OPT®
Machine Vision

OACON

Smart Axis

Thrubeam Measurement Sensor

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Thrubeam Measurement Sensor SmartAxis Series

Online Intelligent Measurement
Ultra-Large Depth of Field
Simple and Efficient

Function introduction

Brand new

Thrubeam Measurement Sensor
SmartAxis Series
OPT-SmartAxis-11
OPT-SmartAxis-36
OPT-SmartAxis-58
OPT-SmartAxis-100

Online intelligent measurement High detection efficiency New standard for industrial measurement

- SmartAxis series through-beam measurement sensor is equipped with dual telecentric high-resolution optical lenses, high-brightness LEDs and a telecentric optical system that constitutes the light source, which improves alignment and angular uniformity; as well as the high-precision image analysis algorithm, subpixel edge extraction algorithm and burr filtering algorithm to automatically remove edge burrs, black shadows, and white bright edges, thus greatly improving the measurement accuracy. Multiple lighting systems can be applied to meet users' requirements for fast and accurate measurement of complex workpieces.
- With the self-developed telecentric optical system free of focus blurring,workpieces can be measured accurately even in case of position deviation.The telecentricity and uniformity of lenses are improved to greatly enhance the measurement reproducibility.
- Due to ultra-fast exposure, the workpieces conveyed at high speeds can be measured without stop.
- Supports industry-leading PLC communication protocols, enabling users to easily achieve seamless integration and efficient communication with their equipment.

Hardware

Subminiature sensor

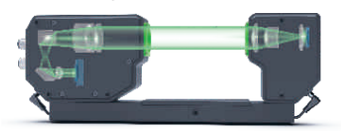
The subminiature structure adapts better to compact automation equipment and narrow spaces.

Partial schematic diagram of image detection system using ordinary telecentric lens

Significant decrease in installation dimensions of SmartAxis series through-beam sensor

Telecentric optical path with large depth of field and ultra-low distortion

Unique parallellight path, clear imaging within a depth of field 30mm, Even if the product shifts, a clear outline can still be captured,greatly improving the detection accuracy and stability.



Optical Axis Alignment Function

▷ Equipped with an optical axis alignment function for engineers to quickly make optical axis adjustments.

▷ By removing the emitter and receiver probe bases, the optical axis alignment calibration can be performed, allowing for simple and accurate adjustment of the optical axis, thereby easily achieving high-precision measurements.

Adjustable installation distance

The emitter end can adjust the installation distance according to on-site requirements. Due to the high telecentricity of the sensor, changes in the installation distance have minimal impact on accuracy.

Hardware

High-precision measurements can also be achieved for rapidly moving products.

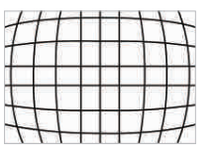
Utilizing the sensor trigger measurement function, the high-brightness LED emitter works in tandem with the optical system to synchronize data collection, significantly enhancing the light reception of the CMOS and instantaneously exposing all pixels. With an ultra-fast exposure time of 15 μs, high-speed moving products can be accurately measured without the need for deceleration.

Have ghosting

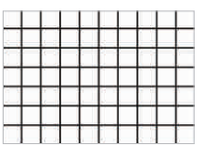
No ghosting

Low distortion, no image deformation

Use the low-distortion telecentric lens,to avoid resolution losses arising from image distortion and edge blurring while reducing the workload of subsequent image processing.



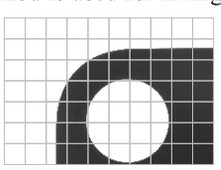
Imaging of general-purpose lens



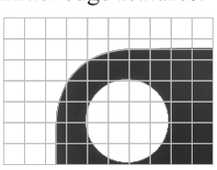
Imaging of OPT double telecentric lens

Subpixel processing

In the subpixel edge extraction algorithm, a single pixel into 100 subpixels for calculation, and the least squares method is used for fitting to extract edge features.



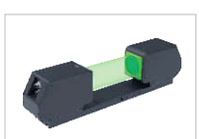
Without subpixel processing



With subpixel processing

Measurement precision

The perfect combination of telecentric imaging and intelligent image analysis algorithm ensures the measurement accuracy within the entire field of view.



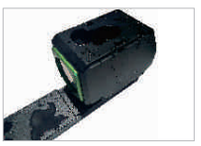
Filtering of foreign matters and burrs

Foreign matters or defects in the measurement position can be removed for stable dimensional measurement, greatly enhancing the accuracy of measurement.

IP64 protection class, high durability

The sensor has an IP64 protection level, which prevents the ingress of splashing water and the entry of solid particles, thus enhancing the safety of the sensor.

