

Intelligent 3D Laser Profile Sensor



COMPANY PROFILE

Tianjin Elco Automation Co., Ltd. is a leading enterprise in industrial automation in China. It was established in 2003 with a sales and service network covering the whole country. As a provider of domestic industrial automation products and intelligent manufacturing solutions, Elco holds a leading position in various fields such as automobiles, automotive parts, engineering machinery, new energy, logistics equipment, food & pharmaceuticals, printing & packaging, textile machinery, electronic manufacturing, etc.

From the system layer, control layer, network layer to execution layer, Elco provides a full range of services for intelligent manufacturing top to bottom. Our products and solutions include but are not limited to cloud platforms, MES manufacturing execution systems, industrial fieldbus, industrial Ethernet, industrial wireless communication, IoT gateways, automated production lines composed of robots and intelligent devices, integration of automated electrical control systems, intelligent logistics warehousing systems, IoT integrated solutions and services, industrial technology software based mobile solutions, Elco Cloud · Industrial Internet Platform, etc., comprehensively help enterprises achieve intelligent manufacturing.

From 2016, Elco won the bid for the National Ministry of Industry and Information Technology's major intelligent manufacturing project for two consecutive years. In 2018, Elco was honorably selected and became a nationally recommended and supported intelligent manufacturing system solution supplier. From 2019, Elco won the bid for the Ministry of Industry and Information Technology's high quality development project for two consecutive years. In 2020, Elco's application for the "Industrial Internet Platform for the Automobile Manufacturing Industry" was rated as a national level specialized industrial Internet platform. In 2021, Elco was honorably selected as the professional, refined, characteristic and innovative key "Little Giant" enterprise by the Ministry of Industry and Information Technology of China. In 2022, Elco was selected as the National Enterprise Technology Center.

Elco defines "automation+digital factory+industrial internet" as an important development strategy. In 2017, under the guidance of the Tianjin Municipal Science and Technology Commission, Elco initiated the establishment of the Tianjin Automation and Information Technology Innovation Strategic Alliance, and relied on the alliance's investment to establish the Elco • XEDA Industrial Internet Application Innovation Promotion Center.

Nowadays, with the coming of the industrial internet era, traditional industrial models have been impacted unprecedentedly, and the integration of the internet and manufacturing industry has gradually been elevated to a strategic level. Elco will promote the development of industrial Internet with unremitting innovation pursuit, accelerate the process of intelligent manufacturing, and build a new ecosystem of industrial Internet+intelligent manufacturing.

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.

Smart 3D sensor



sensor

- Highly integrated
- Simplified operation
- Flexible mounting



Rejection actuator

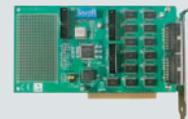
Traditional 3D vision measurement system



Camera



Industrial computer



I/O interface board



Rejection actuator

Product Specification

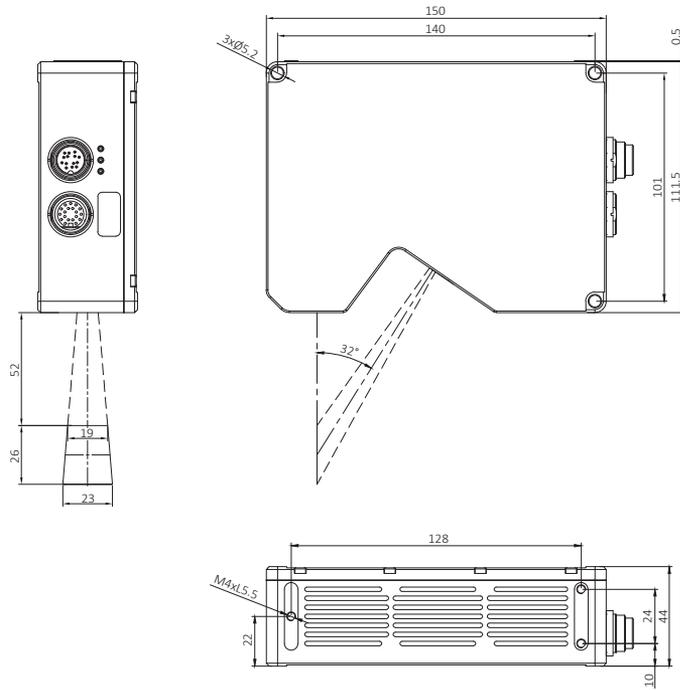
LVM21 SERIES

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	405nm					660nm	
Laser class	2,3R						
Dimensions (mm)	44x111.5x150	44x99x148	44x99x213	44x99x278	44x99x284	44x99x284	
Weight (kg)	0.89	0.87	1.05	1.45	1.44	1.44	
Enclosure material	Aluminium						
Temperature characteristics	0.01%						
Scan rate	270-5000Hz						
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:≤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)						

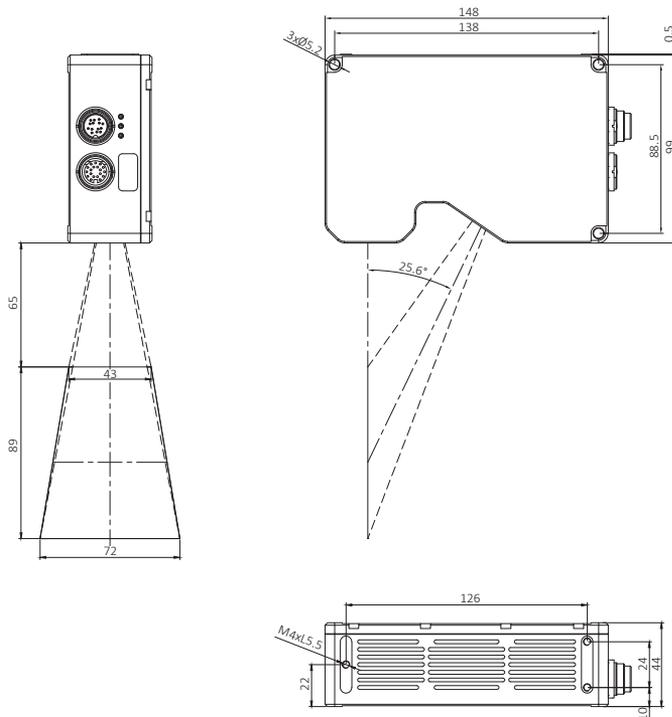
Intelligent 3D laser profile sensor

Outline dimensional drawing

LVM2120



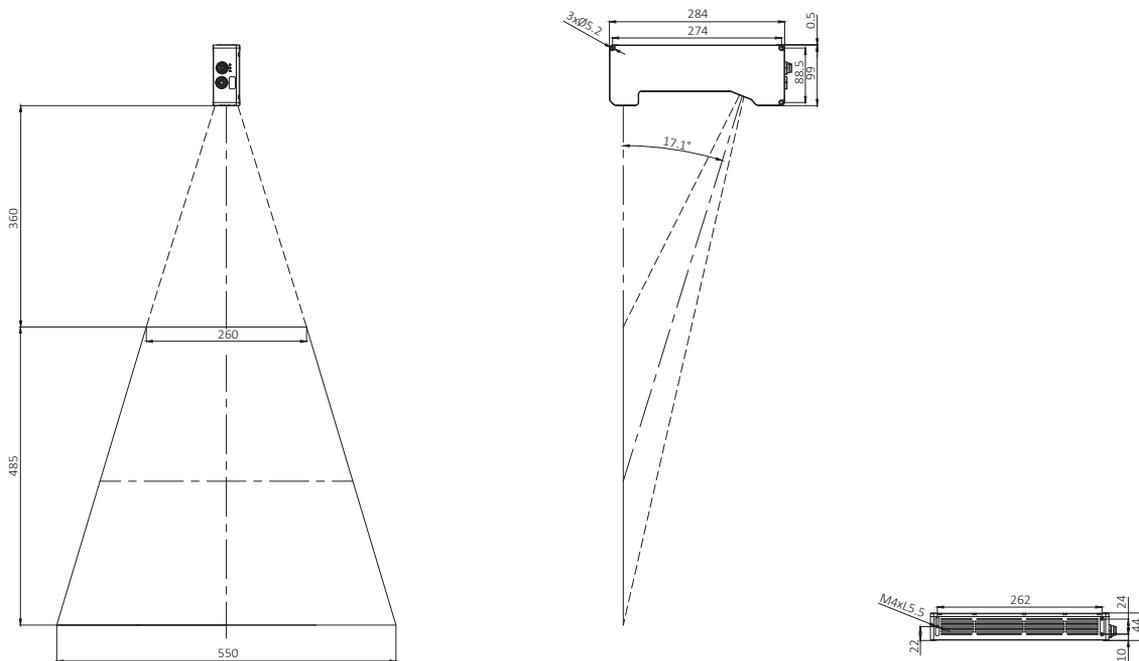
LVM2130



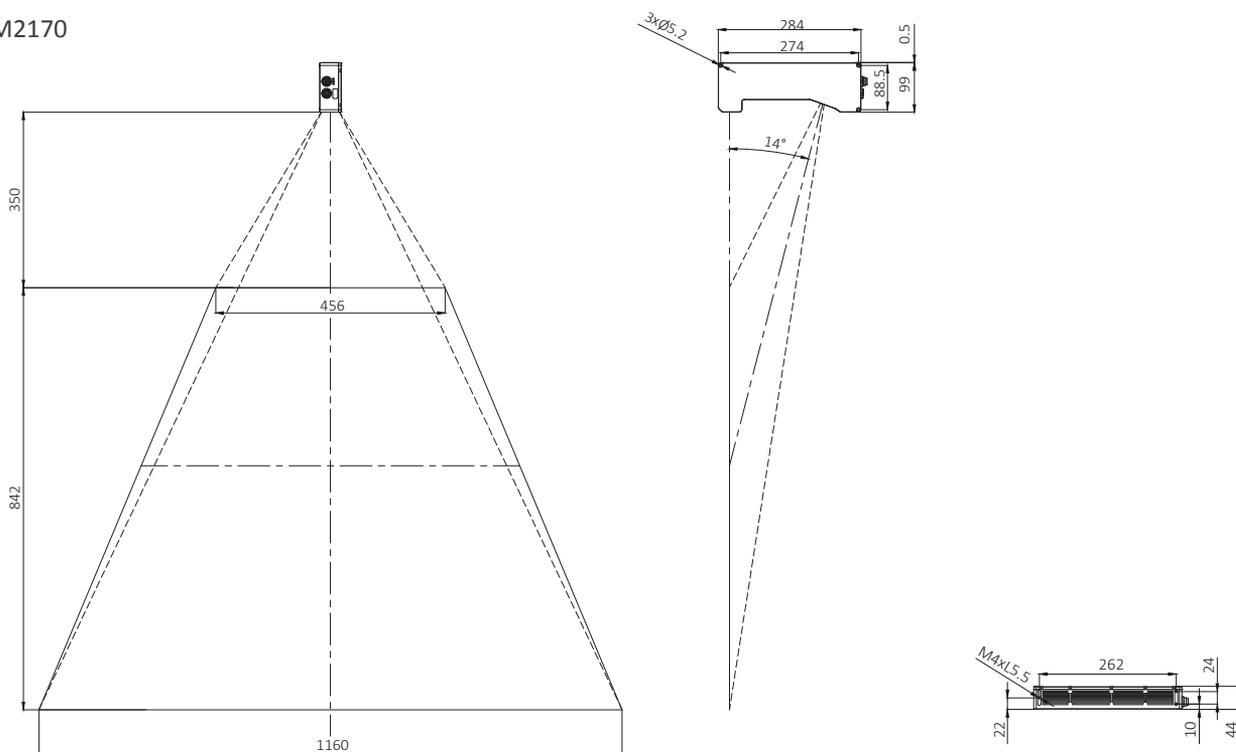
Intelligent 3D laser profile sensor

Outline dimensional drawing

LVM2160



LVM2170



Product Specification

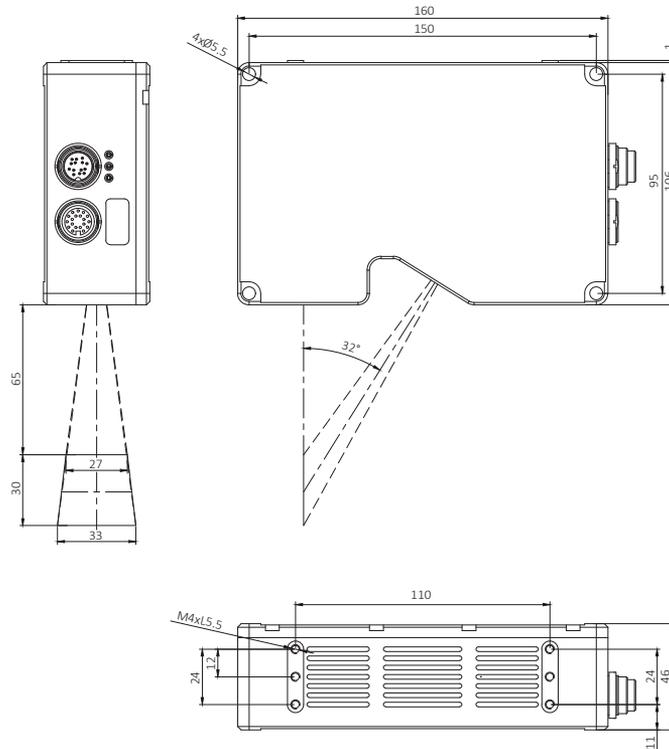
LVM22 SERIES

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	405nm				
Laser class	2,3R				
Dimensions (mm)		46x106x160	46x105.5x170	46x106x195	46x106x250
Weight (kg)		0.9	0.92	1.06	1.48
Enclosure material	Aluminium				
Temperature characteristics	0.01%				
Scan rate	240-5000Hz				
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)				

