

ZEISS eMobility Solutions



Seeing beyond

# Power Electronics Whole Unit & Cooling Plate

## Non-destructive Inspection by CT



## Power Electronics quality control

Whole unit & cooling plat  
non-destructive inspection by CT

Power Electronic assemblies are crucial components in the powertrain system of new energy vehicles (NEVs), converting battery energy into the required electrical forms for various components.

As the development of NEV, power electronic is increasingly integrated, aiming for higher output in smaller sizes, hereby raising reliability requirements.

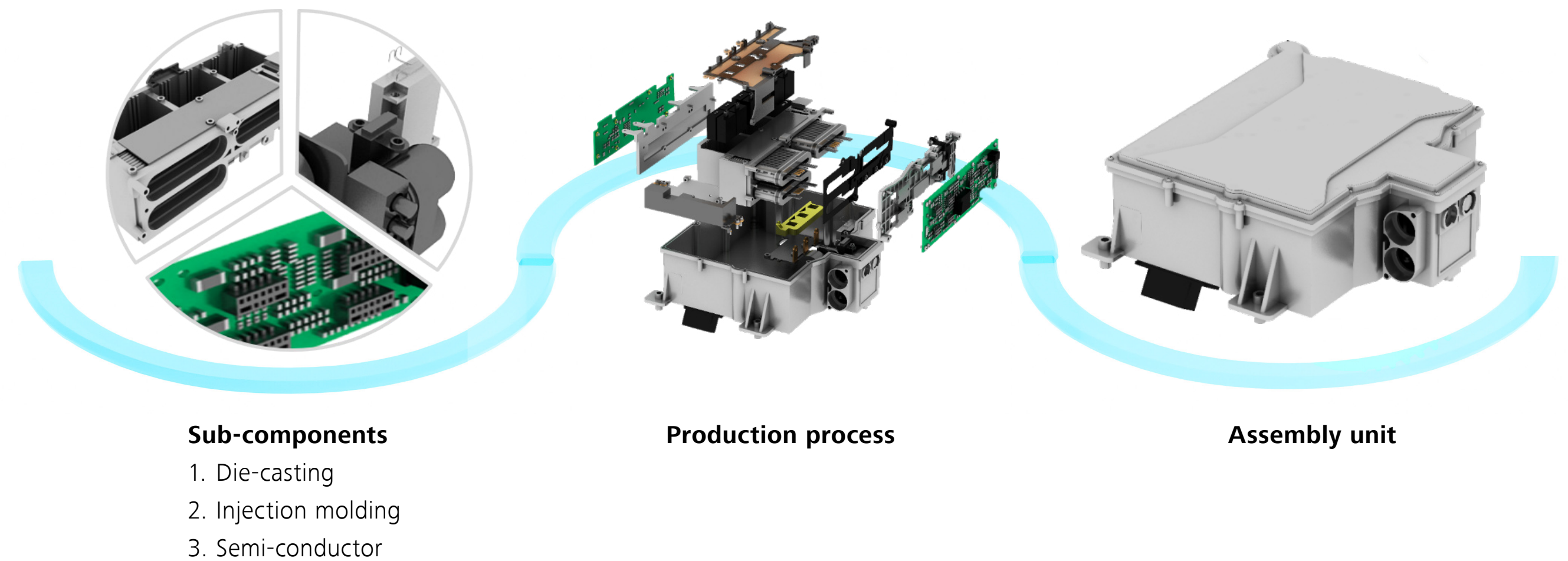
As electrification advances and component structures become more complex, product reliability is becoming increasingly important. This drives a rising demand for internal non-destructive testing to have the comprehensive quality assessments for the entire unit.



