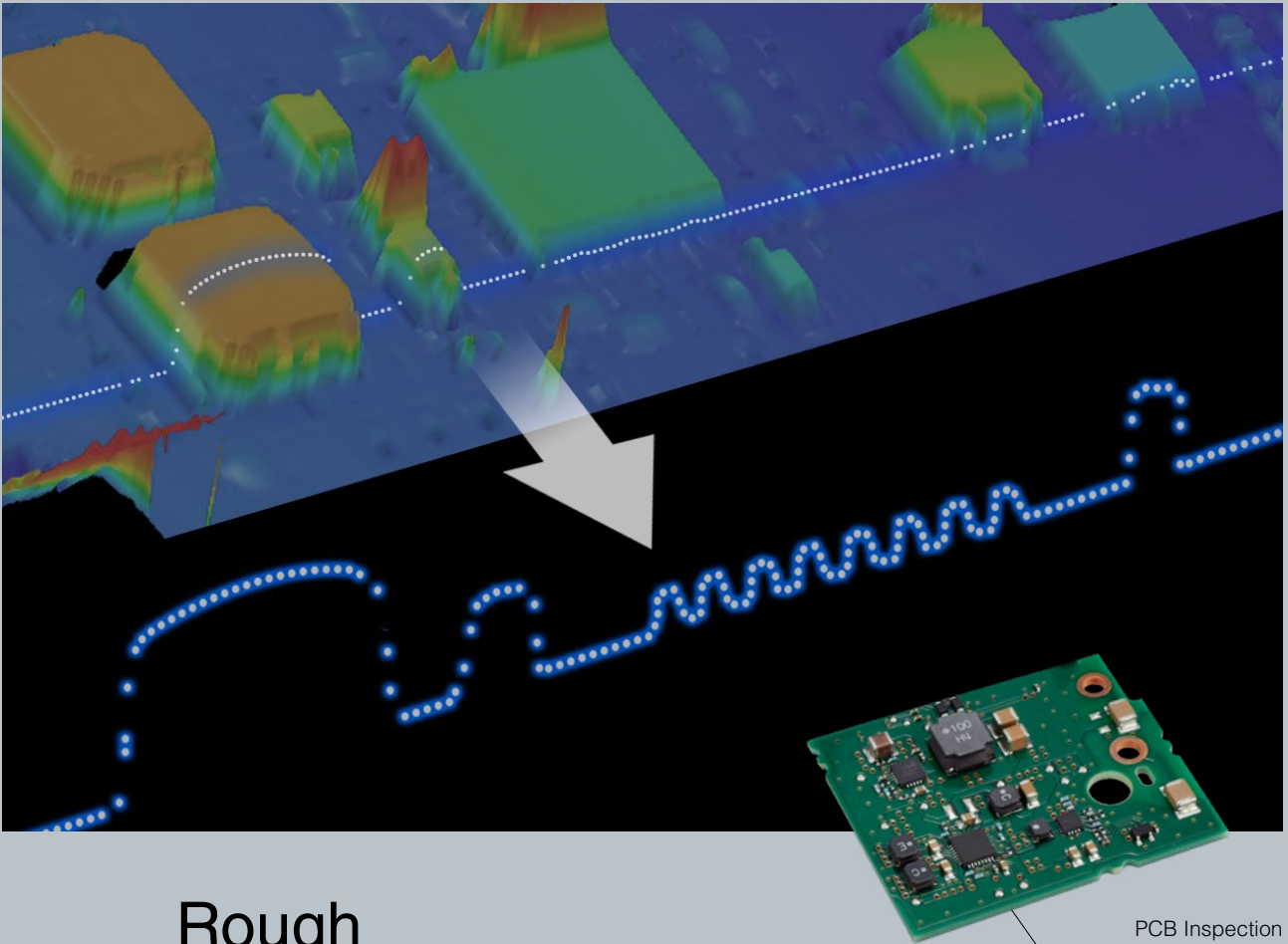
Measurement and inspection settings can be configured in three easy steps that any user can complete.



2D/3D Laser Profiler
NEW LJ-X8000 Series

Improved imaging capability makes it possible to measure or inspect any target with high precision.

Conventional measurement



Rough

Lower profile resolution limits the ability to accurately render the shape of a target.

Irregular

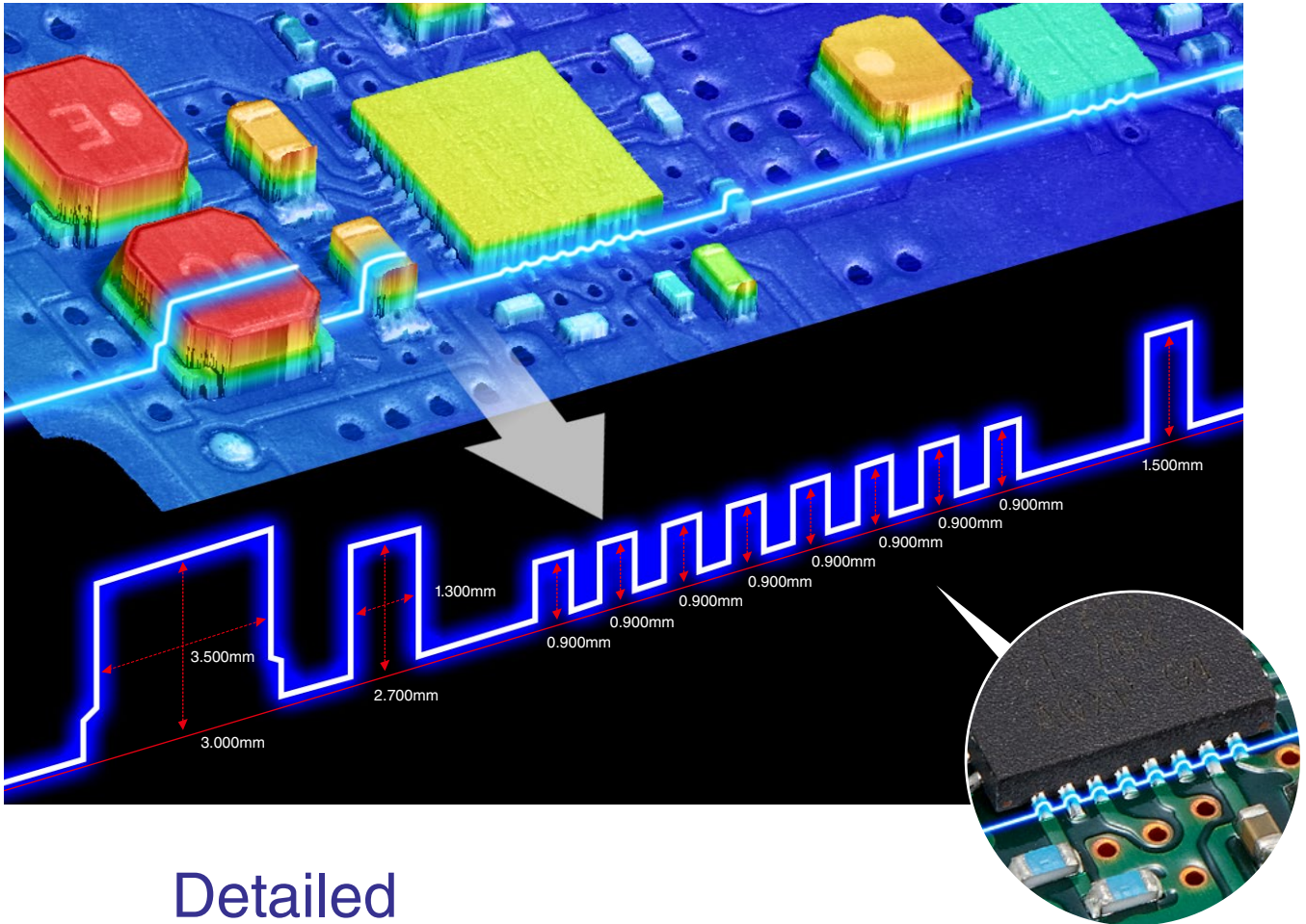
Noise such as light reflected from the target causes variations in measurement data and tracking errors.

Surface dependent

Image quality and measurement values can fluctuate based on the colour or gloss of a target.



Measurement with the LJ-X Series



Detailed

Each high resolution profile contains 3200 data points, so the shape of targets can be rendered in exceptional detail.

Consistent

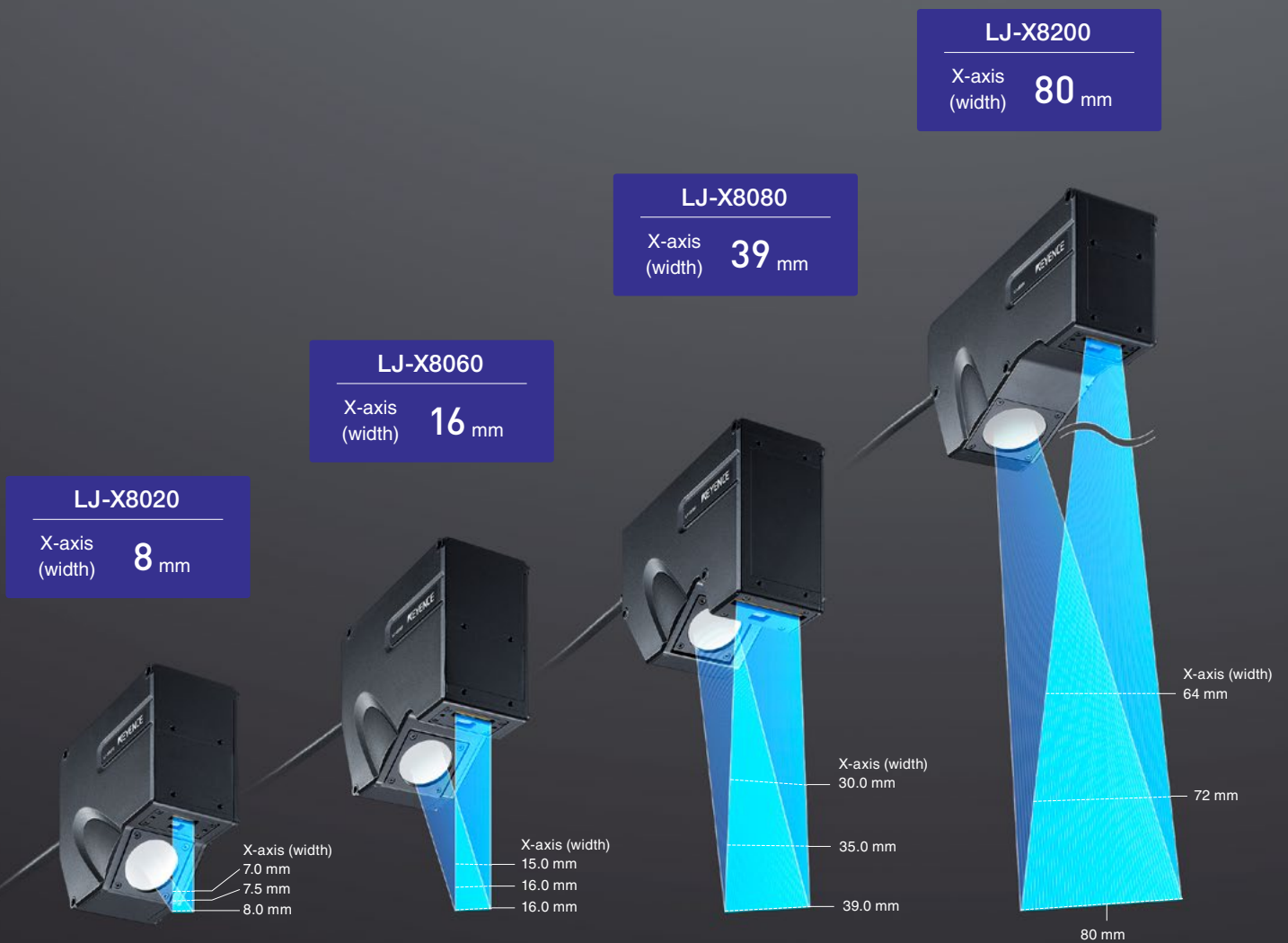
Newly developed shape processing algorithms minimise the effect of noise and eliminate tracking errors.

Stable on any surface

By using an ultra-sensitive CMOS with wide dynamic range, the sensor can produce stable profiles on any target, including those with colour variation.

Select from a lineup designed to meet any application requirements

The LJ-X8000 series offers a wide range of sensors to support quality control and process improvement in any industry.



Choose a controller that fits your needs

With three different controller options available, you can find the perfect setup to match system capability with your inspection requirements and budget.

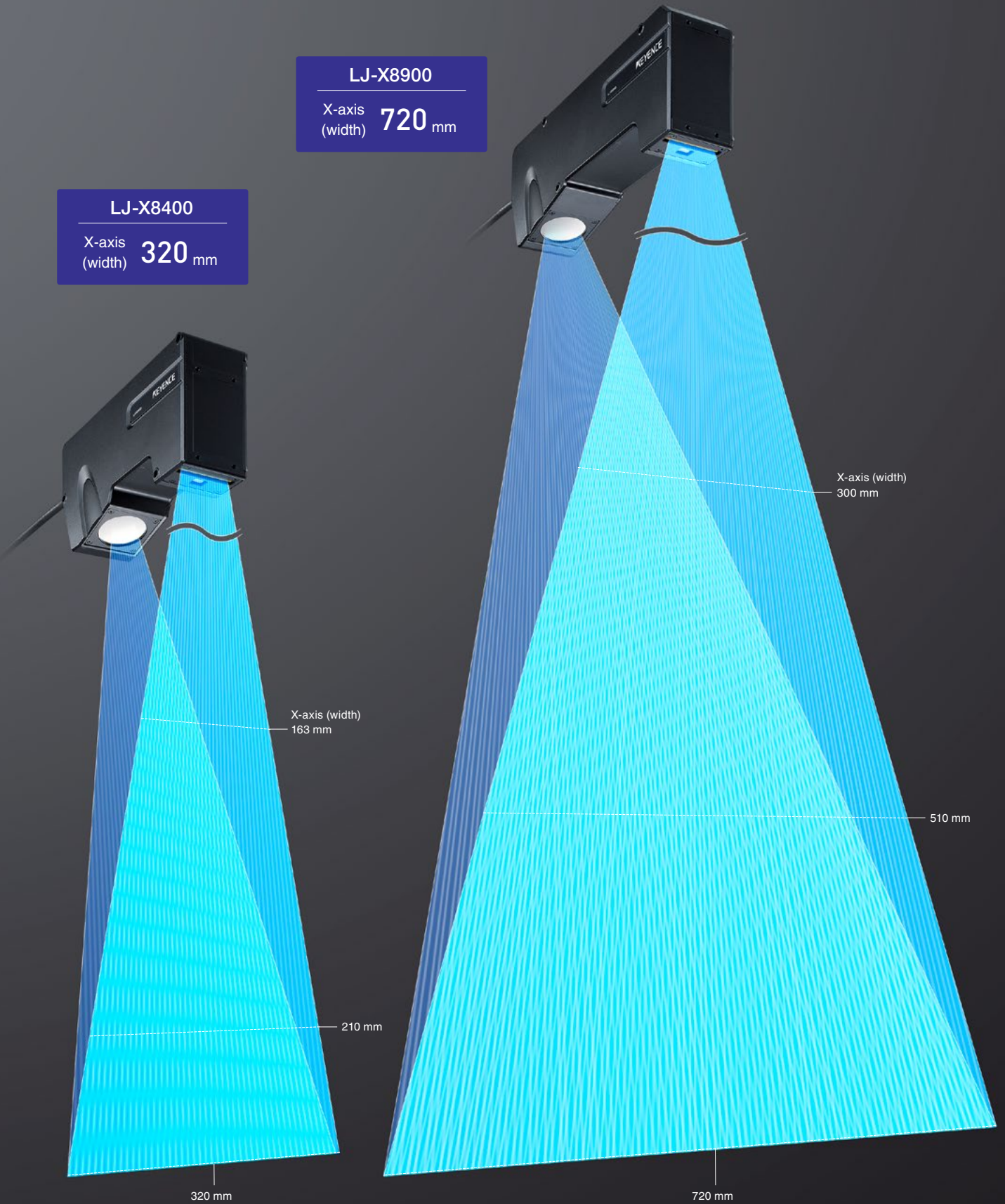
	2D/3D Controller LJ-X8000	2D Controller LJ-X8000E	Raw Data Output Controller LJ-X8000A
3D measurement mode	✓		
2D measurement mode	✓	✓	
Profile output			✓

