



“Redefining Precision: TronSight's Laser Triangulation and Confocal Technology for Next-Gen Manufacturing”

Speakers:



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AOI Airon UG | The Start Up for Machine Vision
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TechTalks

November 5th, 2025

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Who we are?

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All Products

- Laser Sensors
- Lighting
- FA Lenses
- Industrial PC
- Industrial Cameras
- Touch Panels (HMI)

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Product	Price
AIRON-RING-30-90	€44.00
10.1 inch - YPC-101AZ	From €273.00
MV-3DL2048G-AB	€2.999.99
MV-ITA/ITAE134GC/M	€500.00
TronSight TS-PM80UEA	€1.262.00
TronSight TS-P150E	€1.238.00
TronSight TS-IV Series Controller IVS-100	€6.813.00
TronSight TS-CPF	€3.390.00

Company Timeline: 10 years of R&D



TronSight: Precision Measurement Expert

- First demo product
- Base in Suzhou, ready to start a business

- Investment obtained
- 30 colleagues
- New project on interferometric sensor

2015

2018

2021

2023

2025

- First project on laser distance sensor
- Three Master Thesis in Zhejiang University, China

- TronSight Established
- 1 PhD & 4 Masters
- 200 m² space
- New project on confocal sensor

- More than 120 colleagues
- 3000 m² space
- 4 site offices in China
- Presence in Southeast Asia & **Europe (Airon)**

Product Overview: displacement and thickness



Displacement Measurement



Chromatic Confocal Displacement Sensor

- < 8 mm
Probe outer diameter
- 1×10^{-4} Torr
Vacuum compatible

Laser Triangulation Displacement Sensor

- 160kHz
Sampling speed
- 2~2000mm
Measurement range



Split-type Autofocus Sensor

- 50kHz
focusing speed
- $0.5 \mu\text{m}$
focusing accuracy

Thickness Measurement



Reflective Film Thickness Sensor

- >20 nm
measurement capability
- ± 1 nm
accuracy

Infrared Interferometric Thickness Sensor

- $\pm 0.1 \mu\text{m}$
linear accuracy
- 40 kHz
Sampling rate
- $10 \mu\text{m}$ -2 mm
silicon wafer thickness measurement



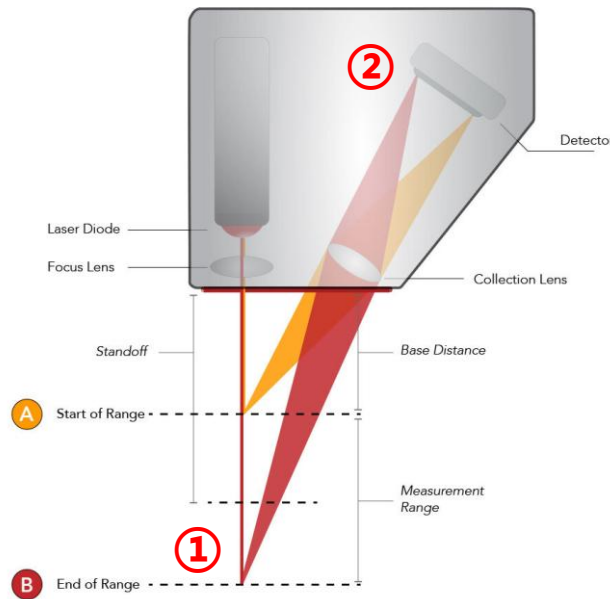
White Light Interferometric Thickness Sensor

- 50 mm
working distance
- <100 μm
thickness range

Principle for displacement measurement

Laser Triangulation Principle

Laser Triangulation
Measurement Method



Source: Acuity

PRINCIPLE:

- ① Laser beam diffusely reflected
- ② Image of the spot focused on the detector
- ③ spot location changes with the distance to the target

