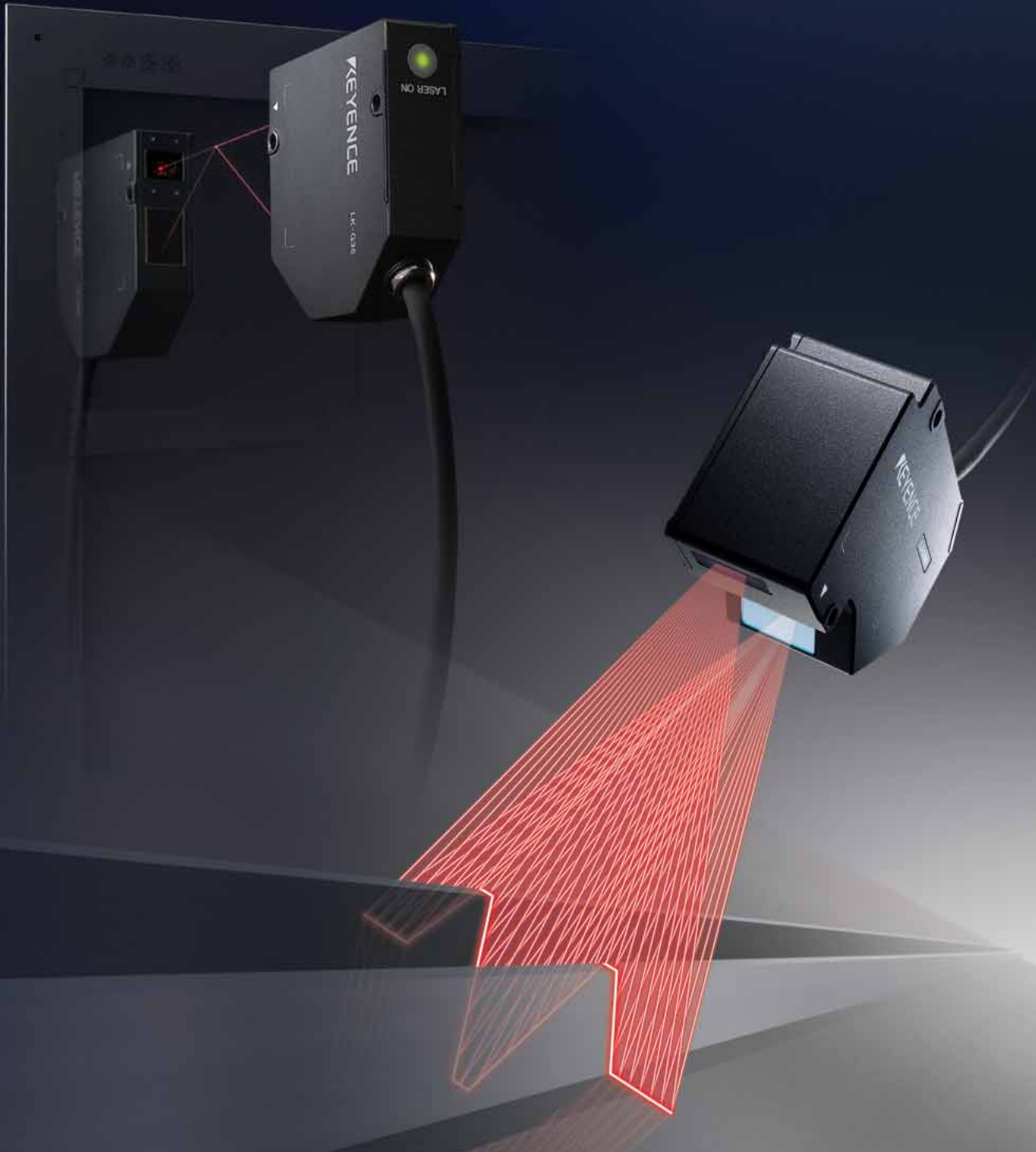




NEW High-speed, High-accuracy 1D/2D
Laser Displacement Sensor
LK-G/LJ-G Series



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



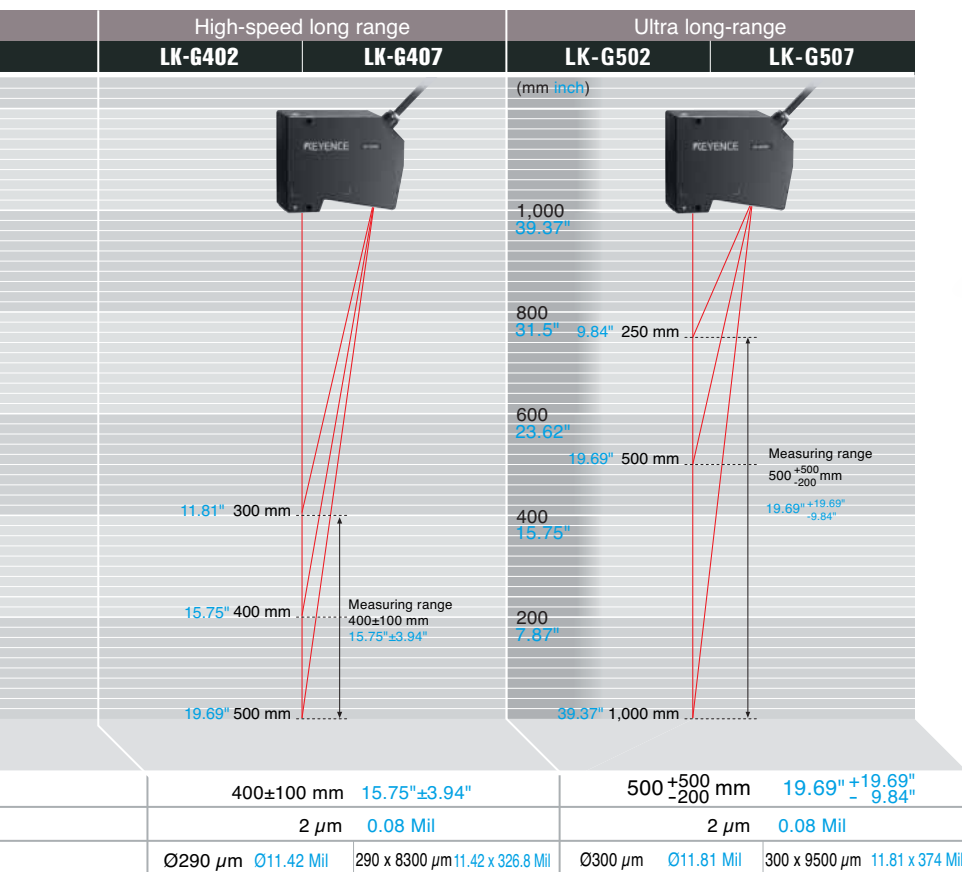


LK-G SERIES SELECTION GUIDE

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	
(mm inch)									
500 19.69"									
400 15.75"									
300 11.81"									
200 7.87"									
100 3.94"									
0									
Measuring range	10±1 mm	0.39"±0.04"	30±5 mm	1.18"±0.2"	80±15 mm	3.15"±0.59"	150±40 mm	5.91"±1.57"	
Repeatability	0.01 μm	0.0004 Mil	0.05 μm	0.002 Mil	0.2 μm	0.008 Mil	0.5 μm	0.02 Mil	
Spot shape	Ø20 μm Ø0.79 Mil	20 x 500 μm 0.79 x 19.69 Mil	Ø30 μm Ø1.18 Mil	30 x 850 μm 1.18 x 33.46 Mil	Ø70 μm Ø2.76 Mil	70 x 1100 μm 2.76 x 43.31 Mil	Ø120 μm Ø4.72 Mil	120 x 1700 μm 4.72 x 66.93 Mil	

LJ-G SERIES SELECTION GUIDE

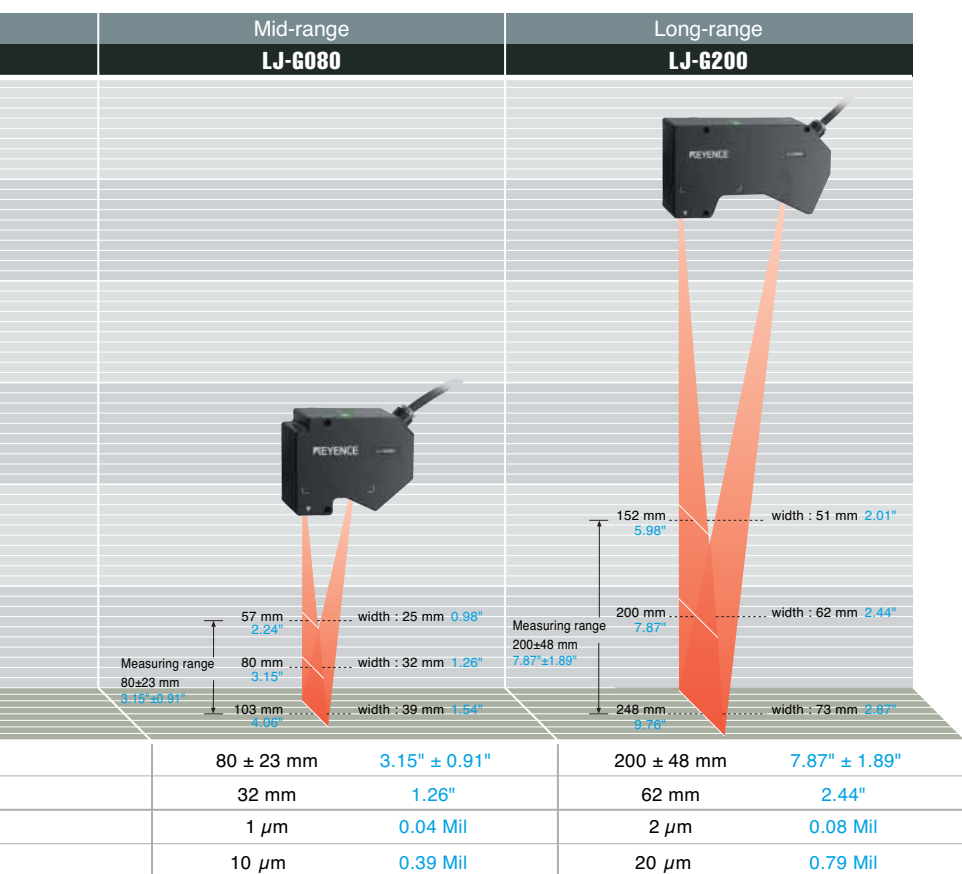
Type	Ultra high-accuracy regular reflection		Ultra high-accuracy		High-accuracy		
Model	LJ-G015K		LJ-G015		LJ-G030		
(mm inch)							
250 9.84"							
200 7.87"							
150 5.91"							
100 3.94"							
50 1.97"							
Measuring range	Z axis	15 ± 2.3 mm 0.59 ± 0.09"	Z axis	15 ± 2.6 mm 0.59 ± 0.1"	Z axis	30 ± 10 mm 1.18 ± 0.39"	
	X axis	7 mm 0.28"	X axis	7 mm 0.28"	X axis	22 mm 0.87"	
Repeatability	Z axis	0.2 μm 0.008 Mil	Z axis	0.2 μm 0.008 Mil	Z axis	1 μm 0.04 Mil	
	X axis	2.5 μm 0.1 Mil	X axis	2.5 μm 0.1 Mil	X axis	5 μm 0.2 Mil	



Controllers

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

LK-G SERIES



Controllers

Standard type	LJ-G5001
PNP output type	LJ-G5001P

Monitor

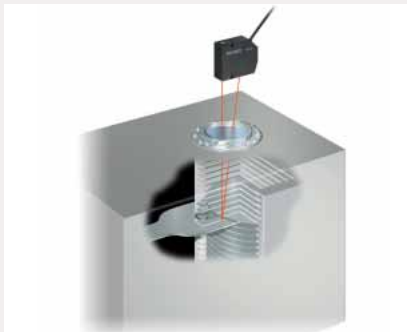
8.4-inch LCD monitor	CA-MP81
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LJ-G SERIES

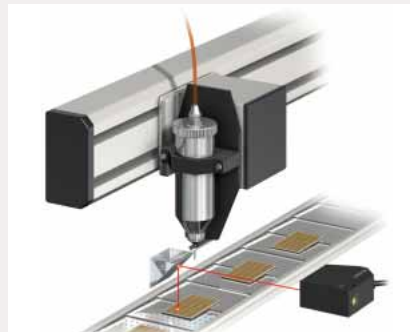
SUCCESSFUL APPLICATIONS



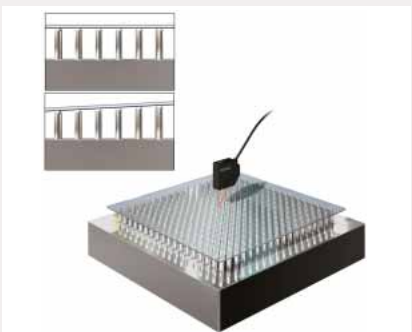
Measuring the thickness of a silicon wafer



