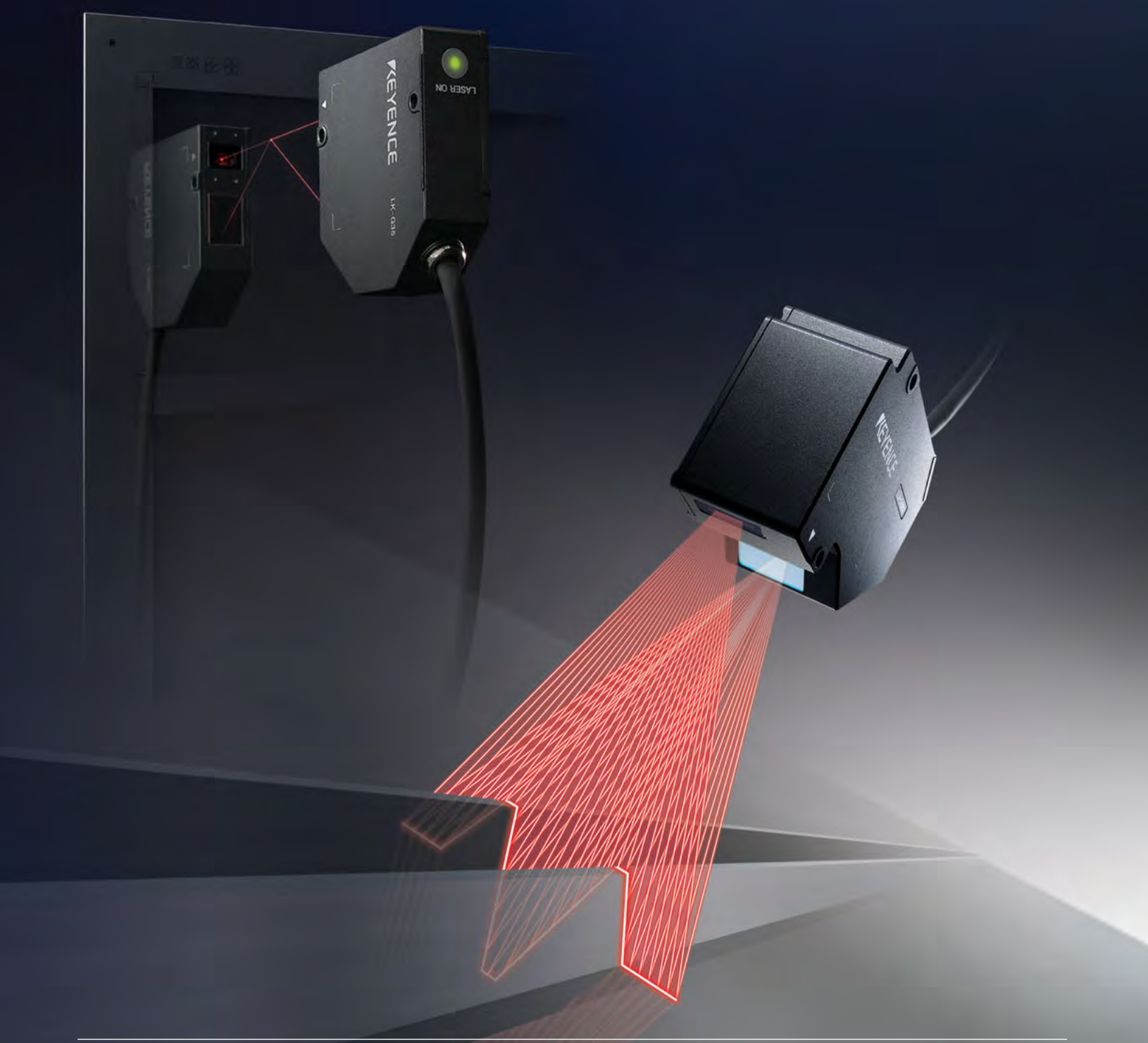
KEYENCE

NEW **High-speed, High-accuracy 1D/2D Laser Displacement Sensor**
LK-G/LJ-G Series



LASER MEASUREMENT PRODUCT BROCHURE

Industry-leading technology provides stable and accurate 1D & 2D displacement measurement

SINGLE SPOT TYPE

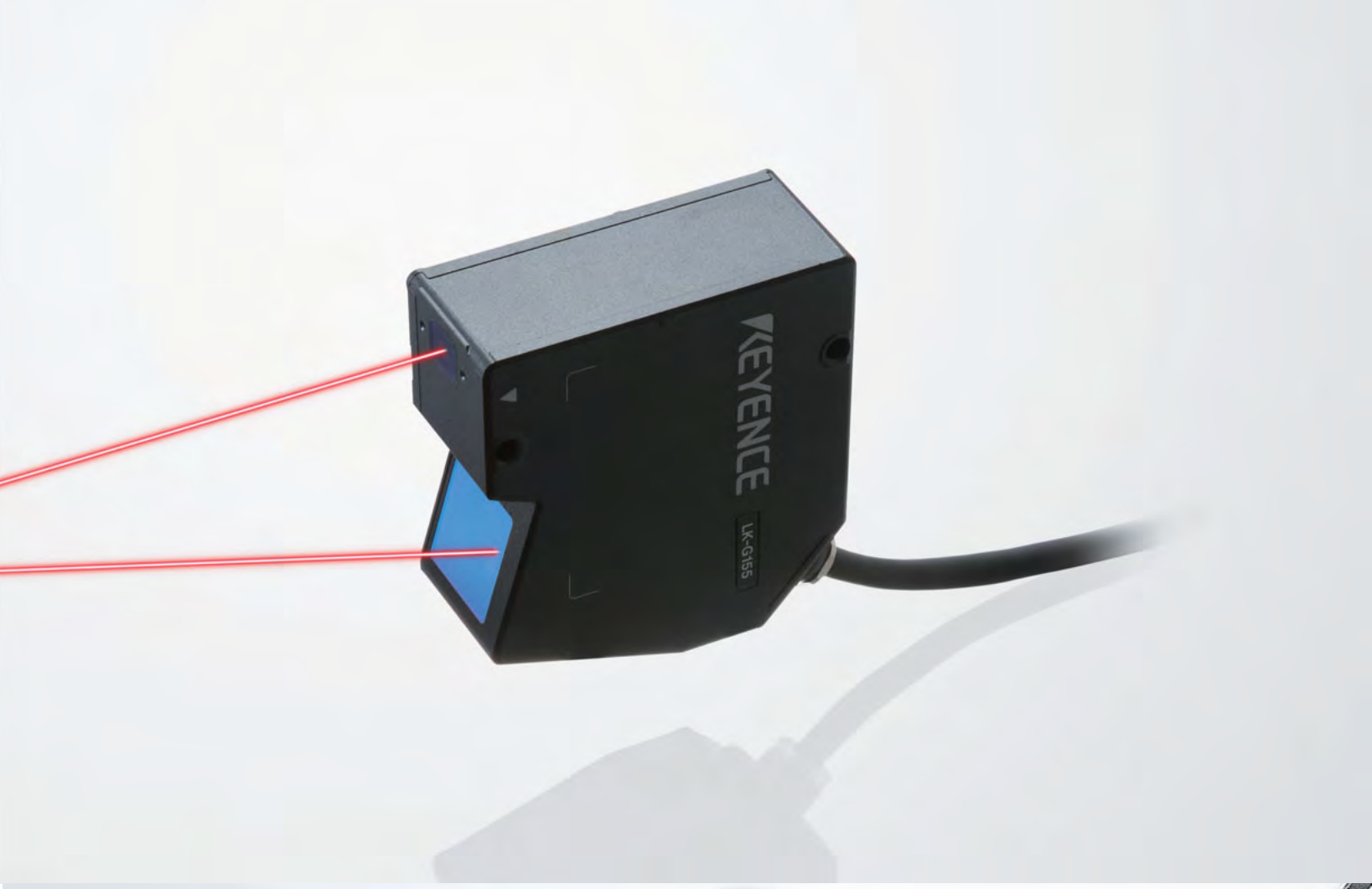
LK-G SERIES

Constantly advancing laser displacement sensors
A wide variety of high-accuracy spot-type and
2D-type sensors are available to meet various needs.

A wide variety of both 1D and 2D sensor types are available to meet any application need.
The 1D types can measure height, position, thickness and runout / vibration at high speed.
The 2D types can quickly determine the target profile, enabling high speed height,
width, angle and gap measurements.
KEYENCE's laser displacement sensors have been designed to ensure stable, high accuracy
measurements on line while enduring the harshest environmental conditions.
KEYENCE's constantly advancing technology ensures the best performance in the industry.

HEIGHT / WIDTH
2-DIMENSIONAL TYPE

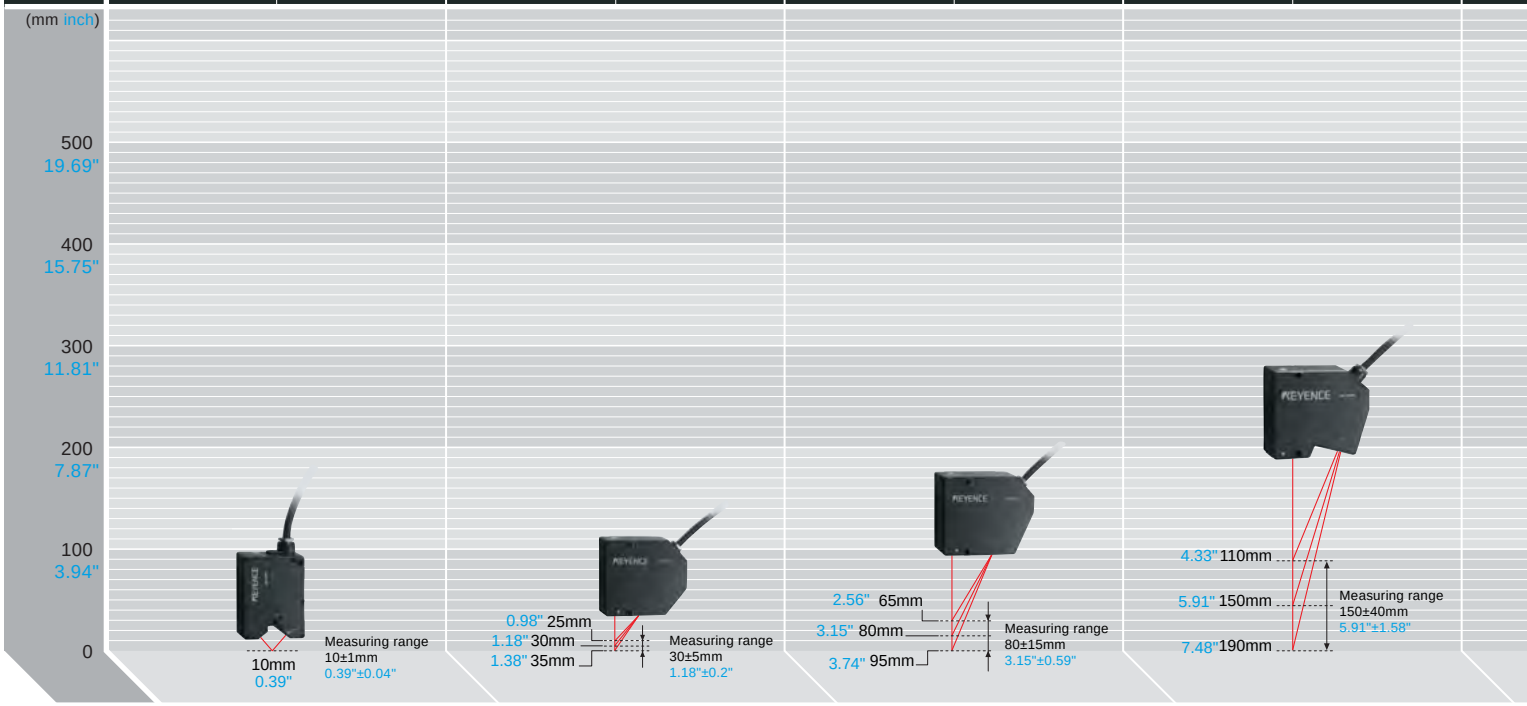
LJ-G SERIES


KEYENCE
LK-G155


LASER ON
LJ-G080
KEYENCE

LK-G SERIES SELECTION GUIDE

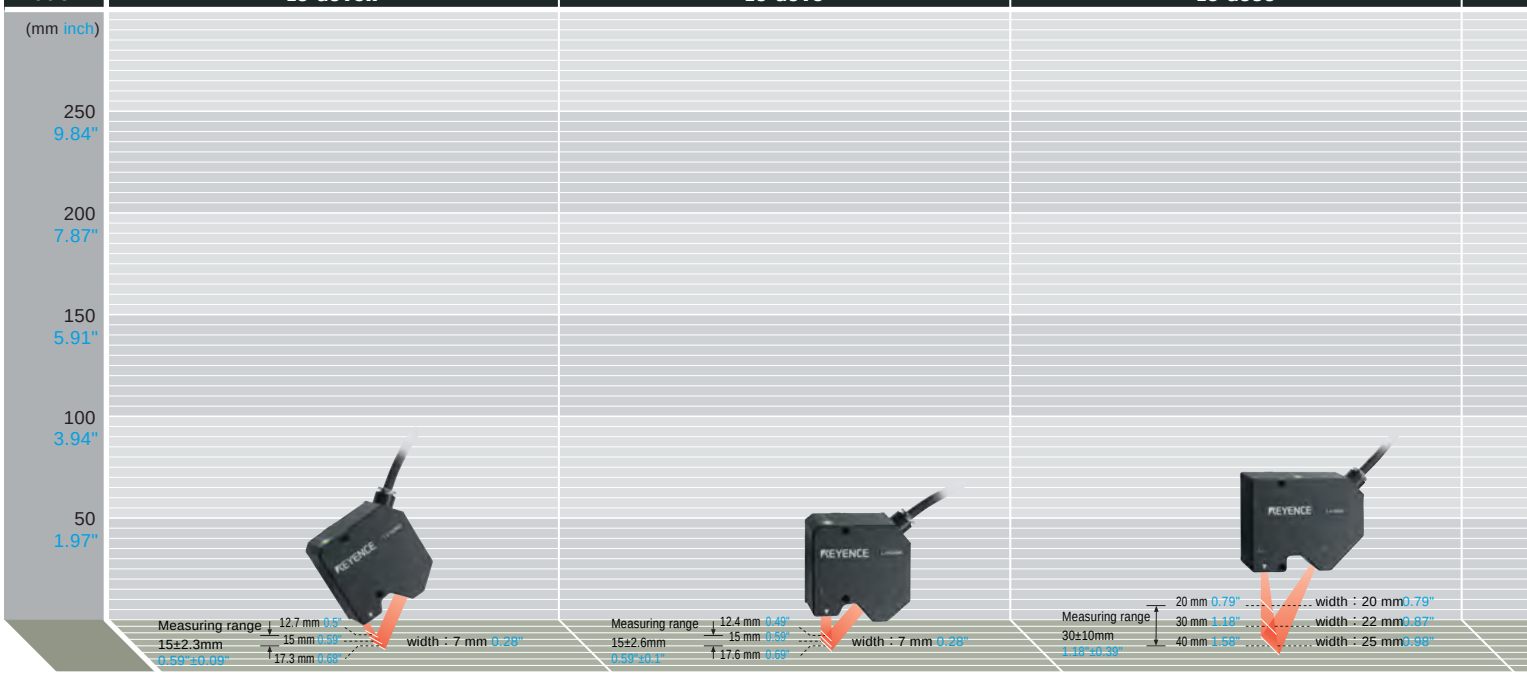
Type	Super precision		High-accuracy		Mid-range		Long-range	
Model	LK-G10	LK-G15	LK-G32	LK-G37	LK-G82	LK-G87	LK-G152	LK-G157



Measuring range	10±1mm	0.39"±0.04"	30±5mm	1.18"±0.2"	80±15mm	3.15"±0.59"	150±40mm	5.91"±1.58"
Repeatability	0.01µm	0.0004 Mil	0.05µm	0.002 Mil	0.2µm	0.008 Mil	0.5µm	0.02 Mil
Spot shape	Ø20µm	Ø0.79Mil / 20 x 50µm 0.79 x 19.69 Mil	Ø30µm	Ø1.18 Mil / 30 x 850µm 1.18 x 33.46 Mil	Ø70µm	Ø2.76 Mil / 70 x 1100µm 2.76 x 43.31 Mil	Ø120µm	Ø4.72 Mil / 120 x 1700µm 4.72 x 66.93 Mil

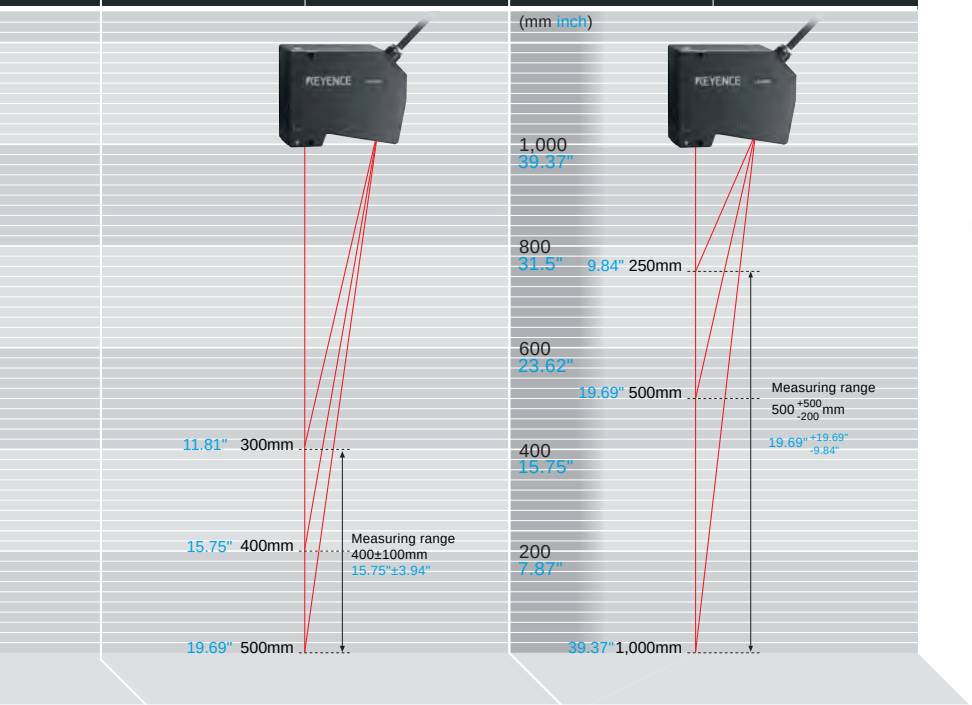
LJ-G SERIES SELECTION GUIDE

Type	Ultra high-accuracy regular reflection	Ultra high-accuracy	High-accuracy
Model	LJ-G015K	LJ-G015	LJ-G030



