# **入口C** 奥美加科技 SPDPHOTO

# 精密光学测控系统专业制造商

PROFESSIONAL MANUFACTURER OF PRECISION OPTICAL MEASUREMENT AND CONTROL SYSTEMS





www.amgkj.com

# **CATALOG**



of the outer diameter of RF cables and optical cables;

various tubes and wires.

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# ABOUT US

Chengdu Auto Measure Gauge Technology Technology Co., Ltd. has been engaged in the non-contact non-destructive testing industry for over 20 years. With a team of experienced professionals in design, production, and sales, it is a high-tech enterprise specializing in the research and production of non-contact optical inspection instruments and equipment.

The company adheres to the business philosophy of a professional team, striving for excellence, people-oriented, and customer-first, aiming to provide high-quality products and services to help enterprises improve efficiency.

In recent years, with the continuous development and progress of technology, the requirements for productivity in various industries have been increasing. To meet the higher demands of customers, the company established a high-tech R&D center in 2010 and introduced a team of PhDs and Masters in related fields. They launched the high-end brand SPDPHOTO, developing high-end inspection instruments and equipment, covering imaging inspection, laser scanning, high-speed CCD imaging, diffraction outer diameter measurement, and particle defect detection for both online and offline industrial non-destructive optical inspection systems. These systems cater to different industries, scales, and applications, including wire, pipe, semiconductor, electronic components, packaging, photovoltaic electrical, automotive, machine tools, molds, tobacco, rubber, extrusion, medical, and glass.

The company has successively established offices, foreign trade departments, and overseas branches in East China (Wuxi, Jiangsu), South China (Shenzhen, Guangdong), Northwest China (Xi'an, Shaanxi), and Southeast Asia to better provide pre-sales technical consultation, sales, and after-sales technical services to domestic and international customers.



# **APPLICATIONS**



High-speed production of ultra-fine wire measurement

Adapts to a wide range of line speeds, accurate detection of small sizes.Minimum detection size: 0.01mm.



Accurate measurement of corrugated and stranded wires

Ultra-high-speed sampling, precise capture of peak and trough values.



Accurate positioning of workpieces in the two-dimensional field

Continuous detection of target positions, commonly used for optical fibers;Assisting in correction to improve process levels and product yield.



Simultaneous measurement of multiple production lines Networking topology, wide-range data monitoring, centralized storage, and processing of detection data.



**Simultaneous measurement of width and thickness** Dual-module collaboration for simultaneous detection of the width and thickness of flat materials.



**Rapid measurement of wire ovality** Simultaneous measurement of the outer diameter and ovality of ultra-fine targets, achieved with one click.





Hand-held gauges for fast measurements Flexible measurements that are not constrained by space, helping personnel conduct inspections anytime. Strong, durable, and long-lasting.



**Dimensional measurement of large workpieces** Collaborative sampling between modules to achieve large outer diameter measurement; Customizable according to size requirements.



**Precise measurement of camshafts** Segmented positioning detection, continuous data output, anomaly alerts. High-precision edge detection, high response speed,

accurate measurement of workpiece runout.



**Measurement of the width of extra-wide flat tapes** Monitoring the edge position and continuous measurement of width data for large-sized films or flat materials. High accuracy and quick response.



Roll gap width measurement Accurate real-time measurement of roll gap values to improve rolling precision; Assists in automatic rolling control.



**Pin size and gap measurement** Efficient pin spacing positioning detection Helps improve the process, assist in screening, and increase the yield rate.

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# PRECISION OPTICAL MEASUREMENT AND CONTROL SYSTEMS

# Explanation of the Principle of Laser Diameter Gauge



**Optoelectronic Receiver Unit** 

Optoelectronic Emission Unit

## Measurement mode



1. The laser beam emitted from the semiconductor laser is reflected into a single beam by a polygonal mirror.

2. It is then reflected by a plane mirror.

3. The beam passes through a collimating  $F(\theta)$  lens, making each laser beam parallel and collimated.

4. The beam scans the object being measured.

5. The beam is converged by the receiver lens.

6. It is converted into an electronic signal proportional to the received light intensity.

7. The size of the measured object is calculated based on the time the beam is blocked by the object, forming a shadow.



Detailed products & applications P8-19

# Explanation of the principle of high-speed CCD telecentric imaging optical system



High-intensity green LEDs emit high-power green light.
 The light is emitted parallel and collimated through a

collimating lens. 3. The light is directed towards the object being measured, creating a shadow.

4. The shadow of the object is projected into the CCD image sensor through a telecentric optical system.

5. An accurate shadow image of the object is formed in the high-speed linear CCD.

6. The measurement size is calculated through a digital edge detection processor.

#### Measurement mode







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# Explanation of the principle of laser diffraction diameter gauge



When a laser passes through a slit of a certain size or a small obstacle, it deviates from its straight-line propagation direction, resulting in a diffraction phenomenon. This causes alternating light and dark fringes to appear on the image sensor. By analyzing the spatial distribution of these fringes, the size of the measured object can be calculated.



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#### Measurement type

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# **FEATURES**





# High-precision Parallel Optical Imaging System

The high-precision parallel optical imaging system accurately identifies the target edges of the measured object, ensuring linear measurement precision and accuracy at different positions within the test area.

# **Unaffected by Vibration**

A dedicated adaptive stabilization algorithm ensures that the measurement accuracy of the object being measured is not affected by vibration or runout.