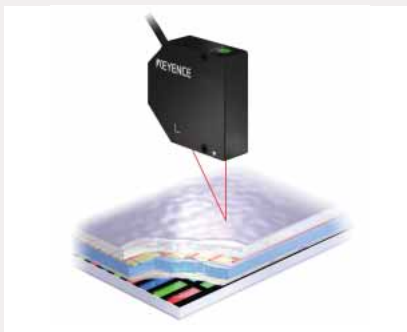
Checking robotic arm position through a view port



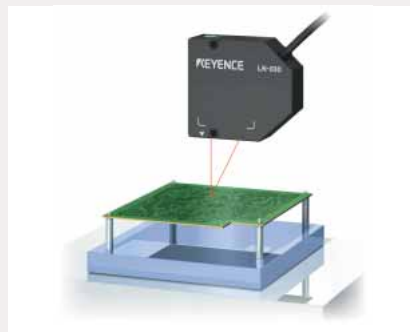
Controlling the nozzle height of a dispenser



Measuring pin height through a glass plate



Measuring the swell of liquid crystal glass



Measuring the warpage of a substrate

SEMICONDUCTOR/LCD

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



Flatness of a wafer polishing machine



Measuring the profile/height of cream solder



ELECTRONIC PARTS



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



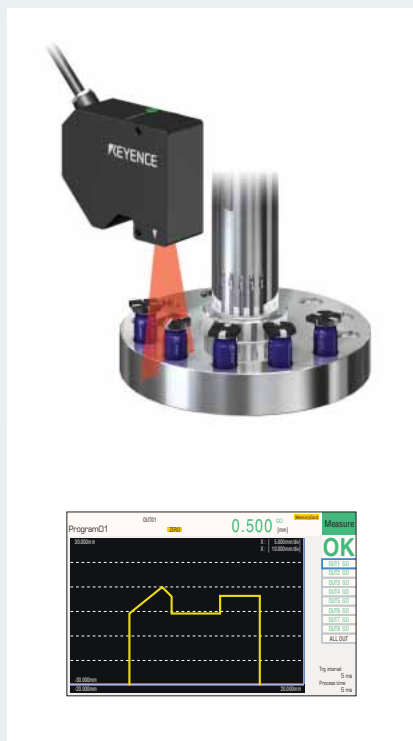
Measuring the vibration of a motor shaft



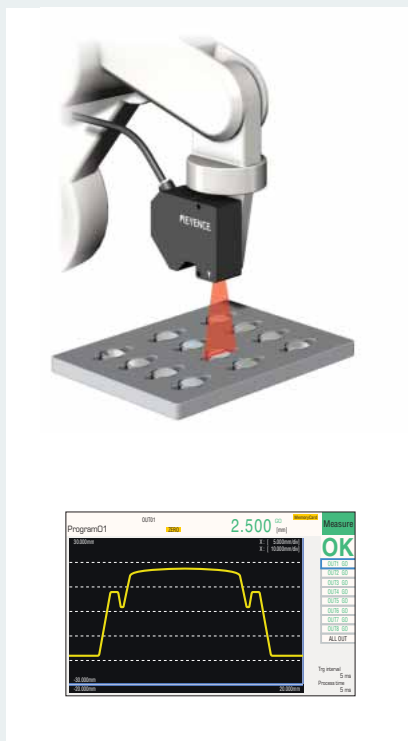
Measuring runout of a polygon mirror

ELECTRONIC PARTS

Measuring warpage of a condenser terminal



Measuring the profile of a lithium coin battery



Measuring step height on a mobile phone

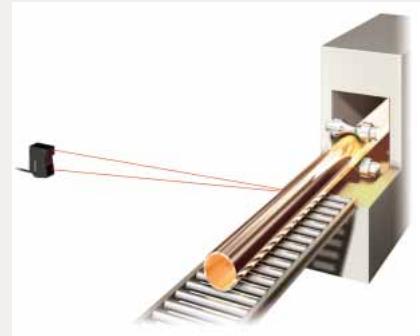




Measuring height of an air suspension vehicle



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

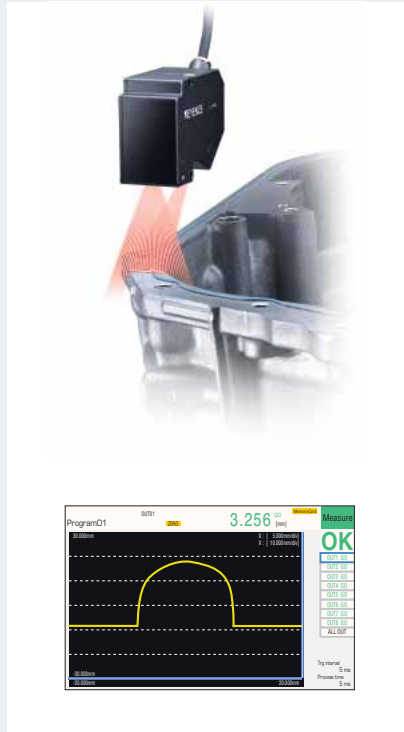
AUTOMOTIVE

METAL

Checking the assembly accuracy of an auto body



Sealant bead height, width and area measurement



Position feedback in an automated welding operation

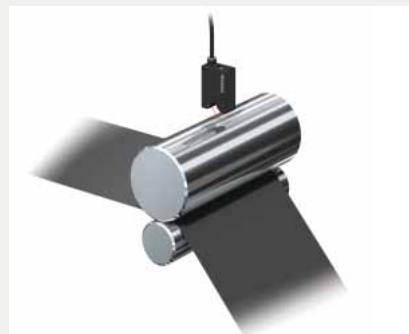




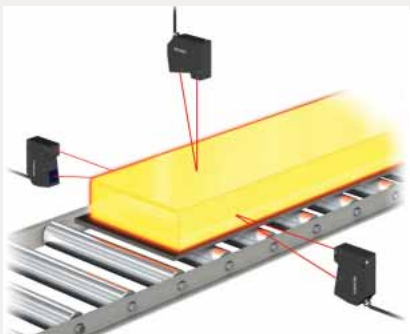
Monitoring free loop control



Thickness measurement/loop control of a rubber sheet



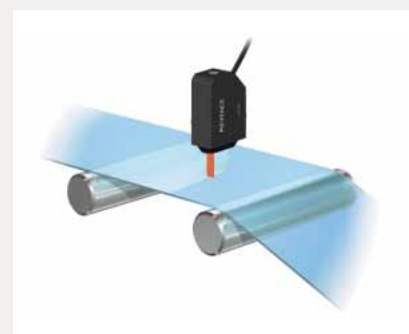
Eccentricity of a high-accuracy roller



Measuring the width/bulging of slab material



Measuring the surface profile of a tire



Measuring the thickness of transparent film

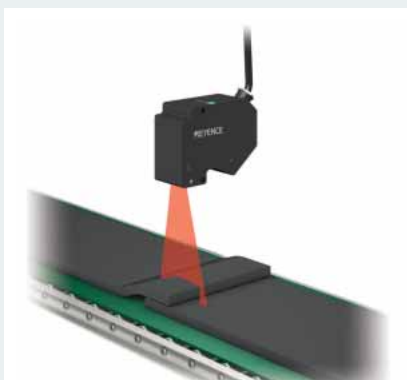
METAL

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



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.



10 mm 0.39"
0.01 μm 0.0004 Mil



30 mm 1.18"
0.05 μm 0.002 Mil



Advanced specifications

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



Ultra high speed sampling

50 kHz

Highest accuracy in the industry

0.02%

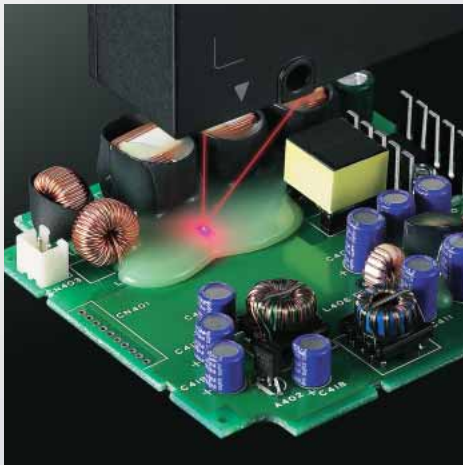
Highest repeatability in its class

0.01 μm
(0.0004 Mil)

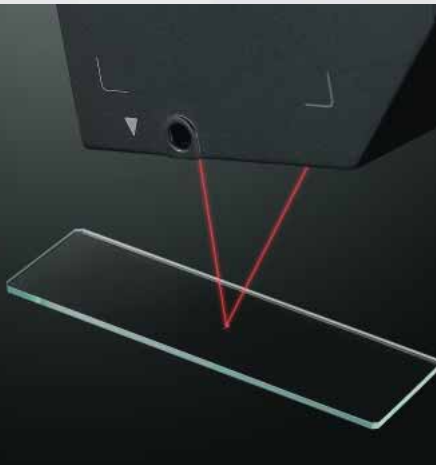


Newly-developed algorithms

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



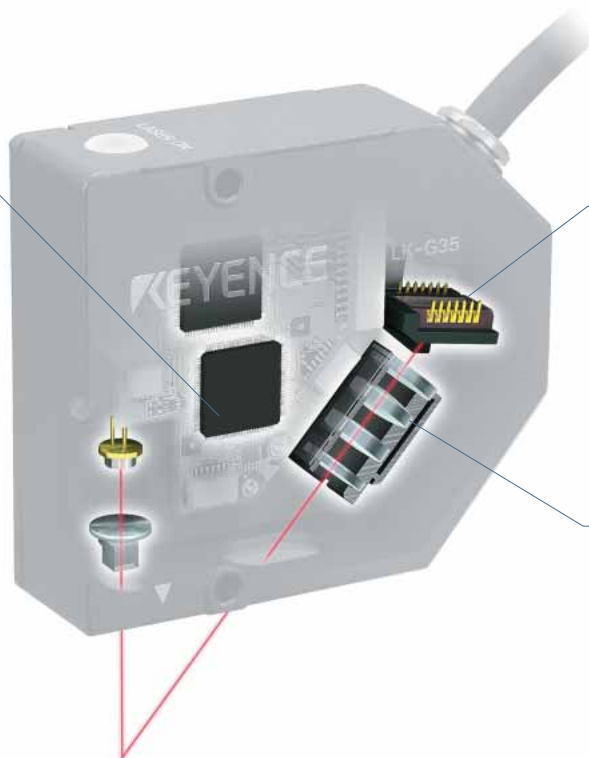
MRC algorithm
Multiple reflections

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

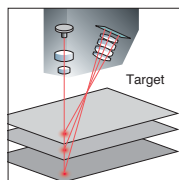
The high-accuracy Ernstar lenses integrated with the sensor head achieves highly accurate and highly stable measurements.

LI-CCD*

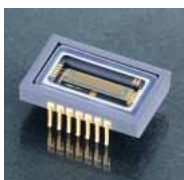
Errors in pixel edges are reduced to achieve accuracy that is two times greater than conventional models.

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.

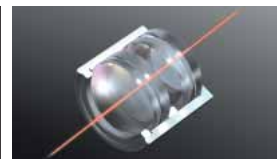
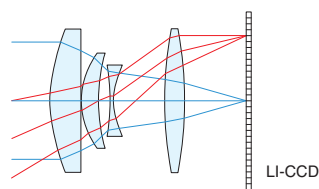


HIGH ACCURACY LENS UNIT

Reducing errors caused by aberrations

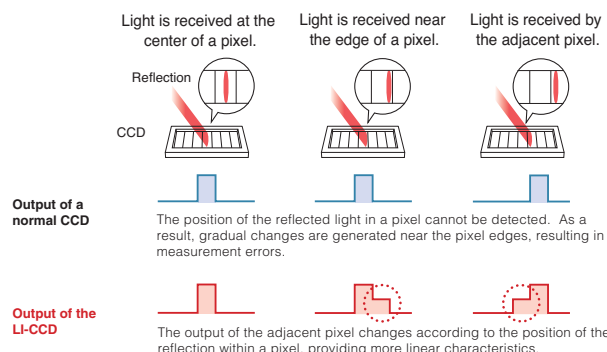
KEYENCE has designed a new light-receiving unit for concentrating reflected light onto the LI-CCD. The newly-developed, high-accuracy Ernstar lens drastically reduce spot distortion caused by aberrations. In addition, a special die-cast housing integrating the sensor head with the lenses is employed,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

High-accuracy Ernstar lens



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.

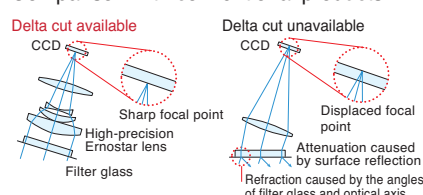
Principle of the LI-CCD that achieves high-accuracy measurements



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.

Comparison with conventional products



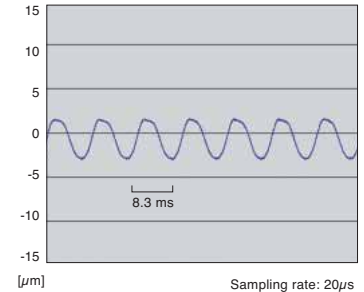
*LK-G157/G407/G507 Series

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.