Measuring range	Z axis	15 ± 2.3mm	0.59 ± 0.09"	15 ± 2.6mm	0.59 ± 0.1"	30± 10mm	1.18 ± 0.39"
	X axis	7mm	0.28"	7mm	0.28"	22mm	0.87"
Repeatability	Z axis	0.2 µm	0.008 Mil	0.2 µm	0.008 Mil	1 µm	0.04 Mil
	X axis	2.5 µm	0.1 Mil	2.5 µm	0.1 Mil	5 µm	0.2 Mil

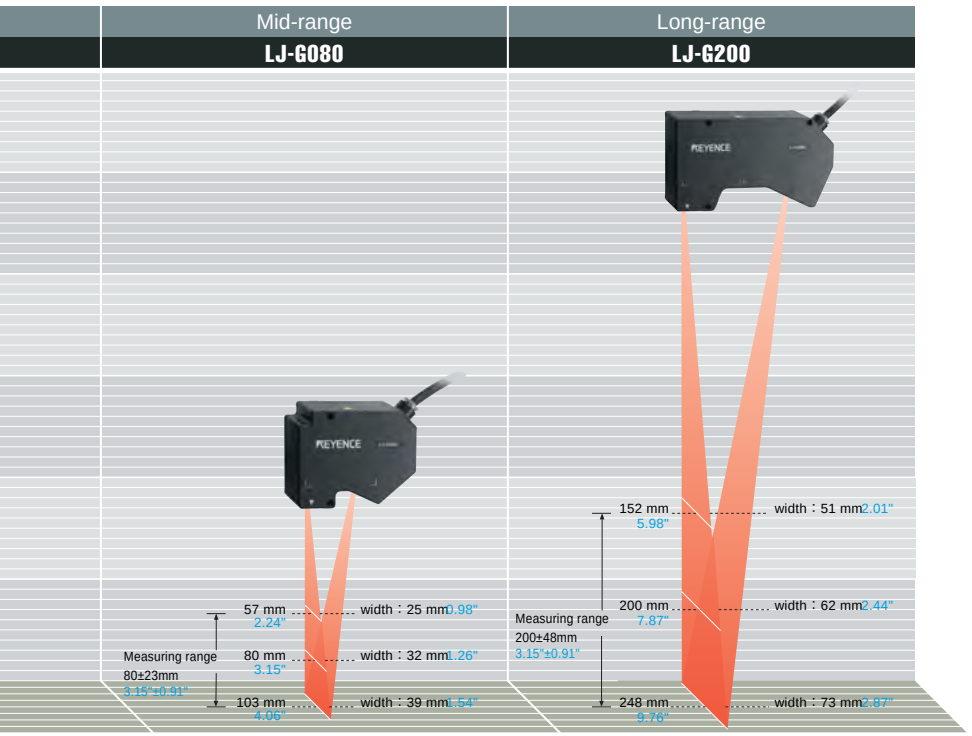
	High-speed long range		Ultra long-range	
	LK-G402	LK-G407	LK-G502	LK-G507
	400±100mm 15.75"±3.94"		500 +500 −200 mm 19.69" +19.69" - 9.84"	
	2µm 0.08 Mil		2µm 0.08 Mil	
	Ø290µm Ø11.42 Mil	290 x 8300µm 11.42 x 326.8 Mil	Ø300µm Ø11.81 Mil	300 x 9500µm 11.81 x 374 Mil



Controllers

Type	All-in-one	Separate display
Standard type	LK-G3001V	LK-G3001
PNP output type	LK-G3001PV	LK-G3001P

	Mid-range		Long-range	
	LJ-G080		LJ-G200	
	80 ± 23mm 3.15" ± 0.91"		200 ± 48mm 7.87" ± 1.89"	
	32mm 1.26"		62mm 2.44"	
	1 µm 0.04 Mil		2 µm 0.08 Mil	
	10µm 0.2 Mil		20µm 0.79 Mil	



Controllers

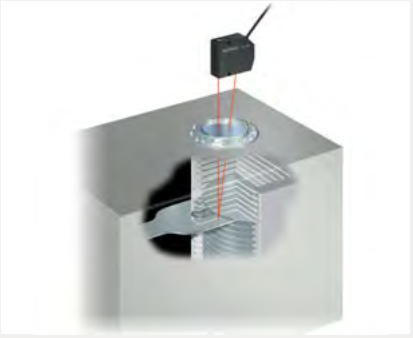
Standard type	LJ-G5001
PNP output type	LJ-G5001P

Monitor

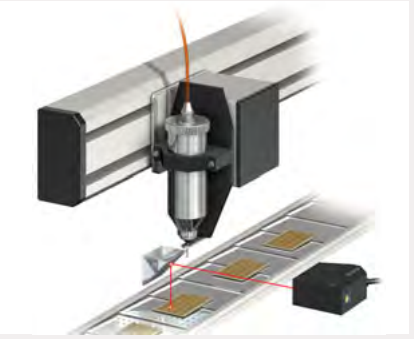
8.4-inch LCD monitor	CA-MP81

SUCCESSFUL APPLICATIONS

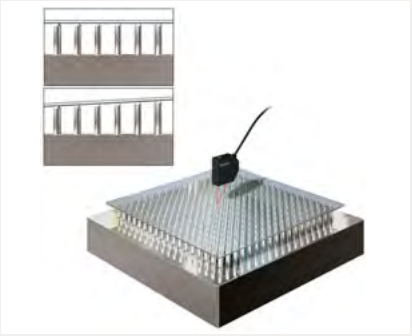
Measuring the thickness of a silicon wafer



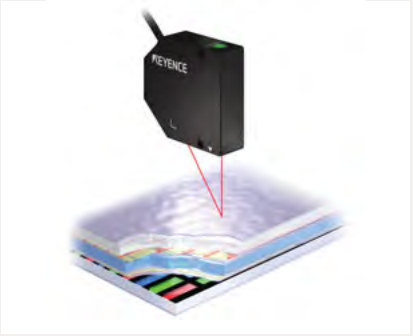
Checking robotic arm position through a view port



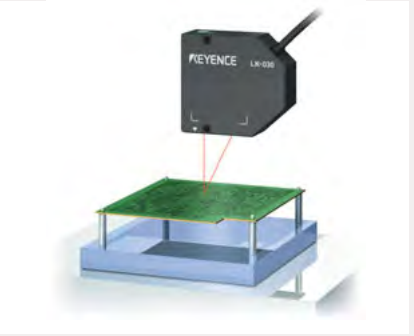
Controlling the nozzle height of a dispenser



Measuring pin height through a glass plate



Measuring the swell of liquid crystal glass



Measuring the warpage of a substrate

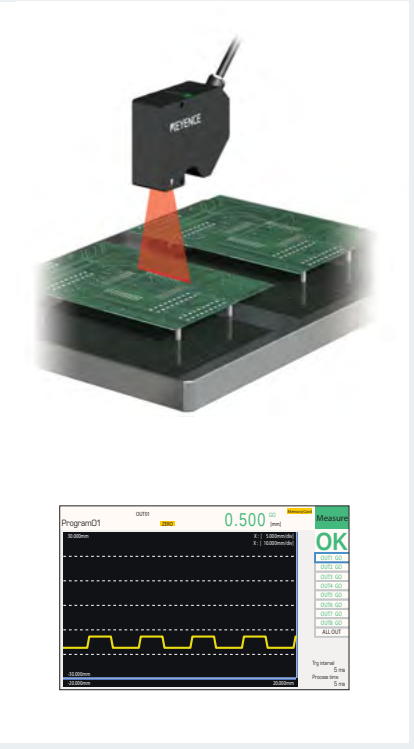
SEMICONDUCTOR/LCD

ELECTRONIC PARTS

Measuring the width/height of seal adhesive on a glass plate

Flatness of a wafer polishing machine

Measuring the profile/height of cream solder



Measuring the profile of a chip

Measuring amplitude of a speaker cone

Detecting the runout of a HDD

Measuring coplanarity of a pins on a connector

Measuring the vibration of a motor shaft

Measuring runout of a polygon mirror

LK-G SERIES

ELECTRONIC PARTS

Measuring warpage of a condenser terminal

ELECTRIC PRODUCTS

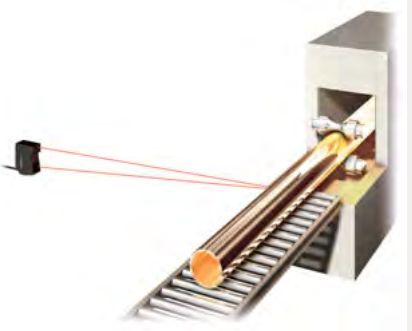
Measuring the profile of a lithium coin battery

Measuring step height on a mobile phone

LJ-G SERIES

Measuring height of an air suspension vehicle

Checking vehicle height



Detecting the position of hot steel shafts

Measuring the surface runout of a flywheel

Measuring a valve stroke

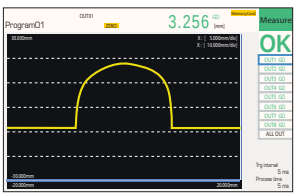
Detecting double-fed steel plates

AUTOMOTIVE

METAL

Checking the assembly accuracy of an auto body

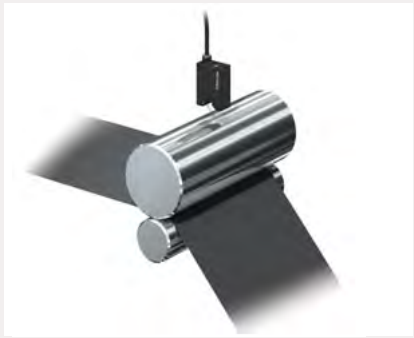
Sealant bead height, width and area measurement



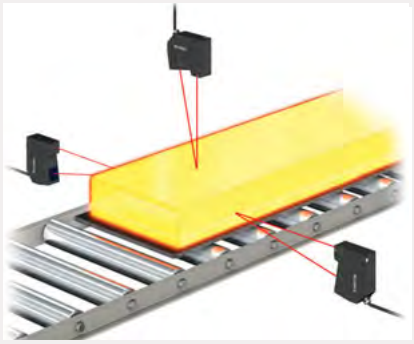
Position feedback in an automated welding operation

Monitoring free loop control

Thickness measurement/loop control of a rubber sheet

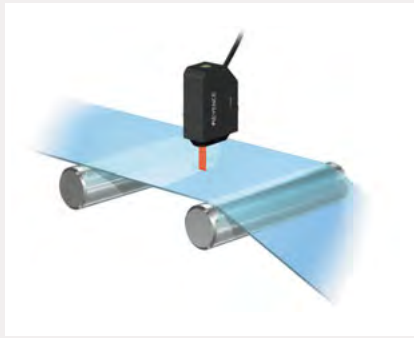


Eccentricity of a high-accuracy roller



Measuring the width/bulging of slab material

Measuring the surface profile of a tire



Measuring the thickness of transparent film

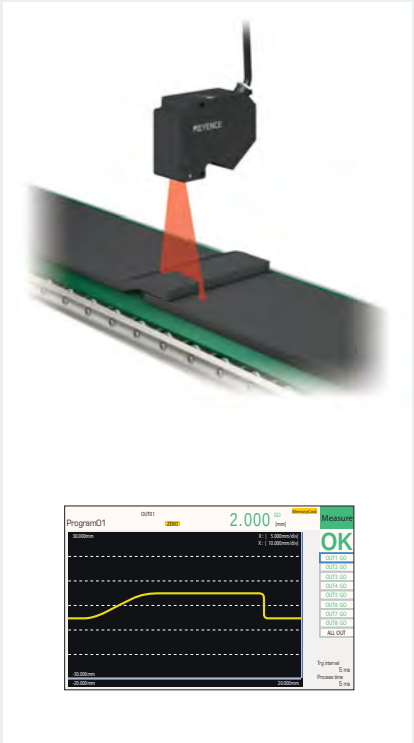
LK-G SERIES

METAL

PLASTIC/RUBBER/FILM

Measuring the step height/profile of a key

Measuring the height/width of overlapping rubber



Step height measurement of a roll and a blade

LJ-G SERIES

HIGH-SPEED, HIGH-ACCURACY CCD LASER DISPLACEMENT SENSOR

LK-G SERIES

LK-G Series lineup

Revolutionary technology enables stable, high accuracy measurement, providing solutions to previously impossible applications. Cutting-edge sensing technology and a wide array of sensor heads offer unmatched performance for any application.

All-in-one controller
LK-G3001V (self-contained type)

10mm 0.39"
0.01 µm 0.0004 Mil

Super precision
LK-G10/15

30mm 1.18"
0.05 µm 0.002 Mil

High-accuracy
LK-G32/37

Advanced specifications

Unmatched technology has achieved specifications that are the best in the industry

Fastest in the world

50kHz

Highest accuracy in the industry

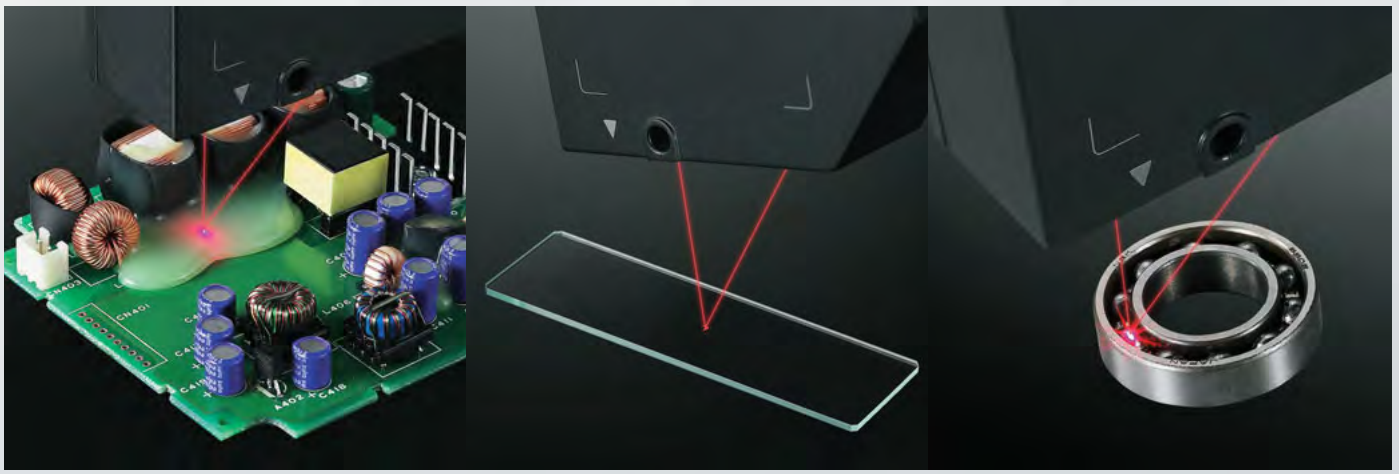
±0.02%

Highest repeatability in its class

0.01µm
(0.0004 Mil)

Newly-developed algorithms

Newly-developed algorithm ensures highly accurate measurement of targets that were impossible to measure with conventional detection methods.



RPD algorithm

Translucent targets

Multi-ABLE control

Transparent targets

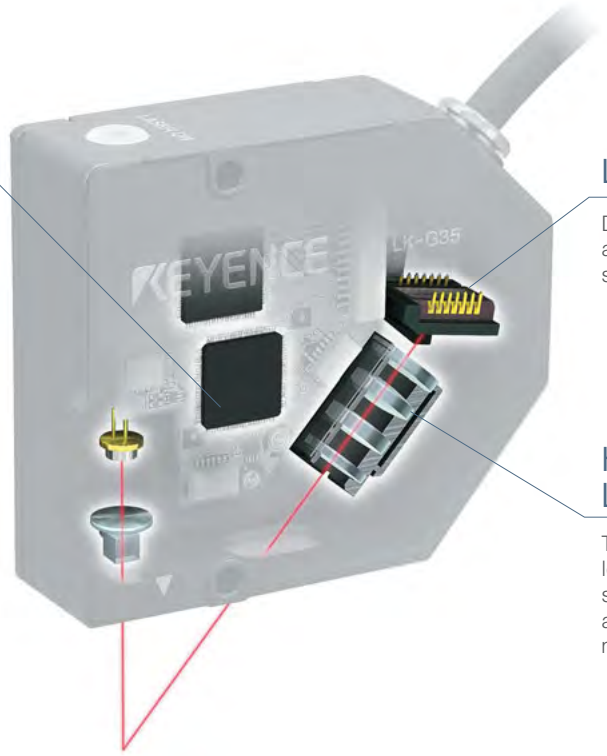
MRC algorithm

Multiple reflections

Advanced technology for high performance

ABLE

ABLE intelligently controls the three elements of laser emission time, laser power, and gain (CCD amplification factor).
*ABLE= Active Balanced Laser control Engine



LI-CCD

Demonstrates higher accuracy, speed, and sensitivity.

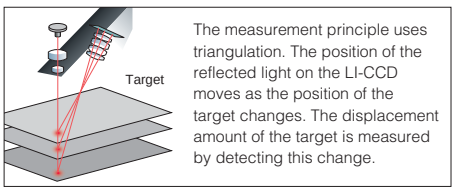
HIGH ACCURACY LENS UNIT

The high-accuracy Ernostar lenses integrated with the sensor head achieves highly accurate and highly stable measurements.