# High-speed Digital Processing Technology

High-speed DSP digital processing technology can handle large amounts of data in a short time, ensuring data integrity and accuracy.



# Unaffected by Ambient Temperature

A dedicated, long-tested optical imaging sampling module ensures the long-term accuracy and reliability of measurement data.

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#### **Data Integration Processing Center**

Collect real-time data and generate trend graphs. Flag out-of-tolerance data so you can see anomalies in your production process at any time and take timely countermeasures.

High-speed data storage, ensuring the integrity of each sample data.

Compile all data from the production process and generate histograms or curve reports.

Provide historical data query capabilities for easy traceability.



# Design Adapted for Use in Production Environments

The measuring head is IP64 compliant, reliably preventing the ingress of water vapor or dust.

In actual production environments, conditions are often complex, with high temperatures, high humidity, and dust or smoke. To ensure stability, the design not only focuses on high environmental performance and safety but also emphasizes convenience of use.



## **Multiple Communication Methods**

Flexible communication methods, including various protocols: RS485 free port, MODBUS RTU, Internet Protocol TCP/IP, and wireless network transmission protocol WIFI.



## Long-term Stable Operation

Custom optical transmission devices and industrialgrade design ensure the long-term stability of the product's operation.

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# **LSG Series**

Multi-Function High-precision Laser Diameter Gauge



# Applicable to

Detection of the outer diameter, runout, and ovality of shafts and rollers; Measurement of the outer diameter of medical wires, tubes, rods, and other materials; Measurement of the outer diameter of wires and cables; Measurement of the outer diameter and runout of workpieces.



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#### Long-life Brushless Custom Laser Motor

It can achieve fast and stable scanning, ensuring the continuity and accuracy of measurements.

The custom laser ensures that the laser beam hardly diverges during propagation, maintaining its diameter over long distances.

tical System Design

Using an  $F(\theta)$  lens to ensure the light is parallel and collimated, it measures the external dimensions of the target based on the time the laser beam is blocked by the target, forming a shadow.

#### High Parallelism Op- High-precision Edge High-speed Re-Positioning

Through edge detection, it can detect defects such as particles, paint lumps, bubbles, and sand holes on the product surface within a very small scanning interval.

# sponse Acceptance Components

High-speed response components, combined with a high-speed DSP chip, perform rapid calculations to ensure measurement frequen-CY.



Product model	LSG-1012(S)	LSG-1030S	LSG-1060S	LSG-1090S
Number of axes	1axes	1axes	1axes	1axes
Measuring range	0.02-6mm	0.1-30mm	0.5-65mm	1-90 mm
Resolution	0.01-100 µm(Optional)	0.01-100 $\mu$ m(Optional)	0.01-100 $\mu$ m(Optional)	0.01-100 $\mu$ m(Optional)
Accuracy	±0.2µm±0.01% *D	±0.4µm±0.01% *D	±1µm±0.01% *D	±4µm±0.01% *D
Repeatability	±0.1µm±0.005%*D	±0.2µm±0.005%*D	±0.3µm±0.005%*D	±1µm±0.005% *D
Scanning frequency	800 Hz			
Alarm output	24V, 1A(contact load)			
Communication	RS485 /ModBus			
PI control	Optional			
Power supply	DC 12V 2A	DC 24V 2A		
Probe size	234x70x53(mm)	355x114x45(mm)	459x141x45(mm)	606x161x58(mm)

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LSG Series Micro-Wire Laser Diameter Gauge



# Applicable to

Measurement of outer diameters for enameled wire, optical fiber, nylon wire, stainless steel wire, tinned wire, micro-drawn wire, and micro-flat wire.





# **Technical Indicators**

#### **Product features**

- Optimized optical system design
- Optical aspheric processing technology
- High-speed laser scanning, DSP high-speed data processing
- Dedicated measurement algorithms, long-term use with no data drift
- Automatic calibration, user-friendly operation
- Compact structure, small size, and lightweight

Product model	LSG-1005	LSG-1015	LSG-1015XY
Number of axes	1axes	1axes	2axes
Measuring range	0.010-3mm	0.010-10mm	0.015-6mm
Resolution	0.1µm 0.01-100µm(Optional)		0.1-100µm(Optional)
Accuracy	±0.2μm±0.01%*D	±0.05μm±0.01%*D	±0.2µm±0.01%*D
Repeatability	±0.1µm±0.005%*D ±0.03µm±0.005%*D ±0.1µm±0.005		±0.1µm±0.005%*D
Scanning frequency	800Hz		
Alarm output	24V, 1A(contact load)		
Communication	RS-485/MODBUS Dual channel RS-485/MODBUS		
PI control	Optional		
Power supply	DC 12V, 1A	DC 24V, 1A DC 24V, 2A	
Probe size	160×70×45(mm) 214×116×50(mm) 203.5×137×50(m		203.5×137×50(mm)





## Applicable to

Measurement of the outer diameter of enameled wire, nylon wire, stainless steel wire, tinned wire, and micro-drawn wire;

Measurement of the outer diameter of optical fiber and data collection and measurement of the outer diameter of diamond wire.



# **Product features**

- Optimized optical system design
- Advanced optical aspheric processing technology
- Laser scanning technology is used for precise measurement of the outer diameter
- Dedicated measurement algorithms ensure no data drift during long-term use
- Automatic calibration, user-friendly operation
- Compact structure, small size, light weight
- Equipped with a powerful lithium battery, short charging time, long battery life



# **Product introduction**

LSP Portable Series uses the laser scanning principle for non-contact measurements, ensuring no damage to the surface of the measured object.

