The key characteristics for achieving high-precision measurement capabilities

TS-C Series

Spectral Confocal Displacement Sensor

- Minimum Measurement Blind Zone
- Multi-layer Transparent Thickness Measurement
- Ultra-smooth Mirror Surface Measurement
- Sub-micrometer Measurement Precision
- Strong Anti-interference Capability
- Axial/Radial Light Emission Measurement

Ultra-fast Sampling Speed of 10 kHz

The design of Tronsight incorporates a high-brightness color light source, high-efficiency optical components, and highly sensitive electronic devices, enabling industry-leading sampling speeds and thereby helping customers to enhance measurement efficiency and accelerate production line pacing.

Ultra-high Repeatability Precision of 0.02 μm

High-sensitivity, high signal-to-noise ratio components are used, with internal signal digitization implemented in the controller, significantly reducing noise interference. Additionally, the optical module of the probe head is isolated from the electronic modules inside the controller, minimizing the impact of environmental temperature fluctuations and structural vibrations on measurement accuracy, truly delivering high-precision measurement capabilities to the client.

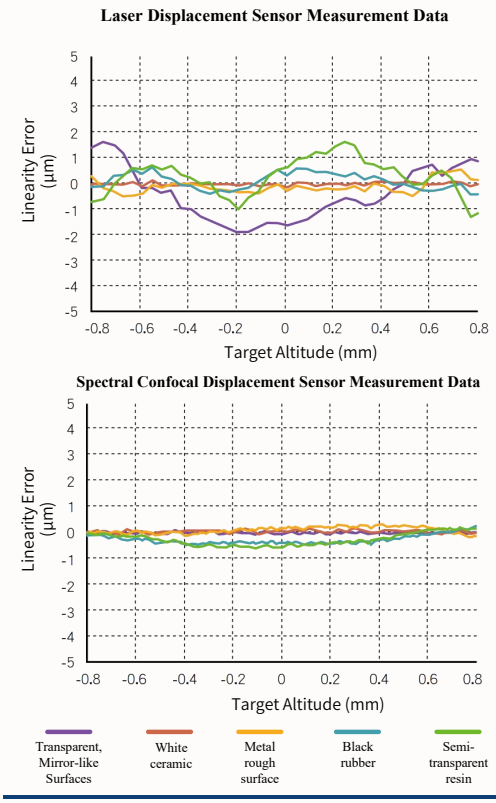
Ultra-high Linearity Precision of ±0.02% of F.S.

The independently designed high spatial resolution spectral confocal optical probe head brings excellent linear characteristics. Along with an automated calibration system of nanometer-level precision based on traceability to a laser interferometer, it meets the high-precision, mass-production performance calibration requirements of sensor products.

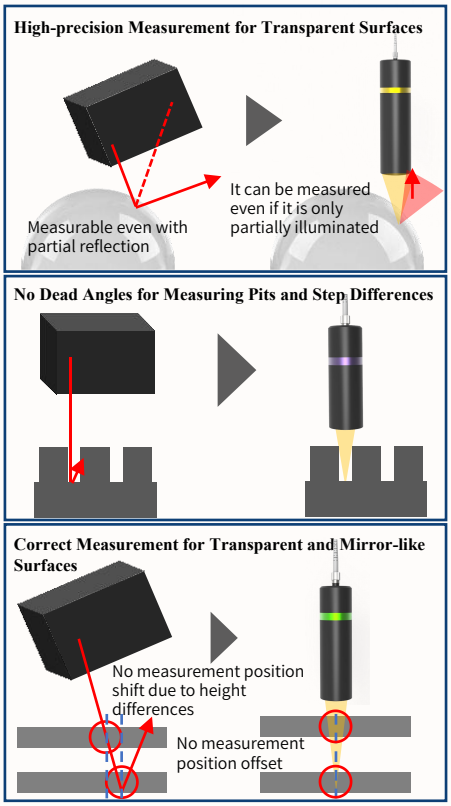
Ultra-large Measurement Angle of ±65°

Tronsight offers probe head models with a maximum measurement angle of ±65°, capable of meeting the requirements for 2.5D glass and chip pin morphology measurement and positioning.