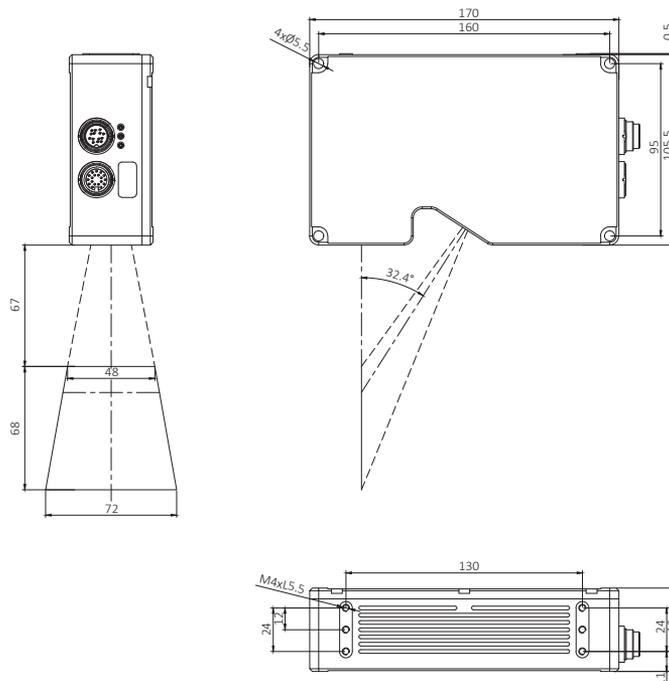
Intelligent 3D laser profile sensor

Outline dimensional drawing

LVM2220

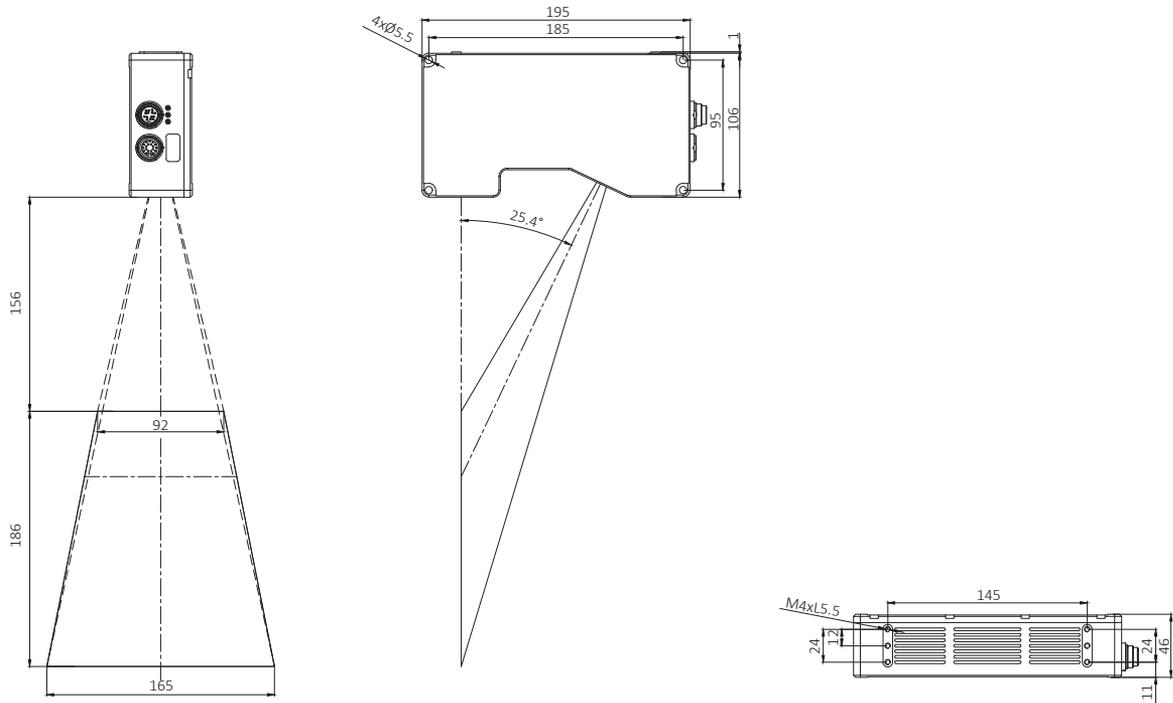


LVM2230

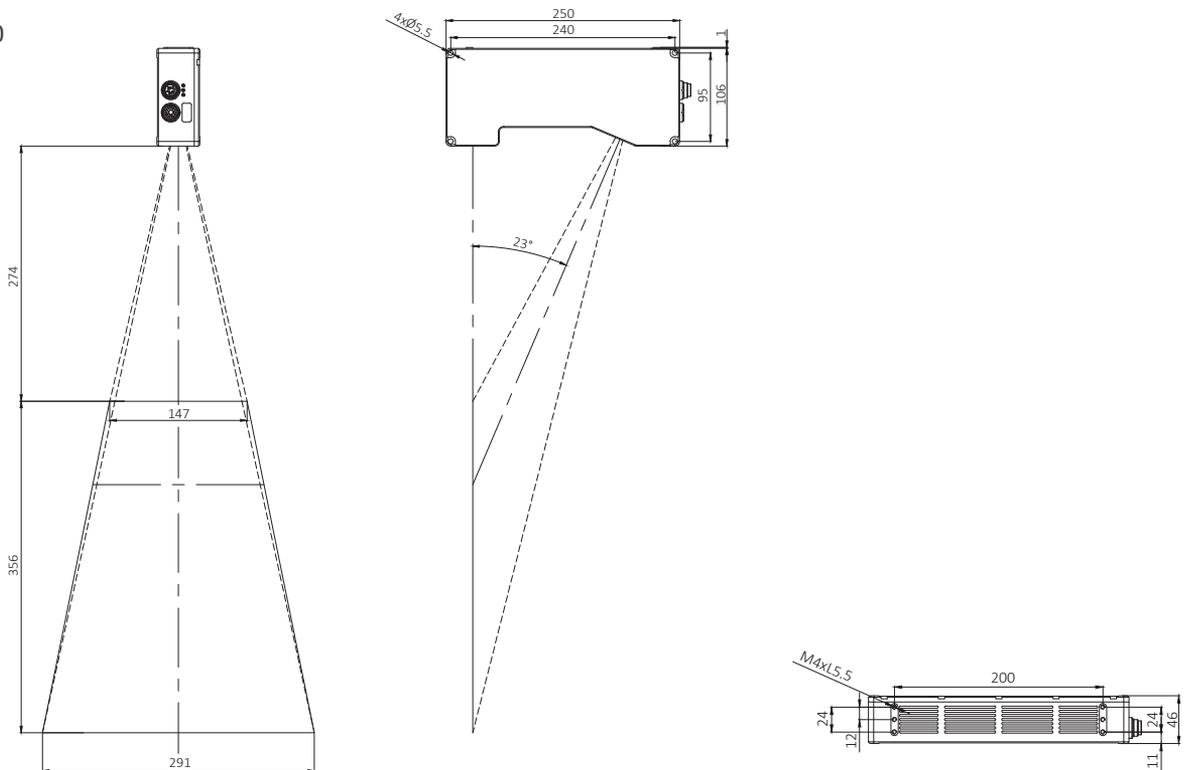


Outline dimensional drawing

LVM2240



LVM2250



Product Specification

LVM23 SERIES

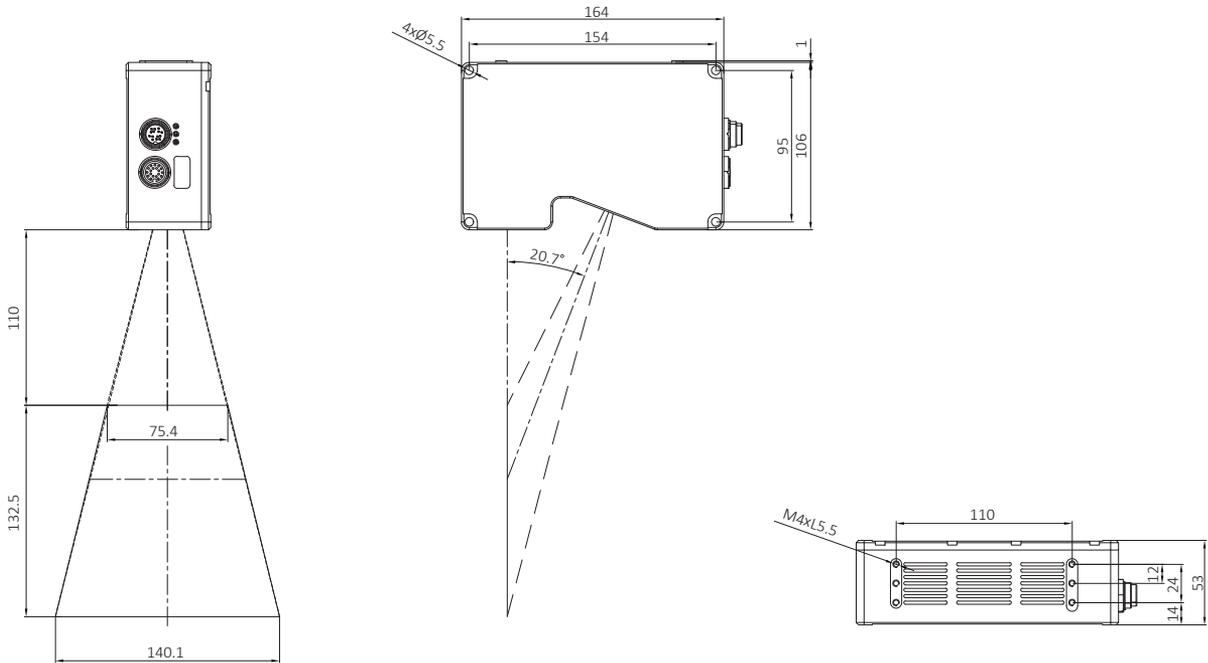
Model	LVM2330-L	LVM2340-L	LVM2350-L	LVM2370-L	LVM2390	
Data points	4200	4200	4200	4200	4200	
Clearance distance (mm)	110	167	328	495.8	357.6	
Measurement range (mm)	132.5	192.6	472	1052.6	1576.2	
Field of view (mm)	Proximal	75.4	110.8	197.1	282.4	521.2
	Reference distance	107.8	157.6	314.6	549.8	1455.8
	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 *	405nm/660nm					
Laser class	3B				3R	
Dimensions (mm)	53x106x164	53x106x204	53x126x254	53x106x284	57x111x280	
Weight (kg)	1.23	1.43	1.72	1.78	2.06	
Enclosure material	Aluminium					
Temperature characteristics	0.01%					
Scan rate	316-12000Hz					
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 to +50 °C					
Storage temperature	-30 °C to +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.

