

Intelligent 3D Laser Profile Sensor





CONTENTS

Product introduction	04/
Product technical specifications	06/
LVM21 series	06/
LVM22 series	10/
LVM23 series	13/
LVM25 series	17/
Product features and advantages	21/
Application of measuring tools, measuring modes	30/
Product application cases.	34/
Consumer electronics industry applications	34/
Automotive industry applications	38/
Food and packaging industry applications.	41/

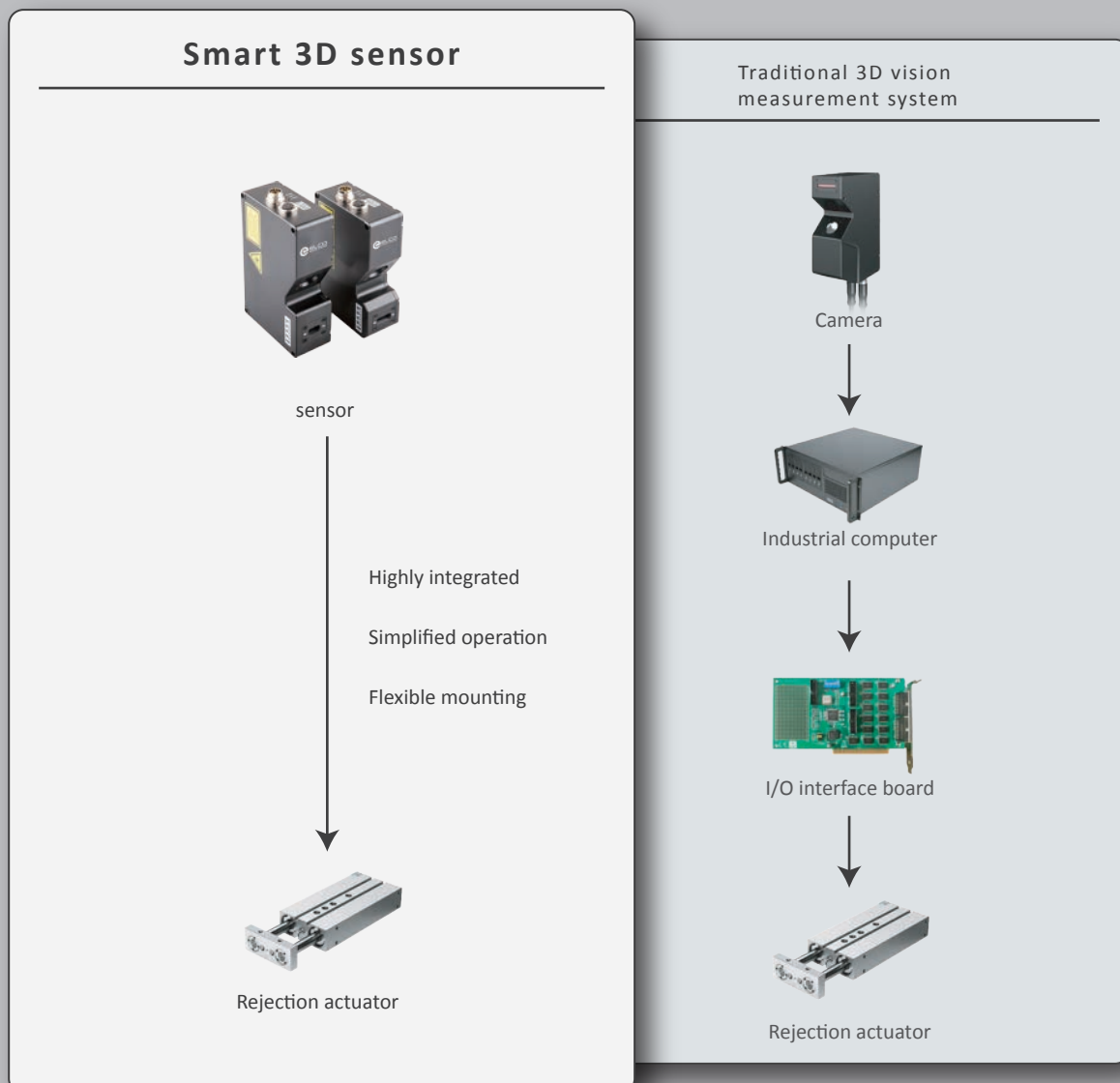
Intelligent 3D Laser Profile Sensor

The 3D laser profile sensor uses a super-high-speed processor to accurately scan and process the outline and size of the object, providing real-time contour and point cloud data and output the results.

The product adopts an integrated structure, built-in embedded 3D measuring tools, does not require any external computing equipment such as industrial computer, can independently complete real-time size measurement and defect detection tasks, and has a wide range of applications in lithium, new energy, consumer electronics, automotive, food, pharmaceutical, logistics and other industries.

It integrates scanning, measurement and control

The measurement results can be directly output to the actuator, eliminating the industrial computer and I/O interface board in the traditional 3D vision measurement system, greatly reducing the complexity of the system, and saving costs for customers.



Model Code

LVM

23

50

.

Series

L: Laser
V: Vision
M: Measurement

Special instructions

-L: Upgrade version
-R: Red light version
-L-R: Upgrade & red light version
-(User-defined):
Customer-customized version

Data points

21: 1456
22: 2048
23: 4200
25: 4096

Field of view

20 / 30 / 40 / 50 / 60 / 70 / 90

(Numbers do not truly reflect the field of vision.
In the same series, the field of view increases with the number)



Product Specification

LVM21 SERIES

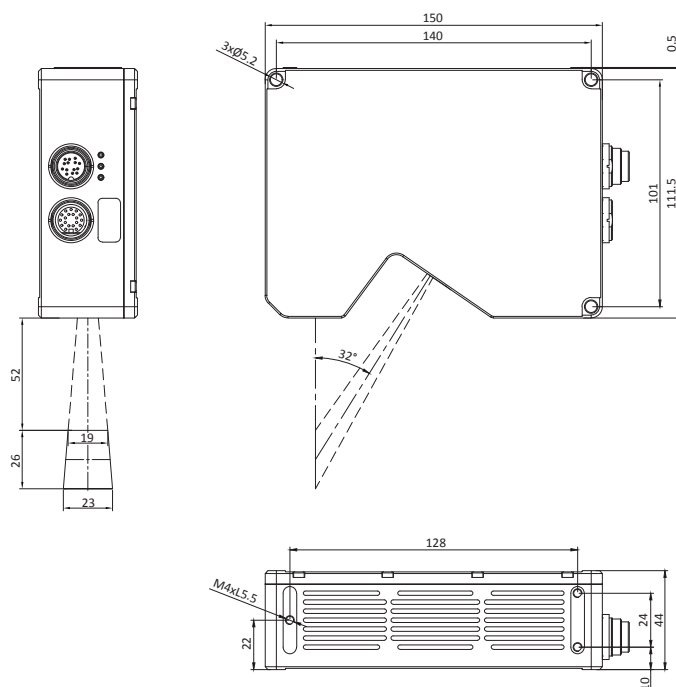
Model		LVM2120	LVM2130	LVM2140	LVM2150	LVM2160	LVM2170
Data points		1456	1456	1456	1456	1456	1456
Clearance distance (mm)		52	65	162	291	360	350
Measurement range (mm)		26	89	195	368	485	842
Field of view (mm)	Proximal	19	43	90	144	260	456
	Reference distance	21	57.5	123	208	405	808
	Remote	23	72	156	272	550	1160
Resolution (μm)	X (Width) (μm)	13.1-15.8	29.6-49.5	61.9-107.2	98.9-186.9	178.6-377.8	313.2-796.7
Repeatability Z (μm)		0.5	1	1.2	1.8	6	10
Linearity Z (+/- % of MR)		0.01%	0.01%	0.01%	0.01%	0.05%	0.05%
Light source wavelength		405 nm					660 nm
Laser class		2,3R					
Dimensions (mm)		44 x 111.5 x 150	44 x 99 x 148	44 x 99 x 213	44 x 99 x 278	44 x 99 x 284	44 x 99 x 284
Weight (kg)		0.89	0.87	1.05	1.45	1.44	1.44
Enclosure material		Aluminium					
Temperature characteristics		0.01%					
Scan rate		270-5000 Hz					
Inputs		Differential rncoder, laser safety enable, trigger					
Outputs		2 x digital output, RS-485 serial, 1 x analog output					
Protocols		Modbus TCP, PROFINET, ASCII					
Protection class		IP67 inserted and tightened					
Ambient light		Incandescent Lamp: ≤ 10000 lux					
Operating temperature		0 °C ... +50 °C					
Storage temperature		-30 °C ... +70 °C					
Working humidity		20%-85% RH					
Vibration resistance		10 to 55 Hz, 1.5 mm double amplitude in X, Y and Z directions, 2 hours per direction					
Shock resistance		15 g/11 ms, positive and negative for X, Y and Z directions					
Electromagnetic protection		EN 61326-1:2013 (GB/T18268), EN 55011:2007-11 (GB4824, group 1, A class), EN 61000-6-2:2006-03(GB/T17799.2)					

* default blue laser, add -R behind sensor type if red laser.