High Linearity for Various Materials



Adaptable to Different Structural Features



All-optical Measurement Probe

Zero Heat

Traditional laser displacement sensors often suffer from measurement errors due to self-heating, which can cause deformation of the fixture and misalignment of the optical axis. The TS-C series spectral confocal displacement sensor probe head features only a lens structure inside. As there are no electronic components, it does not generate heat, thus avoiding deformation of the fixture where the probe head is installed, enabling ideal high-precision measurement.

Anti-interference

The connection via optical fiber to the controller helps avoid the impact of electromagnetic interference from the site on measurement accuracy.

For more industry application cases and to apply for product trials, please follow the WeChat public account "创视智能" official website: https://www.tronsight.com.

● The Probe of Series TS-C

Model	Reference Distance*1	Measuring Range	Measuring Angle*2	Beam Diamteter*3	Static Noise*4	Linear Error*5	Outside Diameter * Length	Weight	Minimum Measurable Thickness	Temperature Characteristic	Protection grade
C100*9	8 mm	±0.05 mm	±46.5°	Φ2.7 / 5.4 / 43.2μm	3 nm	< ±0.03 μm	φ40*125 mm	/	5% of F.S.	<0.03% F.S./°C	IP40
C400	10 mm	±0.2 mm	±43°	Φ 7 / 14 / 112 μm	12 nm	< ±0.12 μm	φ40*99.4 mm	186 g			
C600	6.5 mm	±0.3 mm	±32.5°	Φ 8/ 16 / 128 μm	16 nm	< ±0.18 μm	φ20*110 mm	73 g			
C1200	20 mm	±0.6 mm	±32°	Φ 9.5 / 19 / 152 μm	30 nm	< ±0.3 μm	φ36*106.3 mm	182 g			
C2000	50 mm	±1 mm	±14°	Φ 20 / 40 / 320 μm	85 nm	< ±0.6 μm	φ34*90.7 mm	162 g	10% of F.S.	~0.1% F.S./°C	
C2400	9 mm	±1.2 mm	±60°	Φ 5.5 / 11 / 88 μm	45 nm	< ±0.48 μm	φ94*267.5 mm	2350 g	5% of F.S.	<0.03% F.S./°C	
C2600	15mm	±1.3 mm	±31°	Φ 9 / 18 / 144 μm	50 nm	< ±0.3 μm	φ36*97.9 mm	228 g	5% of F.S.		
C3000	7 mm	±1.5 mm	±14°	Φ 20 / 40 / 320 μm	100 nm	< ±0.6 μm	φ8*38.7 mm	23 g*7	10% of F.S.	~0.05% F.S./°C	IP67
C4000N	14.5 mm	±2 mm	±21°	Φ 12 / 24 / 192 μm	100 nm	< ±0.8 μm	φ32*158.8 mm	238 g	5% of F.S.	<0.03% F.S./°C	IP40
C4000F	38 mm	±2 mm	±21°	Φ 16 / 32 / 256 μm	100 nm	< ±0.8 μm	φ36*126.1 mm	226 g			
C6000	40 mm	±3 mm	±14°	Φ 22 / 44 / 352 μm	140 nm	< ±1.2 μm	φ30*71 mm	112 g		~0.05% F.S./°C	
C7000	45 mm	±3.5 mm	±15.5°	Φ 20 / 40 / 320 μm	140 nm	< ±1.4 μm	φ36*84.2 mm	200 g		<0.03% F.S./°C	
C7000L	47 mm	±3.5 mm	±21°	Φ 16 / 32 / 256 μm	140 nm	< ±1.4 μm	φ52*207 mm	784 g			
C7000S	70 mm	±3.5 mm	±10°	Φ 25 / 50 / 400 μm	200 nm	< ±1.4 μm	φ30*84.2 mm	130 g			
C10000	50 mm	±5 mm	±13°	Φ 20 / 40 / 320 μm	250 nm	< ±2 μm	φ36*84 mm	203 g			
C16000	55 mm	±8 mm	±15.3°	Φ 15 / 30 / 240 μm	300 nm	< ±2 μm	φ60*211.1 mm	1180 g			
C20000	55 mm	±10 mm	±15.3°	Φ 15 / 30 / 240 μm	300 nm	< ±2 μm					
C50000	100 mm	±25 mm	±9.5°	Φ 25 / 50 / 400 μm	850 nm	< ±5 μm	φ60*217.3 mm	1154 g			
CR1500*6	5.75 mm	±0.75 mm	±14°	Φ 20 / 40 / 320 μm	80 nm	< ±0.3 μm	φ8*47.7 mm	23 g*7	10% of F.S.		
CR1500N	3 mm	±0.75 mm	±12°	Φ 17 μm	100 nm	< ±0.75 μm	φ3.8*85 mm	23 g*7			
CR4000	Axial Direction: 4.7 mm Radial Direction: 8 mm*8	±2 mm	±12.5°	Φ 20 μm	100 nm	< ±1.2 μm	φ8*39 mm	24 g*7			
CR5000*9	12 mm	±2.5 mm	±13°	Φ 19 μm	100 nm	< ±2 μm	φ12*66 mm	37 g	—	—	
Customizable Models	1~500 mm	0.1~50 mm	±5°~60°	1~100 μm	4~2000 nm	Typical Value ±0.02% of F.S.	Model Correlation	Model Correlation	Model Correlation	Model Correlation	