It features a lightweight structural design, making the body compact and easy to carry. The high-definition wideviewing angle LCD screen supports horizontal and vertical dual-mode display, allowing data to be observed from different angles.

The large capacity lithium battery can support 8-9 hours of continuous work, making it particularly suitable for quick measurements on production sites.

Product model	LSP-1005	LSP-1005A	
Measuring range	0.010-2mm	0.03-4.5mm	
Resolution	0.1-100µm(Optional)		
Accuracy	±0.2um±0.01%*D		
Repeatability	±0.1um±0.005%*D		
Wavelength	650	)nm	
Scanning frequency	800Hz		
Power supply	7.4V 锂电池组 (2000mah)		
Display		CD	
Size	225x48>	(39(mm)	

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#### LSG - 5000Series

Ellipticity Laser Detection System





#### Applicable to

Measurement of the ovality and outer diameter of enameled wire, optical fiber, and diamond wire;

Measurement of the ovality and outer diameter of stainless steel wire and micro-drawn wire.



#### **Product features**

- Optimized optical system design.
- Advanced optical aspheric processing technology.
- Laser scanning technology is used for precise measurement of the outer diameter.
- Dedicated measurement algorithms ensure no data drift during long-term use.
- Automatic calibration, user-friendly operation.
- Equipped with a high-precision automatic rotation platform, automatically collects and analyzes measurement data.
- Quickly measures the ovality, average value, maximum value, and minimum value of the measured object.
- Optional PC data analysis software system for easy data storage and statistics.

## **Product introduction**

The LSG-5000 series uses high-precision clamping fixtures that do not exert excessive tension on the clamped wires, preventing any slight changes in their outer diameter.

With high-speed motor scanning and 360-degree rotating clamping, the wires are measured at over 100 points within 2-3 seconds, providing real-time display of the wire's average value, ovality, maximum value, and minimum value.

The system offers high measurement accuracy, simple and efficient operation. It can be equipped with an automatic rotation device to eliminate human error.



# Companion data processing software

Circumferential data is automatically acquired, automatically generates an image of the target section profile, stores various parameters of current measurement data for analysis, and historical data queries.



Product model	LSG-5000 (Automatic one-click measurement)	LSG-5000A(Manual)	
Measuring range	0.015-0.8mm(Expandable up to 3mm)	0.015-0.8 mm	
Resolution	0.01-100µm(Optional)	0.01-100µm(Optional)	
Accuracy	±0.02µm±0.01%*D	±0.02µm±0.01%*D	
Repeatability	±0.01µm±0.005%*D	±0.01µm±0.005%*D	
Wavelength	650nm	650nm	
Scanning frequency	800Hz		
Communication	Dual channel RS-485/MODBUS		
Alarm output	24V, 1A(contact load)		
Power supply	DC 24V, 5A	DC 24V, 1A	
Probe size	216×131×55(mm)	214×115×50(mm)	

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#### LSG - 3000

Multi-Sensor Integrated Laser Measurement and Control System



## **Product introduction**

The LSG-3000 Multi-Head Integrated Laser Measurement and Control System is a high-performance-to-value in-line OD testing system that can drive up to 48 sets of OD measurement sensor heads.

It uses a high-speed DSP processing system to simultaneously perform data acquisition, computing, and communication transmission. Each sensor head has a separate alarm function and data printing, and the system includes 2 independent PI control signal outputs.

The sensor head is small in size and easy to install and maintain.

# Companion data processing software

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Data curves are displayed in real time, making it easy to visualize. Data can be exported.

Measurement data from multi-detector sensors can be printed at any time as needed. Records are saved and backed up.



Measuring range	0.015-3mm
Resolution	0.1-100µm(Optional)
Accuracy	±0.2µm±0.01%*D
Repeatability	±0.1µm±0.005%*D
Scanning frequency	800Hz
Alarm output	24V, 1A(contact load)
Communication	RS-485/MODBUS
PI control	Optional
Power supply	AC220V 50Hz



#### LSG - 6000

Automatic Inspection Measurement and Control System



#### Applicable to

Non-contact automatic cyclic collection, measurement, and control of the outer diameter data of enameled wire, stainless steel wire, micro-drawn wire, and diamond wire.

#### **Product introduction**

The LSG-6000 Automatic Inspection Laser Measurement and Control System achieves automated non-contact measurement of the outer diameter at the production site at a low cost. It is suitable for production equipment with 1-40 lines, with a detection speed of 3 to 10 seconds per line (adjustable on-site).

Professional companion software: Real-time display of data curves, recording, storage, and statistics; analysis of the production time period and process of defective products.

It completely solves the problems of inaccurate outer diameter control and high labor intensity in the production of various fine wires.

#### **Product features**

- Completely non-contact, automated inspection measures the outside diameter of multiple wires.
- Optimized optical system design.
- Advanced optical aspheric processing technology.
- Laser scanning technology is used for precise measurement of the outer diameter.
- Dedicated measurement algorithms ensure no data drift during long-term use.
- Equipped with a high-precision mobile platform to automatically collect and analyze measurement data.
- High-precision positioning sensors accurately and automatically locate each wire position.
- Ensures measurement accuracy is not affected during mobile measurements.
- Equipped with PC data analysis software system for easy data storage and statistics.