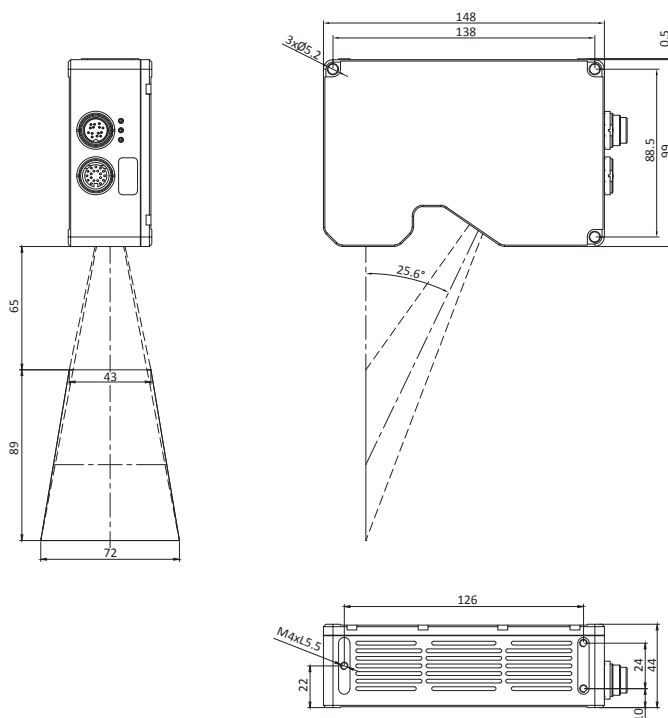
Intelligent 3D laser profile sensor

Outline dimensional drawing

LVM2120

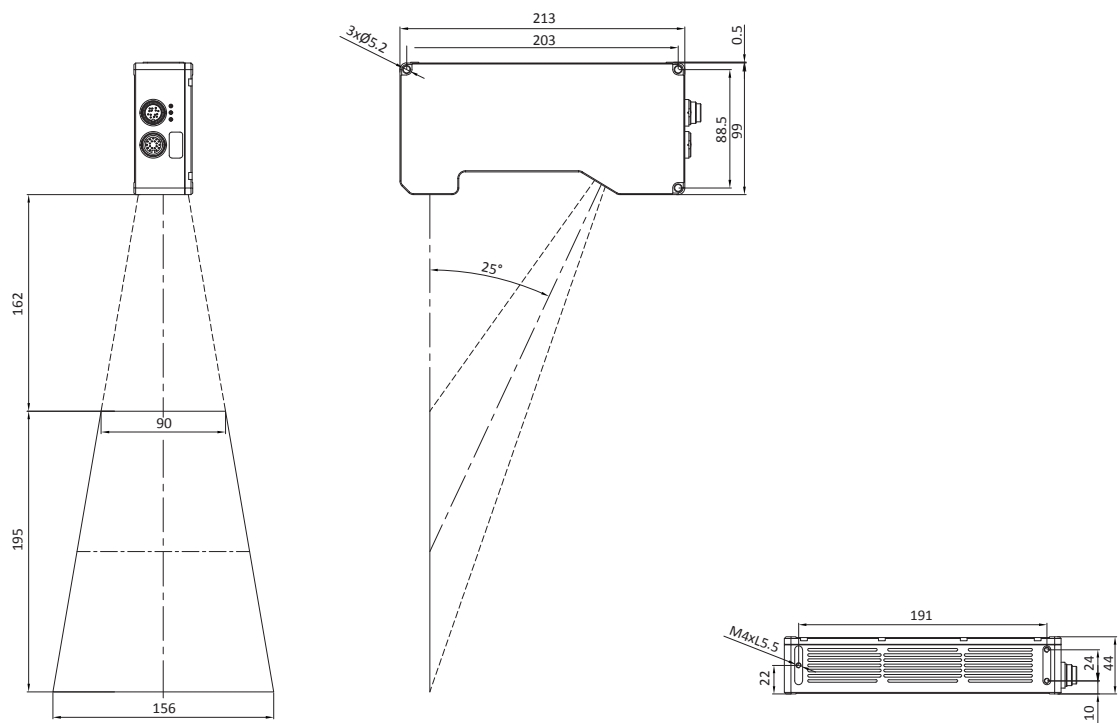


LVM2130

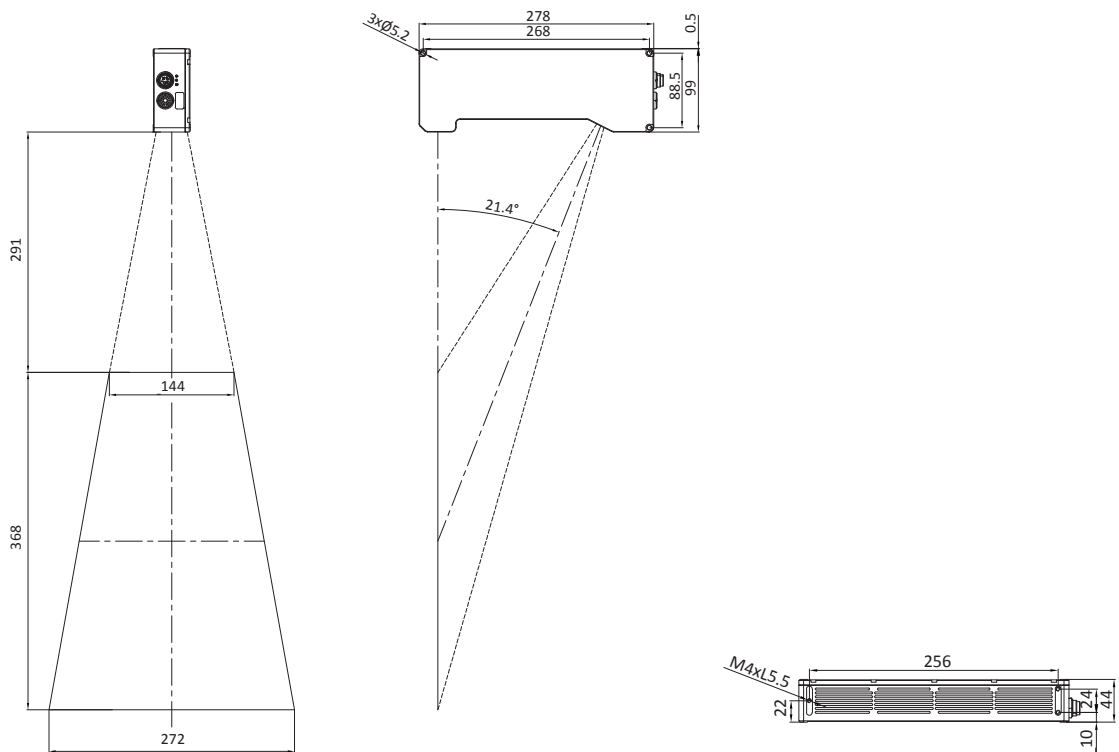


Outline dimensional drawing

LVM2140



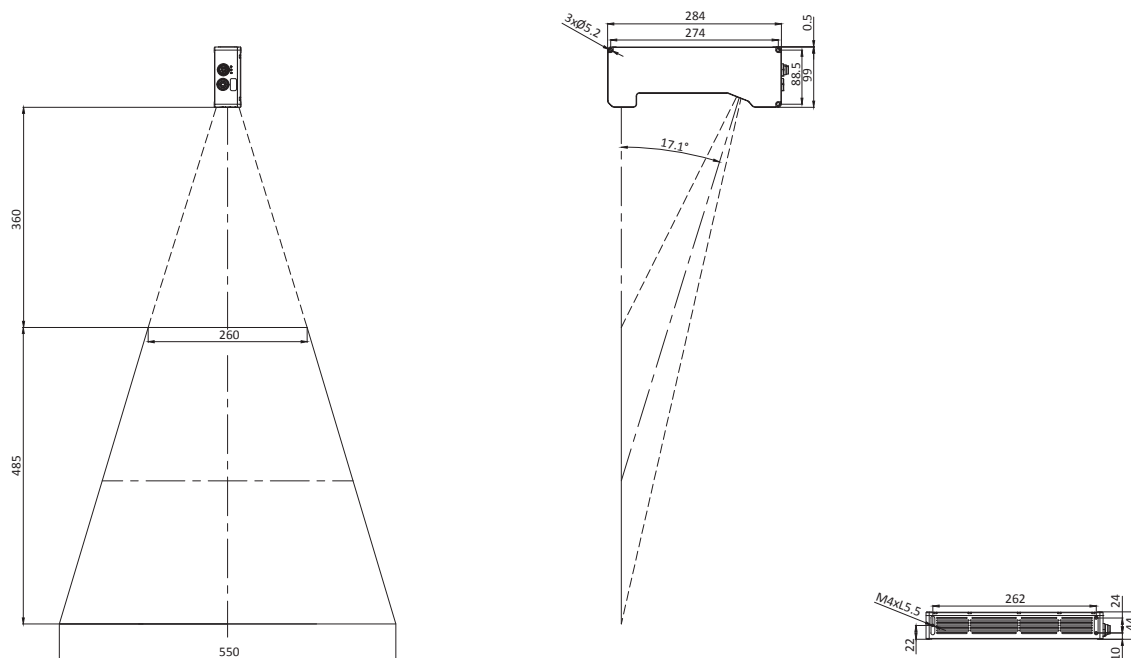
LVM2150



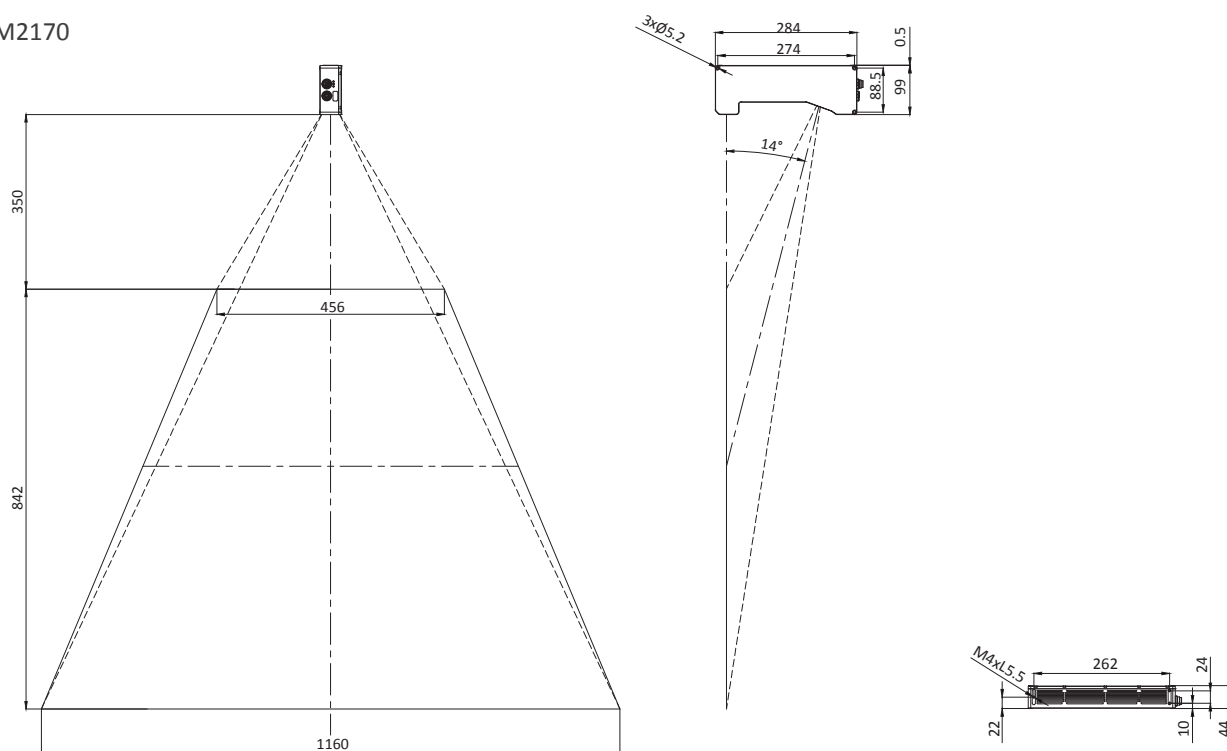
Intelligent 3D laser profile sensor

Outline dimensional drawing

LVM2160



LVM2170



Product Specification

LVM22 SERIES

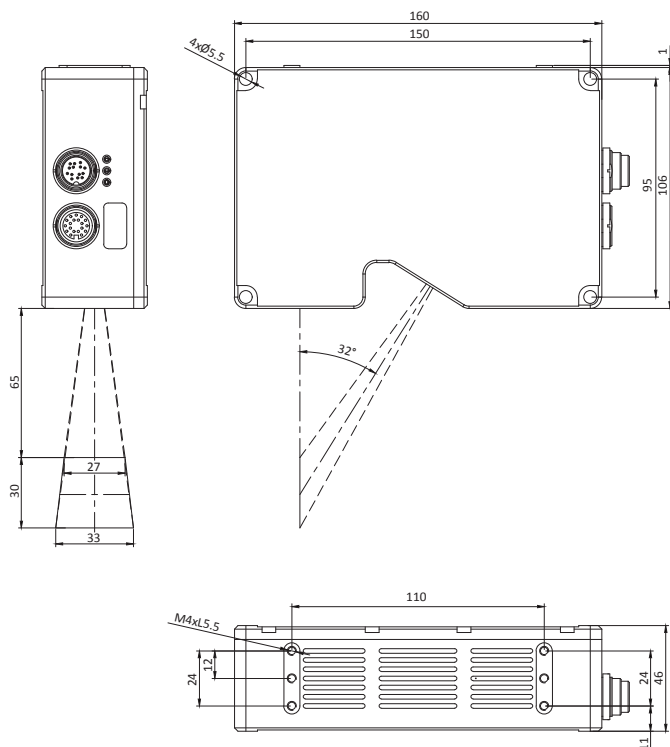
Model		LVM2220	LVM2230	LVM2240	LVM2250
Data points		2048	2048	2048	2048
Clearance distance (mm)		65	67	156	274
Measurement range (mm)		30	68	186	356
Field of view (mm)	Proximal	27	48	92	147
	Reference distance	30	60	128.5	219
	Remote	33	72	165	291
Resolution (μm)	X (Width) (μm)	13.0-16.5	23.4-34.8	44.8-80.8	72.0-142.3
Repeatability Z (μm)		0.4	0.8	1	1.5
Linearity Z (+/- % of MR)		0.01%	0.01%	0.01%	0.01%
Light source wavelength		405 nm			
Laser class		2,3R			
Dimensions (mm)		46 x 106 x 160	46 x 105.5 x 170	46 x 106 x 195	46 x 106 x 250
Weight (kg)		0.9	0.92	1.06	1.48
Enclosure material		Aluminium			
Temperature characteristics		0.01%			
Scan rate		240-5000 Hz			
Inputs		Differential encoder, laser safety enable, trigger			
Outputs		2 x digital output, RS-485 Serial, 1 x analog output			
Protocols		Modbus TCP, PROFINET, ASCII			
Protection class		IP67 inserted and tightened			
Ambient light		Incandescent Lamp:≤10000lux			
Operating temperature		0 °C ... +50 °C			
Storage temperature		-30 °C ... +70 °C			
Working humidity		20%-85% RH			
Vibration resistance		10 to 55 Hz, 1.5 mm double amplitude in X, Y and Z directions, 2 hours per direction			
Shock resistance		15 g/11 ms, positive and negative for X, Y and Z directions			
Electromagnetic protection		EN 61326-1:2013 (GB/T18268), EN 55011:2007-11 (GB4824, group 1, A class), EN 61000-6-2:2006-03 (GB/T17799.2)			

* default blue laser, add -R behind sensor type if red laser.

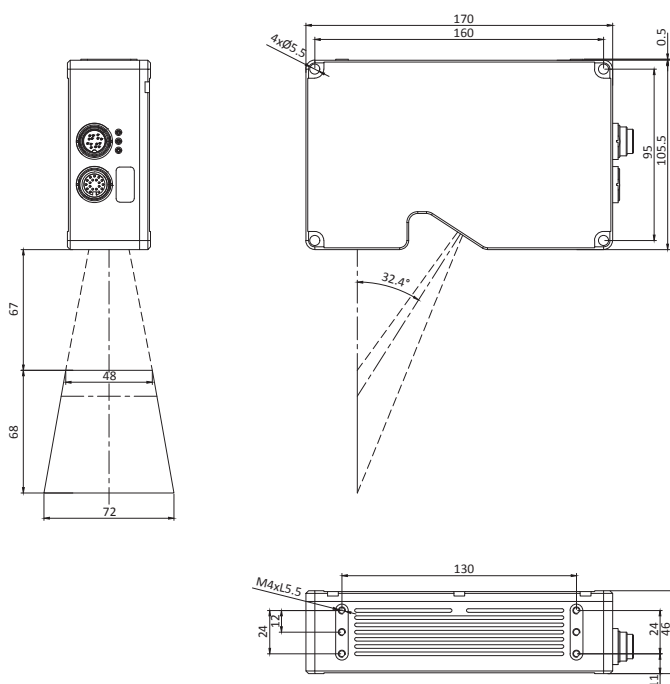
Intelligent 3D laser profile sensor

Outline dimensional drawing

LVM2220



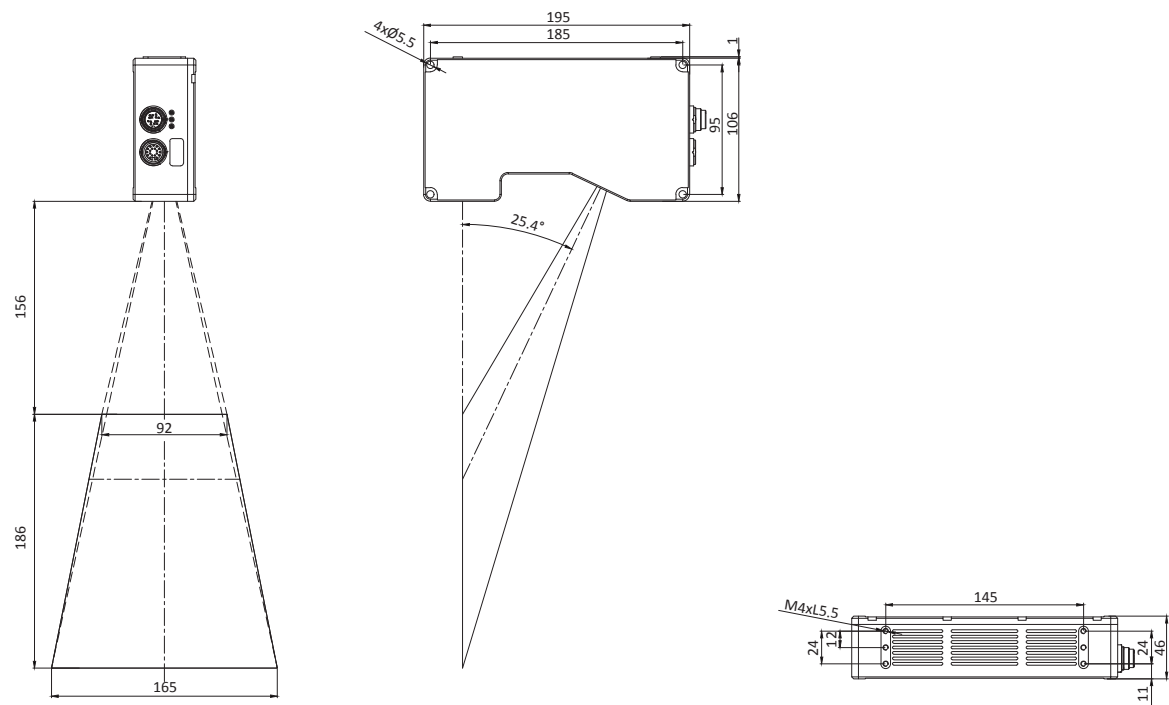
LVM2230



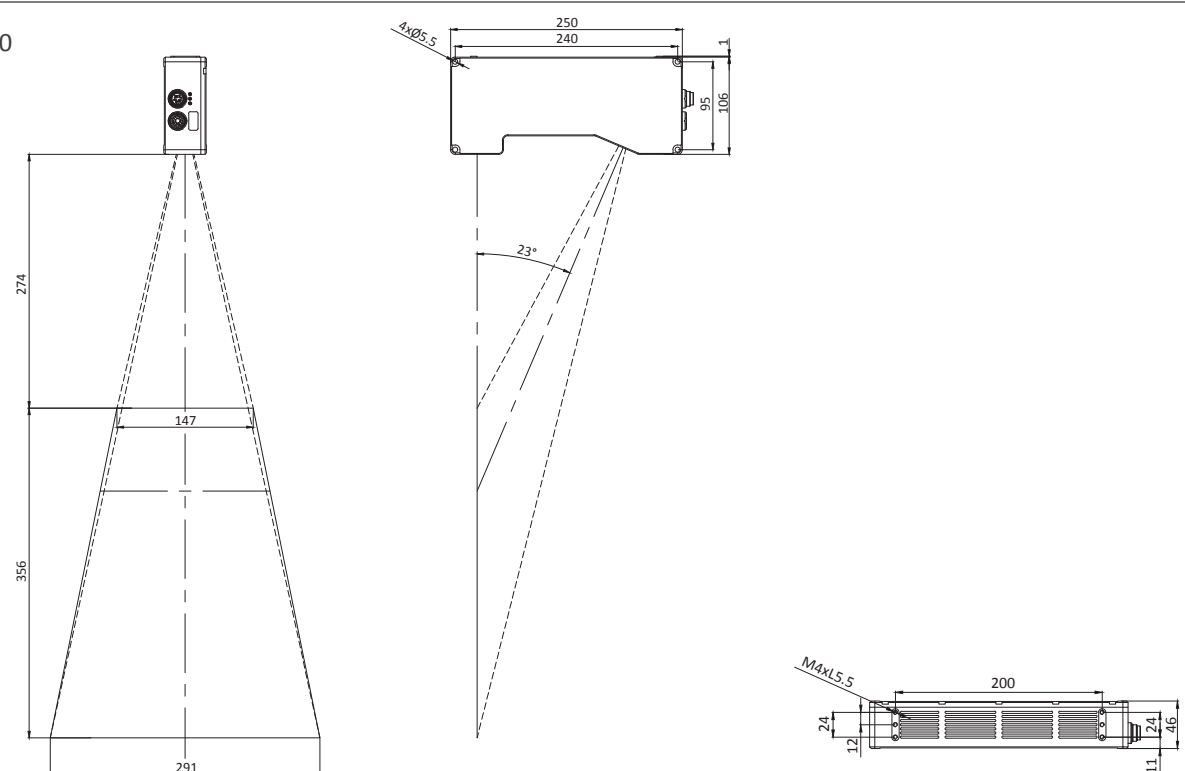
Intelligent 3D laser profile sensor

Outline dimensional drawing

LVM2240



LVM2250



Product Specification

LVM23 SERIES

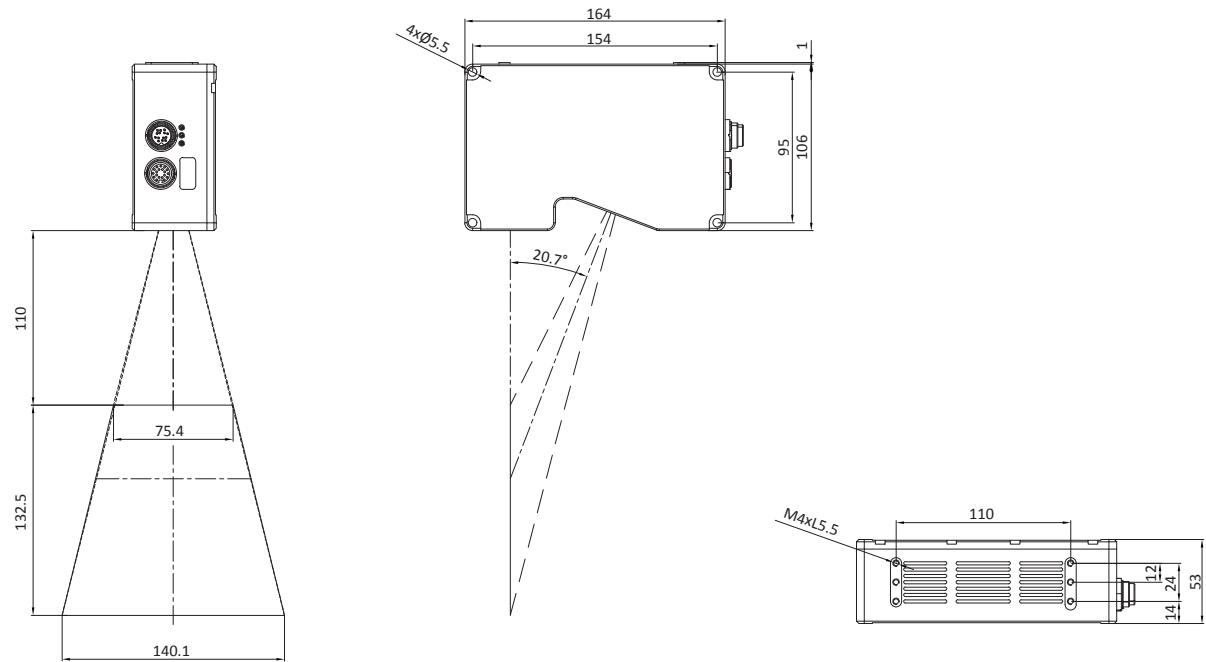
Model		LVM2330-L	LVM2340-L	LVM2350-L	LVM2370-L	LVM2390
Data points		4200	4200	4200	4200	4200
Clearance distance (mm)		110	167	328	495.8	357.6
Measurement range (mm)		132.5	192.6	472	1052.6	1576.2
Field of view (mm)	Proximal	75.4	110.8	197.1	282.4	521.2
	Reference distance	107.8	157.6	314.6	549.8	1455.8
	Remote	140.1	204.3	432	817.2	2390.4
Resolution (μm)	X(Width)	18.0-33.4	26.4-48.6	46.9-102.9	67.2-194.6	124.1-596.1
Repeatability Z (μm)		0.3	1	2.7	10.0	12
Linearity Z (+/- % of MR)		0.03%	0.04%	0.04%	0.05%	0.08%
Light source wavelength *		405 nm / 660 nm				
Laser class		3B				3R
Dimensions (mm)		53 x 106 x 164	53 x 106 x 204	53 x 126 x 254	53 x 106 x 284	57 x 111 x 280
Weight (kg)		1.23	1.43	1.72	1.78	2.06
Enclosure material		Aluminium				
Temperature characteristics		0.01%				
Scan rate		316-12000 Hz				
Inputs		Differential encoder, laser safety enable, trigger				
Outputs		2 x digital output, RS-485 serial, 1 x analog output				
Protocols		ModbusTCP, PROFINET, ASCII				
Protection class		IP67 inserted and tightened				
Ambient light		Incandescent Lamp: ≤10000lux				
Operating temperature		0 ... +50 °C				
Storage temperature		-30 ... +70 °C				
Working humidity		20% ... 85% RH				
Vibration resistance		10 to 55 Hz, 1.5 mm double amplitude in X, Y and Z directions, 2 hours per direction				
Shock resistance		15 g / 11 ms, positive and negative for X, Y and Z directions				
Electromagnetic protection		EN 61326-1:2013 (GB/T18268), EN 55011:2007-11 (GB4824, group 1, A class), EN 61000-6-2:2006-03 (GB/T17799.2)				

* default blue laser, add -R behind sensor type if red laser.