*1 Calculated based on the center of the measuring range;
*2 Tilt test using a standard plane mirror at a sampling rate of 1kHz;
*3 Measuring sharp glass edges, verified with a sub-micron positioning accuracy motion platform using a laser interferometer as the displacement reference, the spot diameter values correspond to the diameters of small spot/large spot/four-point spot;
*4 Measuring standard silver-coated mirrors, RMS deviation of 10,000 continuous data sets collected at 1kHz without averaging;
*5 Verified with a nanometer-level high-precision laser interferometer;
*6 Models starting with CR are the 90° side-emitting versions, suitable for measuring features such as deep holes, inner walls, and side surfaces;
*7 This model of probe includes a 3m jumper at the tail end, and the weight in the table includes the weight of the jumper;
*8 This model of probe can be configured for axial or side emission.
*9 This model is new, and actual parameters may vary slightly, subject to the contract.

● The Controller of Series TS-C

Model		TS-CCS	TS-CCD	TS-CCF	TS-CCH
Number of Connected Sensors		1	2	4	4,8,16
Sample Frequency		Single-channel mode: Max. 10 kHz; Dual-channel mode: Max. 5 kHz; Quad-channel mode: Max. 2.5 kHz			Single-channel mode: Max. 20 kHz; Dual-channel: Max. 18 kHz; Quad-channel mode: Max. 12.5 kHz; Octal-channel: Max. 8 kHz; 16-channel max. 4 kHz (The above are preliminary assessment results, specifications are subject to change upon final release.)
Input Port	Encoder Input	AB/ABZ encoder input, configurable for triggering.			
	Trigger Input	Pulse / Level Triggering			
Output Port	Digital Signal Output	Alarm Output, Comparator Output (configurable as either Comparator Output or Data Invalid Alert)			
	Analog output	Linear ±10 V Analog Voltage Output / 4~20 mA Analog Current Output (optional module)			
Industrial Interface	Ethernet Interface	100BASE-TX			1000/100Mbps
	USB Interface	Conforms to the USB2.0 full-speed standard			USB2.0 High-speed (480Mbps)
	RS485 Interface	Modbus protocol, 19200~115200bps			
	EtherCAT Interface	\			Optional equipment available.
Test-control Software	Host Computer Software	TSConfocalStudio test-control software			
	Secondary Development Kit	C++&C#SDK			
Rated Power	Supply Voltage	24 VDC±10%			
	Current Consumption	About 0.4 A			Approximately 0.5A (when only one channel is activated), approximately 4A (when 16 channels are activated), it is recommended to equip with a power supply of over 24V and 6A.
Environmental Resistance	Working Temperature	0 to +50°C			
	Relative Humidity	20 to 85% RH (Non-condensing)			
Weight		About 2000 g			About 2800g (Subject to change based on the number of channels and configuration.)