Measuring range	0.02-6mm
Resolution	0.1-100µm(Optional)
Accuracy	±0.2µm±0.01%*D
Repeatability	±0.1µm±0.005%*D
Scanning frequency	800Hz
Alarm output	24V, 1A(contact load)
Communication	RS-485/MODBUS
PI control	Optional
Power supply	AC220V 50Hz

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#### **LSG Series**

Wires and Cables Laser Diameter Gauge



#### Applicable to

Measurement of the outer diameter of medical wires, tubes, and other materials;

Measurement of the outer diameter of cable strands and communication cables;

Measurement of the width and thickness of various flat wires, including flat enameled wires.



# **Technical Indicators**

# **Product features**

- Dual-optical redundancy design, high reliability, and strong stability.
- Dual-axis scanning, more precise and comprehensive data acquisition.
- Measurement of outer diameter, ovality, and runout.
- High-speed laser scanning, DSP high-speed data processing.
- Dedicated measurement algorithms ensure no data drift during long-term use.
- Automatic calibration, user-friendly operation.

Product model	LSG-1012XY (F)	LSG-1030XY (F)	LSG-1060XY
Number of axes	2axes	2axes	2axes
Measuring range	0.1-12mm	0.1-30 mm	0.5-65 mm
Resolution	0.01-100 µm(Optional)	0.01-100 µm(Optional)	0.01-100 µm(Optional)
Accuracy	±0.3µm±0.01%*D	±0.5µm±0.01% *D	±1µm±0.01% *D
Repeatability	±0.2µm±0.005% D	±0.3µm±0.005% *D	±0.3µm±0.005% *D
Scanning frequency	1600 Hz(Single-axis:800Hz) (Optional:4800Hz(Single-axis:2400Hz))		
Alarm output	24V, 1A(contact load)		
Communication	RS-485/MODBUS		
PI control	Optional		
Power supply	DC 24V, 2A		
Probe size	230×159×55(mm)	260x232x55(mm)	385x374x56(mm)

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LSG Series

Flat Wire Laser Diameter Gauge





#### Applicable to

Measurement of the width and thickness of photovoltaic ribbon, flat metal wire;

Measurement of the width and thickness of flat enameled wire, as well as surface particle defect detection.

# **Product introduction**

The flat wire laser caliper uses the laser scanning principle for contactless, high-precision in-line or off-line inspection. Its unique edge recognition technology makes it more accurate and efficient in the inspection of flat products.

The structural design oriented to specific use scenarios and modular circuit design make it smaller in size compared to similar products, easy to install, and greatly reduce the constraints of space limitations.



## Paired with fixtures

Some parts can be paired with different types of auxiliary tooling to accommodate flat wires of different sizes, ensuring the wire remains fixed in position, preventing vibration and deflection, and improving measurement accuracy.



Product model	LSG-1020XY (F)	LSG-7000	
Measuring range	0.04-14mm	0.04-10mm	
Resolution	0.1-0.00001 mm(Optional)	0.1µm	
Accuracy	±0.3µm±0.01%*D	±0.5µm±0.01%*D	
Repeatability	±0.1µm±0.005%*D	±0.3µm±0.01%D	
Scanning frequency	1600Hz(Single-axis:800Hz) (Optional:4800Hz(Single-axis:2400 Hz)	1600Hz(Single-axis: 800 Hz)	
Communication	RS-485/MODBUS	Dual channel RS-485/MODBUS	
Alarm output	24V, 1A(contact load)		
Power supply	DC 24V, 2A	DC 24V, 5A	
Probe size	205x201x55(mm)	203.5×137×50(mm)	

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#### LSG - 7000 Series

Flat Wire Laser Measurement and Control System



# **Product introduction**

The LSG-7000 series flat wire laser measurement and control system uses dual laser inspection heads plus auxiliary tooling and unique edge algorithms to accurately measure the width and thickness of flat wires.

The surface of the guide wheel group is finely treated, ensuring no damage to the wire or surface plating.

The system is equipped with professional data

#### Applicable to

Measurement of the outer diameter, width, thickness, and surface roughness of various wires, including enameled round (flat) wire, copper wire, tungsten wire, and photovoltaic ribbon.



processing software that provides real-time data graphs to show trends in data changes, stores data, and offers historical query functionality. It also performs statistical analysis of the production time period and production process of defective products, and supports data export for subsequent analysis.

## Size and surface particle defect detection



① Particle defect detection in the thickness and width directions
 ② Width, thickness, and outer diameter are detected at the same time

# Special custom data processing system (Optional)

1. Real-time recording and display of outer diameter measurements and variation curves, with historical data queries.

2. The OD out-of-tolerance alarm parameters can be set according to the production process. When the measurement value exceeds the set range, an out-of-tolerance alert is triggered and marked on the outer diameter curve.

3. Records the values and total number of concave and convex defects, and can mark defect locations based on preset speeds.



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Product model	LSG-7000A	LSG-7000B	
Measuring range	0.1-14mm (0.1-30 mmOptional)	0.04-10 mm	
Resolution	0.1-0.00001 mm(Optional))	0.1-0.00001 mm(Optional)	
Accuracy	±0.5µm±0.01%*D	±0.5µm±0.01%*D	
Repeatability	±0.1µm±0.01%*D	±0.1µm±0.01%*D	
Display	Configuration screen display		
Scanning frequency	Single-axis: 1200Hz	Single-axis: 1200Hz(Optional: 2400Hz)	
Data Collection	Supports (Optional PC and software)		
Alarm output	24V, 1A(contact load)		
Communication	RS485 communication, including Freeport communication and MODBUS communication		
Power supply	AC 220V 50Hz		
Temperture	5~45℃		
Humidity	35-85%(No condensation)		
Environmental Conditions	The air does not contain corrosive	gases, Severe oil, vapors, and dust.	

