

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.

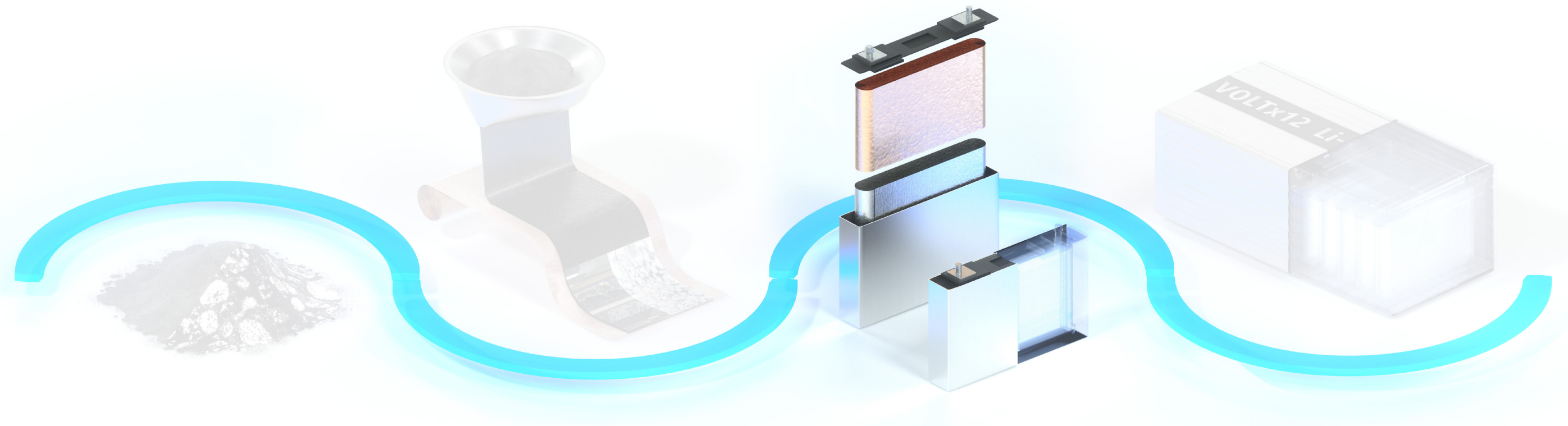
Structural features of prismatic batteries are diverse, and many of these features are surface characteristics that are difficult for probes to reach. The casing of prismatic batteries is generally made of thin-walled materials, and due to the large surface area, contact probes can easily cause deformation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



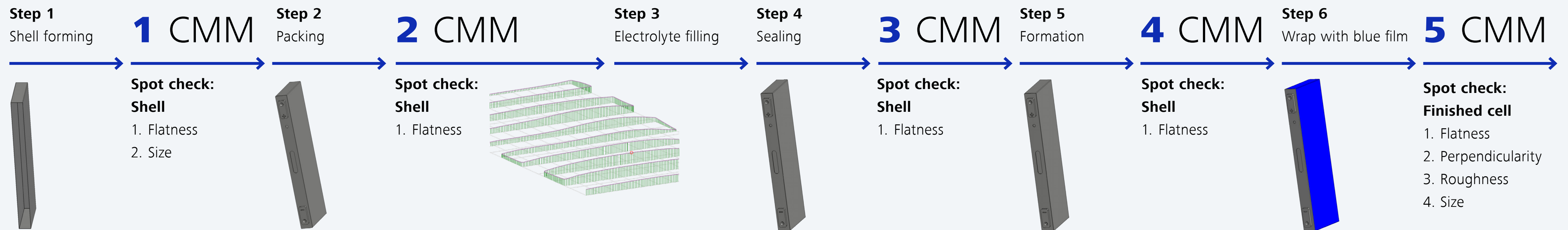
Ensure quality of prismatic cell assembly