Equipped with a highly flexible cable, which can be bent and twisted for high space utilization; it can be used with confidence in scenarios where there is a moving measuring head.

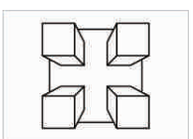


IP64 waterproof and dustproof design

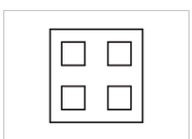
High Toughness Cable

Accurate measurement even in case of deviation

The lens has high telecentricity to avoid the influence of the heights of measured objects on the accuracy.



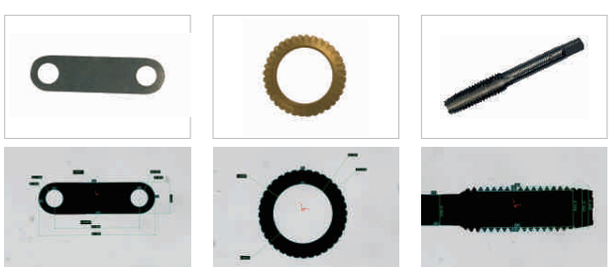
Imaging of general-purpose lens



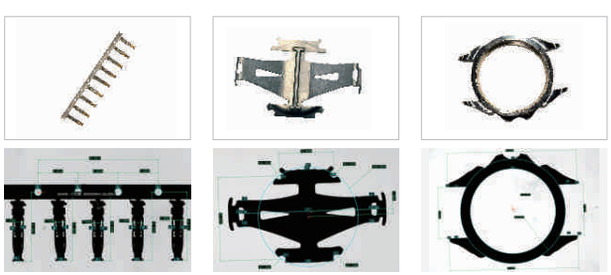
Imaging of OPT double telecentric lens

Measurement in various industries

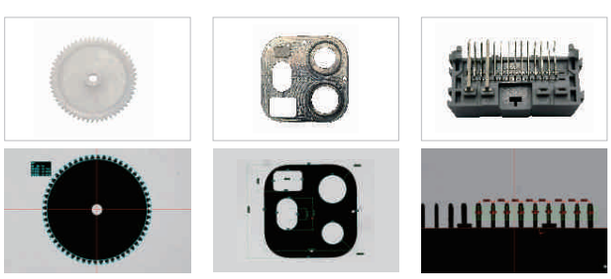
Support multiple measurement modes such as offline and onlinemeasurement, applicable tomultiple fields and industries.



Gasket products | Copper Pillar Products | Cutting tool products



Terminal Products | Stamping Products | watch middle frame



gear wheel | 3C products | PIN Needle

Software

Measurement software

▷ Simple interface, powerful function and easy operation to facilitate learning.

▷ By utilizing innovative distortion correction technology, we have achieved stable and precise measurement results. Additionally, algorithms such as sub-pixel extraction and burr filtering have significantly enhanced measurement accuracy.

▷ Quick creation of programming templates by importing CAD drawings without special programming, truly achieving the purpose of one-click measurement.

▷ Multiple matching modes for accurate positioning and measurement of complex workpieces.

▷ Global comparison between measured workpieces and CAD drawings to quickly identify contour differences.

▷ Marking tools for direct measurement of points, lines, circles, arcs, distances, angles, location degrees, wall thickness and other features, and output of measurement results.

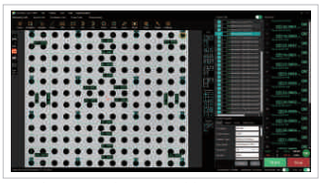
▷ Creation tools for fitting to generate auxiliary features such as intersections, perpendicular lines, tangent lines, tangent circles, and combined edges, thus simplifying complex measurements; and auxiliary element for direct drawing,tofacilitate operation and greatly accelerate programming.

▷ Support multiple coordinate systems for workpieces, as well as coordinate translation and call.

The software boasts user-friendly operation, enabling high-speed and accurate online measurements.

▷ The software interface is designed to be concise and user-friendly, yet powerful in functionality, allowing anyone to easily set up and perform measurements with minimal effort.

▷ Adopting innovative distortion calibration technology ensures stable and accurate measurement results, while algorithms such as subpixel extraction and burr filtering significantly enhance measurement precision.



Measuring tools can be easily set up

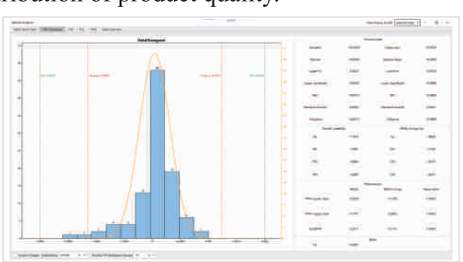
Through various combinations and applications of measurement tools, not only simple dimensional measurements can be achieved, but also various measurement tasks such as geometric tolerance measurement, standard profile comparison of products, and distance measurement can be realized.