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#### **LCG Series**

High-Speed Particle Defect Outer Diameter Detector High Sampling Frequency Up to 10KHz



#### Applicable to

Measurement of the outer diameter and surface particle defect detection of cable strands, electrical cables, and communication cables;

Medical wires, tubes, and other materials;

Precision electronic wires and communication cables;





1. High-intensity green LEDs emit high-power green light.

2. The light is emitted parallel and collimated through a collimating lens.

3. The light is directed towards the object being measured, creating a shadow.

4. The shadow of the object is projected into the CCD image sensor through a telecentric optical system.

5. An accurate shadow image of the object is formed in the high-speed linear CCD.

6. The measurement size is calculated through a digital edge detection processor.

#### Product features

- Using high-speed CCD telecentric optical system imaging technology to achieve rapid detection of particle defects and precise measurement of outer diameter.
- High-precision, single-cycle data acquisition.
- Dedicated measurement algorithms ensure no data drift during long-term use.
- Automatic calibration, user-friendly operation.
- Compact structure, small size, and lightweight.

# Principle of Particle Inspection for Diameter Gauges

#### **Conventional Diameter Gauges**

Conventional diameter gauges are limited by sampling frequency and require a large amount of data averaging and filtering to obtain stable measurement data.

In this case, short-term changes in the outer diameter may be averaged or filtered out, resulting in relatively stable output data with small variations, as shown in the figure below.

Points A and B can be filtered out during averaging.



#### Companion software

#### The software system is used in conjunction with the measuring instrument for real-time communication. It has the following functions:

1.Real-time recording and display of measurement values and outer diameter variation graphs.

2.Setting of outer diameter tolerance alarm parameters according to production processes. When the measurement values exceed the set range, it records the defect values and their positions.

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The LCG series diameter gauges use a high-performance DSP processor and edge processing algorithms, combined with advanced aspheric processing technology, to achieve high accuracy and stability in single measurements. By observing changes in outer diameter values, the size of surface particle defects can be detected.



H1 and H2 refer to the minimum defect detection size, while L refers to the minimum defect detection spacing.



Product model	LCG-1006S	LCG-1015XYF	LCG-1030XYF	LCG-4015
Measuring range	0.04-6mm	0.1-10mm	0.3-20mm	0.1-10mm
Resolution	0.1-100µm(Optional)	0.1-100µm(Optional)	0.1-100µm(Optional)	0.1-100µm(Optional)
Accuracy	±0.3µm±0.01%*D	±1µm±0.01%*D	±2µm±0.01%*D	±1µm±0.01%*D
Repeatability	±0.1µm±0.005%*D	±0.2µm±0.005%*D	±0.3µm±0.005%*D	±0.2µm±0.005%*D
Scanning frequency	5KHz	20KHz Single-axes: 10KHz	20KHz Single-axes: 10KHz	40KHz Single-axes: 10KHz
Alarm output	DC 24V, 1A(contact load)			
Communication	Dual channel RS-485/MODBUS TCP/IP((Optional)PROFINET) WIFI			
I/O (I/O Interface)	Pulse input、Digital input			
Pl control	Optional			
Probe size	232x74x36(mm)	230×150×50(mm)	320×210×50(mm)	300×252×55(mm)
Power supply	DC 24V, 2A	DC 24V, 2A	DC 24V, 2A	DC 24V, 2A

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#### **LSG-100D** Micro-Wire Laser Diffraction Diameter Gauge

#### Applicable to

Applicable for:measurement of the outer diameter of various fine metal wires, including enameled wire, copper wire, and tungsten wire.



#### Not Applicable For:

Excessive surface defects, unevenness, small flaws, or high material transparency can cause sampling errors or distortions in the diffraction system, preventing an accurate reflection of the surface quality and leading to measurement failures.

For example, optical fibers, transparent thin tubes, and sandblasted diamond wires are not suitable for using such products.



#### **Product features**

- Using the Fraunhofer diffraction principle, it achieves precise measurement of ultra-fine wire diameters.
- New optical aspheric processing technology
- Unique optical imaging system
- No calibration needed, providing more stable and reliable measurement results
- Simple product structure
- Easy operation: user-friendly interface design, easy to install and use
- Durable and robust, yet compact and lightweight





## Measurement principle

When a laser passes through a slit of a certain size or a small obstacle, it deviates from its straight-line path, causing a diffraction phenomenon. This results in alternating light and dark fringes appearing on the CCD image sensor. By analyzing the spatial distribution of these fringes, the size of the object being measured can be calculated.

