

Handling of automotive safety parts

Starting point / Task definition

The die-casting company Eisenmann Druckguss wanted to automate the manufacture of flanges for electrical steering systems of cars – safety-related components, in other words. The special challenge in this case was that there was practically no tolerance with regard to repeatability. When hubs are inserted into the die, the margin is only 2/100 mm. The machines that were considered included six-axis jointed-arm robots and linear units.

Implementation / Solution



The company decided in favor of a KUKA KR 60 robot. Although the price of the linear unit was lower, it was much less flexible with regard to changes in the parts to be handled. The KR 60, which operates in three shifts, six days a week, is the fifth KUKA robot to be installed at Eisenmann Druckguss.

The hubs are fed to the robot cell via a shaker conveyor, which separates the parts and presents them to the robot in the correct position. Using one half of its pneumatically operated double gripper the KR 60 picks up six hubs, one after the other, and places them in the die all at the same time. The robot employs the time while the casting process is running as follows: firstly, it uses the other half of its gripper to hold a cast blank (which it had taken from the machine earlier) up to an inspection station, and secondly, it picks up new hubs. The inspection station checks whether all of the hubs are present. The robot then transfers the blank to the locating fixture of a cooling basin. The part is not immersed by the KR 60 directly, or else the heat from the basin would be conducted into its arm. Once the blank is cooled, the robot loads it into a press, which removes the sprue.

In the control of the cell, the master function is performed by the KR 60. It communicates with the controllers of the casting machine, the press and the cooling basin. The complete system, including the casting machine, which is controlled in real time, is designed to be "car safe". In other words, the machine reports any faults to the robot, which then segregates the affected blanks.

System components / Scope of supply

- :: KUKA KR 60 robot
- :: PC-based KUKA robot controller, including control panel with familiar Windows interface
- :: Pneumatic double gripper
- :: Shaker conveyor for separating the hubs
- :: Robot programming
- :: Commissioning

Supplied by KUKA systems partner SHL Automatisierungstechnik AG, Böttingen, Germany.

Results / Success

- :: Highly cost-effective

The KR 60 is impressive for its cost-effectiveness: in addition to a 40% increase in productivity, there was no longer any need for the internal transfer of ten lattice boxes a day, which had to be transported over a route covering about 100 meters. All in all, this automation solution has resulted in an annual cost reduction of some 250,000 euros. Given figures like this, it is no wonder that it will have paid for itself within one year.



Number of report:
R 239

Industry:
Automotive suppliers
Metal products

Application:
Handling

Product:
Controller
KR C (Robot Controller)
Robots
Foundry robots
Medium payloads (30-60 kg)

Implementation:
18.08.2003

Customer:
Eisenmann Druckguss
GmbH,
Villingen-Schwenningen,
Germany

:: Remarkable quality

The robot works with a tolerance of only 2/100 mm, thus fulfilling the requirements with regard to high repeatability.

:: High availability

For the entire casting cell, KUKA Roboter guarantees an availability of 87%; the robot itself achieves a rate of nearly 100%.

:: Stands up to its tough environment

By means of a heat-resistant foundry wrist, KUKA adapted the robot to the tough environmental conditions at the user's plant. This protection is essential because the temperature right next to the casting machine is 200 °C.

:: Reduced personnel requirements

Since Eisenmann Druckguss now requires only one operator per shift, thus reducing its workforce by three employees.



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