

# Ranger3 3D vision camera for inline inspection

HIGH-PERFORMANCE 3D INSPECTION IN THE ELECTRONICS INDUSTRY

High resolution at exceptional speed

**SICK**  
Sensor Intelligence.

## AUTOMATIC OPTICAL INSPECTION (AOI) WITH RANGER3

### + High resolution

- CMOS sensor from SICK with ROCC technology for reliable 3D performance
- Sensor resolution 2,560 x 832 pixels
- Resolution of the Z-axis of up to 0.3  $\mu\text{m}$

### + Flexible use

- Reliable and accurate measurements on dark and light surfaces
- 3D, reflective, and scattered light measurement in one device
- Individually adjustable camera settings

### + Increased throughput

- 3D measuring speed up to 46 kHz



### + Customized AOI inspection solution

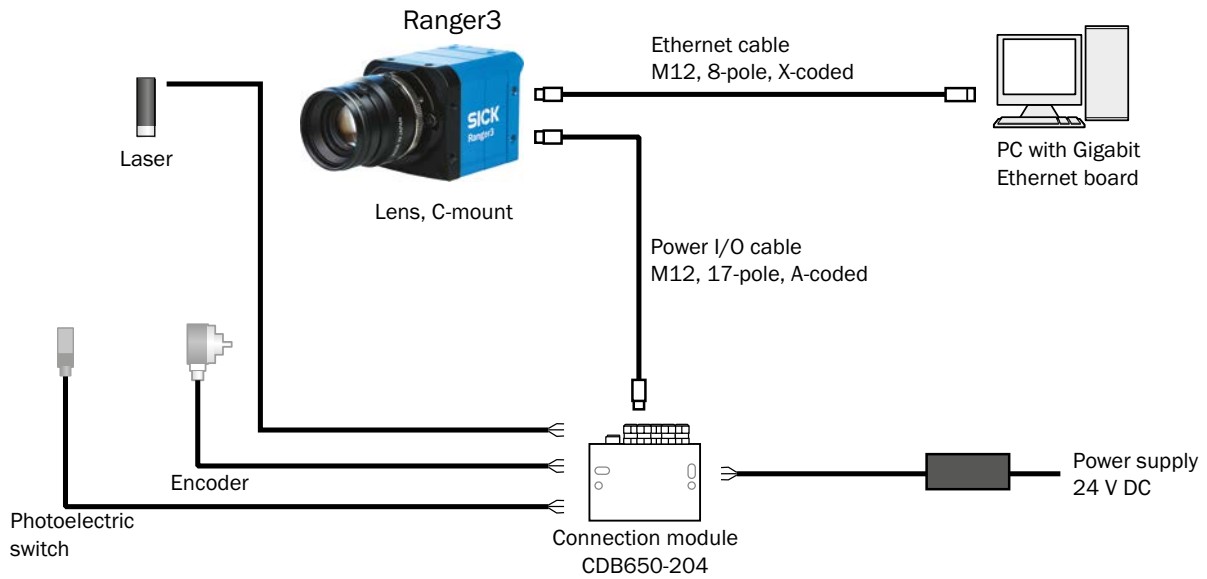
- Option of integrating customized inspection solutions by configuring geometry and working distance

### + Simple integration

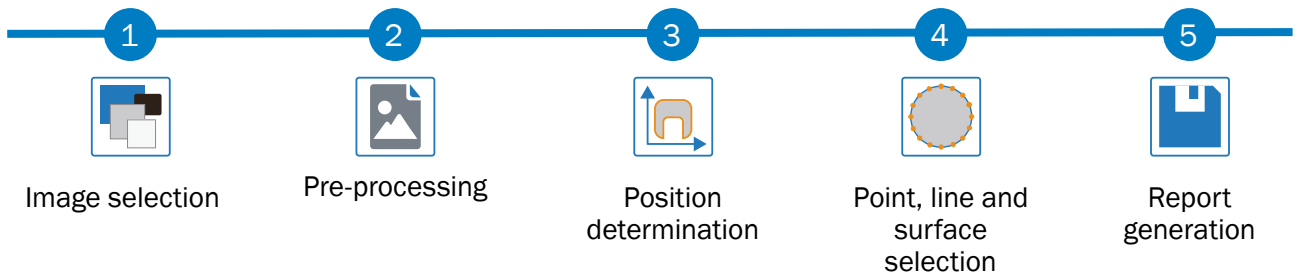
- Complete with accessories and software package for quick and easy installation
- Stream setup software available for easy setup of two cameras with laser
- Software integration based on the GigE Vision and GenICam standards



