

ZEISS eMobility Solutions

# Prismatic Battery Cell Dimension Measurement by CMM



Seeing beyond





## High precision & efficiency

### Prismatic cell measurement

The rapid global shift to new energy vehicles (NEVs) poses a variety of quality challenges, with metrology also greatly impacted by increasing demands relating to accuracy and efficiency.

Batteries are the key to range, performance, and longevity in NEVs. Based on different packaging methods and shapes, lithium batteries are mainly divided into three types: prismatic, pouch, and cylindrical. For prismatic cells, particular attention must be paid to flatness and parallelism.

Structural features of prismatic batteries are diverse, and many of these features are surface characteristics that are difficult for probes to reach. The casing of prismatic batteries is generally made of thin-walled materials, and due to the large surface area, contact probes can easily cause deformation during measurement. In such cases, ZEISS CMM MASS function can be used for highly accurate and efficient measurement.

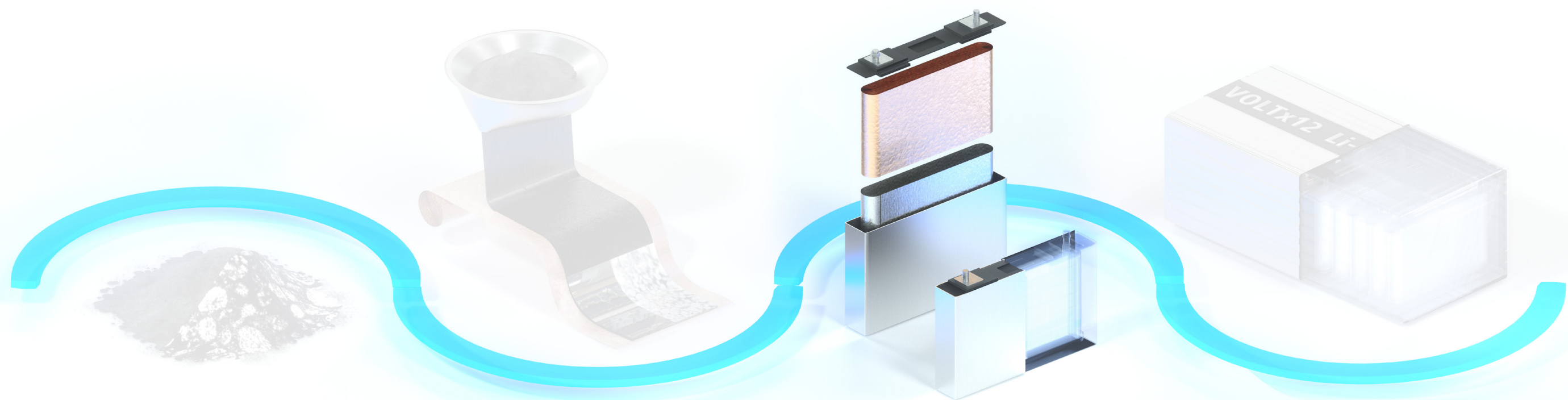




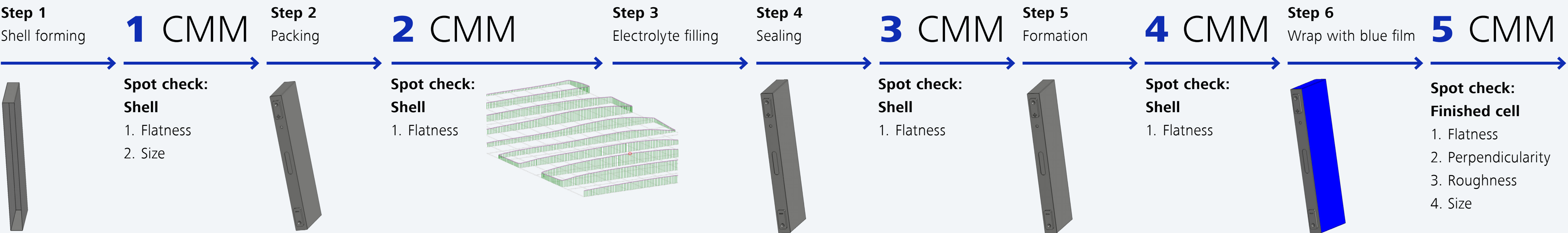
# Ensure quality of prismatic cell assembly

## Efficient evaluation by CMM

During the production process of battery, quality inspection and evaluation at each step is of great significance for assessing the stability and consistency of the battery production process. In the step of cell assembly, each cell can pose specific safety risks. CMM measurement is therefore required at several intervals to pinpoint problems as early as possible. CMM spot checks ensure reliable identification of typical measurement issues ranging from flatness, to parallelism, and to surface characteristics.



