

Robot park in body shop

Starting point / Task definition

In the body shop of the Ford plant in Cologne-Niehl, Germany, robots have to be able to produce any of the possible variants of the Fiesta. Moreover, they must also be capable of assembling two different underbodies at the same time, while at the same time introducing a third variant into the line. This parallel introduction will allow Ford to change from one variant to another without interrupting production, thus avoiding stoppages. In addition, 100 percent flexibility will make it possible to vary freely the sequence and relative proportions of the different versions of the Fiesta models, and production will be able to respond even more quickly to customer wishes.

Implementation / Solution



To achieve these objectives, Ford uses 260 KUKA KR 150 and KR 250 robots. An example of the robots' diverse range of applications are the inline measuring systems, in which a total of eleven robots equipped with laser measuring systems continuously monitor all of the underbodies, among other things. As a result, complete flexibility as required by the system concept is guaranteed. In addition to the 100 percent monitoring, this process also has significant advantages with regard to measuring accuracy, since the optoelectronic sensors of the measuring robots provide tolerances of about a tenth of a millimeter. What is more, the measuring robots know automatically which particular model they are inspecting at any given time, and where to direct the sensor.

The robots must also demonstrate flexibility in the press line. Automatic gripper changers are provided here in order to ensure that conversion from one pressed part to another takes place especially quickly and precisely. The KUKA robots make over 2.3 million spot welds and 100,000 stud welds per day, and apply more than 7,500 meters of adhesive seams. They perform their tasks quickly and with high repeatability.

Besides carrying out joining and handling tasks, the robots apply a sealing compound to the hemmed flanges of the doors before they are installed. The automation of this process allows more precise and more even application of this specially-developed sealer.

System components / Scope of supply

KUKA is the responsible system manufacturer for the complete underbody area, including the front end.

Results / Success

Greater precision

The state-of-the-art robot technology also ensures that the gap dimensions on the doors and trunk lid of the Fiesta model can be reduced to 3.5 mm. That is ten percent less than with our most important competitor in the same market segment. This is possible because the doors are fitted automatically by the robots, and because during production both the vehicles and the transfer pallets which serve as locating fixtures pass through the inline measuring systems.

Higher weld quality

Since Ford is working continuously to improve weld quality, besides pneumatic spot weld guns they also use electric motor-driven ones. When such servo guns are guided by robots, the closing motions of the gun can be defined precisely, resulting in a more gradual force build-up. Other advantages are longer electrode life, better workpiece detection, shorter cycle times and lower noise levels.



Number of report:
R 004

Industry:
Automotive
manufacturers

Application:
Coating and bonding
Handling
Measuring and testing
Welding
Spot welding

Product:
Robots
High payloads (100-240
kg)
Controller
KR C (Robot Controller)

Implementation:
01.11.2001

Customer:
Ford AG, Cologne,
Germany

:: High availability

KUKA provides an overall availability of over 85 percent. The operational readiness of the robots themselves is more than 99.99 percent. The press lines, which also use KUKA robots, are additionally supported by teleservicing from KUKA in Augsburg.

:: Leasing of the production systems

Ford leases 50 percent of these new production systems. In doing this the company expects to develop an even closer partnership with its supplier, since they now have a common interest in operating the systems with the highest possible level of utilization. On top of that, Ford is also able to retain the financial resources for developing future models.



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