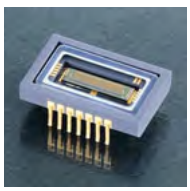
LI-CCD*

Errors in pixel edges are reduced to achieve accuracy that is two times greater than conventional models.

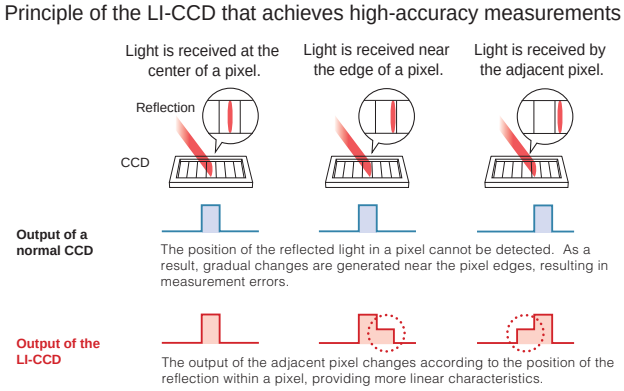
Since a CCD has digital output characteristics for each pixel, the errors caused by gradual outputs generated at the edge of pixels was a barrier to higher accuracy. As a countermeasure, KEYENCE has developed an LI-CCD that outputs the position of reflected light in a pixel, achieving excellent accuracy that is two times higher than conventional models. In addition, the dedicated design of the sensor has achieved a speed that is 25 times faster and a sensitivity 10 times better than conventional models.
* LI-CCD= Linearized CCD



The measurement principle uses triangulation. The position of the reflected light on the LI-CCD moves as the position of the target changes. The displacement amount of the target is measured by detecting this change.



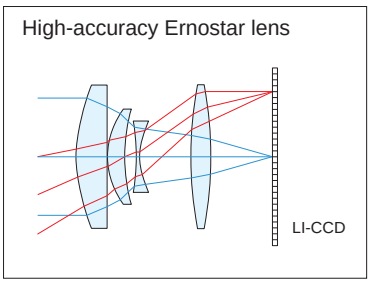
Principle of the LI-CCD that achieves high-accuracy measurements

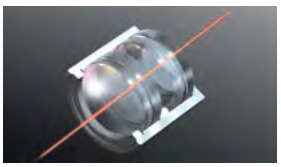


HIGH ACCURACY LENS UNIT

Reducing errors caused by aberrations

KEYENCE has designed a new light-receiving unit for concentrating reflected light onto the LI-CCD. The newly-developed, high-accuracy Ernostar lens drastically reduce spot distortion caused by aberrations. In addition, a special die-cast housing integrating the sensor head with the lenses is employed, achieving excellent rigidity.

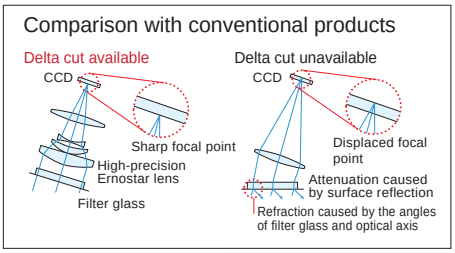




The optical system is composed of four lenses characterized by very small aberrations. With its excellent imaging performance, light entering from various angles can be concentrated to a single point.

DELTA CUT TECHNOLOGY

Accurate reception of reflected light from a long distance is the key to high precision. KEYENCE has reviewed the cabinet design and developed a delta cut technology that reduces reflection on a filter glass surface.



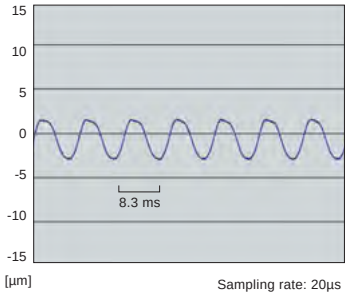
*LK-G155/G405/G505 Series

Best in the world

ULTRA-HIGH SPEED SAMPLING OF 50 kHz

The LI-CCD features high-speed sampling rate 25 times faster than conventional models. High-speed digital processing of signals from the LI-CCD is performed by a special waveform-processor (Digital Signal Processor), satisfying both high-speed and high-accuracy measurements. Targets traveling, rotating, or vibrating at high speed can be measured reliably.

Detecting the runout of a HDD



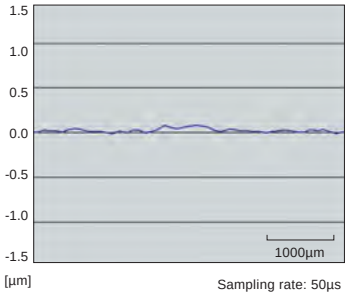
Sampling rate: 20µs

Best in the industry

HIGH-ACCURACY OF ± 0.02 %

KEYENCE has redesigned the optical system in order to achieve high-accuracy measurement. Incorporating Ernostar optical systems with a LI-CCD produces excellent linearity characteristics. It precisely focuses/detects reflection from targets to provide almost double the accuracy of conventional models. Thus, the LK-G Series is designed for product miniaturization and high-accuracy measurement.

Measuring the thickness of a silicon wafer

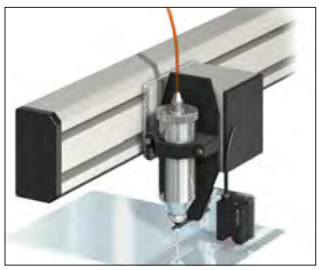


Sampling rate: 50µs

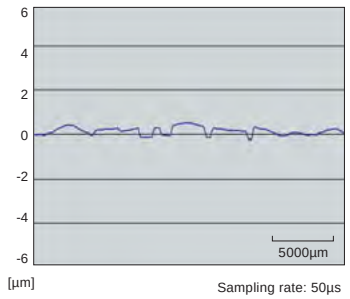
Best in the world

HIGH REPEATABILITY OF 0.0004 Mil (0.01µm)

The CPU, which is integrated in the sensor head, digitizes all signals sent to the controller, dramatically reducing disturbance noise. A highly rigid die-cast body is used to reduce deviations caused by temperature changes, and a LI-CCD with 10 times better sensitivity than conventional models is used to reduce signal noise. These design revisions, targeting high accuracy applications, have successfully produced a repeatability that is 20 times better than conventional models.



Controlling the nozzle height of a dispenser



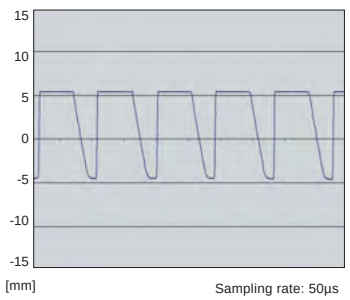
Sampling rate: 50µs

1.5 times of conventional models

LONG RANGE MEASUREMENT OF 39.37" (1000mm)

Delta cut technology realizes high-accuracy measurement at a long detecting distance that is difficult with conventional models. Seven sensor head models meet a surprisingly wide measuring range from 0.98" (9mm) to 39.37" (1000mm) and a broad range of needs.

Measuring the shape of a tire



Sampling rate: 50µs

The ABLE function, along with newly developed measurement algorithms, provide measurement of diffuse, transparent, or translucent targets.

MULTIPLE REFLECTIONS

The LK-G Series cancels measurement error due to diffused reflections from metal surfaces.

TRANSPARENT OBJECT

The LK-G Series detects the reflectance of each layer in a transparent object and adjusts the light intensity to the optimum level.

TRANSLUCENT OBJECT

The LK-G Series eliminates measurement error due to diffused reflections inside the object.

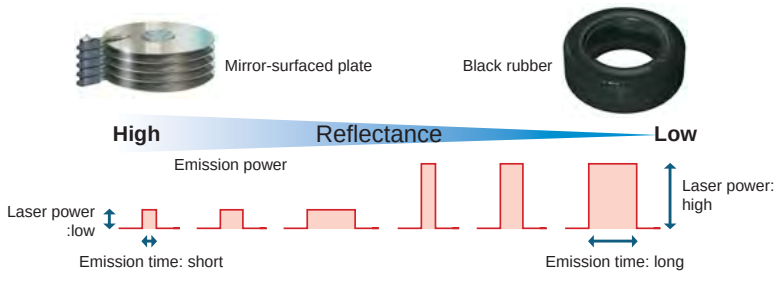
ABLE*

Sensing the surface conditions to control laser light intensity to the optimal level

ABLE technology senses the surface of a target and adjusts the intensity of laser light to an optimal level. ABLE intelligently controls the three elements of laser emission time, laser power, and gain (CCD amplification factor), achieving a wide adjustment range of light intensity that is up to 90 times wider than conventional models. In addition, speed is 120 times faster than conventional methods.

*ABLE=Active Balanced Laser control Engine.

The shift of laser emission time and laser power with a target



Up to 90 times the adjustment range of conventional models

	Laser power	Emission time	Adjustment range
LK-G Series	8x	1662x(0.6 to 997µs)	13296x
Conventional model	–	150x (3.2 to 480µs)	150x

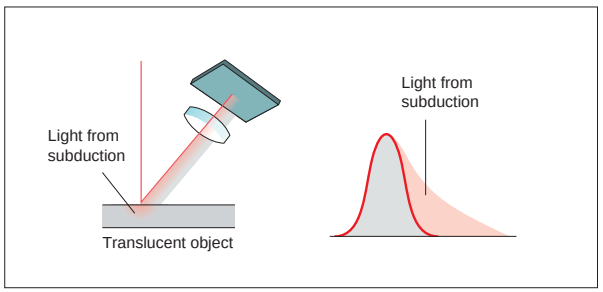
Real-time control at 120 times the speed of conventional models

	Sampling rate	Adjustment speed
LK-G Series	20µs	0.06ms
Conventional model	512µs	7ms

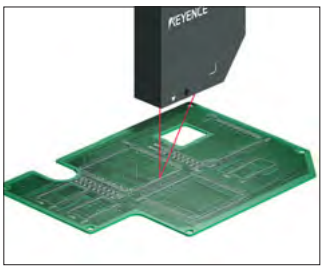
The newly-developed algorithms support various applications

RPD* ALGORITHM

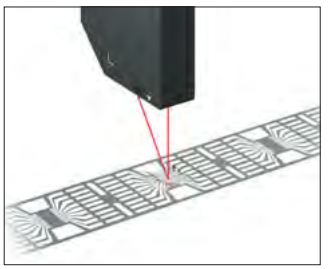
*RPD=Real Peak Detect



Laser light enters the translucent targets, generating diffused reflections, which result in gradual broadening of the received light waveform. The RPD algorithm cancels the influence of the broadened waveform and detects the true peak (Real Peak).

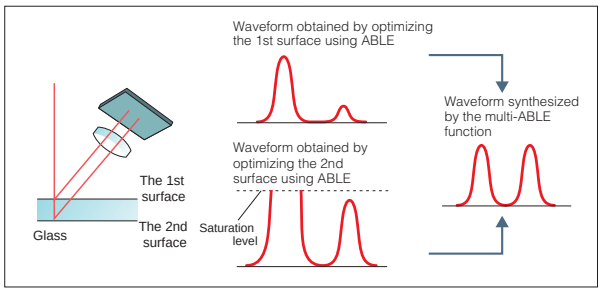


Measuring the warpage of a PCB

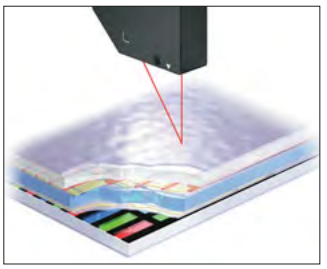


Measuring the profile of an IC plastic mold

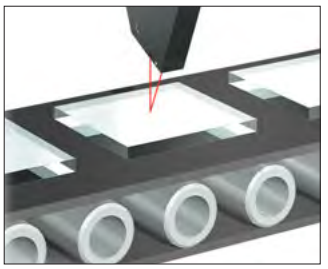
MULTI-ABLE CONTROL



The reflected light at each layer is sensed to optimize the intensity of laser light. Highly accurate thickness measurements are enabled by synthesizing the waveform of each layer.



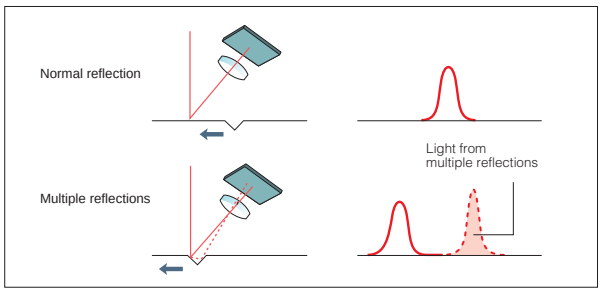
Measuring the swell of liquid crystal glass



Measuring the thickness of a glass plate

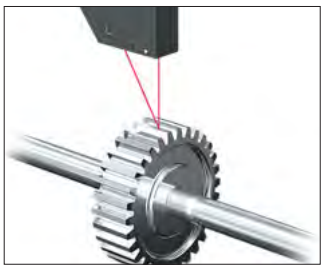
MRC* ALGORITHM

*MRC=Multiple Reflection Cancel



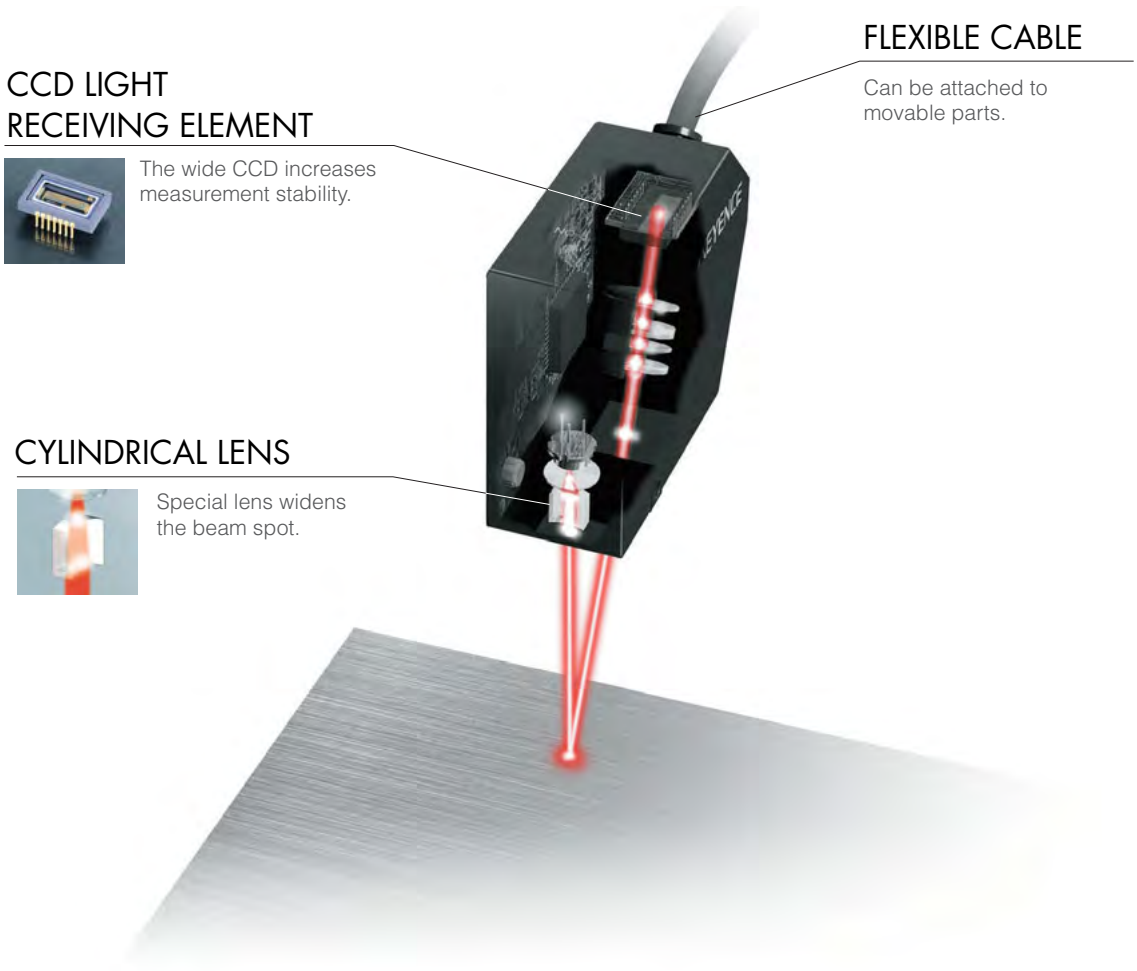
When two or more peaks are generated by multiple reflections, the algorithm compares the waveforms to the most recent received-light waveform and determines the one with the most similarity to the "correct waveform".

Measuring the shape of BGA



Measuring the surface profile of a gear

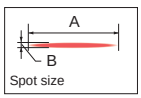
Advanced components provide superior measurements

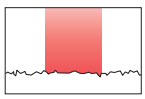


WIDE SPOT OPTICAL SYSTEM

Two types of laser beam spot diameters are available: wide-spot and small-spot. Select the type that best fits your application.

WIDE SPOT TYPE High measurement stability



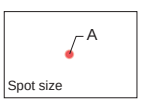


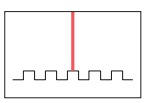
Diffused reflections caused by surface irregularities of a rough-surfaced target are averaged, preventing data fluctuations.

Position **Thickness** **Length** **Vibration**

	L K-G15	L K-G37	L K-G87	L K-G157	L K-G407	L K-G507
A	500µm	850µm	1100µm	1700µm	8300µm	9500µm
B	20µm	30µm	70µm	120µm	290µm	300µm

SMALL SPOT TYPE





The ultra-small spot of 1.17Mil (30µm) detects minute targets reliably. Optimal for profile measurements.

Shape **Gap** **Warpage** **Minute**

	LK-G10	LK-G32	LK-G82	LK-G152	LK-G402	LK-G502
A	Ø20µm	Ø30µm	Ø70µm	Ø120µm	Ø290µm	Ø300µm

FIELD PROVEN DESIGN CONCEPTS

IP-67 RATING

The excellent water-proof construction enables using the product in processing sites or other locations where water splashes onto the product.

