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UNOFFICIAL ENGLISH TRANSLATION

The original article was published in German in etz, a trade magazine published in Germany. Prepared for CRETEC. The German original remains the reference.



Versatile vision modules enable fully automated quality inspection

The adjacent Baumer advertisement remains unchanged. Original publisher artwork, logos and advertisements are retained in their original language.



01 | A complex, flexible inspection system with a minimal footprint. Each part is inspected automatically and precisely from all sides (360°) for 21 features. Data and images are documented and the parts are sorted into pass/fail categories.

Versatile vision modules enable fully automated quality inspection

The modular QBIC system offers vision users many benefits across the entire value chain. Station modules with a broad range of capabilities, encompassing control, data analysis and communication, are connected directly into an autonomous complete system using Plug & Work.

Text: Kamillo Weiß

An internationally known automotive supplier from Germany was looking for a complete solution for 100% quality assurance of components measuring 10 to 60 mm. Parts fed

in bulk were to be inspected precisely from all sides (360°) for dimensional accuracy, completeness, damage, contamination, surface defects and other deviations. The inspection

system also had to operate entirely independently with high functional flexibility and be easy to relocate quickly, with integration into the company's IT communication network. Cretec [1] supplied a fully automated complete vision solution based on connected QBIC modules (Figure 1).

All data and images are documented and available at any time for further analyses and statistics, including deep learning. High-performance industrial PCs based on Windows 10 IoT allow requirements to be adapted at any time and enable short cycle times. Cretec could therefore guarantee complex inspection of numerous features on more than ten parts per minute, or around five million parts per year.

Feasibility and installation at high speed

High-mix production of components, fully inspected and documented by powerful machine vision, places many demands on flexibility throughout the process of absolutely reliable quality assurance. The feasibility study already documents the complete range of achievable flexibility and ensures rapid installation and reliable production.

QBIC is the consistent strategy of a platform with synergy and scalability through logical relationships in networked quality assurance. It enables particularly flexible complete vision solutions, including AI algorithms, for complex automation, quality assurance and traceability. Further attractive aspects are high performance, economy and sustainability. Standardised hardware and software components in

complete station modules make it possible to establish the feasibility of a vision-system solution quickly, already covering most of the required tasks in all their complexity.

The patented hexagonal design of the QBIC modules provides good access from all sides and a high degree of flexibility in designing compact, mobile solutions. A module needs a footprint of 0.8 m × 0.8 m and has a maximum height of 2 m. Its retractable wheels allow it to pass quickly through any office doorway and simplify

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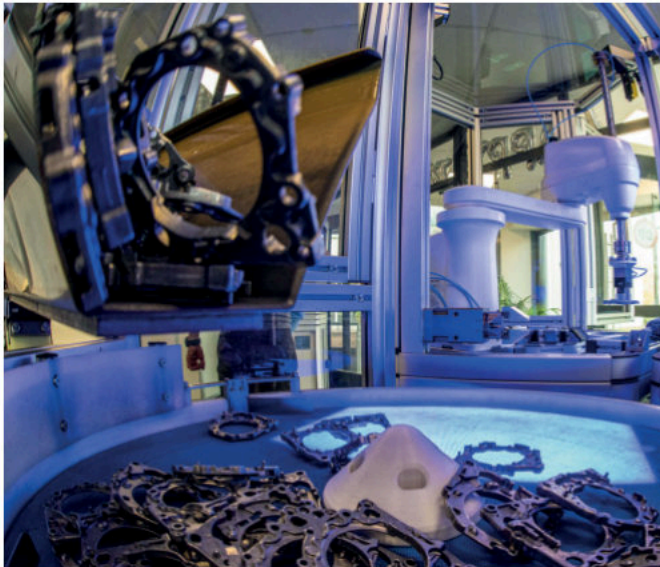
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transport by van. At the destination, the individual modules can be reconnected quickly using Plug & Work.

A perfect team



02 | In the QBIC FlexiBowl station, components fall from the feeder onto the vibrating disc. They are separated and precisely located by machine vision. The robot grips them and presents them to the 2D and 3D vision systems.



03 | Five high-resolution cameras inspect many features simultaneously in a very short time using reflected and transmitted light on the moving conveyor.

Three QBIC modules were already connected during the feasibility study: FlexiBowl part feeding, a robot with 3D part inspection, and five-sided final inspection with pass/fail sorting.

The FlexiBowl feeder family enables reliable handling even of sensitive components. A motorised vibrating feeder supplies parts to the rotating, vibrating disc, where delicate components are separated reliably and presented individually for the next process. The disc has different textures and an integrated vision system with backlighting or reflected lighting. Lighting can be controlled individually for continuous or strobed operation and offers the full RGB spectrum. Machine vision provides precise part and position data relating to geometry, surface properties, material characteristics and weight, enabling safe robot gripping.

In the second station, the robot takes the parts and positions them above the 2D camera for underside inspection and above the 3D camera, also acting as the part-turning station. It then places the component on a conveyor, which carries it to the third QBIC station. Five high-resolution 5 MP cameras, using transmitted and reflected light, perform the final all-round inspection. The system then sorts the parts into pass/fail categories.

In total, 21 features are inspected. This complete vision solution in a minimal space can automate many tasks simultaneously, economically and sustainably, with very high flexibility for inspecting many different part variants. Integrated equipment includes electrical systems, controls, a high-performance PC, cameras, robots, different vision modules, intelligent individual lighting, a large IP65-protected 24-inch touchscreen monitor for data display and operation, and communication modules, Industry 4.0 and OPC UA.

Fully automated complete vision solutions based on connected QBIC modules cover a broad range of applications in many industries: pick-and-place, registration and classification, ID codes, inspections in 2D and 3D, measurement, surface inspection, decision-making, sorting and assembly. (no)

References

[1] Cretec GmbH, Bünden: www.cretec.gmbh

Author

Dipl.-Ing. (FH) Kamillo Weiß is a trade journalist in Leinfelden-Echterdingen.
Kamillo.Weiss@kamillo-pr.de