### Production process of prismatic cell

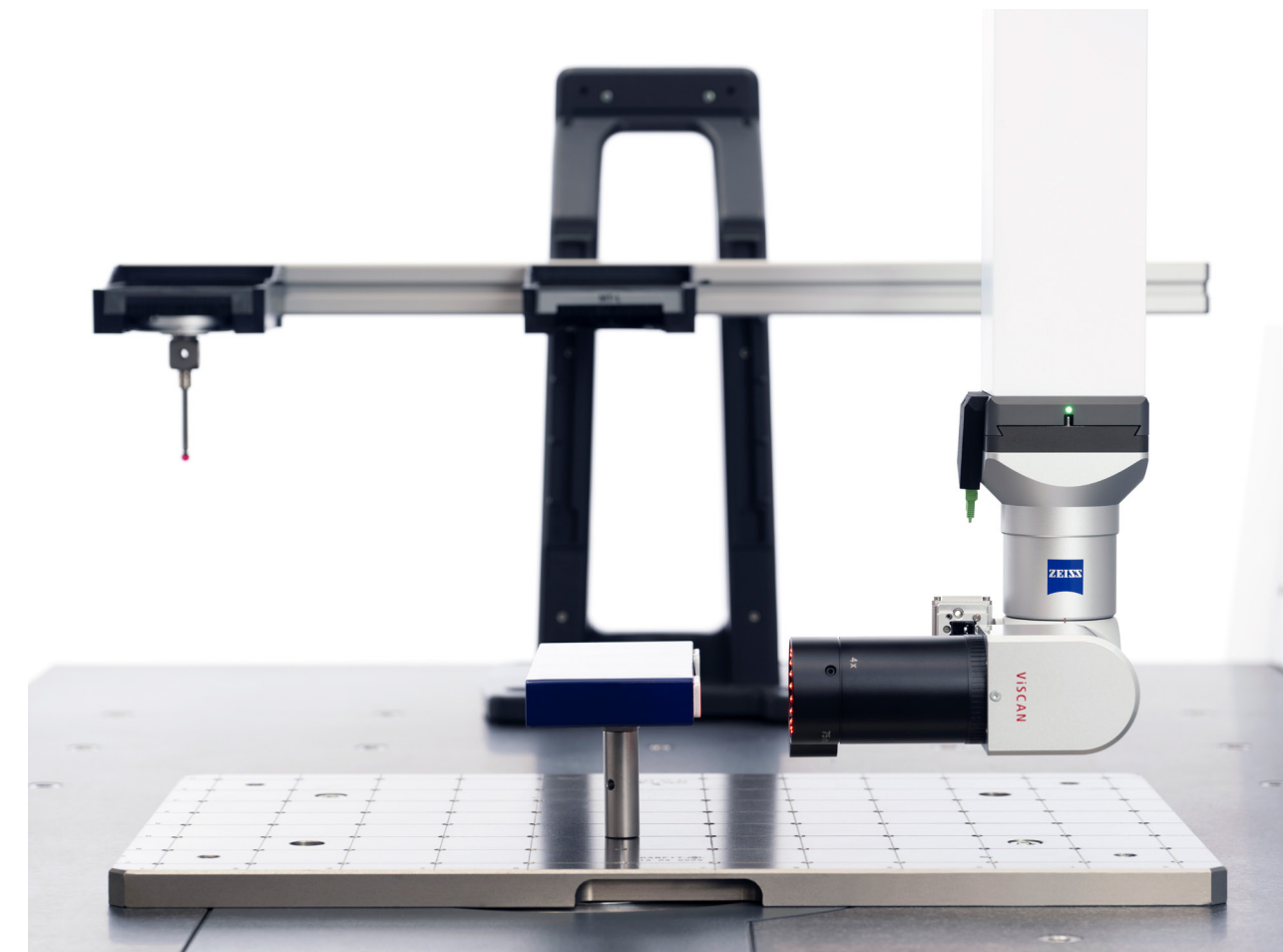


# Application areas of CMM measurement



## **Flatness and parallelism measurement**

- Perform nearly 100% accurate non-contact flatness measurement without deformation by ZEISS DotScan optical probe
- Easily scan a variety of materials from all sides