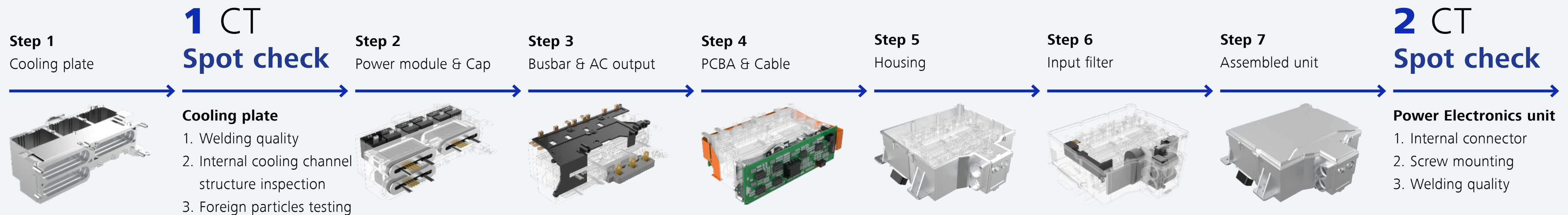
# Enhance quality control of Power Electronics

## Throughout manufacturing process

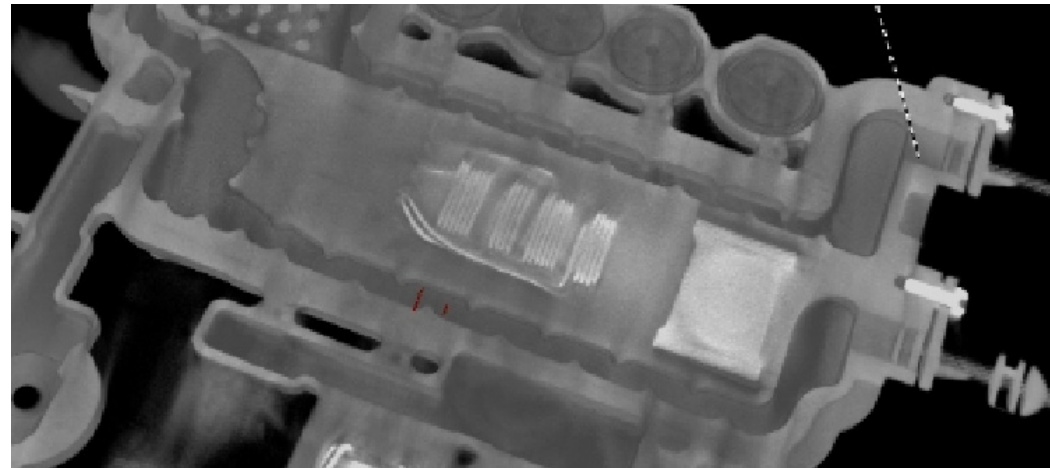
Power Electronics assembly follows a linear production process, with most components supplied externally and assembled in sequence. The connection of mechanical and electrical properties is achieved through methods such as screws and welding. Incoming inspections only verify component delivery quality, while new issues may arise during assembly. Therefore, it is necessary to add inspection processes alongside each critical procedure to ensure production stability. Traditional testing mainly relies on electrical performance measurements. However, integrating CT scanning allows for more reliable assessments by providing a secondary confirmation of internal structures, enhancing overall quality assurance.



