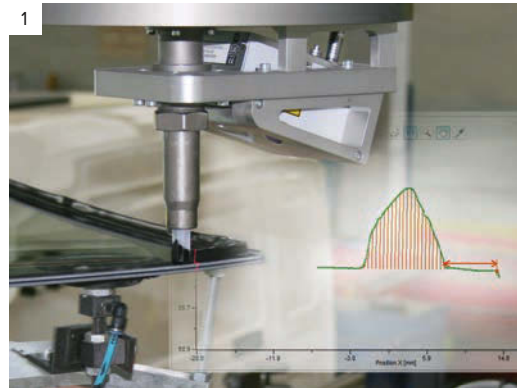# Sensors for manufacturing

In the highly automated vehicle production industry, measurement technology in robots and processing lines is helping to ensure high-quality, precise, safe and reliable operations

Today, a windshield is much more than a simple glass sheet in the car that protects the driver from headwind. This subsystem has evolved, incorporating key vehicle roles while also having to resist shocks and high variations of temperature. As such, applying adhesive beading perfectly to the edges of the screen is a decisive process. ScanControl, a high-tech laser profile scanner developed by Micro-Epsilon, serves to measure the height and position of the adhesive beading on the screen edges. The process sees a robot position the glass in front of the bodywork and after the position has been determined by light section sensors, the screen is put centrally into the bodywork. This process is performed in real time and integrated in common automotive production cycles of less than one minute.

Single bodywork parts are mounted to a complete car in the assembling division, but gap and flushness sizes between the single parts can sometimes occur, which is unacceptable for all customers. To avoid this, optical sensors of the GapControl technology series from Micro-Epsilon are applied in the gripper system of the robots. These sensors have the capacity to control the mounting process for every single assembly step in real time by checking if gap and flushness sizes meet manufacturers' requirements.

For defect detection on diffuse reflective surfaces, Micro-Epsilon has developed its SurfaceControl measurement system. This technology uses structured light projection to detect and analyze local shape defects on surfaces that deviate by micrometers from their target measurements. The system also operates reliably on textured

1. Micro-Epsilon's ScanControl laser profile scanners perfectly measure the height and position of adhesive beadings to the screen edges

2. GapControl measures gap and flushness of the bodywork parts

3. TID 8303.I identifies the DOT (Department of Transport) number on tires within the required cycle time

The SurfaceControl measurement system from Micro-Epsilon automatically detects defects on interior car components

surfaces, such as interior automotive parts. SurfaceControl offers a variety of measurement areas ranging from 150 x 100mm² to 600 x 400mm², and it takes only a few seconds to capture 3D data for a surface. Various evaluation procedures are available, depending on the nature of the shape deviations being investigated. The 3D data can be used to calculate a flawless virtual cover, or a digital whetstone can be used, similar to a whetstone in a press shop. These methods provide repeatable, objective assessments of deviations from around 5µm to 20µm, depending on the surface. The structured light projection procedure is suitable for all surfaces that diffusely reflect at least part of the light, including steel, aluminum, plastics and ceramics.

Today, manufacturers are responsible for providing every tire with a DOT number. The digits, which are imprinted on the tire wall, provide data with regard to the factory, type and size of the wire, as well as the manufacturing week. The automated mounting of tires on rims, conveyance of fully assembled tires to the car mounting, and the corresponding documentation, require automatic detection that is a technical challenge due to the short cycle time. To meet these growing industry needs, Micro-Epsilon is offering the market a new system called IdentityControl TID 8303.I, which detects the DOT number and tire type when the tire lies on the feed slide. TID 8303.I operates according to the structured light protection process that SurfaceControl benefits from.

Unlike other conventional systems, the Micro-Epsilon solution does not require any additional electromechanic components in order to index or turn the tires. Furthermore, IdentityControl is wear-free, easy to maintain and cost-effective. ◉

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