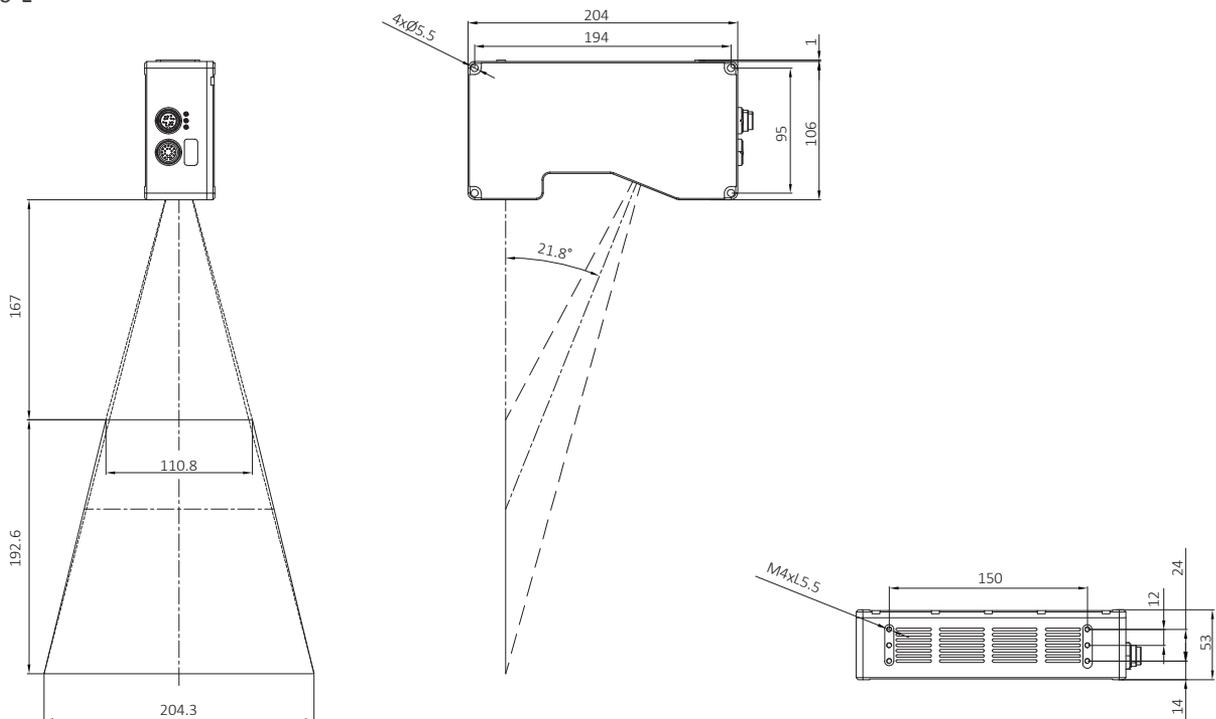
Intelligent 3D laser profile sensor

Outline dimensional drawing

LVM2330-L



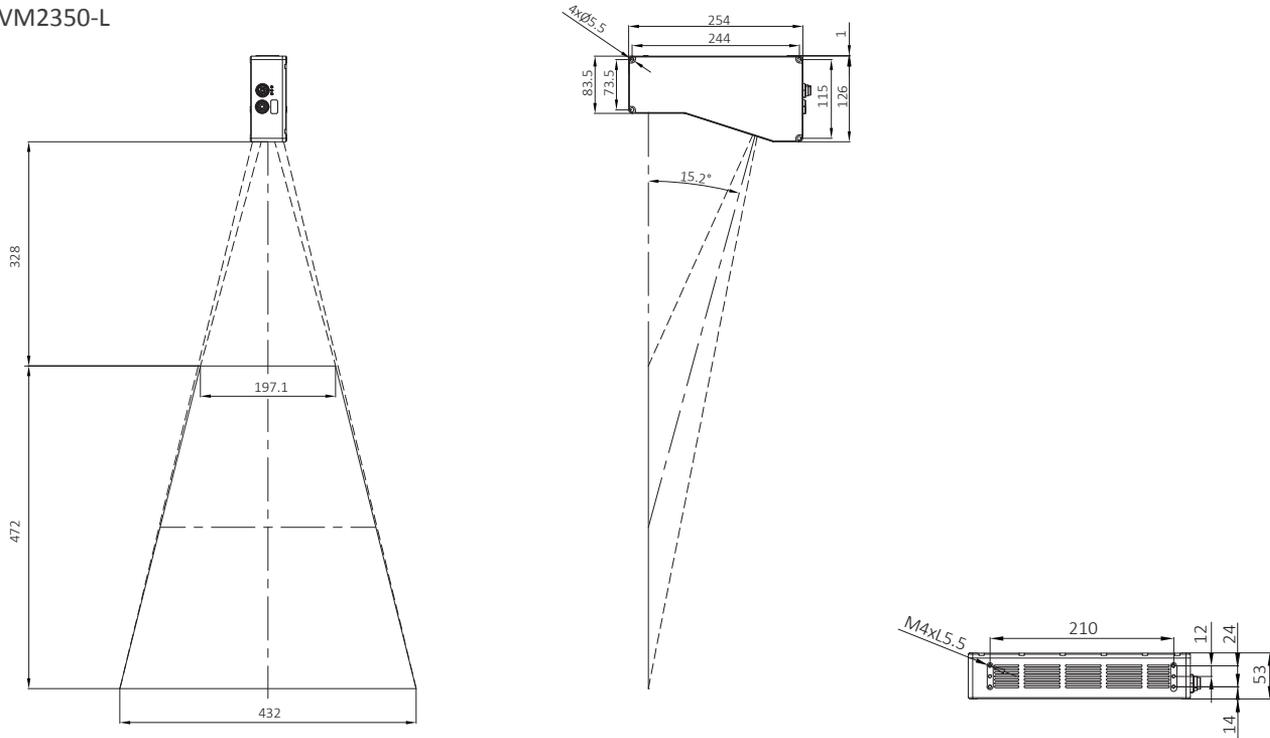
LVM2340-L



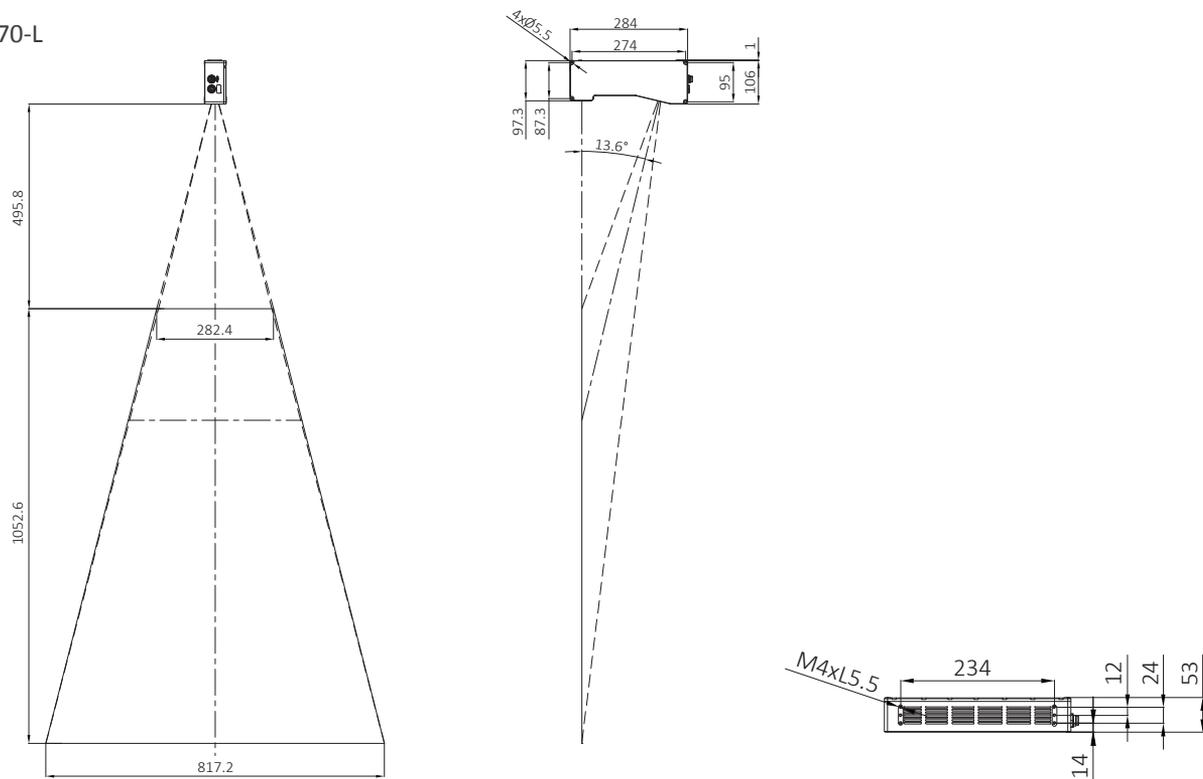
Intelligent 3D laser profile sensor

Outline dimensional drawing

LVM2350-L



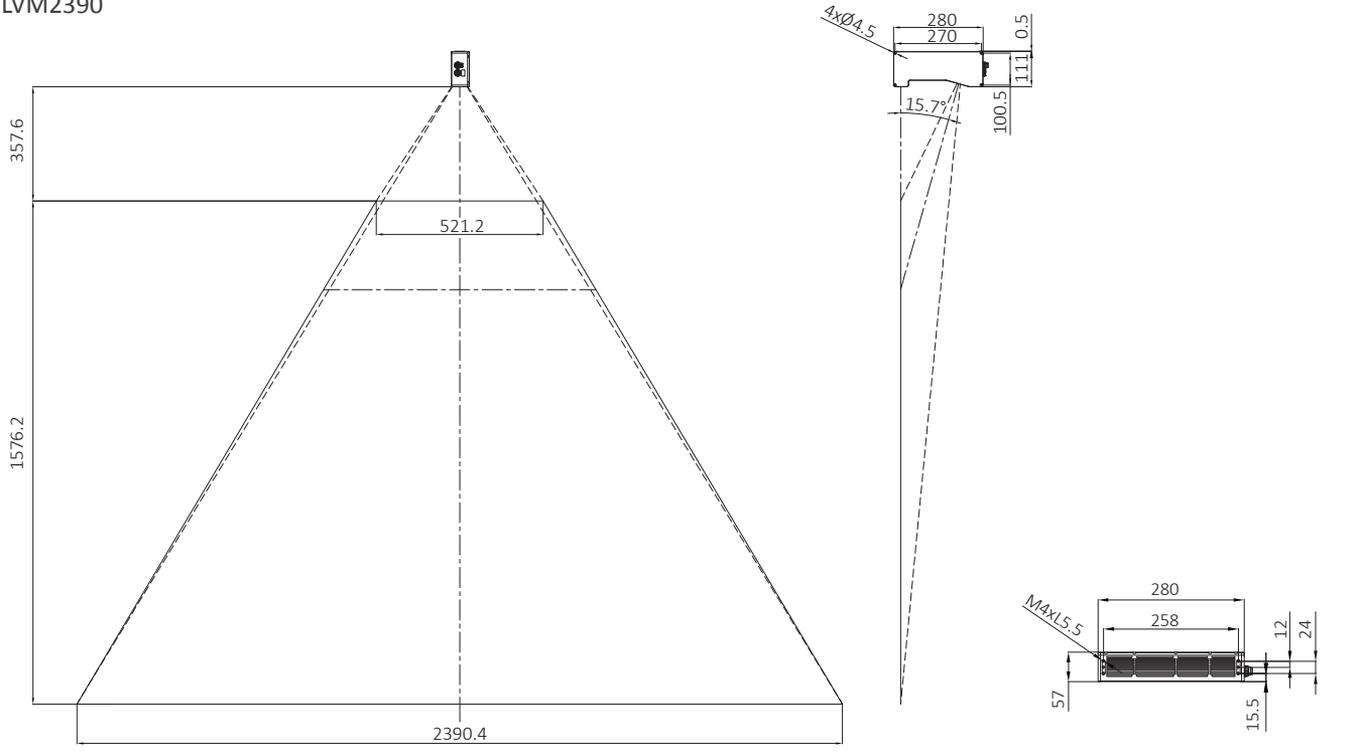
LVM2370-L





Outline dimensional drawing

LVM2390



Product Specification

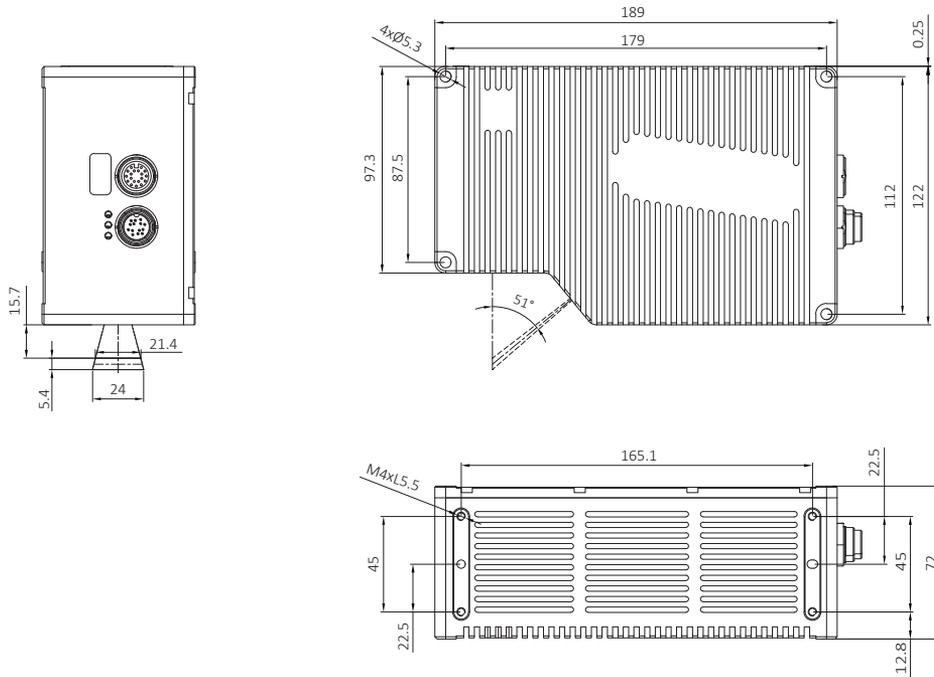
LVM25 SERIES

Model	LVM2520	LVM2540	LVM2550	LVM2560	LVM2570	
Data points	4096	4096	4096	4096	4096	
Clearance distance (mm)	15.7	54.5	41.5	151.2	206.5	
Measurement range (mm)	5.4	17.7	65.8	237.3	457.1	
Field of view (mm)	Proximal	21.4	46.0	115.3	298.4	363.3
	Reference distance	22.7	50.9	155.3	452.5	669.4
	Remote	24.0	55.7	195.3	606.5	975.4
Resolution (μm)	X(Width)	5.2-5.8	11.2-13.6	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	405nm		405nm/650nm		650nm	
Laser class	3B					
Dimensions (mm)	72x122x189	73x110x165	95x117x175	95x127x195	89x121x195	
Weight (kg)	2.22	1.82	2.42	2.75	2.58	
Enclosure material	Aluminium					
Temperature characteristics	0.01%					
Scan rate	1800-37900Hz					
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 to +50 °C					
Storage temperature	-30 °C to +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)					

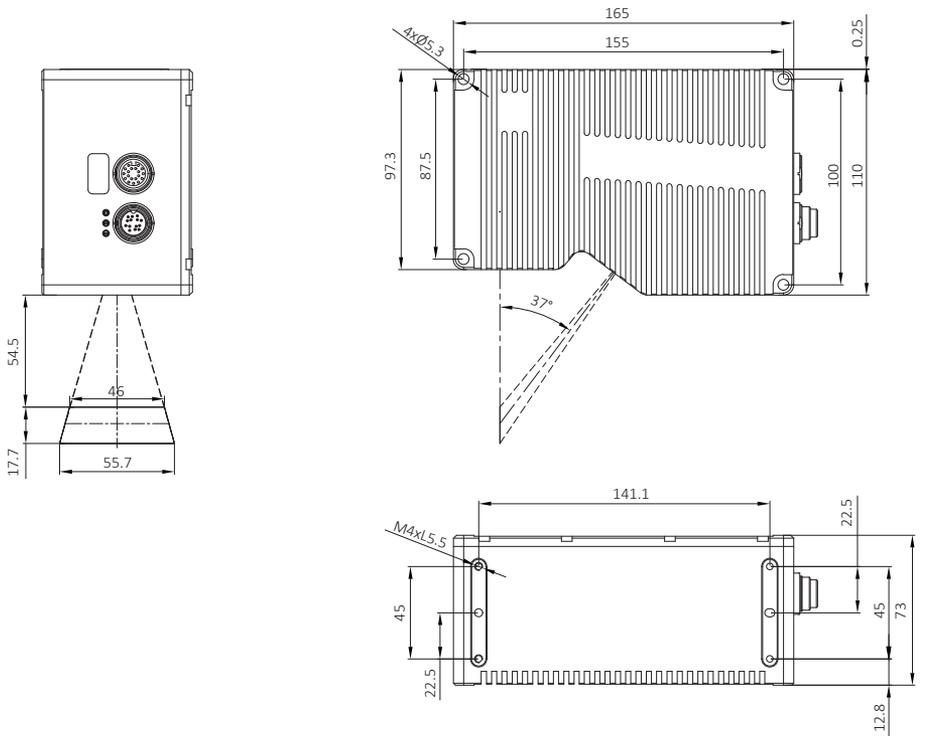
Intelligent 3D laser profile sensor

Outline dimensional drawing

LVM2520



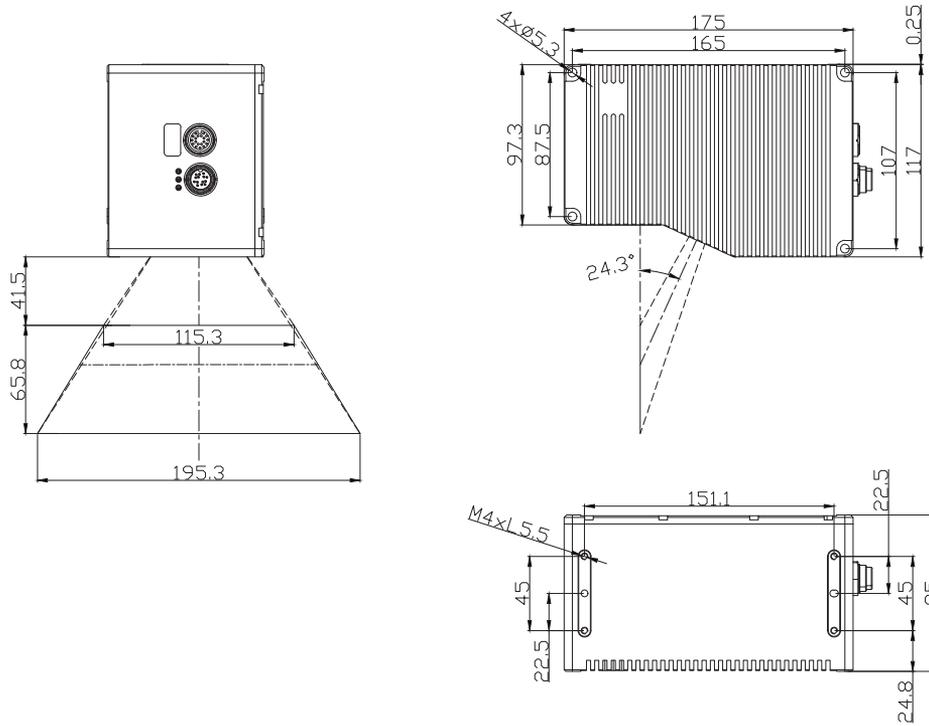
LVM2540



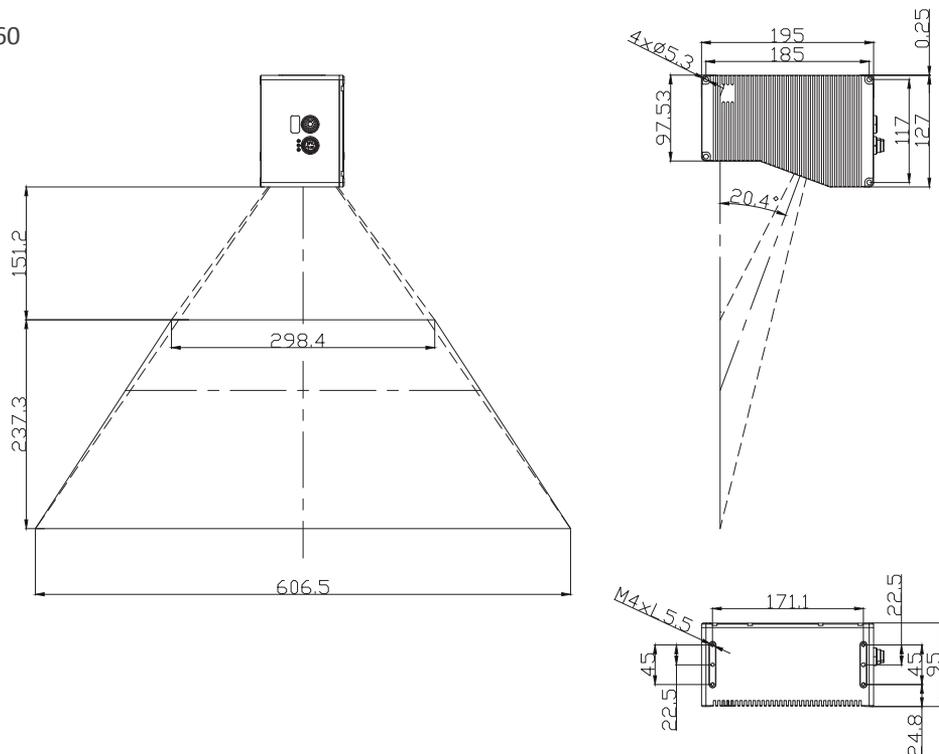
Intelligent 3D laser profile sensor

Outline dimensional drawing

LVM2550



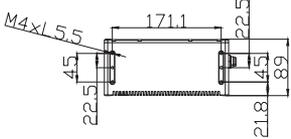
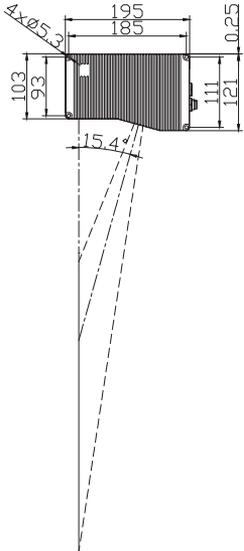
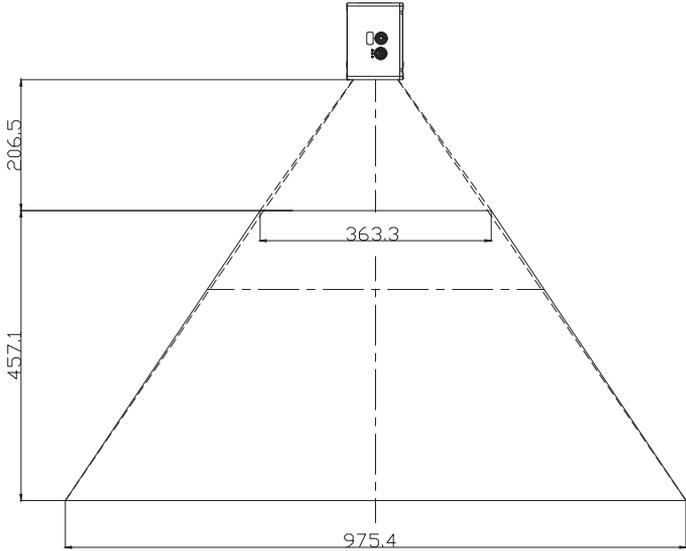
LVM2560





