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A flawless wheel in focus

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How a turnkey vision solution excels at 360° quality control of automotive wheels

A flawless wheel in focus

In the premium automotive segment, a perfect appearance is a very important part of brand image. Components must therefore meet the highest standards of precision, and no visible surface defects may spoil their appearance. The human eye can overlook details under slightly different lighting conditions. The powerful QBIC 3D vision platform from German machine-vision specialist Cretec delivers perfection in quality control as a scalable, complete solution. QBIC stands for "Quality Inspection Cubicles": a universal inspection-cell concept that can be used as a modular vision system, either stand-alone or fully integrated.

By Dipl.-Ing. Kamillo Weiß

A specific feasibility study for an automotive company examined how a 3D image scan could unequivocally detect defects in plastic blades that must be positioned precisely on aluminium wheels. Measured evidence was required to show that all blades complied with the specified permissible gap and height difference relative to the aluminium surface. Ultimately, the compact QBIC platform offered convincing technological and economic advantages as a stand-alone, flexible vision solution.

Each wheel is placed manually or automatically in the vision system's drawer and moved into the measuring position. From above, a 20 MP camera records the wheel's exact centring, rotational position and type with an inspection

accuracy of 0.3 to 0.15 mm. This also documents its flawless condition. A six-axis robot moves the 3D camera measuring head to the respective inspection positions.

Patented measuring concept

Cretec's measuring concept, patented for both inline and offline use, guarantees an accuracy per measuring point of less than 10 µm in all three dimensions during wheel inspection. MSA measurement accuracy is better than 100 µm. This ensures very high accuracy and flexibility, because each inspection feature can be adjusted individually at any time. The cycle time for a complete wheel inspection in QBIC is less than one minute.

Using QBIC during the feasibility

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study allowed the study to be completed with around 50% less time. Further time savings came from faster final project implementation and quicker, simpler installation and integration into production. Accelerated project delivery also proved to be an important economic factor. In the event of a complaint, the documentation provides the measuring-point data, all measured values and every wheel type. This supplies evidence that the wheel was in flawless condition when delivered.

Versatile vision modules

The mobile platform with its minimal footprint and modular hardware and software ensures exceptional flexibility for complete vision-system solutions. This shortens project development, installation and adaptation to new product variants. Versatile QBIC modules, each with a broad range of capabilities, are linked directly into an autonomous system through control, data analysis and communication.

The hexagonal design of the Cretec vision system provides excellent access from all sides and great flexibility in designing particularly compact, mobile solutions. Depending on the version, the complete QBIC module requires a footprint of only 0.8 m × 0.8 m or 1.2 m × 1.2 m, with a maximum height of 2 m. Integrated

retractable wheels allow it to be moved quickly for delivery or relocation and connected to other QBIC units.

Complete solution in a minimal space

Electrical equipment, controls, a high-performance PC, cameras, code verification, robots, lighting, a touchscreen monitor and communication modules can be integrated into a complete solution in a minimal space. This allows many vision



Retractable wheels allow the QBIC module to be relocated quickly.

tasks to be automated economically and sustainably. A mains-independent power supply maintains operation during a power failure and prevents data loss. Integrated high-performance PCs also make these solutions suitable for demanding AI tasks using deep learning. The complete solution is suitable for pick-and-place, inspection, registration and classification, 2D and 3D measurement, surface inspection and sorting. (TR)

About the author: Dipl.-Ing. Kamillo Weiß is a freelance trade journalist in Germany and wrote this article on behalf of Cretec.

Vision trade fair: Hall 8, Stand E60

INFORMATION: www.cretec.gmbh



The versatile QBIC modules form a flexible complete solution. Control, data analysis and communication are combined in an autonomous system.



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