*Measurements may become unstable due to light refraction when water or oil adheres to the front side of the lens.

ND FILTER (OPTION : LK-F1 and LK-F2)

When measuring a target with strong luster or a mirror surface, the ND filter attenuates the laser light to its optimal intensity, ensuring more accurate measurement.

FLEXIBLE CABLE

Flexible cables are available as standard. The product can be securely attached to a robot or other movable parts.

COMPATIBILITY OF HEADS

Sensors of different types can be used with a single controller.

Newly designed multifunction controller with built-in display and data storage

Various functions with advanced specifications and unparalleled detection performance are concentrated into a compact controller.

All-in-one controller
LK-G3001(P)V

Display panel
LK-GD500

Separate controller
LK-G3001(P)

COMPACT ALL-IN-ONE CONTROLLER SUPPORTS 2-HEAD CONNECTION

2 Ch | Large-size 2-color LED | Measurement | Judgment | Statistic

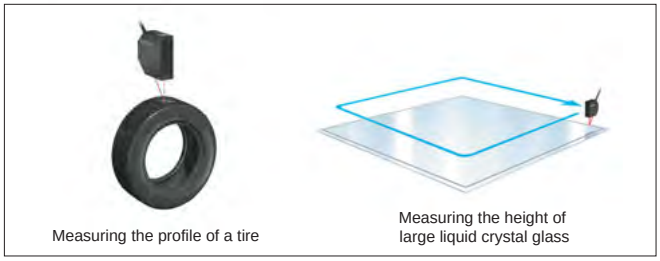
Two channels are available for sensor head connection, display and judgment. In addition, seven measurement modes and statistic functions are featured to support a wide range of measurement requirements

Easy-to-operate, simple setting
The current settings are displayed on a user-friendly display, which allows any user to configure the settings easily.

Featuring a large, easy-to-see 2-color LED
The ECO mode is featured to turn off the display when visual monitoring is not required.

DATA STORAGE FUNCTION

65,000-point memory is integrated internally in order to store the 50 kHz ultra-high-speed sampling data. Sometimes, it becomes necessary to analyze measurement data from a target moving at high speed. In this case, high-speed processing of all data items is enabled by temporarily storing the data to the internal memory and retrieving the data during the period before the next measurement.



Measuring the profile of a tire

Measuring the height of large liquid crystal glass

SEPARATE INSTALLATION OF THE DISPLAY AND OPERATION PANEL

The display (LK-GD500) and operation unit can be mounted on the outside of a control panel and the separate controller (LK-G3001) can be mounted inside the control panel using a DIN-rail. The separate controller (LK-G3001) can also be operated without a display*.

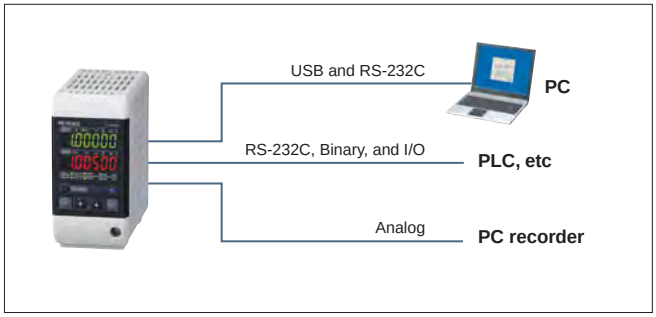
* LK-GD500 or LK-Navigator software is required for setup.

Simplified installation by mounting the separate controller inside the operation panel using DIN-rail mounting.

MULTIPLE I/O REQUIRES NO OPTICAL PARTS

USB | RS-232C | Binary | I/O | Analog

Five types of I/O including USB are available as standard. A wide range of needs are supported, from data gathering with a PC using USB to high-speed digital control with a PLC using binary outputs. High-speed output can be performed at 50 kHz. (Excluding the RS-232C)



Simple setting and analysis on a PC
Setting support software LK-Navigator

LK-Navigator supports optimal setting of the LK-G and data gathering from a PC.
Settings can be made via USB.

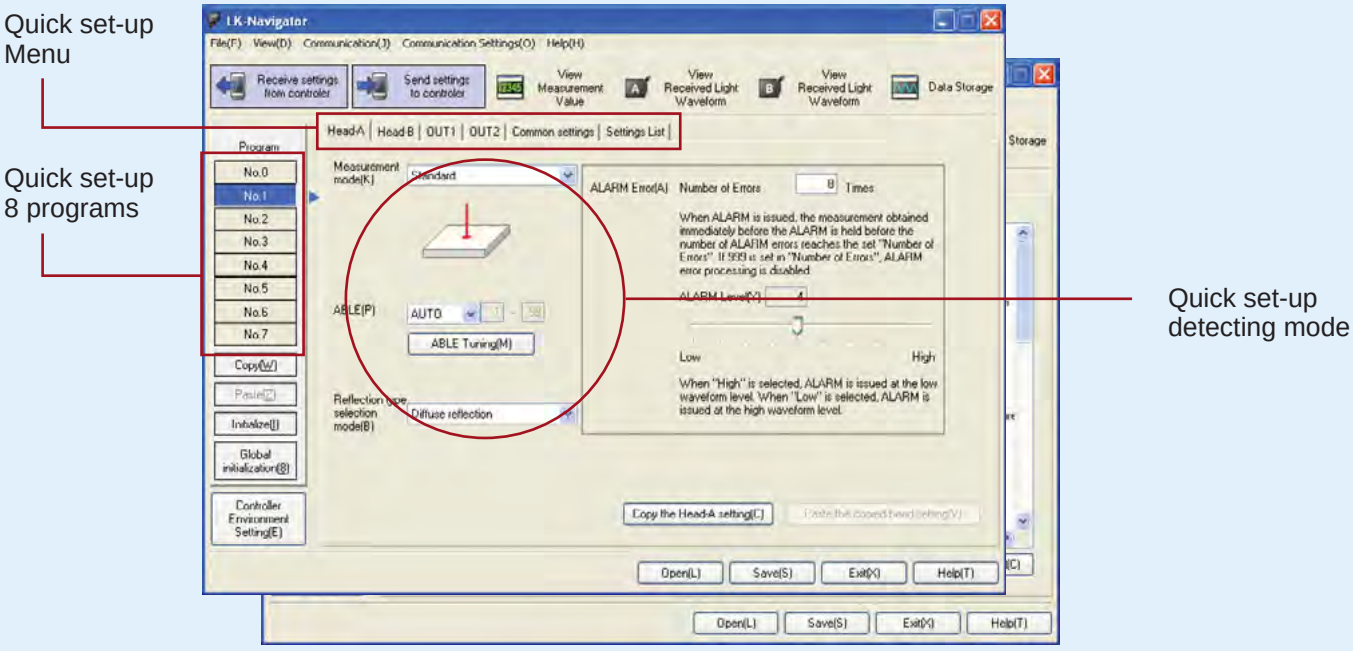
Hardware environment

Item	Hardware requirements
CPU	Pentium III 400MHz or higher
Support OS	Windows98/98SE/ME/XP
Memory capacity	64 MB
Resolution of display	800 x 600 pixels, 256 colors or more
Free disk space	10 MB min.
Interface	RS-232C (Serial port) or (USB Ver 1.1 or higher) should be featured.

• Windows is a registered trademark of Microsoft Corporation of America.
• Pentium is a registered trademark of Intel Corporation.

EASILY PROGRAM OPTIMAL SETTINGS

Simply follow the menu to select the settings. The navigator, with illustrations and explanations, allows any user to make settings easily.

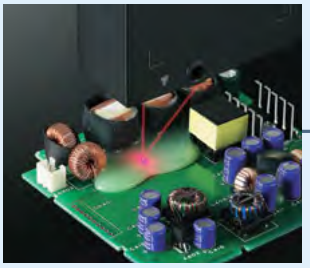


■ Quick set-up output ■ Quick set-up calculation between sensors

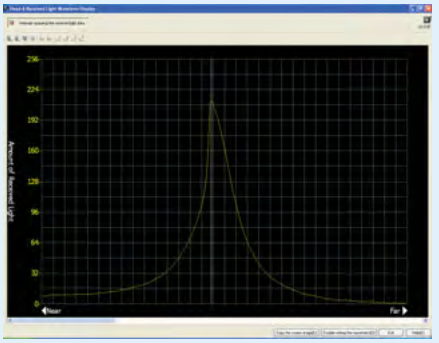
Display of received-light waveform

The waveform of received-light intensity formed on the CCD can be displayed. This feature is highly effective for measuring transparent targets in which two or more received-light waveforms are generated.

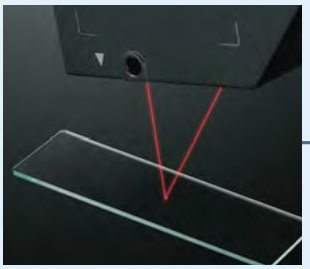
TRANSLUCENT TARGET



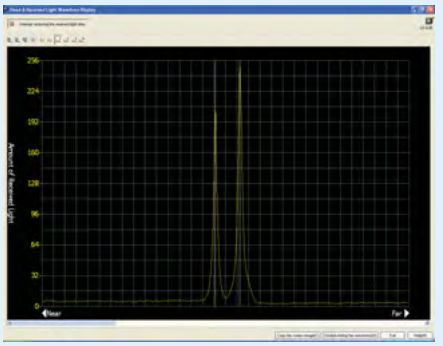
Height measurement of PCB resin



TRANSPARENT TARGET

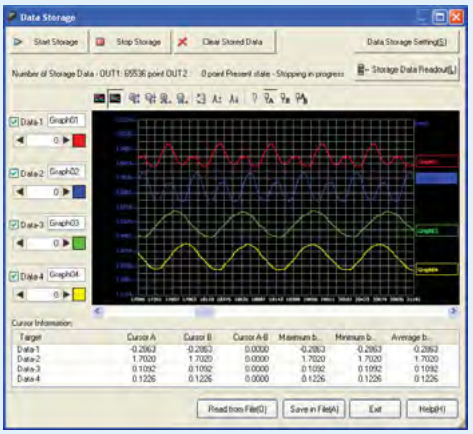


Thickness measurement of glass plate



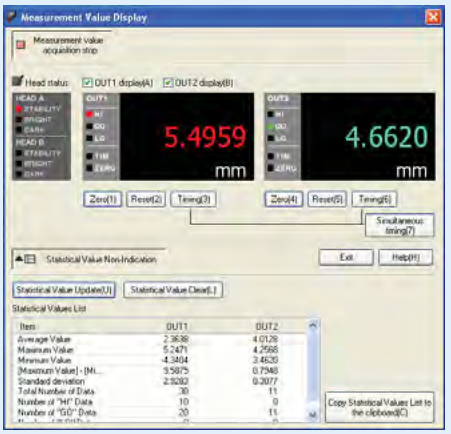
DATA STORAGE FUNCTION

The data stored in the internal memory of the LK-G can be displayed visually and acquired by a PC. It features enlarging, reducing, and overlapping of the display, reading of measurements using the cursor, and other functions for data analysis.



DISPLAY OF MEASUREMENT & STATISTICS VALUES

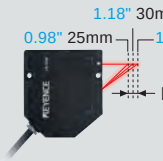
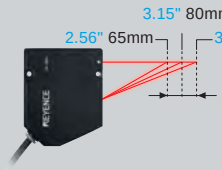
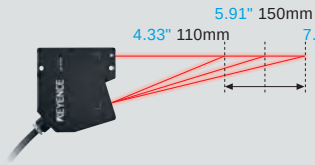
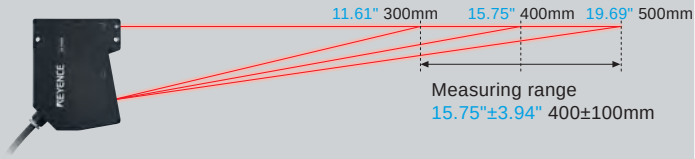
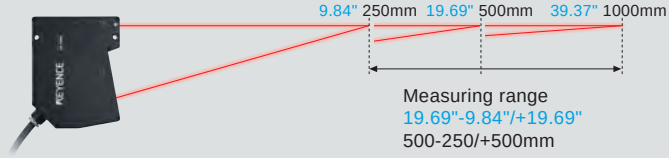
The controller's display can be reproduced on a PC. The measurement condition can be monitored in real time while configuring the settings. Using the statistic function allows the user to check the status of the system.



Measurement data and statistics for both outputs 1 and 2

SELECTION GUIDE

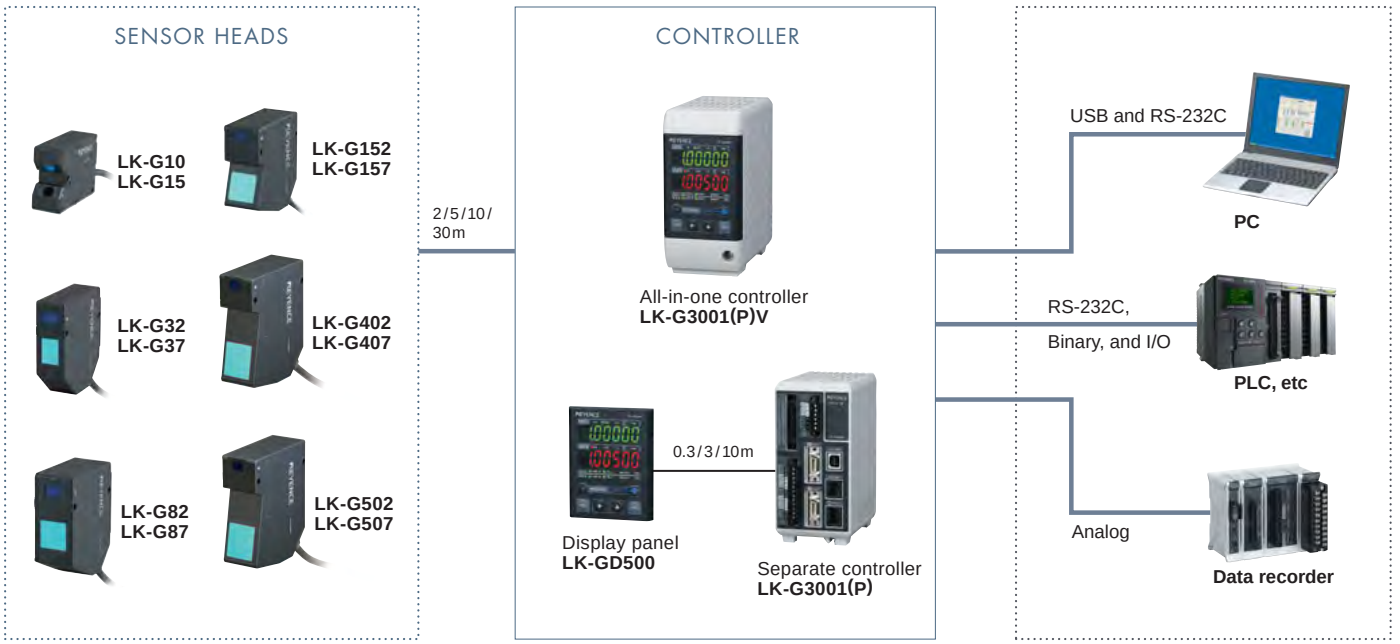
Sensor Heads

TYPE		MODEL	MEASURING RANGE	REPEATABILITY	SPOT DIAMETER
Super Precision	Small spot	**LK-G10**	 Measuring range 0.39"±0.04" 10±1mm	0.0004Mil 0.01 µm	0.79Mil 20µm
	Wide beam	**LK-G15**			0.79x19.7Mil 20x500 µm
High Accuracy	Small spot	**LK-G32**	 Measuring range 1.18"±0.2" 30±5mm	0.002Mil 0.05 µm	1.18Mil 30µm
	Wide beam	**LK-G37**			1.18x33.15Mil 30x850µm
Multi-Purpose	Small spot	**LK-G82**	 Measuring range 3.15"±0.59" 80±15mm	0.008Mil 0.2 µm	2.76Mil 70µm
	Wide beam	**LK-G87**			2.76x43.3Mil 70x1100µm
Long Distance	Small spot	**LK-G152**	 Measuring range 5.91"±1.57" 150±40mm	0.02Mil 0.5 µm	4.72Mil 120µm
	Wide beam	**LK-G157**			4.72x66.9Mil 120x1700µm
High-speed Long Distance	Small spot	**LK-G402**	 Measuring range 15.75"±3.94" 400±100mm	0.08Mil 2 µm	11.31Mil 290µm
	Wide beam	**LK-G407**			11.31x323.7Mil 290x8300µm
Ultra Long Distance	Small spot	**LK-G502**	 Measuring range 19.69"-9.84"/+19.69" 500-250/+500mm	0.08Mil 2 µm	11.70Mil 300µm
	Wide beam	**LK-G507**			11.70x370.5Mil 300x9500µm

Controllers

TYPE	OUTPUT	
	NPN	**PNP**
ALL-in-one	LK-G3001V	LK-G3001PV
Separate Display	LK-G3001	LK-G3001P

SYSTEM



SPECIFICATION

Controller

Model		**All-in-one model**	**LK-G3001(P)V**
		Separate model [1.]	**LK-G3001(P)/ LK-GD500**
Display		**Head compatibility**	All LK-G sensor heads are compatible
		Number of connectable sensors	maximum of 2 units
		Minimum display unit	0.0004 Mil 0.01 µm
		Display range	±9999.99 mm to ±9999.99 µm ±9999.99" ±99.9999Mil (Selectable from six levels)
		Refresh rate	10 times/sec
Terminal block		**Analog voltage output**	±10 V x 2 outputs, output impedance: 100Ω
		Analog current output	4 to 20 mA x 2 outputs, maximum load resistance: 350Ω
		Timing input [3.]	For OUT1, non-voltage or voltage input
		Reset input [3.]	
		Auto-zero input [3.]	
		Laser remote interlock input [3.]	Non-voltage input
		Comparator output [2.]	For OUT1, NPN or PNP open-collector output
		Alarm output [2.]	For OUT1, NPN or PNP open-collector output (N.C.)
Expansion connector[4.]		**Timing input** [3.]	For OUT2, non-voltage or voltage input
		Reset input [3.]	
		Auto-zero input [3.]	
		Program switching input [3.]	Non-voltage input x 3 inputs
		Laser-Off input [3.]	For Head A/Head B, non-voltage input
		Comparator output [2.]	For OUT2, NPN or PNP open-collector output
		Alarm output [2.]	For OUT2, NPN or PNP open-collector output (N.C.)
	Binary	**Binary output** [2.]	Measured data output (21 bits), OUT1/OUT2 selectable, NPN or PNP open-collector output
		Strobe output [2.]	NPN or PNP open-collector output
		Binary selector output [2.]	NPN or PNP open-collector output
		Binary selector input [3.]	Non-voltage or voltage input
RS-232C interface			Measured data output and control input/output (Maximum baud rate: 115200 bit/s, selectable)
USB interface			In conformity with USB Revision 2.0 Full speed (USB1.1 compatible)
Major functions			2 OUT simultaneous measurement, Operation, Averaging, Filter, Calibration, Measurement, AUTO ZERO, Sampling frequency setting, Mutual interference prevention, Data storage, 8-program memory, ECO mode, ABLE setting, Target setting, ABLE tuning, Selection of measurement surface of transparent target, Statistics processing, Connection of setting support software, Selectable head-mounting, etc.
Power supply voltage			24 VDC± 10%, Ripple: 10% (P to P) or less
Current consumption			500 mA or less with 1 head/600 mA or less with 2 heads
Ambient temperature			0 to +50°C (32 to 122°F), No condensation
Relative humidity			35 to 85%, No condensation
Weight			Approx. 480g (LK-G3001V), Approx. 370g (LK-G3001), Approx. 60g (LK-GD500)

1. LK-G3001 can be operated by itself. The measured value display and setting modifications can be performed on the display panel (LK-GD500) or via the setting support software (LK-H1W).
2. The rating of the NPN open-collector: 50 mA max (40V max), residual voltage of 0.5 V max.
   The rating of the PNP open-controller: 50mA max. (30V max.), residual voltage of 0.5V max.
3. The rating of non-voltage input: 1 V or less ON voltage, 0.6 mA or less OFF current
4. Expansion connector not included with controller. Part # is OP-51657.