Product model	LSG-100D
Number of axes	1axes
Measuring range	0.015-0.8mm
Resolution	0.1µm
Accuracy	±0.2µm±0.01%*D
Repeatability	±0.1µm±0.005%*D
Alarm output	24V, 300mA (contact load)
Communication	RS-485/MODBUS
PI control	Optional
Power supply	DC 12V, 1A
Probe size	148×94×33(mm)

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#### **LIG Series**

Laser Diffraction Diameter Gauge



#### Applicable to

Measurement of the outer diameter of medical wires, tubes, and other materials;

Measurement of the outer diameter of electronic wires and communication cables.  $\label{eq:electronic}$ 



Optoelectronic Emission Unit

Optoelectronic Receiver Unit

#### Measurement principle

When a laser passes through the object being measured, it deviates from its straight-line path, causing a diffraction phenomenon. This results in alternating light and dark fringes appearing on the CCD image sensor. By analyzing the spatial distribution of these fringes, the size of the object can be calculated.





#### **Product introduction**

The LIG series uses the Fresnel diffraction principle for non-contact measurement of objects, ensuring no damage to the surface of the measured object. It supports both online measurement in production lines and offline measurement in laboratories.

Thanks to its structural design for multi-scenario applications and modular digital circuit design, it is more compact compared to similar products, easy to install, and significantly reduces the constraints of space limitations.

#### **Product features**

- Using the Fresnel diffraction principle.
- The sensor has high resolution, achieving micron-level measurement accuracy.
- High-speed image data processing.
- Durable and robust, yet compact, with a wide measurement range.
- Utilizes a multi-spectrum parallel laser light source for accurate and reliable imaging.

Product model	LIG-028	LIG-028 XY		
Number of axes	1axes	2axes		
Measuring range	0.4-25mm	0.4-25mm		
Resolution	0.001 mm	0.001 mm		
Accuracy	≤ ±5µm±0.03%*D	≤ ±5µm±0.03%*D		
Repeatability	±2µm	±2µm		
Alarm output	24V, 1A	contact load)		
Communication	RS-485/MODBUS			
PI control	Optional			
Power supply	DC 2	24V, 1A		
Probe size	176×56×33(mm)	200×180×33(mm)		

# 

LN Series Lump and Neck Detection Gauge



#### **Product introduction**

The LN-3000 series is a high-speed, high-precision 3-axis bump detection instrument that can detect bumps and depressions on the target object without contact. It is widely used in industries such as cable manufacturing.

This product uses a highly collimated parallel light curtain for measurement. A red LED emits the light source, which is converted into parallel light through an optical lens and passes through the test area. When the test area contains the object being measured, it blocks part of the parallel light. This light is then focused onto a photoelectric receiving element, converting it into an electrical signal. By analyzing the current difference in the photosensitive element, it determines whether there are bumps or depressions on the object being measured.



## Diagram of blind spots in 3-axis detection

In the production process, defects such as bumps and depressions are inevitable due to issues with raw materials, processes, or equipment.



Using a high-speed 3-axis detection mode, it covers a wider range of the measured object, making the detection more precise and comprehensive.





From the above comparison diagram, it can be seen that the more axes used in detection, the wider the coverage area, and consequently, the smaller the detection blind spots. The smaller the blind spot area, the higher the accuracy in detecting bumps and depressions.



# **Product features**

- 3-axis detection with minimal blind spots.
- Non-contact measurement.
- High-performance infrared light source with low power consumption and long lifespan.
- Advanced process optical lenses.
- High-speed DSP digital processing technology for precision and efficiency.
- No moving parts, reducing errors.

## **Technical Indicators**





OK

NG

Product model	LN-3005	LN-3020				
Controller model	LN-	LN-1000				
Configuration	Detection Hea	ad + Controller				
Number of axes	За	xes				
Detection Method	Infrared light curtain for non-	contact continuous detection				
Lump and Neck Range	0.002-0	).999mm				
Sensitivity	±1% of the set value					
Applicable Wire Diameter	0.05-5mm	0.1-18mm				
Line Speed	5m/min~1	500m/min				
Alarm output	24V, 1A(co	ontact load)				
I/O Interface	Pulse input ar	nd digital input				
Temperture	0 to +50° C (32 to 122° F)					
Humidity	35% to 85% RH, non-condensing.					
Power supply	DC 24V 2A					
Probe size	152x156x40(mm)	165x181x47mm(mm)				

# 山口 奥美加科技

HV-1000 Enameled Round Wire High-Voltage Pinhole Detection



HV-1000 控制器

# **Product introduction**

The HV-1000 is a high-voltage testing system capable of generating any voltage between 200V and 3000V. It can be configured to set different voltages for various wire specifications.

#### **Product features**

- Suitable for high-voltage insulation testing of various enameled round and flat wires.
- The system responds quickly and can simultaneously test 32 wires.
- The software automatically sets the output voltage and collects data.
- Capable of multi-channel parallel processing with data collection for reel changes.

#### **Technical Indicators**

Product model	HV-1000			
Voltage range	200V-3000V			
Detection capacity	The software supports 2 hosts, each driving 16 expandable probes. (Expandable)			
Measuring range	0.02-1.0 mm			
Maximum line speed	1500m/min			
System alarms	24V, 1A (contact load)			
power consumption	< 75W			
Power supply	AC 220V 50Hz			

#### **Introduction to Principles**

The system controls the high-voltage unit via a computer, generating the corresponding DC high voltage and applying it to the high-voltage wheel. When a defective enameled wire passes through the high-voltage wheel, it breaks down the insulation layer, producing a leakage current signal. This signal is collected by the signal acquisition module and transmitted to the microprocessing center. Finally, the microprocessing center sends the processed data to the computer, where it is analyzed, summarized, displayed, and recorded.