Outline dimensional drawing

LVM2570





High Precision



*High Speed
Fast Response*



*Support For
Various Workpieces*



High Stability



Strong Scalability

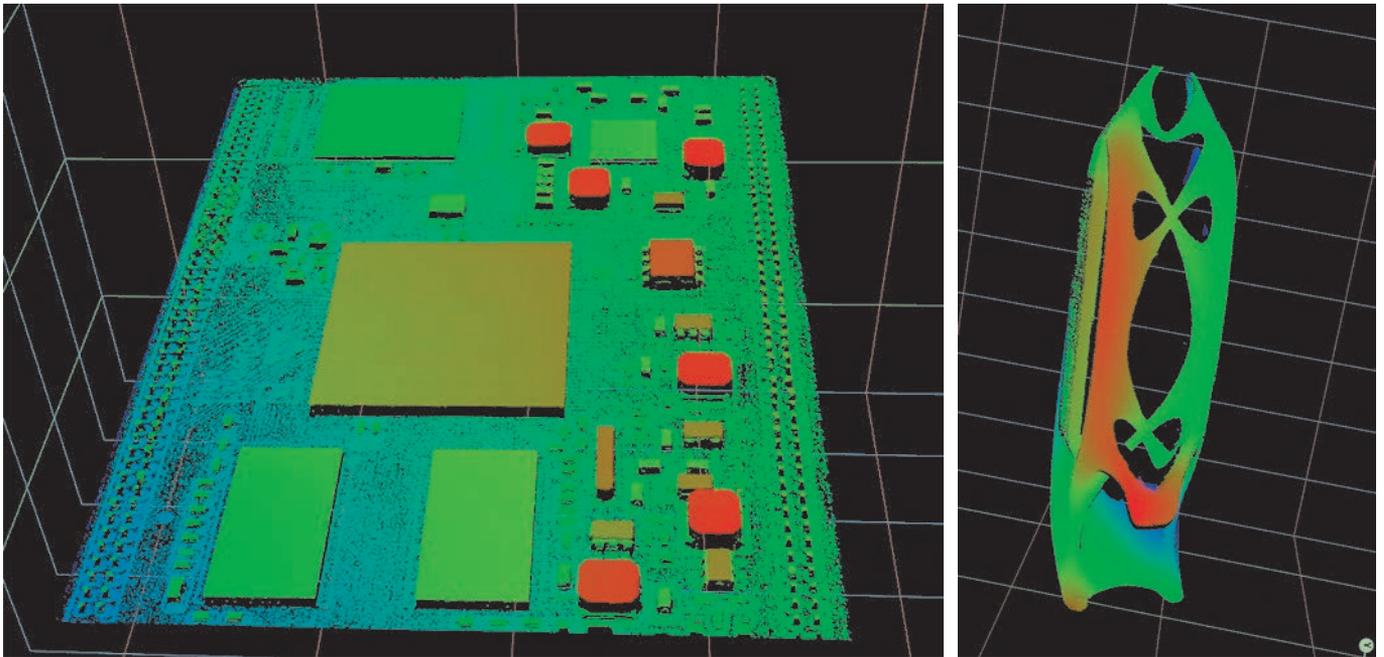


High Fit

Product Features And Advantages

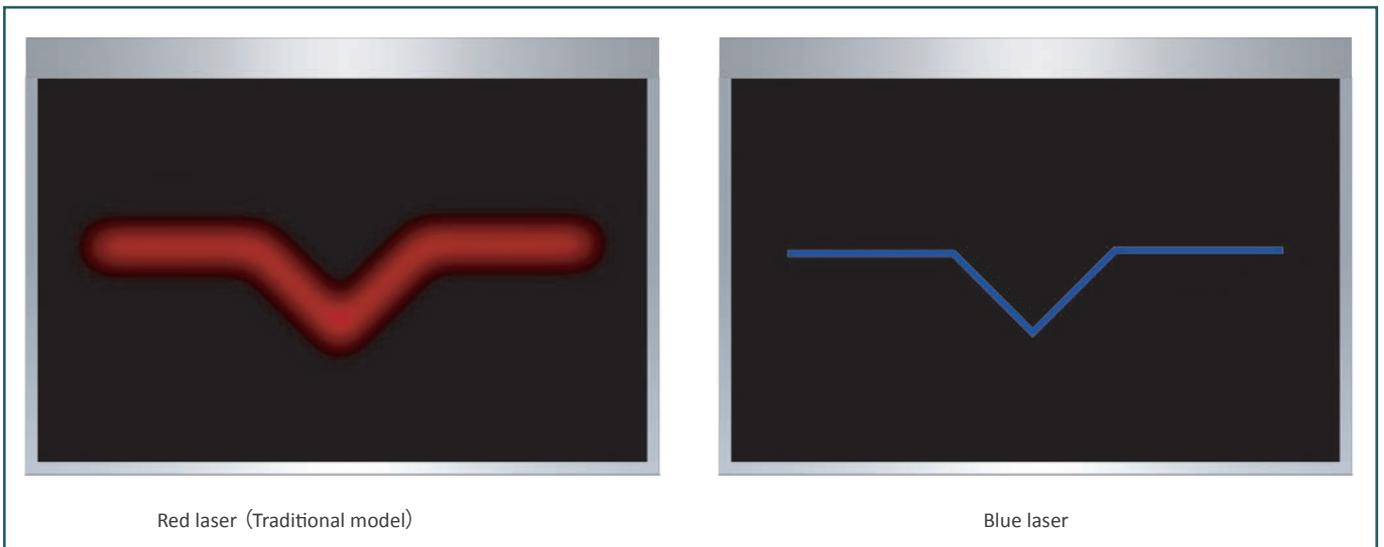

High Precision

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



1 - 405nm blue laser

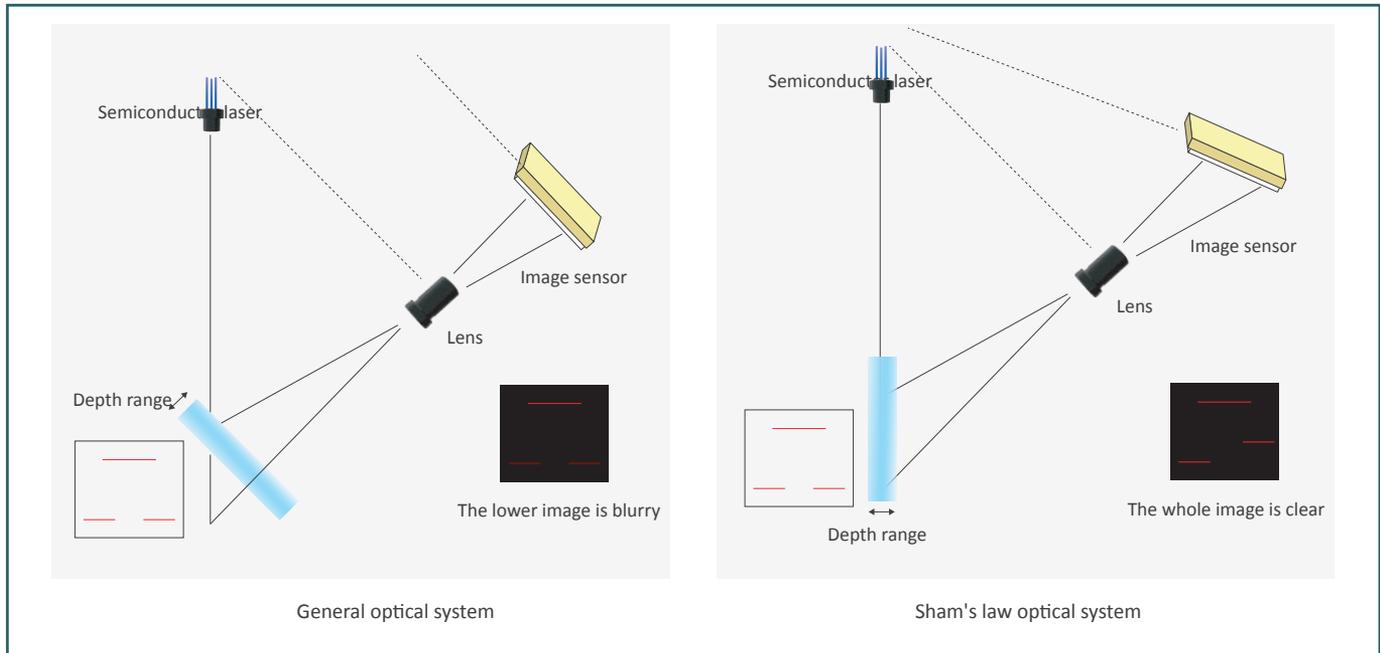
Using a 405nm blue laser, the short-wavelength laser is focused to obtain a clear line beam, allowing for more accurate measurements.



Intelligent 3D laser profile sensor

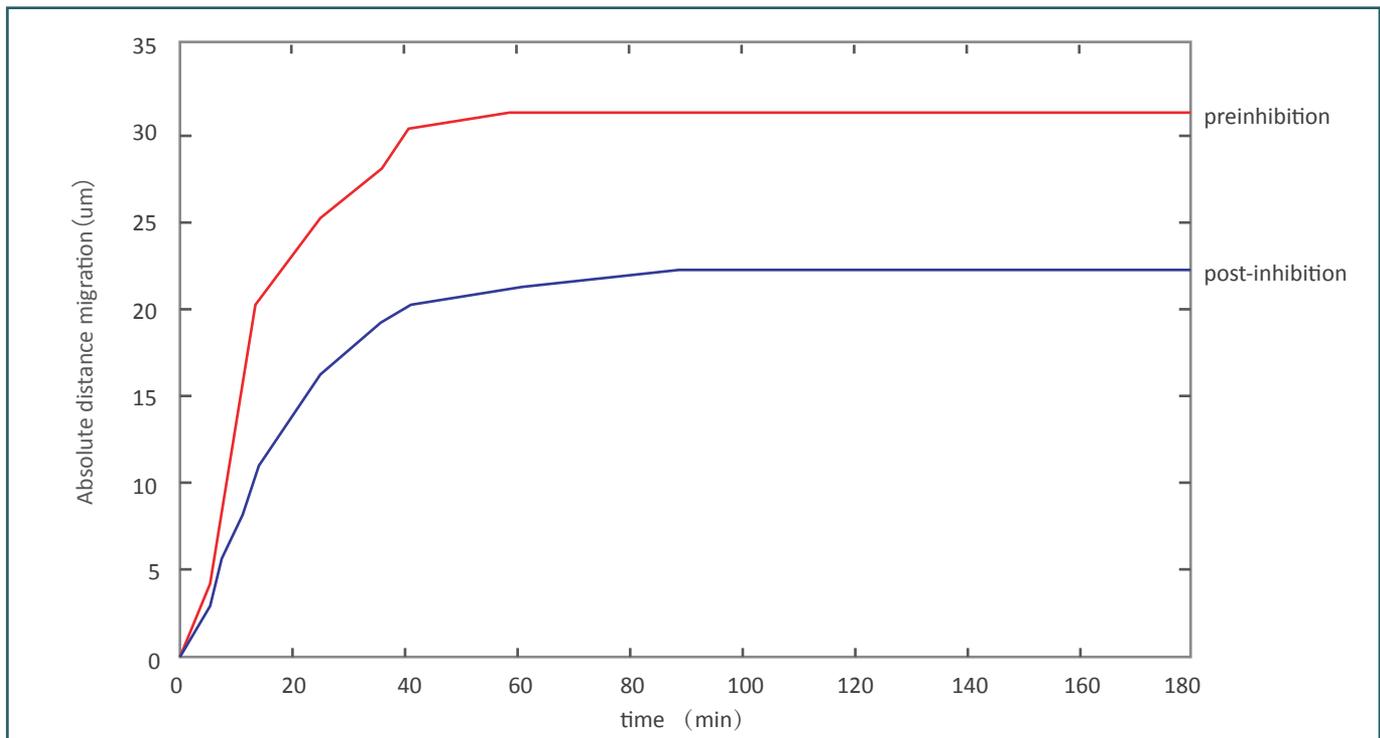
2 - Sham's law optical system

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.



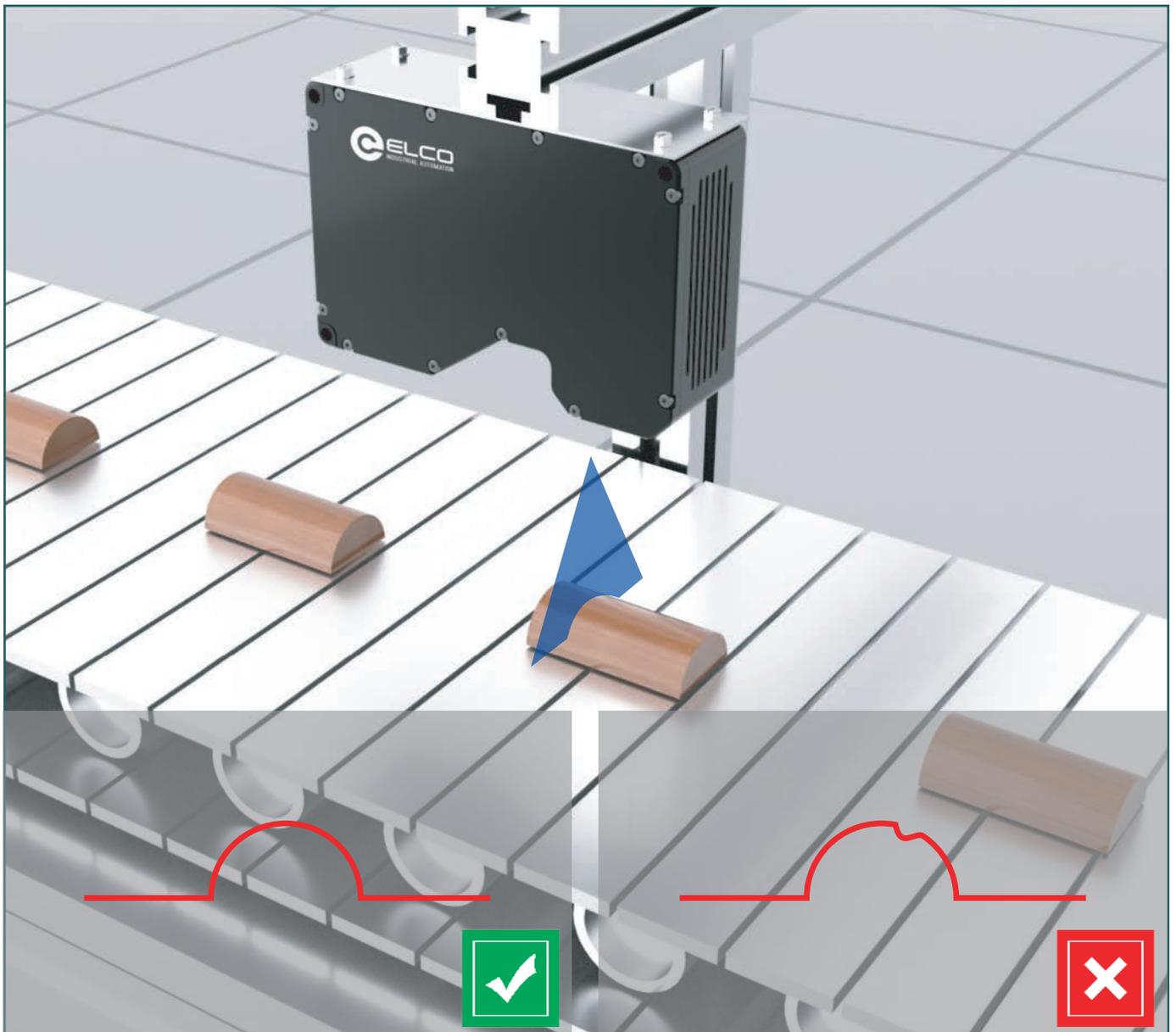
Product Features And Advantages



High Speed / Fast Response

1 - Ultra-high speed scan sampling

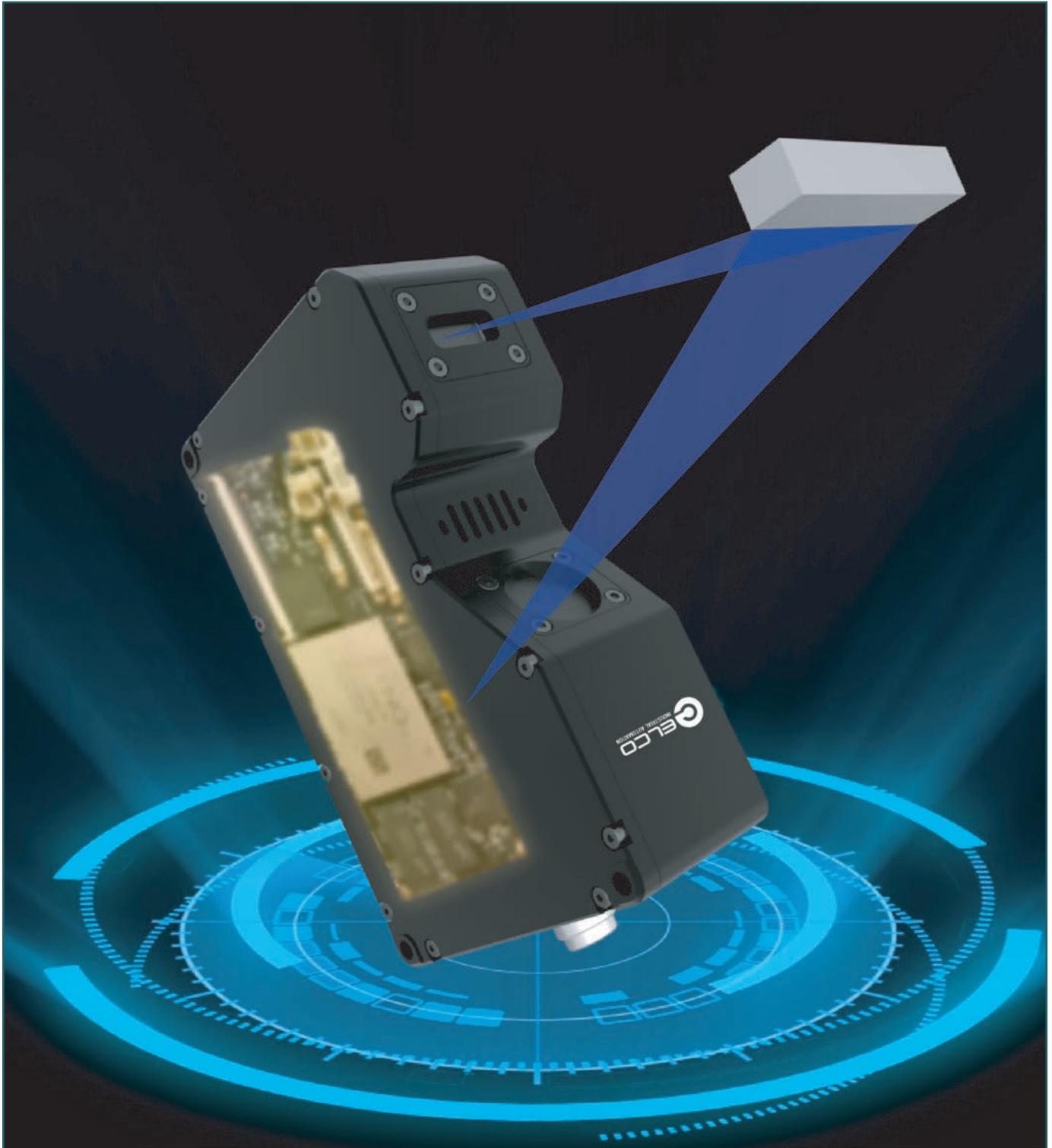
Equipped with high-speed multi-channel CMOS and high-performance processor, sampling frequency up to 10HZ, easy to achieve ultra-high-speed sampling, to meet the needs of high-speed production line measurement and inspection.



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



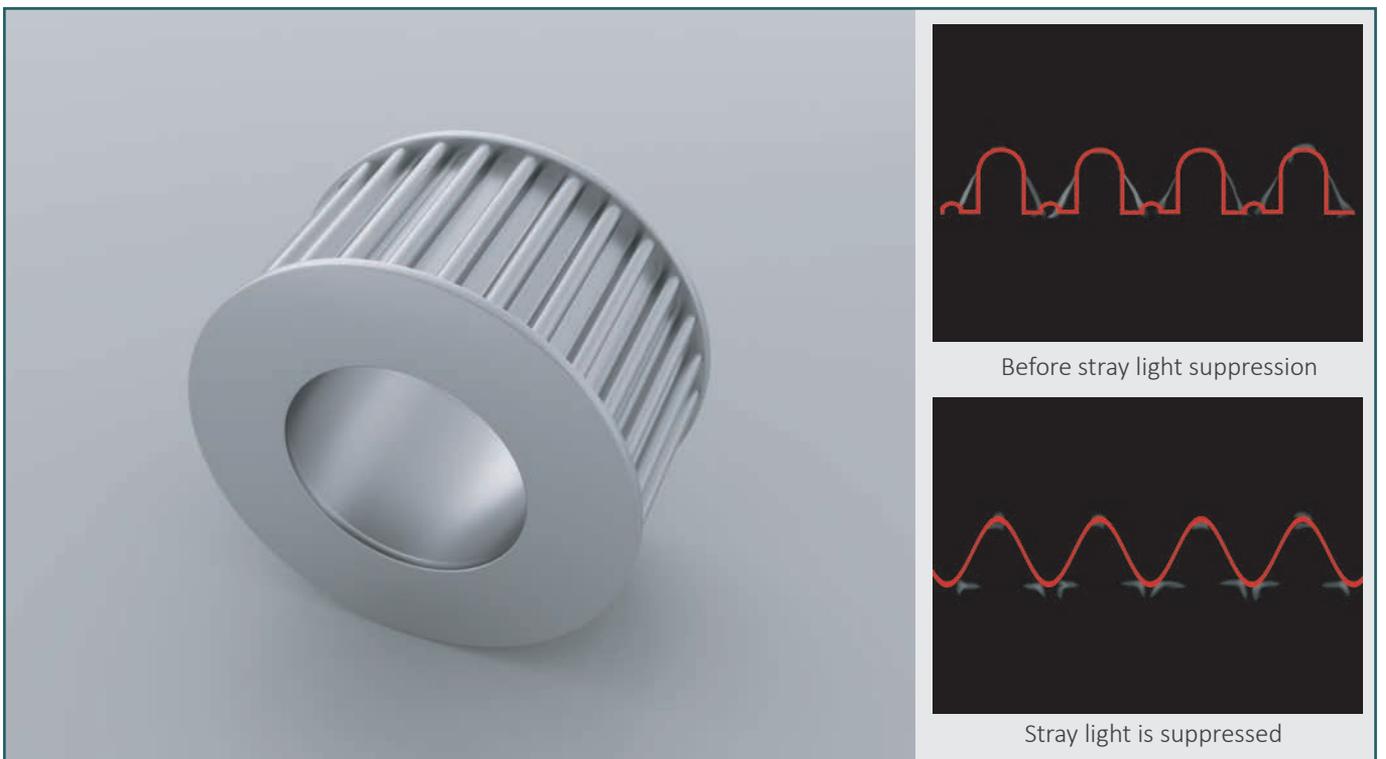
Support For Various Workpieces

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.