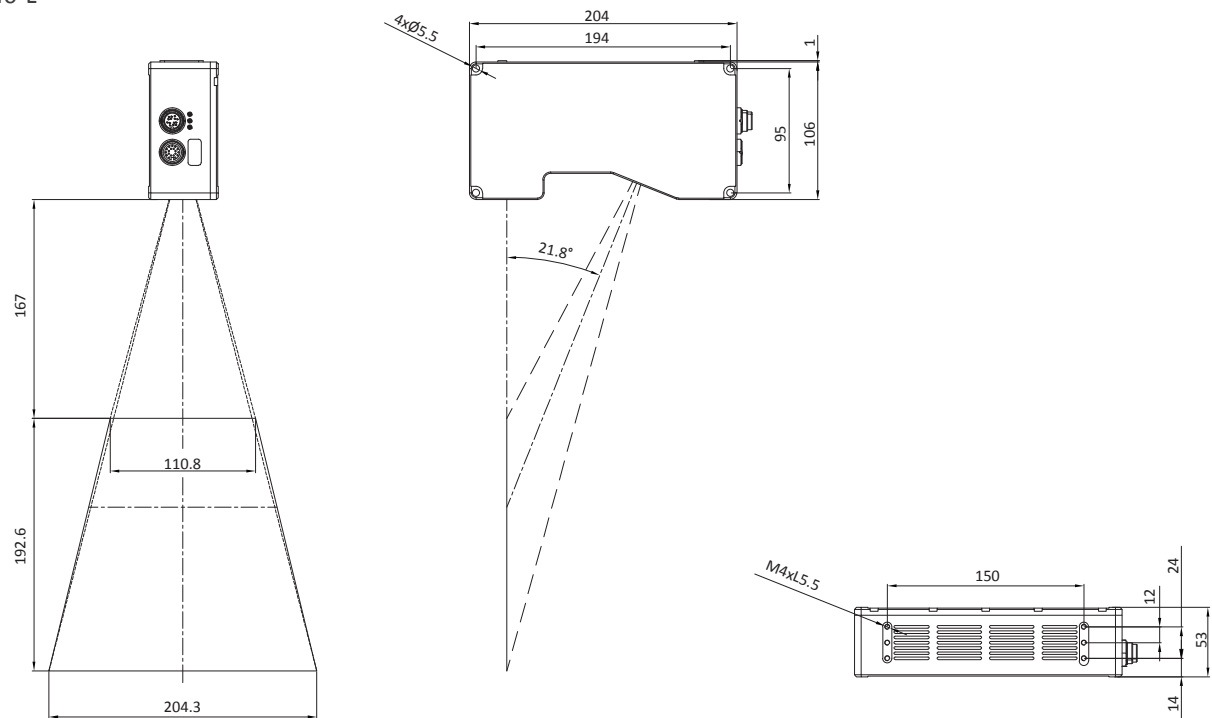
Intelligent 3D laser profile sensor

Outline dimensional drawing

LVM2330-L



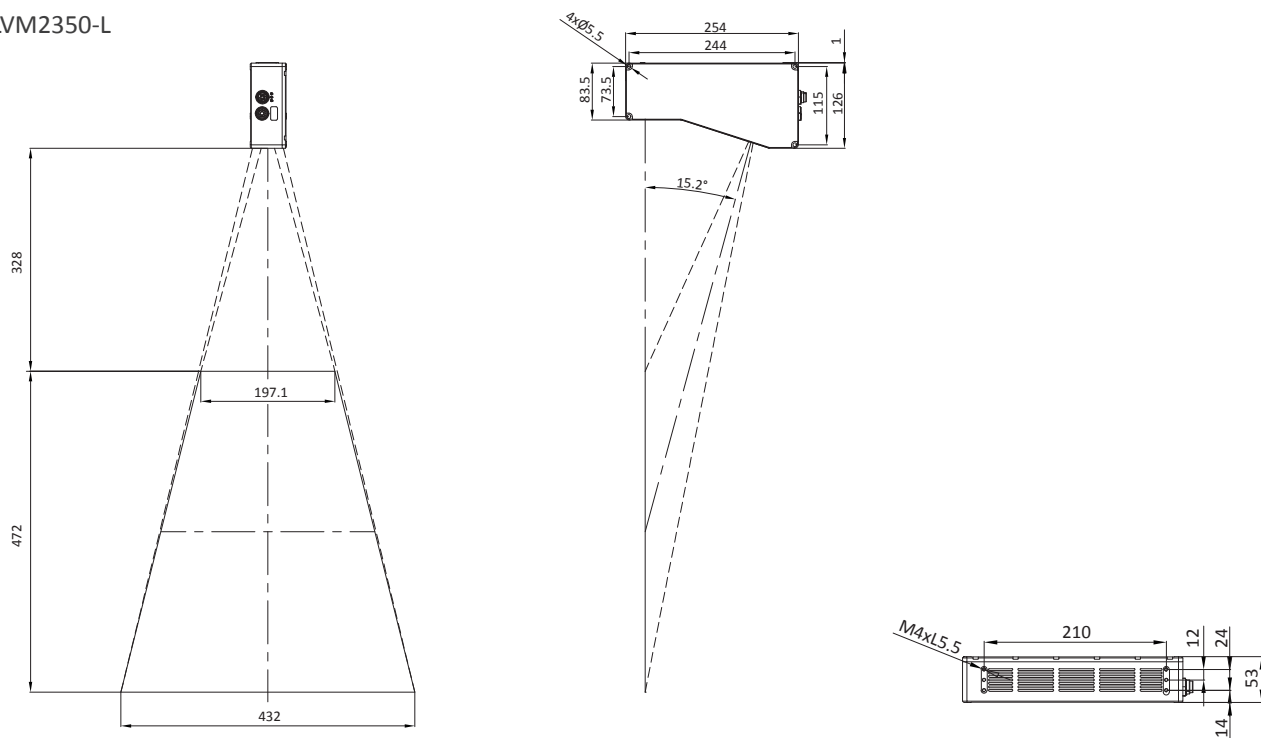
LVM2340-L



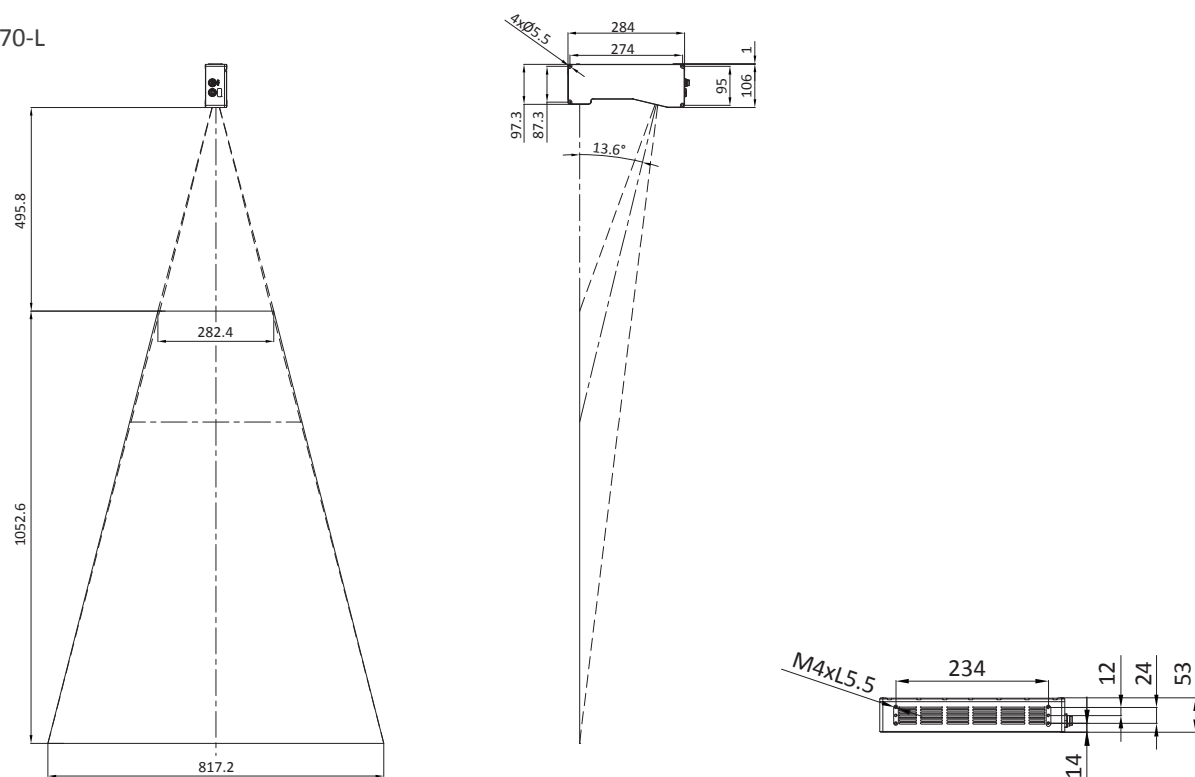
Intelligent 3D laser profile sensor

Outline dimensional drawing

LVM2350-L



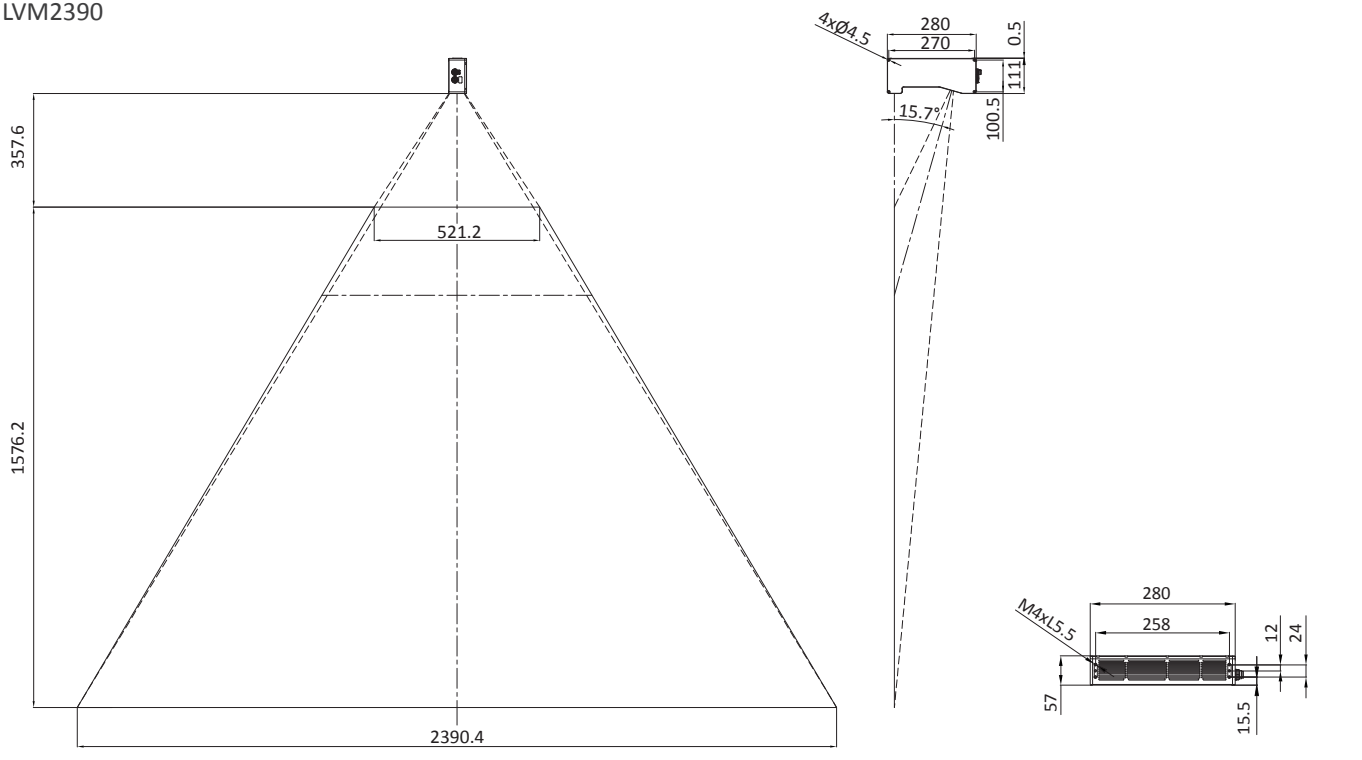
LVM2370-L





Outline dimensional drawing

LVM2390



Product Specification

LVM25 SERIES

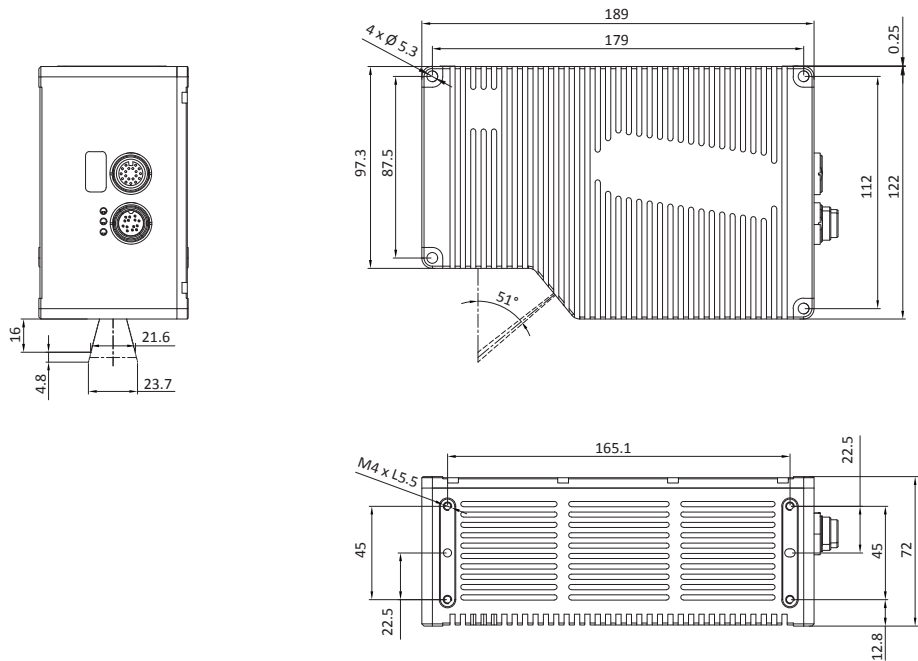
Model		LVM2520	LVM2540	LVM2550	LVM2560	LVM2570
Data points		4096	4096	4096	4096	4096
Clearance distance (mm)		16	55.2	41.5	151.2	206.5
Measurement range (mm)		4.8	15.6	65.8	237.3	457.1
Field of view (mm)	Proximal	21.6	46.4	115.3	298.4	363.3
	Reference distance	22.7	50.7	155.3	452.5	669.4
	Remote	23.7	55	195.3	606.5	975.4
Resolution (μm)	X(Width)	5.3-5.8	11.3-13.4	28.2-47.7	72.9-148.1	88.7-238.1
Repeatability Z (μm)		0.1	0.3	0.5	1.2	2.0
Linearity Z (+/- % of MR)		0.02%	0.02%	0.02%	0.05%	0.06%
Light source wavelength		405 nm		405 nm / 650 nm		650 nm
Laser class		3B				
Dimensions (mm)		72 x 122 x 189	73 x 110 x 165	95 x 117 x 175	95 x 127 x 195	89 x 121 x 195
Weight (kg)		2.22	1.82	2.42	2.75	2.58
Enclosure material		Aluminium				
Temperature characteristics		0.01%				
Scan rate		1800-37900 Hz				
Inputs		Differential encoder, laser safety enable, trigger				
Outputs		2 x digital output, RS-485 serial, 1 x analog output				
Protocols		ModbusTCP, PROFINET, ASCII				
Protection class		IP67 inserted and tightened				
Ambient light		Incandescent Lamp:≤10000lux				
Operating temperature		0 °C ... +50 °C				
Storage temperature		-30 ... +70 °C				
Working humidity		20% ... 85% RH				
Vibration resistance		10 to 55 Hz, 1.5 mm double amplitude in X, Y and Z directions, 2 hours per direction				
Shock resistance		15 g/11 ms, positive and negative for X, Y and Z directions				
Electromagnetic protection		EN 61326-1:2013 (GB/T18268), EN 55011:2007-11 (GB4824, group 1, A class), EN 61000-6-2:2006-03 (GB/T17799.2)				

* default blue laser, add -R behind sensor type if red laser.