The key characteristics for achieving high-precision measurement capabilities

TS-P Series

Laser Triangular Displacement Sensor

- Ultra-long Measurement RangeMulti-layer
- No Controller Required
- Nationally Produced
- Ultra-fast Sampling Rate
- Diffuse/Normal Reflection
- Full Frequency Industrial I/O

Ultra-fast Sampling Speed of 160kHz

The sampling speed is an order of magnitude higher than traditional models on the market, with a dedicated processor performing high-speed digital processing of the light spot signal, capable of meeting the demands for both high-speed and high-precision measurements. Reliable measurements can be taken of objects moving at high speeds, rotating rapidly, or vibrating quickly.

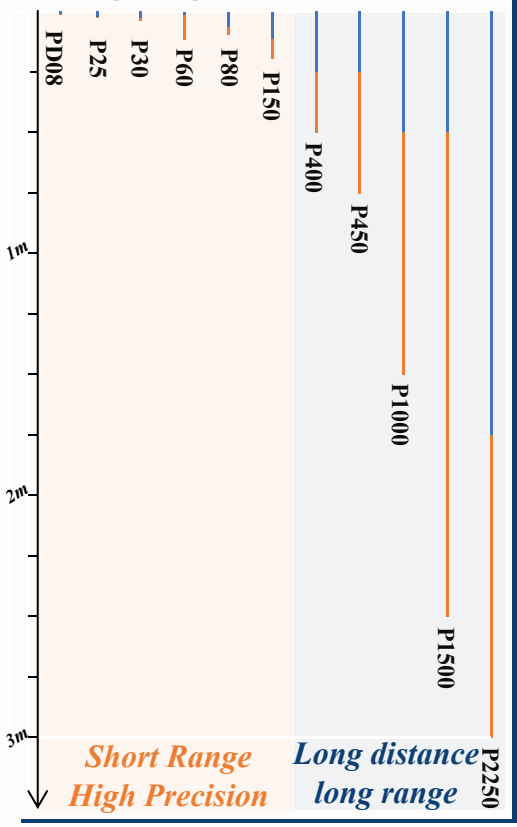
High Linear Accuracy of ±0.02% of F.S.

The independently designed high spatial resolution emission and reception mirror groups bring excellent linear characteristics. With an automated calibration system of nanometer-level precision based on traceability to a laser interferometer, it meets the high-precision, mass-production performance calibration requirements of sensor products.

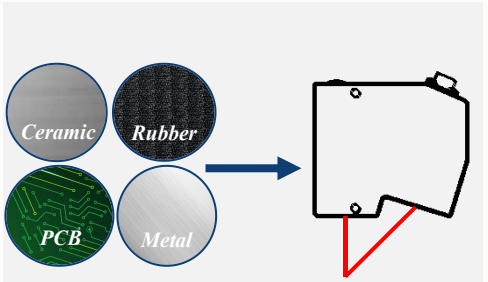
High Repeatability of 0.02μm

High-sensitivity, high signal-to-noise ratio components are used, with internal signal digitization implemented in the probe head, significantly reducing noise interference. Moreover, the design is optimized for application sites, minimizing the impact of environmental temperature fluctuations and structural vibrations on measurement accuracy, truly delivering high-precision measurement capabilities to the client.

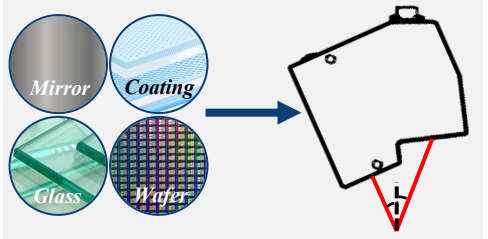
Covering a Range of Measurement Distances



Support for Various Measurement Modes

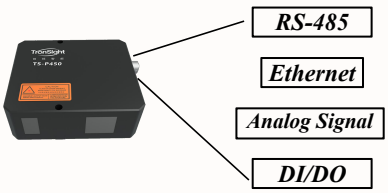


Diffuse Reflection Measurement Mode



Normal Reflection Measurement Mode

Integrated Industrial Interface



No Controller Needed

Single Probe Head
Direct Connection

For more industry application cases and to apply for product trials, please follow the WeChat public account "创视智能" official website: https://www.tronsight.com.

