# **Highest quality assurance** for electrical connectors

**ZEISS Industrial Quality Solutions for Electronics** 





## **A comprehensive solution portfolio** for electrical connectors

Electrical connectors are vital to many industries, with pin orientation, tooling design, assembly process control, and inspection throughput crucial to their success. Future challenges that must be met by electrical connectors include support for intelligent functions, deployment in greater numbers, and higher operating speeds.

Quality assurance promotes the successful deployment of electrical connectors both now and in the future, and ZEISS solutions offer a price-performance ratio that makes all the difference. Read on to explore our one-stop quality solutions for the entire production chain, from mold development to the final assembly. ZEISS Reverse Engineering software reduces mold development iterations

> **3D scanning** streamlines design validation testing

33 33 Quickly identify areas of interest with high resolution **microscopes** 

> Optimize final assembly inspection with **multisensor CMMs**

0.20

0.10

0.00

-0.10

-0.20





## Challenges for electrical connectors Manufacturing processes and quality requirements

The manufacturing of an electrical connector poses many challenges, starting with dimension, contour, and roughness measurement plus reverse engineering to ensure proper mold correction. Both the housing and the contact pin then undergo thorough analysis for wear monitoring and quality assurance: Speed and productivity must be complemented by accuracy and repeatability. The process is rounded off by precise measurement, inspection, and visualization of the final assembly. ZEISS understands the specific manufacturing requirements and provides superlative quality assurance solutions from mold development to assembly verification – ensuring innovative and efficient operations. Click the blue buttons in the graphic to find out more.



## **Mold Development**

## Dimension Measurement

### **Quality Challenge**

New connector designs require tolerances below 5 µm and flawless surfaces

#### Solution

Highly efficient, accurate, and repeatable measurement with ZEISS CONTURA, ZEISS SPECTRUM, ZEISS O-INSPECT, and ZEISS SURFCOM NEX





## Mold Modification

## **Quality Challenge**

Developing new molds requires many iterations to get right

### Solution

Automatically correct deviations, export molds, and reduce iterations with ZEISS METROTOM and ZEISS REVERSE ENGINEERING

## Housing

## Dimension Measurement

## **Quality Challenge**

Incoming inspection of small features with tight tolerances can bottleneck production

### Solution

High repeatability, single-run multi-part sampling, and defect identification with ZEISS O-INSPECT, ZEISS METROTOM, and ZEISS Inspection



## Failure Analysis & Defect Inspection

### **Quality Challenge**

Injection molding process changes stemming from temperature, flow rate, and cooling can cause failures

#### Solution

Identify surface issues and internal porosity problems with ZEISS Smartzoom and ZEISS METROTOM









## CAD Comparison

#### **Quality Challenge**

New automotive and telecom technologies require rapid development of new connector products

#### Solution

Perform quick evaluation of prototype parts to verify proper fit and check for matching CAD dimensions with ZEISS ATOS Q





## **Contact Pins**

## Dimension Measurement

### Quality Challenge

Large-volume sampling of parts and high-accuracy measurements are required

#### Solution

Handle small features, palletize large numbers of pins, and perform fast measurement analysis with ZEISS O-INSPECT and ZEISS O-DETECT

## Failure Analysis & Defect Inspection

### Quality Challenge

Non-homogeneous coatings will hinder electrical performance characteristics

#### Solution

Identify contact pin coating failures with microscopy tools such as ZEISS Smartzoom and ZEISS EVO 10 SEM



## **Final Assembly**

## Dimension Measurement

## **Quality Challenge**

Pin alignment between male and female connectors is critical to achieving electrical specifications

### Solution

Non-destructively verify correct pin orientation with ZEISS METROTOM 1500 or measure each component optically with ZEISS O-INSPECT







### **Quality Challenge**

Assembly processes can result in poor alignment of insulator, housing, and contact pins, which in turn causes failures

#### Solution

Failure location and analysis, plus virtual slicing of workpiece from different angles with ZEISS METROTOM 1500





## Failure Analysis & Defect Inspection

## CAD Comparison

#### **Quality Challenge**

Operators with high final assembly sampling quantities may find themselves struggling to keep up

#### Solution

Quickly gather high-quality cloud point data, maintain excellent accuracy, and gather color-coded visuals with ZEISS ATOS Q





## Your global partner – present in all regions

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Sales & Service Organizations

As electrical connector module parts are rarely produced in a single location, measurement and inspection issues can occur in any country and at any supplier. Our global network of application engineers and service technicians provide quality assurance solutions to help you keep traceability and quality at a consistently high level. Boasting a comprehensive knowledge base and the world's most accurate measuring machines, ZEISS strives to exceeds expectations around the globe. **10** Production Sites ZEISS Quality Excellence Centers

63

## **100** Business Partners

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