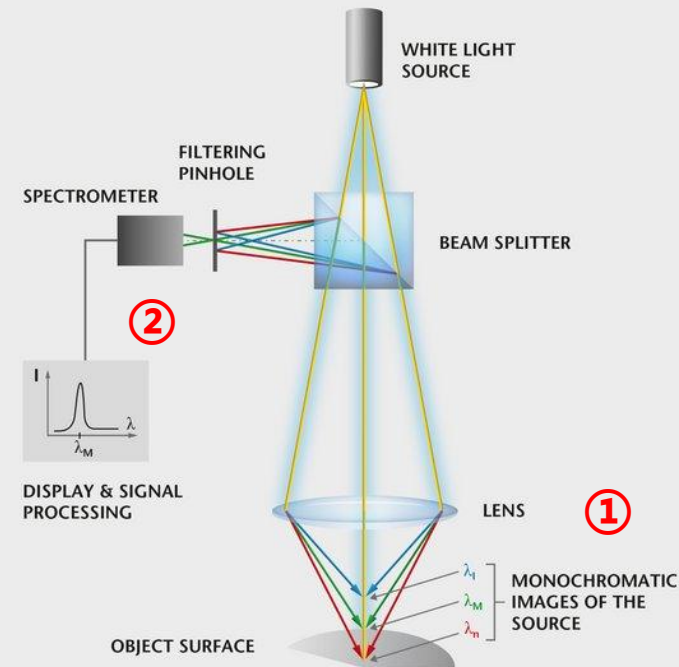
Pros:

1. high speed
2. long range

Cons:

1. big size
2. vacuum incompatible

Chromatic Confocal Principle



Source: Polytec

PRINCIPLE:

- ① Color-coding of space
- ② Color-decoding by analyzing the spectral content
- ③ spectrum position changes with the distance to the target

Pros:

1. small size
2. large solid angle
3. glass compatible
4. vacuum compatible

Cons:

1. limited speed
2. short range

Product for displacement measurement



TS-P Series Laser Triangulation Sensor



KEY FEATURES:

- Measurement range: 2-2000 mm
- Repeatability: 0.15 μm
- High-speed sampling up to 160 kHz
- Deep customization: wavelength, light source, structure

TS-C Series Chromatic Confocal Sensor



KEY FEATURES:

- High resolution 3 nm; high sampling speed 32 kHz
- Small size of 3.8mm outer-diameter
- Supports 16-channel synchronous sampling
- Can measure high-reflective and transparent materials

User case 1: Automotive industry

1D Barcode scanning for the vehicle wheel hub

Background:

- The production of automotive wheels involves numerous processes, and a 1D barcode is set on the hub to identify its information for convenient quality control.
- This product information is converted into a cast or printed 1D barcode on the wheel, serving as the unique identifier for the corresponding mold, which allows for information logging, positioning, and automatic quantity statistics during production.
- Tronsight's TS-P series laser triangulation displacement sensor can measure the height variations on the wheel edge as it rotates, thereby reading the 1D barcode information.

SOLUTION & RESULT:

- TS-P Series Laser Triangulation Sensor



Water cooling plate film thickness measurement

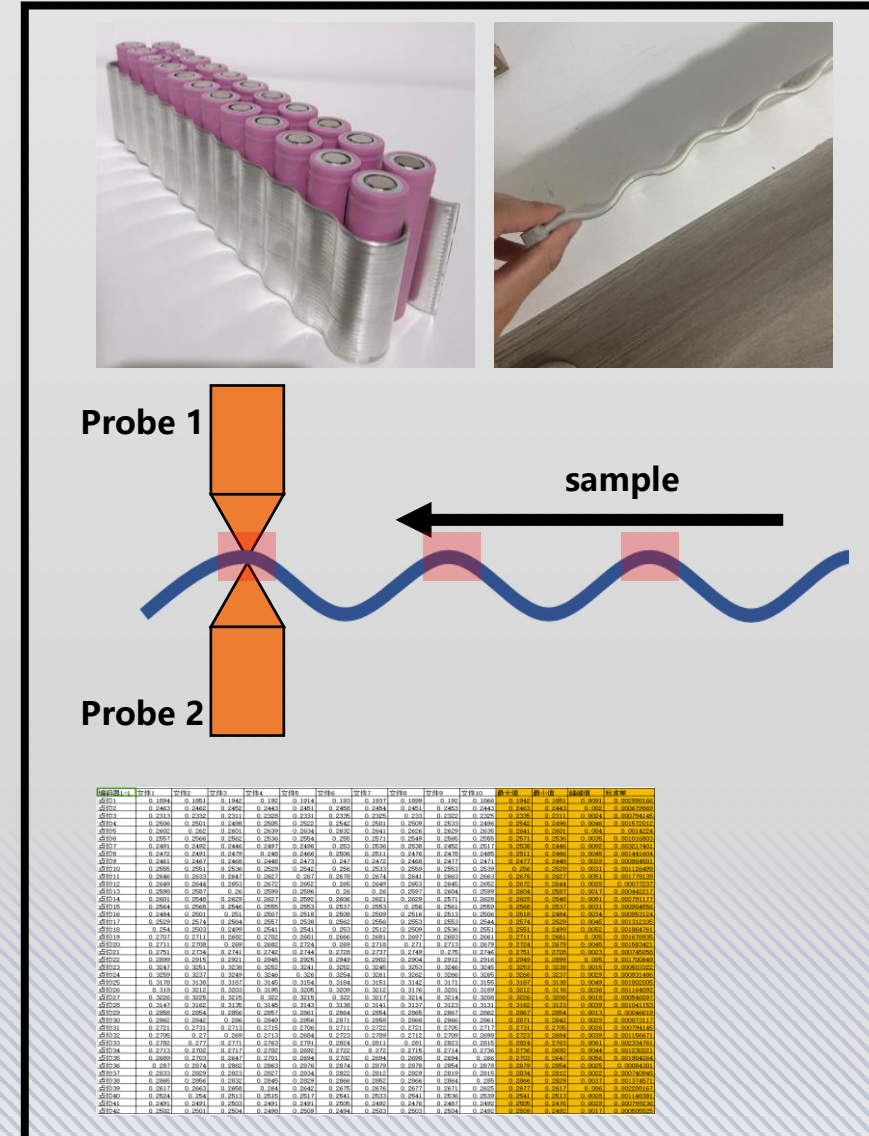
Background:

- New energy vehicle batteries require effective thermal management to prevent performance degradation and safety
- Serpentine liquid cooling tubes are used in cylindrical batteries (e.g., 4680), relying on close contact and an insulating coating for optimal performance and safety.
- Therefore, precisely measuring the thickness of this surface insulation coating is critical to ensure proper heat dissipation and reliable electrical insulation.



SOLUTION & RESULT:

- TS-C Series Chromatic Confocal Sensor
- **Statistically calculate the dynamic repeat precision using the film thickness data at the positions corresponding to the minimum (maximum) values from Probe 1 (Probe 2).**
- **Dynamic repetition can be $< 5\mu\text{m}$ on the movement**



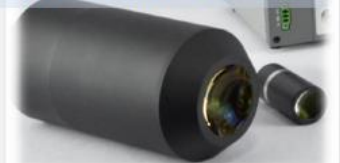
User case 3: glass industry

GLASS BOTTLE THICKNESS MEASUREMENT

Background:

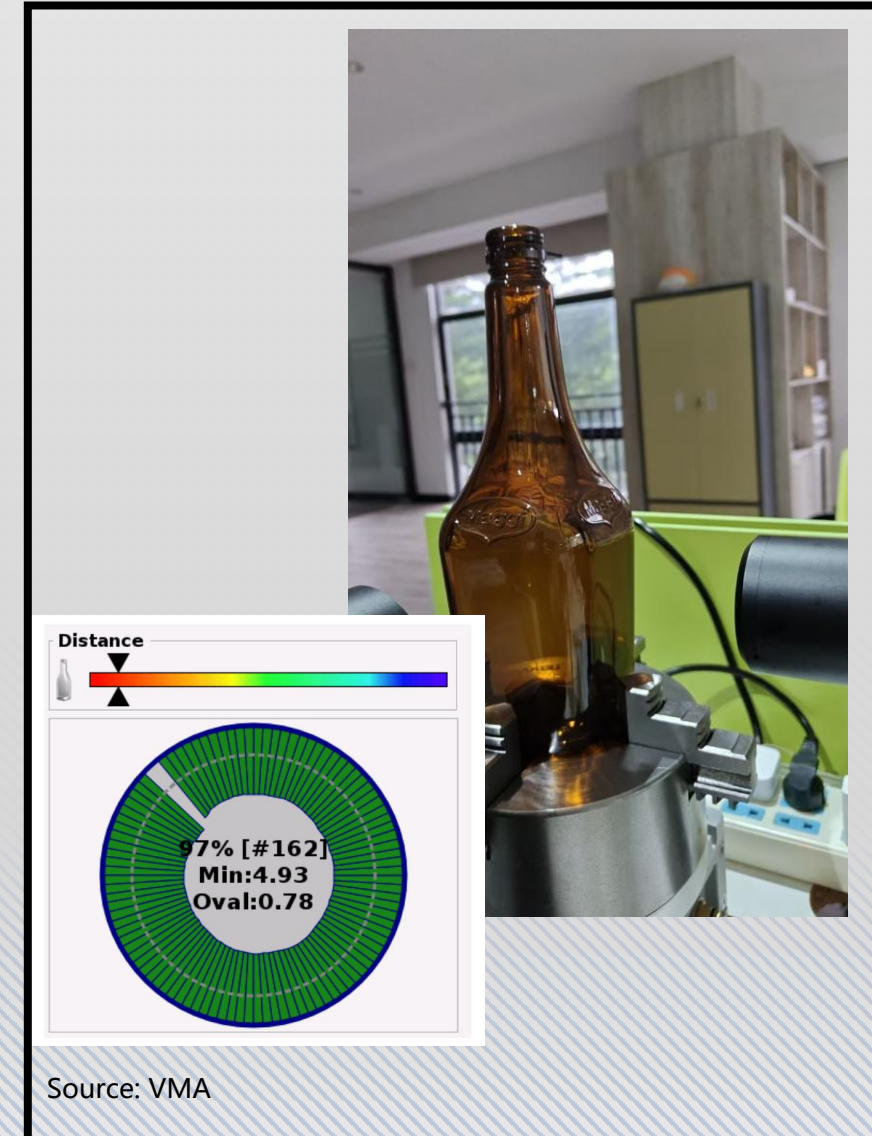
- The wall thickness of every single glass bottle must be checked to avoid breakage and possible harm to the user.
- This measurement process is challenging due to the varying shapes, colors, high production speeds, and extreme temperatures of the glass bottles on the line.
- Therefore, reliable inline measurement is essential for continuous quality control, ensuring manufacturing efficiency and consistent product safety standards.