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¥Х	300.0	4306.0	0h14m	500	6	0.250	5	0	108		in i	
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3,8	300.0	4306.0	0h14m	500	6	0.236	2		400		10	
8%	300.0	4306.0	0h14m	500	6	0.167	2	0	ALL		15	
83	300.0	4306.0	0h14m	500	6	0.083	100	0	100		15	
83	300.0	4306.0	0h14m	500	6	0,000	0	0	.409	٠	in.	
¥Χ	300.0	4306.0	0h14m	500	6	0,628	0	0	410		in.	
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Pinhole Detection System Interface

LN Series Fine Wire Lump and Neck Detection Gauge



## Ultra-fast, non-contact particle defect detection of fine round and flat wires

#### Applicable to

Non-contact detection of particles, lumps, necking, bubbles, thick sections, inclusions, scratches, coating detachment, and dents on the surface of fine round wires and micro flat wires.



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WX.	300, 0	31409.3	1h44m	10	0.062		AU12		
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WX.	300.0	31394.3	1h44m	10	0.067		A04		
X4	300.0	31389.3	1h44m	10	0.000	0	A05		
7.4	300.0	30371.1	thilm	10	0.103	1	A06		
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X.	300.0	30360, 9	th41m	10	0.000	0	N/D		
XW	300.0	30358.9	1b41n	10	0.000	0	A13		
XX.	300, 0	30356.9	1h41m	10	0,000	0	ALL .		
XV.	300.0	30348.8	1h41a	10	0.000	0	A12		
X7	300, 0	30350.8	1h41n	10	0.000	0	ALX		
WX.	300.0	30352.8	1h41n	10	0.000	0	A14		
XX	300.0	30344.7	thitm	10	0.000	0	ALS		
27	300.0	30342.7	1h41m	10	0.000	0	ALS		

A Particle Detection System Interface

## **Product introduction**

The LN series micro-fine particle defect detector uses advanced miniaturized optoelectronic components combined with fast analog signal processing, providing a new solution for non-contact detection of particle defects on target surfaces.

Even at high production line speeds, it can accurately measure and detect micron-level particle defects on target surfaces in real-time, making it a powerful monitoring tool for quality control in both production sites and laboratories.

It is applied to monitor processes such as stretching, coating, sheathing, and coloring on high-speed production lines, accurately detecting and characterizing lumps, necking, blisters, bubbles, coarse knots, defects, scratches, particles, coating peeling, and bruises.

Product model	LN-1005	LN-2004				
Number of axes	1axes	2axes				
Detection Method	Infrared light curtain for non-contact continuous detection					
Measuring range	0.05-5mm	0.02-0.5mm				
Line speed	1500m/min	1500m/min				
Temperture	0 to +50° C (32 to 122° F)					
Humidity	35% to 85% RH,					
- Tarmarcy	non-condensing.					

# 

HV-1000 High-Voltage Pinhole Particle Defect Detection System

#### Applicable to

Non-contact detection of particles, lumps, necking, bubbles, thick sections, inclusions, scratches, coating detachment, dents, and insulation fractures on the surface of enameled round wires and enameled flat wires.





#### **Product introduction**

The high-voltage pinhole and particle defect detection system consists of the HV series high-voltage pinhole detection system and the LN series fine wire particle defect detector. It can simultaneously perform high-voltage pinhole detection and fine wire particle defect detection. The system can detect surface defects and high-voltage pinholes of the target object online and non-contact using two principles. Pinhole detection is controlled by a computer, which generates the corresponding DC high voltage and applies it to the high-voltage wheel. When defective enameled wire passes through the high-voltage wheel, it breaks down the insulation layer, generating a leakage current signal.



精密光学测控系统专业制造商 PROFESSIONAL MANUFACTURER OF PRECISION OPTICAL MEASUREMENT AND CONTROL SYSTEMS

# **Multifunctional Data Processing Software**

The high-voltage pinhole and particle defect detection system is equipped with professional data software, featuring various practical functions to meet the data processing needs in production

- Production Parameter Setting
- Abnormal Alarm Prompt
- System Parameter Setting

- Real-time Data Curve Graph
- Data Storage and Query

• Various Report Outputs

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WX	300.0	6206.6	0h20m	13	0.000	0	500	6	0.000	0	0	A05	۲	ß			
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Pinhole detection	Particle defect detection					
High voltage 200V-3000V	Infrared light curtain for non-contact continuous detection					
360°	2axes					
The software supports 2 hosts, each driv	ving 16 expandable probes.(Expandable)					
0.02-1.0 mm (customizable)						
1500m/min						
24V, 1A (contact load)						
Digita	l Input					

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# **Technical Indicators**

Product model

**Detection Method** Number of axes Detection capacity

Measuring range Maximum line speed

System alarms I/O Interface

Power supply

power consumption)

TCP/IP

29

# 

#### LGD Classic Series Laser Diameter Gauge



#### Applicable to

Measurement of the width and thickness of flat cables and optical cables Measurement of the width and thickness of flat steel strips and copper strips Measurement and control of the outer diameter of RF cables and optical cables Measurement and control of the outer diameter of various tubes and wires



# **Technical Features**

The LGD series laser diameter gauge (as shown below) can accurately measure within its range, regardless of any shaking or movement of the object being measured. It does not require a positioning bracket and is completely non-contact, ensuring that it does not scratch or compress the object, thereby maintaining product quality and minimizing measurement errors.