LJ-X8900

X-axis (width) **720** mm

LJ-X8400

X-axis (width) **320** mm



2D/3D
Controller
LJ-X8000



2D Controller
LJ-X8000E



Raw Data
Output
Controller
LJ-X8000A



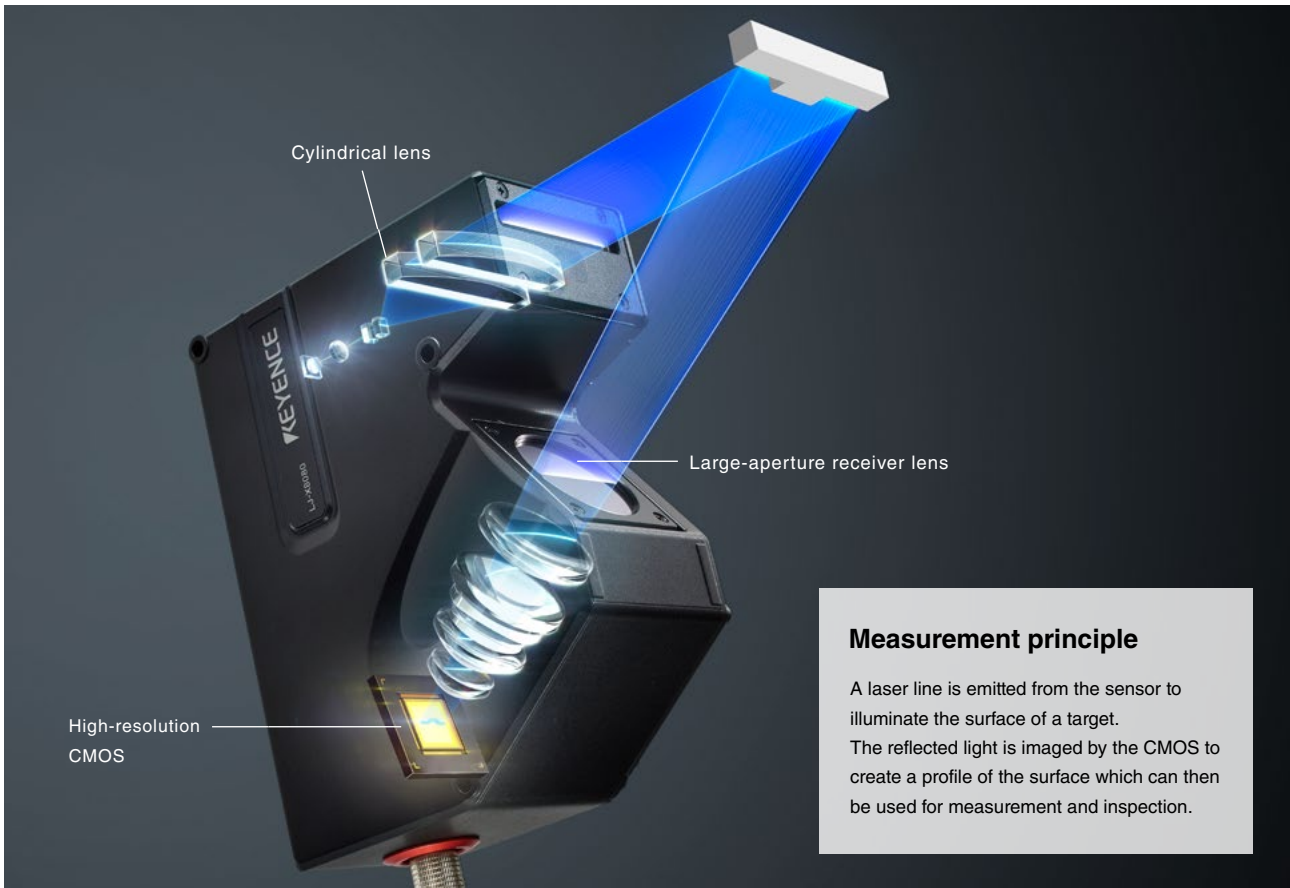
Ultra-high precision

3200 points/profile

Maximising resolution and target detection

To improve the resolution of the sensor, the number of pixels on the CMOS needs to be increased, which can be accomplished by making each pixel smaller. But smaller pixels can result in insufficient light to create an accurate profile of some target shapes or surfaces.

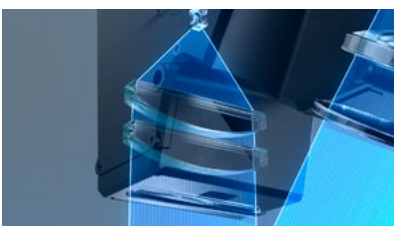
For the LJ-X series, we've implemented new technology to create a laser profiler capable of high resolution measurement on any target.



High-quality components create high-resolution images

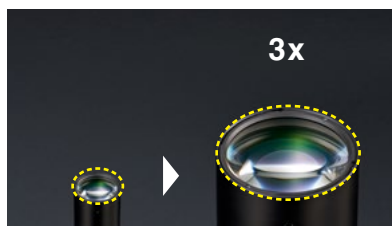
Cylindrical lens

Parallel light is emitted using a cylindrical lens designed to prevent the reflected light from scattering across the surface of the target. This ensures reliable reflections from any shape or surface.



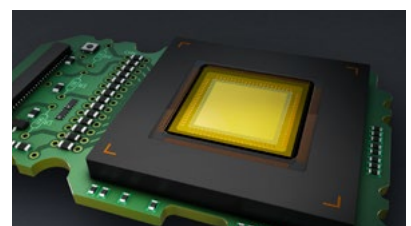
Large-aperture receiver lens

In addition to the unique optical design, a large-aperture light-receiving lens that covers three times the area of the conventional lens is installed to deliver the increased amount of light received.



High-resolution CMOS

This newly developed CMOS enables high-resolution measurement using 3200 points/profile, while delivering improved imaging capability on targets with varying reflectivity.



2D measurement

Car door flush and gap

Control flush and gap at the micron level. By mounting the sensor on a multi-axial robot, inspections can be performed inline.



3D measurement

Brake rotor porosity

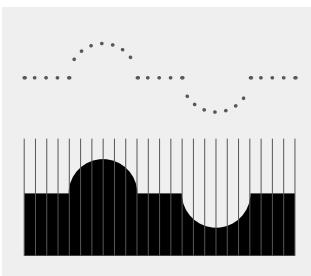
Using 3D images, it's possible to detect porosity in rough surfaces. High resolution profiles enable stable detection of even the smallest dents.



Accurately capture target shape

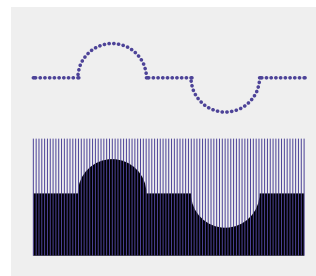
By creating each profile from 3200 data points, inspection can be performed using a profile that captures the shape of a target in more detail, improving measurement precision and defect detection.

Conventional System



Conventional systems have limited profile points which makes the shape rougher. Detecting small dents or protrusions was impossible.

LJ-X Series



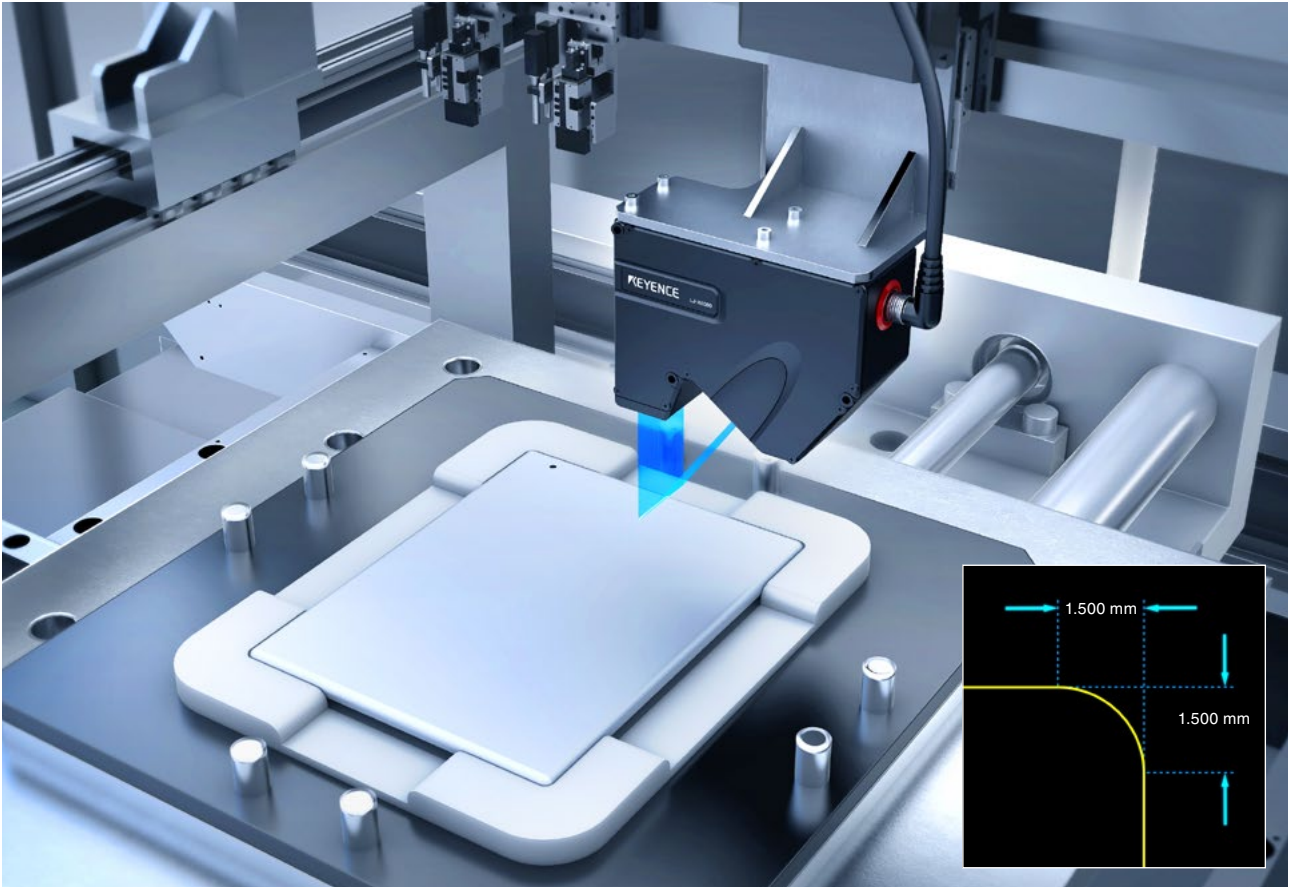
With the LJ-X8000 Series, the shape of the target is accurately rendered using 3200 points/profile. Abnormalities, such as small dents or protrusions, can be easily detected.

Ultra-high precision

Improved precision in both the X-axis and Z-axis

Edge contour measurement

Bevels and other ultra-fine shapes can be accurately measured.
 Deliver higher quality to customers by inspecting 100% inline.



Comparison with conventional product

X-axis (width)

Improved X resolution produces higher precision width measurements.

	Conventional KEYENCE product	LJ-X8000
Measurement range	7 mm (reference distance)	7.5 mm (reference distance)
Profile data count	800	3200
Profile data interval	10 μm	2.5 μm

Measurement precision (X-axis)
4x more resolution

Z-axis (height)

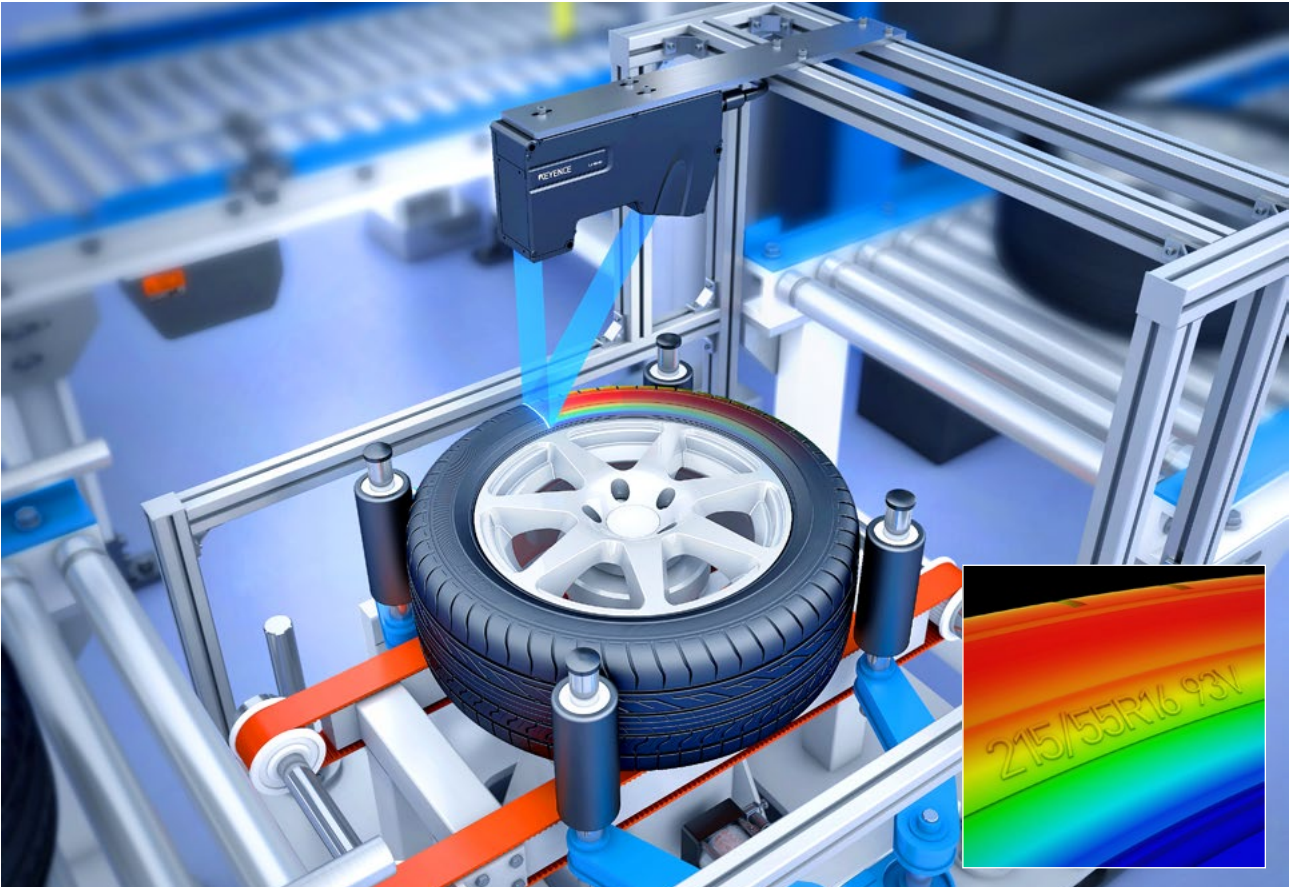
Improved Z-axis precision results in accurate height measurements.

	Conventional KEYENCE product	LJ-X8000
Measurement range	±23 mm	±20.5 mm
Linearity	±0.1% of F.S.	±0.03% of F.S.

Measurement precision (Z-axis)
3x more accurate

Tire shape / DOT code inspection

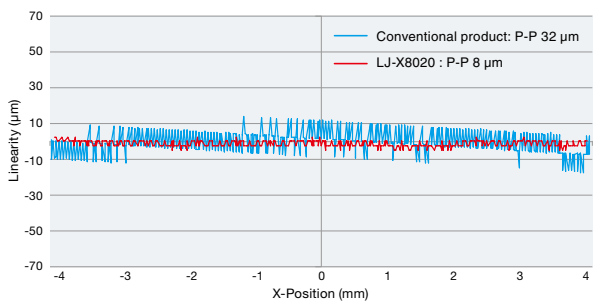
With improved X-axis and Z-axis precision, it's possible to hold tighter tolerances over a wider inspection area. This significantly expands the types of applications that can use 3D measurement.



Linearity comparison

X-axis direction

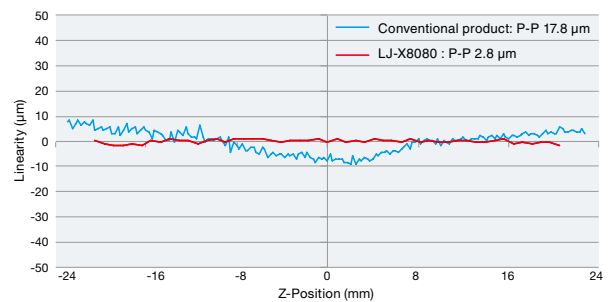
With 3200 points/profile, X-axis linearity has been significantly improved. Edge position can be tracked more reliably.