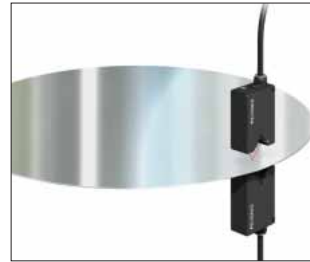
Detecting the runout of a HDD



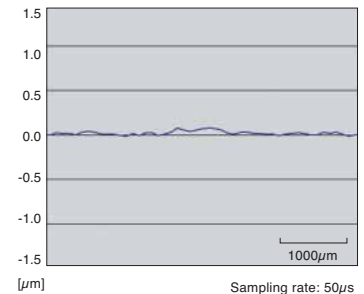
Best in the industry

HIGH-ACCURACY OF $\pm 0.02\%$

KEYENCE has redesigned the optical system in order to achieve high-accuracy measurement. Incorporating Ernstar 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

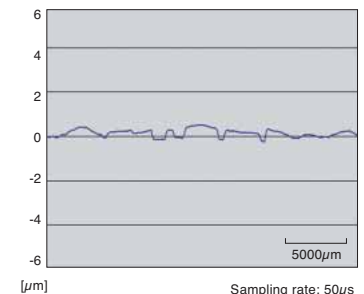


HIGH REPEATABILITY OF 0.0004 Mil (0.01 μm)

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



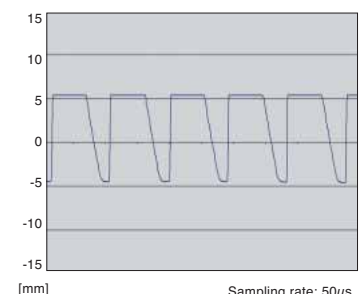
1.5 times of conventional models

LONG RANGE MEASUREMENT OF 39.37" (1000 mm)

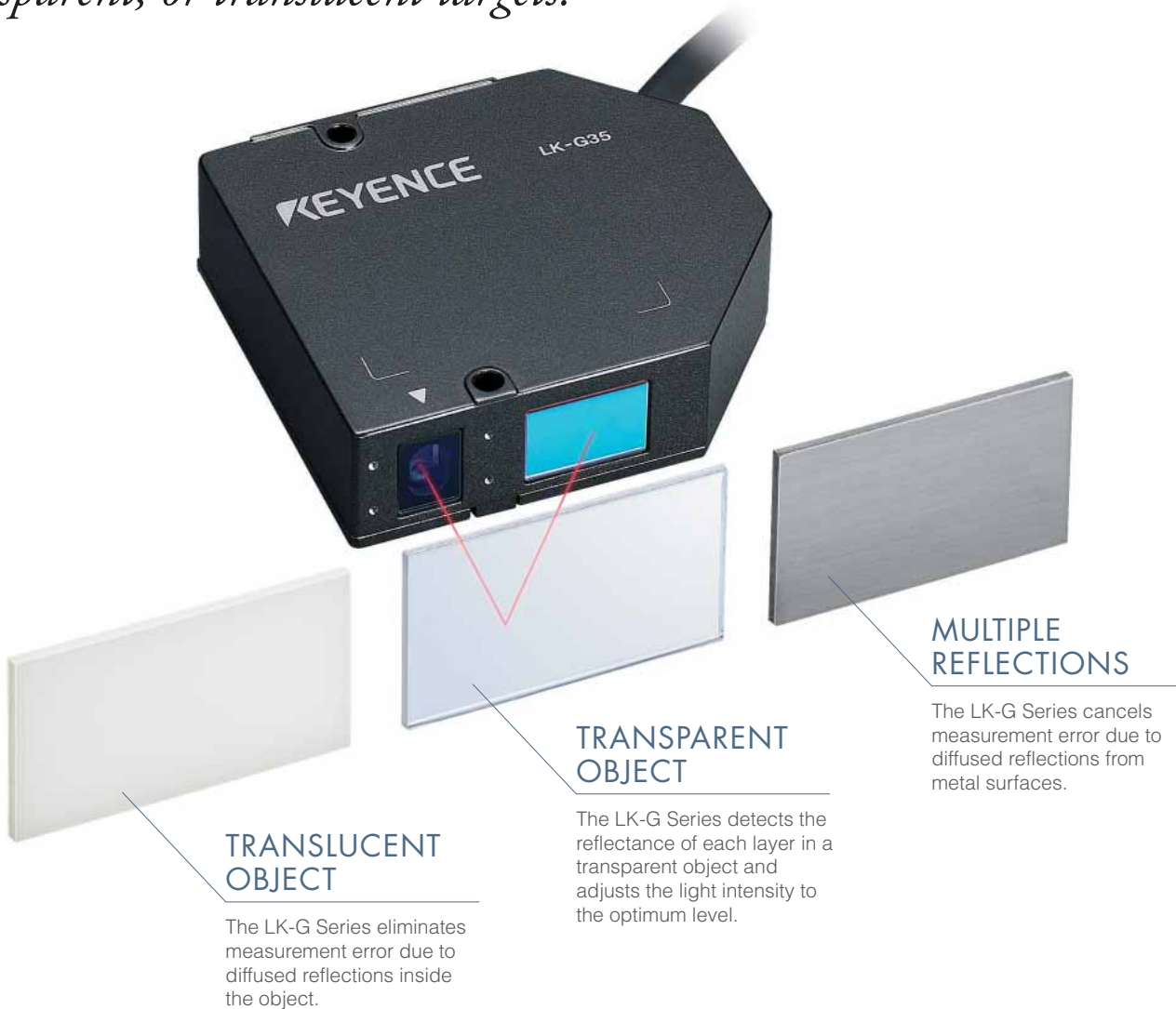
Delta cut technology realizes high-accuracy measurement at a long detecting distance that is difficult with conventional models. Six sensor head models meet a surprisingly wide measuring range from 0.98" (9 mm) to 39.37" (1000 mm) and a broad range of needs.



Measuring the shape of a tire



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



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.

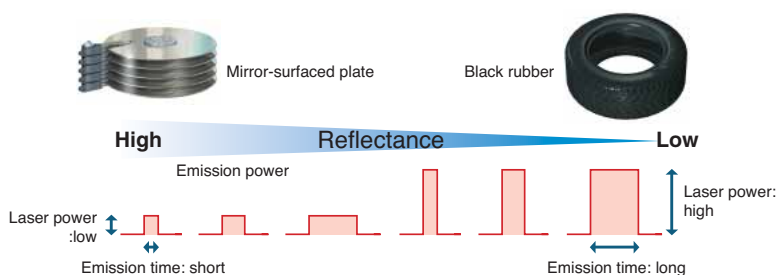
Up to 90 times the adjustment range of conventional models

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

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

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

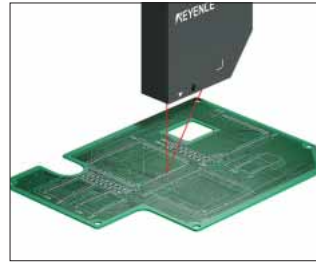
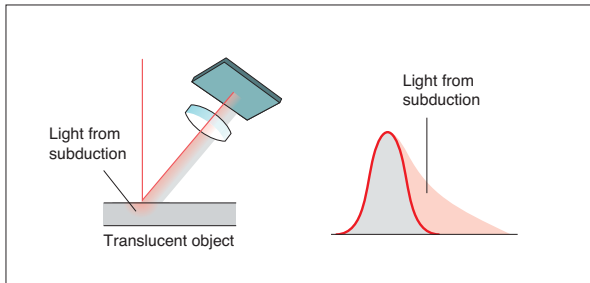
The shift of laser emission time and laser power with a target



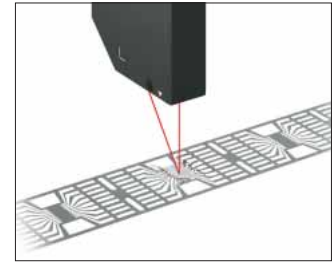
The newly-developed algorithms support various applications

RPD* ALGORITHM

*RPD=Real Peak Detect



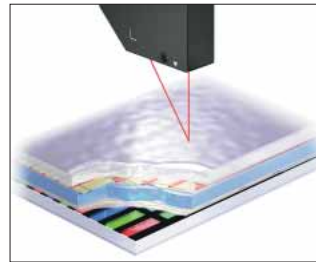
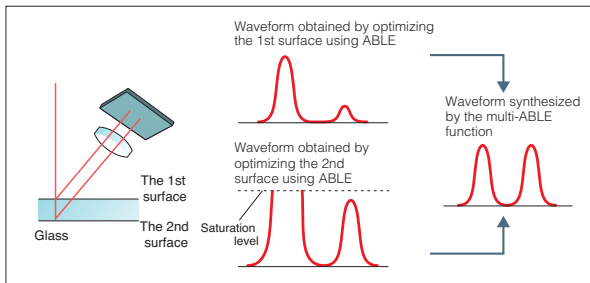
Measuring the warpage of a PCB



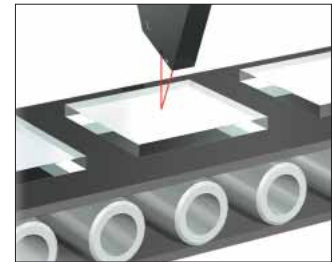
Measuring the profile of an IC plastic mold

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).

MULTI-ABLE CONTROL



Measuring the swell of liquid crystal glass

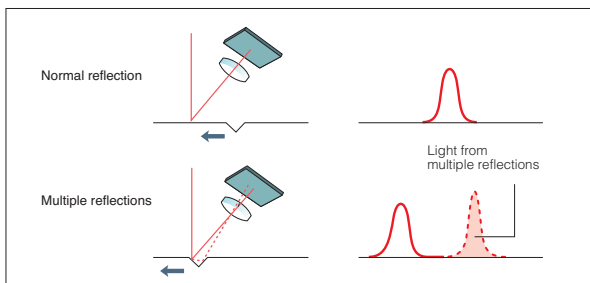


Measuring the thickness of a glass plate

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.

MRC* ALGORITHM

*MRC=Multiple Reflection Cancel



Measuring the shape of BGA

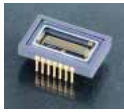


Measuring the surface profile of a gear

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".

Advanced components provide superior measurements

CCD LIGHT RECEIVING ELEMENT



The wide CCD increases measurement stability.

CYLINDRICAL LENS



Special lens widens the beam spot.

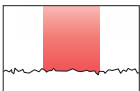
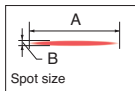
FLEXIBLE CABLE

Can be attached to movable parts.

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

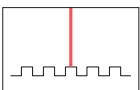
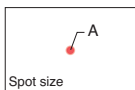


Diffused reflections caused by surface irregularities of a rough-surfaced target are averaged, preventing data fluctuations.

Position Thickness Length Vibration

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

SMALL SPOT TYPE



The ultra-small spot of 1.17 Mil (30 μm) 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	Ø20 μm	Ø30 μm	Ø70 μm	Ø120 μm	Ø290 μm	Ø300 μm

FIELD PROVEN DESIGN CONCEPTS

IP67 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.

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*.