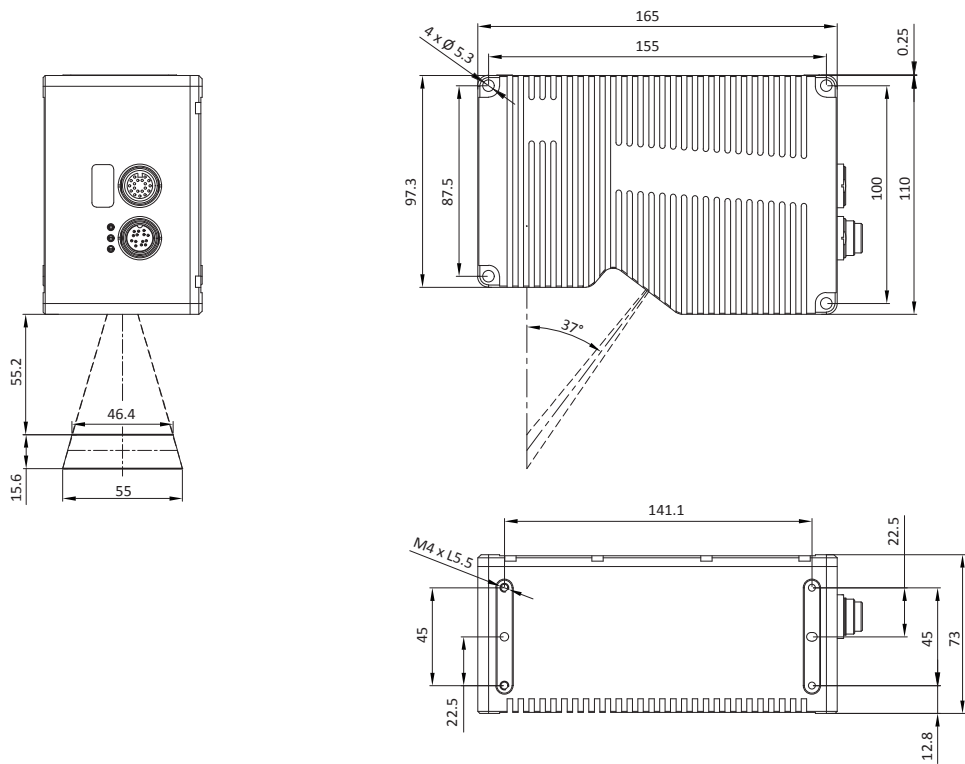
Intelligent 3D laser profile sensor

Outline dimensional drawing

LVM2520



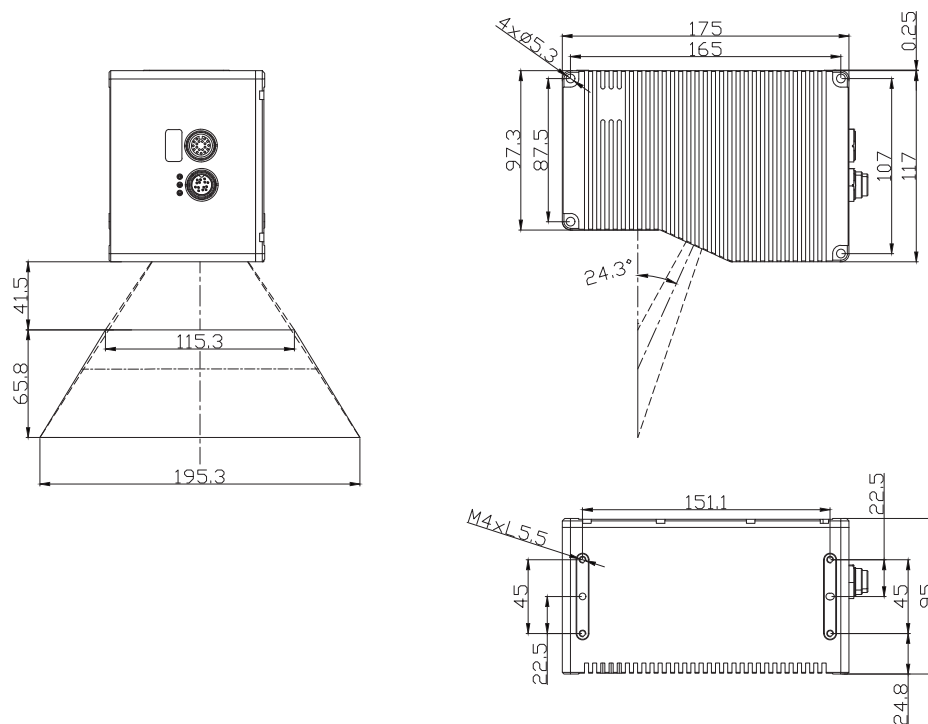
LVM2540



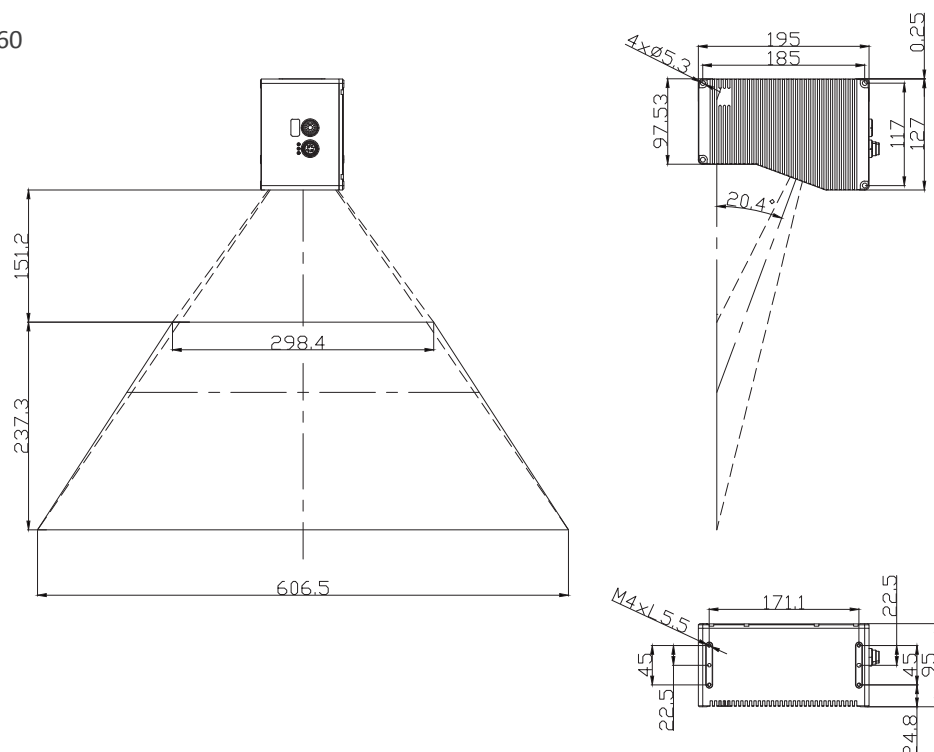
Intelligent 3D laser profile sensor

Outline dimensional drawing

LVM2550



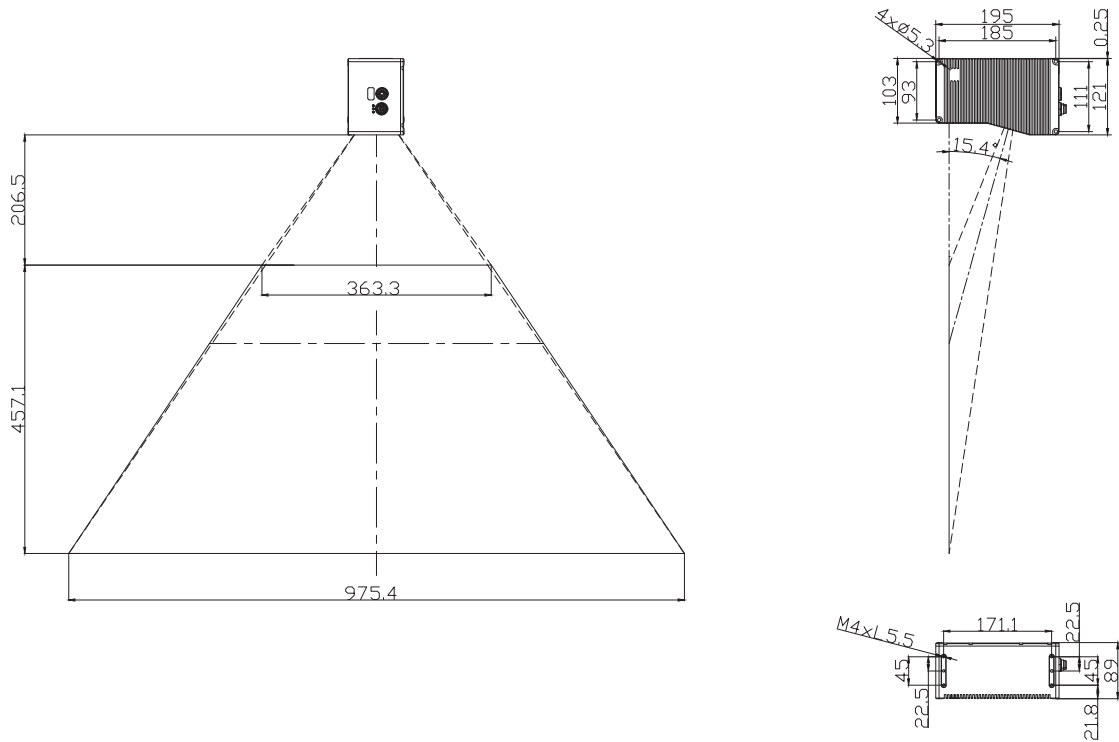
LVM2560





Outline dimensional drawing

LVM2570





High Precision



High Speed
Fast Response



Support For
Various Workpieces



High Stability



Strong Scalability



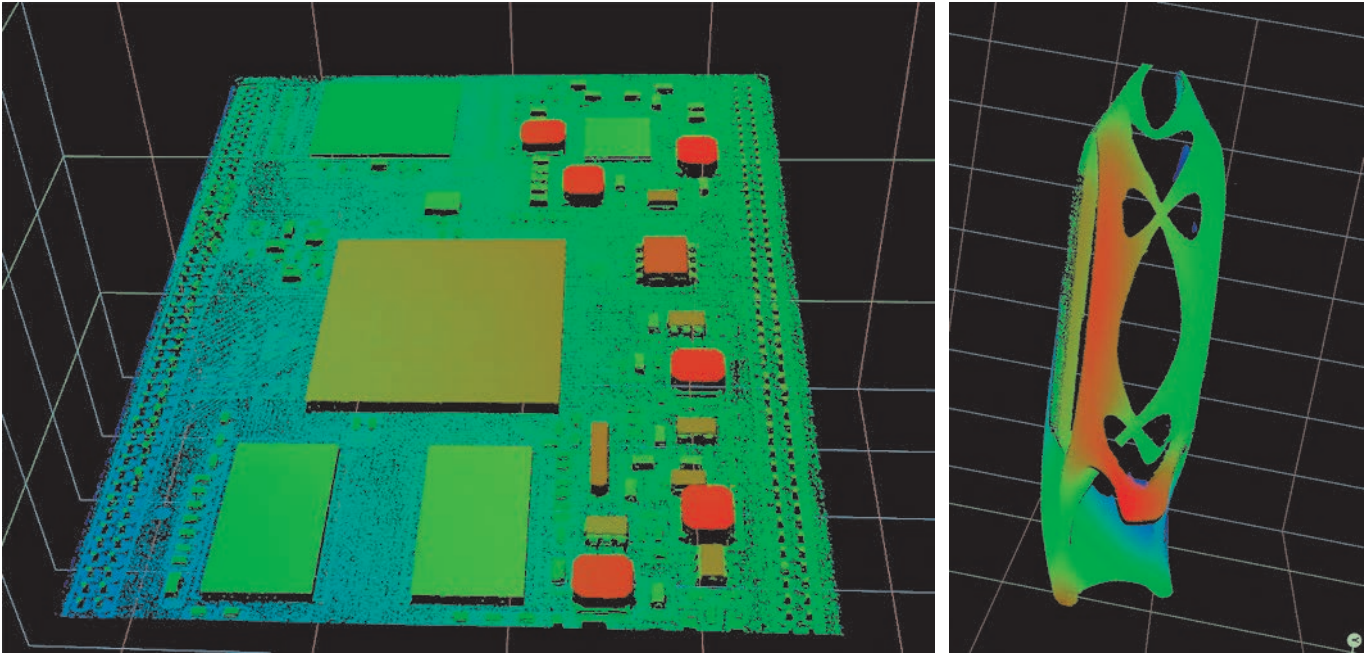
High Fit

Product Features And Advantages




High Precision

Micron-level measurement, accurately draw the shape of the target object, small dents, bumps without missing.

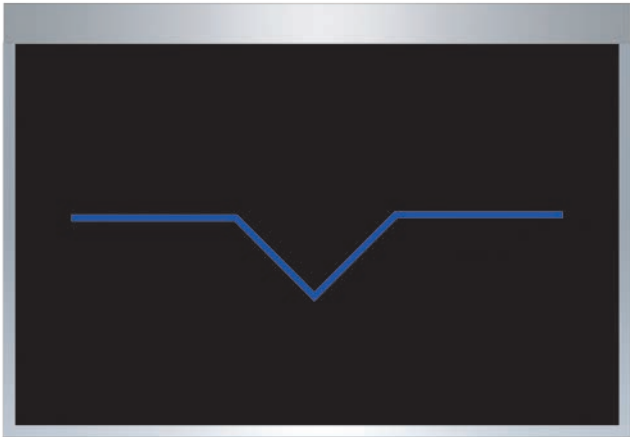


1 - 405nm blue laser

Using a 405nm blue laser, the short-wavelength laser is focused to obtain a clear line beam, allowing for more accurate measurements.



Red laser (Traditional model)

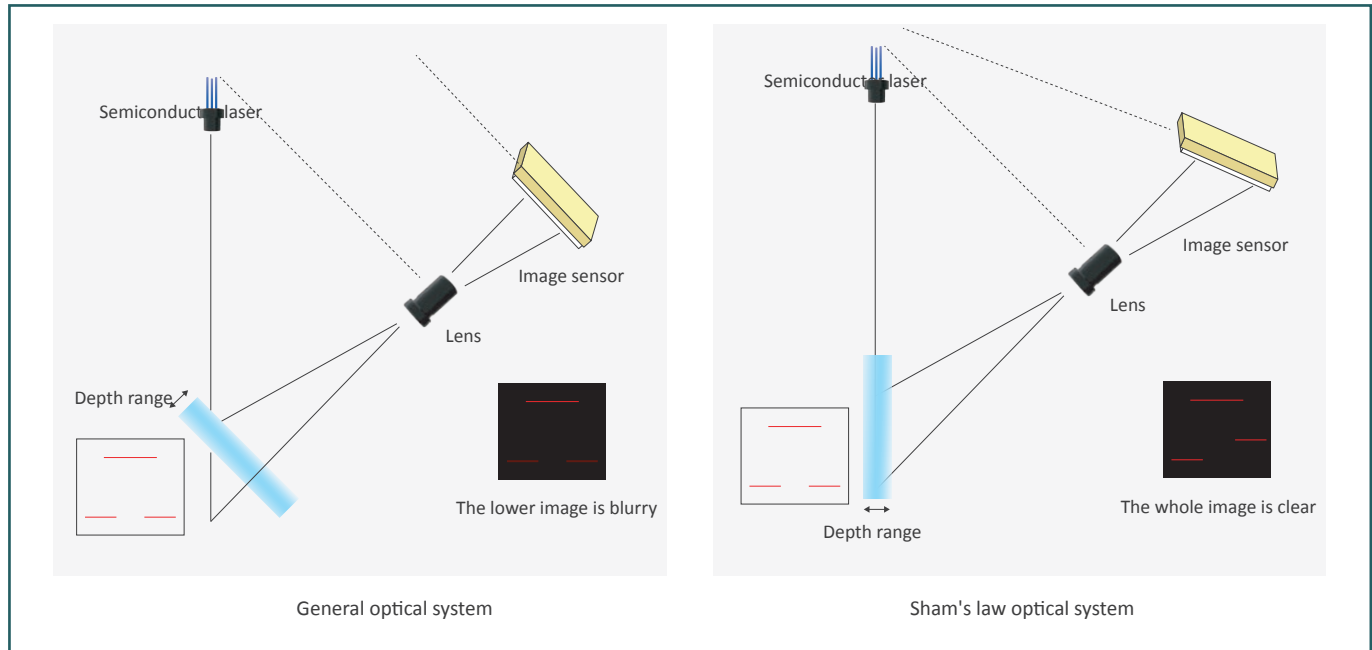


Blue laser

Intelligent 3D laser profile sensor

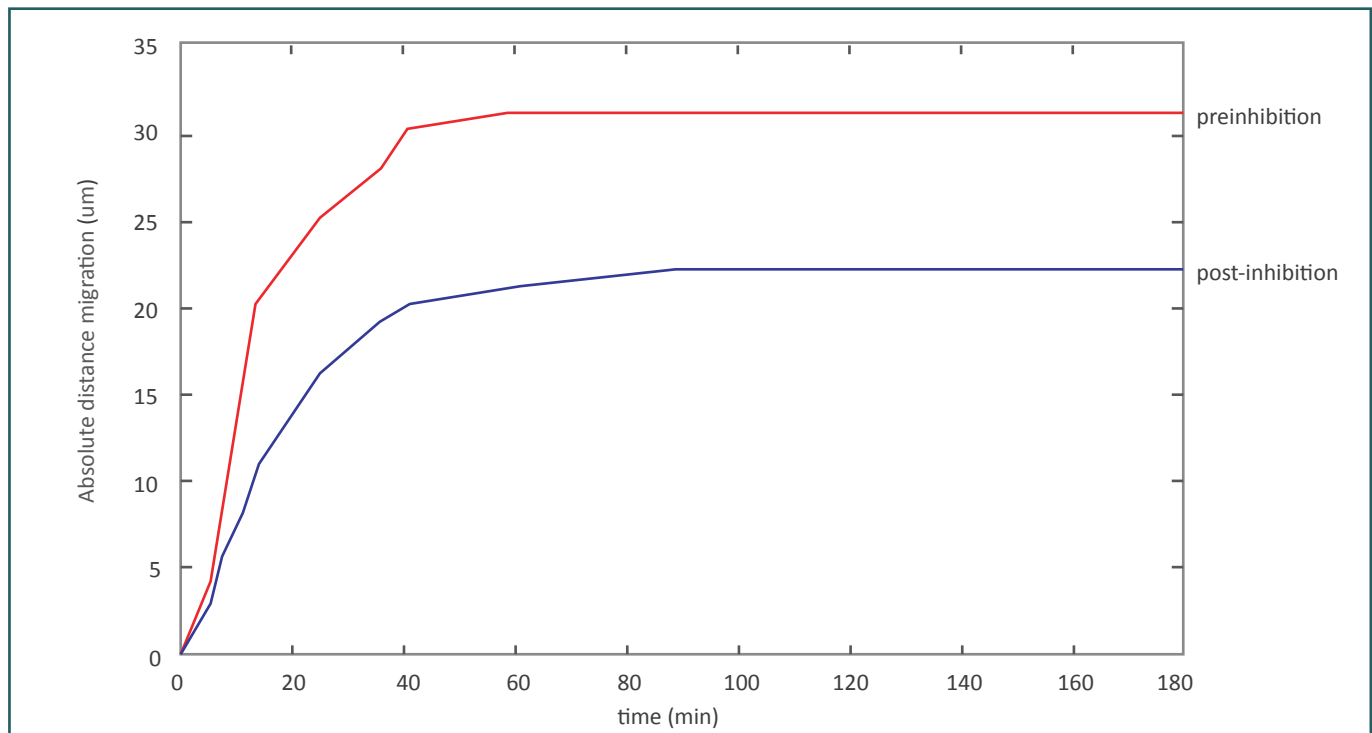
2 - Sham's law optical system

Using Sham's law optical system, the object with high and low difference can be accurately focused to achieve high-precision shooting in the whole field of view.



3 - Automatic temperature compensation

Inhibit the drift of components due to temperature changes to ensure more stable and reliable measurement data.



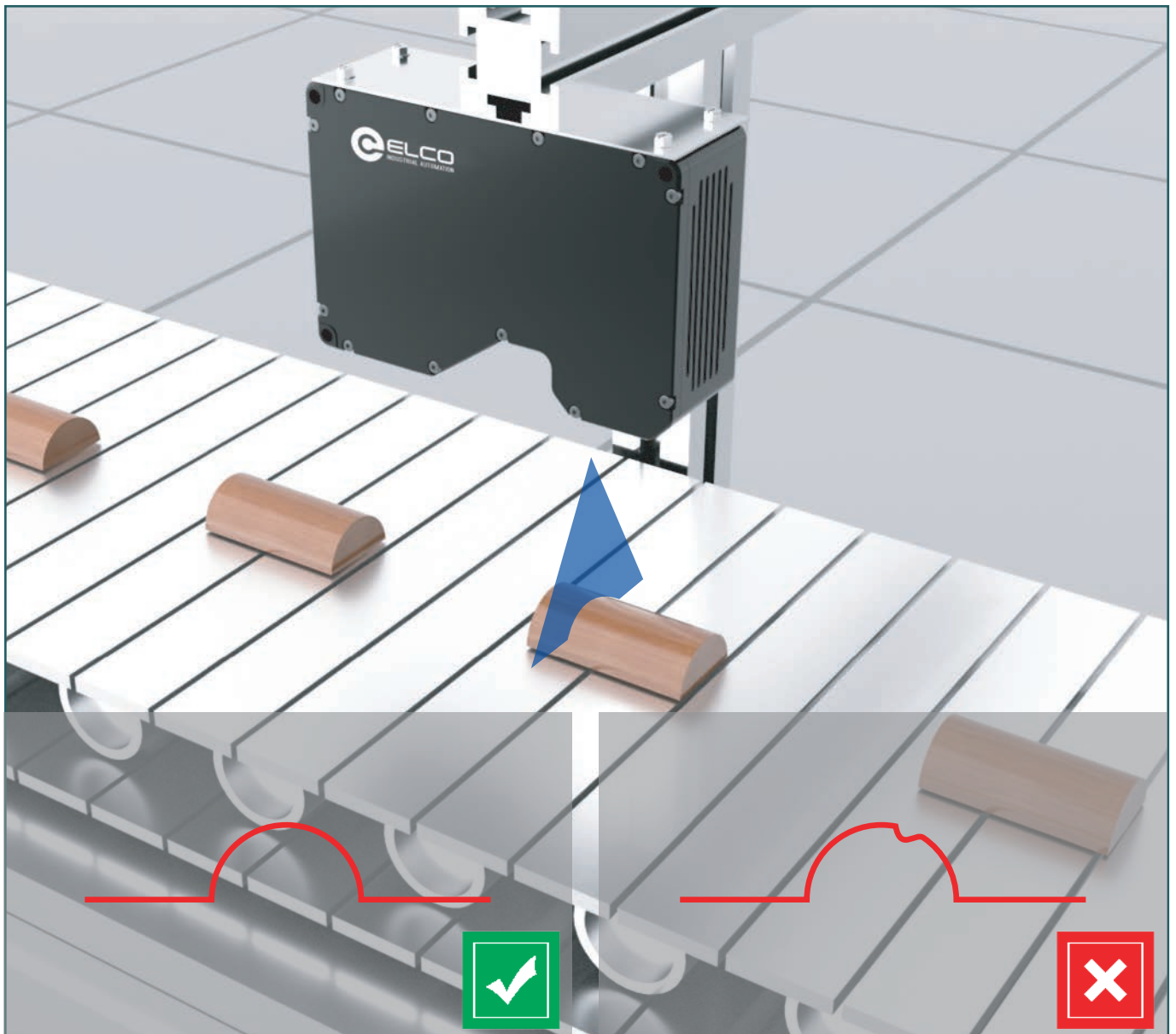
Product Features And Advantages



High Speed / Fast Response

1 - Ultra-high speed scan sampling

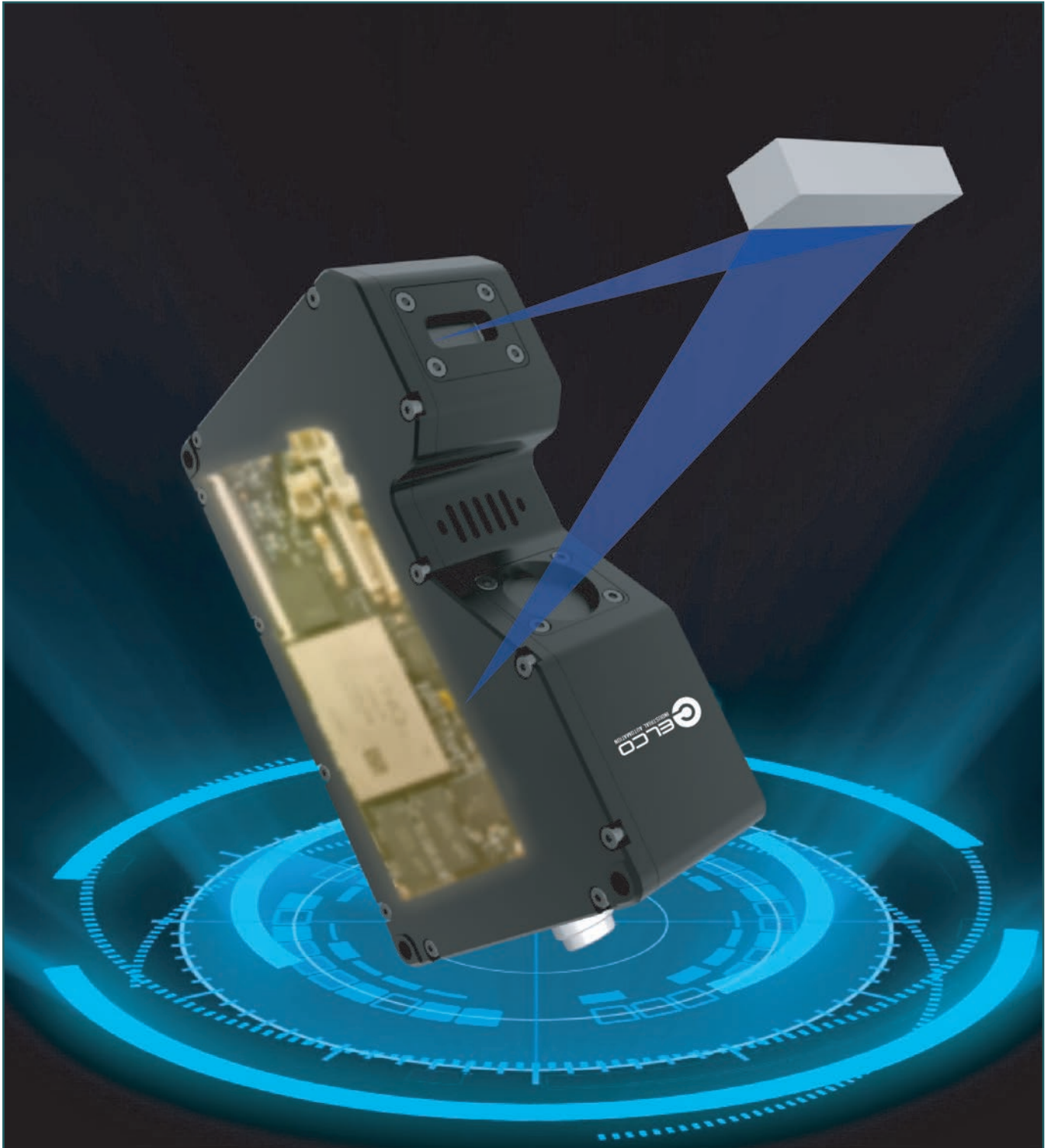
Equipped with high-speed multi-channel CMOS and high-performance processor, sampling frequency up to 10HZ, easy to achieve ultra-high-speed sampling, to meet the needs of high-speed production line measurement and inspection.



Intelligent 3D laser profile sensor

2 - Real-time result output

The built-in powerful embedded 3D measurement tool processes the sampled data at high speed, and the measurement results are output in real time without additional calculation.