LJ-X8020 (typical example)

Z-axis direction

Z-axis linearity improvements make measurements of height difference and position more accurate.



LJ-X8080 (typical example)

Compatible with all targets

Stable measurement on any material or surface

Smartphone assembly

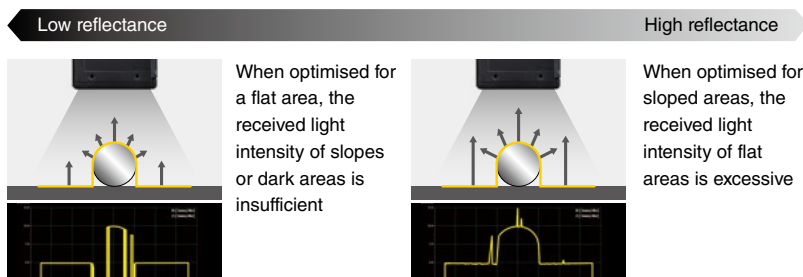
Targets with multiple materials can be captured in a single profile, allowing measurements to be made between glass and metal surfaces. The LJ-X8000 series is equipped to handle reflectances ten times higher than conventional products.



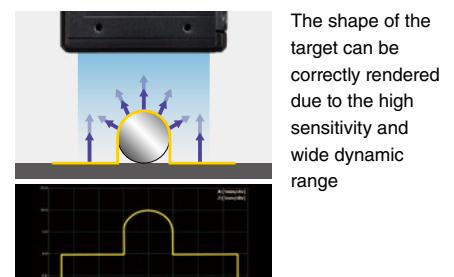
Single-shot HDR

The profiler is equipped with an ultra-high-sensitivity CMOS featuring KEYENCE's single-shot HDR function. This provides the sensor with a dynamic range wide enough to reliably measure targets with multiple surface types (or areas of low reflectance and high reflectance) in a single shot.

Without single-shot HDR function



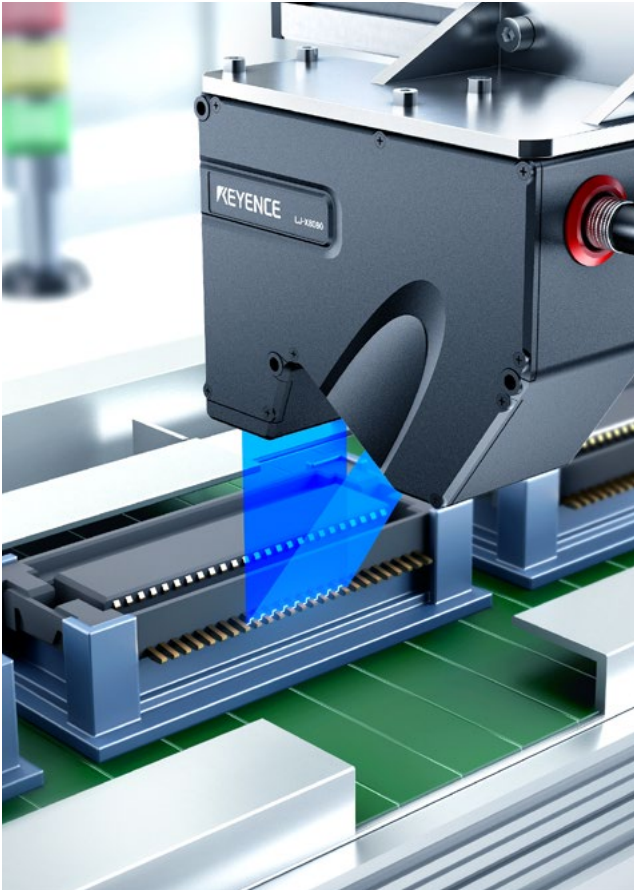
LJ-X Series



2D measurement

Coplanarity inspection

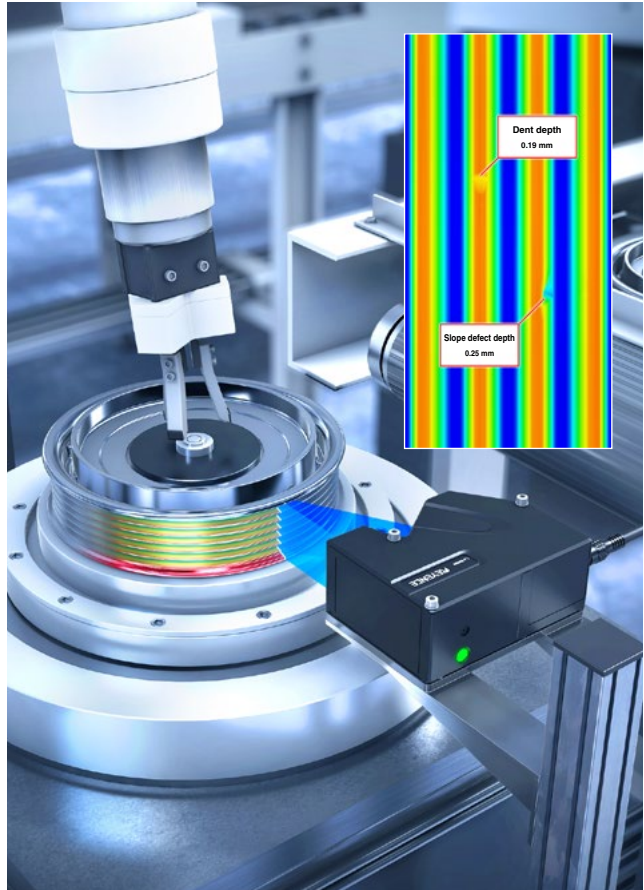
By eliminating the noise generated by differences in reflectivity and shape, it's possible to generate a stable profile for pin inspection.



3D measurement

Pulley shape measurement

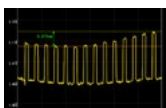
By scanning the pulley as it spins, the sensor can detect chips and dents anywhere in the surface.



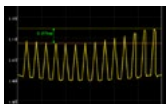
Newly developed

Preserve Shape function

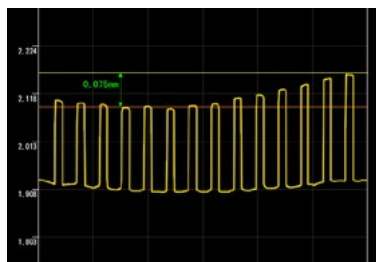
This is a filter that removes noise components caused by variations in reflected light, allowing the shape of the target to be maintained.



Without preserve shape function



Deformation caused by smoothing

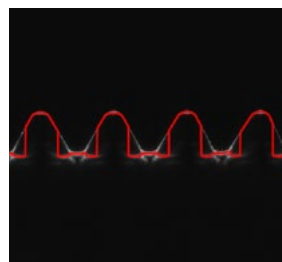
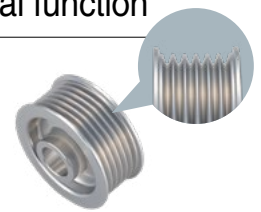


With preserve shape function

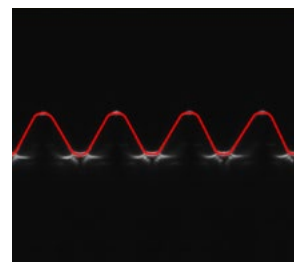
Newly developed

Irregular Reflection Removal function

The effects of stray light from glossy targets are suppressed, making it possible to render their shape accurately.



Stray light control OFF



Stray light control ON

Intuitive user interface reduces setup time

3-step configuration

Conventional unit setup



LJ-X Series setup

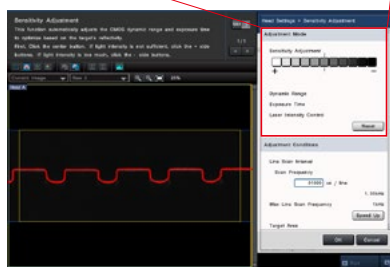
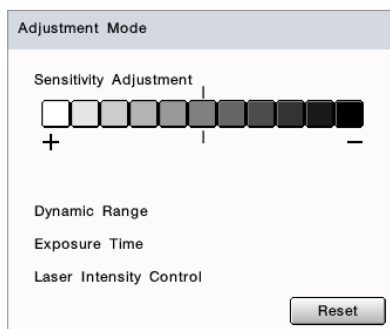


STEP1

STEP2

Capture settings

Automatically tune the sensor by selecting the desired sensitivity.



Inspection tool setup

Add inspections by selecting from a list of available tools using visual icons.

2D profile measurement



Height Diff. / Width



Area

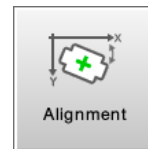


Angle

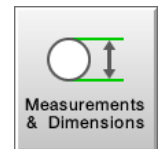
3D profile measurement



Height

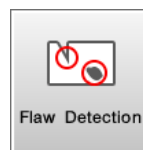


Alignment

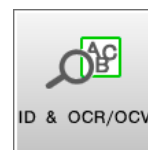


Measurements & Dimensions

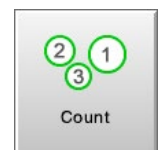
3D appearance inspection



Flaw Detection



ID & OCR/OCV



Count

Position detection
Creation & verification

Tilt detection
Creation & verification

Position correction
Creation & verification

Configuration
complete

Considerable time savings

STEP3

Configuration complete

Position correction

Apply position correction to have inspection regions track with a feature's location.



Pattern Match
(Shading) Position



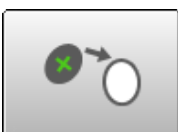
Pattern Match
(Profile) Position



Edge Position



Line Position
and Angle



Gravity Centre
of Cluster



Centre
of Circle

Start inspection

No external software required.

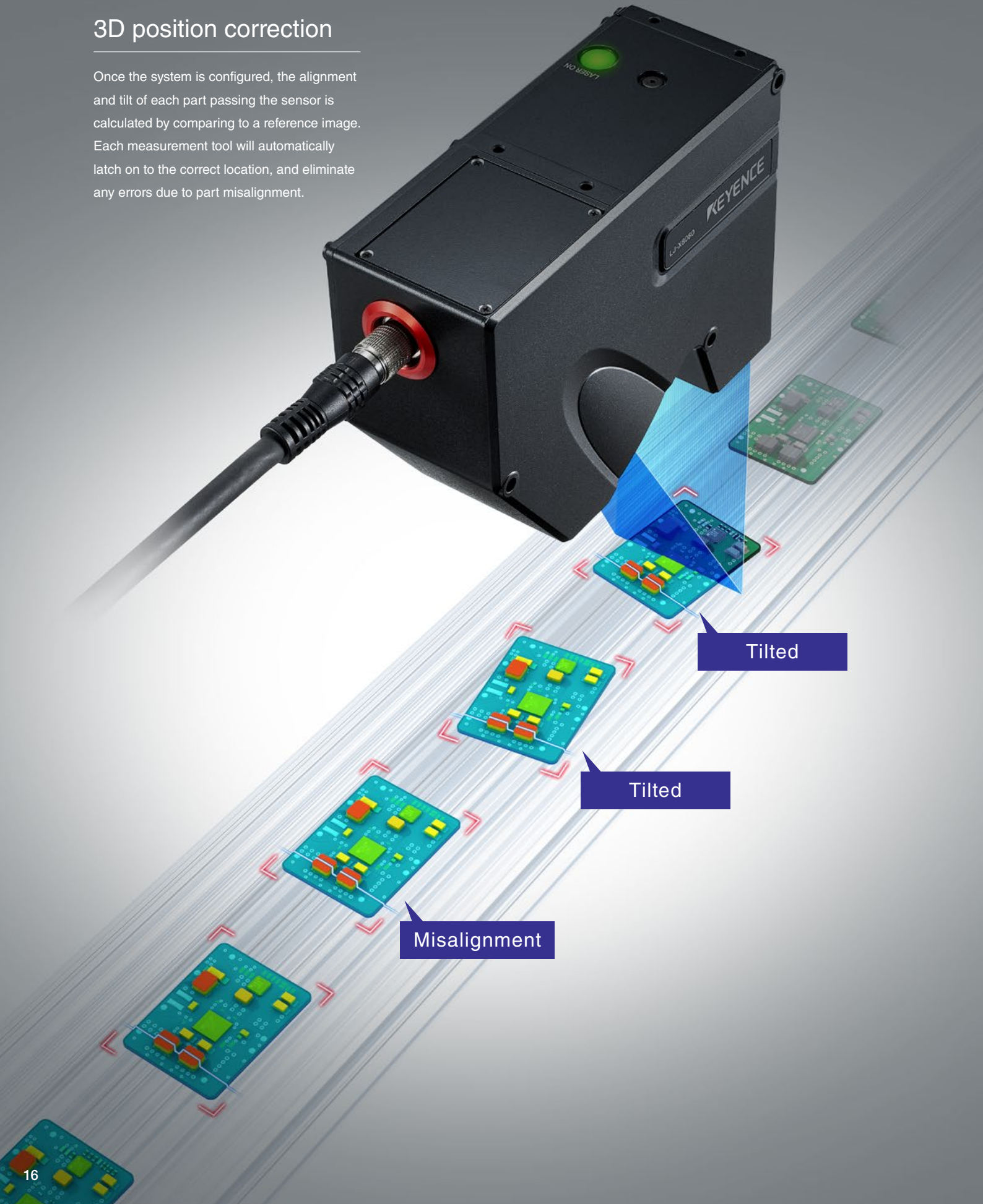


100% inspection made simple

Get accurate results with 3D position tracking

3D position correction

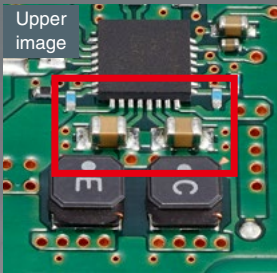
Once the system is configured, the alignment and tilt of each part passing the sensor is calculated by comparing to a reference image. Each measurement tool will automatically latch on to the correct location, and eliminate any errors due to part misalignment.



Area profile measurement

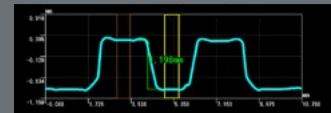
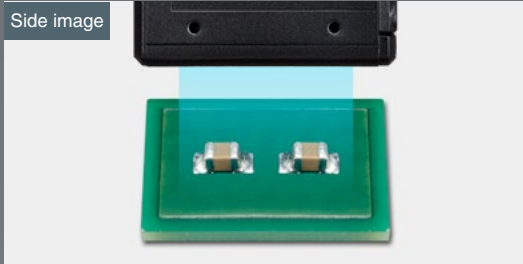
Height inspection of PCB-mounted parts

Any variation in part presentation, such as angle or tilt, is automatically corrected to produce stable profile measurements.

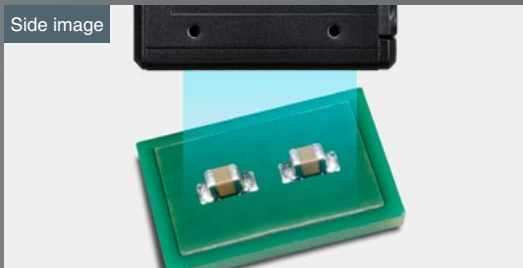


Height inspection of PCB-mounted parts

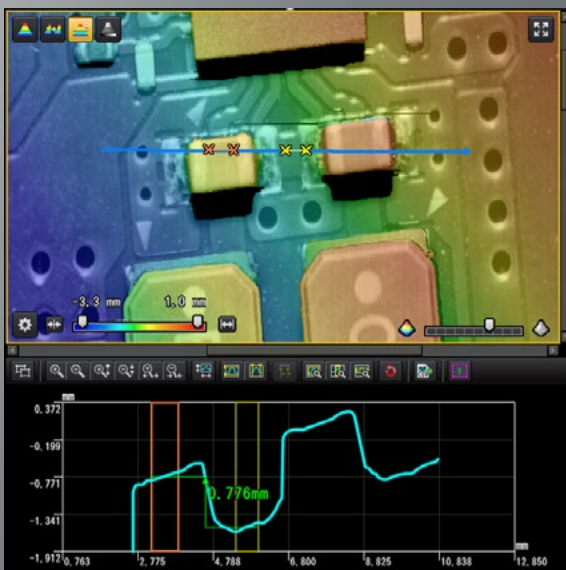
A target that did not become misaligned or tilted during transportation



A target that became misaligned and tilted during transportation

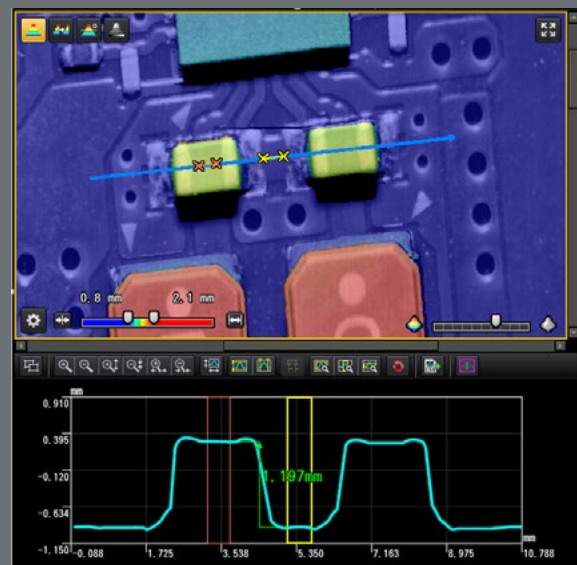


Conventional mode



If a PCB is misaligned or tilted, measurement and inspection cannot be performed correctly.