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

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

MULTIPLE I/O REQUIRES NO OPTICAL PARTS

USB

RS-232C

Binary

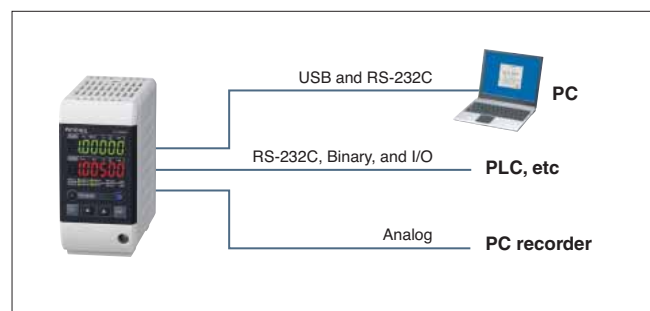
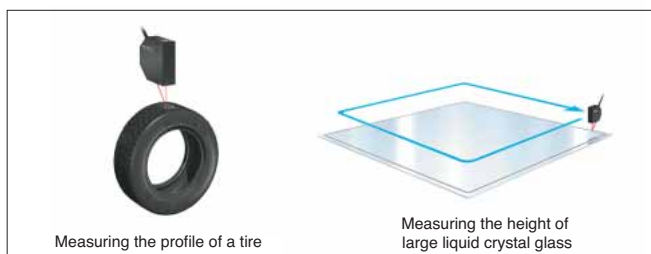
I/O

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)

DATA STORAGE FUNCTION

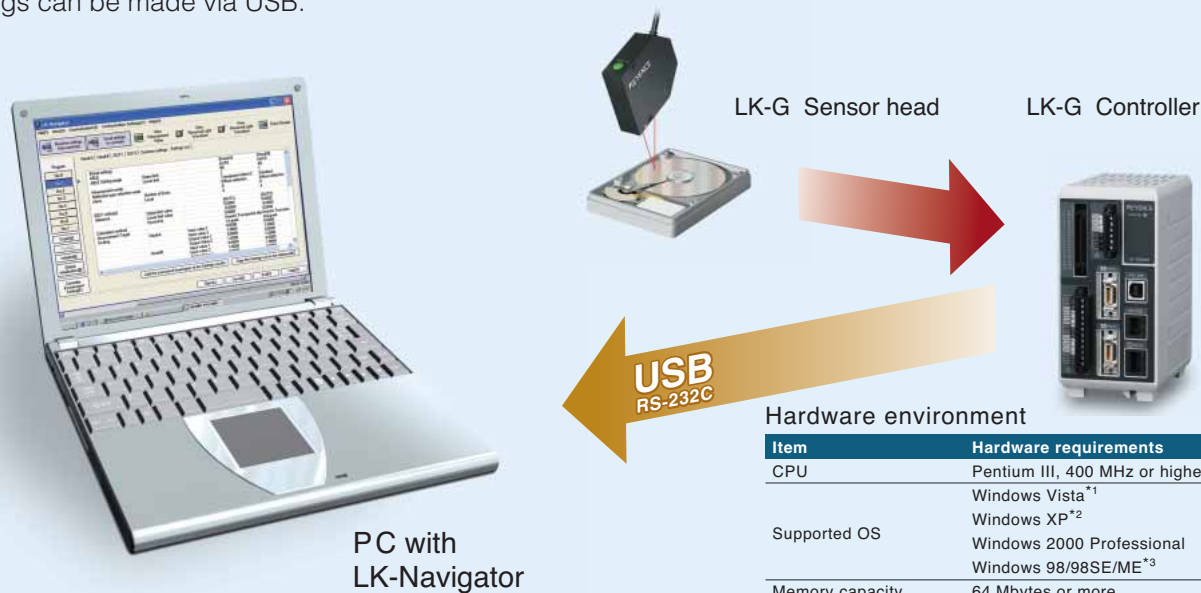
65,000-point memory is integrated internally in order to store the 50 kHz ultra-high-speed sampling data. Sometimes, it becomes necessary to analyze measurement data from a target moving at high speed. In this case, high-speed processing of all data items is enabled by temporarily storing the data to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



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, 400 MHz or higher
Supported OS	Windows Vista*1
	Windows XP*2
	Windows 2000 Professional
	Windows 98/98SE/ME*3
Memory capacity	64 Mbytes or more
Display resolution	800 x 600 pixels, 256 colors or more
Free space on hard disk	10 Mbytes or more
Interface	RS-232C (serial port) or
	USB (version 1.1 onward) must be installed.

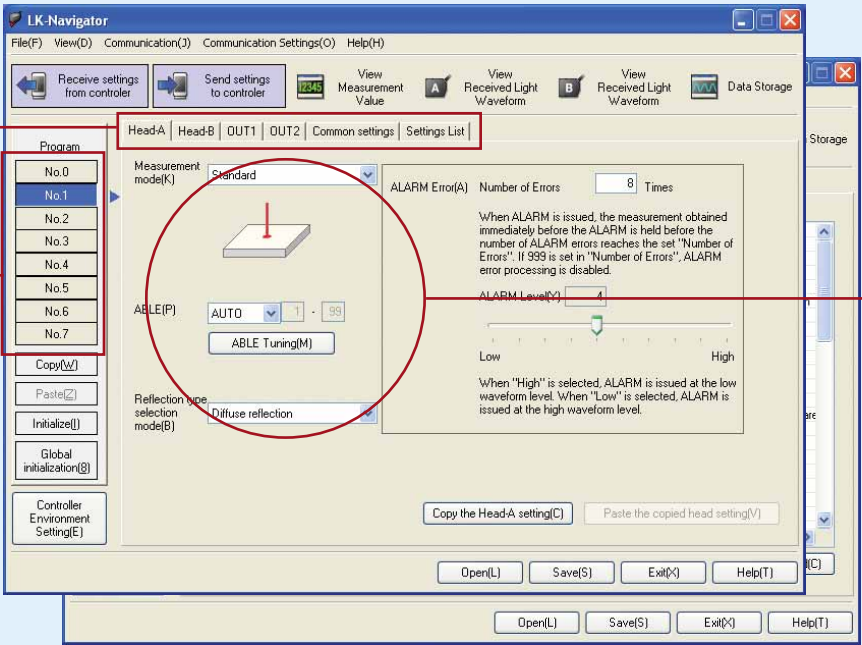
- *1 Ultimate, Business, Home Premium, and Home Basic editions each are supported for Windows Vista ver. 1.5 or later.
- *2 Professional and Home Edition editions each are supported.
- *3 For Windows 98/98SE/Me, Ver. 1.4 or older is supported.
- Windows is a registered trademark of Microsoft Corporation 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
Menu

Quick set-up
8 programs



Quick set-up
detecting mode

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

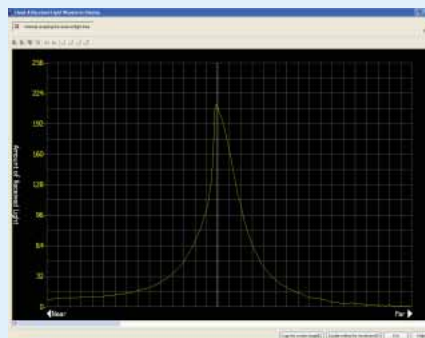
Display of received-light waveform

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.

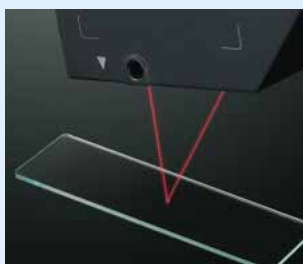
TRANSLUCENT TARGET



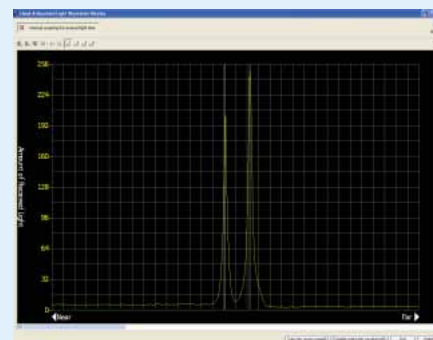
Height measurement of PCB resin



TRANSPARENT TARGET

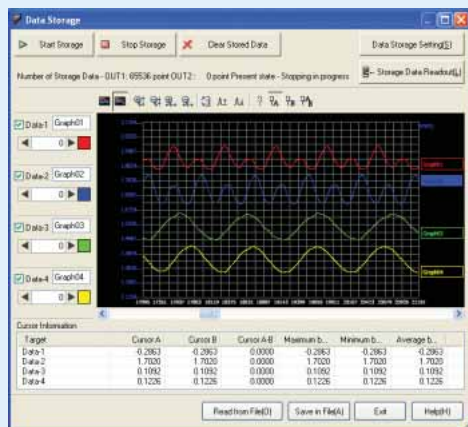


Thickness measurement of glass plate



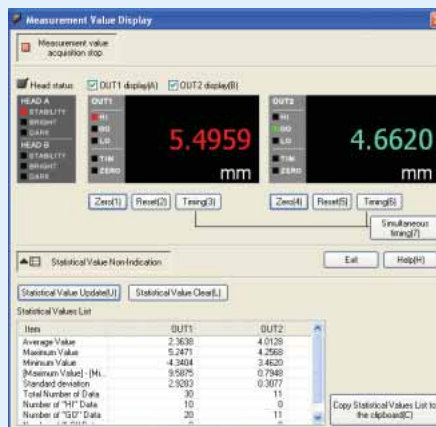
DATA STORAGE FUNCTION

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

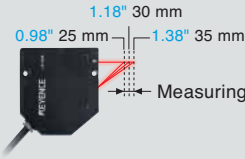
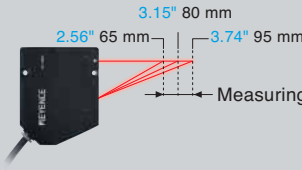
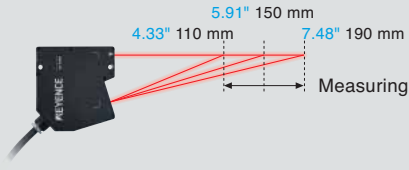
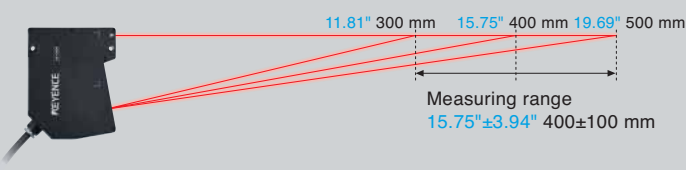
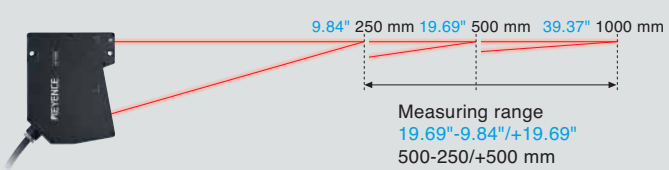
The controller's display can be reproduced on a PC. The measurement condition can be monitored in real time while configuring the settings. Using the statistic function allows the user to check the status of the system.



Measurement data and statistics for both outputs 1 and 2

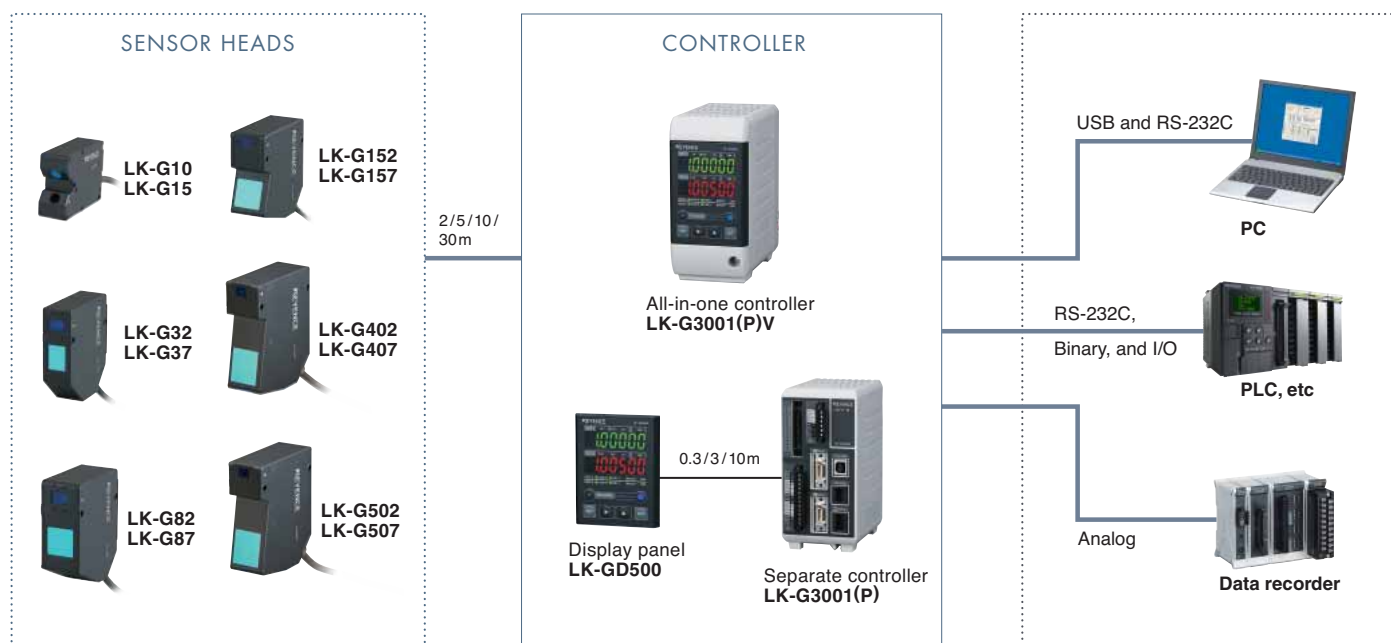
SELECTION GUIDE

Sensor Heads

TYPE		MODEL	MEASURING RANGE	REPEATABILITY	SPOT DIAMETER
Super Precision	Small spot	LK-G10	 0.39" 10 mm Measuring range 0.39"±0.04" 10±1 mm	0.0004 Mil 0.01 µm	Ø0.79 Mil Ø20 µm
	Wide beam	LK-G15			0.79x19.69 Mil 20x500 µm
High Accuracy	Small spot	LK-G32	 1.18" 30 mm 0.98" 25 mm 1.38" 35 mm Measuring range 1.18"±0.2" 30±5 mm	0.002 Mil 0.05 µm	Ø1.18 Mil Ø30 µm
	Wide beam	LK-G37			1.18x33.46 Mil 30x850 µm
Multi-Purpose	Small spot	LK-G82	 3.15" 80 mm 2.56" 65 mm 3.74" 95 mm Measuring range 3.15"±0.59" 80±15 mm	0.008 Mil 0.2 µm	Ø2.76 Mil Ø70 µm
	Wide beam	LK-G87			2.76x43.31 Mil 70x1100 µm
Long Distance	Small spot	LK-G152	 5.91" 150 mm 4.33" 110 mm 7.48" 190 mm Measuring range 5.91"±1.57" 150±40 mm	0.02 Mil 0.5 µm	Ø4.72 Mil Ø120 µm
	Wide beam	LK-G157			4.72x66.93 Mil 120x1700 µm
High-speed Long Distance	Small spot	LK-G402	 11.81" 300 mm 15.75" 400 mm 19.69" 500 mm Measuring range 15.75"±3.94" 400±100 mm	0.08 Mil 2 µm	Ø11.42 Mil Ø290 µm
	Wide beam	LK-G407			11.42x326.8 Mil 290x8300 µm
Ultra Long Distance	Small spot	LK-G502	 9.84" 250 mm 19.69" 500 mm 39.37" 1000 mm Measuring range 19.69"-9.84"/+19.69" 500-250/+500 mm	0.08 Mil 2 µm	Ø11.81 Mil Ø300 µm
	Wide beam	LK-G507			11.81x374 Mil 300x9500 µm