Chromatic Confocal
Displacement Sensor

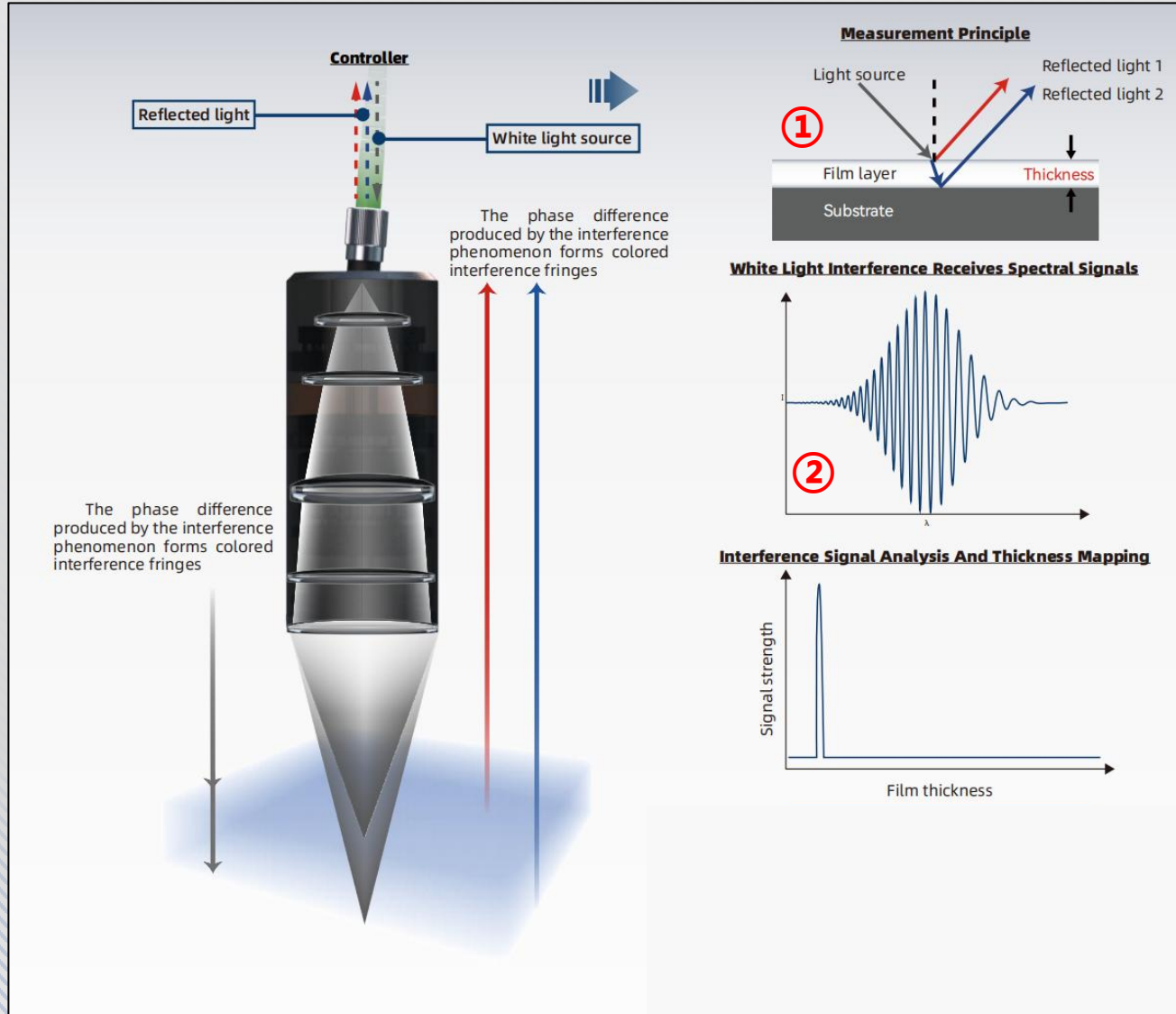


SOLUTION & RESULT:

- TS-C Series Chromatic Confocal Sensor



Principle for thickness measurement



KEY FEATURES:

- ① Film introduces phase differences depends on the wavelength
- ② Light interfere over the spectrum
- ③ the interference features changes with the thickness of the film

Pros:

1. high accuracy
2. usually no calibration needed
3. large working range

Cons:

1. small measurement angle

Product for thickness measurement



TS-IV Series white light interferometric sensor



KEY FEATURES:

- Measurement range: 1-100 μm ($n=1.5$)
- Accuracy: $\pm 0.05 \mu\text{m}$
- High-speed sampling up to 10 kHz
- Supports 16-channel synchronous sampling

TS-IR Series infrared interferometric sensor



KEY FEATURES:

- Measurement range: 4-2500 mm($n=1.5$)
- Accuracy: $\pm 0.1 \mu\text{m}$
- High-speed sampling up to 40 kHz
- Able to measure silicon wafer