3D position correction with LJ-X8000



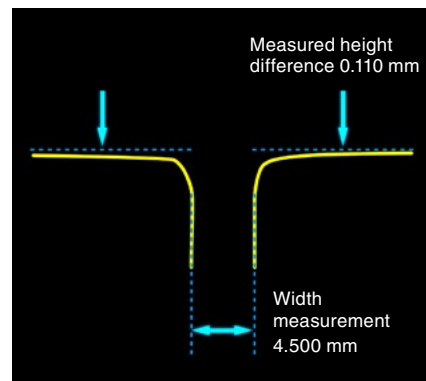
Area profile measurement detects target position shifts and tilt and automatically performs correction, enabling stable inspection.

2D profile measurement

Door panel flush and gap



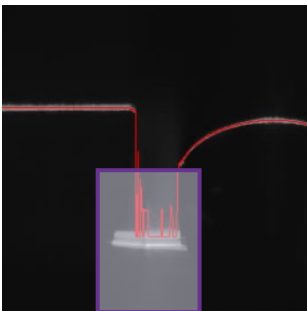
Measure door panel flush and gap without touching the car. The sensor settings don't need to be adjusted for variations in body colour or size, making it easy to automate external appearance inspection.



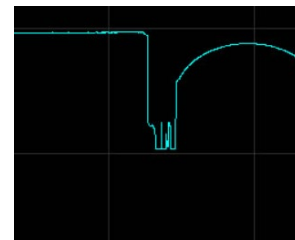
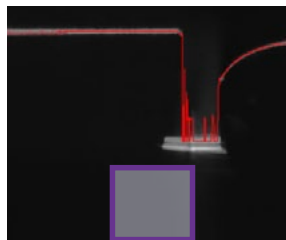
Mask tracking function

In cases where stray light due to scattered reflections cannot be eliminated with filters, a mask can be applied. Masks can dynamically track part location, so even if the height or position of the desired mask area changes, measurement results will not be impacted by stray light.

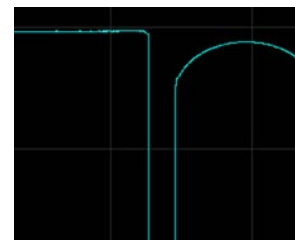
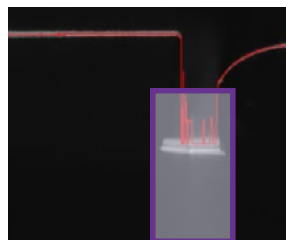
Apply a mask to stray light



Mask tracking OFF



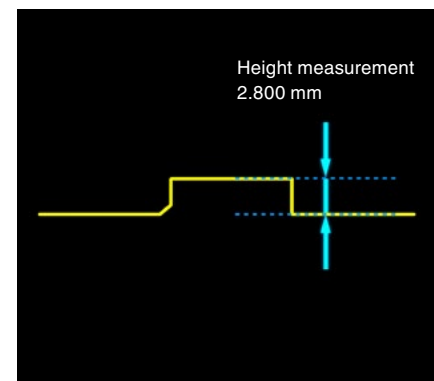
Mask tracking ON



PCB chip height



Inspect the height, position, and shape of a mounted part. By using parallel light, the sensor captures target shape accurately, right down to the fine details.



LED lighting function

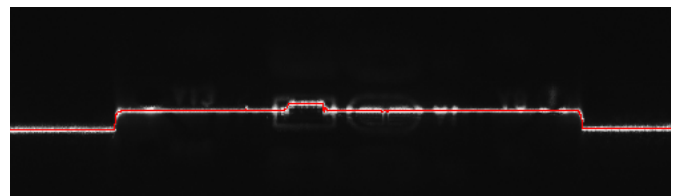
The profiler is equipped with an LED right beside the laser transmitter.

This illuminates the area on the measurement target that is currently being captured by the laser, making it easy to understand where measurements are taking place.



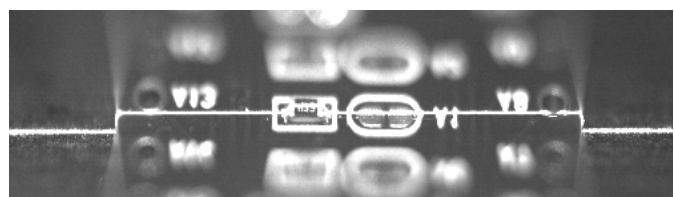
Lighting setting **OFF**

Only the shape of the area being irradiated by the laser can be determined



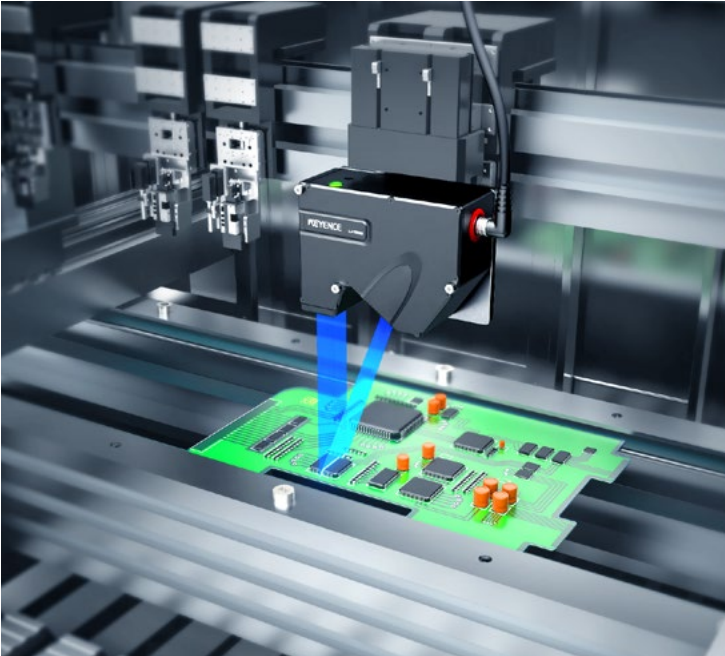
Lighting setting **ON**

It's possible to confirm where the laser line is located by viewing the target.

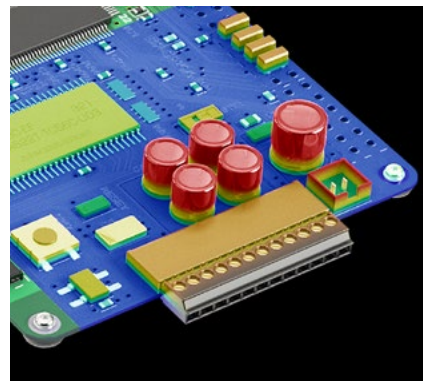


3D profile measurement

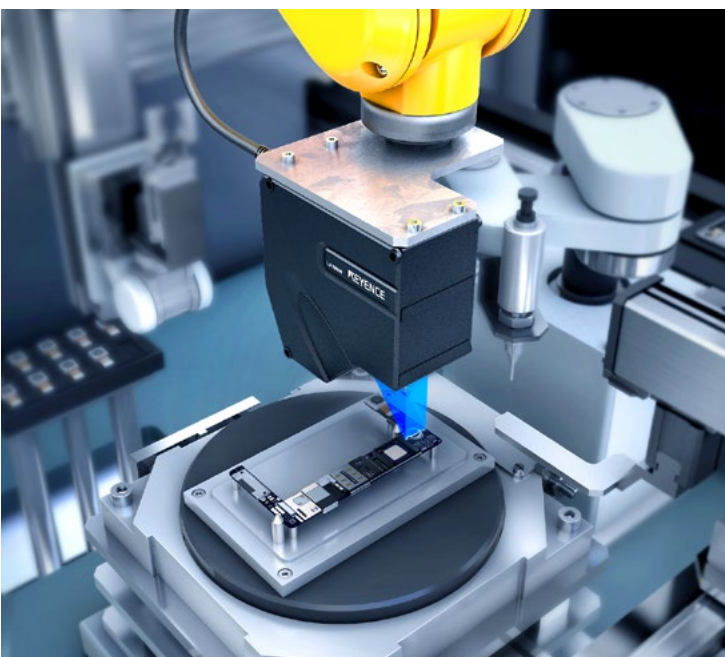
Inspection of mounted components



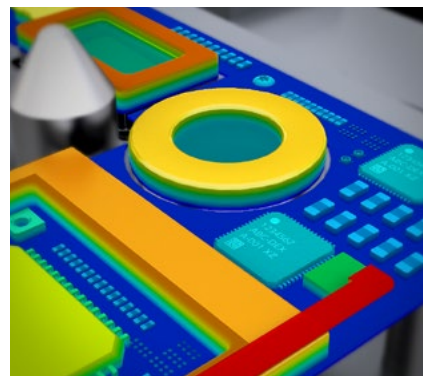
The height of mounted parts can be measured, using the surface of the PCB as a reference. The adjustment function can handle misaligned and tilted targets, so accurate inspection is possible without stopping the target.



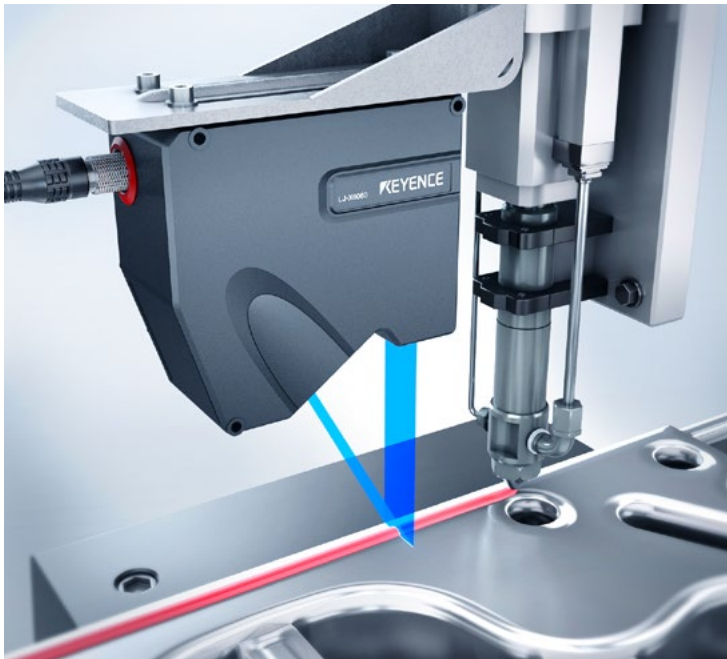
Camera module assembly check



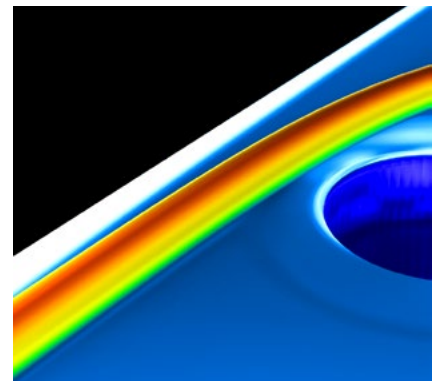
For camera modules with multiple functions, it's necessary to confirm the relative position of various elements. Performing high precision assembly inspection is possible with a single sensor using 3D data.



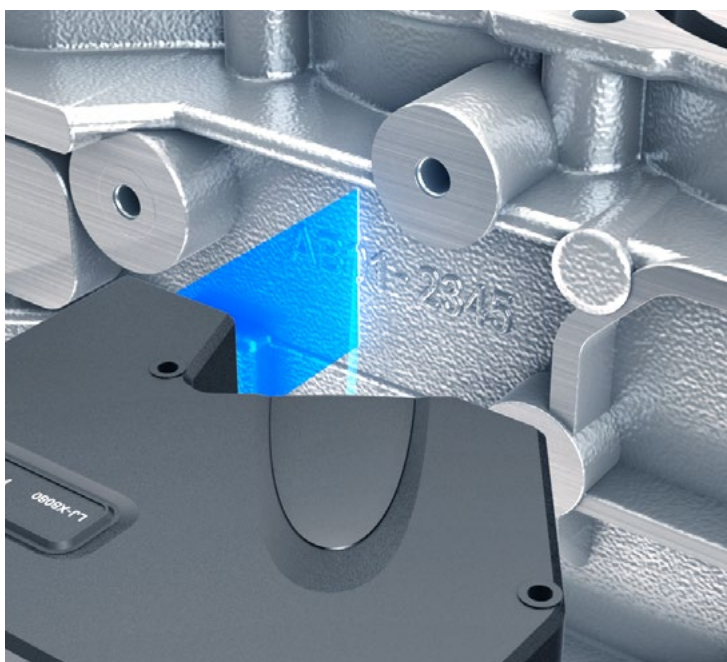
Sealant height, width, and volume



Improve quality control by confirming sealant bead height, width, and area, rather than checking for presence alone. Even sudden, small abnormalities are detected.



Character recognition on cast surfaces (OCR)

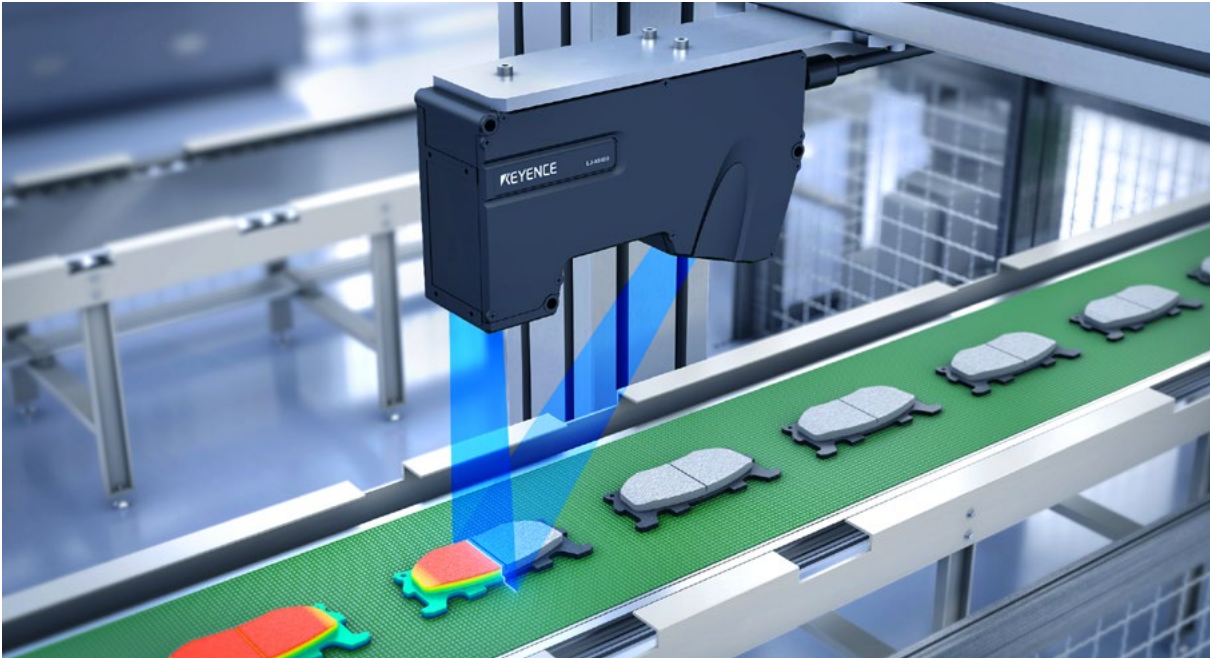


Characters machined on cast surfaces can be identified. Detection using height data allows for stable reading, even for characters on rough metal surfaces.