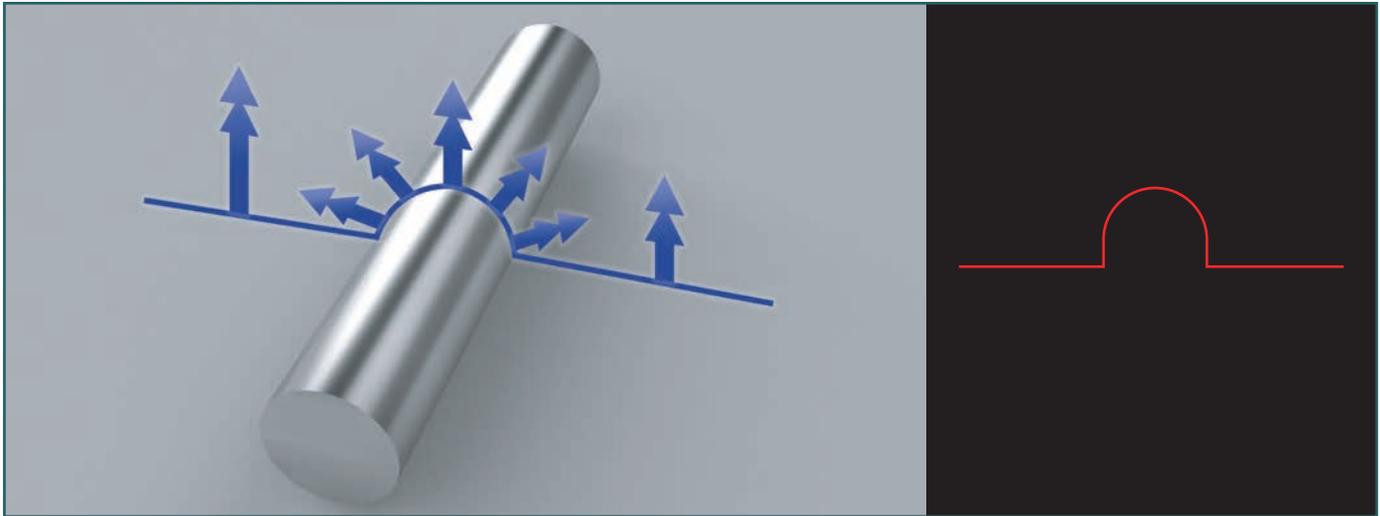


Intelligent 3D laser profile sensor

2 - High dynamic range

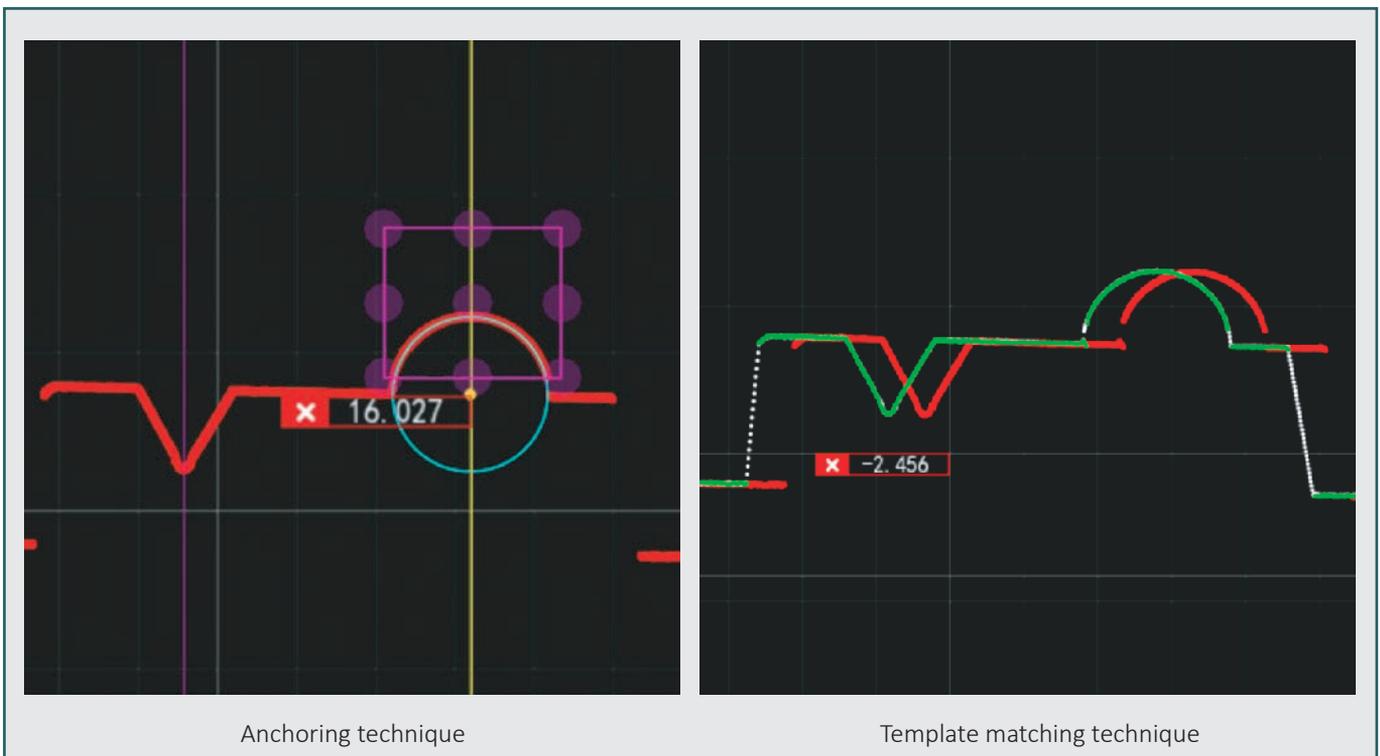
Using multiple exposure technology, the highly reflective area is low exposure, and the weakly reflective area is high exposure.

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.