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

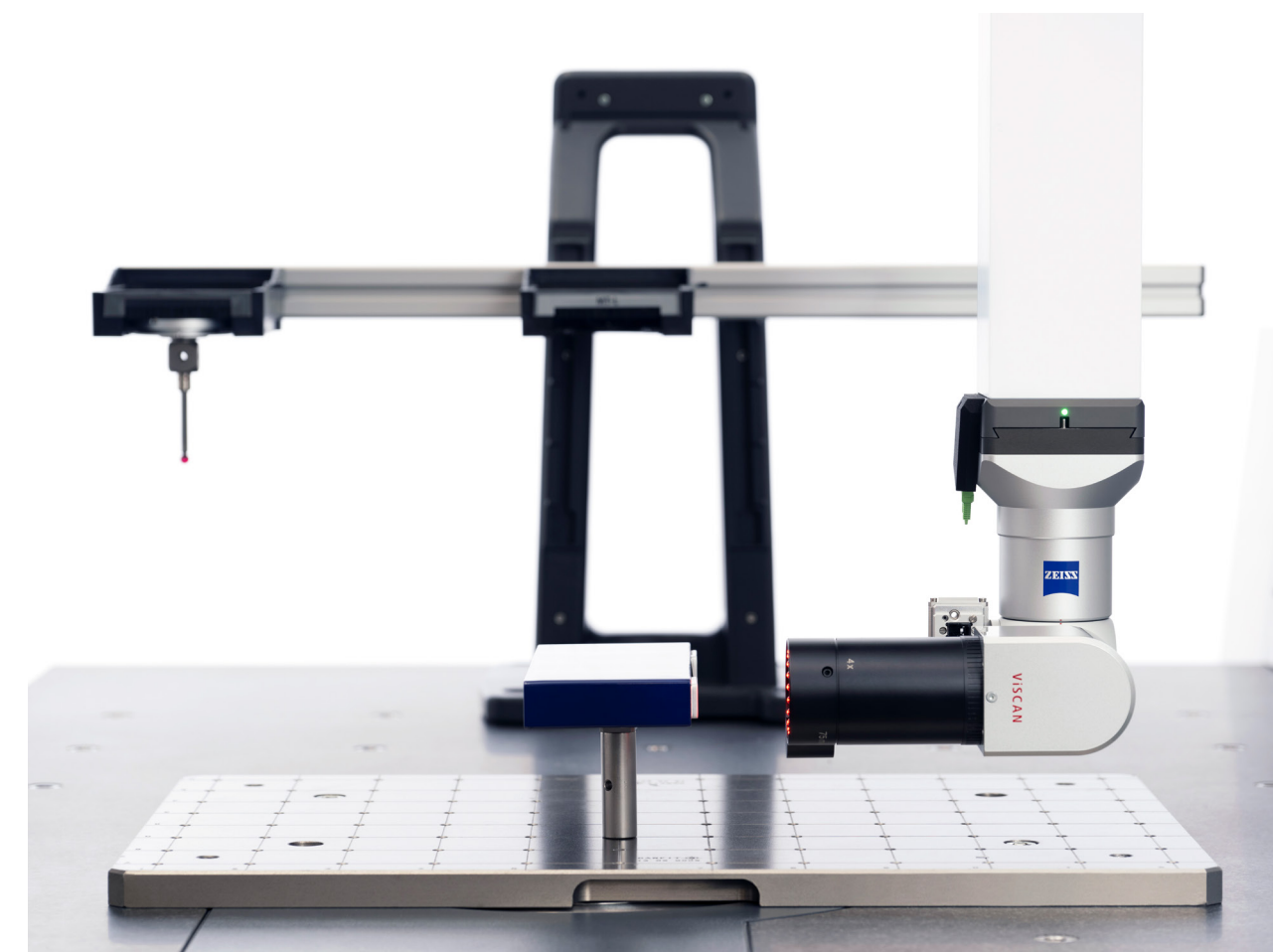


Application areas of CMM measurement



Flatness and parallelism measurement

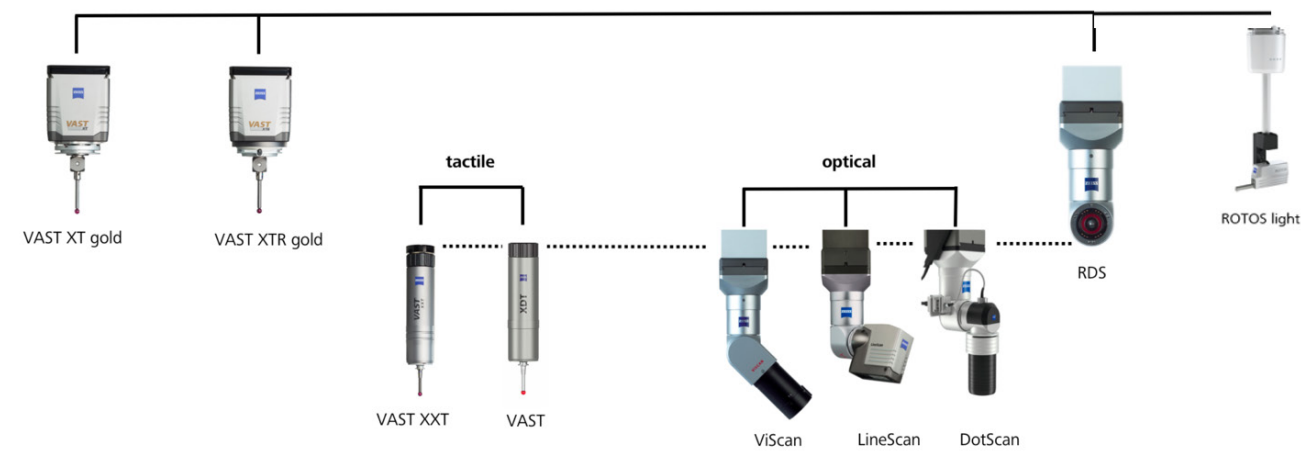
- Perform nearly 100% accurate non-contact flatness measurement without deformation by ZEISS DotScan optical probe
- Easily scan a variety of materials from all sides