3D appearance inspection

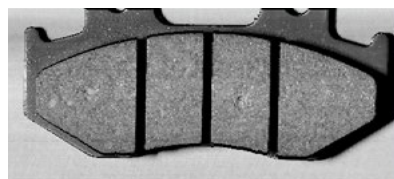
Brake pad dent inspection



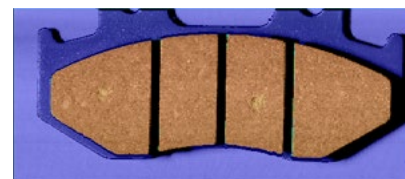
Height images provide reliable detection on patterned surfaces

Height images are created by scanning a target and using colour to represent height changes.

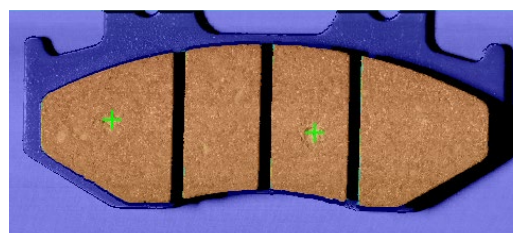
Patterns or markings on the surface do not impact the height image, making it easy to detect indentations or other defects.



Grayscale image



Height image



Indentation detection results

Weld shape inspection



Catch small changes in continuous processes

Profile measurement can be continuously performed on captured 3D shapes. This allows pass/fail criteria to be applied to maximum and minimum values over an area or period of time, making it possible to catch small defects in continuous processes.

Weld perforation sample



▼ The 3D shape is captured...

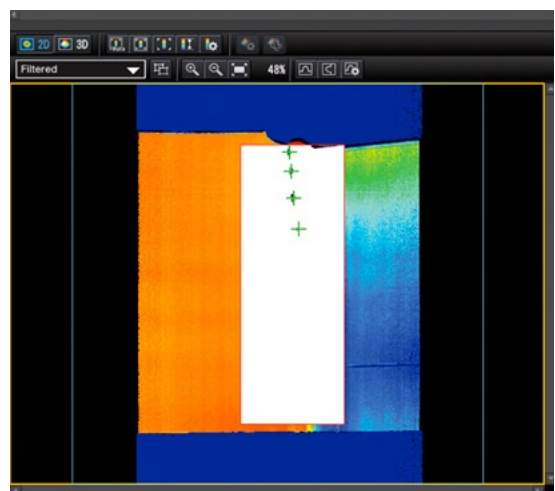
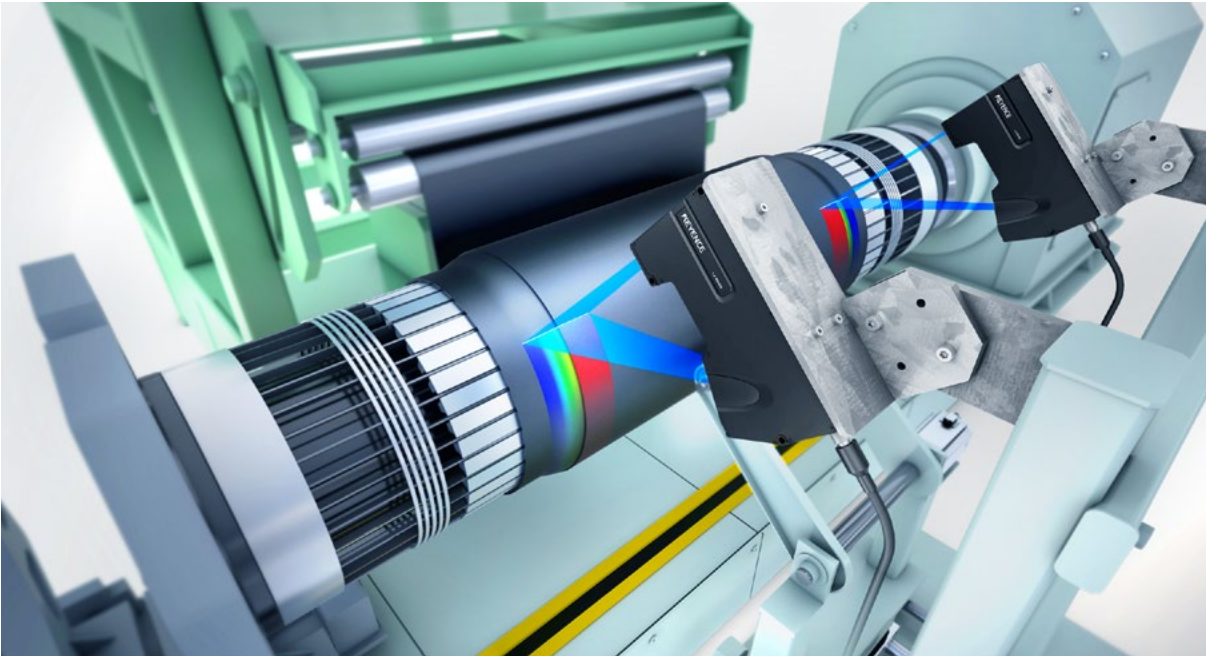


Image processing analysis is performed

3D appearance inspection

Sheet thickness and width



Extraction of uneven surfaces from free-form curved shapes

Defect inspections are possible by extracting changes in height from free-form curved surface information.
Stable detection is possible even with complex curved shapes.

Picture of target



Height image

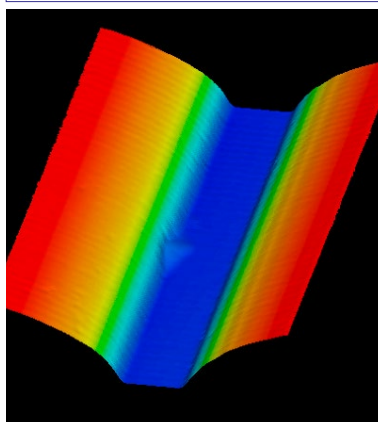
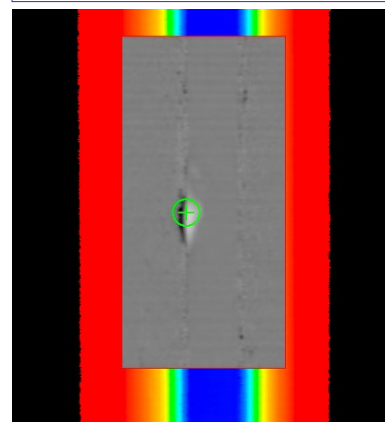
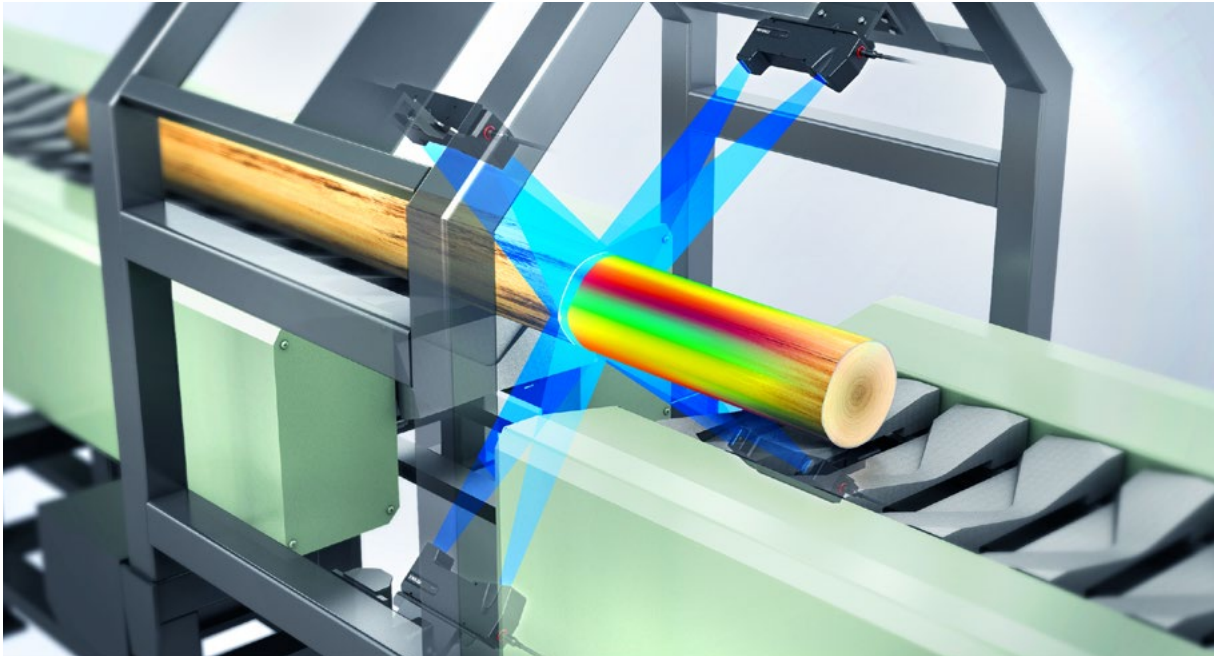


Image after extracting height + damage



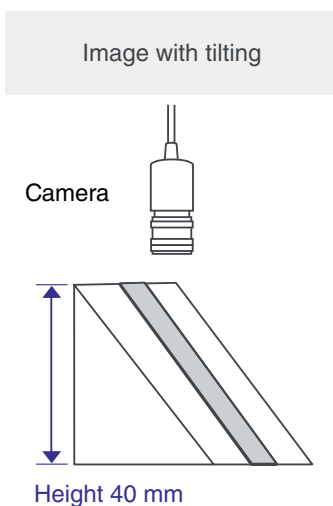
Lumber grading



Stable detection for targets with height differences

Highly accurate measurements can be made even when measuring targets with height differences or where the distance from the target to the camera could vary. Because the part image is focused anywhere in the Z-axis range, stable measurements can be performed on parts with height variation.

■ When capturing inclined targets with a height difference of 40 mm



Ordinary 2D camera



Out of focus

LJ-X Series

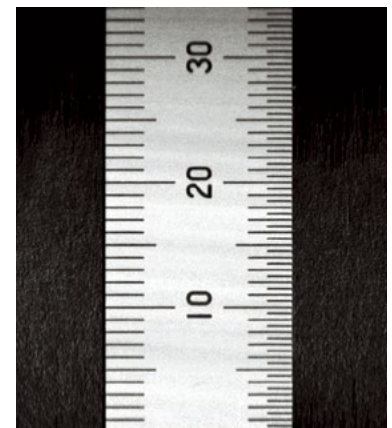
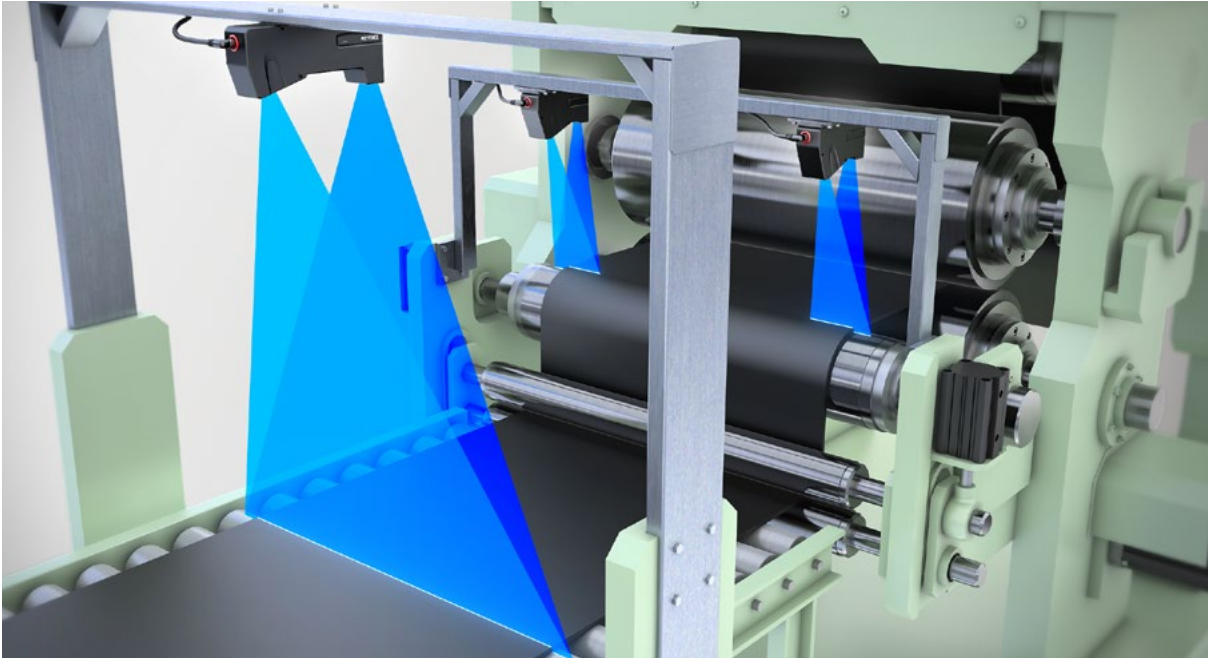


Image captured clearly

Customise inspections using raw data

Sheet width measurement & defect inspection



Maximise flexibility by creating custom programmes

With the raw data output controller, you can output profiles at high-speed (up to 16kHz) and process the data using custom software. A sample programme is available with a comprehensive list of commands for obtaining profile data, issuing triggers, changing various settings, and so on.

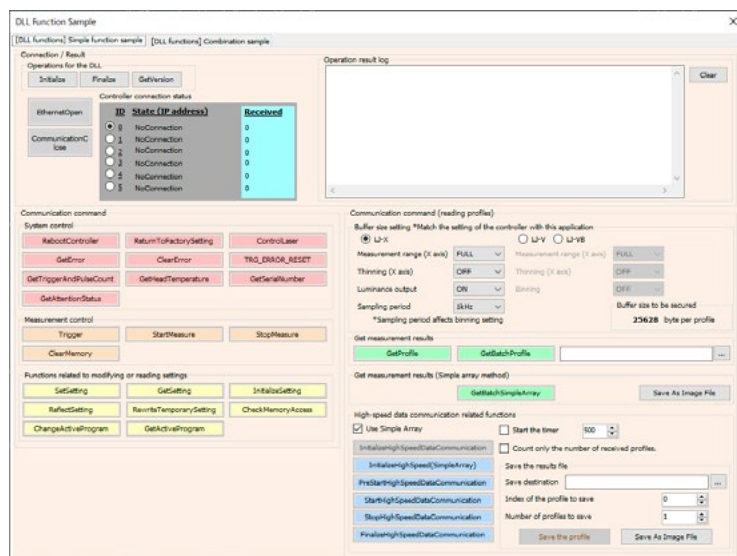
There is also a programme for saving files in bitmap and TIFF format.