● The Probe of Series TS-P

Model	Reference Distance*1	Measuring Range	Beam Diamteter	Static Noise*2	Static Noise*3	Linear Error*4	Dimensions	Weight	Sample Frequency	Light Source*5
PD08	8mm	±0.8 mm	Φ20 μm	0.03 μm	0.01μm	< ±0.5μm	82*115*38.5mm	213 g	Max. 160 kHz	655 nm Max. 0.5mW
PD15	15mm	±1.0 mm	Φ35 μm	0.05 μm	0.01μm	< ±0.6μm	102*137*55.5mm	475g		
PD50	50mm	±0.8 mm	Φ25 μm	0.05 μm	0.01μm	< ±0.6μm	74*205*110mm	725 g		
P25	25 mm	±1 mm	Φ18 μm	0.05 μm	0.01μm	< ±0.6μm	120*80*31mm	372 g		405 nm Max. 4.9 mW
P30	30mm	±5 mm	Φ35 μm	0.15 μm	0.02μm	< ±3μm	87*76*31mm	287 g		655 nm Max. 4.9 mW
P30W			约Φ35*400 μm			< ±2μm				
P30U			约Φ35*1100 μm	0.075 μm					Max. 25kHz	
P70	70mm	-50 mm +40 mm	Φ70 μm	1.3 μm	0.3μm	< ±18μm	130*90*31mm	408 g	Max. 160 kHz	
P70W			约Φ70*500 μm							
P80	80mm	±15mm	Φ70μm	0.5 μm	0.1μm	< ±6μm	93*78*37mm	359 g		
P80W			约Φ70*800 μm							
P80U			约Φ70*2200 μm	0.25 μm					Max. 25kHz	
P150	150mm	±40mm	Φ110 μm	1.2 μm	0.25μm	< ±16μm	95*80*37 mm	374g	Max. 160 kHz	
P150W			约Φ110*1400 μm							
P400	400mm	±100mm	Φ300 μm	3 μm	1.5μm	< ±60μm	115*85*37mm	438 g		
P400W			约Φ300*3400 μm							
P450	450mm	±250mm	Φ320 μm	8 μm	2μm	< ±250μm	120*75*37mm	416 g		
P450W			约Φ320*4200 μm							
P1000	1000mm	±500mm	Φ320 μm	12 μm	/	< ±500μm	180*85*40mm	785g		655 nm Max. 4.9 mW /660 nm Max.50mW
P1500	1500mm	±1000mm	Φ400 μm	30 μm	/	<±1000μm	260*85*45mm	1250g		660 nm Max.50mW
P2250	2250mm	±650mm	Φ700 μm	50 μm	/	<±650μm	200*85*41mm	924 g		
Customizable Models	8~2250mm	5~2500mm	Model Correlation	20 ppm of F.S.	Model Correlation	Typical Value ±0.05% of F.S.	Model Correlation	Model Correlation	Max. 160 kHz	Model Correlation
Temperature Characteristic	0.01% of F.S./°C									
Industrial Interface*6	Ethernet, 485 serial port, analog signal output*7（Max.±10V，4-20mA）									
Test-control Software	TSLaserStudio measurement and control software and C++, C# SDK									
Working Mode	Works independently without a controller. The probe can be configured as a host or slave, and the host controls the slave to achieve the same step thickness measurement, alternating exposure anti-interference and other functions.									
Supply Voltage	DC 9~36V, maximum allowed ±10% fluctuation									
Power Consumption	About 2.5W									
Protection grade	IP67（IEC60529）									
Working Temperature	0 至 +50°C									

*1 Calculated based on the center position of the measuring range;
*2 Measure the standard white ceramic sample, with no averaging at 50kHz, take the root mean square deviation (1 δ) of 65,536 measured data sets;
*3 Measure the standard white ceramic sample, with an averaging of 1024 at 50kHz, take the root mean square deviation (1 δ) of 65,536 measured data sets;
*4 Verified with a nanometer-level high-precision laser interferometer;
*5 The laser power can be customized according to different application requirements, and some models offer a 405nm blue light version;
*6 The probe can independently provide voltage, current, and RS485 outputs;
*7 Optional analog voltage/current output modules available;
*8 This model is new, and actual parameters may vary slightly, subject to the contract.

