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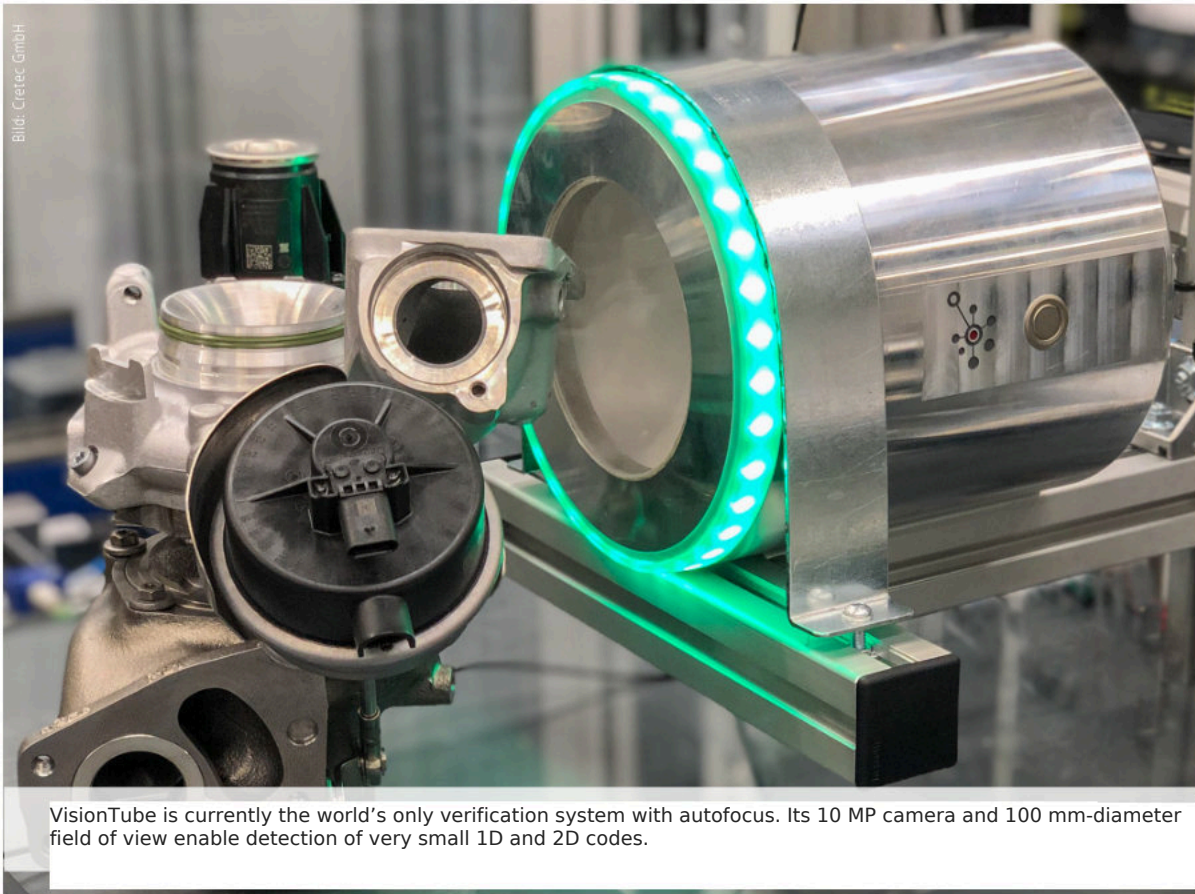
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At the touch of a button

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Independent standards-compliant code verification with autofocus

At the touch of a button

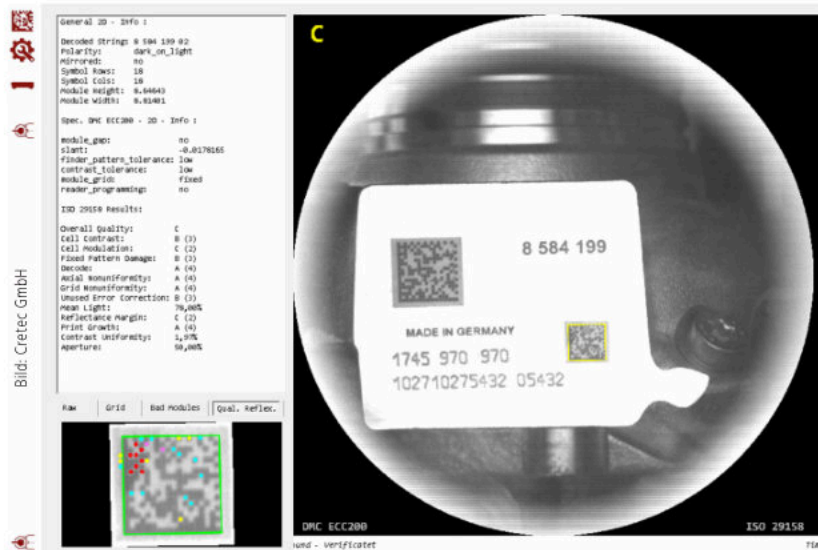
The independent VisionTube verification system enables standards-compliant code verification at the touch of a button, thanks to simple operation and autofocus, in harsh industrial environments and for a wide range of tasks.