Controllers

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



SPECIFICATION



Controller

Type		All-in-one model	Separate monitor model ¹
Model	NPN	LK-G3001V	LK-G3001/LK-GD500
	PNP	LK-G3001PV	LK-G3001P/LK-GD500
Display	Head compatibility	All LK-G sensor heads are compatible	
	Number of connectable sensors	Maximum of 2 units	
	Minimum display unit	0.01 μm 0.0004 Mil	
	Display range	$\pm 9,999.99$ mm to $\pm 9,999.99$ μm (Selectable from six levels)	
Terminal block	Refresh rate	10 times/sec	
	Analog voltage output	± 10 V x 2 outputs, output impedance: 100 Ω	
	Analog current output	4 to 20 mA x 2 outputs, maximum load resistance: 350 Ω	
	Timing/Reset/Auto-zero input	For OUT1, non-voltage or voltage input ³	
Expansion connector	Laser remote interlock input	Non-voltage input ³	
	Comparator output	For OUT1, NPN or PNP open-collector output ²	
	Alarm output	For OUT1, NPN or PNP open-collector output ² (N.C.)	
	Timing/Reset/Auto-zero input	For OUT2, non-voltage or voltage input ³	
Binary	Program switching input	Non-voltage or voltage input ³ x 3 inputs	
	Laser-Off input	For Head A/Head B, non-voltage or voltage input ³	
	Comparator output	For OUT2, NPN or PNP open-collector output ²	
	Alarm output	For OUT2, NPN or PNP open-collector output ² (N.C.)	
Expansion connector	Binary output	Measured data output (21 bits), OUT1/OUT2 selectable, NPN or PNP open-collector output ²	
	Strobe output	NPN or PNP open-collector output ²	
	Binary selector output	NPN or PNP open-collector output ²	
	Binary selector input	Non-voltage or voltage input ³	
RS-232C interface		Measured data output and control input/output (Maximum baud rate: 115,200 bps, 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, Connection of setting support software, Selectable head-mounting, etc.	
Power supply voltage		24 VDC $\pm 10\%$, 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, No condensation	
Relative humidity		35 to 85%, No condensation	
Weight		Approx. 480 g (LK-G3001V/G3001PV), Approx. 370 g (LK-G3001P/G3001P), Approx. 60 g (LK-GD500)	

1. LK-G3001(P) can be operated singly. 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. (40 V max.), residual voltage of 0.5 V max. The rating of the PNP open collector: 50 mA max. (30 V max.), residual voltage of 0.5 V max.

3. (NPN model) The rating of non-voltage input: 1 V or less ON voltage, 0.6 mA or less OFF current. (PNP model) The rating of voltage input: 10.2 V or more ON voltage (26.4 V max.) 0.6 mA or less OFF current.

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	Wavelength	Red semiconductor laser	
	Laser Class	650 nm (visible light) Class II (FDA CDRH 21CFR PART1040.10)	650 nm (visible light) Class II (FDA CDRH 21CFR PART1040.10)
	Output	0.3 mW	0.95 mW
Spot diameter (at reference distance)		Approx. 0.79 x 20 Mil 20 x 500 μm (G15), Approx. ø0.79 Mil ø20 μm (G10)	Approx. 1.18 x 33.46 Mil 30 x 850 μm (G37), Approx. ø1.18 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	Enclosure rating	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	Wavelength	Red semiconductor laser	
	Laser Class	650 nm (visible light) Class II (FDA CDRH 21CFR PART1040.10)	
	Output	0.95 mW	
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. 4.72 x 66.9 Mil 120 x 1700 μm (G157), Approx. ø4.72 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	Enclosure rating	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. 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)			
	Laser Class	Class II (FDA CDRH 21CFR PART1040.10)			
	Output	0.95 mW			
Spot diameter (at reference distance)			Approx. 11.42 x 326.8 Mil 290 x 8300 μm (G407) Approx. ø11.42 Mil ø290 μm (G402)	Approx. 11.81 x 374 Mil 300 x 9500 μm (G507) Approx. ø11.8 Mil ø300 μm (G502)	
Linearity ²			±0.05% of F.S.(F.S. = ±3.94" ±100 mm)	±0.05% of F.S. (±9.84 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./°C (F.S. = ±3.94" ±100 mm)		0.01% of F.S./°C (F.S. = ±9.84" ±250 mm)
Enclosure rating			IP67 (IEC60529)		
Ambient light			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		
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		

- 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.
- The range is obtained by measuring KEYENCE's standard target (ceramic) with the Standard mode.
- The range is obtained by measuring KEYENCE's standard (SUS) with 4096 times of averaging at the reference distance.
- All are calculated at F.S. = ±9.84" (±250 mm).
- "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-96368 (2.5m 8.2")



communication cable 9-pin
conversion connector
OP-26401



communication cable 25-pin
conversion connector
OP-96369



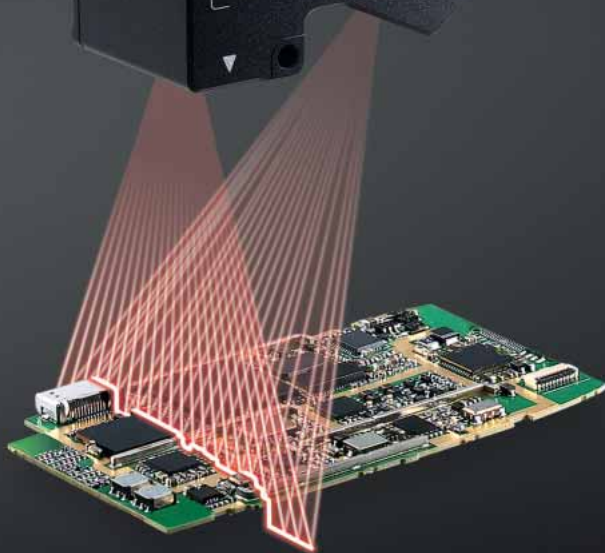
Expansion cable 3 m 9.8'
OP-51657



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

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

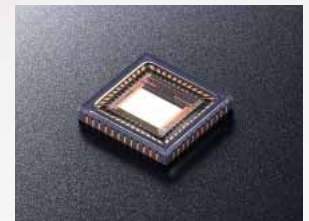
Peak height	Bottom height
Average height	Gap
Width/position	Section area
Angle/intersection	Profile comparison

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



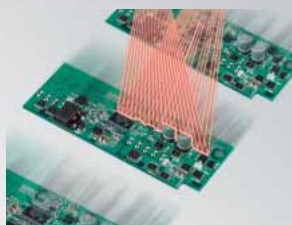
Simultaneous measurements can be done at 8 points.



FASTEST IN ITS CLASS

High-speed sampling of 3.8 ms,
high-accuracy of $\pm 0.1\%$ of F.S.

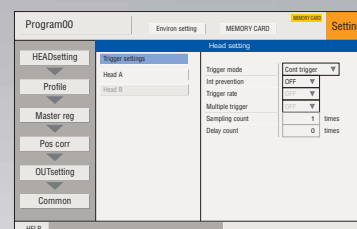
The Quatro link system achieves the highest sampling speed in its class, 3.8 ms. The LJ-G Series can follow high-speed lines or moving targets. In addition, a 2D Ernstar lens is used to make the optical system the best accuracy in its class.



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.

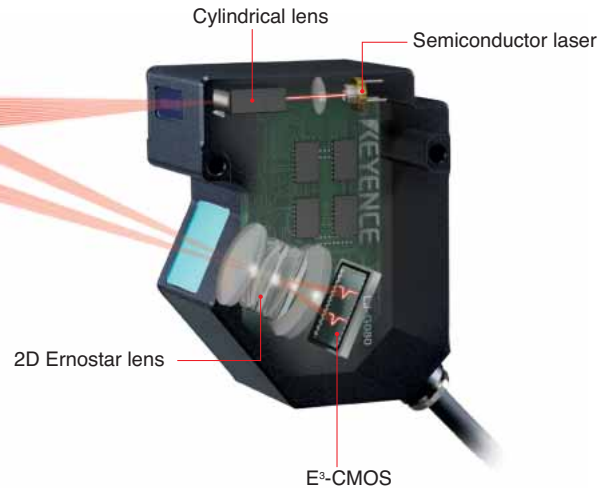


Unique design for high-accuracy measurements

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

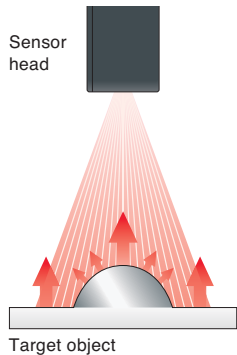
The E³-CMOS image sensor, developed for machine vision, has a 300 times larger dynamic range than a conventional sensors range and a reliable S/N ratio. This allows measuring objects such as black rubber (with weak reflection) and metals (with strong reflection).

E³-CMOS



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

I Laser light reflection

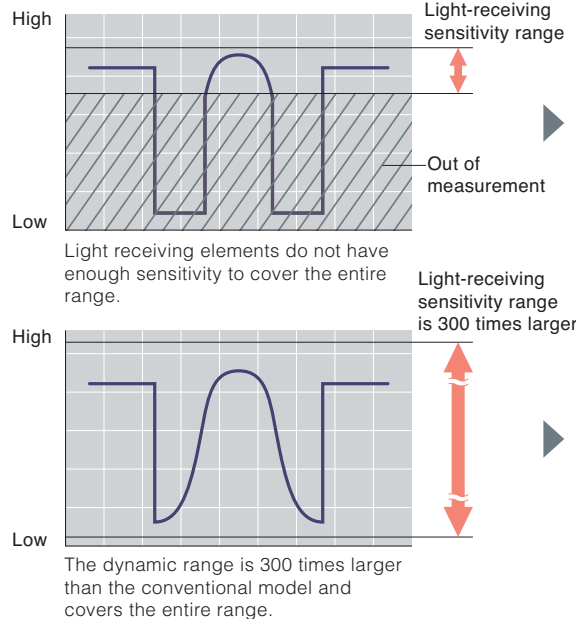


The reflection factor and the reflected light intensity change according to the shape, color and material of the target.

