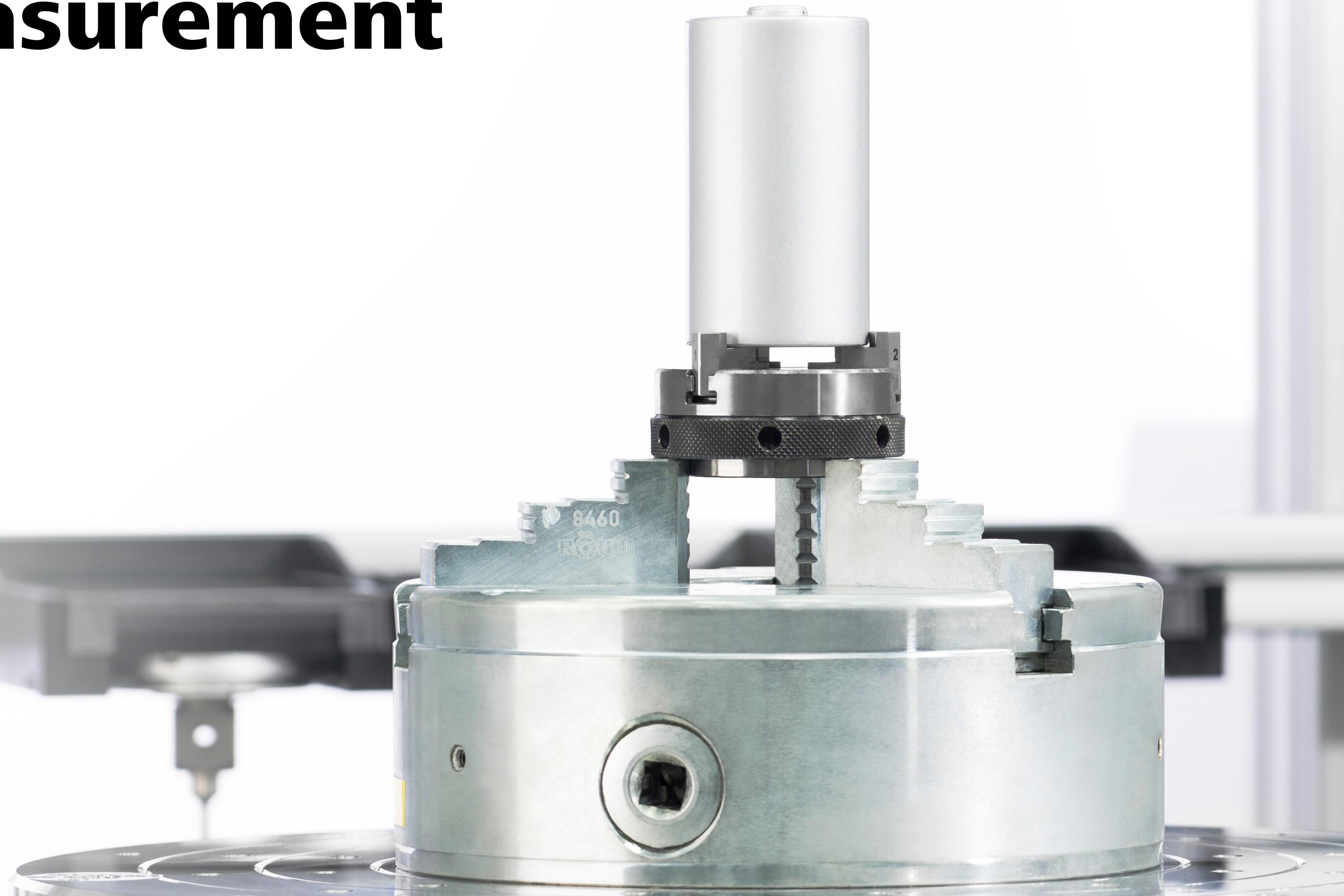


ZEISS eMobility Solutions

Cylindrical Battery Cell Dimension Measurement by CMM



Seeing beyond



ZEISS eMobility Solutions

Cylindrical Battery Cell Dimension Measurement by CMM

High precision & efficiency

Cylindrical 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 cylindrical cells, particular attention must be paid to cylindricity and flatness.