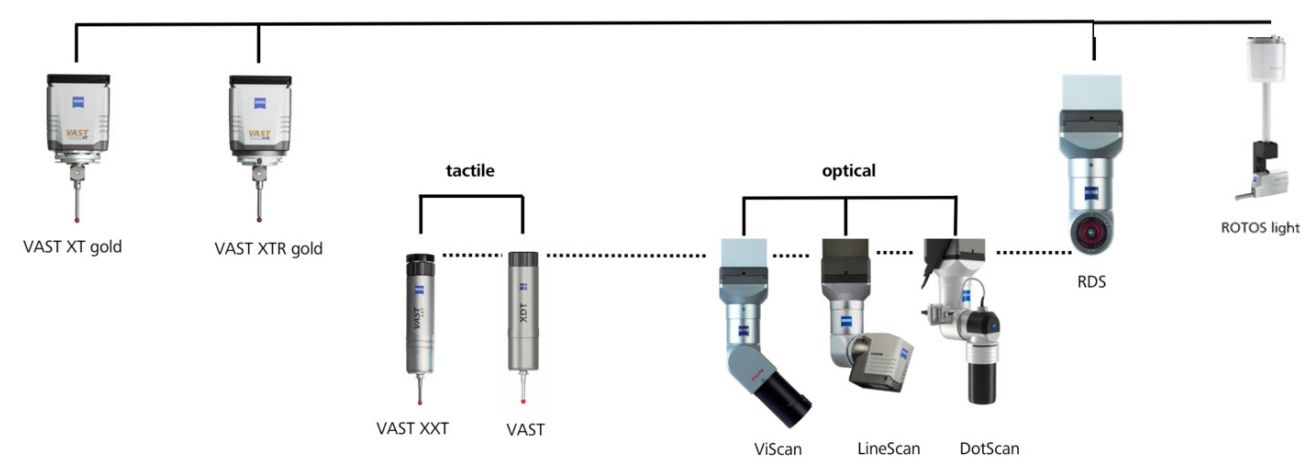


## **Surface characteristics measurement**

- Perform fast and flexible measurements by ZEISS ViScan 2D optical probe
- Easily capture geometries with high accuracy
- Reduce complexity and save inspection time through fewer stylus exchanges