### Production process of Power Electronics

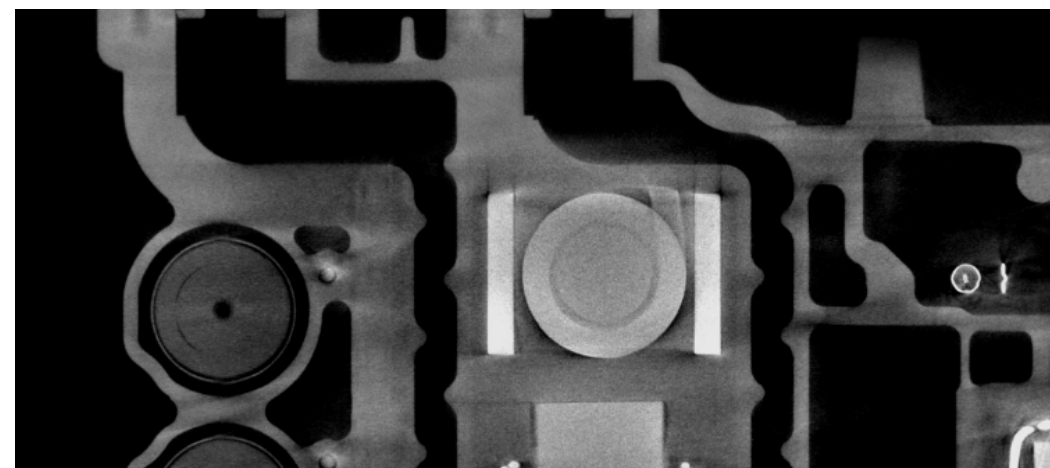


## Application areas of CT non-destructive inspection



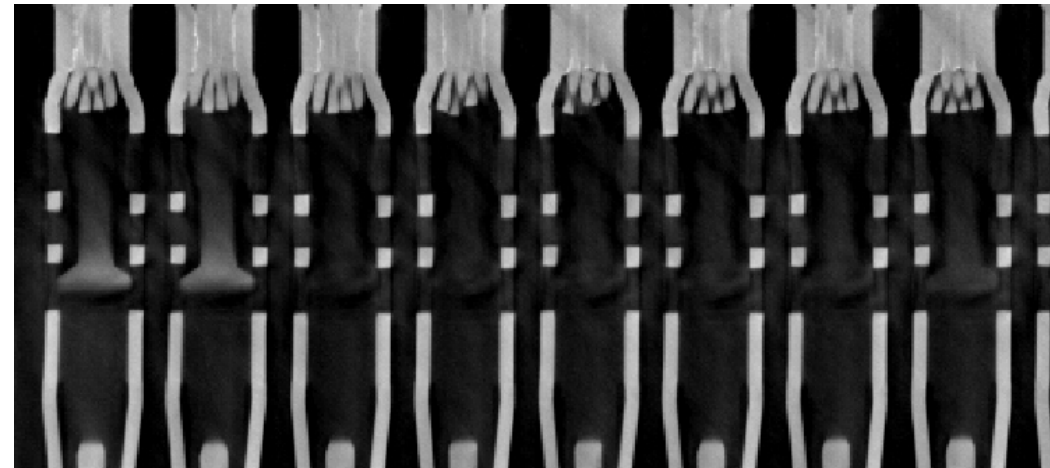
### Failure analysis

- Delivering clear failure overview and identifying root cause after assembly
- Scans for causes of varying severity, including welding defects and screw loosening



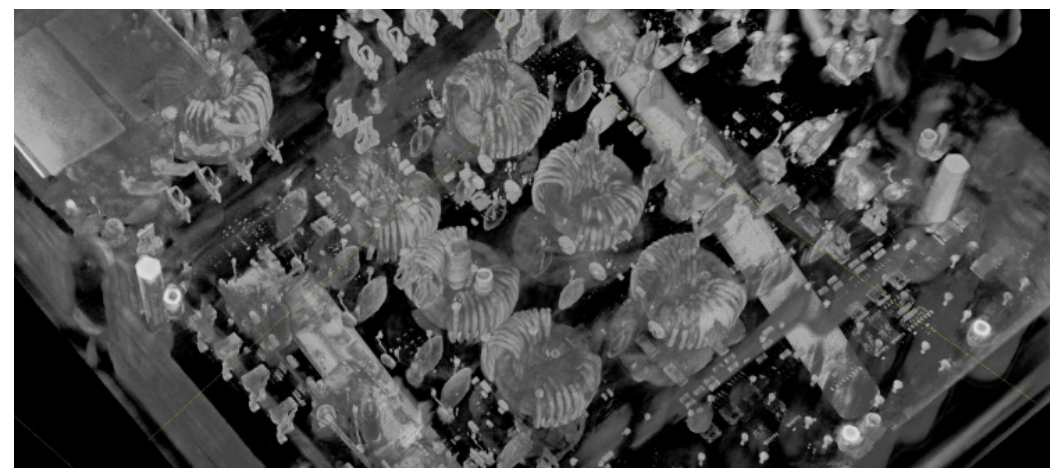
### Quality lab

- One-stop CT solution for comprehensive understanding of entire unit
- Statistical data and quantification of results for determining manufacturing standards



### Research and development

- High-resolution & high-magnification CT for components of a whole unit
- Quantifying assembly quality to ensure precision machining within tight tolerances



### Atline production

- 2D X-ray: insufficient clarity of intricate internal connections
- 3D CT: spot checks to ensure the internal connectivity in a good state