SPECIFICATION

Sensor head

Model		LK-G10/G15	LK-G32/ G37	
Mounting mode		–	Diffused reflection	Specular reflection
Reference distance		0.39" 10 mm	1.18" 30 mm	0.93" 23.5 mm
Measuring range [1.]		±0.04" ±1 mm	±0.2" ±5 mm	±0.18" ±4.5 mm
Light source		Red semiconductor laser		
	Wavelength	650 nm (visible light), Class II (FDA)	650 nm (visible light), Class II (FDA)	
	Output	0.3 mW max.	0.95 mW max.	
Spot diameter (at reference distance)		Approx. 0.78 x 20 Mil 20 x 500 µm (G15), Approx. ø0.78 Mil ø20 µm (G10)	Approx. 1.17 x 33.15 Mil 30 x 850 µm (G37), Approx. ø1.17 Mil ø30 µm (G32)	
Linearity [2.]		±0.03% of F.S. (F.S.=±0.04" ±1 mm)	±0.05% of F.S. (F.S.= ±0.2" ±5 mm)	
Repeatability [3.]		0.0008 Mil (0.0004 Mil) 0.02 µm (0.01 µm)	0.002 Mil 0.05 µm	
Sampling frequency		20/50/100/200/500/1000 µs (Selectable from 6 levels)		
LED display		Near the center of the measurement: Green lights Within the measurement area: Orange lights Outside the measurement area: Orange flashing		
Temperature characteristics		0.01% of F.S./˚C (F.S.=±0.04" ±1 mm)	0.01% of F.S./˚C (F.S.= ±0.2" ±5 mm)	
Environmental resistance	Protective construction	IP67 (IEC60529)		
	Ambient luminance	Incandescent lamp or fluorescent lamp: 10,000 lux max.		
	Ambient temperature	0 to +50˚C (32 to 122˚F), No condensation		
	Relative humidity	35 to 85%, No condensation		
	Resistance to vibrations	10 to 55 Hz, multiple amplitude 0.06" 1.5 mm; two hours in each direction of X, Y, and Z		
Material		Aluminum die-cast		
Weight (including the cable)		Approx. 190 g	Approx. 280 g	

1. The range is obtained by measuring KEYENCE's standard target (ceramic).
   LK-G10/G15: When the sampling rate is 20 µs, the range becomes +0.37(FAR side) to -1 mm (NEAR side).
   LK-G32/G37: When the sampling rate is 20 µs, the range becomes +1.8(FAR side) to -5 mm (NEAR side) for diffuse reflection, and +1.6 mm(FAR side) to -4.5 mm (NEAR side) for specular reflection.
2. The range is obtained by measuring KEYENCE's standard target (ceramic) with the Standard mode.
3. The range is obtained by measuring KEYENCE's standard(SUS) with 4096 times of averaging at the reference distance. The range in parenthesis is the typical linearity obtained by measuring the target with 16384.

Sensor head

Model		LK-G82/ G87		LK-G152/G157	
Mounting mode		Diffused reflection	Specular reflection	Diffused reflection	Specular reflection
Reference distance		3.15" 80 mm	2.96" 75.2 mm	5.91" 150 mm	5.81" 147.5 mm
Measuring range [1.]		±0.59" ±15 mm	±0.55" ±14 mm	±1.57" ±40 mm	±1.54" ±39 mm
Light source		Red semiconductor laser			
	Wavelength	650 nm (visible light), Class II (FDA)			
	Output	0.95 mW max.			
Spot diameter (at reference distance)		Approx. 2.76 x 43.3 Mil 70 x 1100 µm (G87), Approx. ø2.76 Mil ø70 µm (G82)		Approx. 4.68 x 66.3 Mil 120 x 1700 µm (G157), Approx. ø4.68 Mil ø120 µm (G152)	
Linearity [2.]		±0.05% of F.S. (F.S.= ±0.59" ±15 mm)		±0.05% of F.S. (F.S.= ±1.57" ±40 mm)	
Repeatability [3.]		0.008 Mil 0.2 µm		0.02 Mil 0.5 µm	
Sampling frequency		20/50/100/200/500/1000 µs (Selectable from 6 levels)			
LED display		Near the center of the measurement: Green lights Within the measurement area: Orange lights Outside the measurement area: Orange flashing			
Temperature characteristics		0.01% of F.S./˚C (F.S.= ±0.59" ±15 mm)		0.01% of F.S./˚C (F.S.= ±1.57" ±40 mm)	
Environmental resistance	Protective construction	IP67 (IEC60529)			
	Ambient luminance	Incandescent lamp or fluorescent lamp: 10,000 lux max.		Incandescent lamp or fluorescent lamp: 5000 lux max.	
	Ambient temperature	0 to +50˚C (32 to 122˚F), No condensation			
	Relative humidity	35 to 85%, No condensation			
	Resistance to vibrations	10 to 55 Hz, multiple amplitude 0.06" 1.5 mm; two hours in each direction of X, Y, and Z			
Material		Aluminum die-cast			
Weight (including the cable)		Approx. 380 g		Approx. 290 g	

1. The range is obtained by measuring KEYENCE's standard target (ceramic).
   LK-G82/G87: When the sampling rate is 20 µs, the range becomes -9(NEAR side) to -15 mm(NEAR side) for diffuse reflection, and -8.7(NEAR side) to -14 mm(NEAR side) for specular reflection.
   LK-G152/G157: When the sampling rate is 20 µs, the range becomes -22(NEAR side) to -40 mm(NEAR side) for diffuse reflection, and -22(NEAR side) to -39 mm(NEAR side) for specular reflection.
2. The range is obtained by measuring KEYENCE's standard target (ceramic) with the Standard mode.
3. The range is obtained by measuring KEYENCE's standard(SUS) with 4096 times of averaging at the reference distance. The range in parenthesis is the typical linearity obtained by measuring the target with 16384.

SPECIFICATION

Model		LK-G407/LK-G402		LK-G507/LK-G502	
Mounting mode		Diffused reflection	Specular reflection	Diffused reflection	Specular reflection
Reference distance		15.75" 400 mm	15.67" 398 mm	19.69" 500 mm	19.59" 497.5 mm
Measuring range[1.]		3.94" ±100 mm	3.90" ±99 mm	-9.84" to 19.69" -250 to +500 mm	-9.80" to 19.61" -249 to +498 mm
Light source		Red semiconductor laser			
	Wavelength	650 nm (visible light), Class II (FDA)			
	Output	0.95 mW max.			
Spot diameter (at reference distance)		Approx. 11.41 x 326.7 Mil 290 x 8300 µm (G407) Approx. ø11.41 Mil ø290 µm (G402)		Approx. 11.70 x 370.5 Mil 300 x 9500 µm (G507) Approx. ø11.7 Mil ø300 µm (G502)	
Linearity [2.]		±0.05% of F.S.(F.S.= ±3.94" ±100 mm)		±0.05% of F.S. (±9.75 Mil ±250 µm) [4.5.] -9.84" to +9.84" -250 mm to +250 mm <high-accuracy range> ±0.02% of F.S. (±3.9 Mil ±100 µm) -9.84" to -1.97"-250 mm to -50 mm <long range> ±0.1% of F.S. (±19.5 Mil ±500 µm) -9.84" to -19.69"-250 mm to +500 mm (F.S. = ±9.84"±250 mm)	
Repeatability [3.]		0.08 Mil 2 µm			
Sampling frequency		20/50/100/200/500/1000 µs (Selectable from 6 levels)			
LED display		Near the center of the measurement: Green lights Within the measurement area: Orange lights Outside the measurement area: Orange flashing			
Temperature characteristics		0.01% of F.S./ºC (F.S.= ±3.94" ±100 mm)		0.01% of F.S./ºC (F.S.= ±9.84" ±250 mm)	
Protective construction		IP67 (IEC60529)			
Ambient light		Incandescent lamp or fluorescent lamp: 5000 lux max.			
Ambient temperature		0 to +50ºC (32 to 122°F), No condensation			
Relative humidity		35 to 85%, No condensation			
Vibrations		10 to 55 Hz, multiple amplitude 0.06" 1.5 mm; two hours in each direction of X, Y, and Z			
Material		Aluminum die-cast			
Weight (including the cable)		Approx. 380 g			

1. The range is obtained by measuring KEYENCE's standard target (ceramic).
   <LK-G407/LK-G402>
   When the sampling rate is 20 µs, the range becomes -2.76" (-70 mm) (NEAR side) to -3.94" (-100 mm) (NEAR side) for diffuse reflection.
   When the sampling rate is 20 µs, the range becomes -2.76" (-70 mm) (NEAR side) to -3.90" (-99 mm) (NEAR side) for specular reflection.
   <LK-G507/LK-G502>
   When the sampling rate is 20 µs, the range becomes -9.06" (-230 mm) (NEAR side) to -9.84" (-250 mm) (NEAR side) for diffuse reflection.
   When the sampling rate is 20 µs, the range becomes -9.06" (-230 mm) (NEAR side) to -9.80" (-249 mm) (NEAR side) for specular reflection.
   When the sampling rate is 50 µs, the range becomes -4.92" (-125 mm) (NEAR side) to -9.84" (-250 mm) (NEAR side) for diffuse reflection.
   When the sampling rate is 50 µs, the range becomes -4.92" (-125 mm) (NEAR side) to -9.80" (-249 mm) (NEAR side) for specular reflection.
2. The range is obtained by measuring KEYENCE's standard target (ceramic) with the Standard mode.
3. The range is obtained by measuring KEYENCE's standard(SUS) with 4096 times of averaging at the reference distance.
4. All are calculated at F.S. = ±9.84" (±250 mm).
5. "High accuracy range" and "long range" refer to the linearity when those ranges are used.

Extension cable [Cable between the head and controller]

Model	LK-GC2	LK-GC5	LK-GC10	LK-GC20	LK-GC30
Cable length	6.6' 2 m	16.4' 5 m	32.8' 10 m	65.6' 20 m	98.4' 30 m
Weight	Approx. 200 g	Approx. 400 g	Approx. 750 g	Approx. 1400 g	Approx. 2000 g

Extension cable [Cable for display panel]

Model	OP-51654	OP-51655	OP-51656
Cable length	0.98' 0.3 m	9.8' 3 m	32.8' 10 m

ND filter

Model	Description
LK-F1 (for LK-G3*, LK-G8*)	Used when the mirror surface is measured at a mirror reflection setup.
LK-F2 (for LK-G15*,LK-G40*,LK-G50*)	Used when the mirror surface is measured at a mirror reflection setup.

CORD

RS-232C communication cable
OP-26487（2.5m 8.2"）

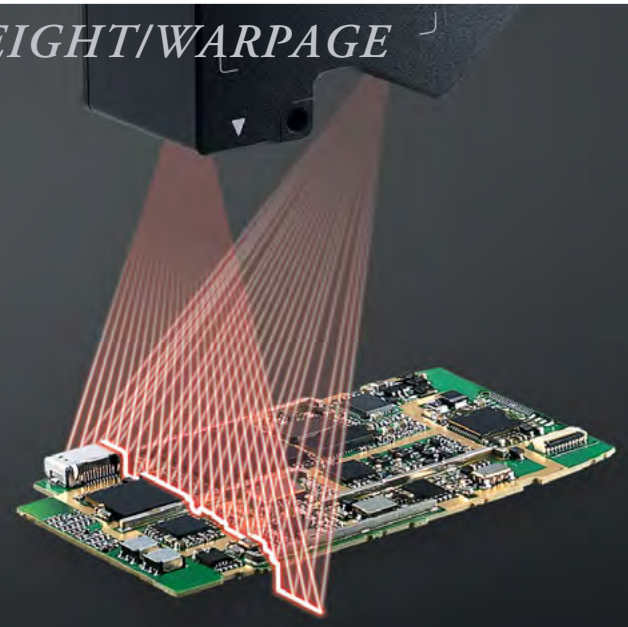
communication cable 9-pin
conversion connector
OP-26486

communication cable 25-pin
conversion connector
OP-26485

Expansion cable 3 m 9.8'
OP-51657

Ethernet cable 3 m 9.8'
OP-66843

HEIGHT/WARPAGE



Measuring the height at multiple points in a specified range

The average, peak or bottom height can be measured. Warpage or swell is measured by calculating the heights at specified points.

WIDTH/GAP

Measuring width/gap with a specified measurement mode

Width and gaps are measured on the basis of the surface profile. High-accuracy measurements are carried out without being affected by the color of targets.

HIGH-ACCURACY 2D LASER DISPLACEMENT SENSOR

LJ-G SERIES

High accuracy can be conducted on-line

The LJ-G Series accurately measures the surface profile of targets in X and Z directions.
The height, width or gap on a surface profile can be measured using 28 measurement modes.
8-point simultaneous measurement (Industry first) enables monitoring of multiple inspections.
Measurement modes and calculations are freely combined to meet various needs.

High-accuracy 2D laser displacement sensor
LJ-G Series

PROFILE/SECTION

Measuring/judging a section in a flash

A section area is instantly measured in a specified range. This allows for the quality control of profiles and sections.

ANGLE/ INTERSECTION/ POSITION

Automatic calculation of angles/intersections

Angles, intersections, and edge positions are instantly measured/judged based on the surface profile.

Mid-range type
LJ-G080

Ultra high-accuracy regular reflection type
LJ-G015K

High-accuracy type
LJ-G030

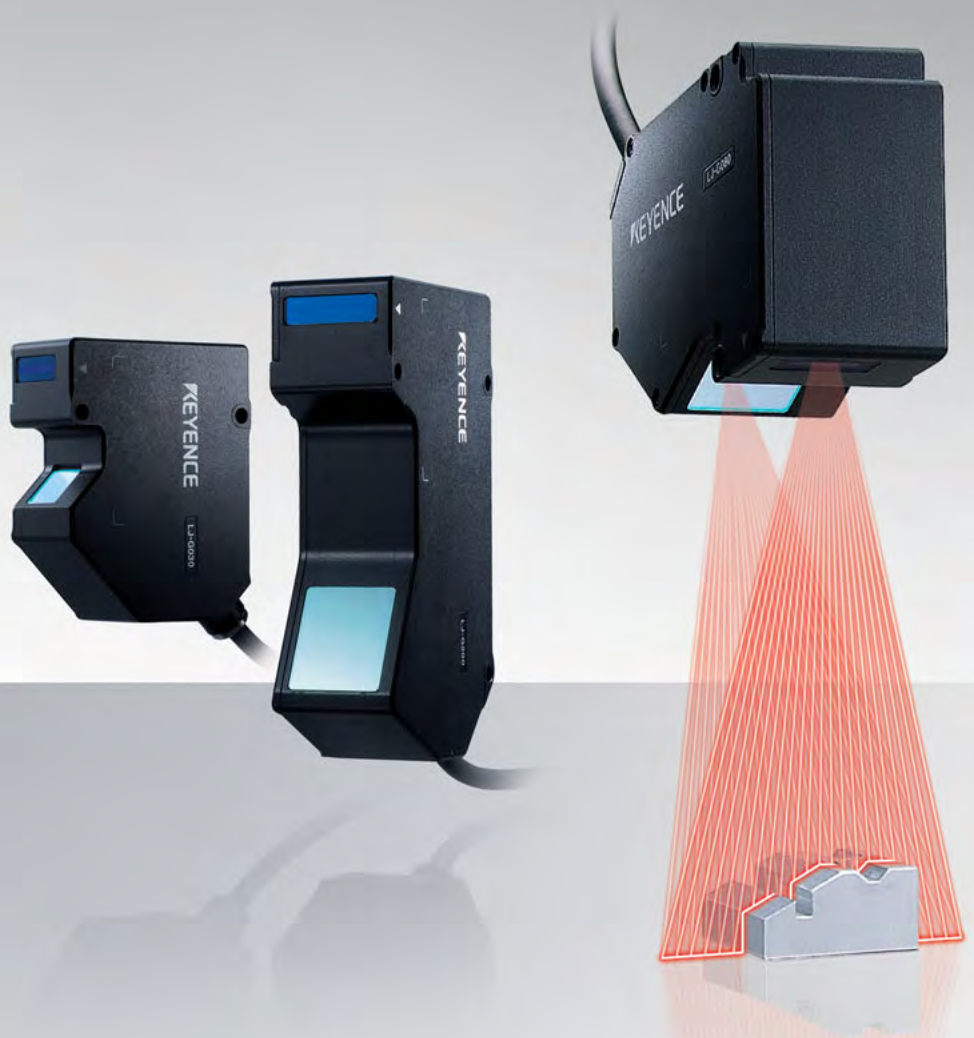
Ultra high-accuracy type
LJ-G015

Long-range type
LJ-G200

LJ-G SERIES

Cutting edge technology offers innovative performance for 2D measurement

The LJ-G Series accurately captures surface profiles in 2D at high-speed enabling 100% inspection of various attributes. All-in-one design and user-friendly operation make programming / trouble shooting simple.