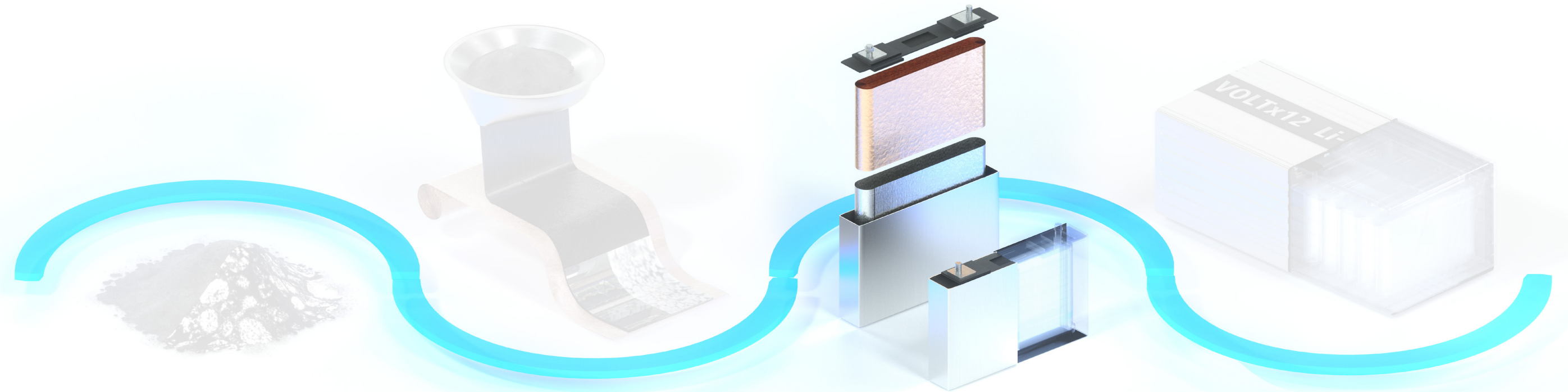
The production cycle of cylindrical batteries is very fast, resulting in a large amount of measurement required. Therefore, higher measurement efficiency is required. As an international innovation leader, ZEISS provides advanced CMM technologies to ensure the safety, production efficiency, and reliability of cylindrical batteries.



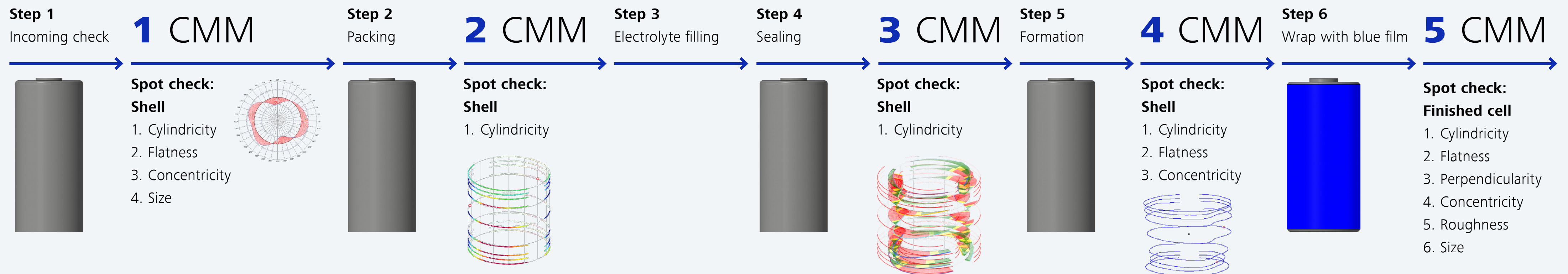
Ensure quality of cylindrical cell assembly

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 cylindricity.