Product Features And Advantages



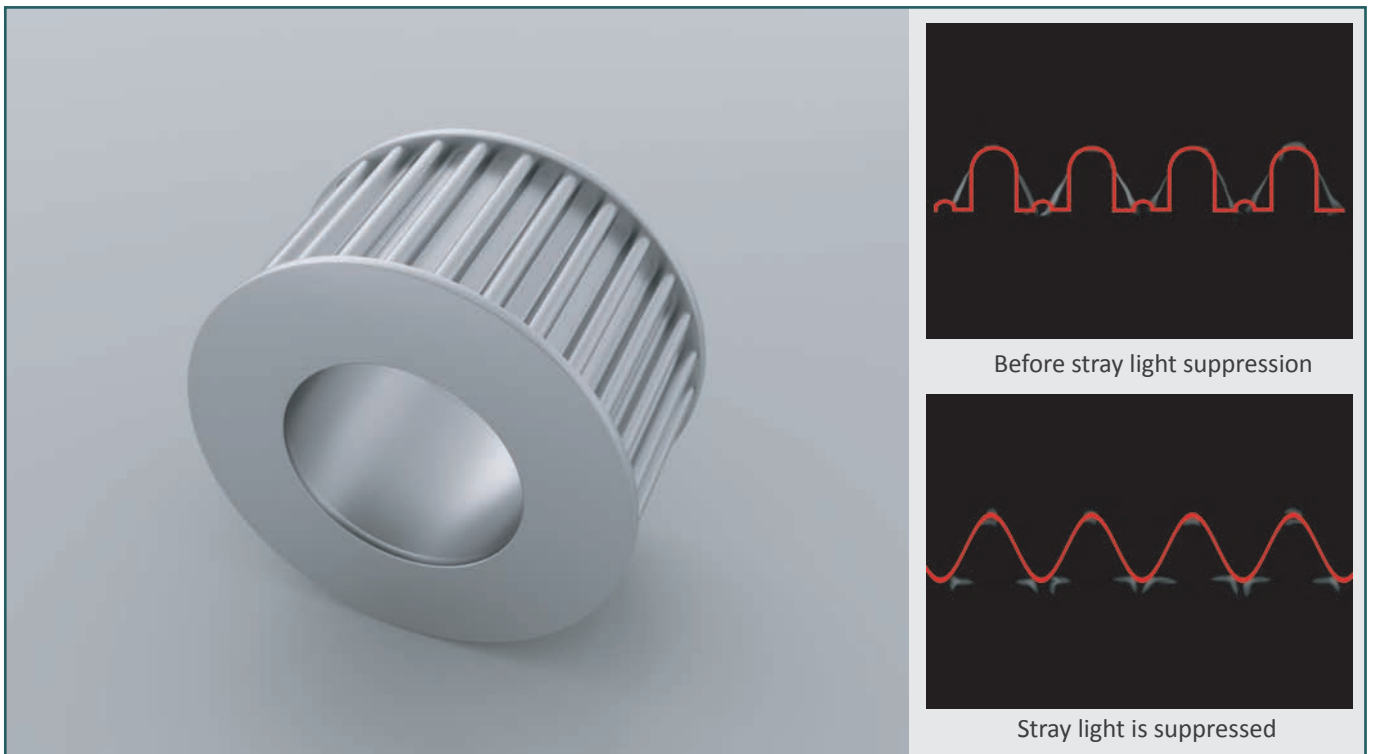
Support For Various Workpieces

Not affected by color, gloss, easily detect metal, plastic, glass and other workpieces.



1 - Stray light suppression

Through the original algorithm, it can suppress the influence of stray light caused by multiple reflections and diffuse emission of shiny objects, and accurately represent the object contour.

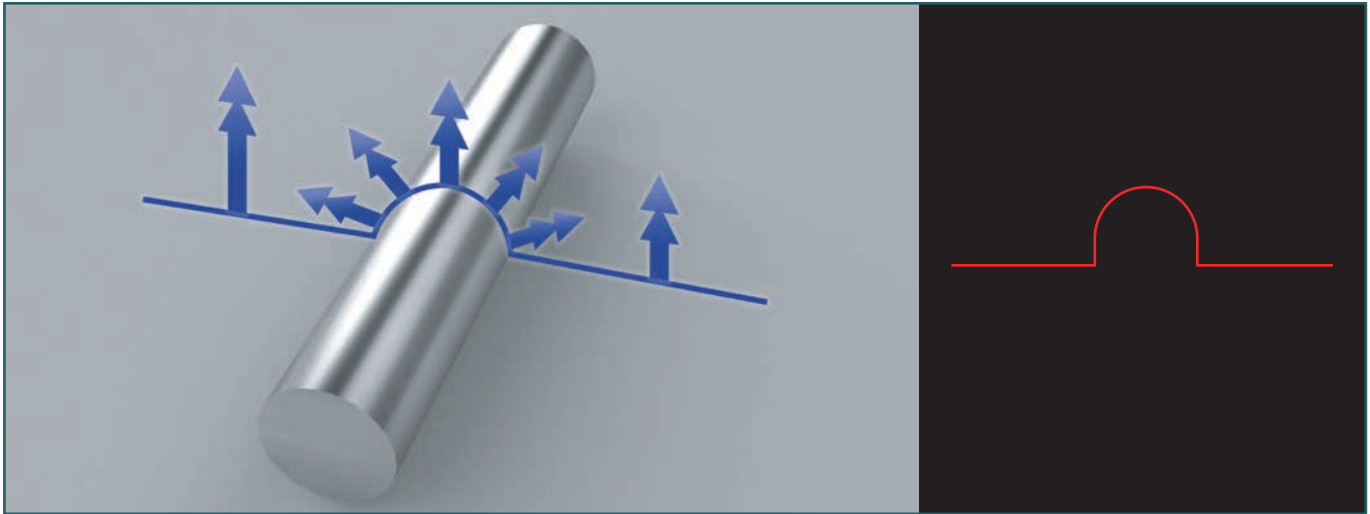


Intelligent 3D laser profile sensor

2 - High dynamic range

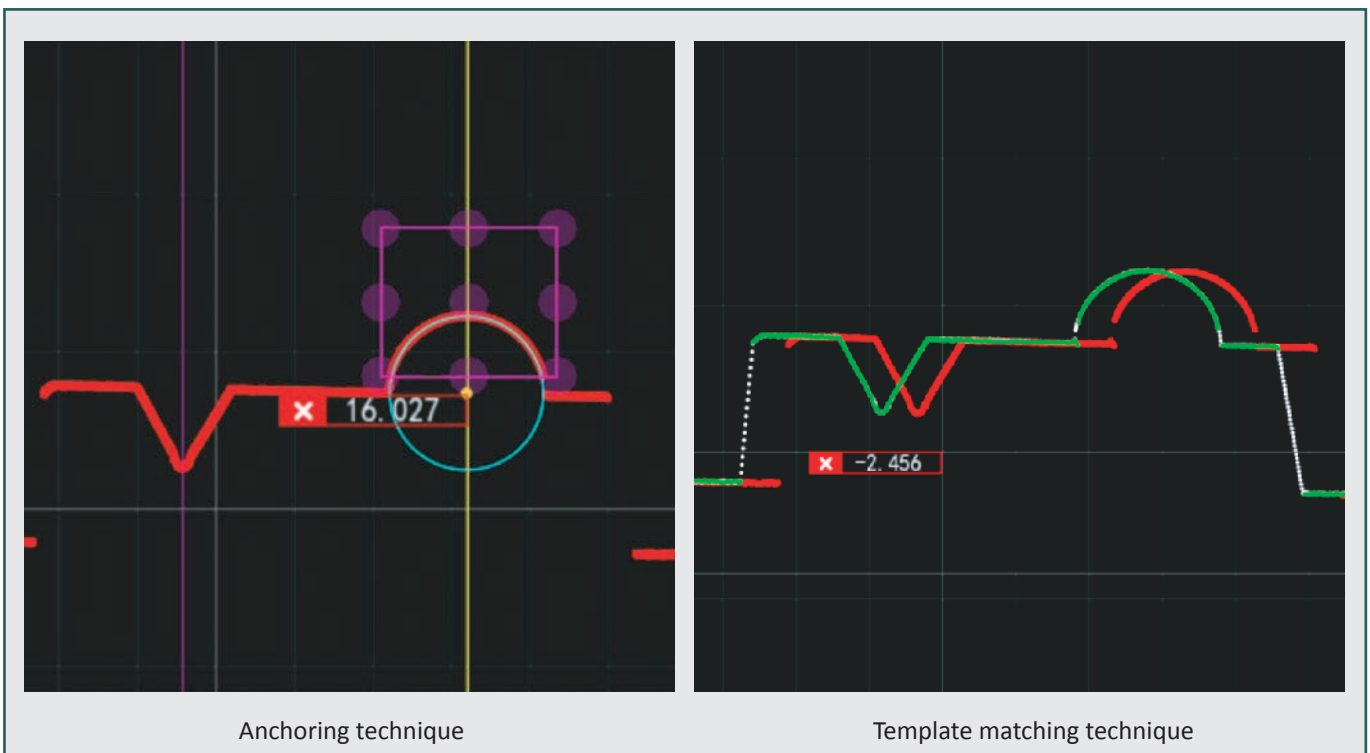
Using multiple exposure technology, the highly reflective area is low exposure, and the weakly reflective area is high exposure.

Accurately measure the shape of objects regardless of light and dark differences.



High Stability

Anchor and template matching technology is used to track the local or overall characteristics of the object, and remove measurement deviations caused by conveyor vibration, sample deviation or rotation, so as to achieve stable measurement under vibration environment.



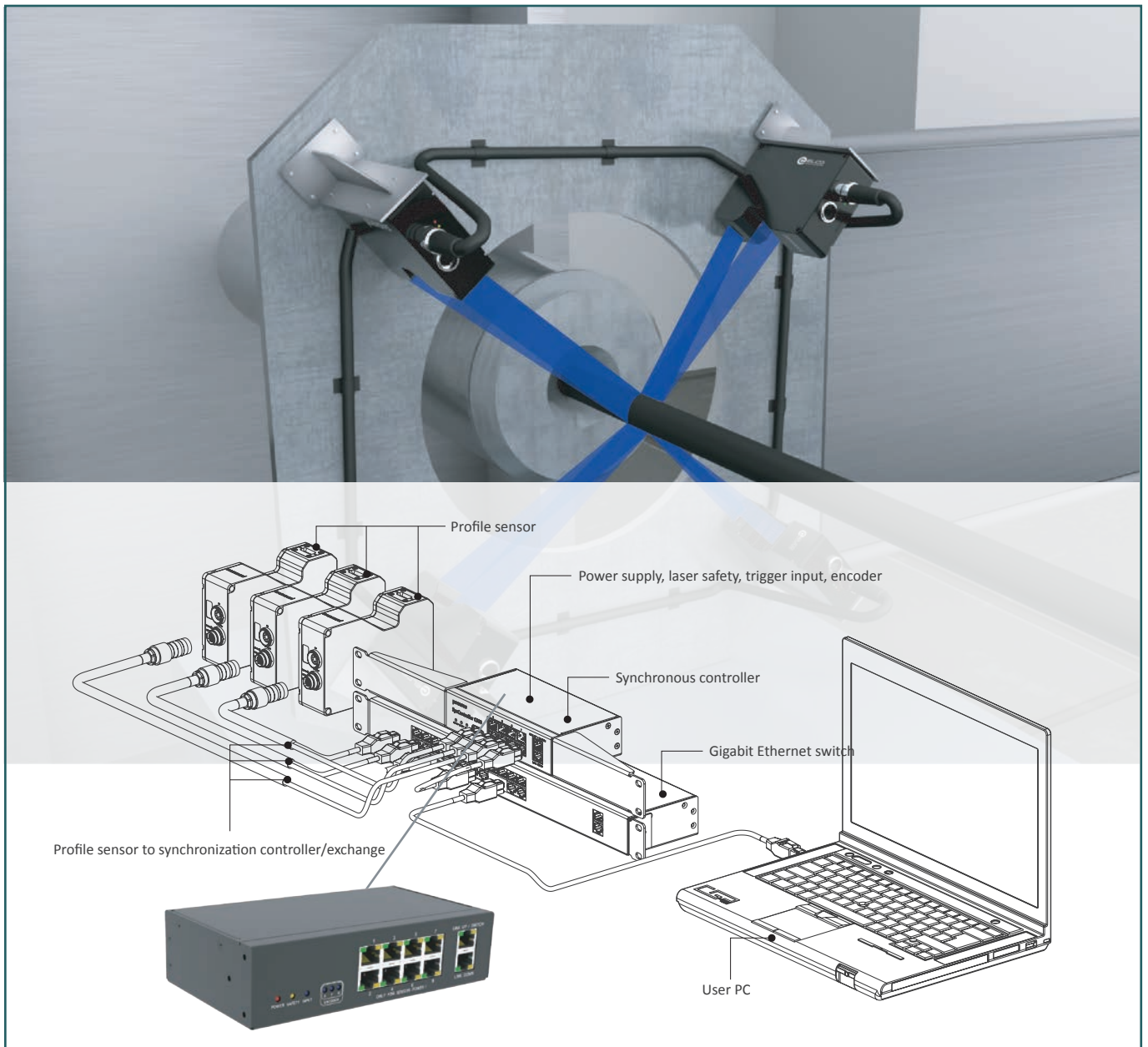
Product Features And Advantages



Strong Scalability

Strong scalability, multi-machine collaboration

A measurement system can be connected to up to 8 sensors for detection in multiple directions and multi-point detection on large workpieces.



Intelligent 3D laser profile sensor



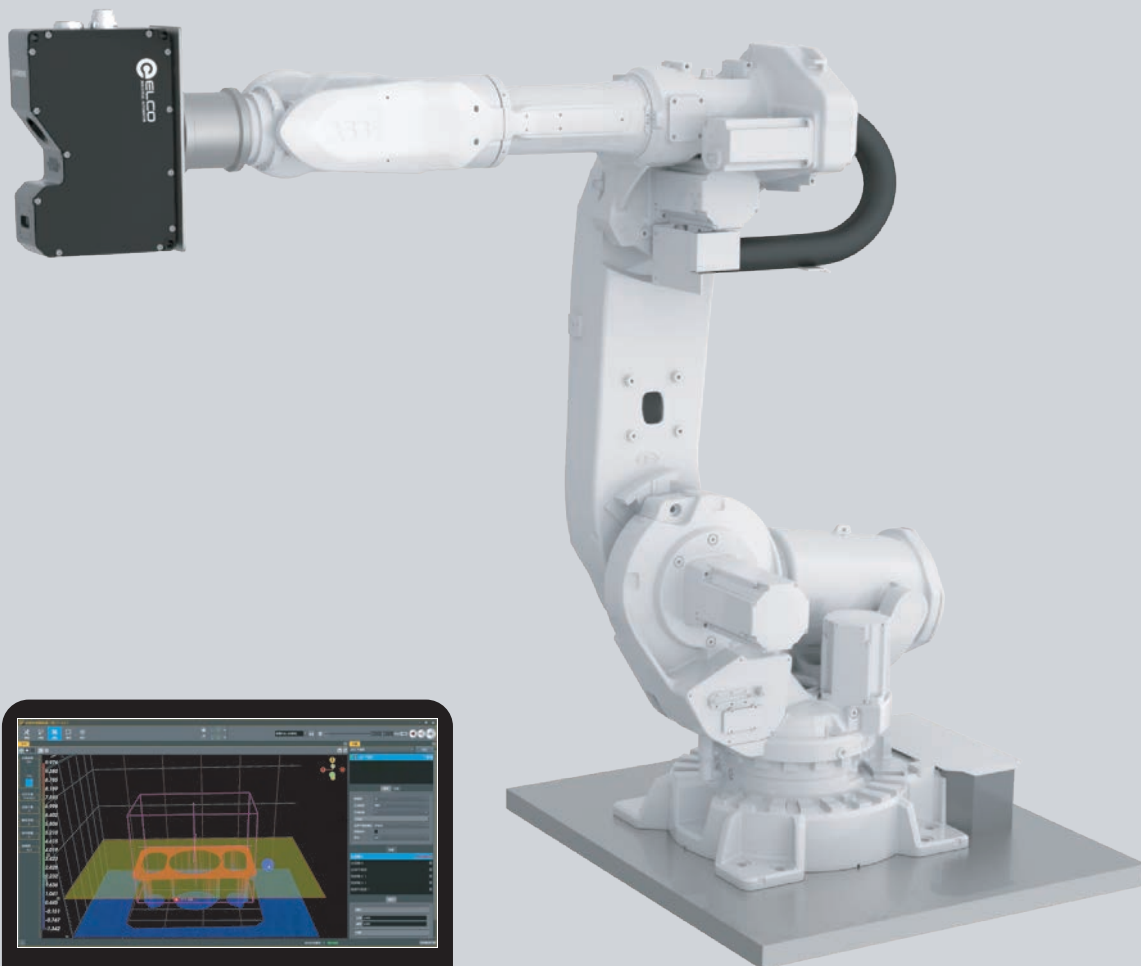
High Fit

High adaptability, rich output interface

Support multi-channel protocols, such as Modbus, ProfiNet, ASCII, etc., compatible with a variety of PLC control systems.

It supports GenTL transmission protocol and can be seamlessly connected with measurement platforms such as Haclon.

Provide SDK based on C/C++, Java, C# programming languages, convenient for users to carry out secondary development.



Apply Measuring Tools And Measuring Modes

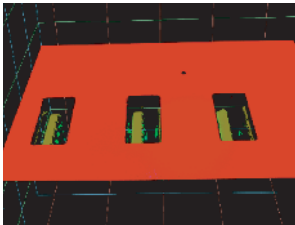


Multiple Measurement Modes

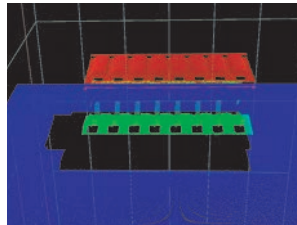
Powerful, rich software features, to provide a variety of solutions.

Scanning and measurement can be performed automatically with simple Settings, and the measurement results are directly output to the control system for rapid deployment.