The following languages are available:

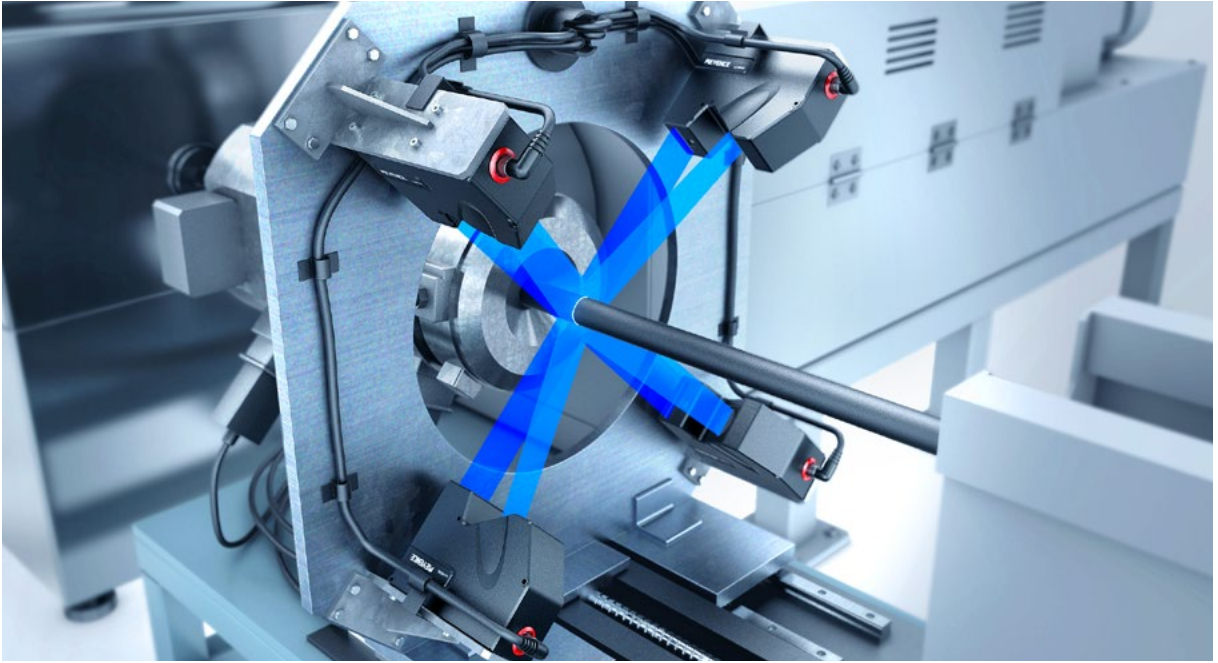
C#

C++

VB.NET

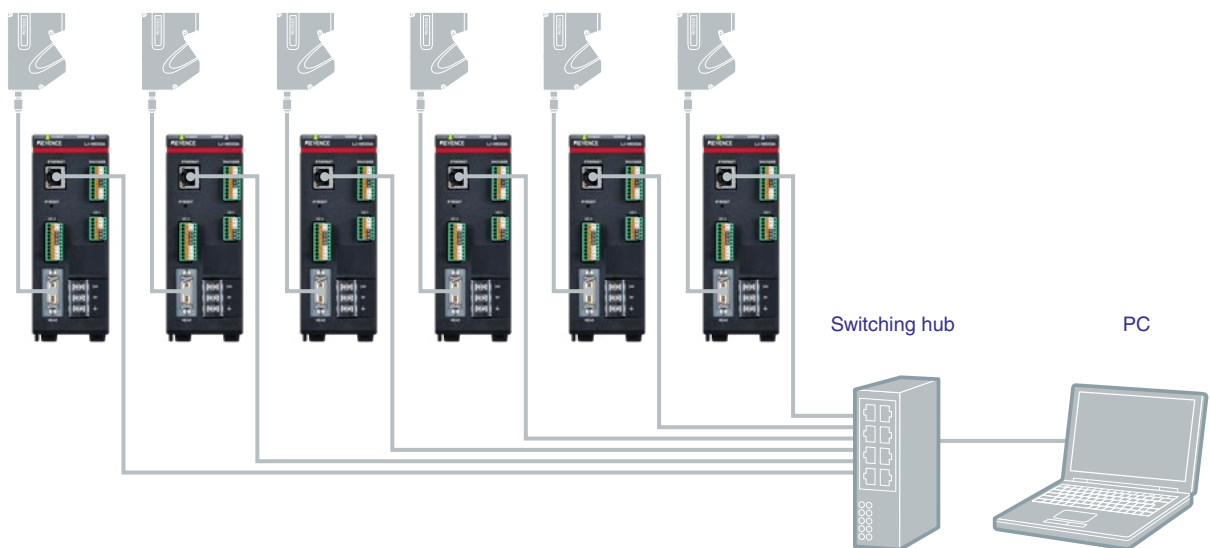


360° surface inspection



Synchronised measurement of multiple units

By triggering the master controller, other controllers are triggered at the same time.
Each sensor can output profile data and luminance data.



Integrating the LJ-X8000 series into your process





Dedicated encoder

Capture

KEYENCE's dedicated encoders can be set to any number of pulses, making it easy to install an encoder that matches with the capture conditions.



LJ-X sensor head

Measure

Perform high precision 2D and 3D measurements inline. Get the system up and running quickly with 3-step configuration.



Monitor

Control

Based on measurement results, parts can be sorted in real-time. Data can be fed back to control upstream and downstream processes with a variety of communication methods.

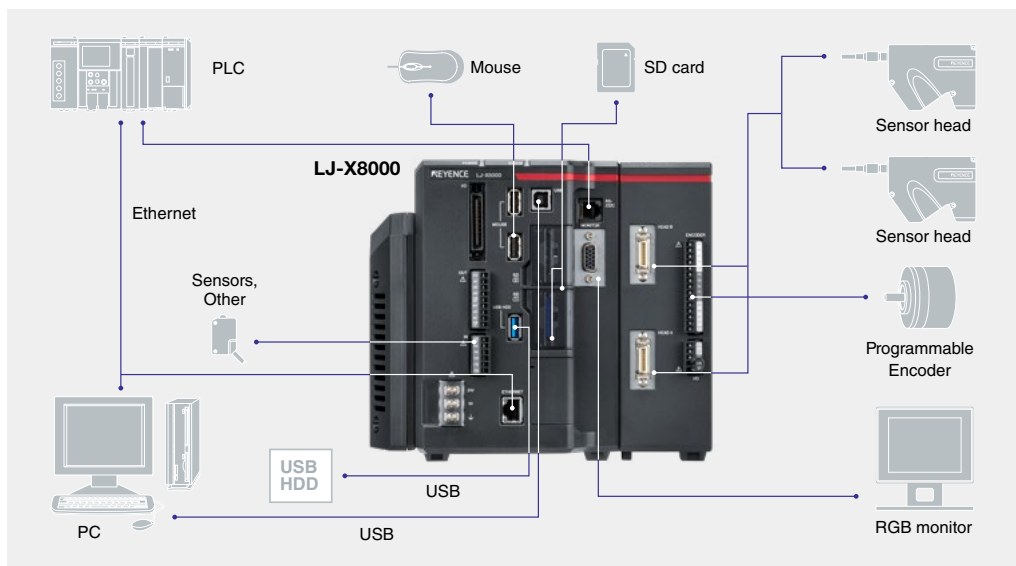


LJ-X controller

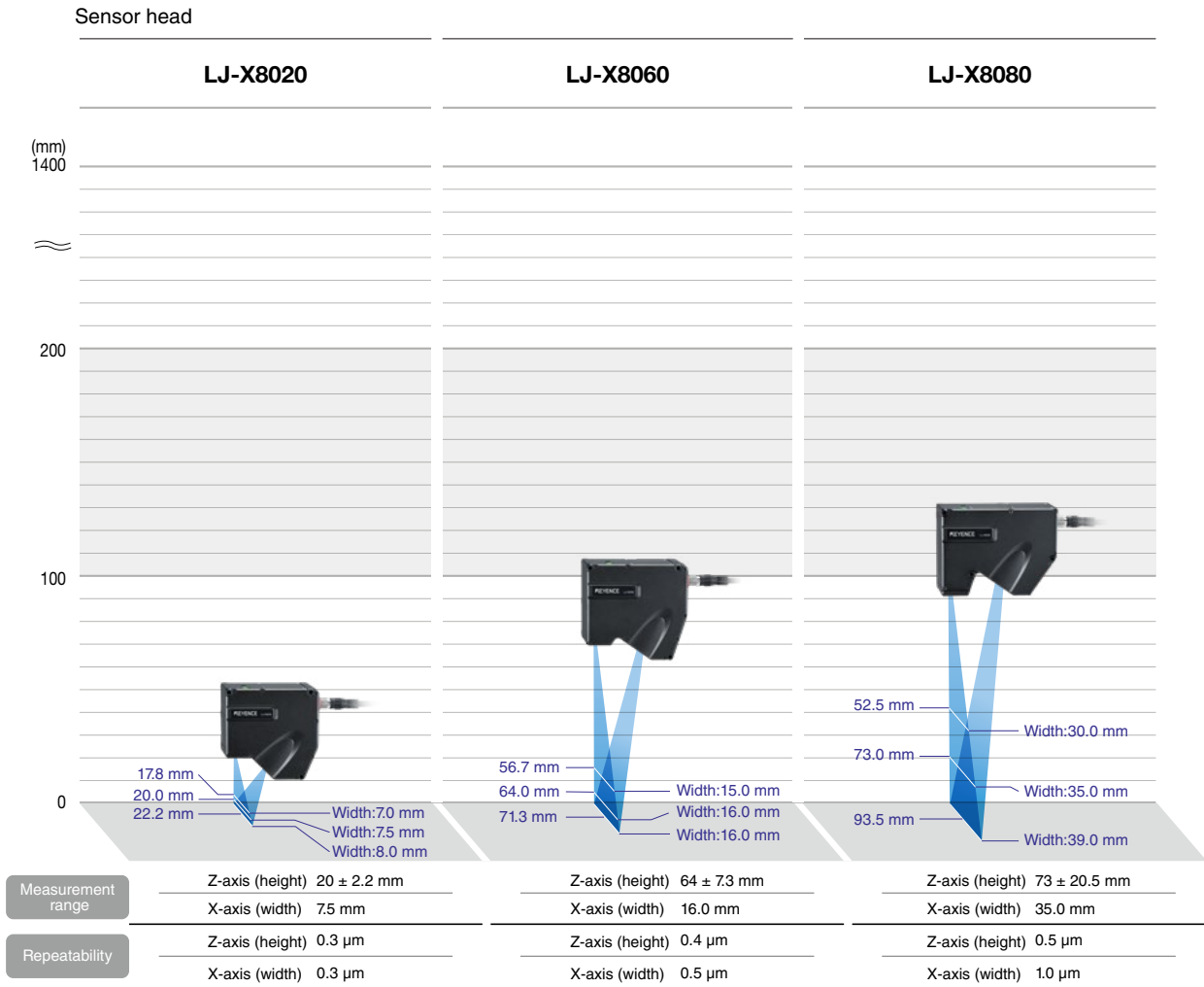
Record

Gain a better understanding of your process by storing image and measurement data locally or on your server.


System Configuration




Head lineup



Required




Head-to-controller cable
CB-B3 (3 m)
CB-B10 (10 m)




Extension cable
CB-B5E (5 m)
CB-B10E (10 m)
CB-B20E (20 m)

Extension cables & L-shaped connectors
CB-B05LU (0.5 m)
CB-B05LL (0.5 m)
CB-B05LR (0.5 m)


Required



2D/3D controller
LJ-X8000



2D controller
LJ-X8000E



Profile Controller
LJ-X8000A

*Total cable length is 30 m, and a maximum of two extension cables can be added. Users can make their selection according to their needs.

Monitor

<p>12" LCD colour monitor CA-MP120</p> 	<p>CA-MP120 monitor stand OP-87262</p> 	<p>CA-MP120 pole-mounting bracket OP-42279</p> 	<p>RGB monitor cable OP-66842 (3 m) OP-87055 (10 m)</p> 
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Programmable encoder



Dedicated encoder
CA-EN100H



Encoder relay unit
CA-EN100U
Accessories:
RS-422 cable (2.5 m)
RS-232C straight cable (2.5 m)



Encoder head cable
CA-EN5 (5 m)
CA-EN10 (10 m)

Communication cable

Extension I/O cable
OP-51657 (3 m)



Communication cable conversion connector
OP-26486 for 9-pin
OP-84384 for 9-pin SYSMAC
OP-86930 for 9-pin MELSEC



* Use OP-26486 for 9-pin when connecting MELSEC FX

RS-232 communication cable
OP-26487 (2.5 m)



Ethernet cable
OP-66843 (3 m)



USB cable
OP-66844 (2 m)



Other



SD card (industrial grade)
16 GB **CA-SD16G**
4 GB **CA-SD4G**
1 GB **CA-SD1G**
512 MB **OP-87133**



Dedicated mouse
OP-87506
Mouse stand
OP-87601

*The mouse is included with the controller



24 V DC power supply
CA-U4

Controller

Model	LJ-X8000/LJ-X8000E ⁶		
	2D mode	3D mode	
Head input	Up to 2 head units Compatible with LJ-X8000 Series heads and LJ-V7000 Series heads *When using 2 units, heads A and B are the same model.		
Sampling cycle (trigger interval)	Maximum speed of 1 kHz (1 ms) ¹¹	When connecting the LJ-X8000 Series: maximum speed of 16 kHz (62.5 μs) ² When connecting the LJ-V7000 Series: maximum speed of 64 kHz (16 μs) ³ (Luminance output types for model designations ending with B have a maximum speed of 8 kHz (125 μs)) ⁴	
Number of registered inspection settings	Up to 1000 (depending on SD card capacity and setting contents) for each of SD cards 1 and 2. External switching is possible		
Master profile / number of reference images	Maximum 200 per setting (depends on SD card capacity)	Maximum 400 per setting (depends on SD card capacity)	
Memory card	• SD card slot × 2 • Supports OP-87133 (512 MB), CA-SD1G (1 GB), CA-SD4G (4 GB), CA-SD16G (16 GB) *In the SD1 slot, CA-SD4G is equipped as standard for 8000, and CA-SD1G is equipped as standard for 8000E		
Number of tools	100/setting (of those, 20 are for misalignment correction)	Maximum of 100/setting	
Interface	Control input	20 points (input terminal block: 5 points, parallel I/O: 15 points)	
	Control output	28 points (output terminal block: 6 points, parallel I/O: 22 points) • Photo MOSFET ⁵	
	RS-232C	• Value output and control I/O (exclusive use with PLC link using an RS-232C port) • Supports baud rates up to 230,400 bps	
	PLC link	• Value output using Ethernet port or RS-232C port, and control I/O (Exclusive use with EtherNet/IP™ and PROFINET. When using an RS-232C port, exclusive use with RS-232C no-procedure communication)	
	Ethernet	• Value output and control I/O • In addition to the above functions, can upload/download inspection settings, perform various simulations, send/receive various data including profile and image data, and be used with remote connection programmes via KEYENCE PC application software • Supports FTP client and FTP server functions • Supports VNC server functions (for non-PC clients, only displaying the monitor screen is supported) • Supports BOOTP functions • 100BASE-T/100BASE-TX/10BASE-T	
	USB	• Can output values (3D mode only), upload/download inspection settings, perform various simulations, send/receive various data including profile and image data, and be used with remote connection programmes via KEYENCE PC application software • Dedicated USB 2.0	
	EtherNet/IP™	• Value I/O and control I/O using Ethernet port (exclusive use with PLC link and PROFINET) • Supports cyclic communication (max. 1436 bytes) and message communication • Maximum Connections: 32 • Conforms to Version.CT15 conformance test	
	PROFINET	• Value input and control input/output using Ethernet port (when this is in use, PLC-Link and EtherNet/IP™ cannot be used) • Supports cyclic communication (max. 1408 bytes) • Supports non-cyclic communication (record data) • Conforms to Conformance Class A	
	Mouse	Various menus can be controlled via the dedicated mouse (included with the controller)	
	SNTP	Automatic correction of date and time for this unit is possible by connecting to an SNTP server	
	USB HDD	By connecting an HDD (max. 2 TB) to the dedicated USB port (supports USB 3.0, bus-powered, rated output: 900 mA), profile, image and other data can be output	
	Monitor output	Analogue RGB output, XGA 1024 × 768 (24-bit colour, 60 Hz)	
	Encoder input	1 port: combination RS-422 line-driver output (with 5 V output: maximum 150 mA) open collector output (compatible with 5 V, 12 V, 24 V)	
Response frequency	RS-422	Single phase / Z phase: 1.6 MHz, 2 phase / 1x: 1.6 MHz, 2 phase / 2x: 3.2 MHz, 2 phase / 4x: 6.4 MHz	
	Open collector (OC)	Single phase / Z phase: 100 kHz, 2 phase / 1x: 100 kHz, 2 phase / 2x: 200 kHz, 2 phase / 4x: 400 kHz	
Laser ON input	Non-voltage input (Shorted with short pin when shipped from factory)		
Cooling fan	Provided		
Minimum display unit	0.1 μm, 0.01°, 0.00001 mm ²	0.1 μm, 0.001°, 0.0001 mm ² , 0.00001 mm ³	
Language	Switchable between English, Japanese, Simplified Chinese, Traditional Chinese, Korean and German		
Ratings	Power voltage	24 V DC ±10%	
	Maximum current consumption	3.3 A	
Environmental resistance	Operating ambient temperature	0 to +45°C (DIN rail mounting) / 0 to +40°C (base surface mounting)	
	Operating ambient humidity	35 to 85% RH (no condensation)	
Weight	Approx. 2500 g		

*1 For LJ-X8080 and LJ-X8200 connection, when binning (Z) is ON, or when the measurement range (Z) is set to 1/2. LJ-X8900 when the measurement range (Z) is set to 1/2.

*2 When the measurement range is narrowed in accordance with the binning settings.

*3 When the measurement range is set to minimum, binning is ON, and parallel imaging is ON. All other settings are default values.