Production process of cylindrical cell



Application areas of CMM measurement



Cylindricity measurement

- Measure the entire cylindrical cell in one spin by LineScan and rotary table, which is several times more efficient than contact measurement
- Perform rapid point cloud scanning for comparison with nominal CAD data or the creation of new CAD models by LineScan



Geometric dimensioning and tolerancing

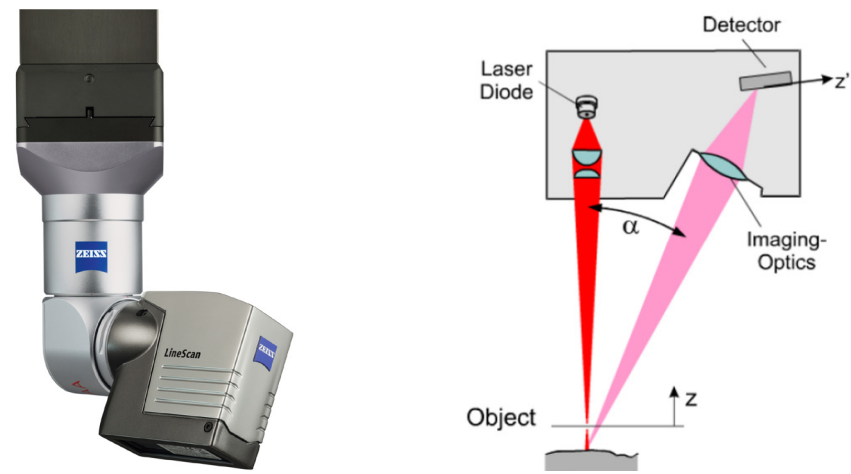
- Evaluate size, dimension, form, and location tolerances in more reliable and repeatable results through high point density scanning technology
- Reduce operating time and eliminate the need for single-angle qualification by the CAA¹-integrated RDS² probe



Surface characteristics measurement

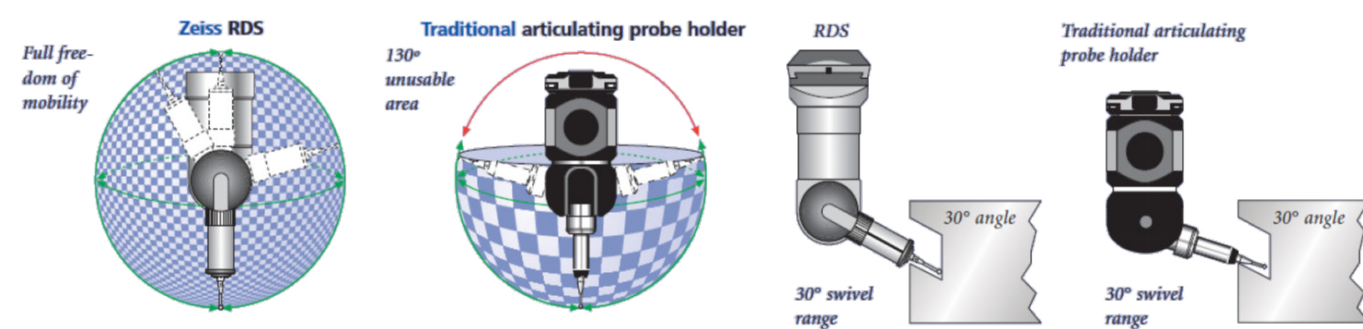
- Offer optimum precision and maximum flexibility in roughness measurements by the modular design and three axes rotation of ZEISS ROTOS
- Expand the range of possible applications by easy-to-change stylus arms

Value proposition of ZEISS solution



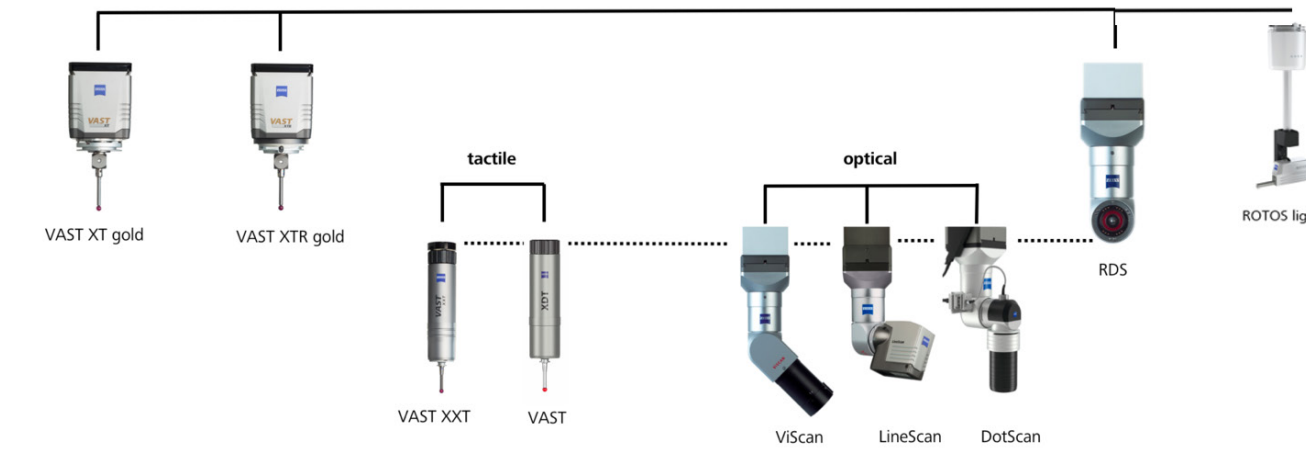
Highly efficient cylindricity measurement by LineScan