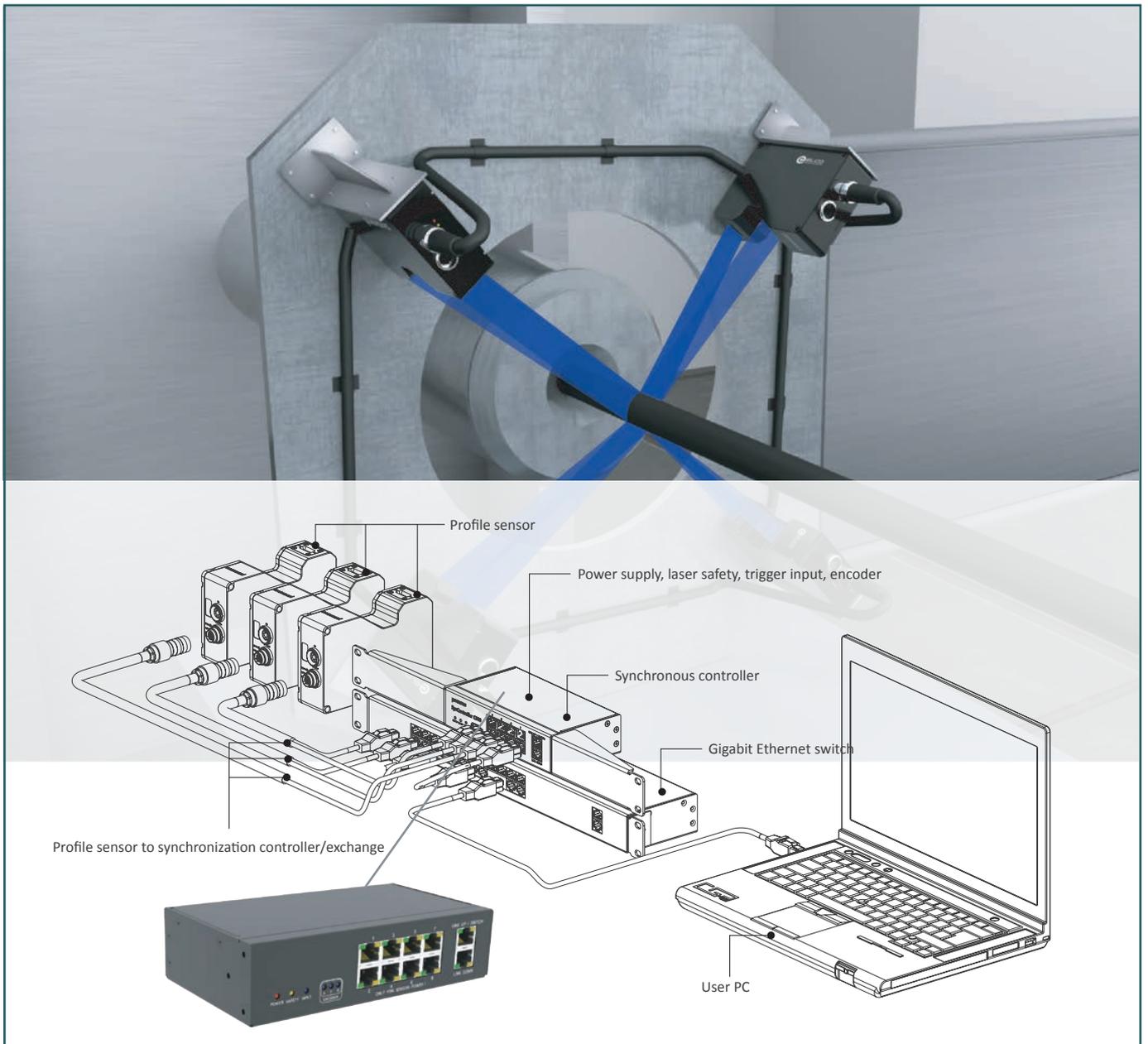
Product Features And Advantages



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



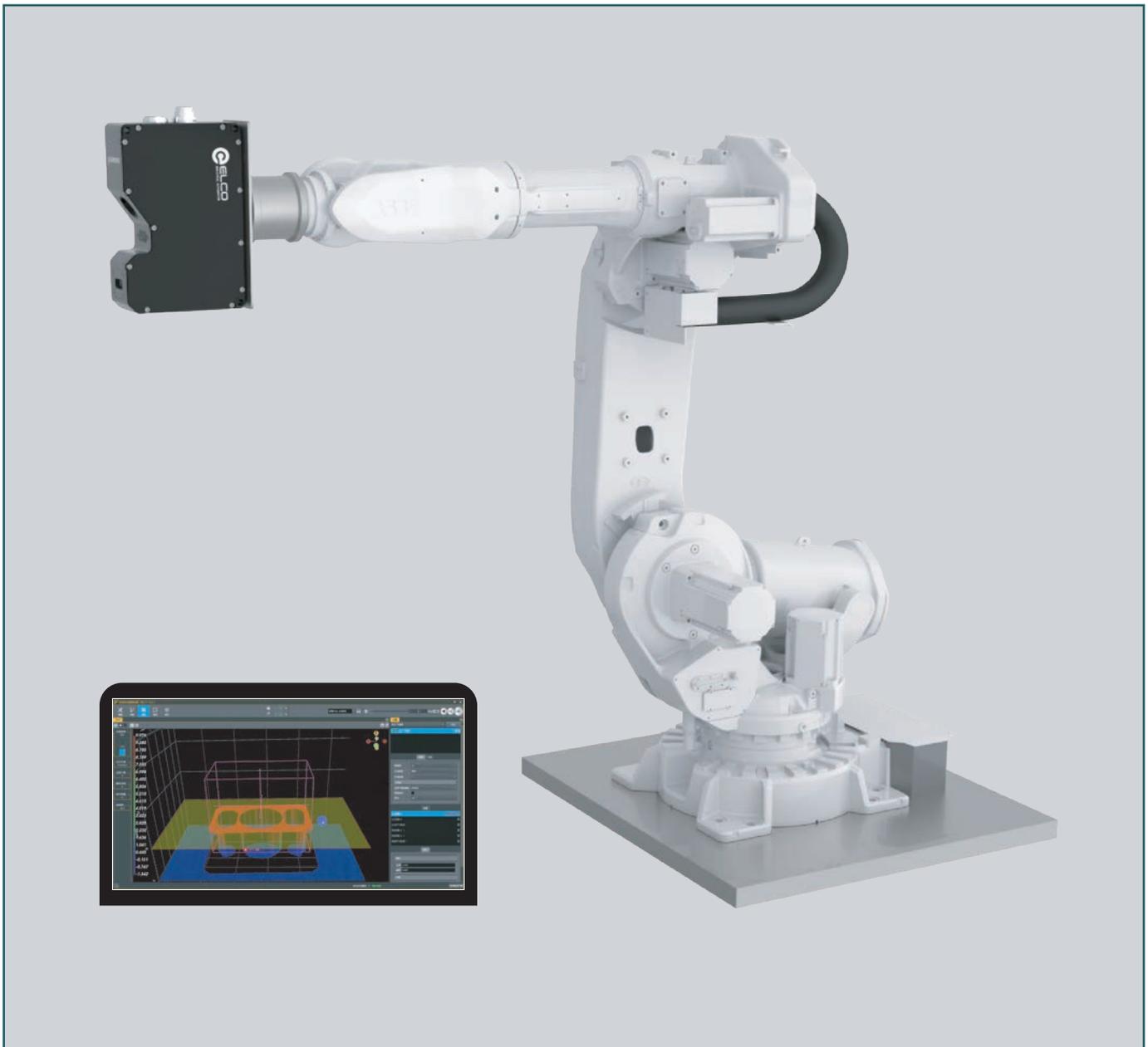
High Fit

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

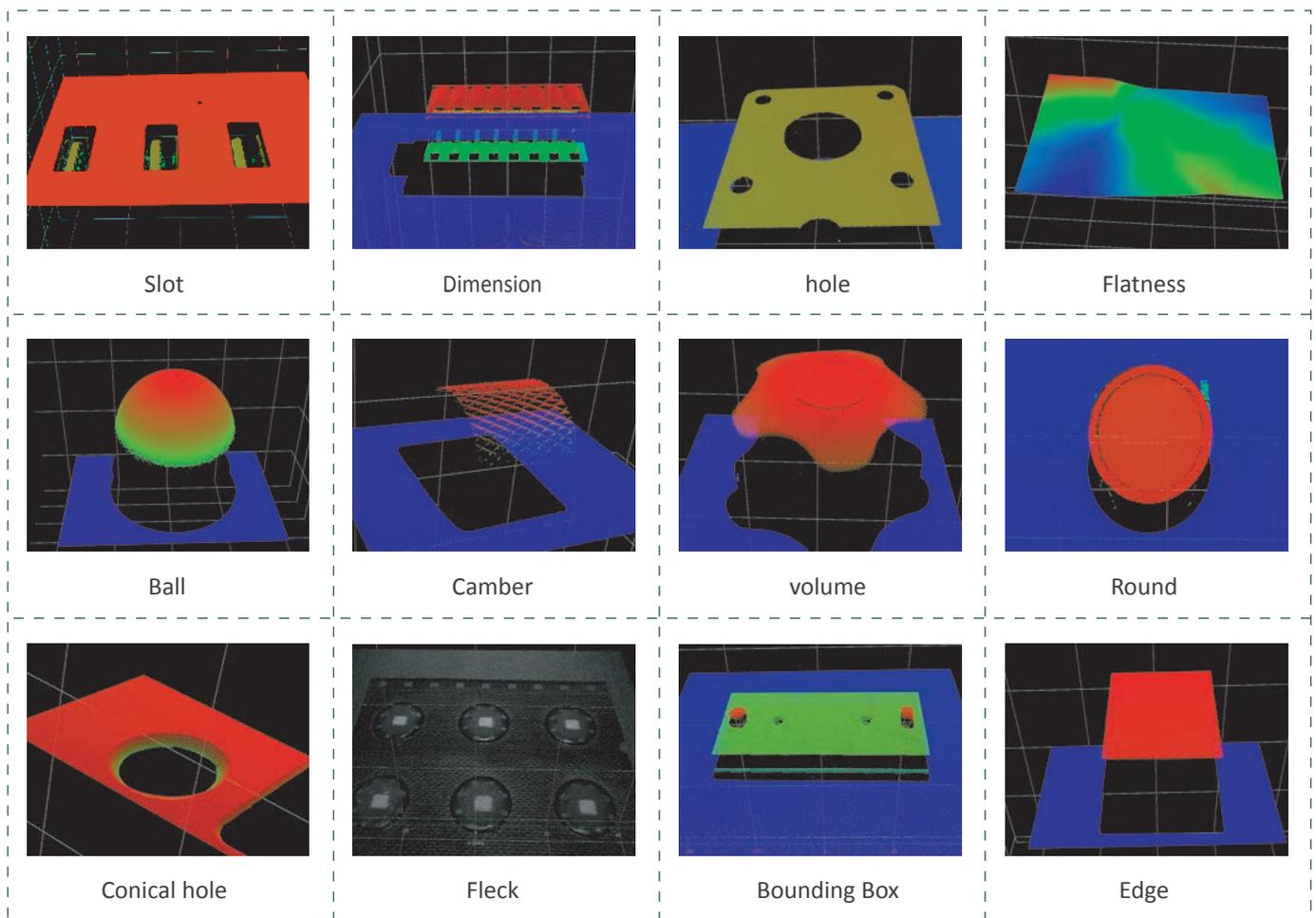


Multiple Measurement Modes

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

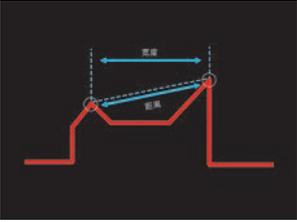
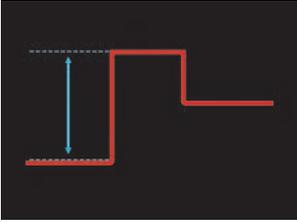
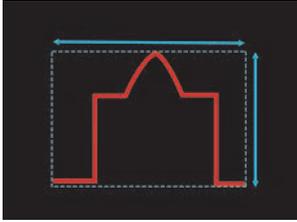
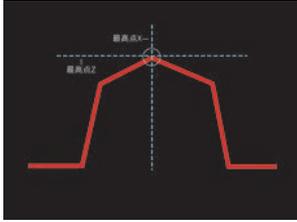
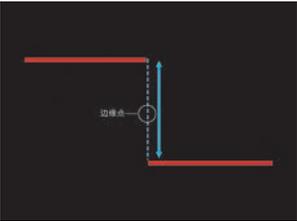
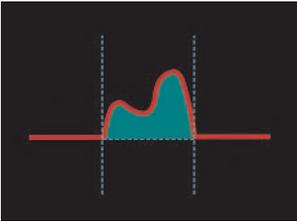
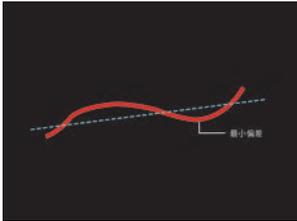
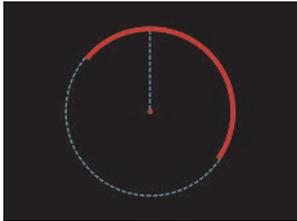
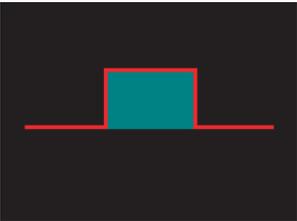
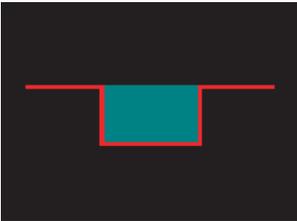
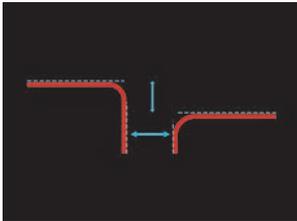
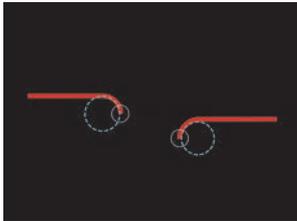
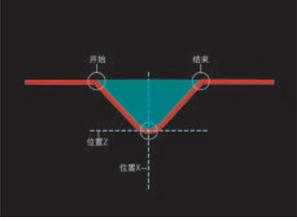
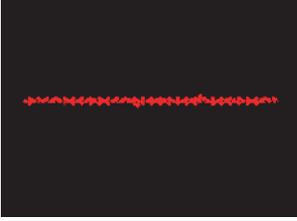
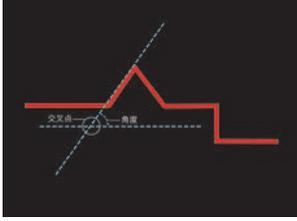
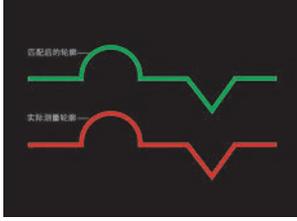
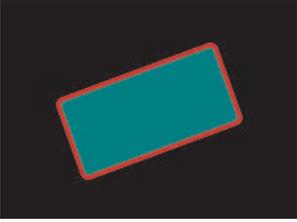
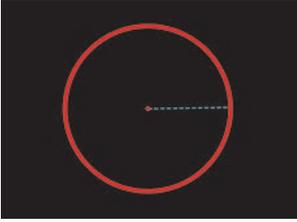
Scanning and measurement can be performed automatically with simple Settings, and the measurement results are directly output to the control system for rapid deployment.

1 - Point cloud tool



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		

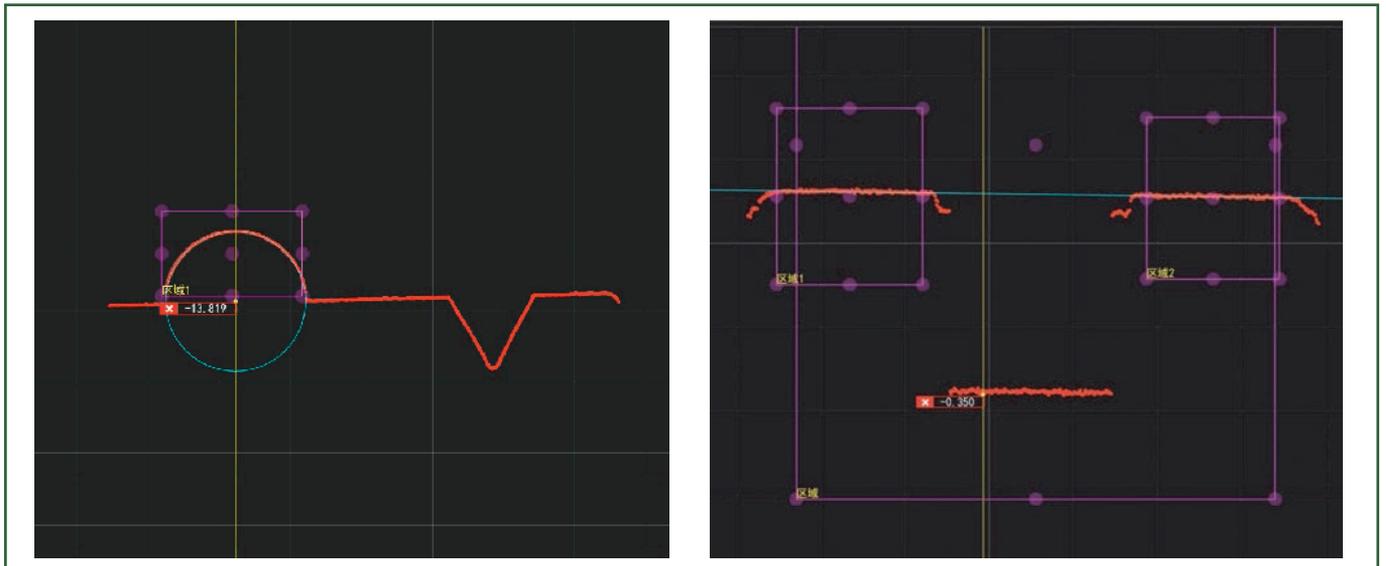
Apply Measuring Tools And Measuring Modes



Multiple Measurement Modes

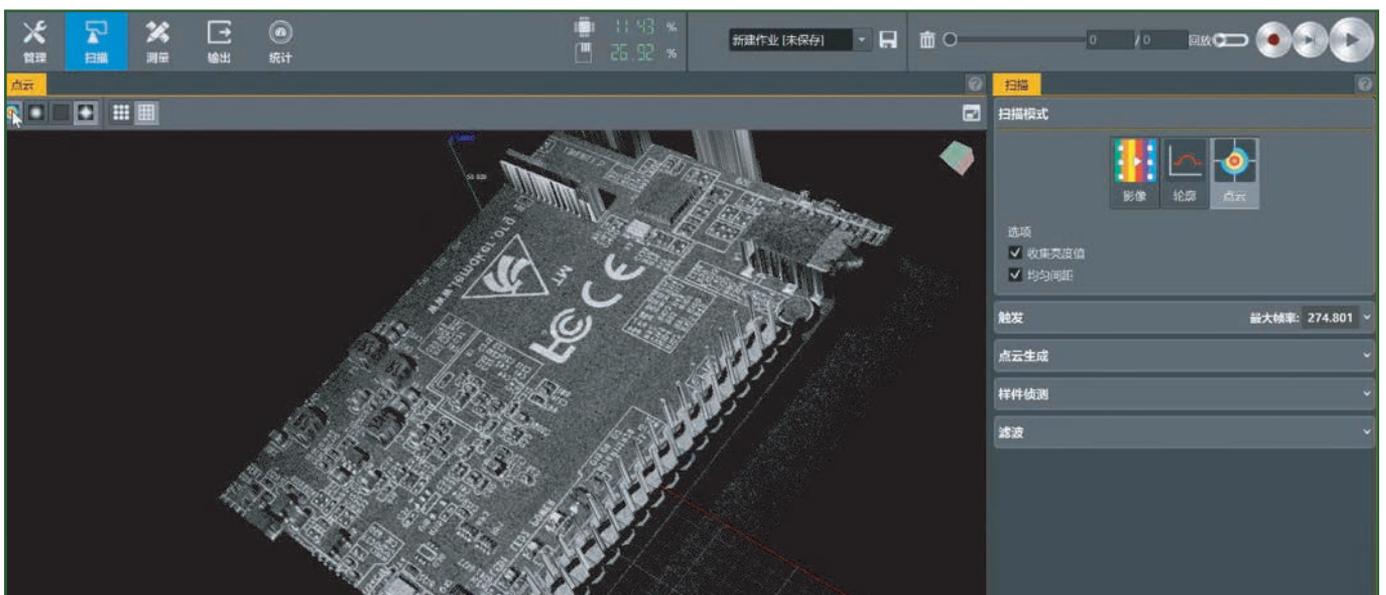
1 - Contour pattern

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



2 - Luminance mode

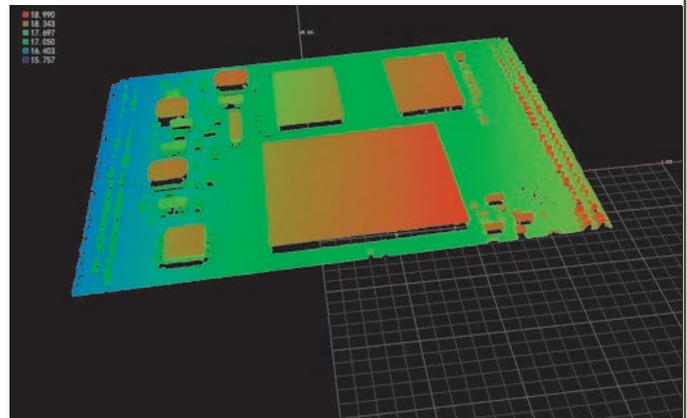
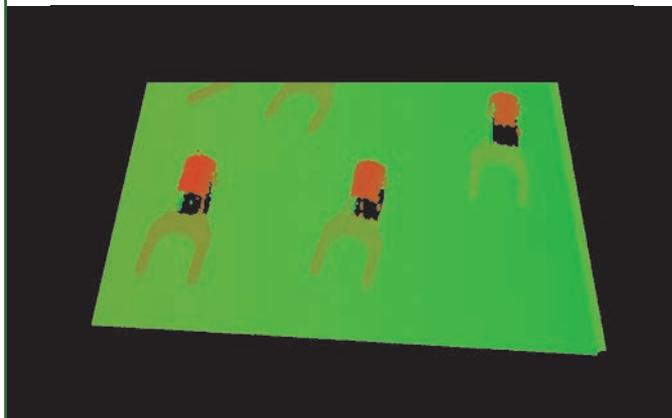
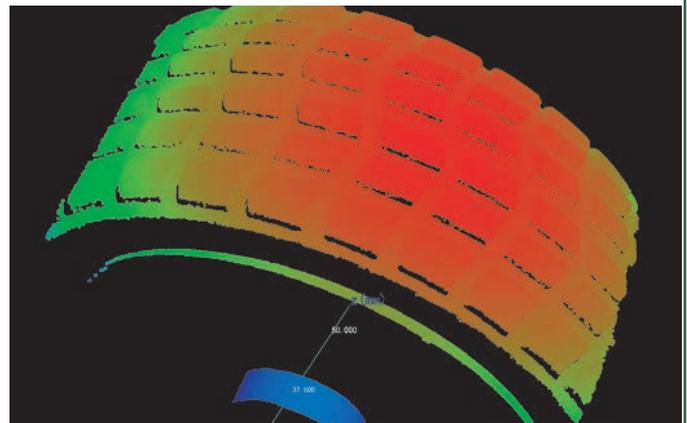
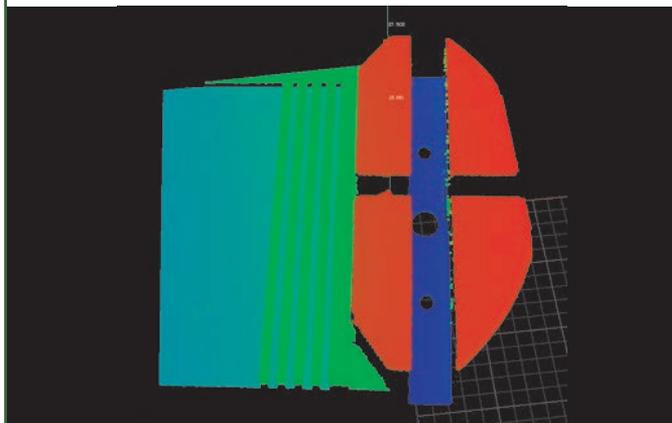
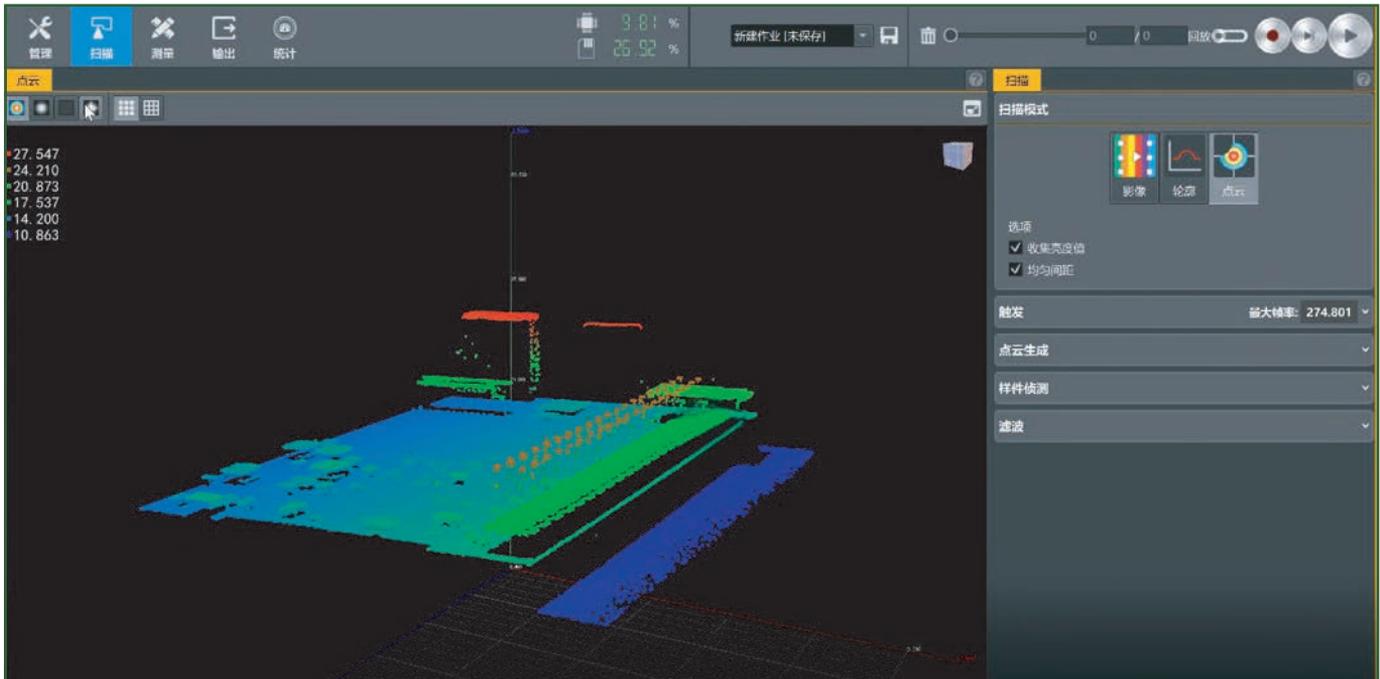
It is used to detect 2D features on the surface of objects, such as character recognition and bar code recognition.