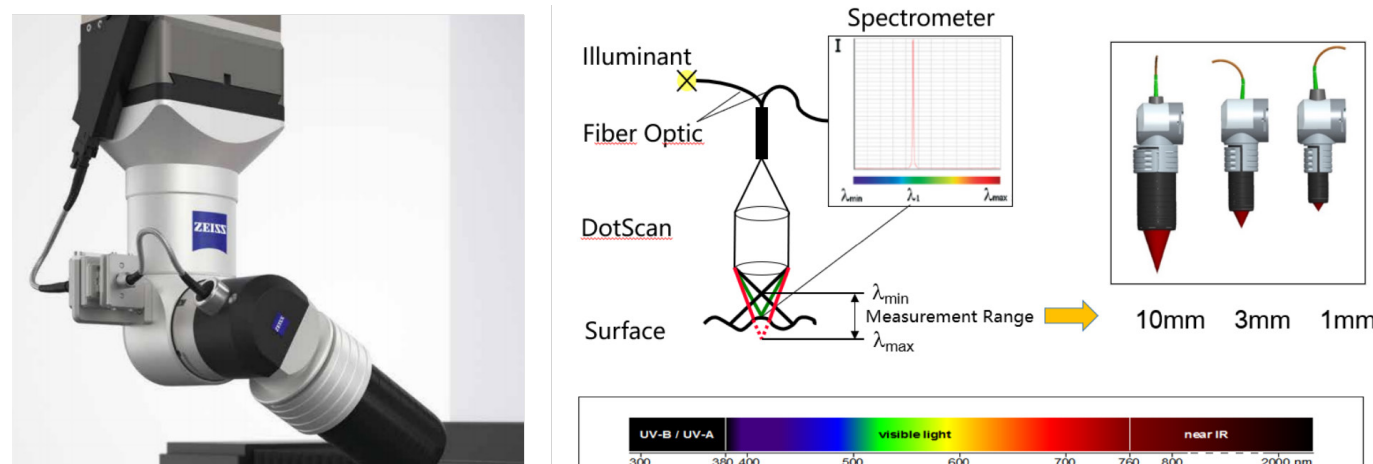


# Value proposition of ZEISS solution



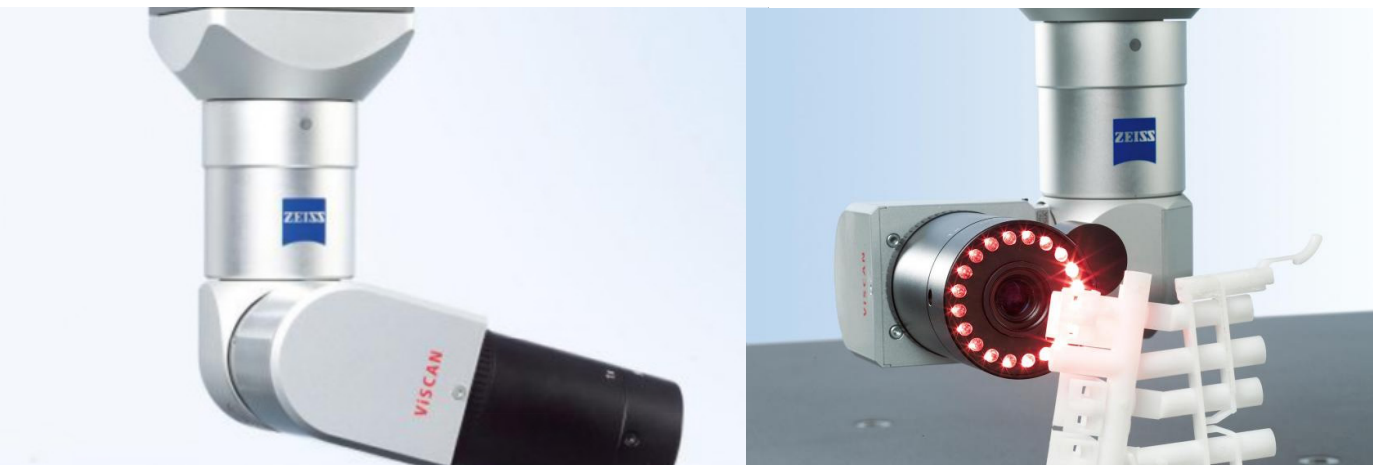
### One-stop solution by mass<sup>1</sup> technology

- Sensors can be easily changed by the operator or be automatically switched between tactile scanning sensors and optical mode during the CNC<sup>2</sup> operation, which is highly flexible and eliminates the need to pre-select the most suitable sensor for the application



