



Surface inspection of instrument panels

With the surfaceCONTROL2500 3D sensor from Micro-Epsilon, diffuse reflecting surfaces can be inspected on a non-contact basis using 3D data. This allows local surface deviations to be identified clearly and automatically. Finally, an objective evaluation of the component is possible. For this reason, the surfaceCONTROL2500 surface inspection system is also used for the inspection of interior parts in car manufacturing.

Sink marks and waviness on dashboards and instrument panels must be prevented to avoid complaints. These can be optically recognized only under certain lighting conditions and occur particularly in the area of the passenger airbag. By applying predetermined breaking points for the safe opening of the airbag, the basic carrier is deliberately weakened. Due to mechanical stress or heat input during processing, sink marks or dents occur on the surface. These are often only a few hundredths of a millimeter in size. With the 3D sensor, these tiny discontinuities can be reliably detected and evaluated. Thanks to a 400 mm x 300 mm large measuring field, the complete airbag area is tested in one measuring process. The complete measuring cycle to the evaluated result takes only a few seconds.

The captured 3D measurement data is optimally analyzed with the surfaceCONTROL DefMap3D software. It controls the sensor and allows the defect detection to run independently.

Through the targeted use of the sensor in the production process, defects can be detected early and automatically, thus reducing rework and rejects. Based on the measurement data, however, production processes can also be controlled and insights gained for the development process. Materials, process parameters and also the design can thus be optimized even before the start of the series production.

Requirements for the measurement system

- Large measuring range: 400 mm x 300 mm
- Detectable defect size: from 20 μm depth (with lateral expansion x, y > 5 mm)
- Special methods for local analysis of surface shape
- Target: diffuse reflecting plastic or leather in different colors
- Measurement of grained surfaces also possible
- Inline use (cycle time from 2 s, depending on the surface)

Ambient conditions

- Production hall with industrial conditions
- Production line or offline test station next to the line

System design

- 3D sensor: surfaceCONTROL2500-500
- Software: surfaceCONTROL DefMap3D
- Tripod or column stand
- Workstation with TFT screen
- Calibration set for surfaceCONTROL2500-500

Advantages

- Detection of form deviations in the micrometer range
- Early defect detection can contribute to process correction or cost reduction
- Testing according to Daimler standard (MBN 55555-3) for quality assurance
- Objective and plausible evaluation of diffuse reflecting surfaces

References

- Daimler AG, VW AG, Audi AG, Yanfeng Automotive