The key characteristics for achieving high-precision measurement capabilities

TS-IV Series

White Light Interference Thickness Sensor

*Thin film thickness measurement scenarios

- Nanometer-level Measurement Precision
- Wide-range Working Distance
- Thin Film and Thin-layer Glass Thickness Measurement.

10kHz Ultra-Fast Sampling Rate

Tronsight design utilizes a high-brightness color light source, high-efficiency optical components, and highly sensitive electronic devices, achieving industry-leading sampling speeds and thus helping customers to improve measurement efficiency and accelerate production line pacing.

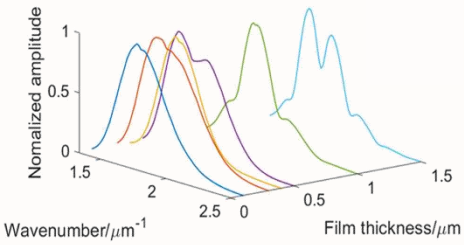
±20nm Ultra-high Linearity Precision

The independently designed high spatial resolution white light interference optical probe head offers excellent linear characteristics. The thickness measurement probe based on the interference principle introduces no nonlinear factors at the principle level, with only nonlinear errors to be considered during the spectral analysis process.

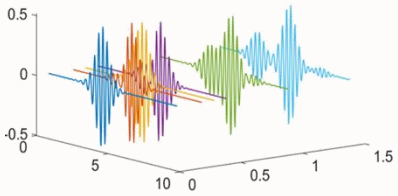
1nm Ultra-high Repeatability Precision

High-sensitivity, high signal-to-noise ratio components are used, with internal signal digitization implemented in the probe head, significantly reducing noise interference. Additionally, the interference-based thickness measurement method greatly enhances the sensor's ability to suppress external disturbances.

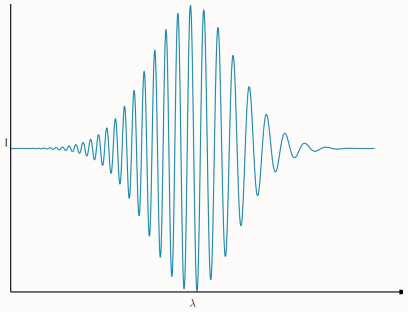
Nanometer-level Thickness Measurement Capability