## MOUNTING AND CONFIGURATION

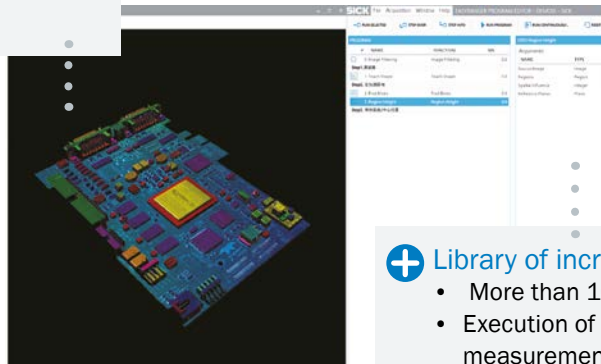


## 5 EASY STEPS TO HEIGHT MEASUREMENT



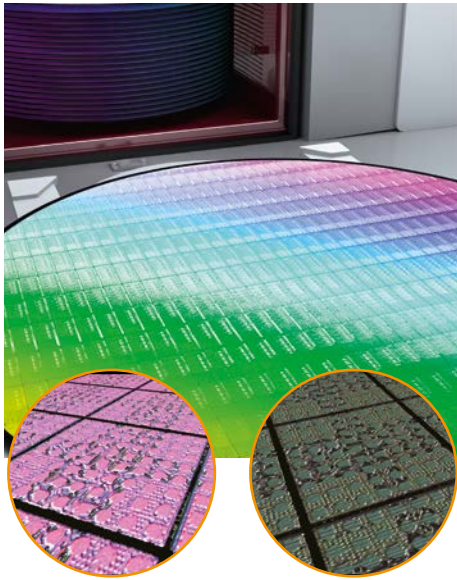
### + Graphical user interface

- Easy operation, even for beginners



### + Library of incremental algorithms

- More than 100 algorithms
- Execution of many 3D measurements in one step

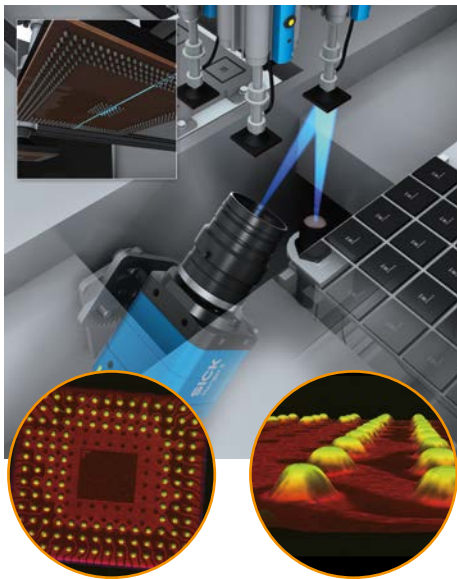


## Surface inspection of wafers after etching

- Measurement of surface roughness of semiconductors
- Suitable for very small structures in the range of 10  $\mu\text{m}$

### Measurement accuracy

- Resolution in X/Y-direction: 5  $\mu\text{m}$
- Resolution in Z-direction: 0.5  $\mu\text{m}$
- Measuring speed: 150 mm/s
- Laser selection:
  - 660 nm, 50 mW, high performance
  - 450 nm, 30 mW, mid-range performance