- The LineScan consists of a laser line scanner and software components. The laser line scanner is based on the triangulation principle. Compared with traditional methods, the measurement efficiency is nearly 10 times higher, which reduces part costs and increases machine productivity



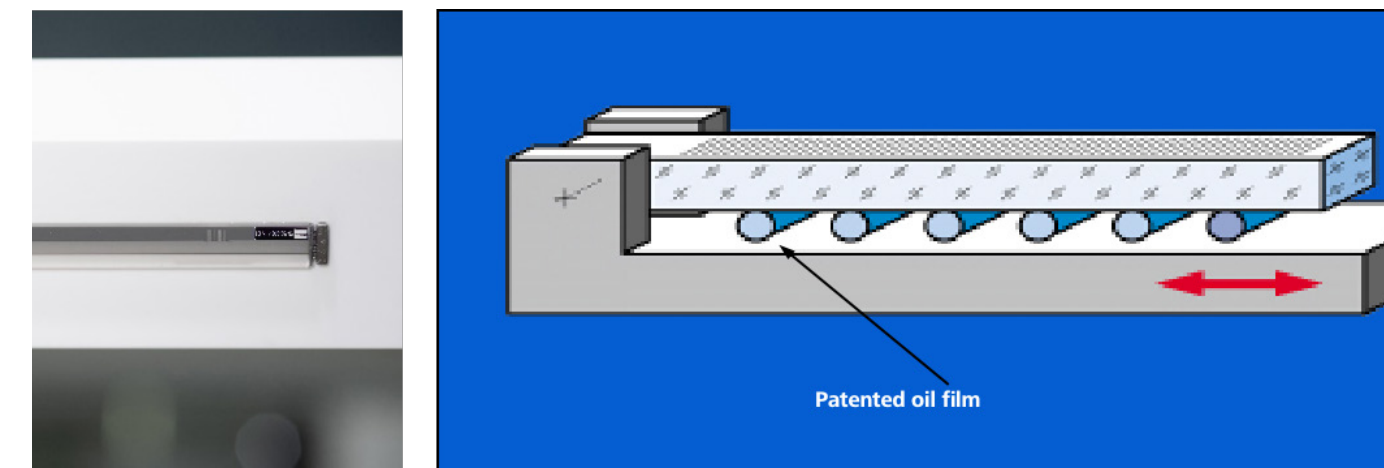
High cost-effectiveness by RDS with CAA

- The CAA-integrated RDS probe eliminates the need for single angle qualification, thus reducing operation time by several times



One-stop solution by mass¹ technology

- Sensors can be easily changed by the operator or be automatically switched between tactile scanning sensors and optical mode during the CNC² operation, which is highly flexible and eliminates the need to pre-select the most suitable sensor for the application



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

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} $475 \frac{\text{mm}}{\text{s}}$

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

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} $346 \frac{\text{mm}}{\text{s}}$

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

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} $435 \frac{\text{mm}}{\text{s}}$

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

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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Sales & Service
Organizations

63
Quality
Excellence
Centers

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Locations

245
Sales Partners
Worldwide

Global Metrology Network

Our global service network provides easy access to ZEISS expertise around the world. We use local teams to ensure a swift response and reduced downtime. Make your operations even more secure and reliable with ZEISS.

Find your perfect solution today.
Contact our global experts.

