

Adhesive and sealant application under three-dimensional control 3D position and orientation determination

EASI3D – Enhanced Adhesive and Sealant Inspection 3D determination of the position and the orientation of objects and fully automatic inspection of adhesive and sealant applications with only one sensor! The EASI3D makes it possible to control and monitor the entire process of fully automatic adhesive application using only one sensor.

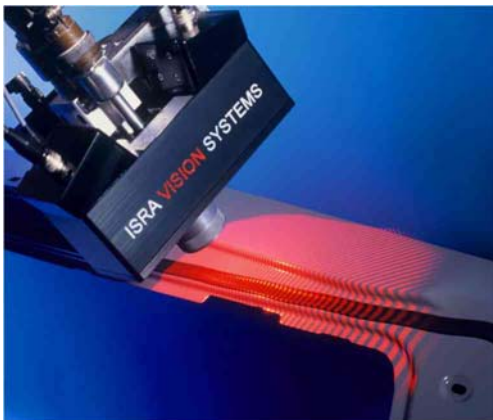
Today, the application of adhesives and sealants is a common process in industrial bonding technology. Because it is almost impossible to detect defects after assembly is complete and because repairs are expensive, the processes have to be monitored with 100% precision under full automation in order to be able to observe all required parameters with tight tolerances.

Before the actual adhesive or sealant application process can be started, some applications require that the position of the object (e.g. a car body) is determined in 3D in order to be able to accurately apply the material in the defined positions or paths.

To avoid having to use an additional measurement system for achieving this functionality, the EASI sensor, which has already been proven and tested for the inspection of adhesives and sealants, was supplemented with 3D measurement functionality. Thanks to the integrated stripe-light projector, this system makes it possible to use not only hole features, but also any type of edge, contour or corner on the object as a measurement feature.

To be continued on page 2.

Pictures



EASI3D: 3D position and location measurement



EASI3D: Location and position detection as well as adhesive and sealant inspection with one sensor

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EASI3D calculates the 3D position of the object from the individual measurements with an accuracy of up to 0.1mm and is thus capable of transmitting a precise correction course to the robot for its application path. This ensures that the adhesive or sealant is applied to the exact defined position on the object.

While the material is being applied, EASI3D's second functionality is employed: the fully automatic quality control of the adhesive or sealant material alongside the application process. This procedure, called in-process inspection, makes subsequent, separate inspection and associated additional inspection time unnecessary!

The goal of the inspection is to ensure that the adhesive or sealant has been applied in the exact position and is of the specified width and continuity. The measurement of the position, width and continuity of the adhesive or sealant application is based on contour recognition and allows for an evaluation of all necessary measurement values. Tolerances and limits can be easily defined using reference images.

The special EASI3D sensor with integrated high-performance cameras monitors 360° around the application nozzle. The integrated, flash-capable LED lighting can be switched in segments and thus be adjusted to any image-recording situation. The powerful hardware is capable of processing and evaluating the recorded images in real-time, even during high-speed movement of the robotic application arm.

The system is based on state-of-the-art software developments and offers a comfortable user-interface that simplifies setup and operation. The AutoTeach function allows for automated, timesaving teachings of inspection contours using reference images that are recorded in a one-time teach drive. This reduces the time required for adjusting to changes, changing the model pallet, initial operation or subsequent modifications to a minimum.

EASI3D – User-oriented software

Intelligent system architecture makes it possible to carry out all changes even while in "online" mode. Clear, interactive user-interfaces for type management, setup and execution of inspections as well as for system administration together with password-protected access control ensure high levels of data security and operational safety.

In the present day, effective quality management requires, besides fully automatic control and inspection for optimizing the production process, the complete documentation of all measurement data. All recorded values are therefore stored in the system database and allow you to create extensive statistics with freely configurable search and sorting criteria.

The use of industrial adhesives and sealants provides almost all industries with new possibilities for increasing productivity and improving quality. However, only reliable monitoring of all manufacturing stages and a continuous optimization of the processes will lead to satisfactory results.

The described EASI3D system supplements the application possibilities of an inspection system with 3D robot guidance by incorporating 3D measurement technology and in-process quality control in one compact sensor adapted specifically to the industry. By incorporating hardware and software in one user-oriented solution, EASI3D can be employed in completely new areas of application.

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