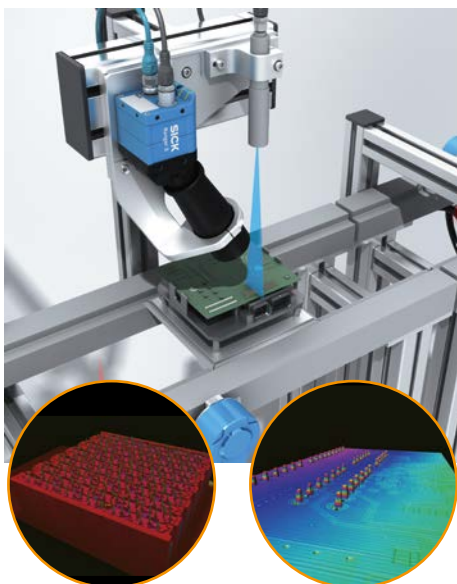


## Coplanarity testing of ball grid arrays (BGAs)

- Testing of coplanarity and correct position of the ball grid arrays in one step
- Suitable for solder beads with a height of 30  $\mu\text{m}$  to 600  $\mu\text{m}$

### Measurement accuracy

- Resolution in X/Y-direction: 5  $\mu\text{m}$
- Resolution in Z-direction: 0.5  $\mu\text{m}$
- Measuring speed: 150 mm/s
- Laser selection:
  - 405 nm, 120 mW, high performance
  - 450 nm, 60 mW, mid-range performance

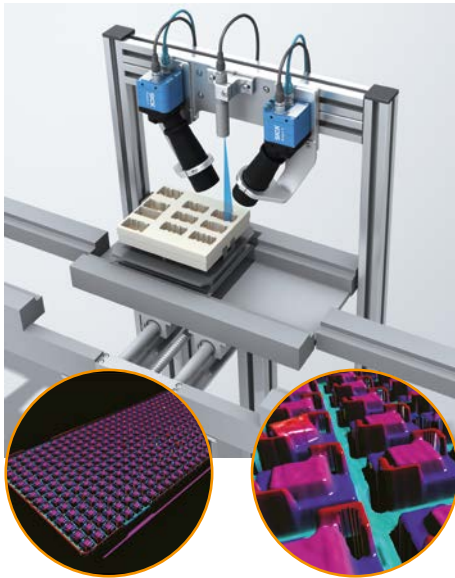


## Pin inspection

- Testing for presence, coplanarity and correct alignment of pins in one step
- Suitable for industrial, network and vehicle plug connectors
- Can be individually configured for different fields of view

### Measurement accuracy

- Resolution in X/Y-direction: 10  $\mu\text{m}$
- Resolution in Z-direction: 1  $\mu\text{m}$
- Measuring speed: 300 mm/s
- Laser selection:
  - 405 nm, 30 mW, low performance
  - 450 nm, 60 mW, mid-range performance

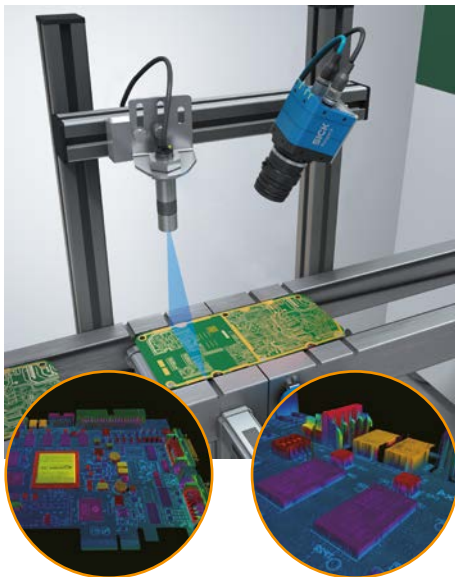


### Inspection of tray stacks

- Checking of tray stack dimensions and semiconductor testing in one step
- Suitable for IC trays and plug connector trays
- Freely adjustable field of view of 10 cm, 15 cm or 20 cm