BEST IN ITS CLASS

Simultaneous measurement / judgment at 8 points

KEYENCE technically trained sales engineers have extensive experience with various applications and industries for the most efficient solution.

Measurements

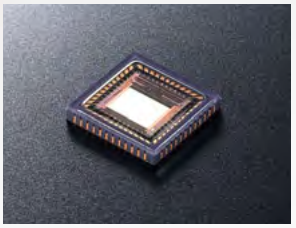
Peak height	Bottom height
Average height	Gap
Width/position	Section area
Angle/intersection	Profile comparison

FIRST IN THE WORLD

E³-CMOS image sensor provides stable measurements

The E³-CMOS with a 300 times larger dynamic range than conventional range is used. The LJ-G Series precisely follows the surface profile of any substance in the X and Z directions. It can reliably measure a workpiece including black rubber, white ceramic, and metal.

*E³-CMOS: Enhanced Eye Emulation C-MOS

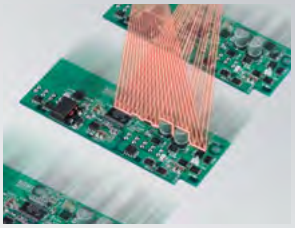


Simultaneous measurements can be done at 8 points.

FASTEST IN ITS CLASS

High-speed sampling of 3.8 ms, high-accuracy of ±0.1% of F.S.

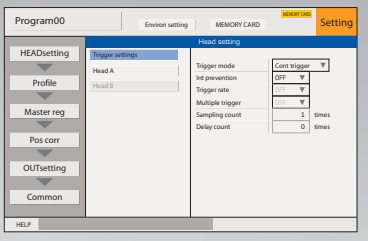
The Quatro link system achieves the highest sampling speed in its class, 3.8 ms. The LJ-G Series can follow high-speed lines or moving targets. In addition, a 2D Ernostar lens is used to make the optical system the best accuracy in its class.



FIRST IN ITS CLASS

Easy setting with the simple setting menu

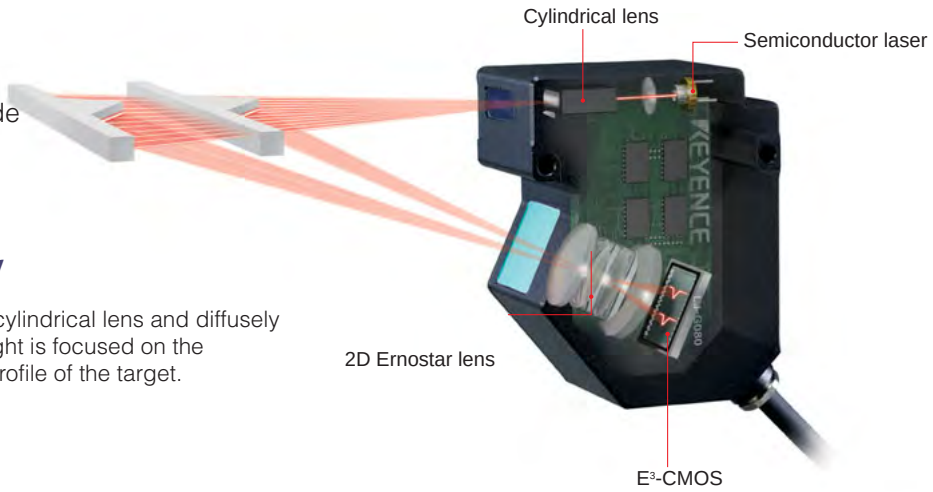
Novice users can easily configure settings following the simple menu. Operation by a PC is also simplified thanks to the included support software.



LJ-G SERIES

Unique design for high-accuracy measurements

KEYENCE laser displacement technology optimizes 2D measuring. These revolutionary techniques provide stable, high accuracy measurements.



2D triangulation method

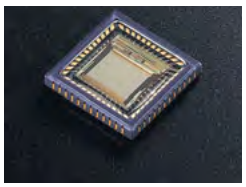
The laser light is enlarged into strips by the cylindrical lens and diffusely reflects on the target object. The reflected light is focused on the E3-CMOS to measure the displacement or profile of the target.

World's first

The LJ-G MEASURES ANY SUBSTANCE : E³-CMOS EQUIPPED

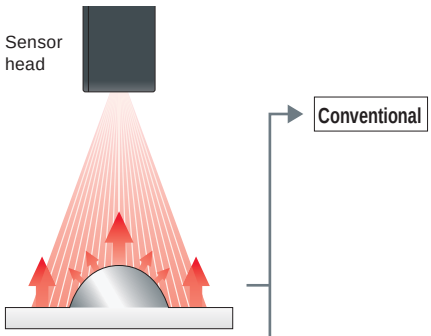
The E³-CMOS image sensor, developed for machine vision, has a 300 times larger dynamic range than a conventional sensors range and a reliable S/N ratio. This allows measuring objects such as black rubber (with weak reflection) and metals (with strong reflection).

E³-CMOS



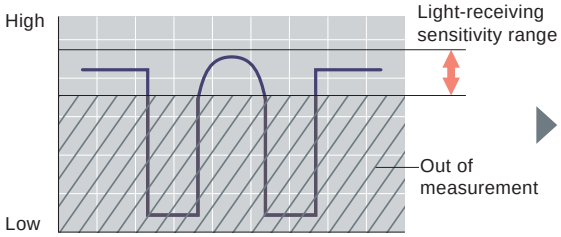
*E³-CMOS sensor: Enhanced Eye Emulation C-MOS image sensor

Laser light reflection

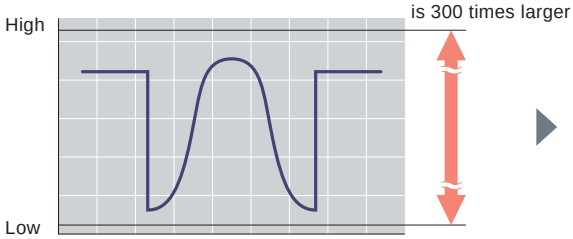


The reflection factor and the reflected light intensity change according to the shape, color and material of the target.

Light intensity

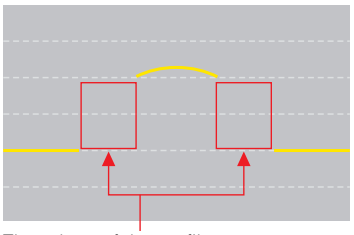


Light receiving elements do not have enough sensitivity to cover the entire range.

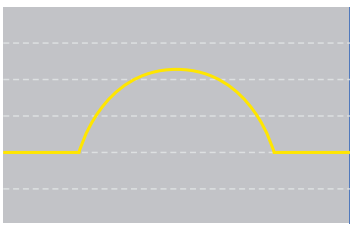


The dynamic range is 300 times larger than the conventional model and covers the entire range.

Profile measurement



The edges of the profile are not measured as the light intensity is lacking.



The entire profile is measured.

New function

ASAP (Automatic Sensitivity Adjustment by Pixel)

Dynamic range 6000x

This function adjusts the sensitivity and laser power of the E³-CMOS to obtain suitable waveform data for each measurement position that has a different reflectance. The obtained data is merged as a single measurement result..

Target with an extremely different reflectance at each position

Sensitivity: Small

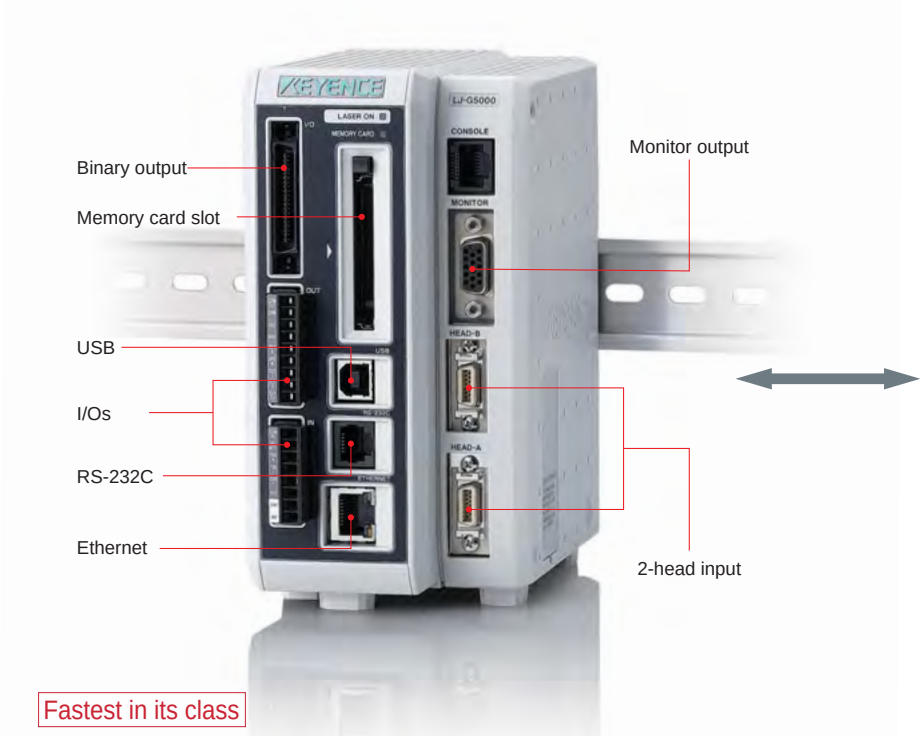
Sensitivity: Medium

Sensitivity: Largest

Measurement result

Multifunctional controller satisfies any need

The multifunctional controller provides ultra-high-speed processing, multiple I/O and a high-capacity internal memory.



Simple setting and analysis with a PC

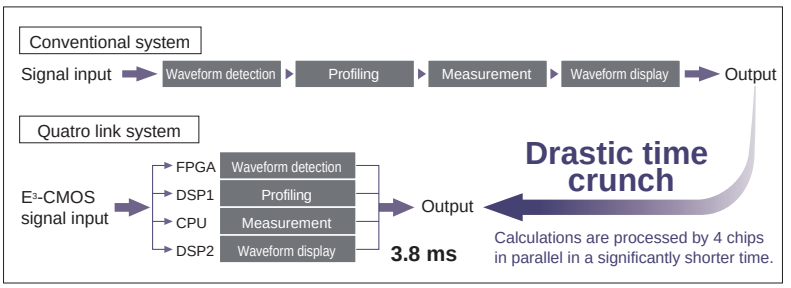
Setting support software: LJ-Navigator (LJ-H1W)

With the included software, settings can be easily configured and data can be saved and analyzed with a PC.

Fastest in its class

SAMPLING SPEED OF 3.8 ms QUATRO LINK SYSTEM

Four arithmetic chips for computation processing are arranged in parallel in the controller. The Quatro link system simultaneously conducts four processes to achieve a sampling speed of 3.8 ms. This allows faster measurements on production lines.



Largest in its class

LARGE CAPACITY MEMORY FOR SAVING DATA

A large capacity memory is equipped in the controller.
A memory card slot is included to store the production records of mass-produced products.

Handling many product types

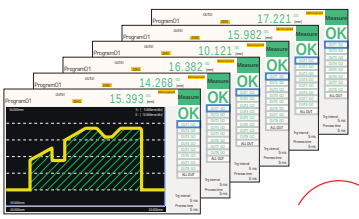
The memory in the controller stores up to 16 programs. When the setting call function from the memory card is used, up to 160 programs can be stored to handle various product types.

	Program setting	Profile saving	Data storage
Internal memory	16	1024 x 2	65536 x 8
CF(1GB)	160	1024 x 300	65536 x 3200

Handles 160 types

Profile saving

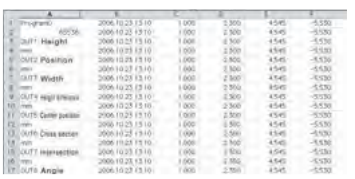
For analyzing NG records or production history.



1024 profiles

Data storage

For controlling daily production records or for traceability.



65536 data can be stored

LJ-G SERIES

Simple operation for settings and high-accuracy measurements

The design concept is "easy for anyone". The simple setting menu is the first in its class and adjustment functions are added for different applications.

QUICK AND EASY SETTING

First in its class

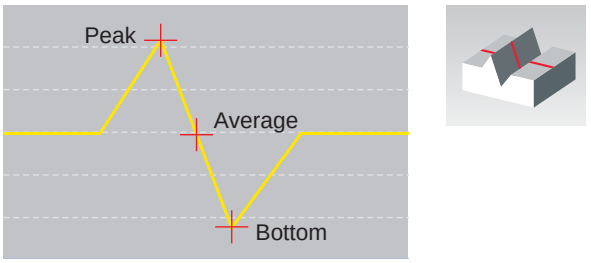
Uncomplicated setup menu

The setup menu is designed so novice users can effortlessly configure settings. The operation by a PC is also simplified thanks to the included setting support software (LJ-H1W).

MEASUREMENT MENUS

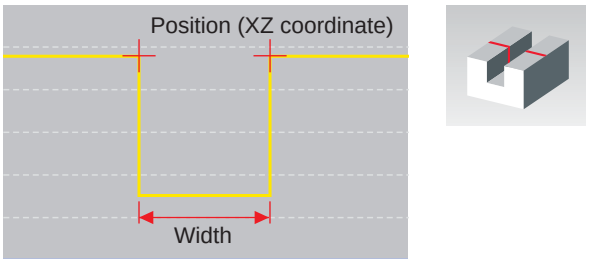
HEIGHT

Measures height in a specified range.



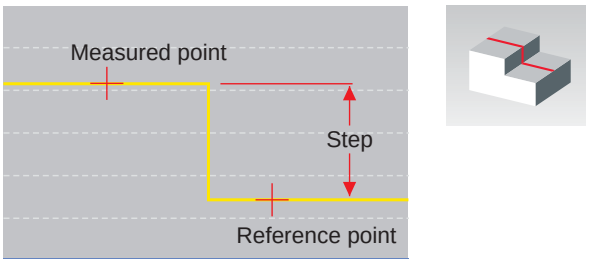
WIDTH/POSITION

Measures width/position with a specified condition.



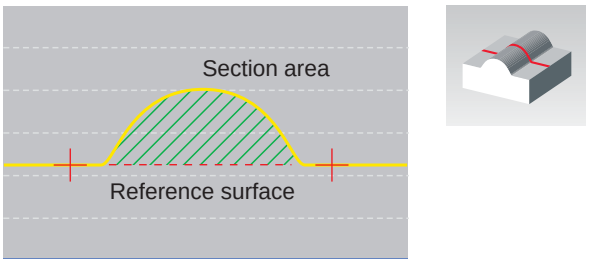
STEP

Determines the height difference between a measured point and the reference point.



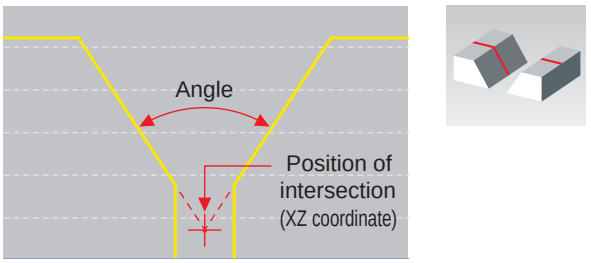
SECTION AREA

Measures the area on the basis of the reference surface.



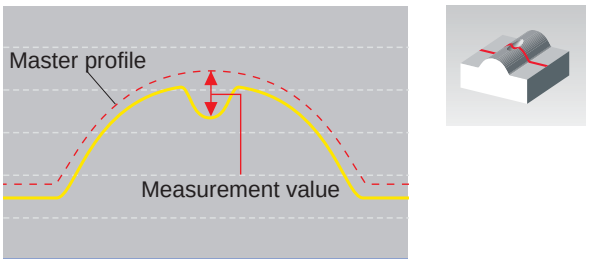
ANGLE/INTERSECTION

Measures the angle or intersection of detected lines.



PROFILE COMPARISON

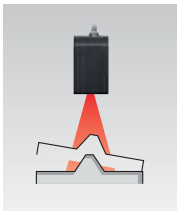
Compares the target profile with the master profile to measure the largest difference.



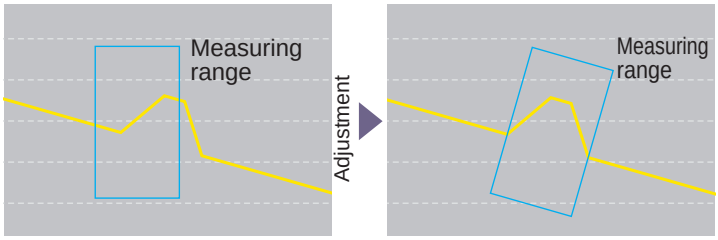
USEFUL ADJUSTMENT FUNCTIONS

POSITION ADJUSTMENT FUNCTION

After the adjustment, the LJ-G Series can provide stable measurements though the targets are not neatly arranged or positioned.



Displacement of target

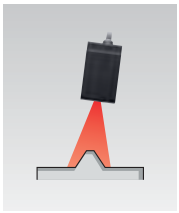


Since the workpiece is not in the measuring range, a precise measurement cannot be carried out.