Code reading errors - 1D, 2D, on labels or in DPM (Direct Part Mark) codes - can cause many adverse or serious consequences and costs. Production lines may have to slow down or stop; reduced read rates, excessive scrap or false rejects, customer dissatisfaction and complaints, recourse and even liability claims, problems with product quality certification and much more can result. Code verification, the classification of all quality parameters of a code, differs fundamentally from simply reading a code. Numerous features such as size, resolution, defects, reflection and contrast must be detected. This also requires processing

large amounts of data in a short time for fast cycle rates. Further requirements include international identification norms and standards, documentation, user management and integration into internal and external business communication. Only readable, error-free codes enable complete product traceability. In some sectors, such as pharmaceuticals or the military, verification is already required by law. Detailed verification results enable early corrective action throughout the automated identification process.

Independent verification system with autofocus

VisionTube is a compact system for verifying 1D and 2D codes, both on labels and as direct marks (laser-marked, printed, dot-peened, etc.). It is suitable both as a manual station and for integration into fully automated production lines with short cycle times. Standards-compliant



One button press triggers standards-compliant code verification and detailed documentation of code quality under ISO 15416, ISO 15415 and ISO 29158.

verification under ISO 15415, 15416 and 29158 (AIM/DPM) is performed both on labels and directly marked products. The modular unit has a robust aluminium enclosure 200 mm in diameter and 200 mm high, and is offered with IP54/IP65 protection. Its adaptability to different tasks and wide application range across all industrial sectors set it apart from competitors. It is factory-calibrated at all focal planes and works straight out of the box, enabling extremely simple Plug & Work within seconds. A monitor or touchscreen can be connected directly via HDMI and USB and immediately displays the standards-based result and individual analysis criteria. Code defects are shown separately in individual images and highlighted in colour within the code. VisionTube is currently the world's only verification system with autofocus; the patent has already been applied for. Its 10 MP camera and 100 mm-diameter field of view enable detection of even very small 1D and 2D codes.

Exchangeable lighting modules

Another distinctive feature is the modular, easily exchangeable, variable multicolour illumination. Four RGB LED lighting modules are available to suit each requirement: on-axis coaxial, off-axis diffuse dome, four-segment 30° dark-field and four-segment 45° low-angle lighting. This creates ideal conditions for optimising the many parameters used to assess readability according to standardised quality criteria and the application, including brightness, contrast, defects, contamination, distortions and so on. The vision kernel uses HALCON Steady 18.11 software to analyse code quality, assign the corresponding

quality grades, save the results and integrate them into internal and external business communication. Final results are indicated by a light ring on top of the device, clearly visible from every direction. In accordance with the international grading system, the LED indication uses green for grades A+B, yellow for C and red for D+F. Grade A codes remain readable even under difficult conditions. Grade B may have minor defects but still ensures that the code can be fully decoded.

Inspection at the touch of a button

Reliable code-quality inspection takes just one button press, for sampling or series inspection. The object is positioned towards the camera's field of view, the glass plate, and the standards-compliant code-quality result is immediately displayed and saved. An inspection-report printer can be connected via USB or RS232. When VisionTube is integrated into a production line, inspection is triggered. Its integrated processing power enables up to 7 fps and high cycle rates. Three digital outputs issue the command to reject defective products. Direct illumination of the test object prevents disruptive external influences. Verification complies with all common international standards for 1D codes (ISO 15416) and 2D codes (ISO 15415, ISO 29158, AIM/DPM). As the complete module is an open image-processing system, it can perform many further tasks: checking code structures, reading human-readable text (OCR) and comparing it with code contents, checking the presence, readability and quality of best-before dates, checking component presence and much more. Integration into fully automatically controlled manufacturing cells or inspection combined with a collaborative robot is also possible. The device is also available in a mobile verification station measuring $0.8 \times 0.8 \times 2$ m, including height adjustment, a darkened inspection chamber and all lighting options. Cretec offers a five-year warranty for VisionTube.

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