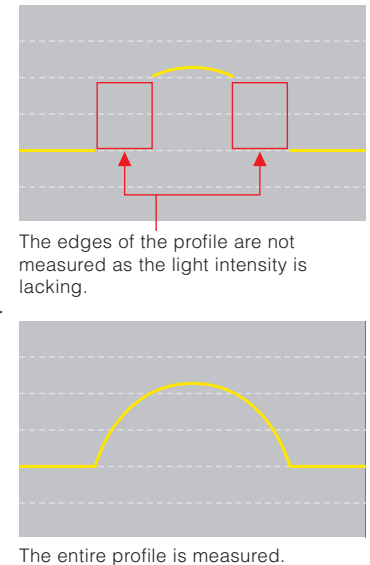
Conventional

E³-CMOS

II Light intensity



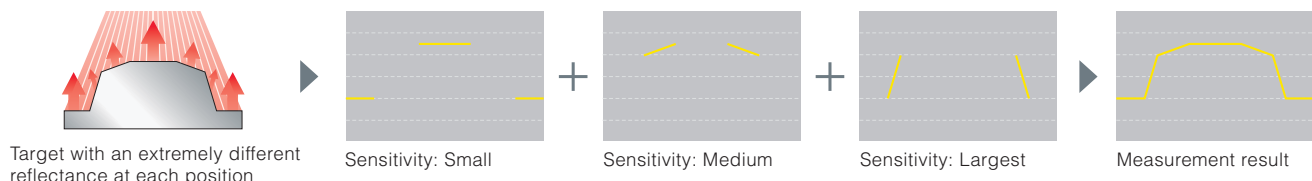
III Profile measurement



New function ASAP (Automatic Sensitivity Adjustment by Pixel)

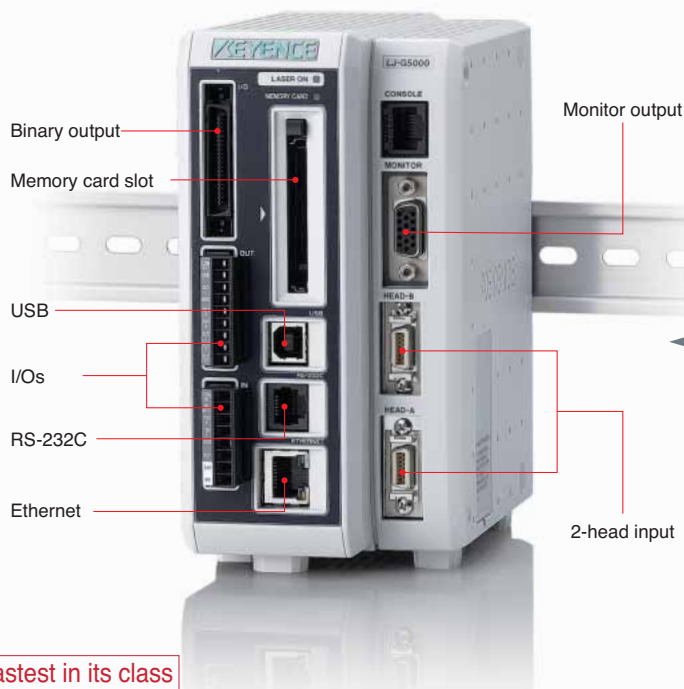
This function adjusts the sensitivity and laser power of the E³-CMOS to obtain suitable waveform data for each measurement position that has a different reflectance. The obtained data is merged as a single measurement result..

Dynamic range
6000x



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)

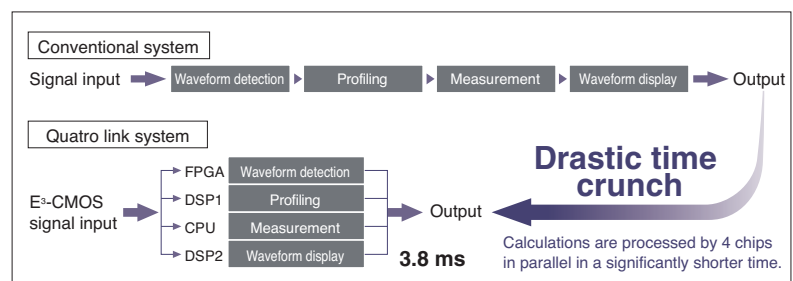
With the optional software, settings can be easily configured and data can be saved and analyzed with a PC.



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

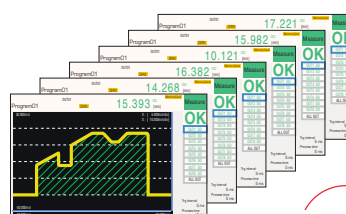
The memory in the controller stores up to 16 programs. When the setting call function from the memory card is used, up to 160 programs can be stored to handle various product types.

	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.

Program	2009.10.23 13:10	1.000	2.300	4.545	-5.550
1. CUT1 Height	2009.10.23 13:10	1.000	2.300	4.545	-5.550
2. CUT1 Width	2009.10.23 13:10	1.000	2.300	4.545	-5.550
3. CUT2 Height	2009.10.23 13:10	1.000	2.300	4.545	-5.550
4. CUT2 Width	2009.10.23 13:10	1.000	2.300	4.545	-5.550
5. CUT3 Height	2009.10.23 13:10	1.000	2.300	4.545	-5.550
6. CUT3 Width	2009.10.23 13:10	1.000	2.300	4.545	-5.550
7. CUT4 Height	2009.10.23 13:10	1.000	2.300	4.545	-5.550
8. CUT4 Width	2009.10.23 13:10	1.000	2.300	4.545	-5.550
9. CUT5 Height	2009.10.23 13:10	1.000	2.300	4.545	-5.550
10. CUT5 Width	2009.10.23 13:10	1.000	2.300	4.545	-5.550
11. CUT6 Height	2009.10.23 13:10	1.000	2.300	4.545	-5.550
12. CUT6 Width	2009.10.23 13:10	1.000	2.300	4.545	-5.550
13. CUT7 Height	2009.10.23 13:10	1.000	2.300	4.545	-5.550
14. CUT7 Width	2009.10.23 13:10	1.000	2.300	4.545	-5.550
15. CUT8 Height	2009.10.23 13:10	1.000	2.300	4.545	-5.550
16. CUT8 Width	2009.10.23 13:10	1.000	2.300	4.545	-5.550
17. CUT9 Height	2009.10.23 13:10	1.000	2.300	4.545	-5.550
18. CUT9 Width	2009.10.23 13:10	1.000	2.300	4.545	-5.550
19. CUT10 Height	2009.10.23 13:10	1.000	2.300	4.545	-5.550
20. CUT10 Width	2009.10.23 13:10	1.000	2.300	4.545	-5.550

65536 data can be stored

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

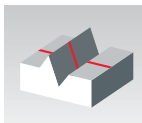
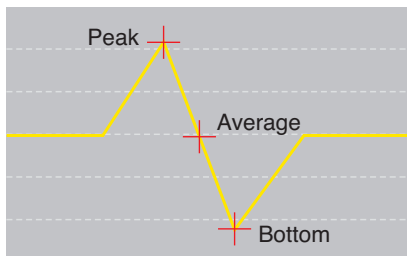
The setup menu is designed so novice users can effortlessly configure settings. The operation by a PC is also simplified thanks to the included setting support optional software (LJ-H1W).



MEASUREMENT MENUS

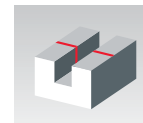
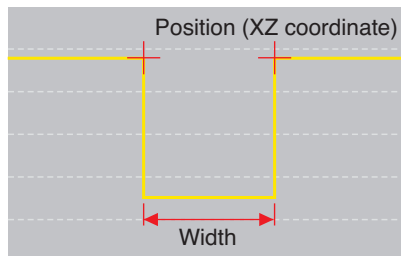
HEIGHT

Measures height in a specified range.



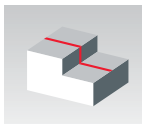
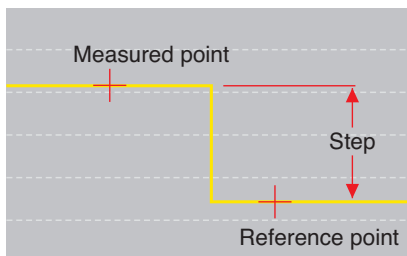
WIDTH/POSITION

Measures width/position with a specified condition.



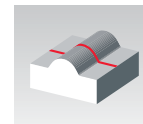
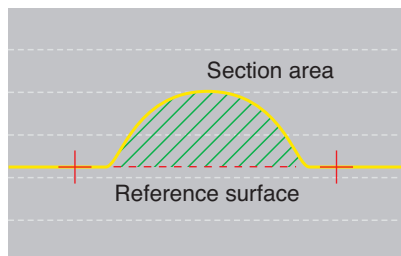
STEP

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



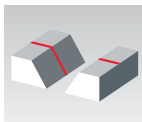
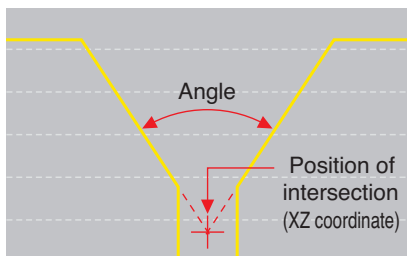
SECTION AREA

Measures the area on the basis of the reference surface.



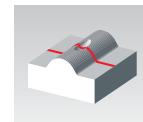
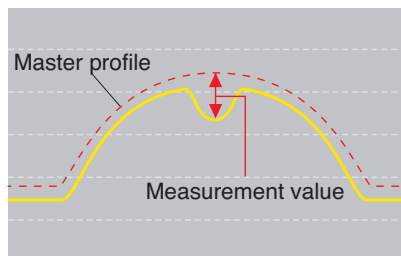
ANGLE/INTERSECTION

Measures the angle or intersection of detected lines.



PROFILE COMPARISON

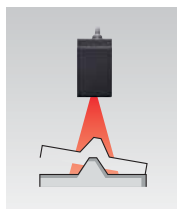
Compares the target profile with the master profile to measure the largest difference.



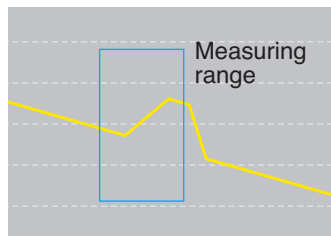
USEFUL ADJUSTMENT FUNCTIONS

POSITION ADJUSTMENT FUNCTION

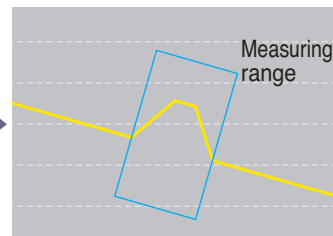
After the adjustment, the LJ-G Series can provide stable measurements though the targets are not neatly arranged or positioned.



Displacement of target



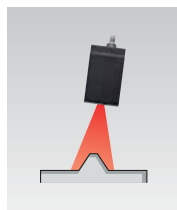
Since the workpiece is not in the measuring range, a precise measurement cannot be carried out.



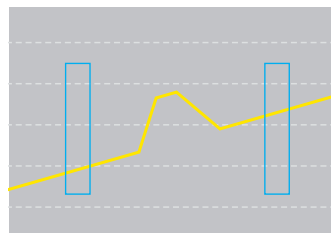
The measuring range moves according to the displacement of the workpiece for precise measurement.

INCLINATION ADJUSTMENT

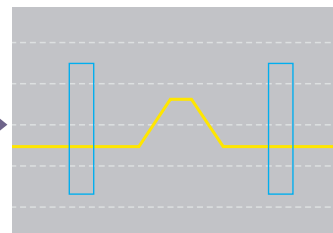
This cuts time for adjusting the installation of the sensor head and eliminates measurement errors.



Inclination of the sensor head to the workpiece



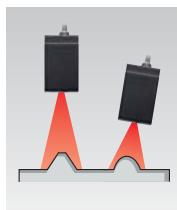
Due to the inclination of the sensor head, the workpiece is not properly measured.



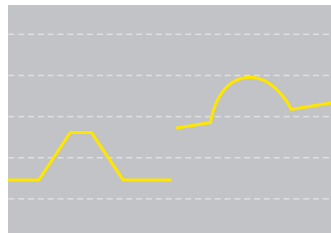
The inclination adjustment adjusts the angle of the sensor head for precise measurement.

PROFILE LINK FUNCTION

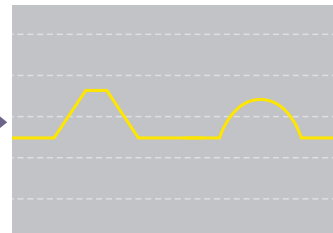
When two sensor heads are connected to a controller in parallel, the profiles are linked as a single profile. This significantly cuts time to adjust two sensor heads and eliminates measurement errors.



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.



CONTROLLER/SENSOR HEAD COMPATIBILITY

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

IP67

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



FLEXIBLE CABLE

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

Controller

Model	LJ-G5001	LJ-G5001P
Sensor head compatibility	Compatible	
Number of connectable sensors	2 units max.*	
Display	0.1 μm^1 , 0.001 mm ² , 0.01° (Inch mode : 0.004 Mil, 0.00001 inch)	
	Maximum display range $\pm 99999.9 \text{ mm}$, $\pm 999999 \text{ mm}^2$, $\pm 99999.9^\circ$ (Inch mode : $\pm 9999.99 \text{ Mil}$, $\pm 999.999 \text{ inch}$)	
Input terminal block	Laser remote interlock input Trigger input Timing 1 input Auto-zero 1 input Reset input	Non-voltage input For sensor head A, non-voltage input Non-voltage input Voltage input
Output terminal block	Analog voltage output Total judgment output Error output Process output Trigger input enable output Adjusted error output	$\pm 10 \text{ V} \times 2 \text{ outputs}$, output impedance: 100 Ω NPN open-collector output NPN open-collector output (N.C.) NPN open-collector output For sensor head A, NPN open-collector output For sensor head A, PNP open-collector output
Expansion connector	Timing 2 input Auto-zero 2 input Trigger input Program switching input Memory card save input Laser-Off input Judgment/Binary output 2. Strobe output Trigger input enable output Adjusted error output	Non-voltage input Voltage input For sensor head B, non-voltage input Voltage input, 4 inputs Voltage input For sensor head A/B, non-voltage input For sensor head A/B, voltage input 3-level judgment output: OUT1 to OUT8, total judgment output Binary output: OUT1 to OUT8 measured data output (21 bits) NPN open-collector output PNP open-collector output For sensor head B, non-voltage input For sensor head B, PNP open-collector output
Analog RGB monitor output	SVGA (800 x 600 pixels)	
RS-232C interface	Measured data output and control input/output (Maximum baud rate: 115200 bps, 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 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 Current consumption	24 VDC $\pm 10\%$, Ripple: 10% (P to P) or less 800 mA or less with 1 sensor head/1 A or less with two sensor heads
Environmental resistance	Ambient temperature Relative humidity	0 to 50°C (32 to 122°F) 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 1 μm .