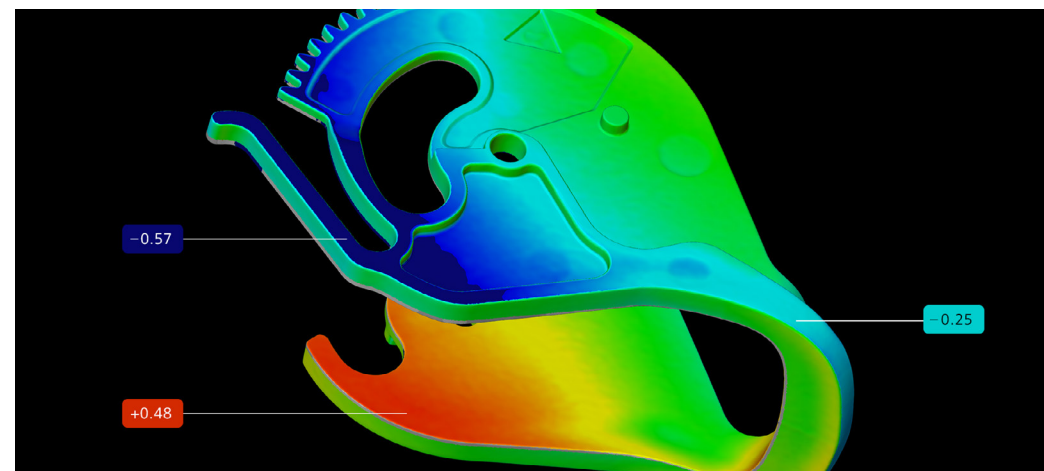


## Value proposition of ZEISS solution



### High accuracy in any position

- High-precision CT inspection as an alternative to traditional inspection
- Non-destructive inspection for internal dimensions to reduce costs of destructive testing



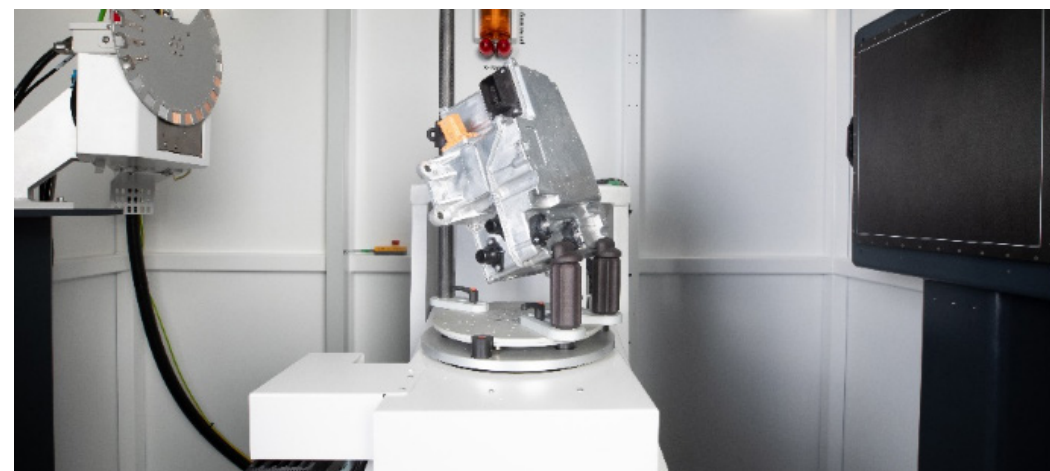
### Powerful metrology for CT data with ZEISS INSPECT X-Ray

- Automated inspection of multiple parts
- Evaluate defects, structures, and assembly situations, and bundle all results in easy-to-understand reports



### Effective reduction of scattering artefacts

- Scatter-Control making high-density regions in multi-material products clearer
- Clear observation of various internal quality details



### High load capacity with huge cabin volume

- Measurement of the entire PCBA in one scanning time
- High-magnification precision measurement for small parts



## Recommended portfolio

### Reliable advanced CT system

ZEISS METROTOM 1500



<b>X-ray tube</b>	225kV / 500 W
<b>Source to detector</b>	1500 mm
<b>Detector size</b>	427 x 427 mm
<b>Detector resolution</b>	3072 px x 3072 px
<b>Pixel size</b>	139µm
<b>Measuring volume</b> (diameter x height)	615 mm x 800 mm