Statistical analysis

▷ A variety of extraction and analysis tools, including statistical analysis tools such as statistical values, trend charts, and histograms.

▷ Trend charts are used to monitor abnormalities of generation equipment and production process based on the trend of changes in measured values.

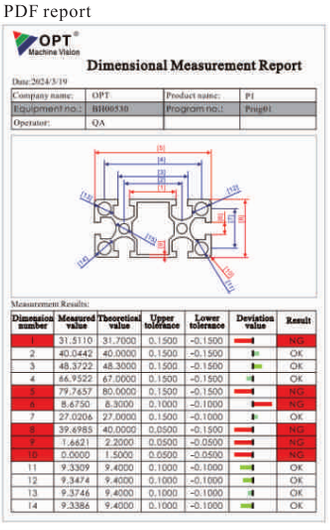
▷ Histograms reflect the real-time fluctuation status and distribution of product quality.



Diverse data storage formats

▷ Reports on measurement results can be exported in Excel, Word, TXT, and PDF formats. Support the setting of report formats.

PDF report



OPT Machine Vision

Dimensional Measurement Report

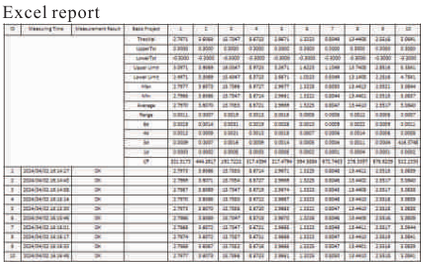
Date:2024/3/19

Company name:	OPT	Product name:	PJ
Equipment no.:	BH00530	Program no.:	Ping01
Operator:	QA		

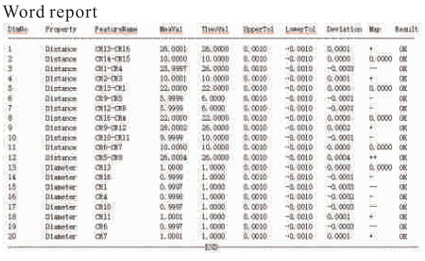
Measurement Results:

Dimension number	Measured value	Theoretical value	Upper tolerance	Lower tolerance	Deviation value	Result
1	31.5110	31.7000	0.1500	-0.1500		NG
2	40.0442	40.0000	0.1500	-0.1500		OK
3	40.3722	40.3000	0.1500	-0.1500		OK
4	66.9522	67.0000	0.1500	-0.1500		OK
5	79.7657	80.0000	0.1500	-0.1500		NG
6	8.6750	8.3000	0.1000	-0.1000		NG
7	27.0206	27.0000	0.1500	-0.1000		OK
8	39.6985	40.0000	0.0500	-0.1500		NG
9	1.6621	2.2000	0.0500	-0.0500		NG
10	0.0000	1.5000	0.0500	-0.0500		NG
11	9.3309	9.4000	0.1000	-0.1000		OK
12	9.3474	9.4000	0.1000	-0.1000		OK
13	9.3746	9.4000	0.1000	-0.1000		OK
14	9.3386	9.4000	0.1000	-0.1000		OK