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.

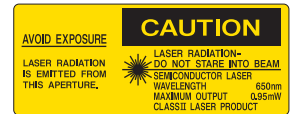
The rating of the PNP open-collector output: 50 mA max. (30 V max.), residual voltage of 1 V max.

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	15 mm 0.59"		30 mm 1.18"	80 mm 3.15"	200 mm 7.87"
Measuring range	Z-axis (Height)	±2.3 mm ±0.09"	±10 mm ±0.39"	±23 mm ±0.91"	±48 mm ±1.89"
	X-axis (Width)				
	Near	6.5 mm 0.26"	20 mm 0.79"	25 mm 0.98"	51 mm 2.01"
	Reference distance	7.0 mm 0.28"	22 mm 0.87"	32 mm 1.26"	62 mm 2.44"
	Far	7.5 mm 0.30"	25 mm 1.98"	39 mm 1.54"	73 mm 2.87"
Light source	Wavelength	Red semiconductor laser 650 nm (Visible light)			
	Laser Class	Class II (FDA CDRH 21CFR PART1040.10)			
	Output	0.95 mW			
Spot diameter (at reference distance)		Approx. 32 μm x 12 mm 1.26 Mil x 0.47"	Approx. 40 μm x 25 mm 1.57 Mil x 0.98"	Approx. 80 μm x 46 mm 3.15 Mil x 1.81"	Approx. 180 μm x 70 mm 7.09 Mil x 2.76"
Repeatability 1.	Z-axis (Height) 2.	0.2 μm 0.008 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 $\phi 10 \text{ mm} \pm 0.39"$ 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)

Item	Hardware requirements
CPU	Pentium III, 400 MHz or higher
Supported OS	Windows Vista *1 Windows XP Professional Edition/Home Edition Windows 2000 Professional Windows 98SE *2
Memory capacity	128 MB or more
Display	XGA (1024 x 768 pixels) or greater, 256 colors or greater
Hard disk space	30 MB or more
Interface *3	Includes one of the following: USB 2.0/1.1 *4, Ethernet *5, RS-232C (Serial port)

- *1 Ultimate, Business, Home Premium, and Home Basic editions each are supported for Windows Vista ver. 1.6 or later.
 *2 For Windows 98SE, Ver. 1.5 or older is supported.
 *3 Select one for communication. Multiple interfaces cannot be used for communication at the same time.
 *4 Operations are not guaranteed when connected through a USB hub.
 *5 Operations are not guaranteed when connected through a router or a LAN connection.

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
(Optional)



USB cable 2 m 6.6' (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-96368 (2.5m 8.2")



communication cable 9-pin
conversion connector
OP-26401



communication cable 25-pin
conversion connector
OP-96369



OPTION

Memory card
NR-M1G : 1GB
GR-M256 : 256MB



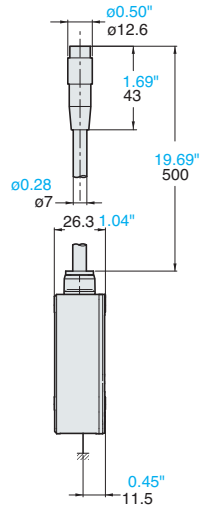
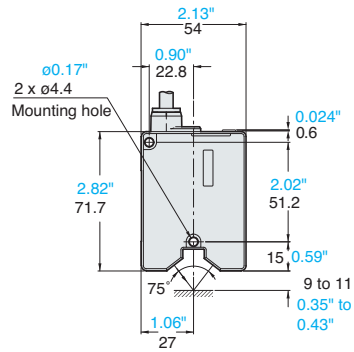
Memory card adaptor
C-A1



24VDC Power supply unit
CA-U3

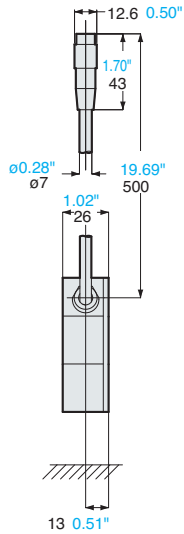
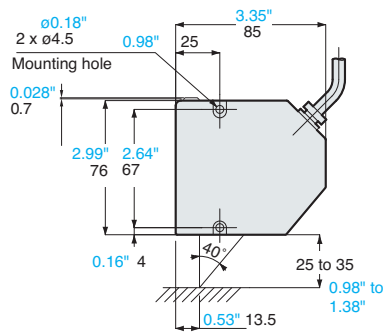


LK-G15/G10

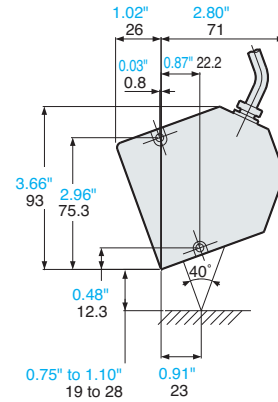


LK-G32/G37

Diffused reflection type mounting

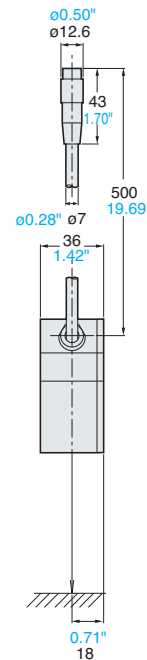
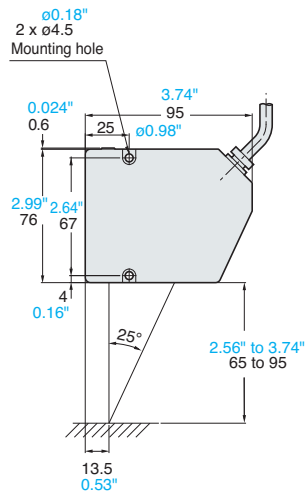


Specular reflection type mounting

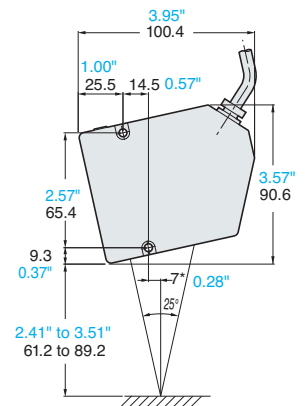


LK-G82/LK-G87

Diffused reflection type mounting



Specular reflection type mounting

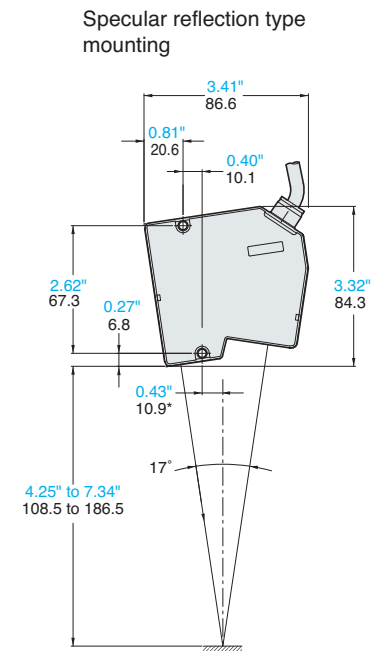
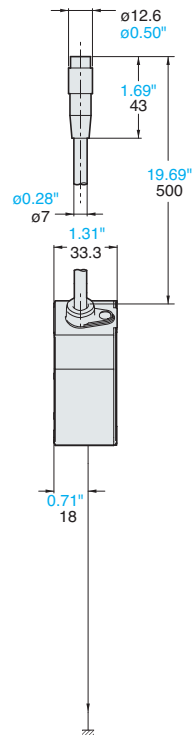
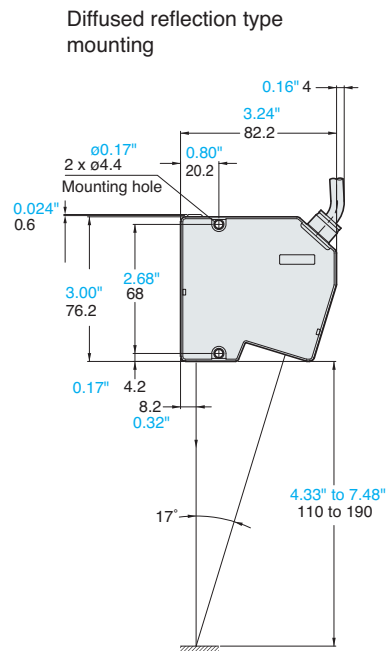


*Measurement reference position

DIMENSIONS

Unit: inch mm

LK-G152/G157

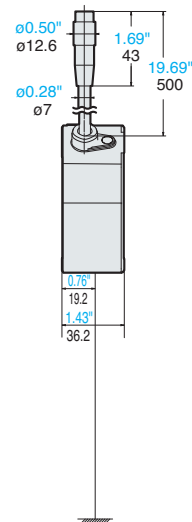
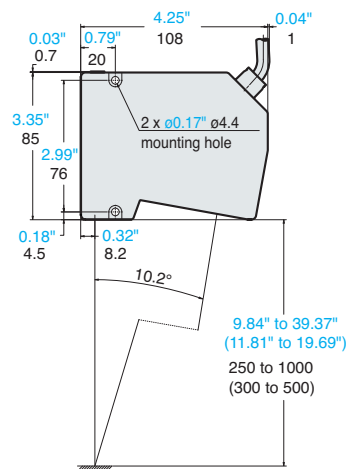


*Measurement reference position

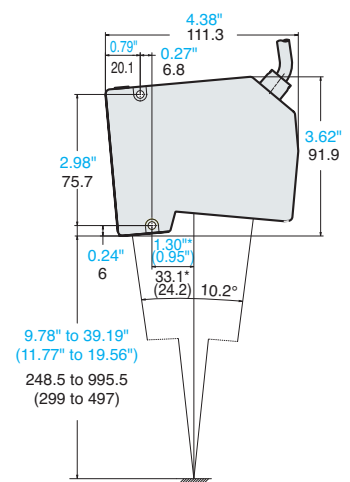
LK-G407/LK-G402/LK-G507/LK-G502

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

Diffused reflection type mounting

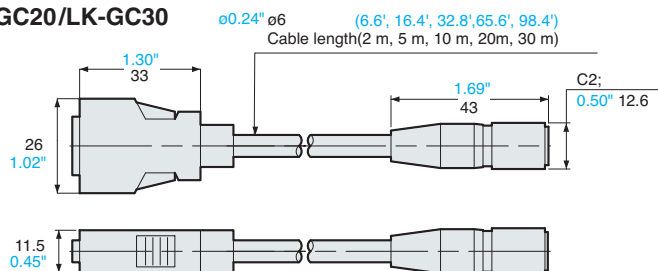


Specular reflection type mounting



*Measurement reference position

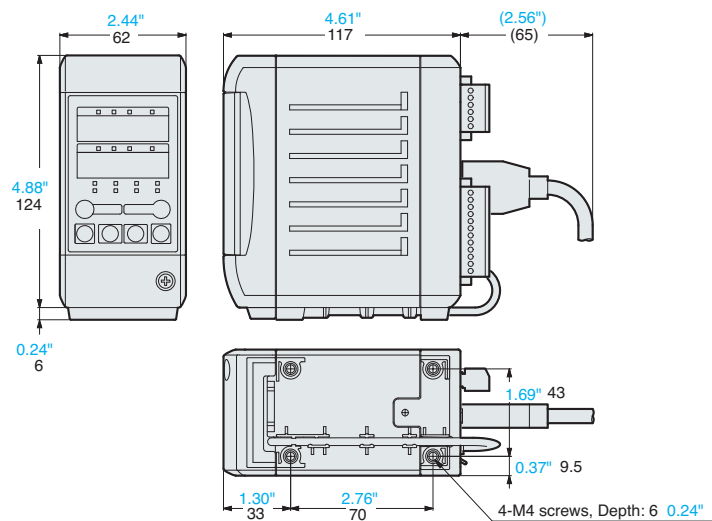
LK-GC2/LK-GC5/LK-GC10/LK-GC20/LK-GC30



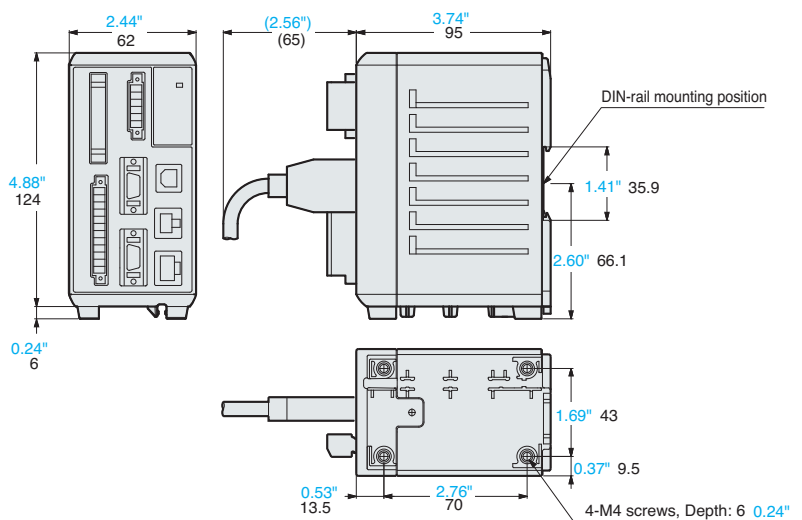
DIMENSIONS

Unit: inch mm

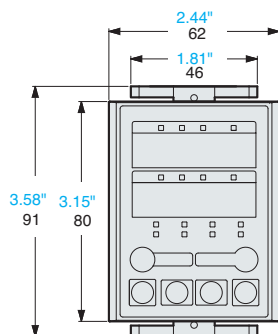
LK-G3001(P)V



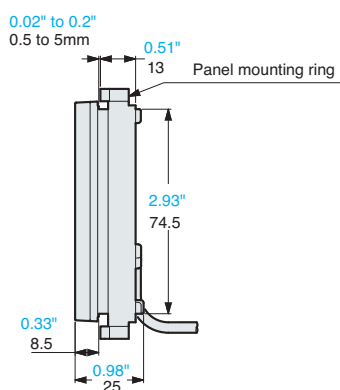
LK-G3001(P)



