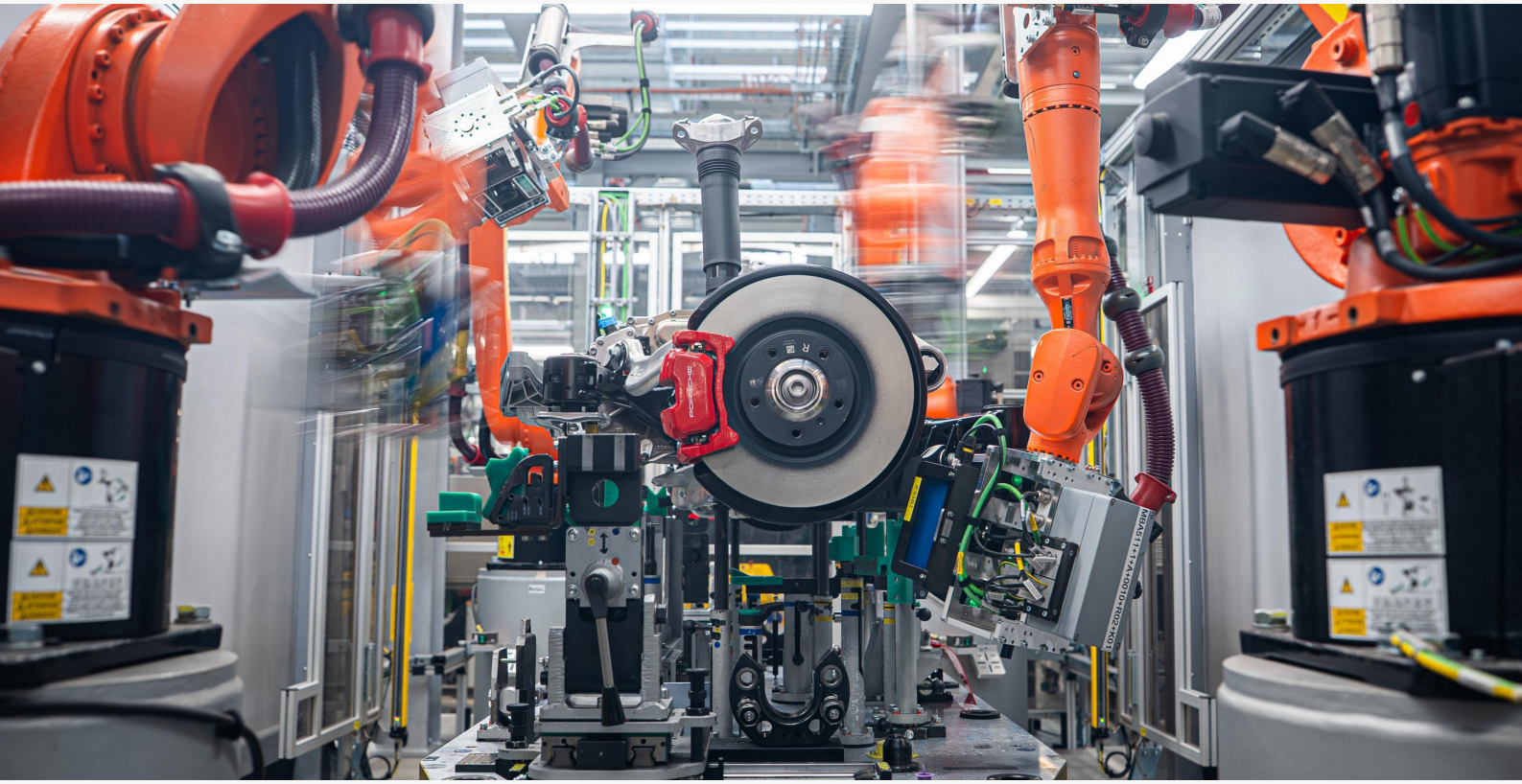

Axle assembly: precision engineering at series pace

22/05/2026 In axle assembly at Porsche Leipzig, engineering expertise meets high-tech automation. The result is a highly precise automated end-of-line inspection.

As the freshly assembled axle enters the inspection cell, four robotic arms take over. They move with maximum precision, pause briefly, scan, inspect and continue their work. Up to 130 inspection points are checked on each axle – in just 80 seconds.

For human employees, this would be an intense test of concentration; for the robots, it is routine. Equipped with cameras and sensors, they detect even the smallest deviations – factors that are crucial to later on-road performance.

The axle as a high-tech assembly

The axle is one of the most complex assemblies in a vehicle: safety-critical, available in numerous

variants and decisive for driving dynamics and comfort. For this reason, axle production at the Porsche Leipzig plant relies on an automated end-of-line inspection (AEOL) that combines human expertise with robot-assisted precision.

“The system scans the entire axle, stops at each inspection point and takes a photo. The image is analysed immediately,” explains Thomas Fredrich, inspection planner in quality management. The automated process identifies connectors, measures distances and checks correct installation based on stored contours. All image data is stored for up to three years, allowing each axle to be traced back to its exact condition at the time of production.

Why humans remain indispensable

The AEOL system is not a standalone solution, but part of a multi-stage quality concept. While robots take over monotonous, highly focused inspection tasks, shopfloor employees can concentrate on activities that require experience and human sensitivity. Not everything can be assessed visually. “Grinding noises from brake discs, for example, cannot be checked by the system – you can’t see noise,” says Fredrich. A manual final inspection therefore continues to follow the automated process. Human and machine complement each other.

The system was developed during ongoing series production, involving extensive validation work. Each inspection point had to be deliberately manipulated to ensure that deviations were reliably detected, while false alarms were systematically reduced. “If the image processing flags an error that isn’t one, we analyse it and fine-tune the system,” the inspection planner explains.

Award-winning: the Porsche Leipzig plant

The project is just one example of the lean and efficient production approach at the Porsche site in Saxony – an approach that has gained external recognition. Most recently, the Leipzig plant impressed the expert jury of the prestigious Automotive Lean Production Award, winning in the OEM category for its innovative automation solutions and digital intelligence.

The Porsche Leipzig plant began operations in 2002 as the second Porsche production site alongside the company's headquarters in Stuttgart-Zuffenhausen. Today, it is home to the production of the Macan and Panamera model lines. Up until 2017, the Cayenne was built in Leipzig and, from 2003 to 2006, the legendary Carrera GT super sports car also rolled off the line there. The site has received multiple accolades for its smart production and sustainable approach, including the Lean and Green Management Award in 2021 and the Factory of the Year title in 2023.

Video

https://newstv.porsche.com/porschevideos/newstv.porsche.com_335015_en.mp4

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