*4 When binning and parallel imaging are both ON. All other settings are default values.

*5 Positive common connection is supported for NPN input devices, and negative common connection for PNP input devices.

*6 3D mode cannot be used with the LJ-X8000E.

Model		LJ-X8000A
Head input	1 unit, compatible with LJ-X8000 Series heads and LJ-V7000 Series heads	
Sampling cycle (trigger interval)	When connecting the LJ-X8000 Series: maximum speed of 16 kHz (62.5 μs) ¹¹ When connecting the LJ-V7000 Series: maximum speed of 64 kHz (16 μs) ² (Luminance output types for model designations ending with B have a maximum speed of 8 kHz (125 μs)) ³	
Interface	Control input	Compatible with batch measurement start (MEASURE_START) and batch measurement stop (MEASURE_STOP)
	Control output	Compatible with trigger ready (READY) and system error (ERROR), Photo MOSFET ⁴
	Synchronised I/O	For multiple controller trigger synchronisation ⁵
	Ethernet ⁶	Profile output, settings, control, 1000BASE-T/100BASE-TX
Encoder input	1 port: combination RS-422 line-driver output (with 5 V output: maximum 150 mA) open collector output (compatible with 5 V, 12 V, 24 V)	
Response frequency	RS-422	Single phase / Z phase: 1.6 MHz, 2 phase / 1x: 1.6 MHz, 2 phase / 2x: 3.2 MHz, 2 phase / 4x: 6.4 MHz
	Open collector (OC)	Single phase / Z phase: 100 kHz, 2 phase / 1x: 100 kHz, 2 phase / 2x: 200 kHz, 2 phase / 4x: 400 kHz
Laser ON input	Non-voltage input (Shorted with short pin when shipped from factory)	
Ratings	Power voltage	24 V DC ±10%
	Maximum current consumption	1.3 A
Environmental resistance	Operating ambient temperature	0 to 45°C (DIN rail mounting) / 0 to 40°C (Horizontal)
	Operating ambient humidity	35 to 85% RH (no condensation)
Weight	Approx. 700 g	

*1 When the measurement range is narrowed in accordance with the binning settings. *2 When the measurement range is set to minimum, binning is ON, and parallel imaging is ON. All other settings are default values.

*3 When binning and parallel imaging are both ON. All other settings are default values.

*4 Positive common connection is supported for NPN input devices, and negative common connection for PNP input devices.

*5 Exclusively for synchronised I/O between controllers (LJ-X8000A).

*6 The PC application (LJ-H2X) includes communication libraries (DLL) and a sample programme. Types of communication libraries (DLL): Profile output, changing various settings, laser ON/OFF control, trigger input, etc.

I Sensor head LJ-X Series

Model		LJ-X8020	LJ-X8060	LJ-X8080	LJ-X8200	LJ-X8400	LJ-X8900	
Reference distance		20 mm	64 mm	73 mm	245 mm	380 mm	980 mm	
Measurement range	Z-axis (height)	±2.2 mm (F.S.=4.4 mm)	±7.3 mm (F.S.=14.6 mm)	±20.5 mm (F.S.=41 mm)	±34 mm (F.S.=68 mm)	±60 mm (+95 to -220 mm ¹¹) (F.S.=315 mm)	±400 mm (F.S.=800 mm)	
	X-axis (width)	NEAR side	7 mm	15 mm	30 mm	64 mm	180 mm(163 mm ¹¹)	300 mm
		Reference distance	7.5 mm	16 mm	35 mm	72 mm	210 mm	510 mm
	FAR side	8 mm	16 mm	39 mm	80 mm	240 mm(320 mm ¹¹)	720 mm	
Light source	Blue semiconductor laser							
	Wavelength	405 nm (visible light)						
	Laser class (IEC60825-1, FDA (CDRH) Part 1040.10 ¹¹)	Class 2M laser product ⁹						
	Output	10 mW						
Spot size (reference distance)		Approx. 16 mm × 32 μm	Approx. 25 mm × 49 μm	Approx. 44 mm × 72 μm	Approx. 115 mm × 116 μm	Approx. 275 mm × 249 μm	Approx. 622 mm × 566 μm	
Repeatability ²	Z-axis (height) ³	0.3 μm	0.4 μm	0.5 μm	1 μm	5 μm	10 μm	
	X-axis (width) ⁴	0.3 μm	0.5 μm	1.0 μm	3 μm	10 μm	25 μm	
Linearity	Z-axis (height) ⁵	±0.05% of F.S. (±0.012%)	±0.04% of F.S. (±0.008%)	±0.03% of F.S. (±0.004%)	±0.04% of F.S. (±0.006%)	Reference distance: ±60 mm ±0.025% of F.S. (±0.003%) Total range: ±0.035% of F.S. (±0.005%)	Near-reference distance: ±0.015% of F.S. (±0.004%) Total range: ±0.05% of F.S. (±0.006%)	
Profile data interval ¹²	X-axis (width)	2.5 μm (2 μm~)	5 μm (4 μm~)	12.5 μm (10 μm~)	25 μm (20 μm~)	75 μm (50 μm~) 100 μm (50 μm~) ¹¹	225 μm (100 μm~)	
Profile data count		3200 points						
HDR (high dynamic range)		Single-shot HDR ¹⁰						
Laser irradiation position confirmation function	Light source	Blue LED (405 nm)						
Temperature characteristic		0.01% of F.S./°C						
Environmental resistance	Enclosure rating ⁶	IP67 (IEC60529)						
	Ambient operating illuminance ⁷	Incandescent lamp: 10,000 lux or less						
	Ambient temperature ⁸	0 to +45°C						
	Operating ambient humidity	20 to 85% RH (no condensation)						
	Vibration resistance	10 to 57 Hz, double amplitude 1.5 mm; 3 hours each for X, Y, and Z axes						
Impact resistance		15 G / 6 msec						
Material		Aluminium						
Weight		Approx. 1000 g	Approx. 1000 g	Approx. 1100 g	Approx. 1200 g	Approx. 1300 g	Approx. 1600 g	

*1 Classification performed based on IEC60825-1 in accordance with FDA (CDRH) Laser Notice No. 56. *2 Values measured by averaging 4096 times at the reference distance.

*3 The measured target is a KEYENCE standard target. Value when the average height of the default setting area is measured with height and position tools. All other settings are default values.

*4 The measured target is a pin gauge. Value when the point of intersection for the pin gauge rounded surface and edge level is measured using height and position tools. All other settings are default values.

*5 The measured target is a KEYENCE standard target. Profile data when measured by smoothing 64 times and averaging 8 times.

All other settings are default values. Values inside parentheses are representative examples of averages for all profile data.

6 The value when a head cable (CB-B) or extension cable (CB-B*E) is connected. Does not include CB-B**L connection.

*7 When measuring white paper, illuminance on the sensor head receiving surface when light is applied to white paper.

*8 The head needs to be mounted to a metal plate to be used.

*9 Do not view the beam directly using optical instruments (such as eye loupes, magnifiers, microscopes, telescopes, or binoculars).

Observing the laser output using optical instruments is dangerous and may damage the eyes.

*10 A characteristic that allows for stable, high-precision measurement with a single capture (exposure) at all levels of reflectance, from black (low) to glossy surfaces (high).

*11 When range is extended.

*12 The profile data interval can be changed. If changed, the measurement range in the X direction will also change.

I LJ-H1X (LJ-X Series Simulation-Software/Terminal-Software) operating system environment

LJ-X Series Simulation-Software

Item	Required Environment
Supported OS	Microsoft Windows® 10 Home, Pro, Enterprise (supports 64-bit version only) Microsoft Windows® 7 Home Premium, Professional, Ultimate, Enterprise (supports 64-bit version only) • Japanese, English, and Chinese (simplified) are supported for the OS. • Cannot be used on an OS that is not listed.
CPU	Intel® Core™ i3 processor equivalent or greater
Memory	8 GB or more
Free space on hard disk	8 GB or more (Separate space is required for storing image and profile data)
Display resolution	Minimum: 1024 × 768 pixels or larger, Recommended: 1280 × 1024 pixels or larger

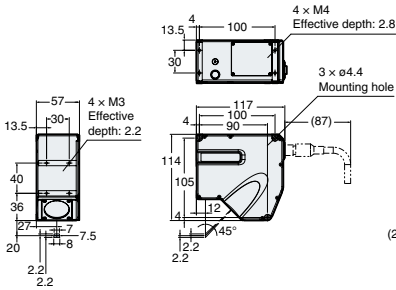
LJ-X Series Terminal-Software

Item	Required Environment
Supported OS	Microsoft Windows® 10 Home, Pro, Enterprise Microsoft Windows® 7 Home Premium, Professional, Ultimate, Enterprise • Japanese, English, and Chinese (simplified) are supported for the OS. • Supports both 32-bit and 64-bit versions • Cannot be used on an OS that is not listed.
Running environment	• CPU: Intel® Core™ i3 processor equivalent or greater • Memory: 2 GB or more • HDD: 500 MB free space or more *Separate space is required for storing image and profile data • Display resolution: 1024 × 768 pixels or larger (Recommended: 1280 × 1024 pixels or larger)

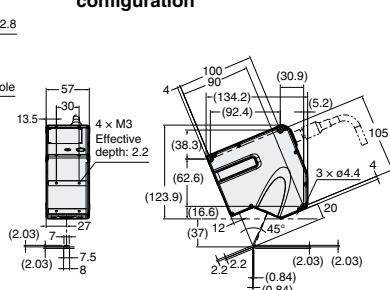
DIMENSIONS

Sensor head LJ-X Series

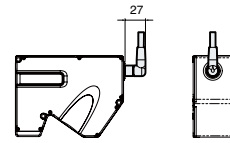
LJ-X8020



LJ-X8020 in specular reflection configuration

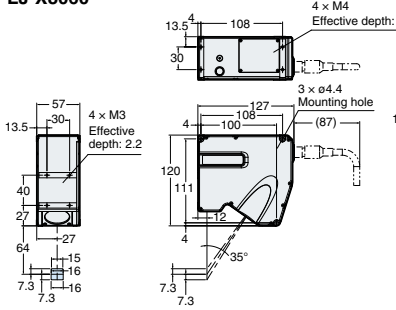


With CB-B05LU (L-shaped cable) connected

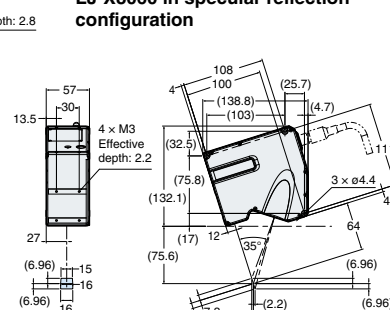


*The value inside parentheses is a reference value calculated by tilting the dimensions during installation by 22.5 degrees.

LJ-X8060

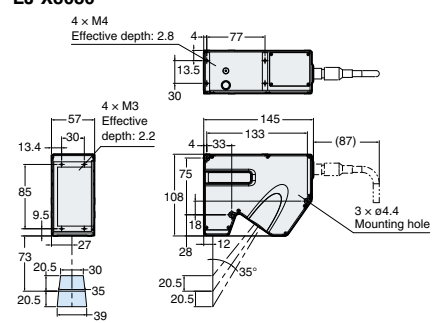


LJ-X8060 in specular reflection configuration

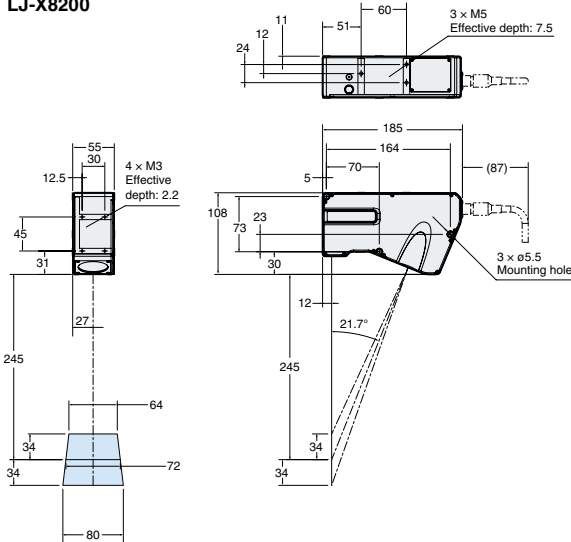


*The value inside parentheses is a reference value calculated by tilting the dimensions during installation by 17.5 degrees.