#### Measurement accuracy

- Resolution in X/Y-direction: 95  $\mu\text{m}$
- Resolution in Z-direction: 10  $\mu\text{m}$
- Measuring speed: 500 mm/s
- Laser selection:
  - 405 nm, 120 mW, high performance
  - 450 nm, 60 mW, mid-range performance

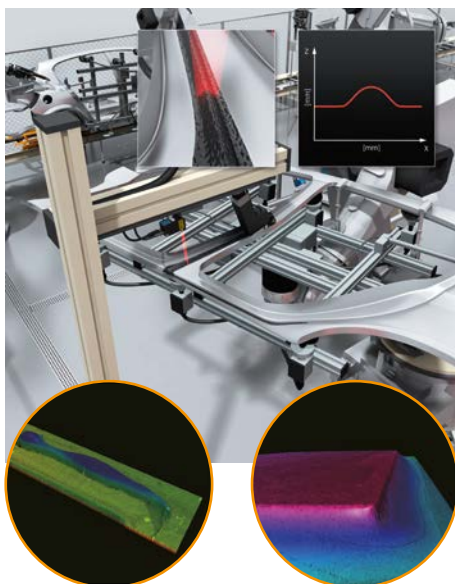


### Inspection of printed circuit board components

- Inspection of various components in one step – before and after populating the printed circuit board
- Determination of pin height, resistor position and capacitor position in one step

#### Measurement accuracy

- Resolution in X/Y-direction: 20  $\mu\text{m}$
- Resolution in Z-direction: 2  $\mu\text{m}$
- Measuring speed: 60 mm/s
- Laser selection:
  - 405 nm, 120 mW, high performance
  - 450 nm, 60 mW, mid-range performance



### Inspection of adhesive application

- Testing for presence of adhesive and quality of application
- Individually adjustable geometry

#### Measurement accuracy

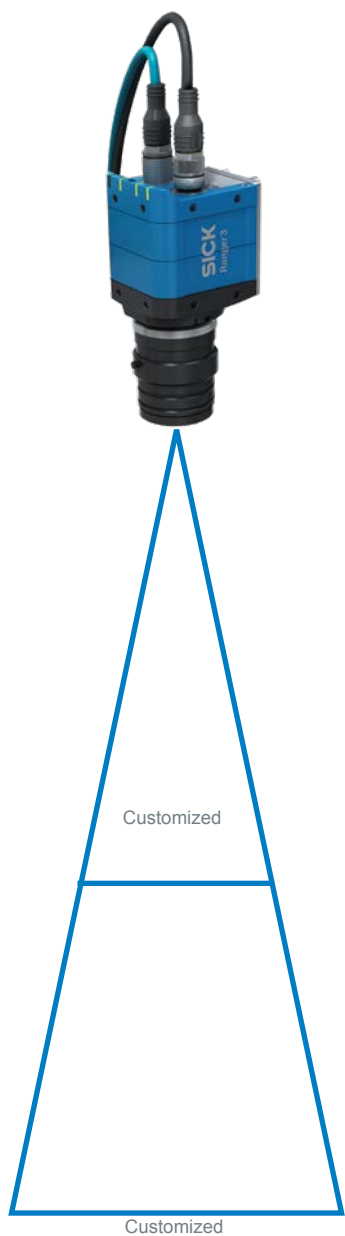
- Resolution in X/Y-direction: 30  $\mu\text{m}$
- Resolution in Z-direction: 5  $\mu\text{m}$
- Measuring speed: 500 mm/s
- Laser selection:
  - 405 nm, 120 mW, high performance
  - 450 nm, 60 mW, mid-range performance