User case 4: 3C industry

UTG THICKNESS MEASUREMENT

Background:

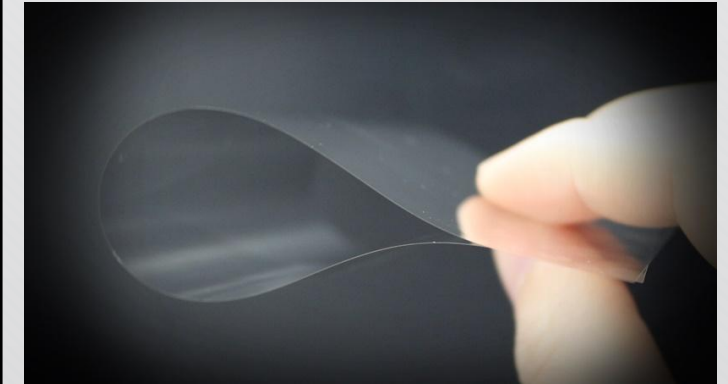
- Ultra-thin flexible glass (UTG) is a type of glass material with flexibility and bendable properties, is a key material in foldable screens.
- UTG is produced by processing ordinary glass through slimming processes, where glass with a thickness of 0.4mm or more is reduced to 0.1mm or less through chemical etching, with some being as thin as 20 μ m, followed by cutting and strengthening treatments.
- During the slimming process, real-time measurement of the reduced thickness is required.



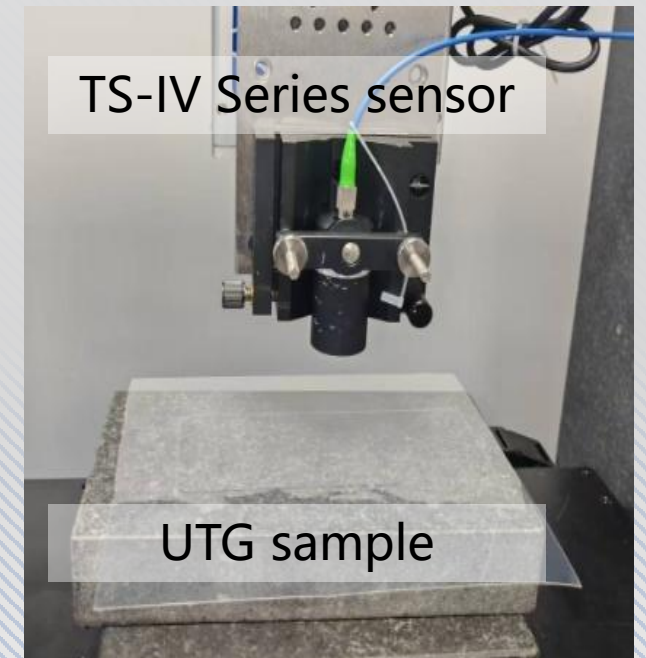
SOLUTION & RESULT:

TS-IV Series white light interferometric sensor

- Sample1: with film on the glass; sample2: without upper film on the glass
- Dynamic repetition test: for each sample, 5 measuring points, 20 times in movement
- **Dynamic repetition < 0.01 μ m**



Source: SAMSUNG



User case 5: semiconductor industry

WAFER THICKNESS MEASUREMENT

BACKGROUND:

- Due to the "More than Moore" trend, the demand for advanced packaging requires increasingly thinner wafers.
- The successful implementation of these advanced packaging techniques depends on critical process upgrades in areas such as chemical mechanical polishing (CMP), bonding, and metrology.
- Therefore, achieving real-time wafer thickness measurement is essential for these processes and their associated equipment.