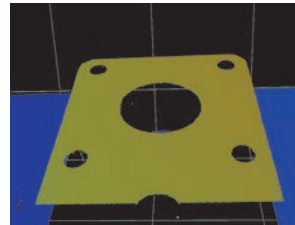
1 - Point cloud tool



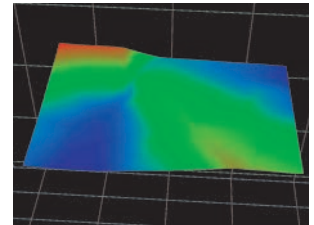
Slot



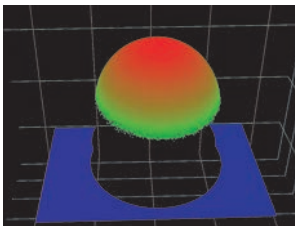
Dimension



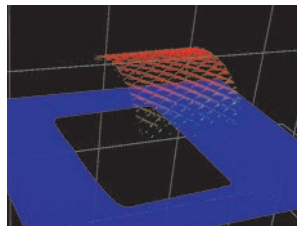
hole



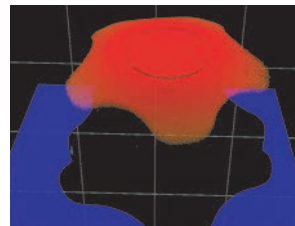
Flatness



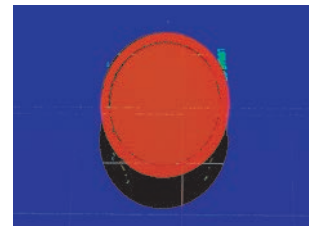
Ball



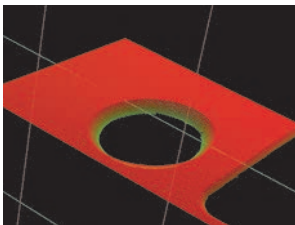
Camber



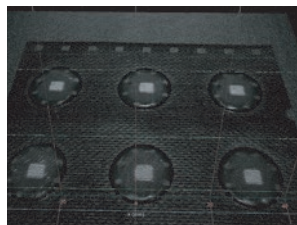
volume



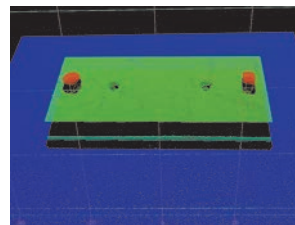
Round



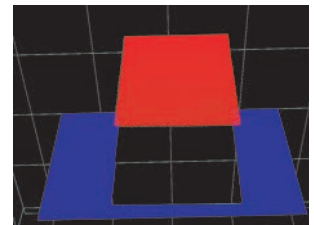
Conical hole



Fleck



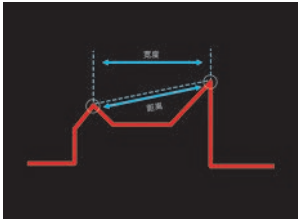
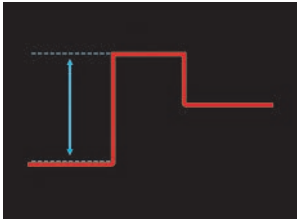
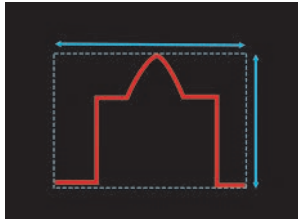
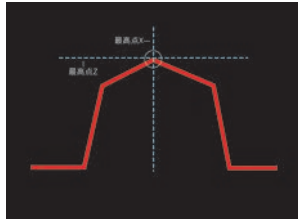
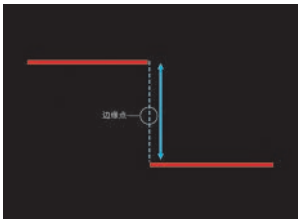
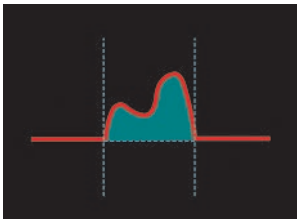
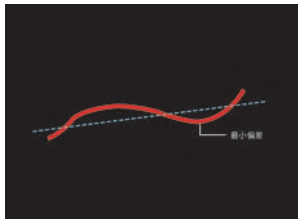
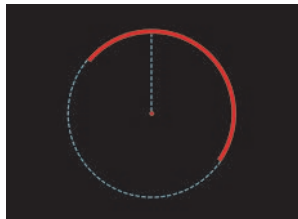


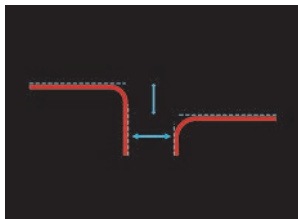
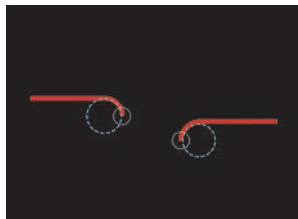
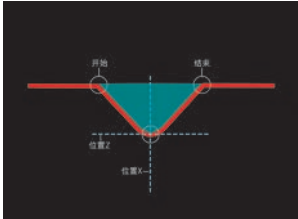
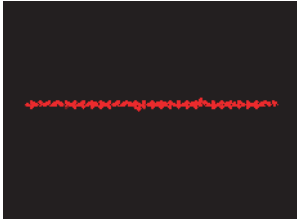
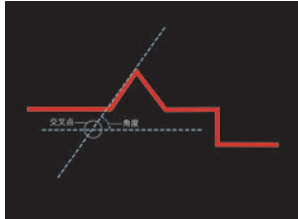
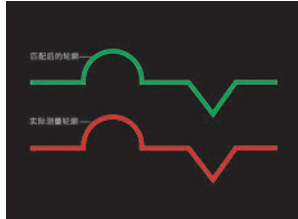


Bounding Box



Edge

Intelligent 3D laser profile sensor

2 - Contour tool

			
Dimension	High	Bounding box	Position
			
Edge	Area	Straight line	Round
			
Embossment	Hollow	Gap surface difference	Chamfer
			
V-groove	Roughness	Intersect	Template matching
		...	
Closed area	Roundness		

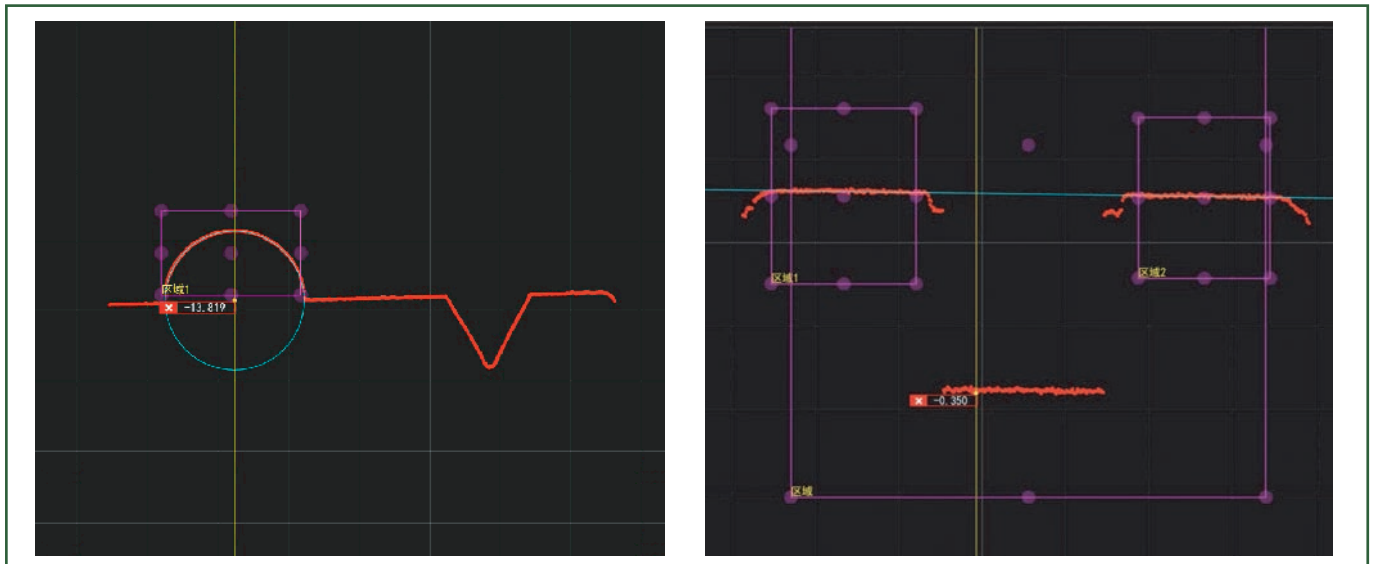
Apply Measuring Tools And Measuring Modes



Multiple Measurement Modes

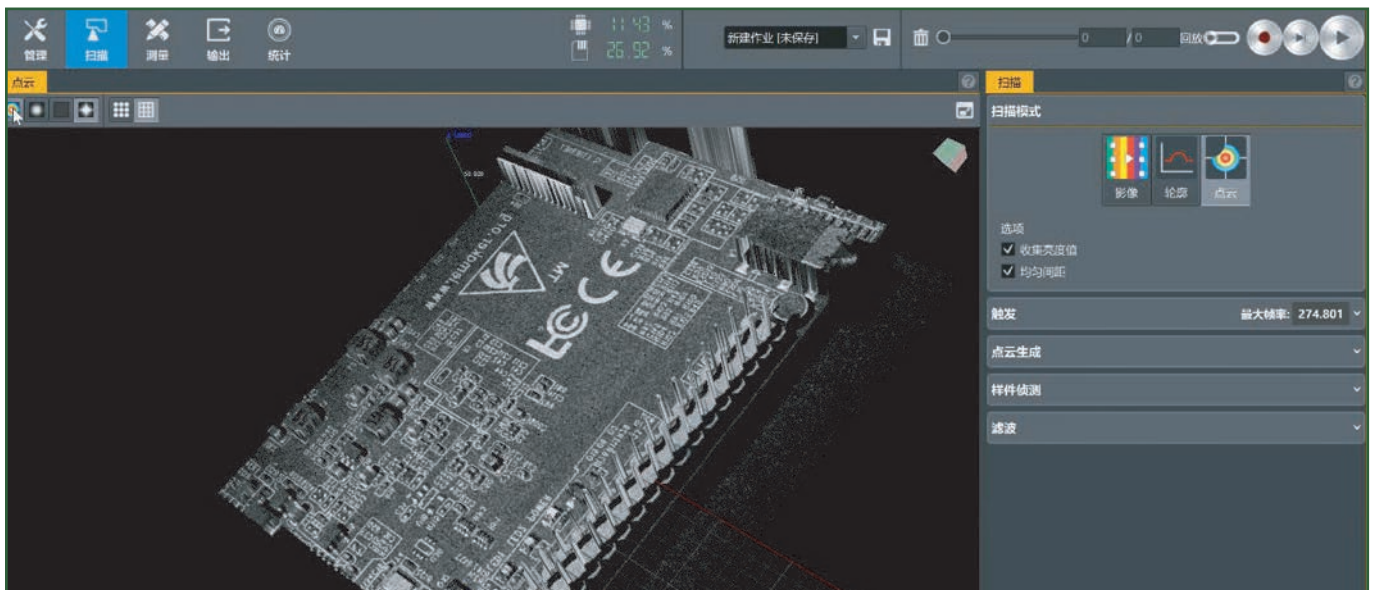
1 - Contour pattern

Used to measure cross-section characteristics of objects, such as height, size, position, clearance, chamfer and roundness.



2 - Luminance mode

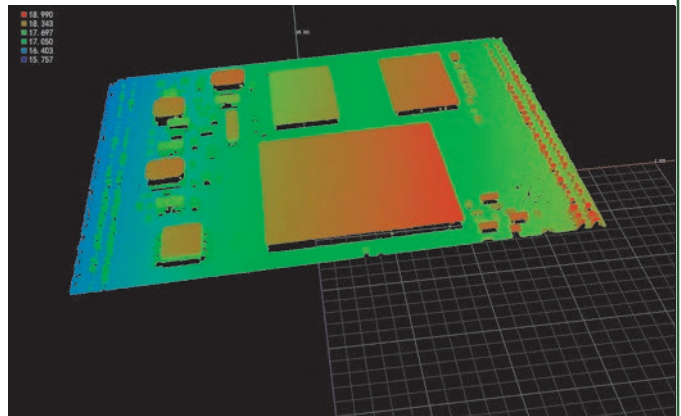
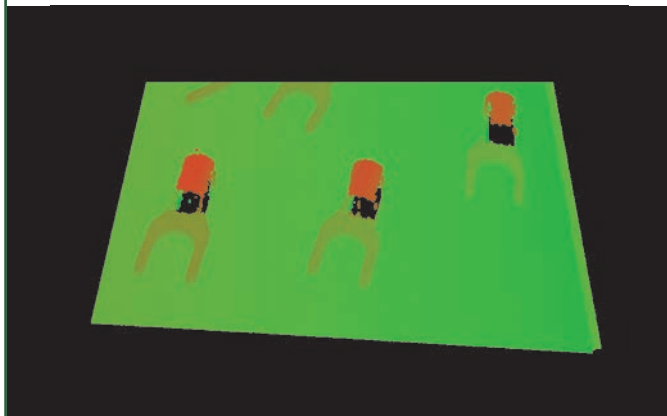
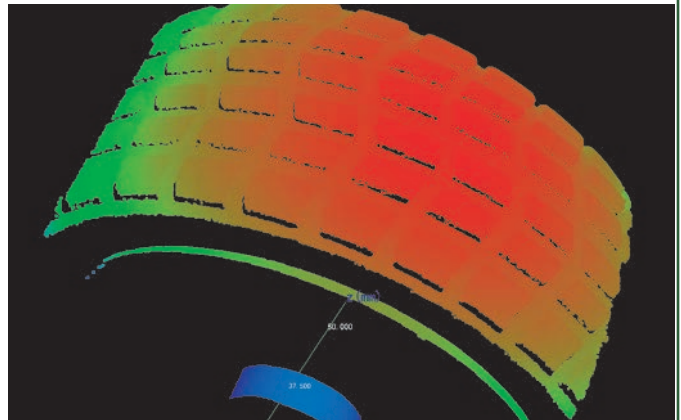
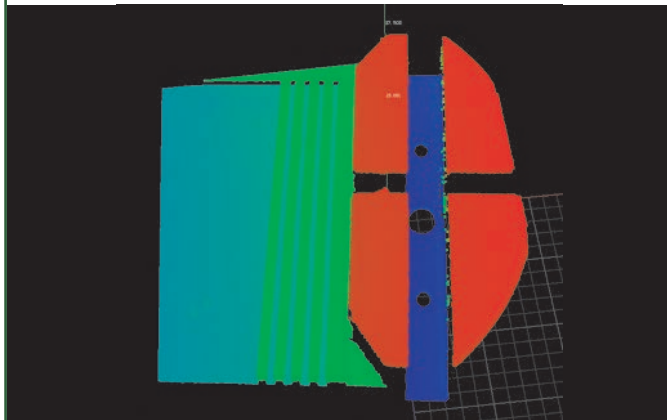
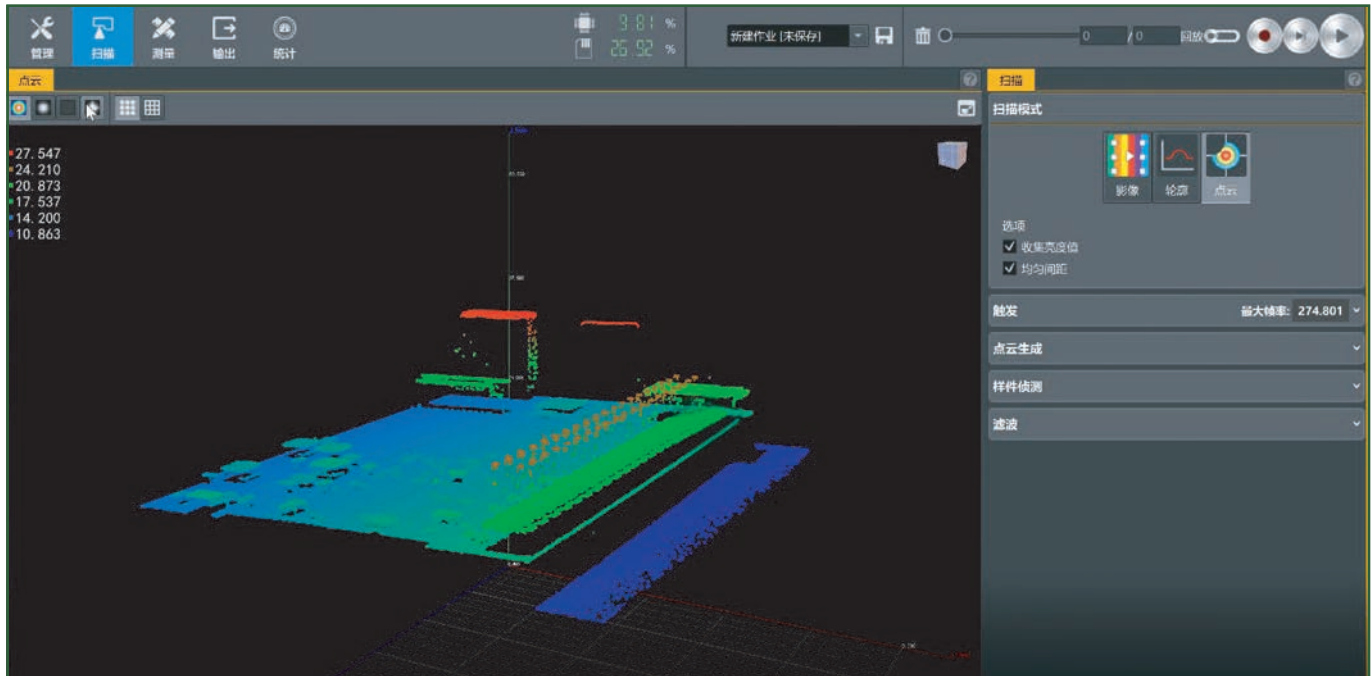
It is used to detect 2D features on the surface of objects, such as character recognition and bar code recognition.



Intelligent 3D laser profile sensor

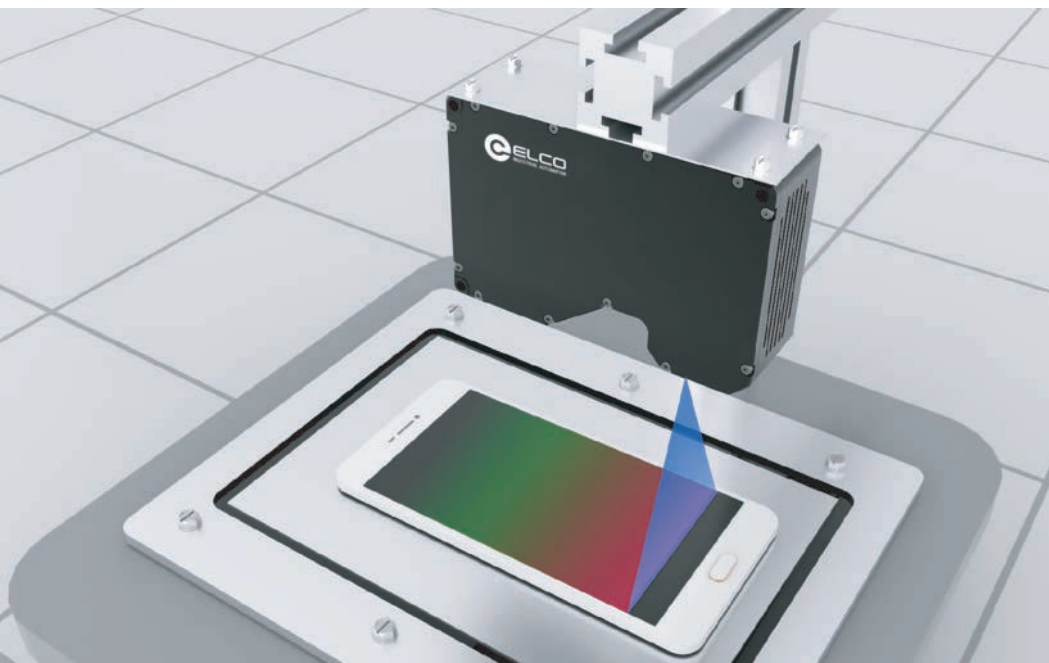
3 - Point cloud model

Used to measure surface features of objects, such as volume, plane, hole, sphere, edge and opening.



Product Application Cases

Consumer Electronics Industry Application



Mobile Phone Screen Detection

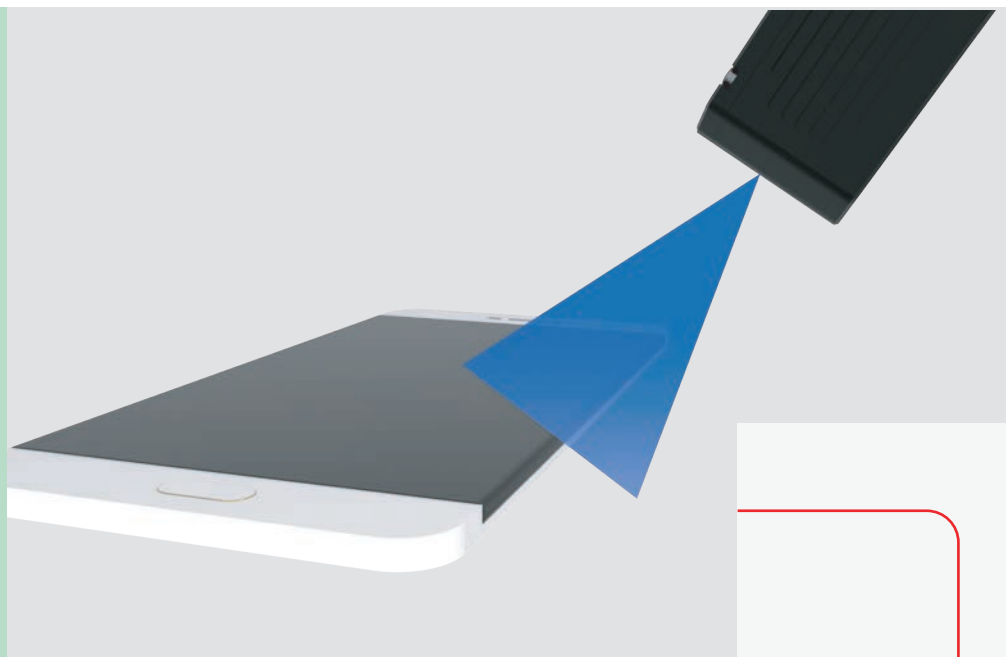
Detect the flatness, thickness and curvature of the mobile phone screen glass, accurately identify the surface defects such as edge breakage, pitting and dirt on the glass, and remove defective products.