Product model	LGD-25	LGD-60	LGD-100	
Measuring range	0.1-20mm	0.4-50mm	0.5-90mm	
Resolution	1µm	1µm	1µm	
Accuracy	±2µm±0.02%*D	±3µm±0.02%*D	±5µm±0.02%*D	
Scanning frequency	600Hz	600Hz	600Hz	
Alarm output	24V, 1A(contact load)	24V, 1A(contact load)	24V, 1A(contact load)	
Communication	RS-485/MODBUS	RS-485/MODBUS	RS-485/MODBUS	
Power supply	AC100-240V(50-60Hz)	AC100-240V(50-60Hz)	AC100-240V(50-60Hz)	



LGD 经典系列 激光测径仪

LGD Classic Series Laser Diameter Gauge





#### Applicable to

Measurement and control of the outer diameter of electrical cables Measurement of the outer diameter of flat wires Measurement of the outer diameter of tubes and rods



#### **Product features**

- Independent dual CPUs and dual optical path redundancy design improve the reliability and stability of online measurement
- Uses SMD circuits, small size, lightweight, and strong anti-interference
- High measurement accuracy and good repeatability
- High-precision F(θ) lens ensures that object movement does not affect normal measurement
- Unaffected by external stray light and smoke, ensuring measurement stability
- Scanning rate of 1200 scan cycles per second

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Product model	LGD-05XY	LGD-10XY	LGD-25XY
Measuring range	0.05-5mm	0.1-10mm	0.1-20mm
Resolution	0.1µm	1µm	1µm
Accuracy	±0.8µm±0.02%*D	1µm±0.02%*D	±2µm±0.02%*D
Repeatability	±0.2µm	1µm	±1µm
Scanning frequency		1200Hz (Single-axes: 600Hz)	
Alarm output		24V, 1A(contact load)	
Communication		RS-485/MODBUS	
Power supply		AC100-240V(50-60Hz)	

# 公下 奥美加科技

#### LGD Classic Series Laser Diameter Gauge





#### Applicable to

Measurement of the outer diameter of enameled wire, optical fiber, nylon wire, stainless steel wire, tinned wire, and micro-drawn wire Measurement of the outer diameter of medical wires, tubes, and other materials

Measurement of the outer diameter of precision electronic wires and communication cables

# **Product features**

- Uses laser scanning technology, providing a large measurement range
- SMD circuit, small size, lightweight, and strong anti-interference
- High measurement accuracy and good repeatability
- $\bullet$  High-precision F( $\!\theta\!)$  lens ensures that object movement does not affect normal measurement
- Unaffected by external stray light and smoke, ensuring measurement stability
- Scanning rate >600 scan cycles per second

# **Technical Indicators**

Measuring range	0.02-1mm				
Resolution	0.1µm				
Accuracy	±0.5µm±0.02%*D				
Repeatability	±0.1µm				
Wavelength	650nm				
Scanning frequency	600Hz				
Communication	RS485/MODBUS				
Alarm output	24V, 1A (contact load)				
Power supply	AC 100-240V (50-60Hz)				

# **Display Features**

- Five-digit digital tube display
- Resolution: 0.0001mm
- Relay deviation alarm output
- RS485 communication, compatible with PLC and PC communication
- (Optional) Equipped with a micro printer for printing measurement data
- Multiple printing modes available for user selection
- Capable of printing measurement values, date, time, device number, and wire number

Product model	LGD-05	LGD-10			
Measuring range	0.05-5mm	0.1-10mm			
Resolution	0.1µm	1µm			
Accuracy	±0.8µm±0.02% *D	1µm±0.02%*D			
Repeatability	±0.2µm	1µm			
Wavelength	650nm				
Scanning frequency	600Hz				
Communication	RS485/MODBUS				
Alarm output	24V,1A (contact load)				
Power supply	AC 100-240V	(50-60Hz)			

LGP Classic Series Handheld Laser Diameter Gauge



#### Applicable to

Measurement of the outer diameter of enameled wire, optical fiber, nylon wire, stainless steel wire, tinned wire, and micro-drawn wire Measurement of the outer diameter of medical wires, tubes, and other materials

Measurement of the outer diameter of precision electronic wires and communication cables

# **Product introduction**

The LGP series portable laser diameter gauge uses laser scanning technology, primarily suitable for portable inspection of the outer diameter of high-end electronic wires, enameled wires, and micro-drawn wires. The product features a modular design, small size, lightweight, and easy maintenance. It is equipped with a powerful lithium battery with a short charging time, providing over 10 hours of continuous use on a single charge. The device also uses a large-capacity FLASH memory to record and save real-time data during measurement



#### **Product features**

- Optimized optical system design
- Advanced optical aspheric processing technology
- Laser scanning technology for precise outer diameter measurement
- Special measurement algorithm ensures long-term data stability
- Automatic calibration, user-friendly operation
- Compact structure, small size, lightweight
- Equipped with a powerful lithium battery, short charging time, long battery life
- Large-capacity FLASH memory for real-time data recording

Product model	LGP-05	LGD-10
Measuring range	0.05-5mm	0.1-10mm
Resolution	0.1µm	1µm
Accuracy	±0.8µm±0.02%*D	1µm±0.02%*D
Repeatability	±0.2µm	1µm
Wavelength	650nm	
Scanning frequency	600Hz	
Communication	RS485/MODBUS	
Power supply	DC 9V, 1A	





Auto Measure Gauge Technology Co., Ltd

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