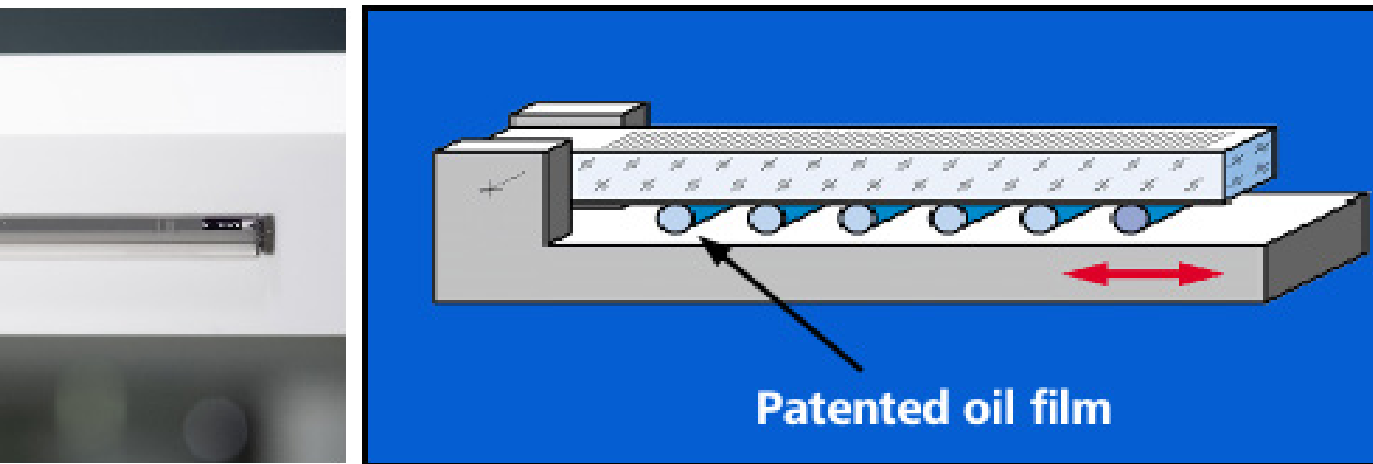
### High flexibility by ZEISS DotScan

- A wide range of materials can easily be scanned in all directions by ZEISS DotScan. In conjunction with a rotary table, it can even perform four-axis scanning measurement tasks



### High efficiency by ZEISS ViScan

- Highly complex specimens can be easily scanned by ZEISS ViScan, an optical 2D image sensor



### High reliability and performance by glass ceramic scales

- The temperature expansion coefficient of glass ceramic grating scale is close to zero, eliminating uncertainties in the temperature compensation process. Since the temperature expansion of the guide rail and bridge cannot be completely eliminated, the grating scale is suspended and installed on a layer of silicone oil

**Note:** 1) Mass refers to multi-application sensor system. 2) CNC refers to computer numerical control.

# Recommended portfolio

## Prepared for all challenges - today and tomorrow

ZEISS CONTURA 7/7/6



Length measurement error in  
µm: MPE\_E0 1.5 + L/350

Max. travel speed vector  $V_{\max}$  475  $\frac{mm}{s}$

Max. vector acceleration 1,85  $\frac{m}{s^2}$

Measuring sizes 700mm\*700mm\*600mm

### Benefits:



- ZEISS multi application sensor system (MASS) allows for tactile and optical, measurements to be performed on the same ZEISS machine.
- ZEISS RDS sensor can reach almost any position of each component with a step size of 2.5 degrees.
- ZEISS ViScan 2D optical probe offers full flexibility for fast measurements.
- ZEISS DotScan, a confocal white light probe, is particularly suitable for measuring sensitive surfaces.
- ZEISS LineScan enables rapid point cloud scanning, allowing for comparison with nominal CAD data or the creation of new CAD models.

## Unmatched performance and flexibility in its class

ZEISS SPECTRUM 5/5/6



Length measurement error in  
µm: MPE\_E0 1.8 + L/300

Max. travel speed vector  $V_{\max}$  346  $\frac{mm}{s}$

Max. vector acceleration 0.866  $\frac{m}{s^2}$

Measuring sizes 500mm\*500mm\*600mm

### Benefits:



- Excellent accuracy performance meets the measurement needs of battery casing dimensions.
- Scanning technology gives you more reliability and repeatability of measurement results due to a massive high point density for evaluating size, form and location tolerances.
- The RDS probe head with integrated CAA reduce operating time, which requires no single angle qualification.
- Direct probe saves measurement range, facilitating batch measurement of more workpieces and saving inspection time costs.

## Optical solution with the right touch

ZEISS O-INSPECT 5/4/3



Length measurement error in  
µm: MPE\_E0 1.4 + L/250

Max. travel speed vector  $V_{\max}$  435  $\frac{mm}{s}$

Max. vector acceleration 0.866  $\frac{m}{s^2}$

Measuring sizes 500mm\*400mm\*300mm

### Benefits:



- The tactile sensor ZEISS VAST XXT measures thousands points with its scanning technology. With ZEISS VAST probing mode, faster single point probing can be achieved, which can lead to a significant reduction in measuring time, from 35% to 80%.
- The camera sensor ZEISS Discovery.V12 (12x ZEISS Zoom-Optic) with different lightings enables complex 2D measurements.
- Every ZEISS O-INSPECT is prepared for the chromatic-confocal white light sensor ZEISS DotScan, which allows contactless distance measurements for sensitive surfaces or tight structures.



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