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

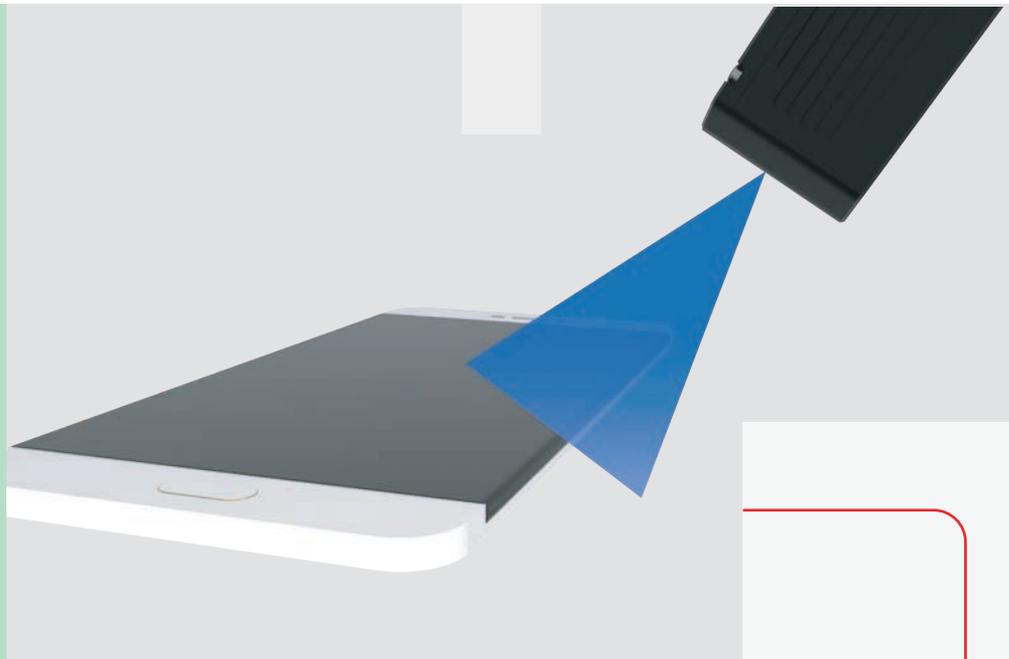
Detect the flatness, thickness and curvature of the mobile phone screen glass, accurately identify the surface defects such as edge breakage, pitting and dirt on the glass, and remove defective products.

<< Flat glass screen

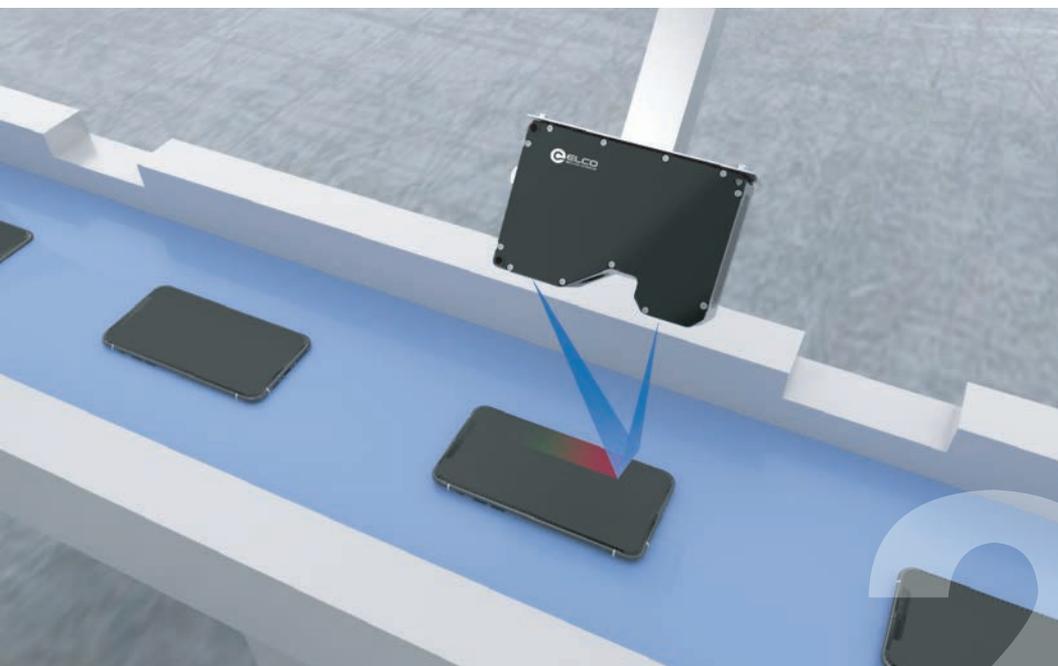
Flatness detection

Curved screen glass >>

Chamfer detection



Intelligent 3D laser profile sensor

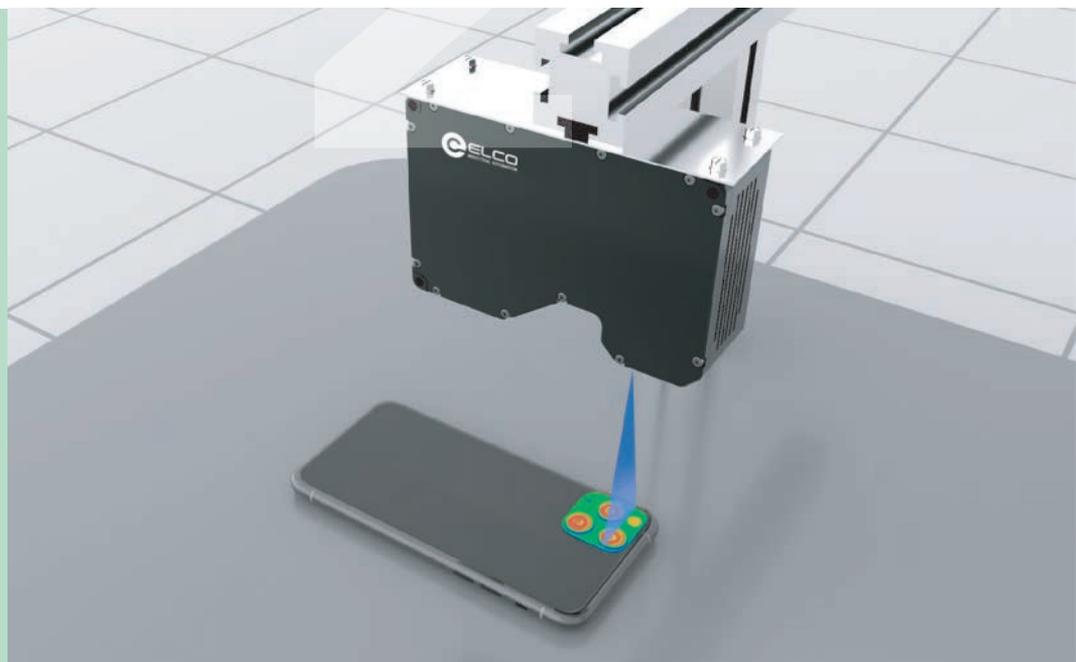


Mobile Phone Assembly Accuracy Detection

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 >>



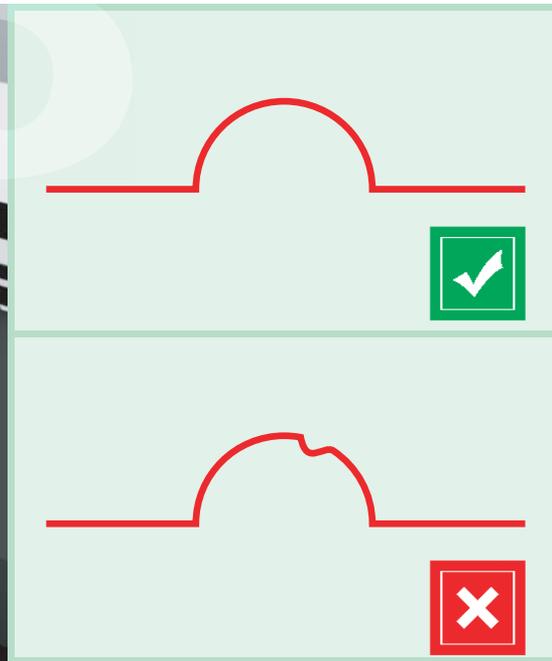
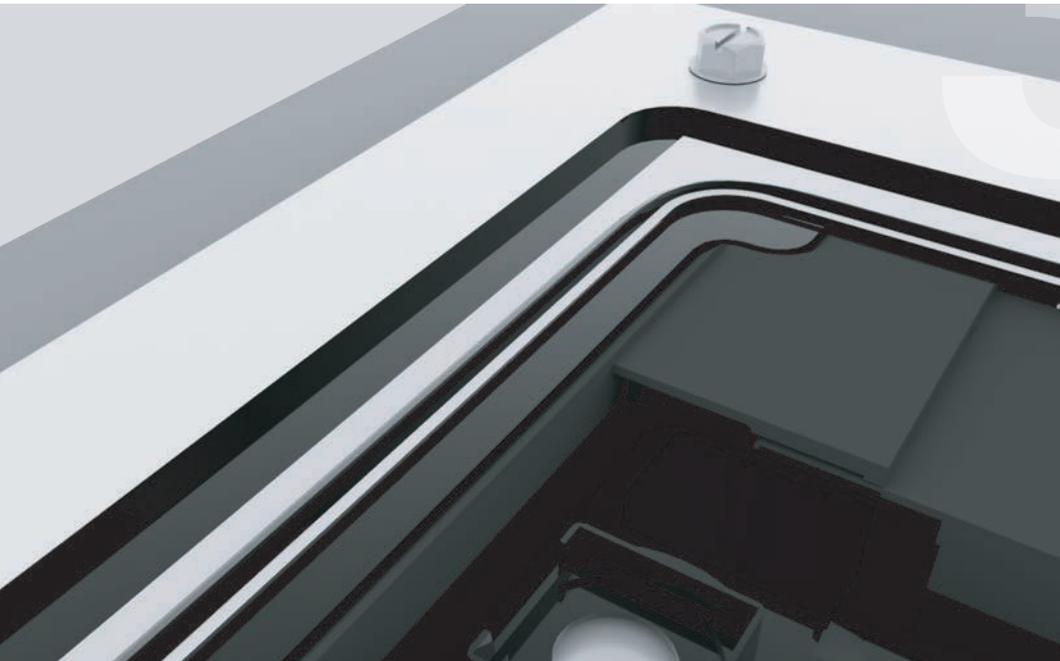
Product Application Cases

Consumer Electronics
Industry Application

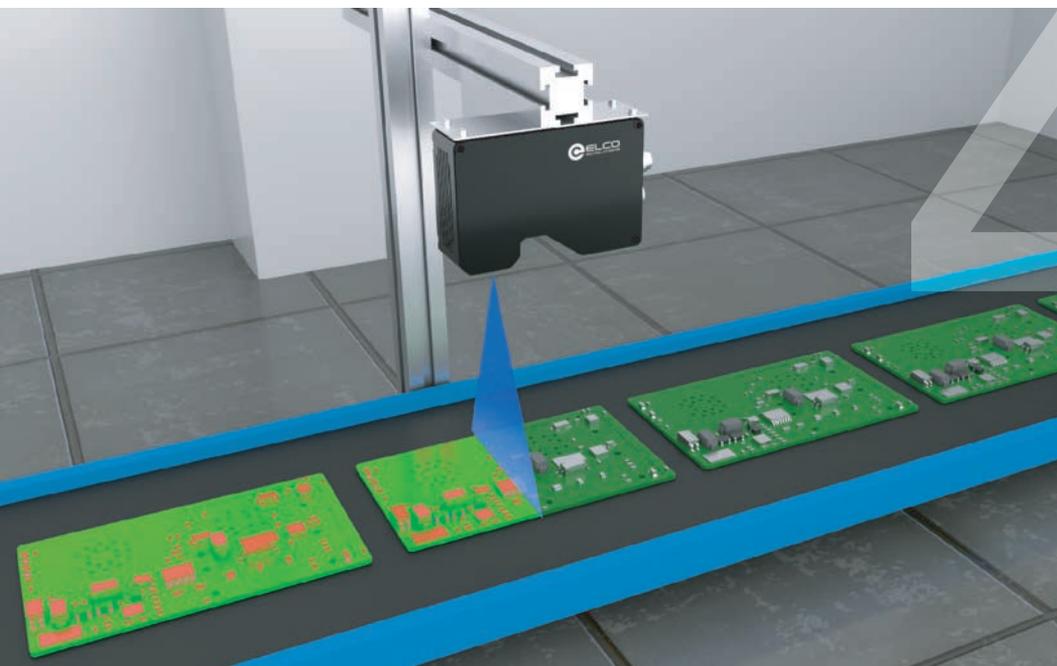


Mobile Phone Glue Path Detection

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

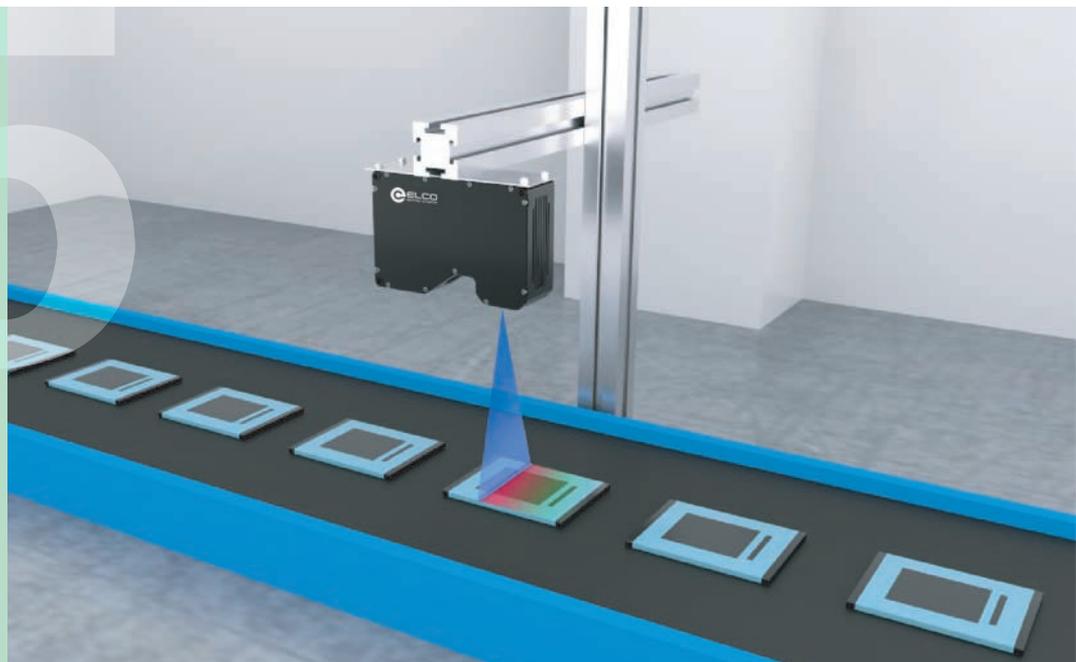


Pcb Solder Paste Test

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

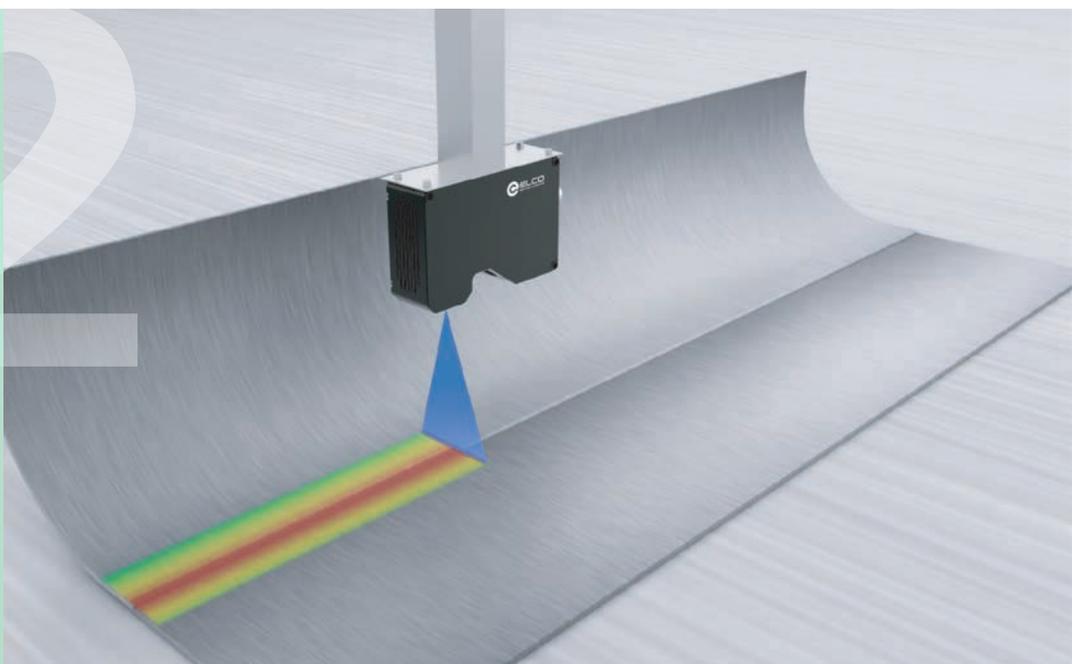


Body Clearance Surface Difference Detection

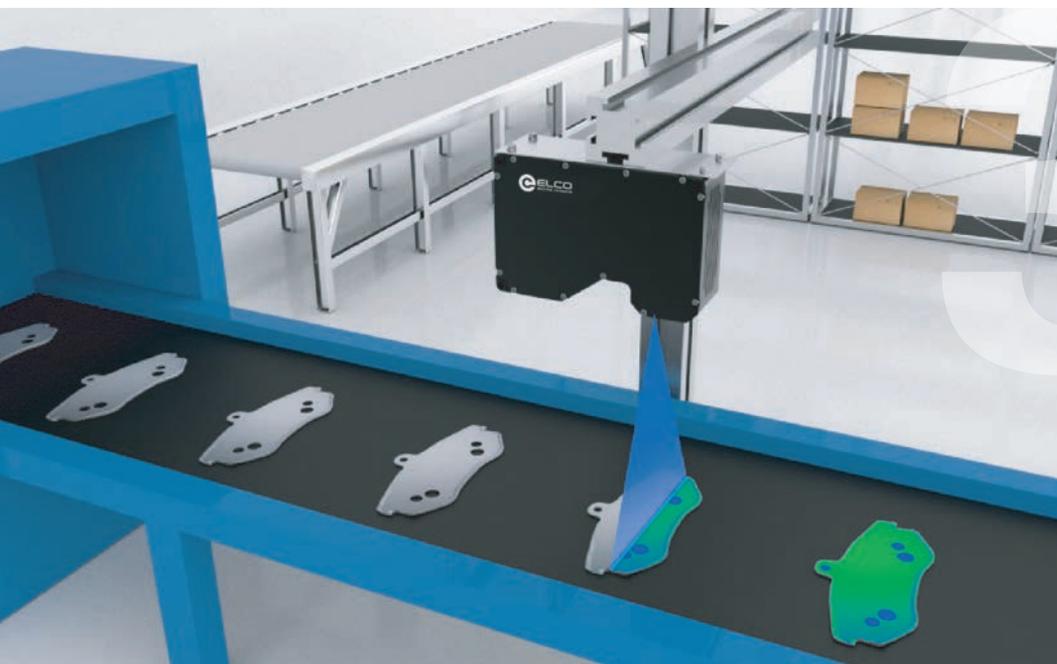
Regardless of material and reflectivity, accurately measure the gap surface difference of the body, such as Windows, mirrors, panoramic sunroofs, lights, etc. The measurement accuracy of micron level fully meets the requirements of high precision for body assembly.