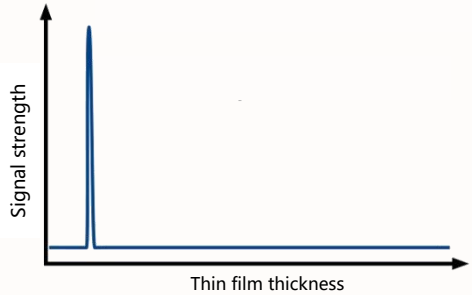
Spectral Signal Intensity



Interference Fringes



Fourier Transform



Thickness Calculation

Wide Working Distance Range

A working range of 50±2mm ensures flexibility in field applications

The Probe&The Controller of Series TS-IT

Series Name		IVS-100	IVS-100W	IVS-50
Controller Model		IVCS-100	IVCS-100W	IVCS-50
Compatible Probe Model		IVP-T50	IVP-T10-UV-VIS	IVP-T50
Reference Distance*1		50mm	Non-Focused Probe	50mm
Recommended Measurement Range		±2mm	Recommended Installation Distance:5-10mm	±2mm
Measurement Angle*2		±3°	±10°	±3°
Spot Type*3		Focused Spot, Φ100μm	Diffuse spot, with a spot diameter of approximately 4mm at an installation distance of 10mm.	Focused Spot, Φ100μm
Static Noise*4		1nm	1nm	1nm
Linearity Error*5		<±20nm	<±20nm	<±20nm
Outside Diameter * Length		φ30*58mm	φ6.35*65mm	φ30*58mm
Probe Weight		90g	—	90g
Protection Rating		IP40	—	IP40
Number of Connectable Sensor Heads		1	1	1
Sampling Frequency		Max.10 kHz		
Thickness Measurement Range		Approximately 2μm to 100μm (when the refractive index is 1.5)		Approximately 1μm to 50μm (when the refractive index is 1.5)
Input Port	Encoder Input	AB/ABZ encoder input, configurable for triggering		
	Trigger Signal Input	Pulse/Level Triggering		
Output Port	Digital Signal Output	Alarm Output, Comparator Output		
	Analog Signal Output	Linear ±10 V Analog Voltage Output / 4~20 mA Analog Current Output (optional module)		
Industrial Interface	Ethernet Interface	100BASE-TX		
	USB Interface	Compliant with USB2.0 Full-speed standard		
	RS485 Interface	Modbus protocol, baud rates from 19200 to 115200		
Measurement and Control Software	Host Computer Software	TSConfocalStudio test-control software		
	Secondary Development Kit	C++&C#SDK		
Rated Power	Power Supply Voltage	24 VDC±10%		
	Current Consumption	About 0.4 A		
Environmental Resistance	Operating Temperature	0 to +50°C		
	Relative Humidity	20 to 85% RH (No condensation)		
Weight		About 2000 g		

*1 Focus position, where the sensor's return light signal is the strongest;
*2 Using a standard plane mirror, perform a tilt test at a sampling rate of 1kHz;
*3 Measuring sharp glass edges, verified with a motion platform having sub-micron positioning accuracy using a laser interferometer as the displacement reference;
*4 Measuring standard film thickness samples, RMS deviation of 10,000 consecutively collected thickness data sets at 1kHz without averaging;
*5 Theoretical value.

The key characteristics for achieving high-precision measurement capabilities

TS-E Series

Laser 3D Profilometer

- Simple and Intuitive Operation
- Powerful Algorithm System
- Rapid Technical Support
- High-Performance Products
- Customized Development
- 3D and 2D Integrated Operations

Ultra-high Sampling Rate

The full field of view can achieve a sampling rate of up to 2500 frames, and with reduced depth of field, it can reach a maximum sampling rate of 56,000 frames; simultaneously outputs depth and brightness maps, meeting the CT requirements of high-speed production lines.

Ultra-high Measurement Precision

4K physical profile points in the X-direction; in depth map mode, arbitrary point spacing resampling in the X-direction, with a maximum of 8K points output per profile.

Customized Series Line Laser Modules

Different laser wavelengths can be selected based on user scenario requirements, with a default of 405nm violet-blue light for medium and small fields of view to achieve higher precision.

Complies with IP67 protection rating.

The protection rating achieved with connector protection or cable connection reaches IP67, which can protect against dust ingress and provide protection against short-term immersion.

Powerful Algorithm System

① Connect the Camera → ② Real-time Laser Line ImageViewing → ③ Acquire Point Cloud → ④ Uniformly Spaced Point Cloud

①
- ☑ Camera Acquisition Parameter Settings
- ☑ Laser Settings
- ☑ Laser Line Quality Assessment

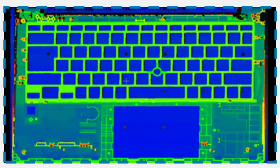
②
- ☑ Camera Device Management
- ☑ Camera Firmware Upgrade
- ☑ Array IP Configuration

③
- ☑ Trigger Parameter Management
- ☑ Encoder Docking Settings for Various Scenarios
- ☑ True High-Speed Raw Point Cloud Acquisition Feature
- ☑ Intensity Map Acquisition

④
- ☑ Point Cloud Rasterization Parameter Settings
- ☑ Region of Interest (ROI) and Acquisition Frame Rate Settings
- ☑ Standard Depth Map Output for Integration with Various Vision Processing Software

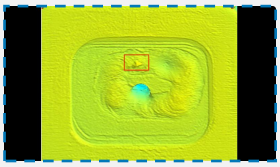
Can achieve multi-channel data stitching, and is also compatible with 3D algorithm platforms to implement three-dimensional processing with artificial intelligence technology.