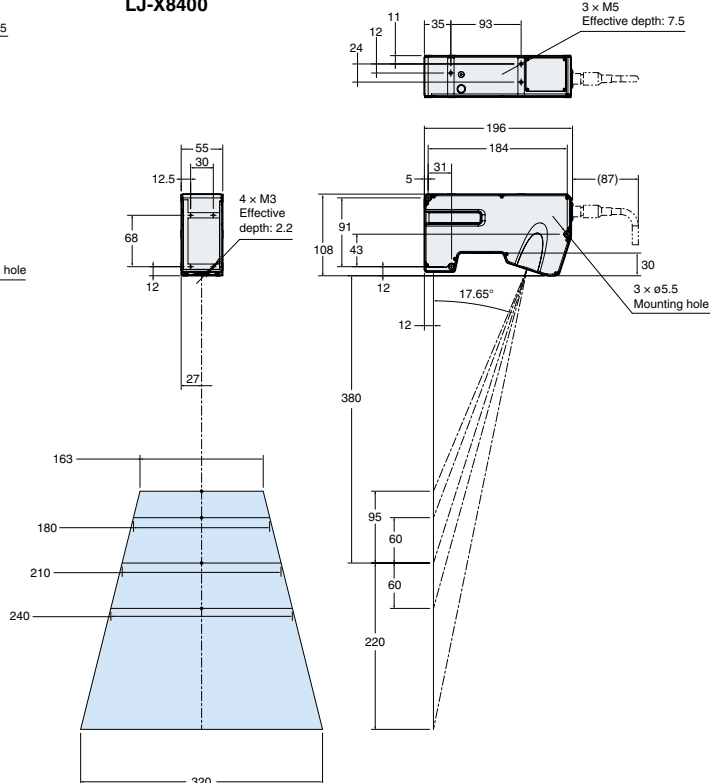
LJ-X8080



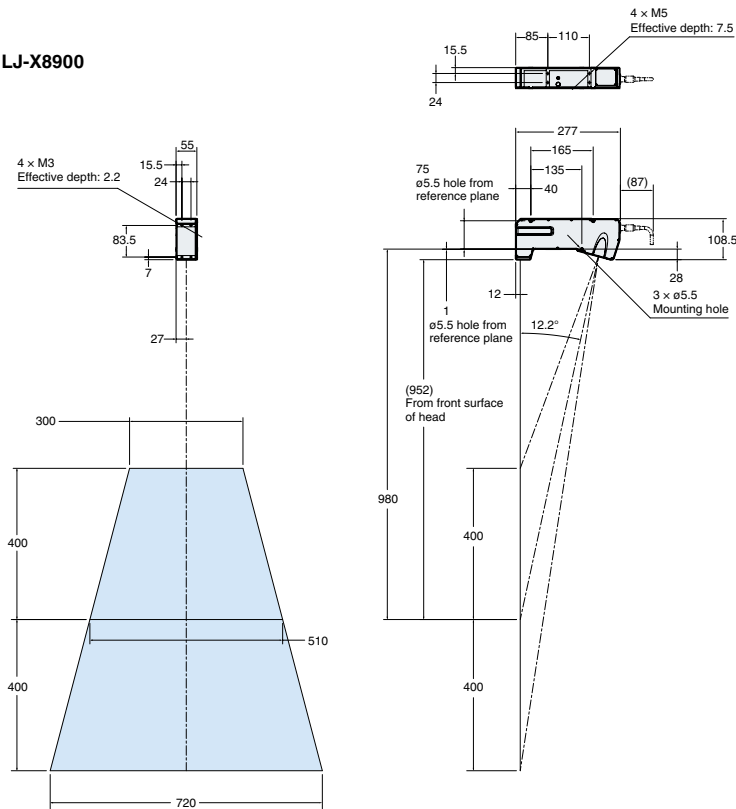
LJ-X8200



LJ-X8400

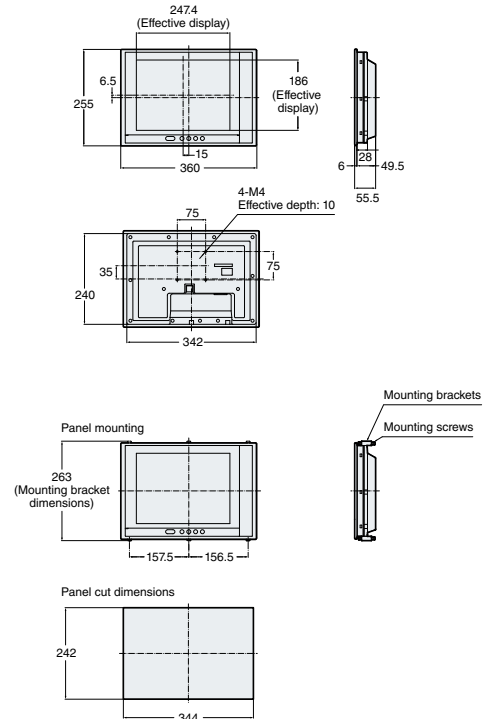


LJ-X8900



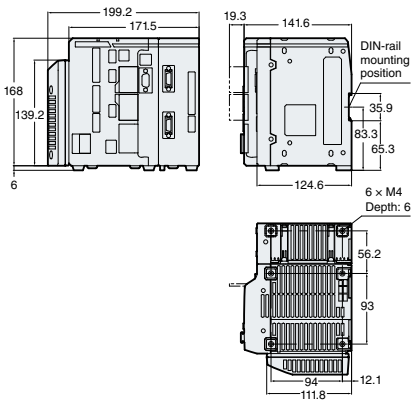
12" LCD colour monitor

CA-MP120

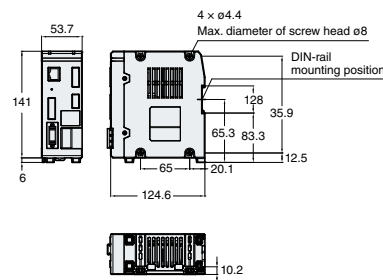


Controller

LJ-X8000

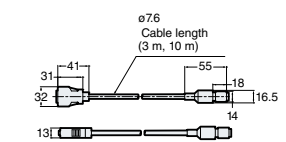


LJ-X8000A



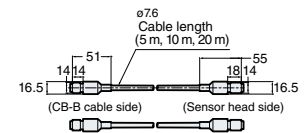
Head-to-controller cable

CB-B3/CB-B10



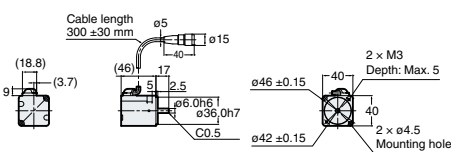
Head connection extension cable

CB-B5E/CB-B10E/CB-B20E



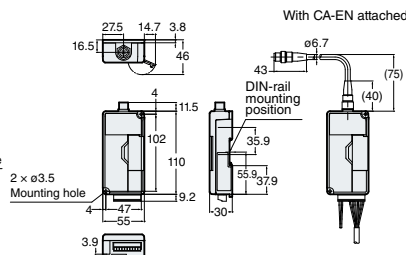
Dedicated encoder

CA-EN100H



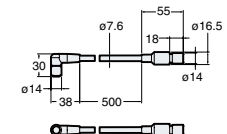
Encoder relay unit

CA-EN100U



Head connection extension cable (L-shaped connector)

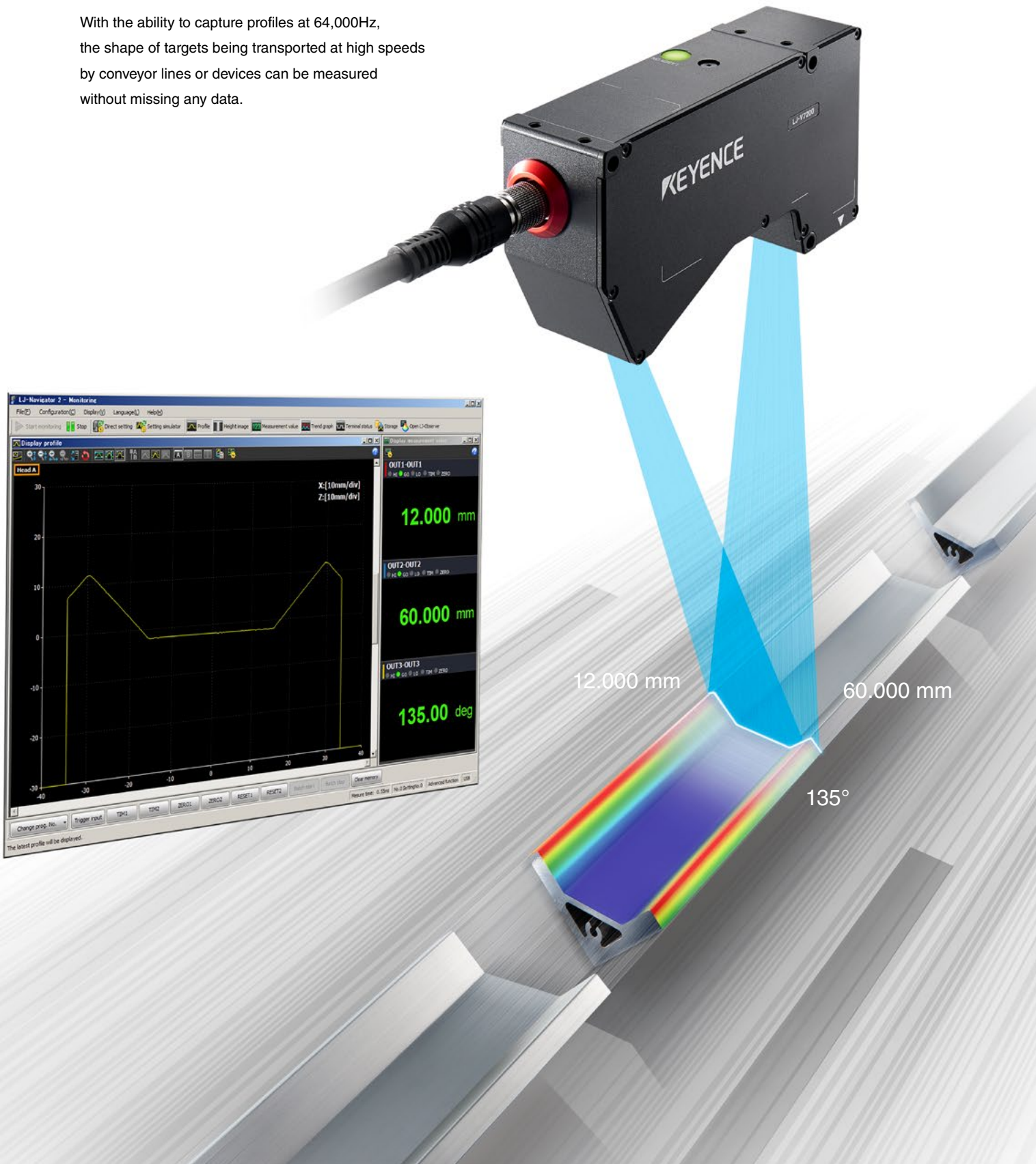
CB-B05LU/CB-B05LL/CB-B05LR



High-speed profile measurement 64,000 profiles/second

High-speed 2D Laser Profiler

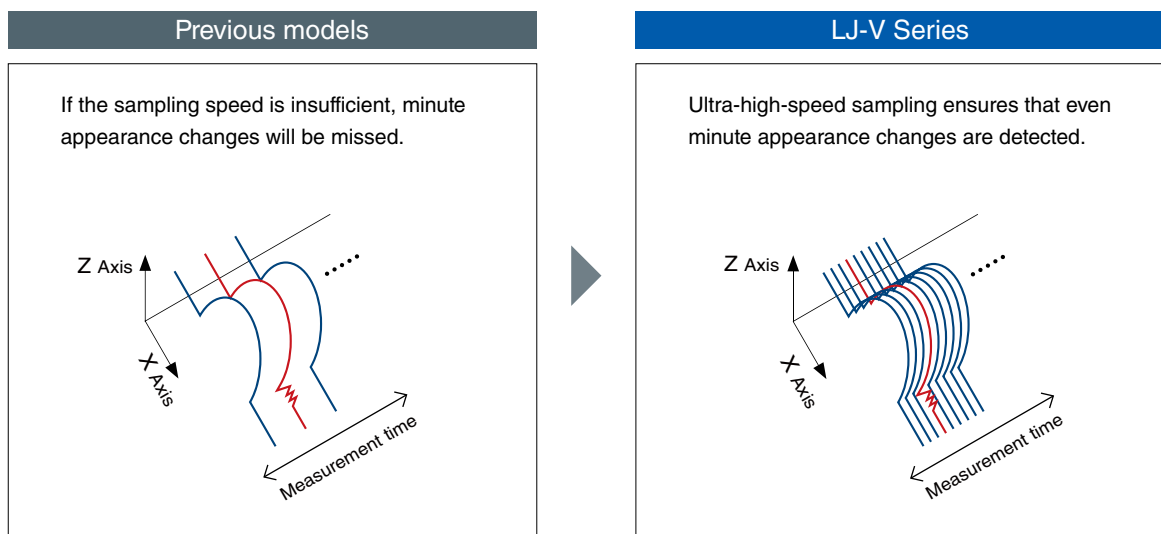
With the ability to capture profiles at 64,000Hz, the shape of targets being transported at high speeds by conveyor lines or devices can be measured without missing any data.



High-speed sampling allows detailed appearance data to be obtained

GP64-Processor

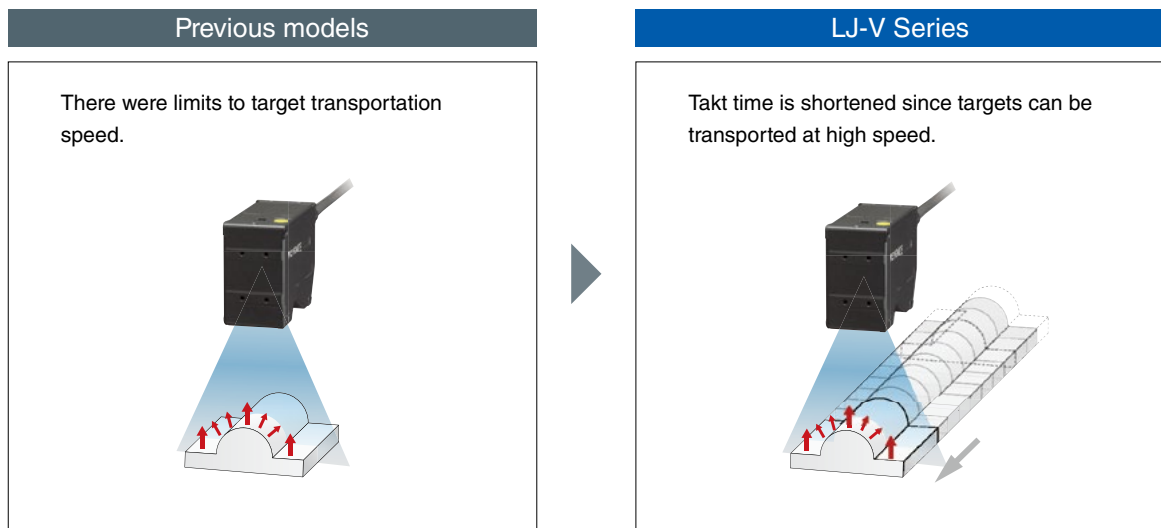
The sensor is equipped with a custom IC that enables a range of ultra-high-speed pipeline processing, from capture data reading to sub-pixel processing, linearisation processing, and data output. Perform measurements of targets moving at high speed.



High-speed measurement supports shorter takt times

HSE³-CMOS

The sensor is equipped with an HSE³-CMOS, which has both high sensitivity and a wide dynamic range. This enables stable measurements, even at high speeds.



I Sensor head LJ-V Series

Model		LJ-V7020K ¹ / LJ-V7020KB ¹	LJ-V7020 ¹ / LJ-V7020B ¹	LJ-V7060K/ LJ-V7060KB	LJ-V7060/ LJ-V7060B	LJ-V7080/ LJ-V7080B	LJ-V7200/ LJ-V7200B	LJ-V7300/ LJ-V7300B	
Mounting conditions		Specular reflection	Diffuse reflection	Specular reflection	Diffuse reflection				
Reference distance		24.2 mm	20 mm	54.6 mm	60 mm	80 mm	200 mm	300 mm	
Measurement range	Z-axis (height)	±2.3 mm (F.S. = 4.6 mm)	±2.6 mm (F.S. = 5.2 mm)	±7.6 mm (F.S. = 15.2 mm)	±8 mm (F.S. = 16 mm)	±23 mm (F.S. = 46 mm)	±48 mm (F.S. = 96 mm)	±145 mm (F.S. = 290 mm)	
	X-axis (width)	NEAR side	6.5 mm	6.5 mm	8 mm	13.5 mm	25 mm	51 mm	110 mm
		Reference distance	7 mm	7 mm	14 mm	15 mm	32 mm	62 mm	180 mm
	FAR side	7.5 mm	7.5 mm	8 mm	15 mm	39 mm	73 mm	240 mm	
		Blue semiconductor laser							
Light source	Wavelength	405 nm (visible light)							
	Laser class (IEC60825-1, FDA (CDRH) Part 1040.10 ²)	Class 2M ³		Class 2	Class 2M ³	Class 2			
	Output	10 mW		4.8 mW	10 mW	4.8 mW			
Spot size (reference distance)		Approx. 14 mm × 35 μm		Approx. 21 mm × 45 μm		Approx. 48 mm × 48 μm	Approx. 90 mm × 85 μm	Approx. 240 mm × 610 μm	
Repeatability ⁴	Z-axis (height) ⁵	0.3 μm		0.4 μm		0.5 μm	1 μm	5 μm	
	X-axis (width) ⁶	2.5 μm		5 μm		10 μm	20 μm	60 μm	
Linearity	Z-axis (height) ⁷	±0.1% of F.S.						From ±0.05% ±0.15% of F.S. ⁸	
Profile data interval	X-axis (width)	10 μm		20 μm		50 μm	100 μm	300 μm	
Profile data count		800 points							
HDR (high dynamic range)		Single-shot HDR ¹²							
Temperature characteristic		0.01% of F.S./°C							
Environmental resistance	Enclosure rating ⁹	IP67 (IEC60529)							
	Ambient operating illuminance ¹⁰	Incandescent lamp: 10,000 lux or less							
	Ambient temperature ¹¹	0 to +45°C							
	Operating ambient humidity	20 to 85% RH (no condensation)							
	Vibration resistance	10 to 57 Hz, double amplitude 1.5 mm; 3 hours each for X, Y, and Z axes							
Impact resistance		15 G / 6 msec							
Material		Aluminium							
Weight		Approx. 410 g		Approx. 450 g		Approx. 400 g	Approx. 550 g	Approx. 1000 g	

¹ Double polarisation function cannot be used.

² Classification performed based on IEC60825-1 in accordance with FDA (CDRH) Laser Notice No. 50.

³ Do not view the beam directly using optical instruments (such as eye loupes, magnifiers, microscopes, telescopes, or binoculars). Observing the laser output using optical instruments is dangerous and may damage the eyes.

⁴ Values measured by averaging 4096 times at the reference distance.

⁵ The measured target is a KEYENCE standard target. Value when the average height of the default setting area is measured with height and position tools. All other settings are default values.

⁶ The measured target is a pin gauge. Value when the point of intersection for the pin gauge rounded surface and edge level is measured using height and position tools. All other settings are default values.

⁷ The measured target is a KEYENCE standard target. Profile data when measured by smoothing 64 times and averaging 8 times. All other settings are default values.

⁸ Linearity will vary depending on the measuring area (refer to the figure on the right)

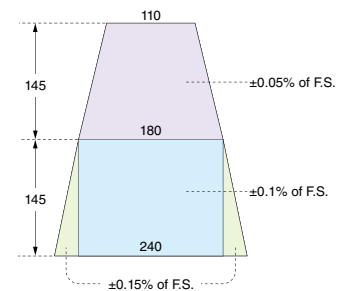
⁹ The value when a head cable (CB-B*) or extension cable (CB-B*E) is connected.

¹⁰ When measuring white paper, illuminance on the sensor head receiving surface when light is applied to white paper.

¹¹ The head needs to be mounted to a metal plate to be used.

¹² A characteristic that allows for stable, high-precision measurement with a single capture (exposure) at all levels of reflectance, from black (low) to glossy surfaces (high).

• Model designations ending with B are luminance output types. The multi emission (optimising light) and multi emission (synthesis) imaging modes are not available.





Please visit: www.keyence.com



SAFETY INFORMATION

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

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