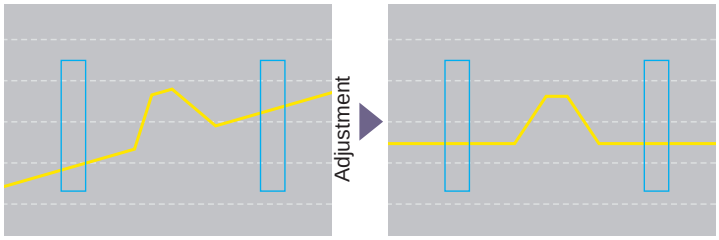
The measuring range moves according to the displacement of the workpiece for precise measurement.

INCLINATION ADJUSTMENT

This cuts time for adjusting the installation of the sensor head and eliminates measurement errors.



Inclination of the sensor head to the workpiece

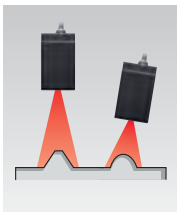


Due to the inclination of the sensor head, the workpiece is not properly measured.

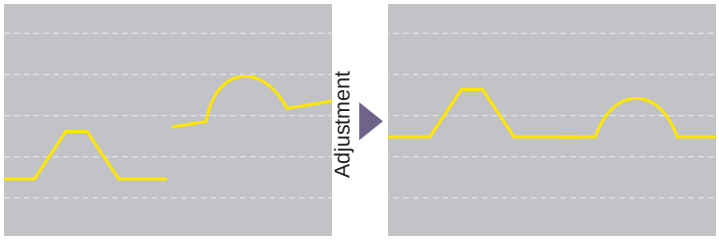
The inclination adjustment adjusts the angle of the sensor head for precise measurement.

PROFILE LINK FUNCTION

When two sensor heads are connected to a controller in parallel, the profiles are linked as a single profile. This significantly cuts time to adjust two sensor heads and eliminates measurement errors.



Installation displacement of two sensor heads



The profiles of two sensor heads are not linked.

The Profiles link function links the profiles from two sensor heads as a profile for precise measurement.

TWO-SENSOR HEAD CONNECTION

Two sensor heads can be connected to a controller. The sensor heads can be arranged face-to-face or in parallel.

IP67

The LJ-G Series can be safely used in a water spray environment.

CONTROLLER/SENSOR HEAD COMPATIBILITY

Adjustment data is stored in the sensor head for compatibility, so sensor heads can be exchanged.

FLEXIBLE CABLE

The flexible cable is standard. The sensor head can be mounted on a moving part.

SPECIFICATION

Controller

Model		LJ-G5001	LJ-G5001P
Sensor head compatibility		Compatible	
Number of connectable sensors		2 units max.*	
Display	Minimum display unit	0.1 µm[1.], 0.001 mm², 0.01° (Inch mode : 0.004 Mil, 0.00001 inch)	
	Maximum display range	±99999.9 mm, ±999999 mm², ±99999.9° (Inch mode : ±9999.99 Mil, ±999.999 inch)	
Input terminal block	Laser remote interlock input	Non-voltage input	Non-voltage input
	Trigger input	For sensor head A, non-voltage input	For sensor head A, voltage input
	Timing 1 input	Non-voltage input	Voltage input
	Auto-zero 1 input		
	Reset input		
Output terminal block	Analog voltage output	±10 V x 2 outputs, output impedance: 100 Ω	
	Total judgment output	NPN open-collector output	PNP open-collector output
	Error output	NPN open-collector output (N.C.)	PNP open-collector output (N.C.)
	Process output	NPN open-collector output	PNP open-collector output
	Trigger input enable output	For sensor head A, NPN open-collector output	For sensor head A, PNP open-collector output
	Adjusted error output		
Expansion connector	Timing 2 input	Non-voltage input	Voltage input
	Auto-zero 2 input		
	Trigger input	For sensor head B, non-voltage input	For sensor head B, voltage input
	Program switching input	Non-voltage input, 4 inputs	Voltage input, 4 inputs
	Memory card save input	Non-voltage input	Voltage input
	Laser-Off input	For sensor head A/B, non-voltage input	For sensor head A/B, voltage input
	Judgment/Binary output [2.]	3-level judgment output: OUT1 to OUT8, total judgment output Binary output: OUT1 to OUT8 measured data output (21 bits) NPN open-collector output	3-level judgment output: OUT1 to OUT8, total judgment output Binary output: OUT1 to OUT8 measured data output (21 bits) PNP open-collector output
	Strobe output	NPN open-collector output	PNP open-collector output
	Trigger input enable output	For sensor head B, non-voltage input	For sensor head B, PNP open-collector output
	Adjusted error output		
Analog RGB monitor output		SVGA (800 x 600 pixels)	
RS-232C interface		Measured data output and control input/output (Maximum baud rate: 115200 bit/s, selectable)	
USB interface		In conformity with USB Revision 2.0 HI-SPEED (USB 1.1 Full-SPEED compatible)	
Ethernet interface		100BASE-TX/10BASE-T	
Memory card		Compatible with NR-M32 (32 MB), GR-M256 (256MB), and NR-M1G (1GB). (with FAT32)	
Major functions		Sensor heads calculation, Profile adjustment, Filter, Smoothing, Averaging, Position adjustment, OUT name change, Measurement mode selection (Height, position, gap, width, center position, section area, intersection, angle, profile comparison, profile tracking), Scaling, Average, Measurement, Measured value alarm, Tolerance setting, Auto-zero, Storage (data/profile), Memory card saving, Program memory, Trigger mode change, Mutual interference prevention, Measuring range change, Calibration, Laser light adjustment, Sampling time setting, Mask, Profile alarm setting, Inclination adjustment, Height adjustment, Display language switch, Setting support software connection, Trigger pitch/Measuring time display, etc.	
Ratings	Power supply voltage	24 VDC ±10%, Ripple: 10% (P to P) or less	
	Current consumption	800 mA or less with 1 sensor head/1 A or less with two sensor heads	
Environmental resistance	Ambient temperature	0 to 50°C (32 to 122°F)	
	Relative humidity	35 to 85% (No condensation)	
Weight		Approx. 1050 g	

1. When LJ-G015 or LJ-G015K is connected only. When other sensor heads are connected, the minimum display unit is 1µm.
2. Time-sharing output of judgment results or binary measured data.
The rating of the NPN open-collector output: 50 mA max. (30 V max.), residual voltage of 1 V max.
The rating of the PNP open-collector output: 50 mA max. (30 V max.), residual voltage of 1 V max.
The rating of the non-voltage input: 1 V or less ON voltage, 0.6 mA or less OFF current (Trigger input terminal: 1 V or less ON voltage, 1.0 mA or less OFF current)
The rating of the voltage input: 26.4 V maximum rating, 10.8 V or less ON voltage, 0.6 mA or less OFF current
(Trigger input terminal: 26.4 V maximum rating, 10.8 V or less ON voltage, 1.0 mA or less OFF current)
*When mounting two heads, make sure that head A and B are of the same type. Measurement is not possible if two different types of heads are connected.

Sensor head

Model			LJ-G015K	LJ-G015	LJ-G030	LJ-G080	LJ-G200
Type			Specular reflective	Diffuse reflective			
Reference distance			15mm 0.59"		30 mm 1.18"	80 mm 3.15"	200 mm 7.87"
Measuring range	Z-axis (Height)		±2.3mm ±0.09"	±2.6mm 0.1"	±10 mm ±0.39"	±23 mm ±0.91"	±48 mm ±1.89"
	X-axis (Width)	Near	6.5mm 0.26"		20 mm 0.79"	25 mm 0.98"	51 mm 2.01"
		Reference distance	7.0mm 0.28"		22 mm 0.87"	32 mm 1.26"	62 mm 2.44"
		Far	7.5mm 0.30"		25 mm 1.98"	39 mm 1.54"	73 mm 2.87"
Light source			Red semiconductor laser				
		Wavelength	650 nm (Visible light), Class 2 (IEC), Class II (FDA)				
		Output	0.95 mW max.				
Spot diameter (at reference distance)			Approx. 32 µm x 12 mm 1.26 Mil x 0.47"		Approx. 40 µm x 25 mm 1.56 Mil x 0.98"	Approx. 80 µm x 46 mm 3.12 Mil x 1.81"	Approx. 180 µm x 70 mm 7.02 Mil x 2.76"
Repeatability [1.]		Z-axis (Height) [2.]	0.2 µm 0.007 Mil		1 µm 0.04 Mil	1 µm 0.04 Mil	2 µm 0.08 Mil
		X-axis (Width) [3.]	2.5 µm 0.10 Mil		5 µm 0.20 Mil	10 µm 0.39 Mil	20 µm 0.78 Mil
Linearity Z-axis (Height) [2.]			±0.1% of F.S.				
Sampling frequency (Trigger pitch) [4.]			3.8 ms				
Temperature characteristics			0.02% of F.S./°C				
Environmental resistance		Enclosure rating	IP67 (IEC60529)				
		Ambient illumination [5.]	Incandescent lamp or fluorescent lamp: 5,000 lux max.				
		Ambient temperature	0 to 50°C (32 to 122°F)				
		Relative humidity	35 to 85% (No condensation)				
		Vibration	10 to 55 Hz, multiple amplitude 1.5 mm 0.06", two hours in each direction of X, Y and Z				
Material			Aluminum				
Weight			Approx. 260 g		Approx. 290 g	Approx. 350 g	Approx. 480 g

1. The value obtained after 64 times Averaging at the reference distance.
2. The target is KEYENCE standard object. (White diffusing material). The value is the average of the widths in the Height mode.
3. The target is ø10 mm ø0.39" pin gauge. The value is the edge in the Position mode after 16 times of the Smoothing.
4. When the measuring range is the minimum in the initial setting and the smoothing is set to 1.
5. The illumination on the receiver of the sensor head when targeting an illuminated white paper.

Hardware environment for the LJ-H1W (LJ-Navigator)

	Hardware requirements
Item	Pentium III 400 MHz max.
CPU	Windows XP Professional Edition/Home Edition
Support OS	Windows 2000 Professional Windows 98SE Contact us for Windows Vista.
Memory capacity	128MB min.
Resolution of display	XGA (1024 x 768 pixels) min, 256 colors min.
Free disk space	30MB min.
Interface [1.]	USB2.0/1.1 [2.], Ethernet [3.], or RS-232C (serial port) should be featured.

1. One of the interfaces is selected for communication.
   Simultaneous communication is not available.
2. Connection via Hub is not guaranteed.
3. Connection to LAN and connection via a router are not guaranteed.
   Company names and product names in the table are registered trademarks or trademarks.

Cable between the sensor head and the controller

Model	LJ-GC2	LJ-GC5	LJ-GC10	LJ-GC20	LJ-GC30
Cable length	2 m 6.6'	5 m 16.4'	10 m 32.8'	20 m 65.6'	30 m 98.4'
Weight	Approx. 200 g	Approx. 400 g	Approx. 750 g	Approx. 1400 g	Approx. 2000 g

SENSOR HEADS

LJ-G15K

LJ-G015

LJ-G030

LJ-G080

LJ-G200

CONTROLLER

Controller
LJ-G5001(P)

Console (Optional)
OP-82125

Setting support software LJ-H1W

USB cable (Optional)
OP-66844

MONITOR

High-resolution monitor
CA-MP81

Monitor stand
OP-42278

CORD

Cable between the sensor head and the controller LJ-GC (2 m, 5 m, 10 m, 20 m, 30 m) (6.6', 16.4', 32.8', 65.6', 98.4')

Monitor cable 3 m 9.8'
OP-66842

Expansion cable 3 m 9.8'
OP-51657

Ethernet cable 3 m 9.8'
OP-66843

RS-232C communication cable
OP-26487 (2.5m 8.2")

communication cable 9-pin conversion connector
OP-26486

communication cable 25-pin conversion connector
OP-26485

OPTION

Memory card
NR-M1G :1GB

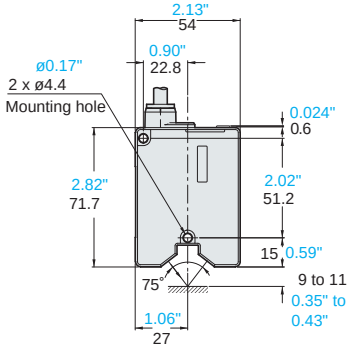
Memory card adaptor
C-A1

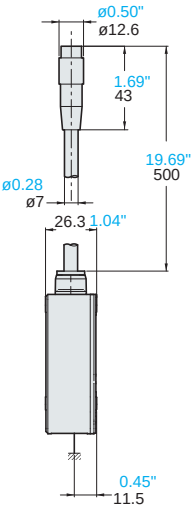
24VDC Power supply unit
CA-U3

DIMENSIONS

Unit: inch mm

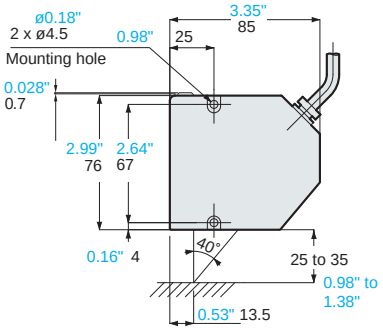
LK-G15/G10

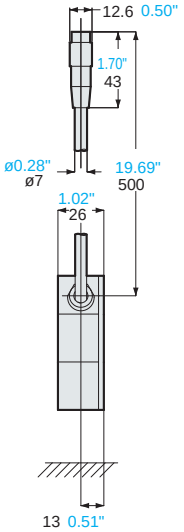




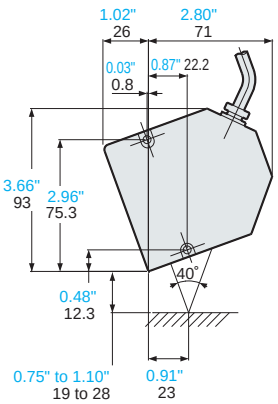
LK-G32/G37

Diffused reflection type mounting



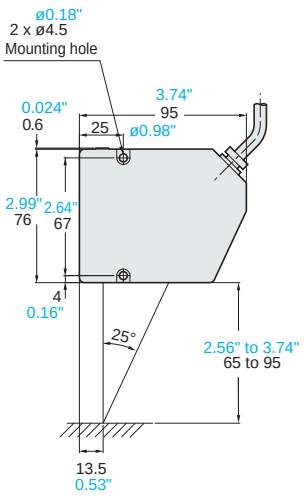


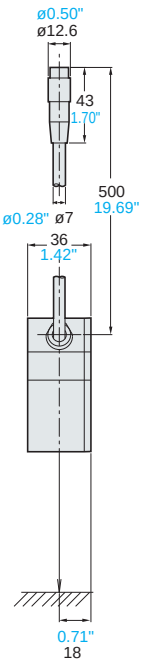
Specular reflection type mounting



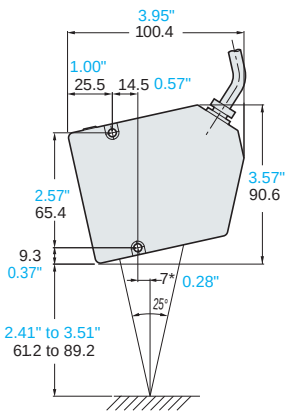
LK-G82/LK-G87

Diffused reflection type mounting





Specular reflection type mounting

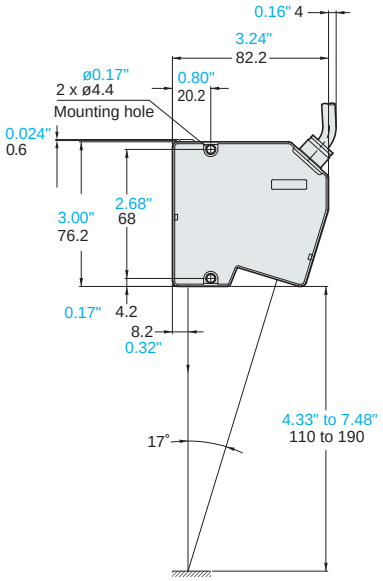


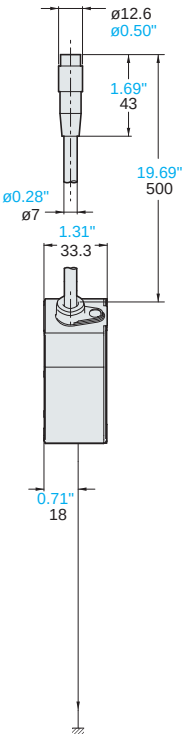
*Measurement reference position

Unit: inch mm

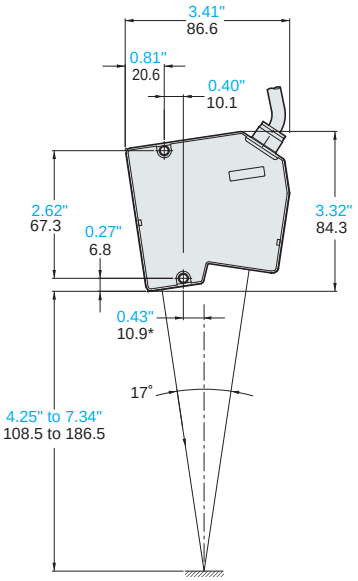
LK-G152/G157

Diffused reflection type mounting





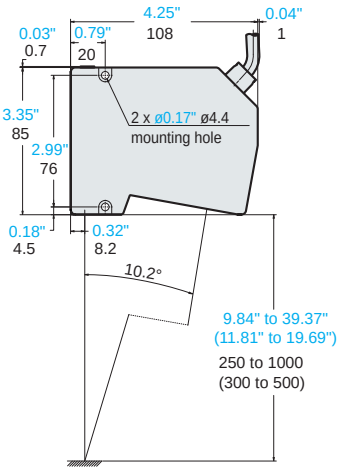
Specular reflection type mounting

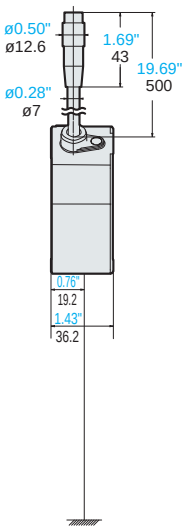


*Measurement reference position

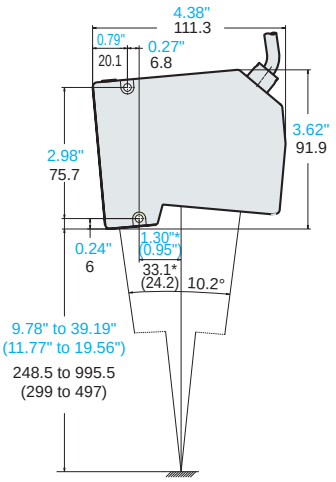
LK-G407/LK-G402/LK-G507/LK-G502
Data in ( ) applies to LK-G407/LK-G402