Surface characteristics measurement

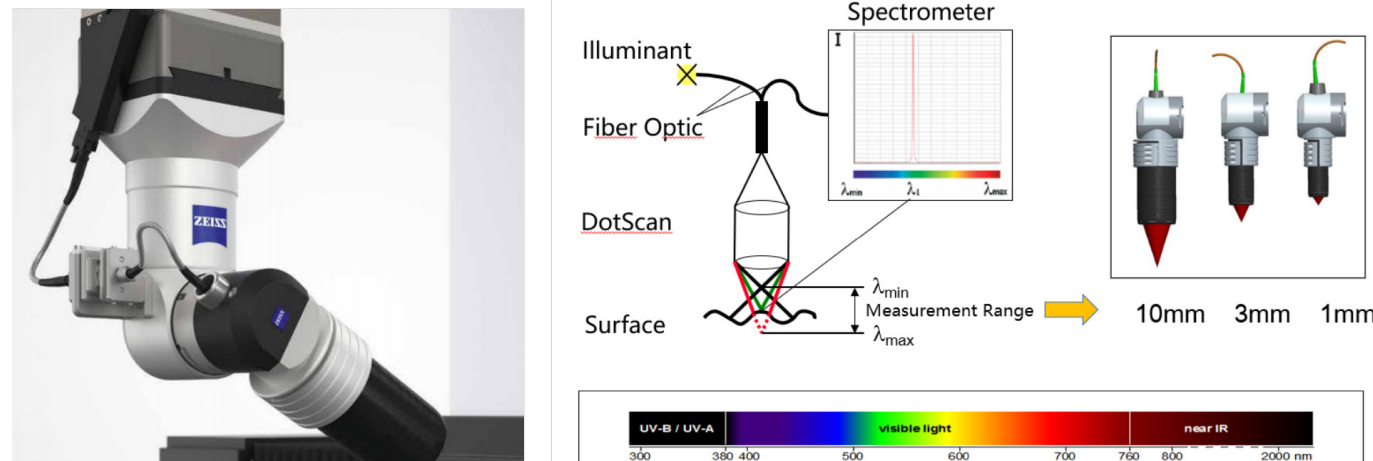
- Perform fast and flexible measurements by ZEISS ViScan 2D optical probe
- Easily capture geometries with high accuracy
- Reduce complexity and save inspection time through fewer stylus exchanges

Value proposition of ZEISS solution



One-stop solution by 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



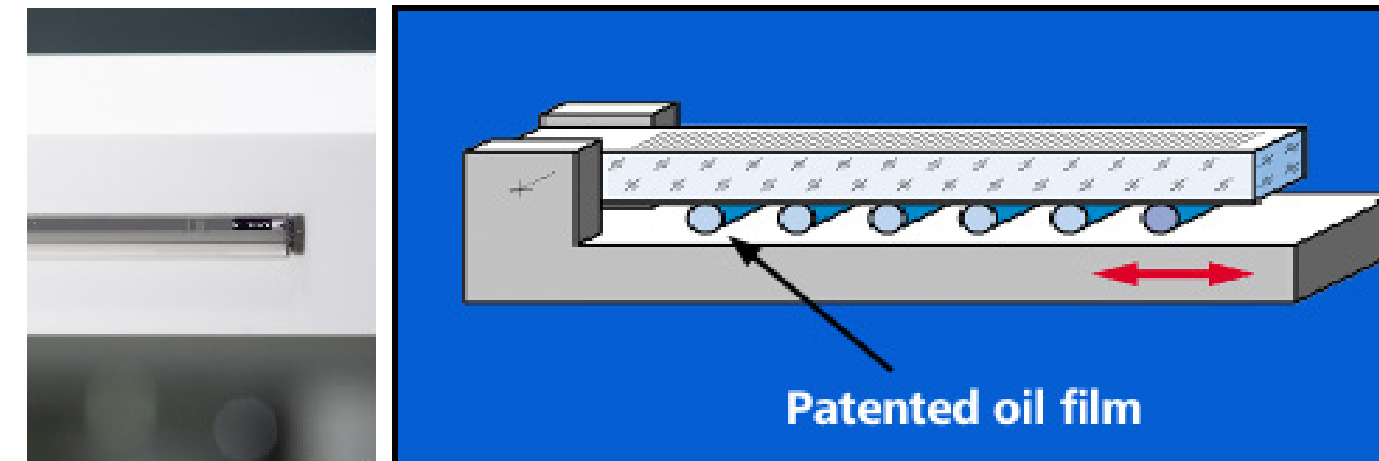
High flexibility by ZEISS DotScan

- 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

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.

38

Sales & Service
Organizations

63

Quality
Excellence
Centers

11

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.