# A NEW STANDARD FOR HIGH SPEED 3D

## Ranger3 customized

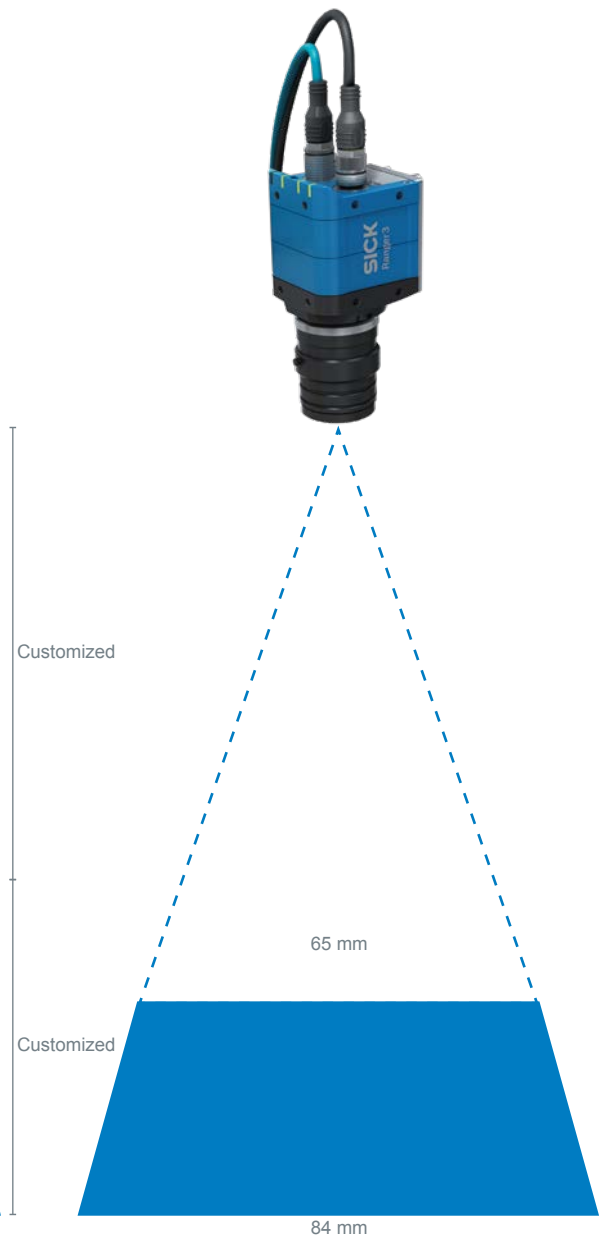
Customized field of view



Resolution X-axis:  
customized  
Resolution Z-axis:  
customized

## Ranger3 FOV 70 mm

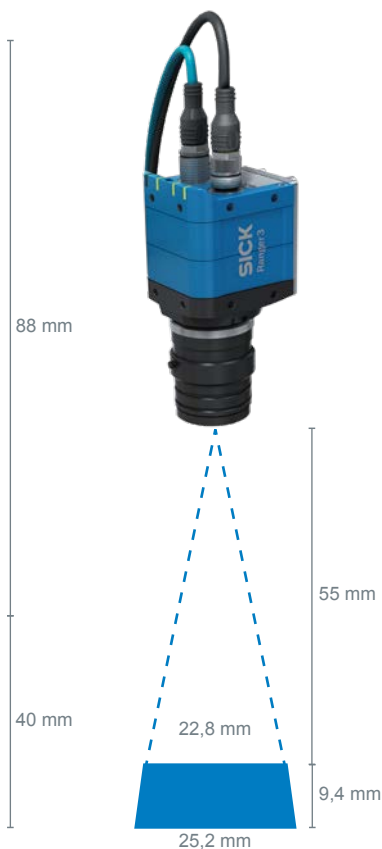
Recommended field of view  
70 x 40 mm



Resolution X-axis: 28  $\mu$ m  
Resolution Z-axis: 2  $\mu$ m

## Ranger3 FOV 23 mm

Recommended field of view  
23 x 9 mm



Resolution X-axis: 8  $\mu$ m  
Resolution Z-axis: 0.7  $\mu$ m