Excel report



Word report



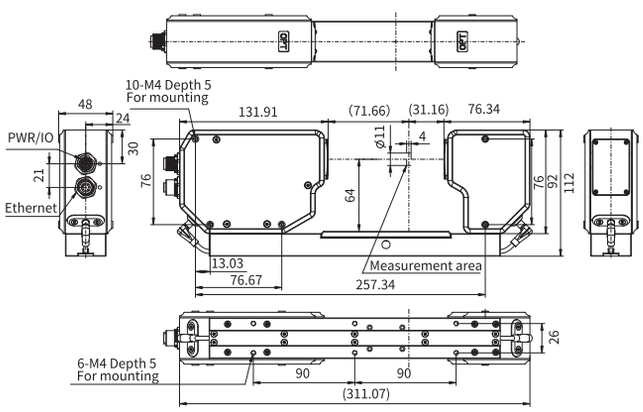
List of Parameters

Product name		Thrubeam Measurement Sensor SmartAxis Series			
Specification and model		SmartAxis-11	SmartAxis-36	SmartAxis-58	SmartAxis-100
Illuminating system		Telecentric parallel light source (green)			
Measurement range Field of view	Maximum measurement area	8.5x7 mm	28x23 mm	42.5x42.5 mm	80x76 mm
	High-precision measurement area	5x4 mm	18x15 mm	28x28 mm	50x48 mm
Measurement range Depth of field	Maximum measurement area	3 mm	12 mm	15 mm	30 mm
	High-precision measurement area	1.5 mm	6 mm	8 mm	15 mm
repeated precision*1		±0.3 μm	±0.5 μm	±0.9 μm	±1.5 μm
measurement precision*2	Maximum measurement area	±1 μm	±1.5 μm	±2 μm	±3 μm
	High-precision measurement area	±0.6 μm	±1 μm	±1.5 μm	±2 μm
Operating environment	Temperature range	0~40℃	0~40℃	0~40℃	0~40℃
	Humidity range	20%~80%RH	20%~80%RH	20%~80%RH	20%~80%RH
Enclosure protection level *3		IP64	IP64	IP64	IP64
Transmitter Spacing Receiver Spacing		102 mm	181 mm	184 mm	240 mm
Weight	Transmitter	Approximately 960g	Approximately 1580g	Approximately 2520g	Approximately 4825g
	Receiver	Approximately 675g	Approximately 1820g	Approximately 2260g	Approximately 4480g
	Base	Approximately 515g	Approximately 1280g	Approximately 1980g	Approximately 3300g

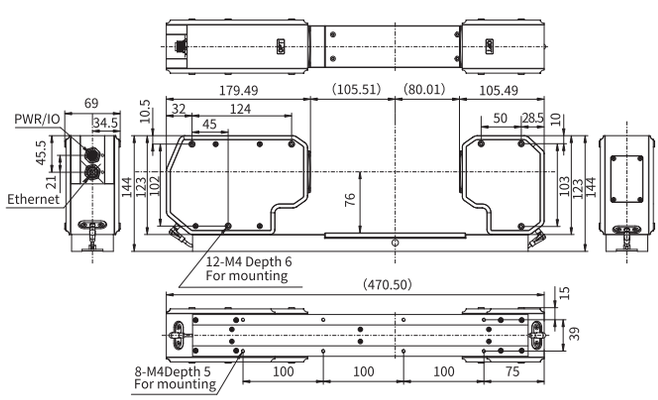
* Note: 1. Value of ±2 σ after 16 repeated measurements of the distance between standard parts (dot calibration plate) at the center of the measurement area.
2. Error of the measured distance between standard parts (dot calibration plate) at the focus and ambient temperature of 20±2°C.
3. Excluding cables and peripherals.

Schematic Diagram of Product Size

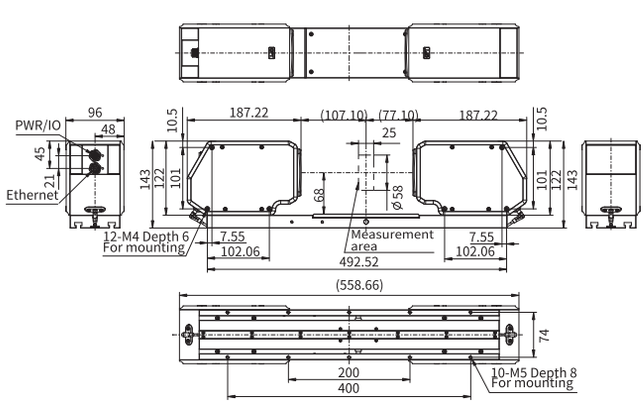
1.SmartAxis-11



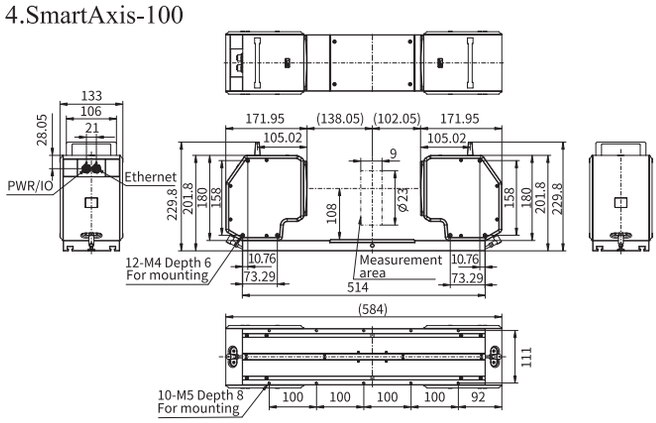
2.SmartAxis-36



3.SmartAxis-58



4.SmartAxis-100



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