Infrared interferometric sensor

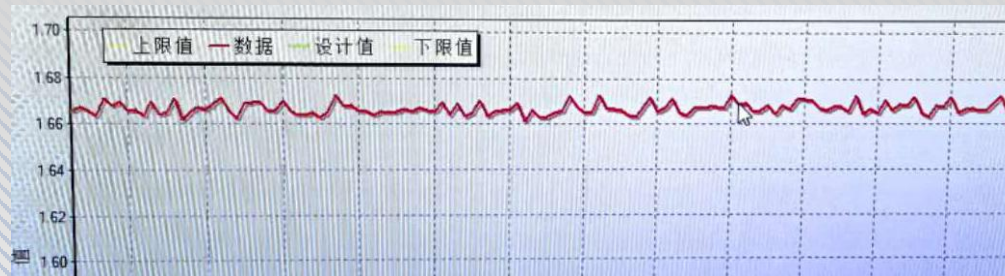


测量项目选择	
测量项目	TTV
最大值	1.6728 μm
最小值	1.6614 μm

SOLUTION & RESULT:

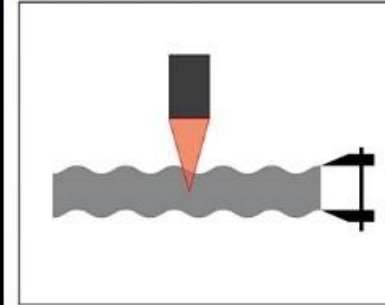
TS-IR Series infrared interferometric sensor

- Sample: 12-inch wafer of 700 μm thickness
- Measurement process: real-time thickness measurement on rotation
- **TTV repetition(130 times) < 0.02 μm**

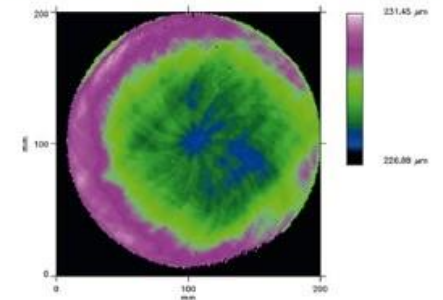


TTV of 12-inch wafer measured over 130 times

WAFER THICKNESS (IR)

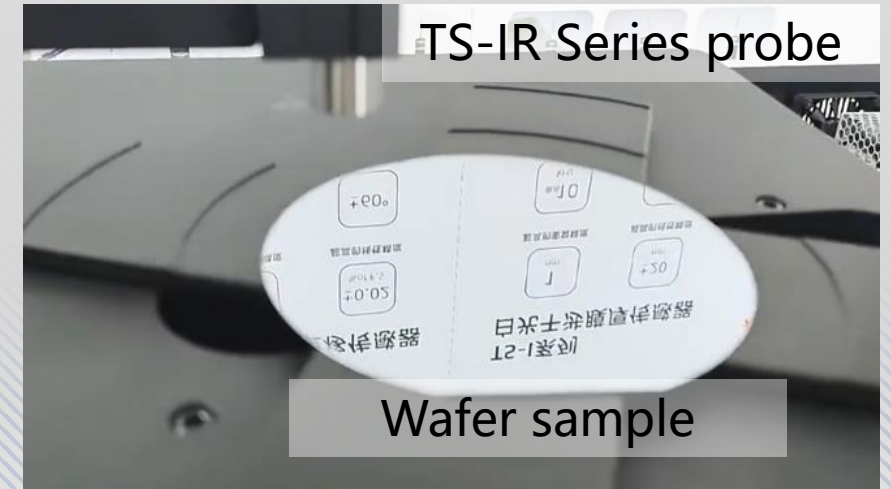


Wafer thickness and layer thickness using IR technology



Thickness of a Si wafer, post grinding

Source: formfactor



TS-IR Series probe

Wafer sample

In conclusion



- With AIRON, TronSight offers high-precision metrology solutions for industries, including
 - new energy industry
 - 3C industry
 - semiconductor industry
 - glass industry
 - automotive industry
 - ...



If you have any measurement demands and challenges, please contact us!



Danke,
Thanks,
Obrigado!
谢谢!

AOI Airon UG
The Start Up for Machine Vision

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