Adaptable to the Needs of Various Industries



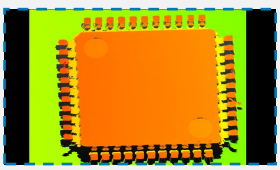
3C Industry

Laptop overall planarity and height inspection.



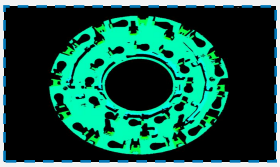
Lithium Battery Industry

Busbar Post-Welding Quality Inspection



Semiconductor Industry

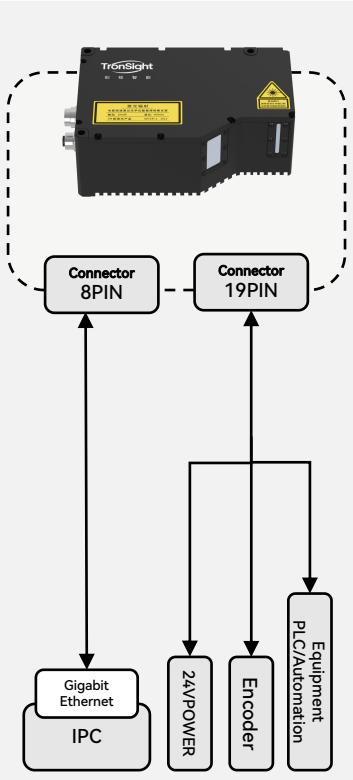
Component Pin Height Variation Inspection



Automotive Industry

Automotive Parts Inspection

Integrated Full-Frequency Industrial Interface



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TronSight

●The Laser 3D Profilometer of Series TS-E

Model	Reference Distance	Z-Axis Height	Near FOV	Far FOV	Z-Axis Repeatability	X-Axis Resolution	Laser Wavelength	X-Axis Profile Points	Scanning Speed	Power
E7100	100mm	200mm	110mm	234mm	1.2μm	85um	650nm	2048	340~10000 Point Cloud Profiles per Second	24V+10% (11W)
E7300	340mm	356mm	190mm	338mm	2μm	128um	650nm			
E7250	250mm	490mm	236mm	543mm	6μm	190um	650nm			
E7800	760mm	1280mm	694mm	1500mm	15μm	535um	650nm			
E7021	18mm	7mm	13mm	16mm	0.2μm	7.7um	405nm	1920	.000 (Full Frame) ~20000 Point Cloud Profiles per Second	24V+10% (11W)
E7041	41mm	24mm	28mm	39mm	0.4μm	17um	405nm			
E7091	89mm	74mm	55mm	90mm	0.6μm	38um	405nm			
E7151	142mm	190mm	99mm	191mm	1μm	76um	405nm			
E8020	18mm	7mm	13mm	16mm	0.2μm	8um	405nm	1920	2500~56000 Point Cloud Profiles per Second	24V+10% (20W)
E8040	41mm	24mm	28mm	39mm	0.4μm	17um	405nm			
E8090	90mm	74mm	55mm	90mm	0.6μm	38um	405nm		2500 (Full Frame) ~56000 Point Cloud Profiles per Second	
E8150	142mm	190mm	100mm	191mm	1μm	76um	405nm			
Z-axis Linearity	±0.02% of F.S.									
Laser Category	2M(Output adjustable, optional 3R)									
Operating Temperature	0~50°C									
Protection Rating	Aluminum alloy fully enclosed design, IP67									
Communication Interface	Gigabit network interface, 1 each of 24V TTL input and output, 2 bidirectional IOs of RS485									
Vibration Test	10 to 55 Hz, double amplitude of 1.5 mm, 2 hours each for X, Y, Z directions									
Shock Test	Half-sine wave shock with a peak acceleration of 15g and a duration of 11 ms									