Diffused reflection type mounting



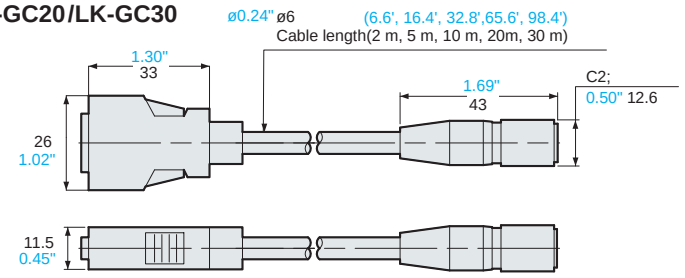


Specular reflection type mounting



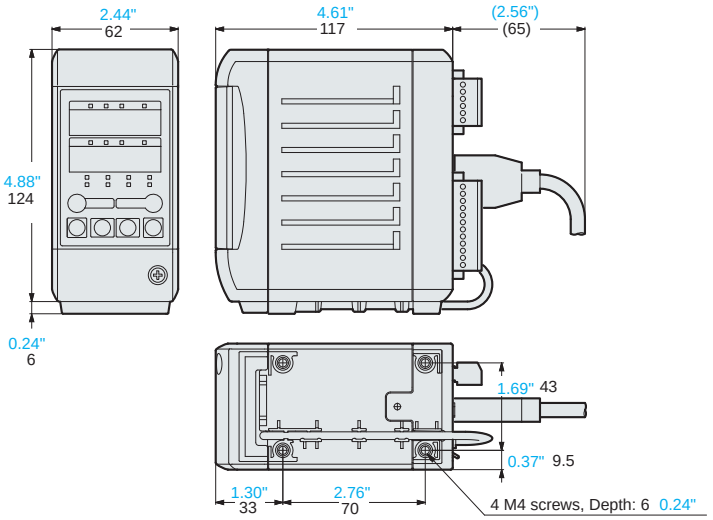
*Measurement reference position

LK-GC2/LK-GC5/LK-GC10/LK-GC20/LK-GC30

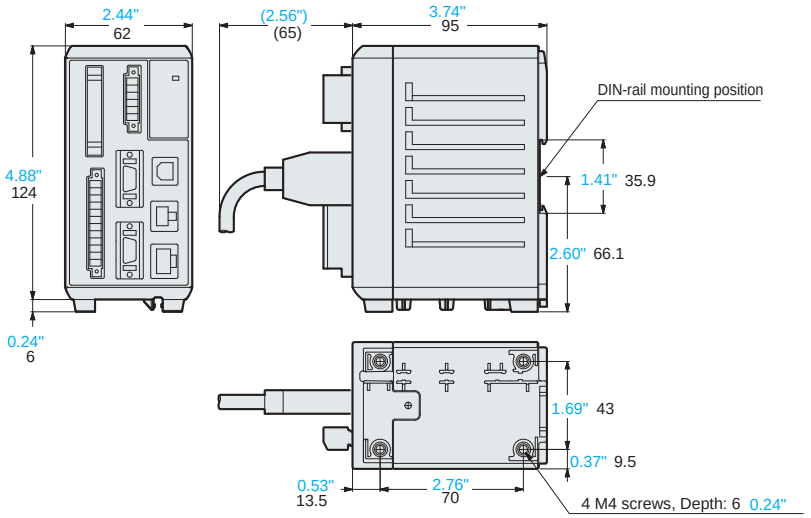


Unit: inch mm

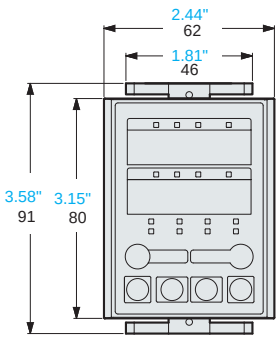
LK-G3001(P)V



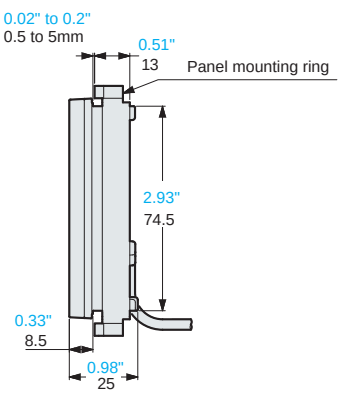
LK-G3001(P)



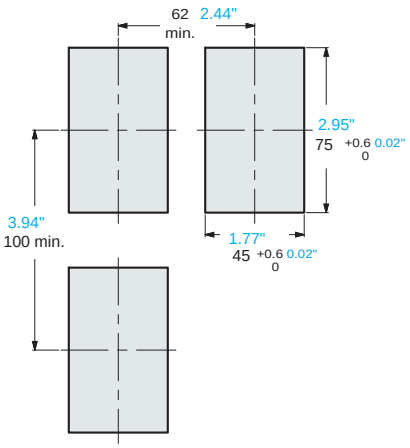
LK-GD500



Panel thickness



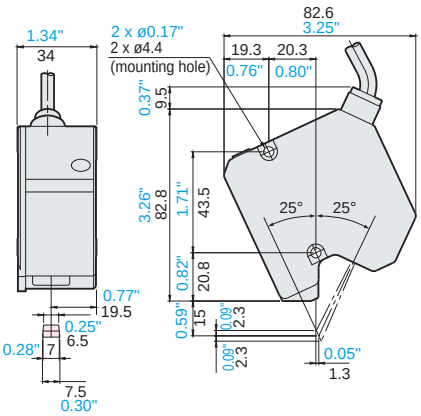
Panel cutout dimensions



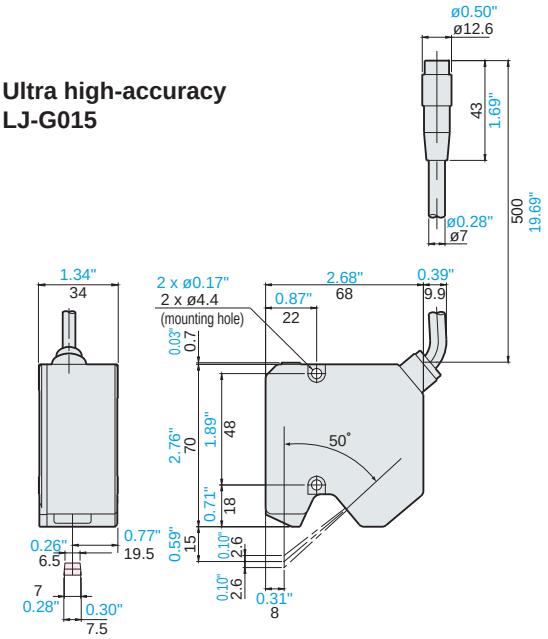
DIMENSIONS

Unit: inch mm

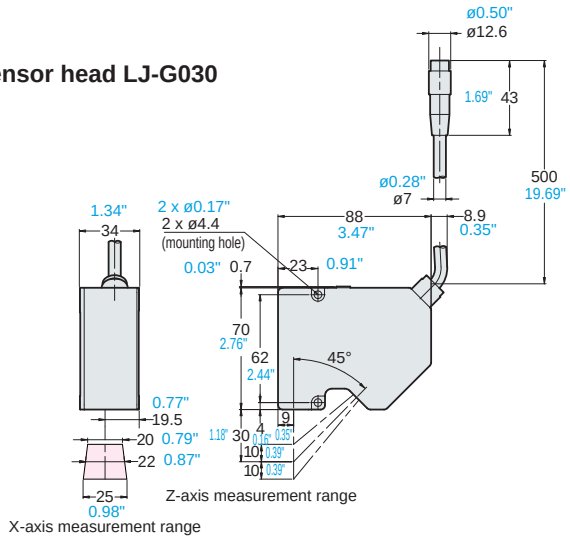
Ultra high-accuracy specular reflection
LJ-G015K



Ultra high-accuracy
LJ-G015



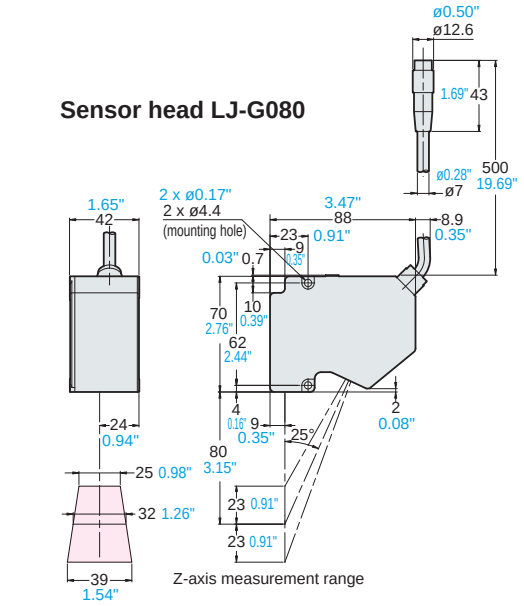
Sensor head LJ-G030



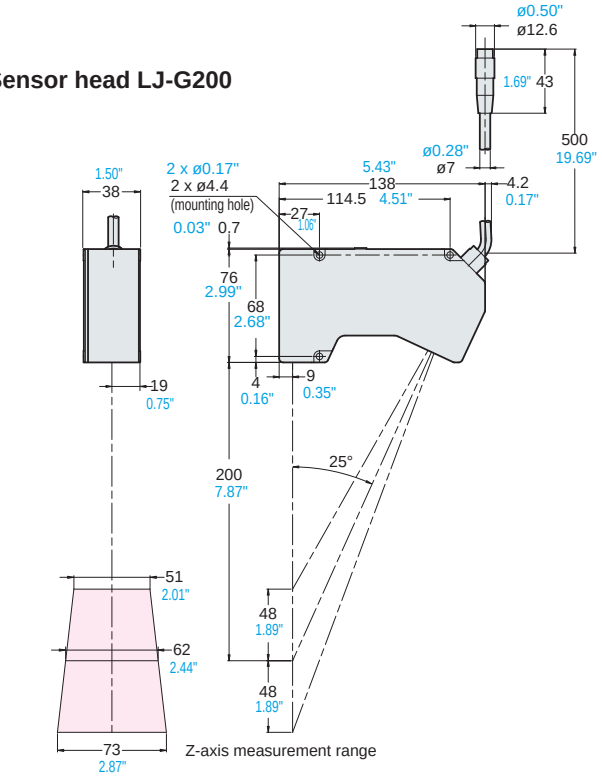
DIMENSIONS

Unit: inch mm

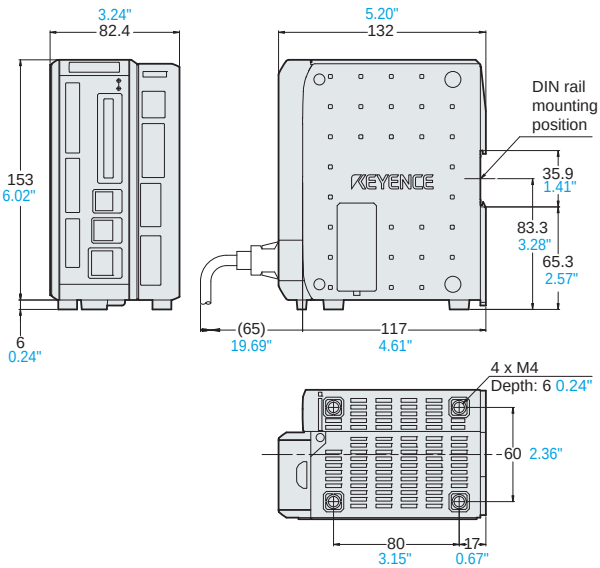
Sensor head LJ-G080



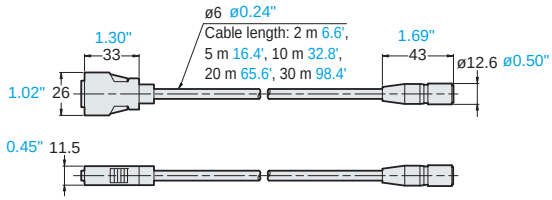
Sensor head LJ-G200



Controller LJ-G5001(P)



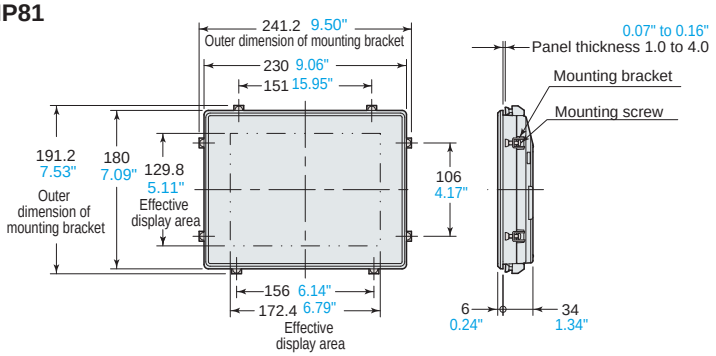
Cable between the sensor head and the controller



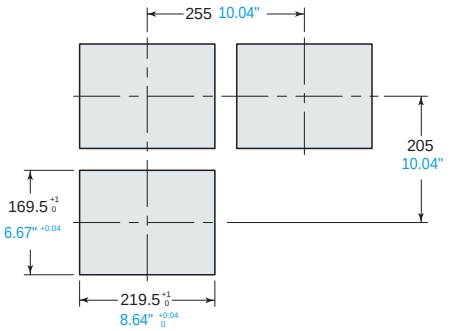
DIMENSIONS

Unit: inch mm

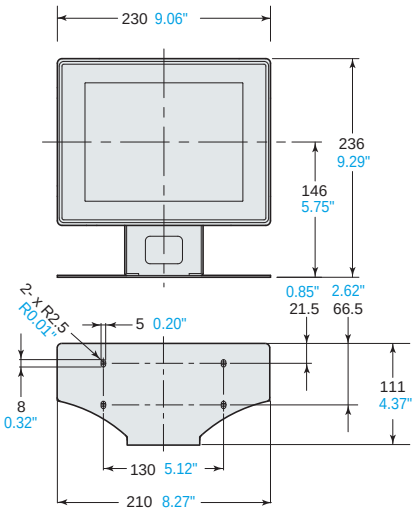
LCD monitor
CA-MP81

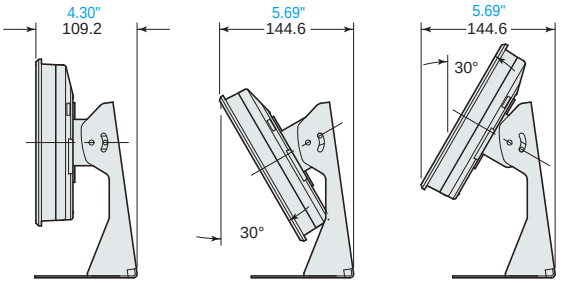


Panel cutout dimensions



Stand
OP-42278





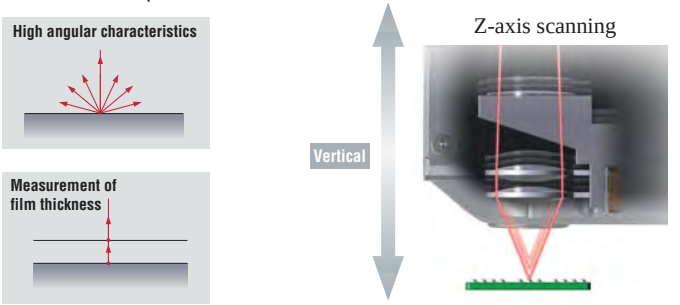
Surface Scanning Laser Confocal Displacement Meter

LT-9000 Series

- Surface scanning method for a variety of high accuracy measurements
- Multiple measurement modes
- 0.01 μm 0.0004 Mil resolution is 10 times higher than conventional models

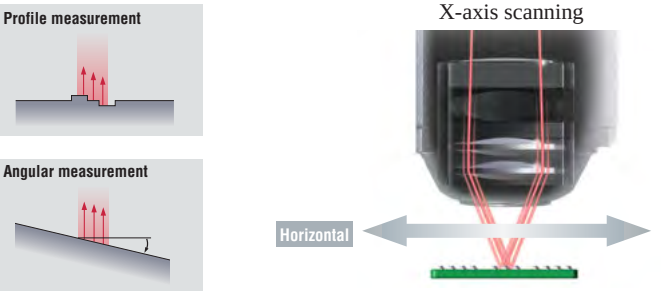
Excellent resolution of 0.0004 Mil (0.01 μm) for high-accuracy applications

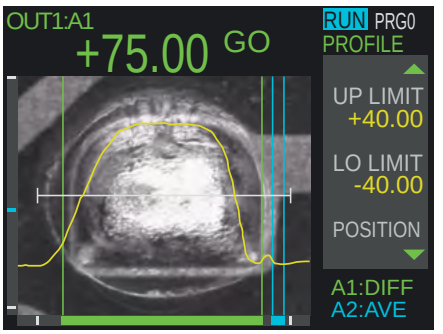
The coaxial optical system improves measurement performance



New wide scanning feature increases measurement stability and versatility

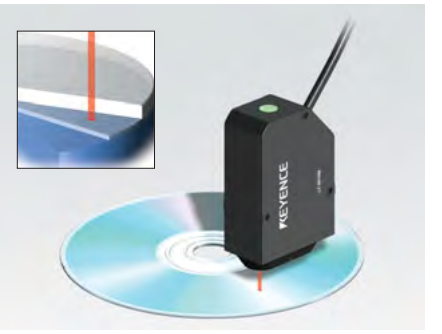
Wide scanning enables various measurements





Measuring the profile of solder paste on a PWB

Engraved mark



Measuring the thickness of an optical disc

Specifications are subject to change without notice.

KEYENCE

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KA1-0087