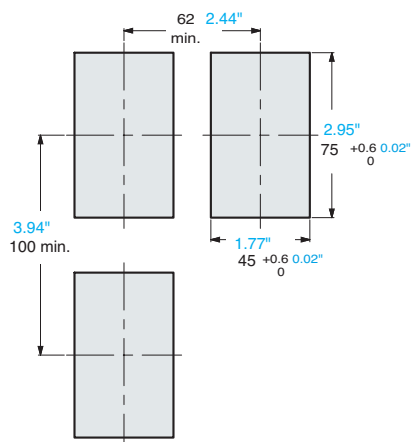
LK-GD500



Panel thickness



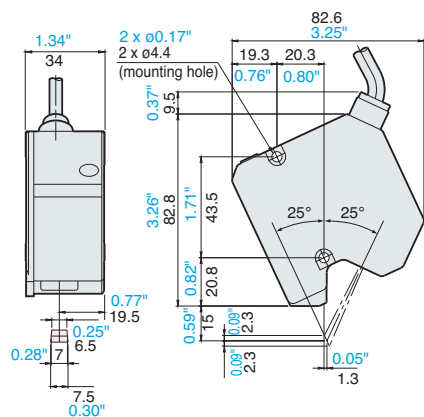
Panel cutout dimensions



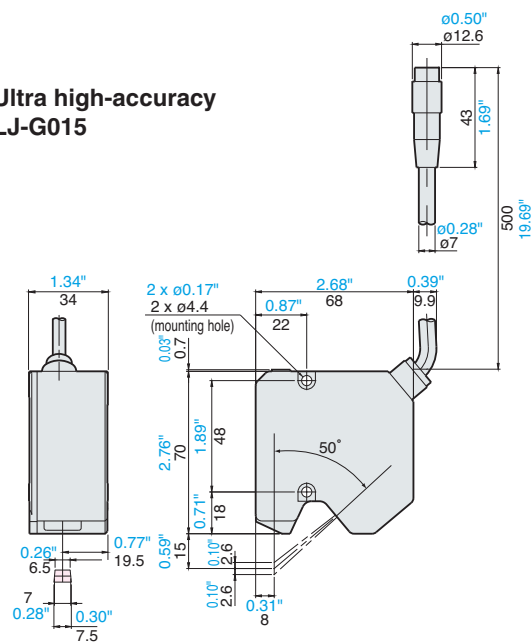
DIMENSIONS

Unit: inch mm

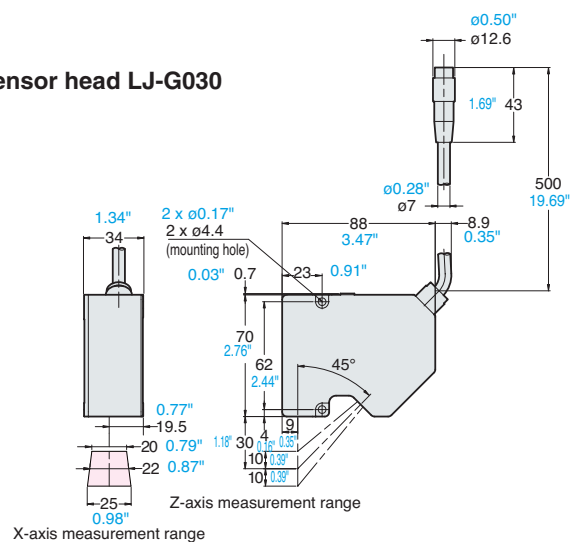
Ultra high-accuracy specular reflection LJ-G015K



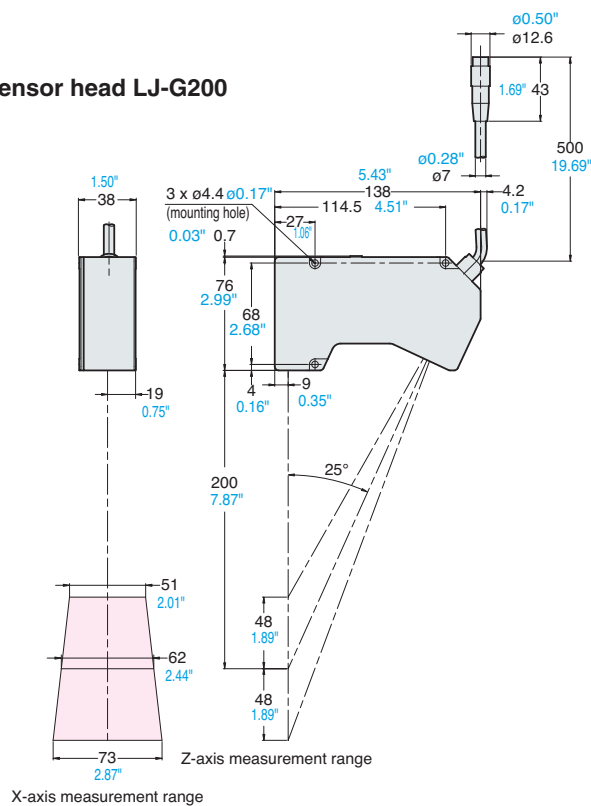
Ultra high-accuracy LJ-G015



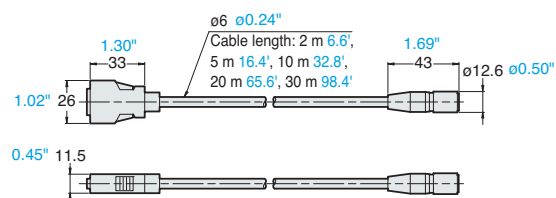
Sensor head LJ-G030



Sensor head LJ-G200



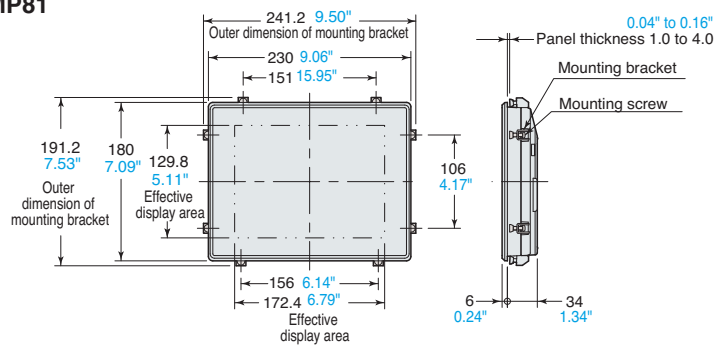
Cable between the sensor head and the controller
LJ-GC2/GC5/GC10/GC20/GC30



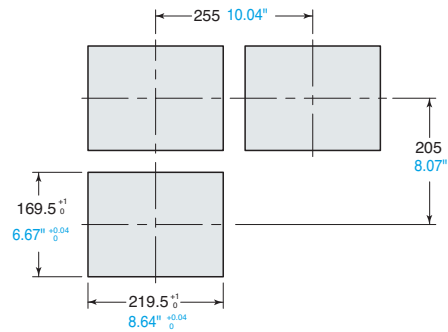
DIMENSIONS

Unit: inch mm

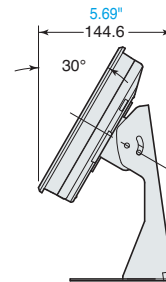
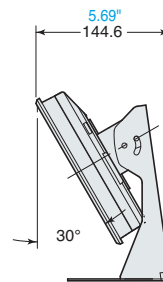
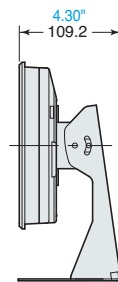
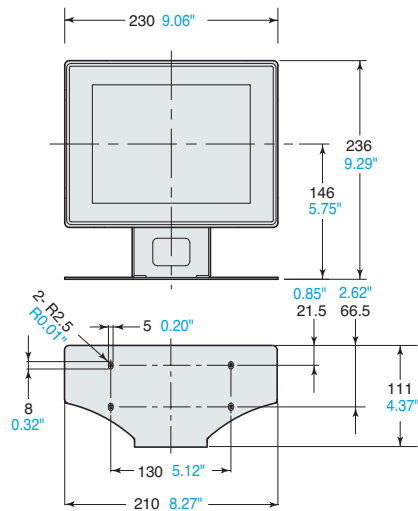
LCD monitor CA-MP81



Panel cutout dimensions



Stand OP-42278



Surface Scanning Laser Confocal Displacement Meter

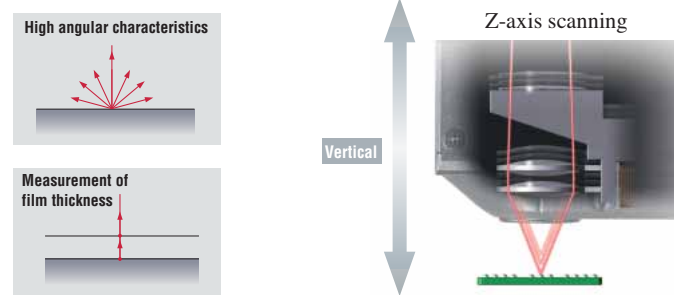
LT-9000 Series



- 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

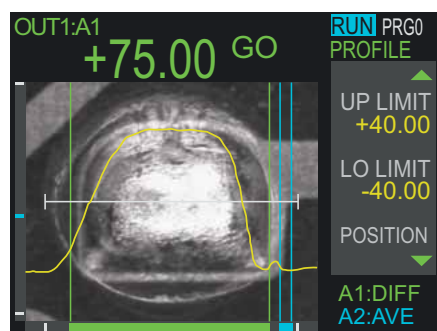
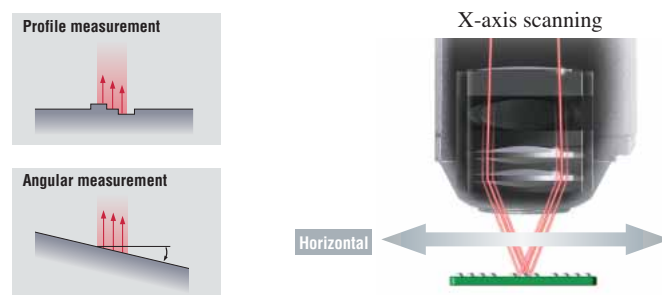
Excellent resolution of 0.0004 Mil (0.01 μm) for high-accuracy applications

The coaxial optical system improves measurement performance

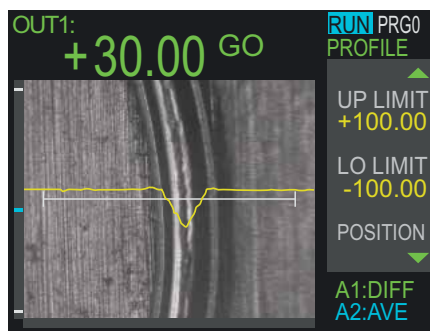


New wide scanning feature increases measurement stability and versatility

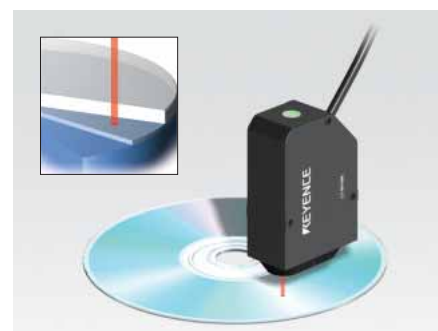
Wide scanning enables various measurements



Measuring the profile of solder paste on a PWB



Engraved mark



Measuring the thickness of an optical disc

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SAFETY INFORMATION

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

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LKLJ-General-KA-C-E 0129-2 [611115] Printed in Japan

KA1-0129