<< Flat glass screen

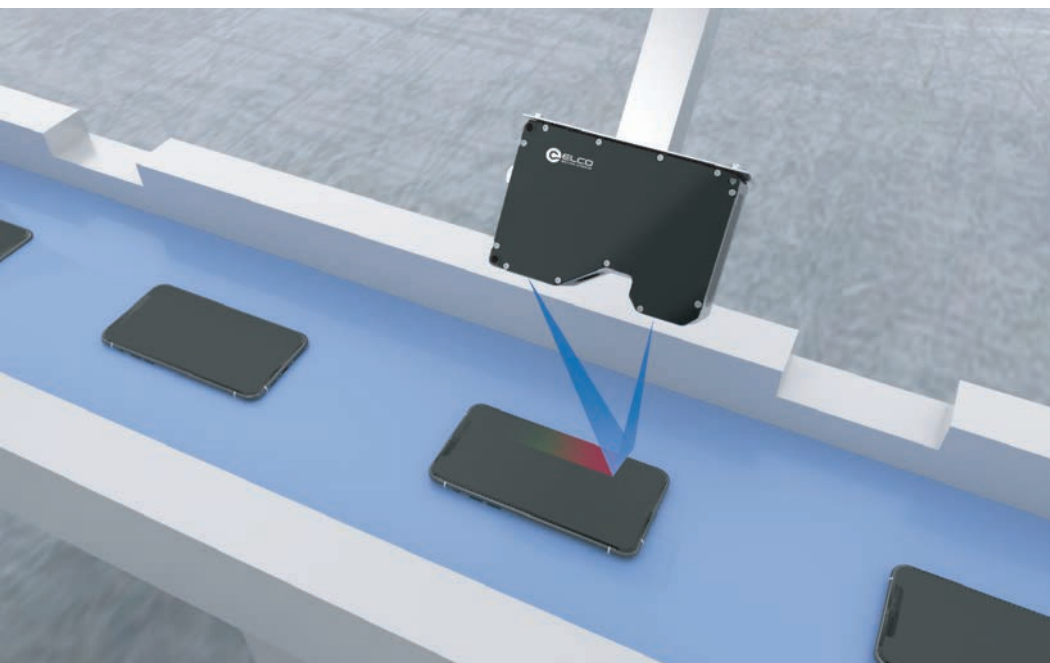
Flatness detection

Curved screen glass >>

Chamfer detection



Intelligent 3D laser profile sensor

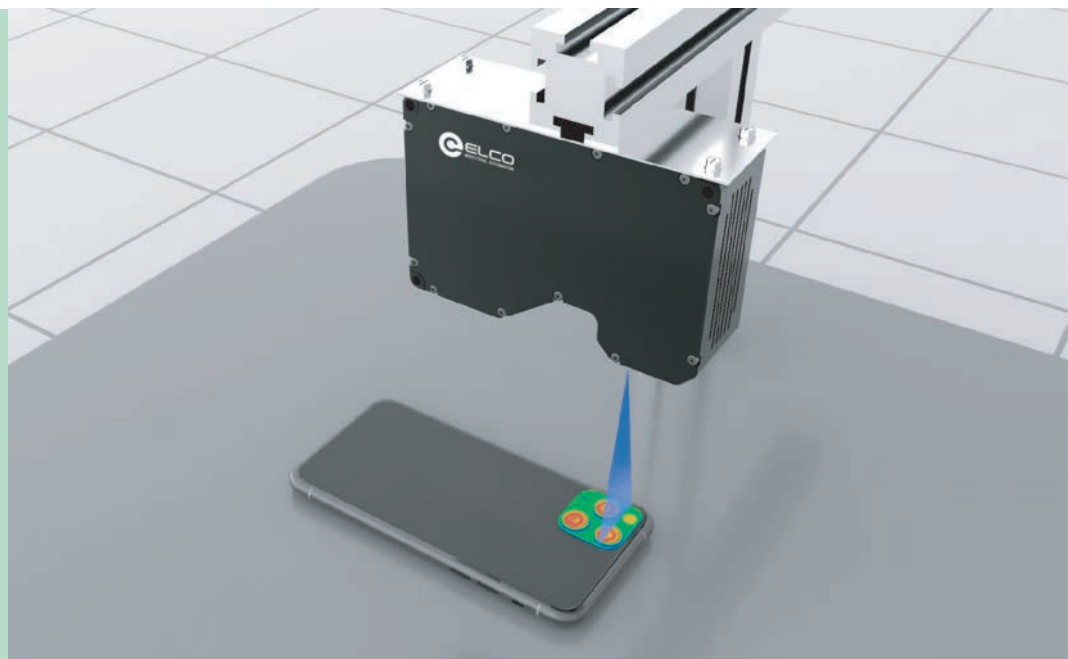


Mobile Phone Assembly Accuracy Detection

Accurately detect gaps and height differences between objects with different reflectance such as screen glass and shell to ensure assembly accuracy.

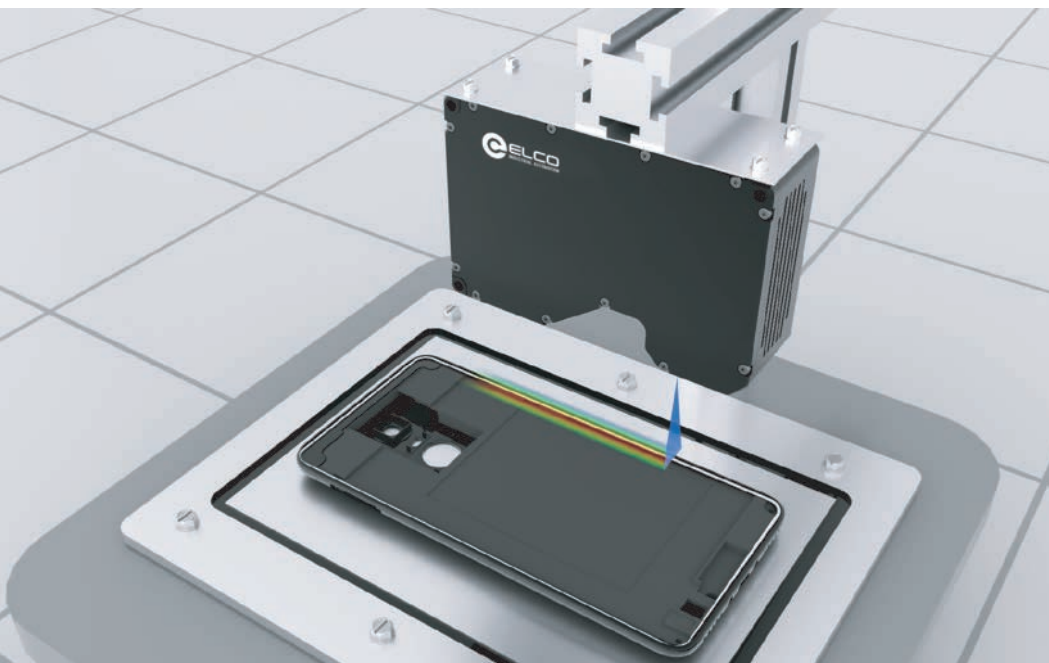
<< Screen gap detection

Camera gap detection >>



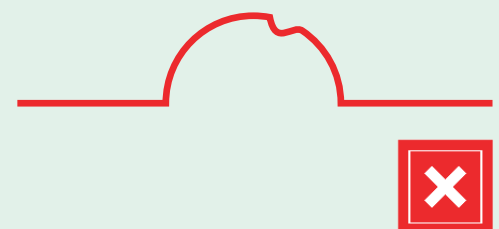
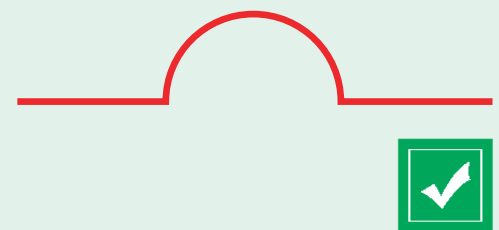
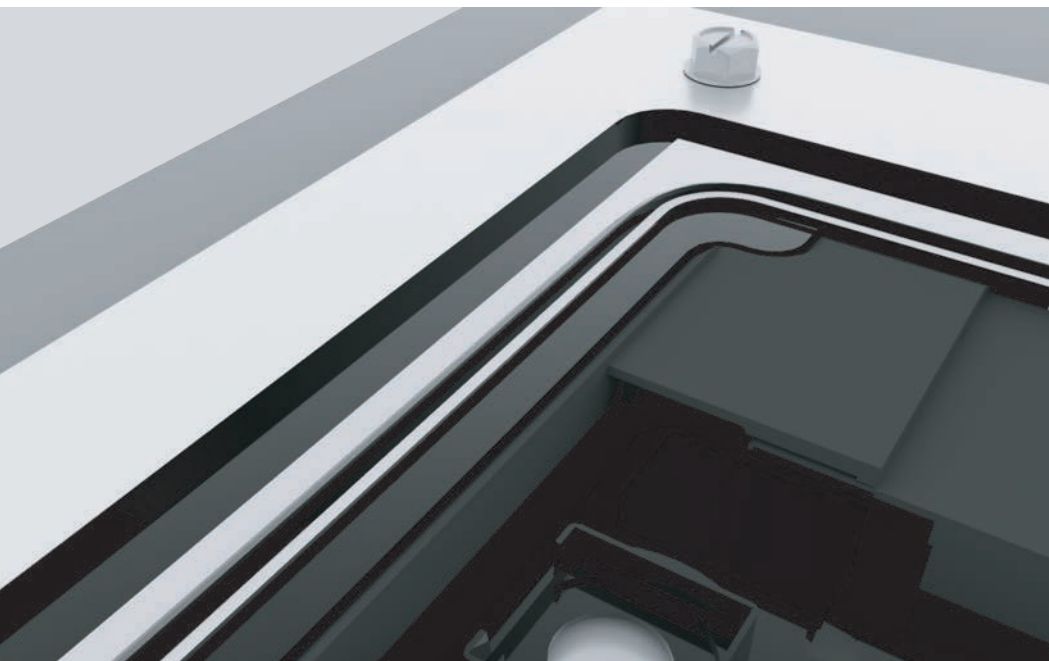
Product Application Cases

Consumer Electronics Industry Application

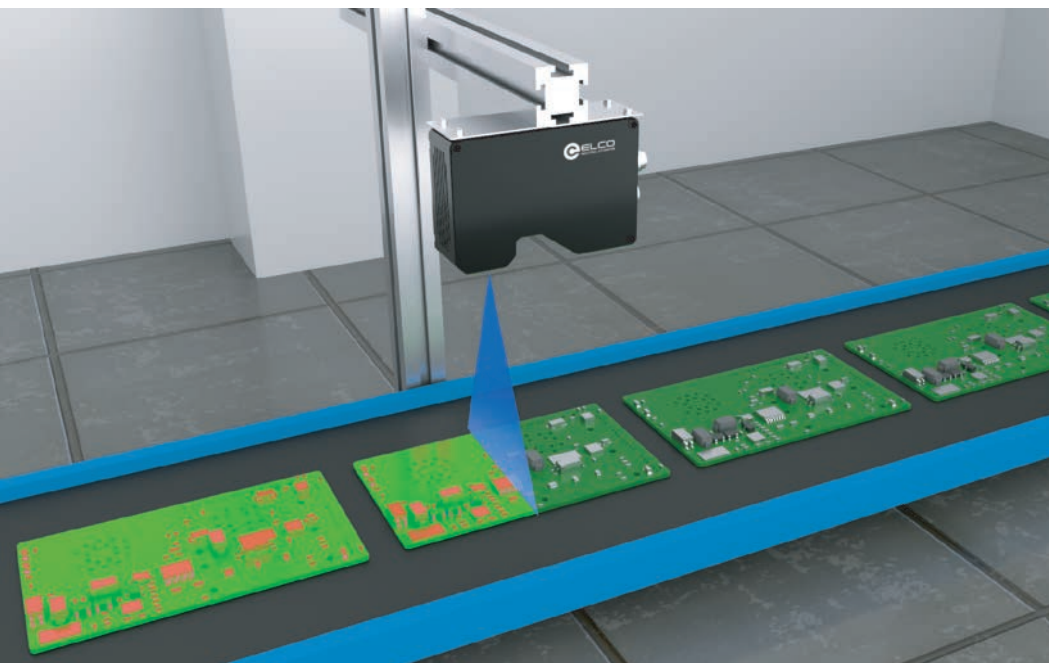


Mobile Phone Glue Path Detection

Detect the transparent and black glue of the ultra-narrow frame mobile phone glue road, accurately detect the excessive or too little glue and other anomalies.



Intelligent 3D laser profile sensor

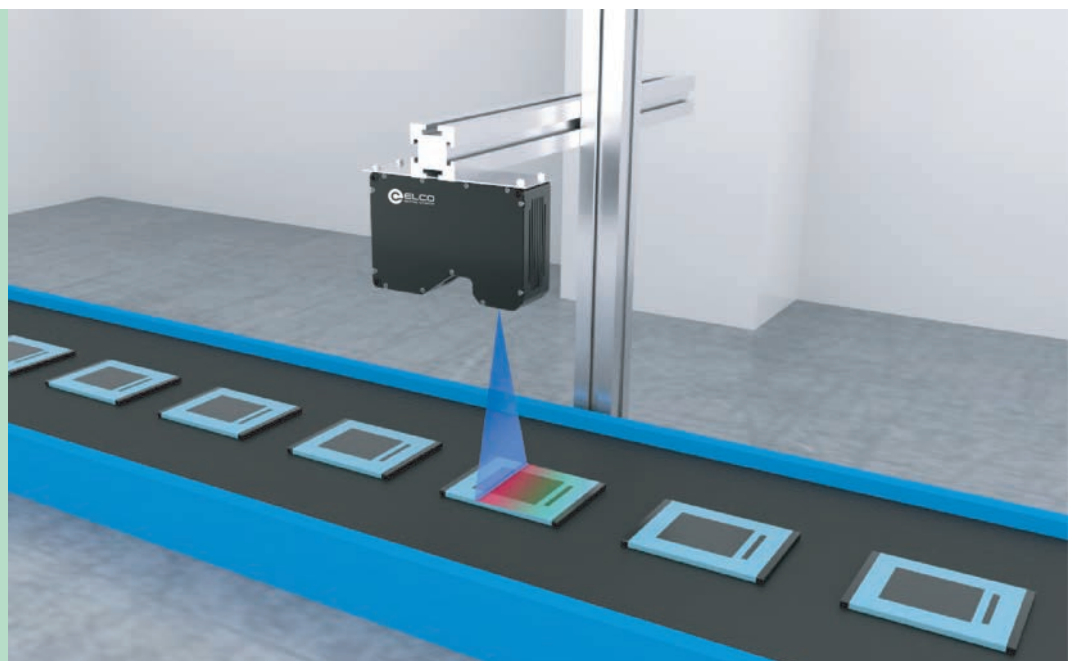


Pcb Solder Paste Test

Check whether the height and position of the solder paste are correct, and whether there is welding leakage and welding slag.

Battery Flatness Check

Detect the flatness of the battery to avoid assembly abnormalities caused by uneven batteries or foreign objects.



Product Application Cases

Automotive Industry Application

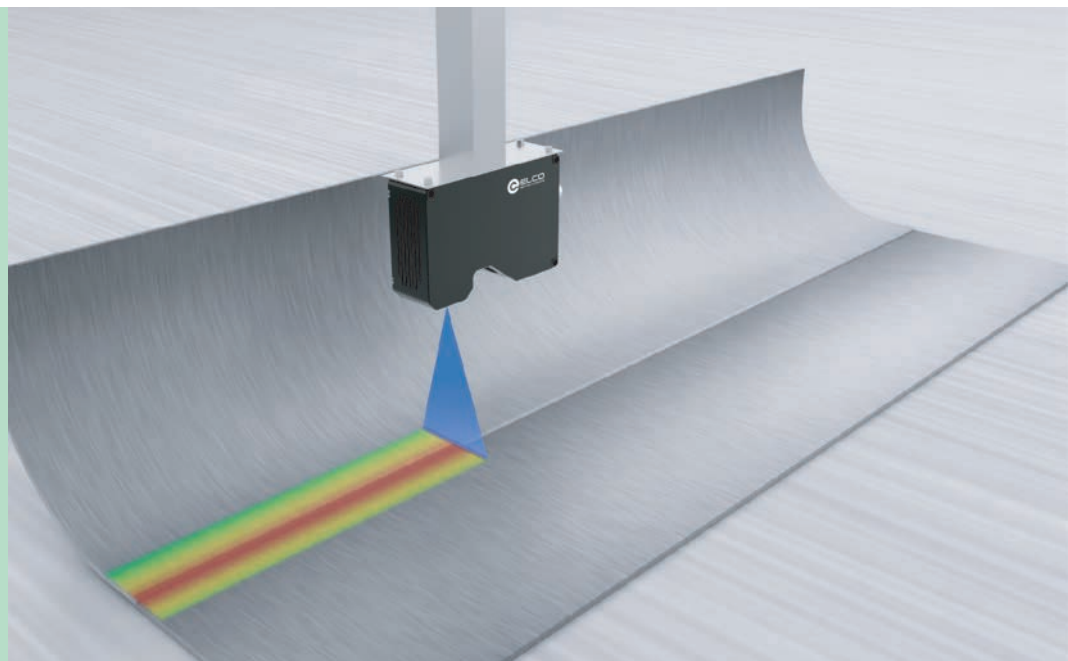


Body Clearance Surface Difference Detection

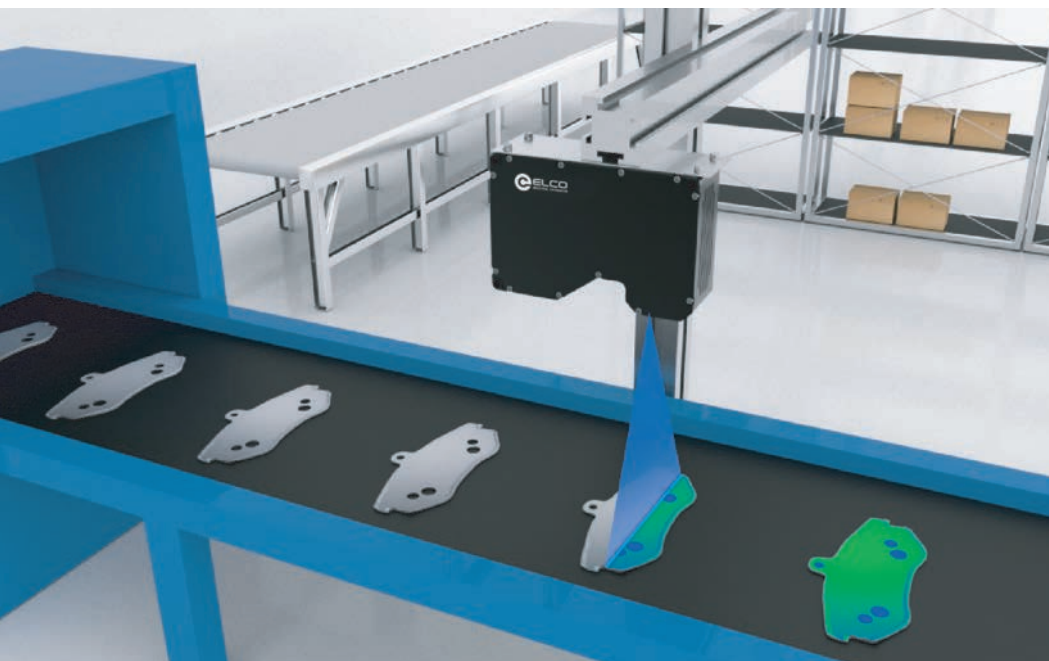
Regardless of material and reflectivity, accurately measure the gap surface difference of the body, such as Windows, mirrors, panoramic sunroofs, lights, etc. The measurement accuracy of micron level fully meets the requirements of high precision for body assembly.

Weld Shape Detection

The weld is perforated, staggered, weld height, edge bite and so on detection to prevent bad welding. Using a blue laser, subtle defects can be detected.