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

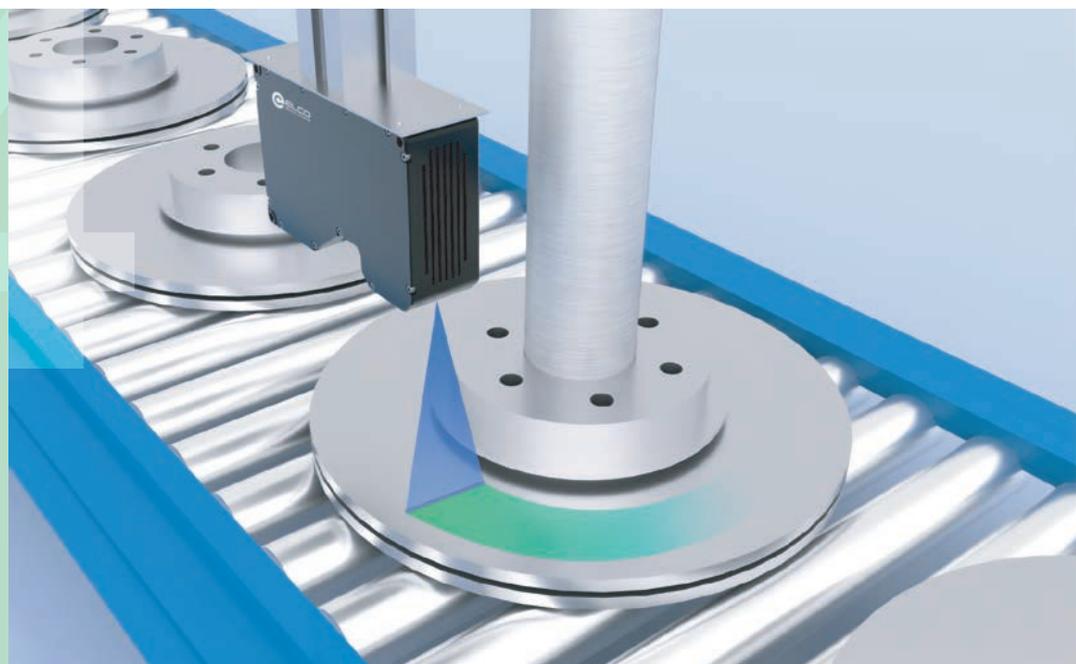


Stamping Part Inspection

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.

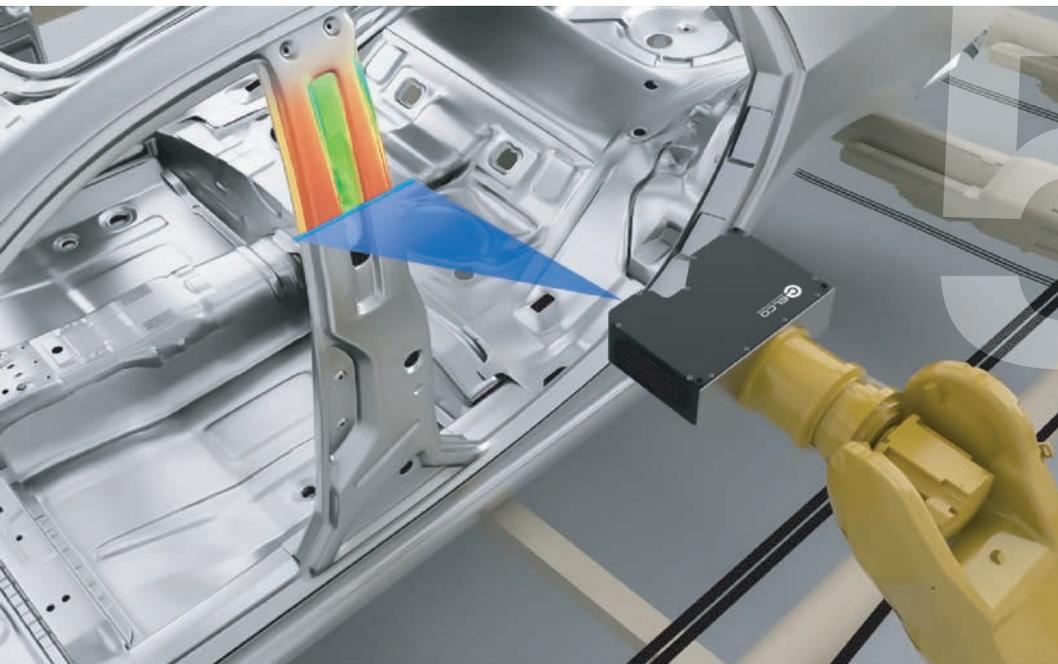
Brake Disc Surface Polishing Detection

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

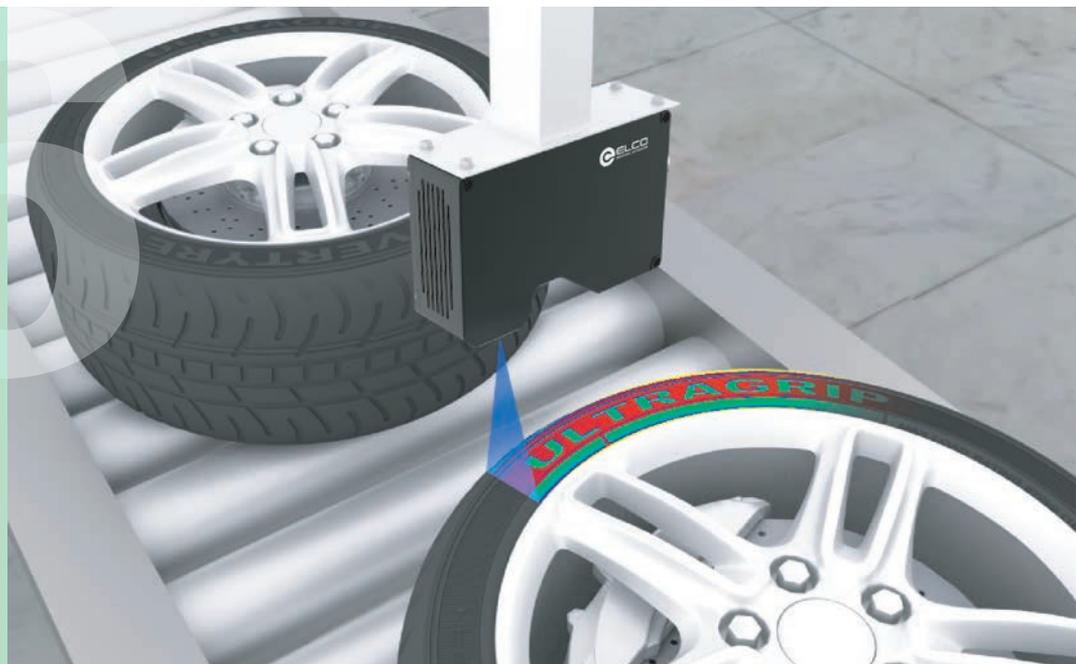


Vehicle Mounting Hole Detection

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

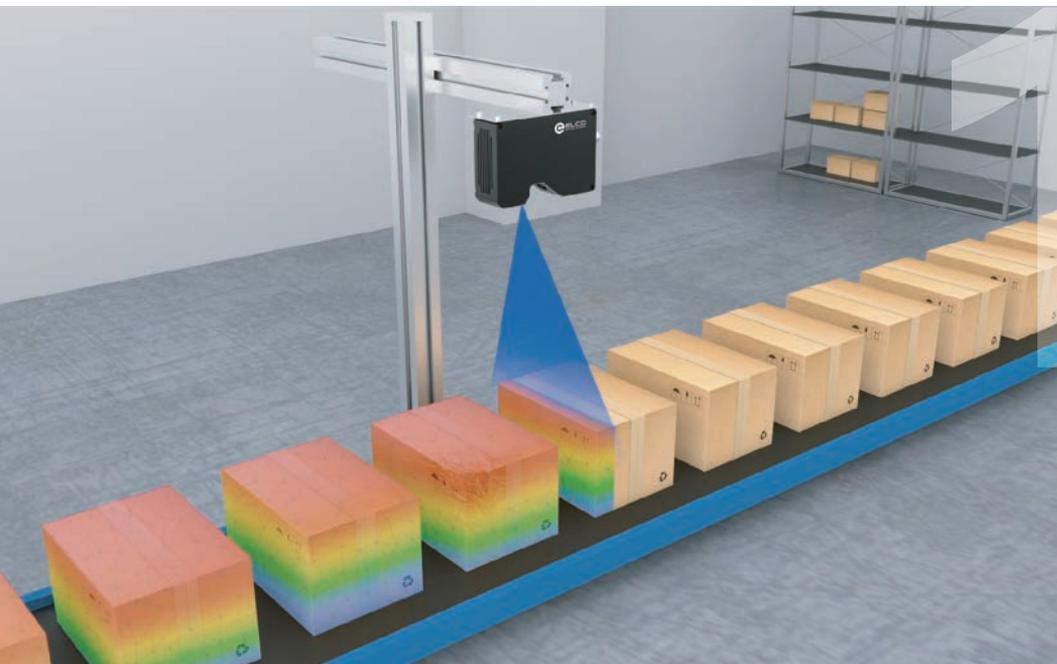
Tire Character Recognition

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

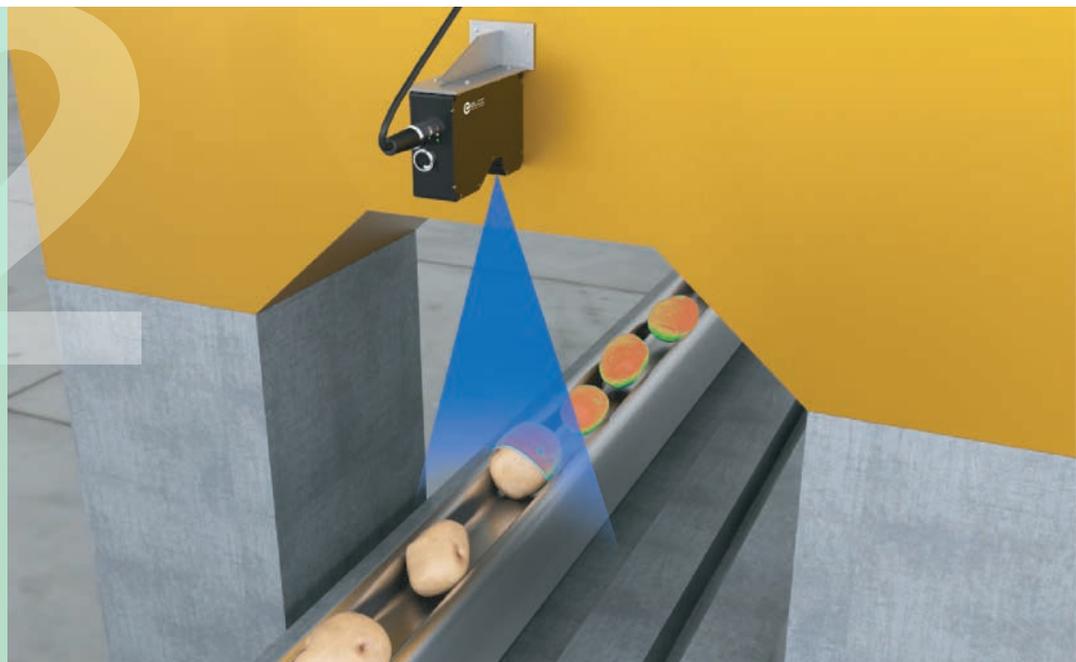


Product Packaging Inspection

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

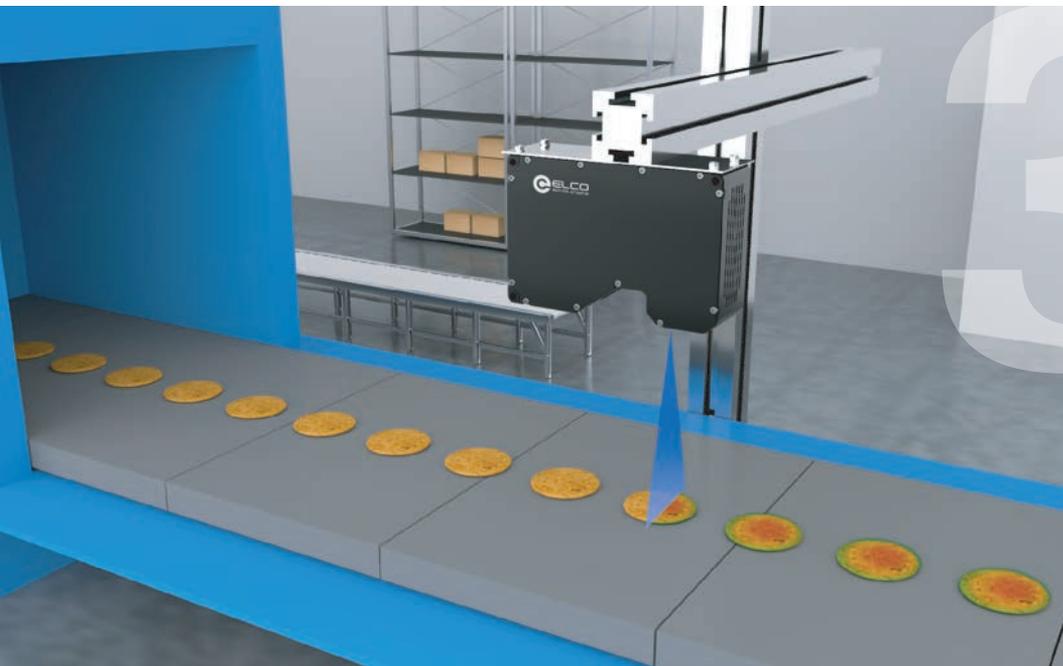
Potato Sorting

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

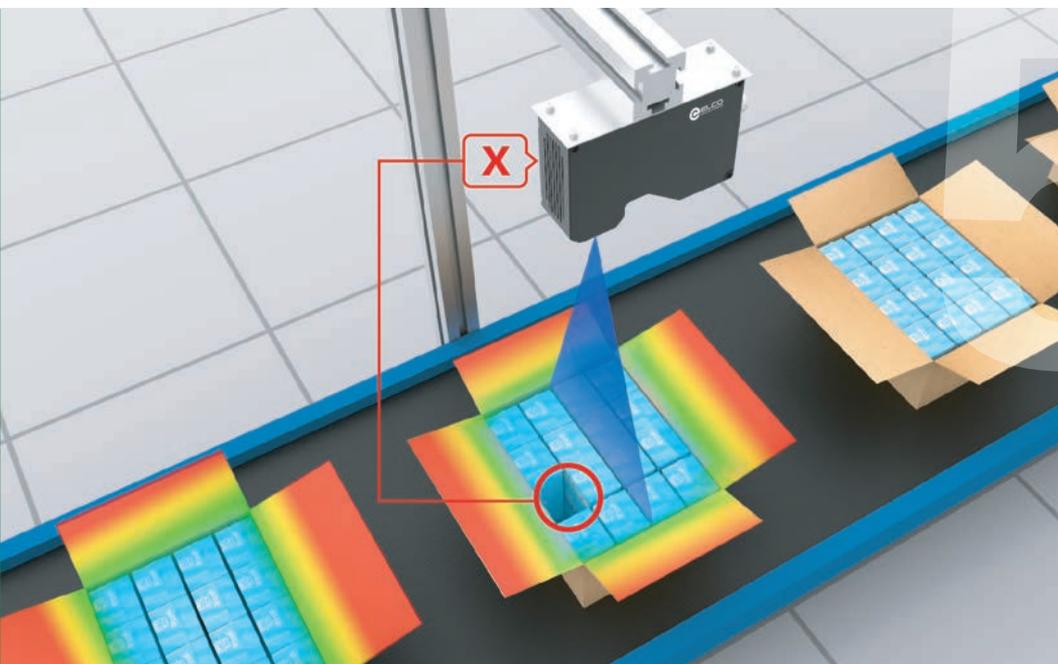
Detect the thickness and size of cookies, identify cookies with defects in appearance, and ensure that the cookie size is consistent and the thickness is uniform. It can also be used in the quality detection of potato chips, cheese slices, oatmeal bars and other food.

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

C+R Automations- GmbH

Nürnberger Straße 45
90513 Zirndorf

Tel. +49 (0)911 656587-0
E-Mail: info@crautomation.de
www.crautomation.de