#### Benefits:



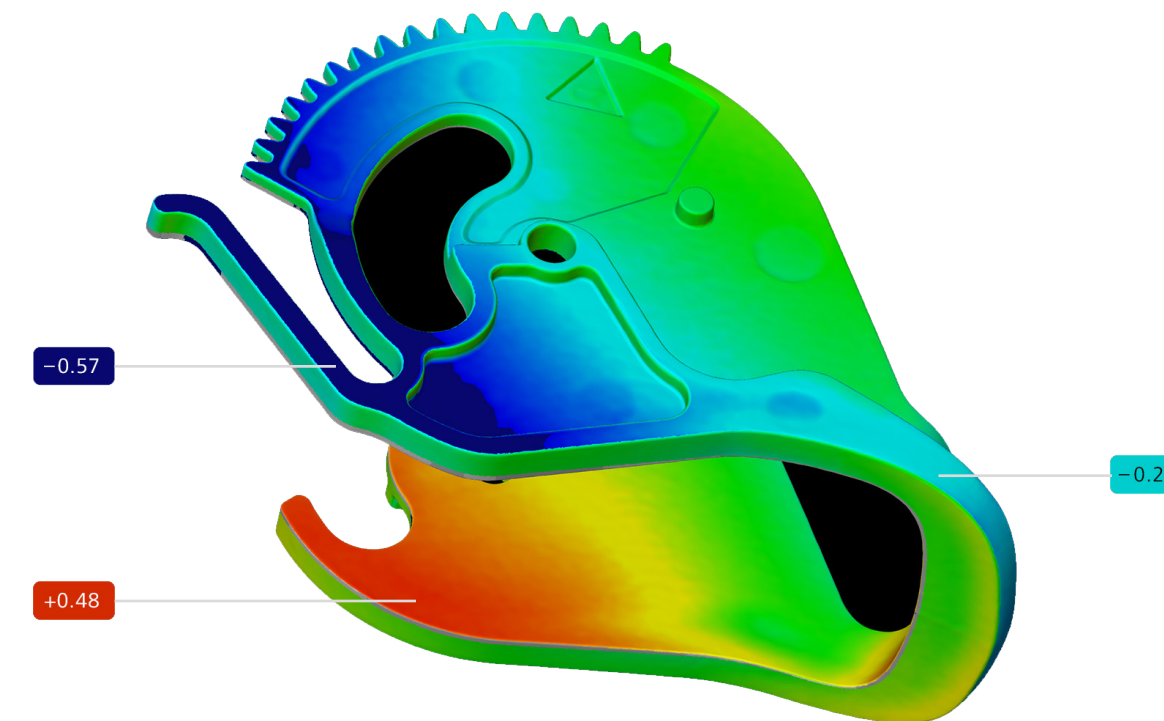
- A high-resolution 3k detector can discover even small details with high resolution. An object with 15cm in diameter can be reconstructed with 50µm voxel size.
- The reduced footprint of only 6.7m<sup>2</sup> and the clever construction of the service door allows flexible installation on a small space.
- It enables to measure and inspect parts of 1500mm in height on 6.7m<sup>2</sup> – the best system/part volume ratio available on the market.
- The positioning systems provide a highly accurate movement of the part over the entire field-of-view guaranteeing a MPESD of 4.5+L/50µm referring to VDI/VDE 2630 sheet 1.3.

### Software solutions

Customer challenges in focus

ZEISS Quality Software delivers high flexibility combined with high-precision analyses. Depending on your requirements, you create data evaluations analyses and reports across technologies and systems.

With the digital ecosystem for **ZEISS Quality Software**, the ZEISS Quality Suite, you have access to the various software solutions via one central platform and can access all services with just a few clicks.



### ZEISS INSPECT X-Ray

ZEISS INSPECT X-Ray is a powerful inspection software for any CT on the market with large scope of functionality. Evaluate defects, structures, and assembly situations. Analyze geometric dimensions. Bundle your results in easy-to-understand reports even with video and share them with others.

**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.