Intelligent 3D laser profile sensor

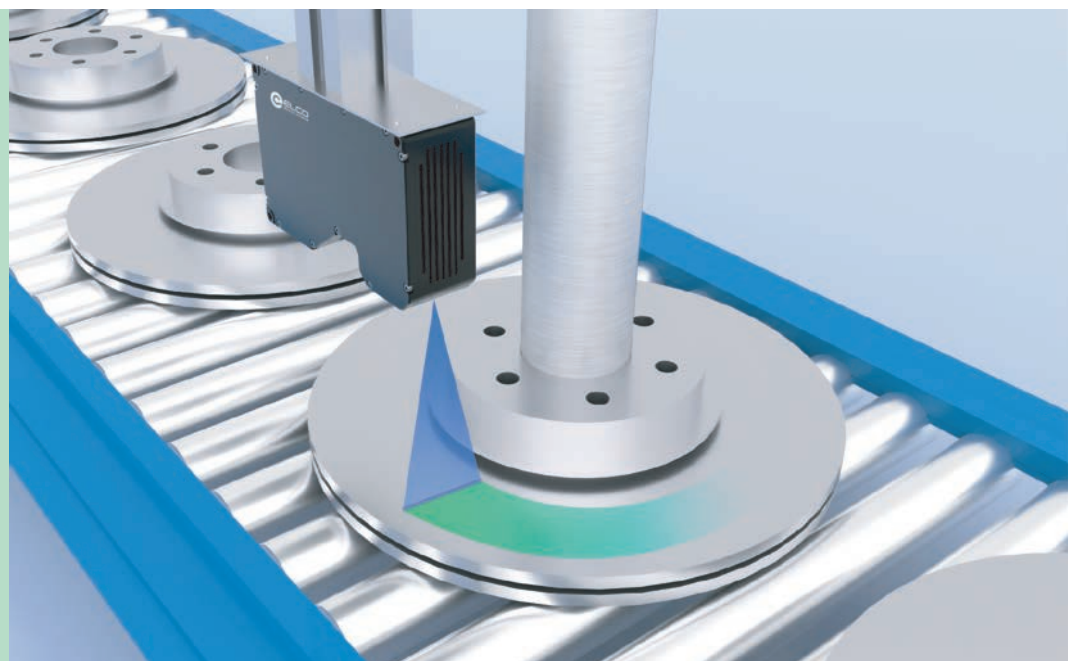


Stamping Part Inspection

By testing the size, shape, width and height of the stamping parts, judge whether there are burrs, wrinkles, pits, convex hull and other appearance defects.

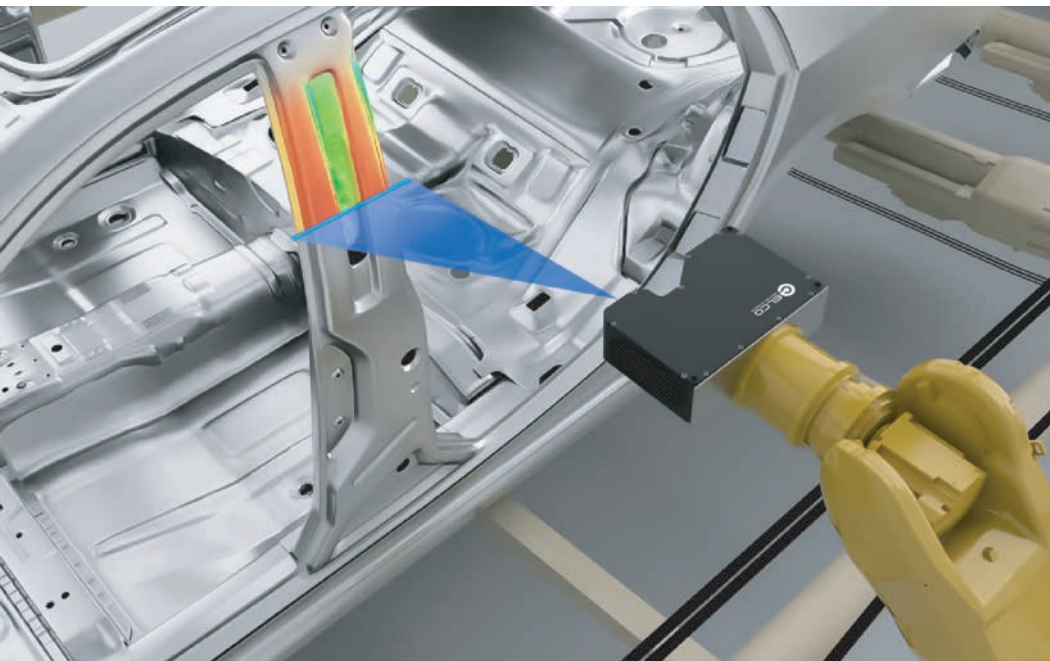
Brake Disc Surface Polishing Detection

Test the surface smoothness of the brake disc to ensure smooth and smooth grinding, no burrs, sand holes, pores, etc. Accurate detection of even minor defects.



Product Application Cases

Automotive Industry Application

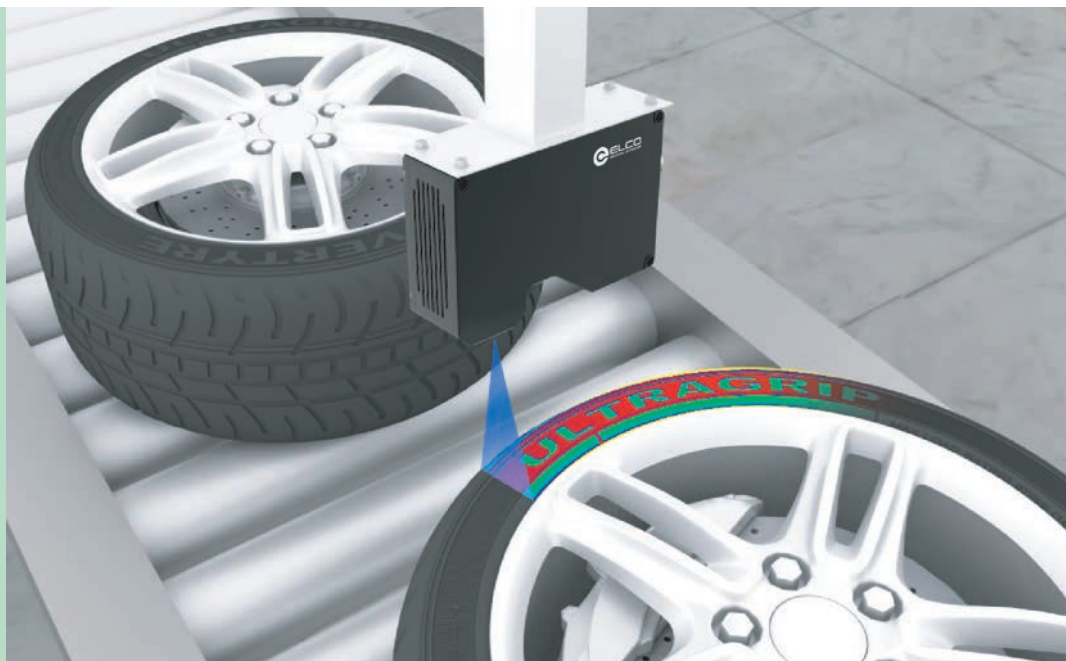


Vehicle Mounting Hole Detection

Test whether the installation hole and the position, size, etc. meet the requirements to ensure that other parts can be correctly riveted.

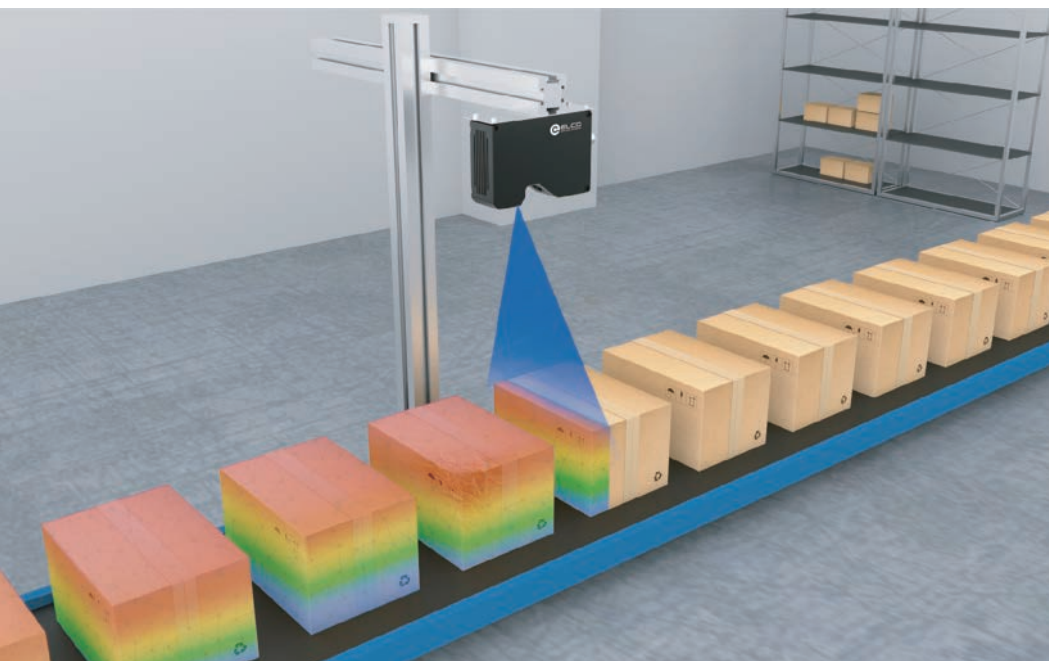
Tire Character Recognition

Scan the pattern or character on the side wall of the tire to generate a high-precision 3D point cloud map to verify whether its shape, height, position, etc.



Product Application Cases

Food And Packaging Industry Application

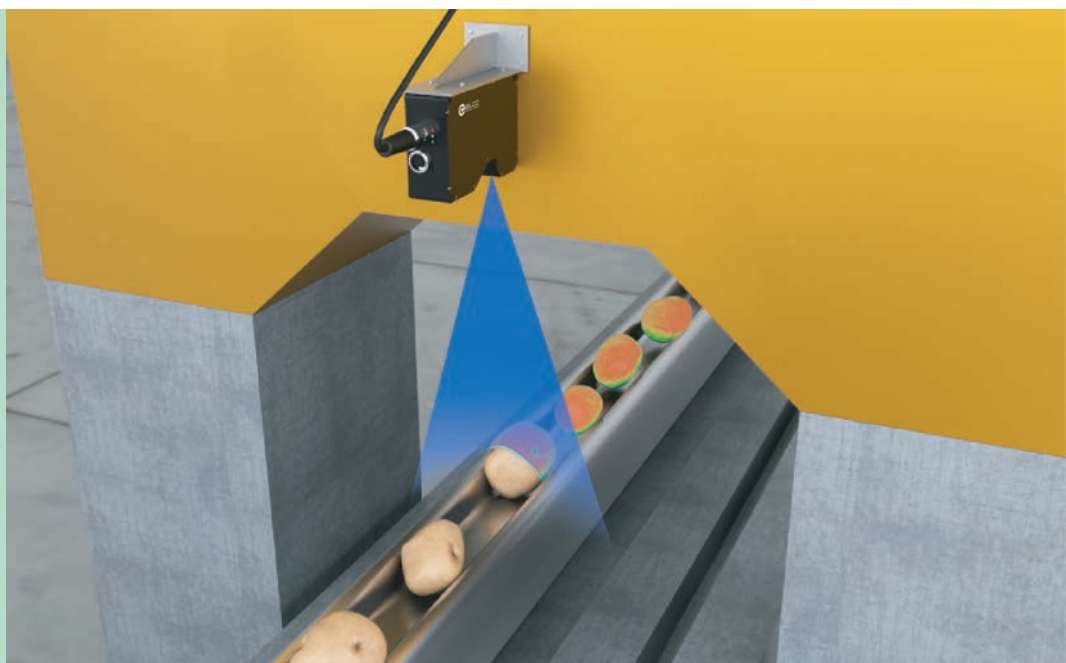


Product Packaging Inspection

Inspect the outer packaging of the packaged food to determine whether the outer packaging is damaged, folded, loophole, etc.

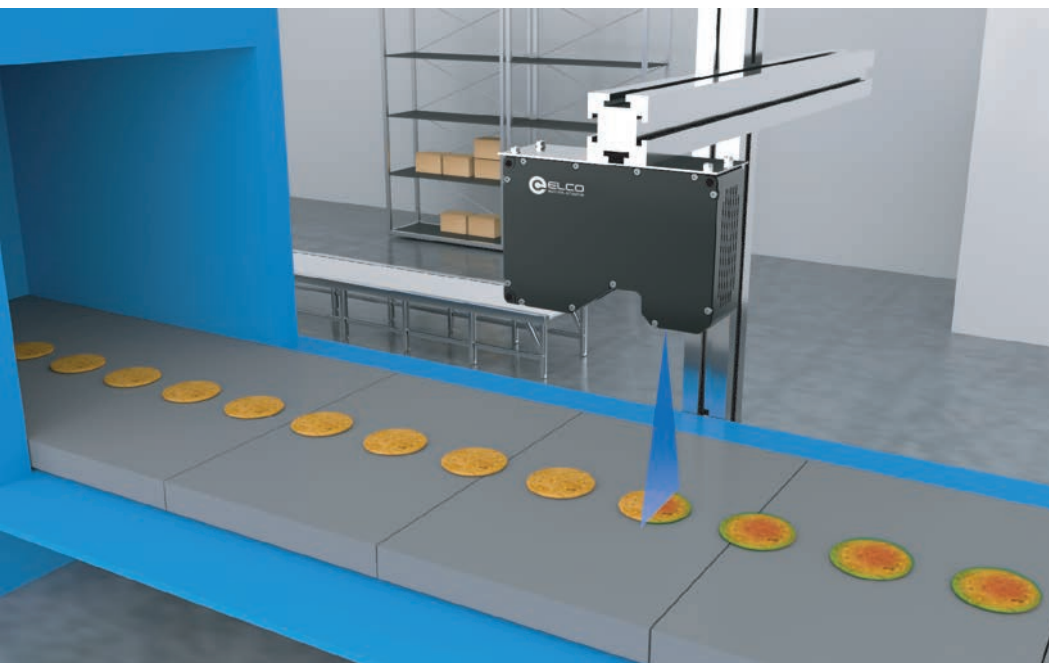
Potato Sorting

Scan the shape and size of potatoes, quickly measure the volume of potatoes, and accurately detect the surface defects of potatoes.



Product Application Cases

Food And Packaging Industry Application



Biscuit Quality Inspection

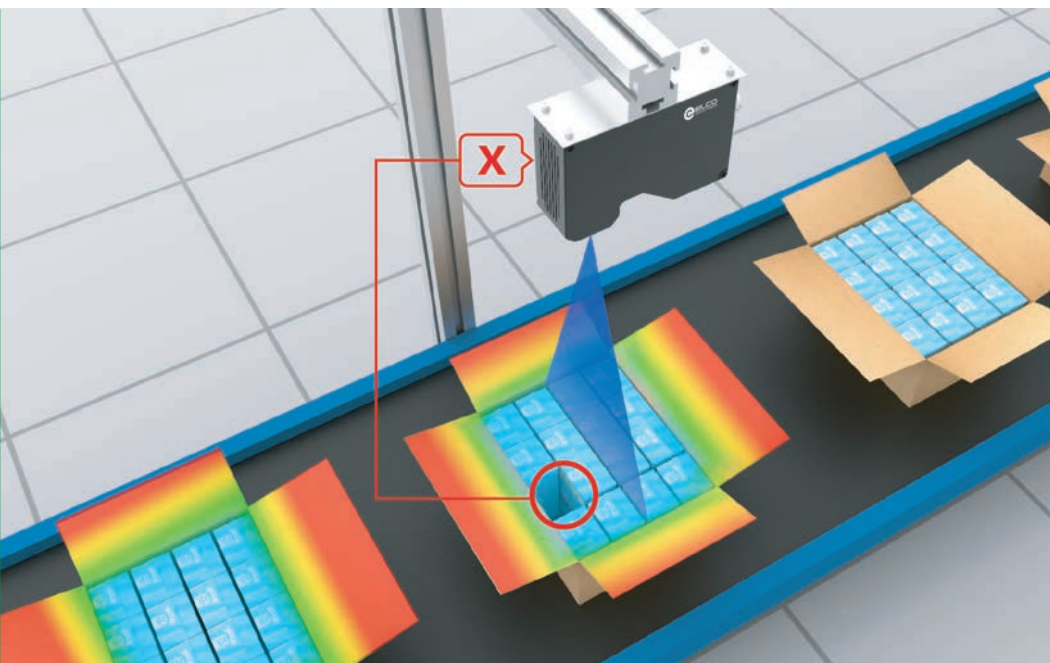
Detect the thickness and size of cookies, identify cookies with defects in appearance, and ensure that the cookie size is consistent and the thickness is uniform. It can also be used in the quality detection of potato chips, cheese slices, oatmeal bars and other food.

Package Volume Detection

Use height and width measurements to measure the volume of the carton.



Intelligent 3D laser profile sensor

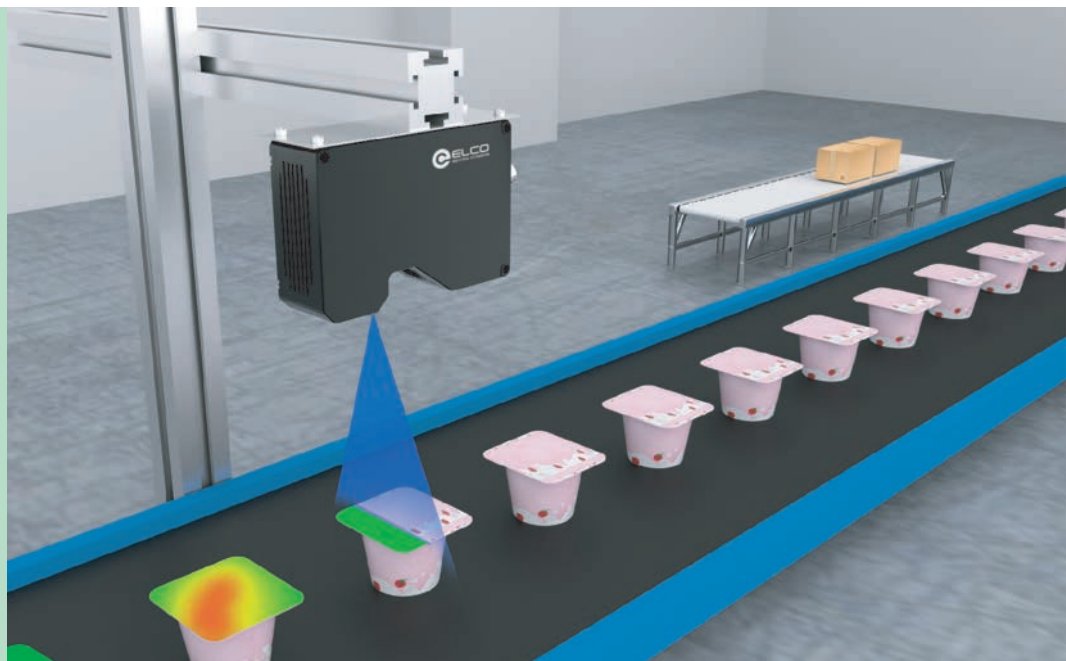


Package Filling Inspection

Detect the height of the filling and use the height change to confirm if there is a filling defect.

Bottle Cap Packaging Inspection

By testing the height of the bottle cap to verify the complete package of the bottle cap, eliminate the missing bottle cap, bottle cap skew and other bad products, can be used in beer, drinks, cans, yogurt, jam, sweet wine and other bottle cap packaging detection.





ELCO Industrie Automation GmbH

Benzstrasse 7
71720 Oberstenfeld
Deutschland
E-Mail: info@elco-automation.de
www.elco-automation.de

Elco Automation LLC

1097 Highway 101 South, Suite D-3
Greer, South Carolina 29651 – USA
Office Phone: +1 864-581-7431
E-Mail: infousa@elcoautomation.com
www.elcoautomation.com

TIANJIN ELCO AUTOMATION CO., LTD

No.12, 4th XEDA Branch Road
Xiqing Economic-Technological Development Area
Tianjin 300385, P. R. China
E-Mail: info@elco.cn
www.elco-holding.com.cn