CASE STUDY

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Flexible production of individual components

Dreher's new system mills workpieces in batch size 1. The KUKA KR QUANTEC robot guarantees maximum flexibility.

Dreher AG manufactures automated systems for customers from a variety of sectors and industries. They develop and produce their systems in Denkingen, Swabia. As an automation provider, Dreher mills many of the workpieces for the special systems themselves – a challenge, because the system then requires a high degree of flexibility in automated milling for batch size 1 and up. Dreher meets these high expectations in the loading and unloading of the machine tool by using a KUKA robot.

Dreher AG, which has its headquarters in Denkingen, is completely committed to the automation of production processes. At the Swabian site, 70 employees develop all-round solutions from a single source for individual requirements, which come from customers predominantly in the machine tool industry, but also from all other sectors of mechanical engineering. Furthermore, Dreher AG is a trade partner of the machine tool manufacturer Haas and the laser technology manufacturer Rofin.

Bottlenecks are avoided by in-house production

In the customer-specific production of automated solutions there is often a bottleneck in the delivery of the small and individual components required, which previously were milled externally. To guard against this, particularly during a volatile order situation, Dreher decided to take individual component

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manufacturing into their own hands. The required workpieces, with batch size 1 to 3, are milled using the Dreher DR-Zero robot cell combined with a Haas type VF-8 machine tool.

First, the set-up station of the system is manually loaded. The KUKA.SafeOperation software enables this manual loading without switching off the robot, which reduces technical effort and saves time. The newly loaded parts are deposited in the rack system by the KUKA KR 90 R2700 pro. As soon as the Haas machine tool is ready, the robot loads the pallets with the highest priority into the machine. Communication between the robot and the machine tool, and management of the parts are accomplished via the user interface of the Siemens S7 controller. The PLC is used here as the interface between robot, human operator and machine. After the machine tool has finished the milling process, the machined part is picked up by the robot again. This initially tilts the workpiece in order to discharge coolant and milling chips. A blower cleans the part. Then the KUKA robot deposits the finished workpiece in the rack system. Once again, the output is done manually via the set-up station.

Two-fold advantage

With its new automation system, Dreher AG kills two birds with one stone: the solution is always available for customers to view and serves as a showcase exhibit. Dreher also achieves maximum flexibility in the manufacture of its automation solutions by producing the parts they need themselves. In addition, the KUKA robot is suitable for far more than merely tending, loading and unloading the machine tool. It can also do other tasks, such as the automated retrofitting of tools. "Due to the flexibility required, we could only consider using a six-axis robot in the system," explains Martin Dreher, director of Dreher AG. "We have already been able to gather a lot of experience in robot-based automation thanks to KUKA. That's why the robot from the KR QUANTEC series was our first choice."

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With its extensive range of models comprising 27 basic robot types with various mounting options, the KR QUANTEC series ensures that there is a perfectly suited robot for every customer-specific application. For the first time, a single robot family covers the entire high payload range from 90 to 300 kg, with reaches from 2,500 to 3,900 mm. The robots are characterized by up to 160 kg less weight and 25% less volume. The most compact robots in their class, they reduce space requirements and open up whole new fields of potential applications in production – even in confined spaces. The lighter components allow greater dynamic performance and even shorter cycle times, as well as being stiffer than before. The robot series thus impresses with great precision and a pose repeatability of +/- 0.06 mm. A KUKA KR 90 R2700 is in use at Dreher. "Its payload of 90 kg is sufficient for us to adequately handle the great range of part sizes," said Dreher, justifying the decision made in favor of the KUKA robot. This means that larger parts can also be handled and milled effortlessly.

System saves time and storage space

The new system has fulfilled the requirements of Dreher AG excellently, as Martin Dreher explains: "We have the necessary flexibility to produce the individual parts in the required quality ourselves and no longer have to be concerned about milling work. In addition, it saves us storage space." The director already has plans for the future too. This is because the capacity of the robot has not yet been fully exhausted. Dreher can imagine expanding the system with a second rack system featuring 32 storage spaces and a second machine tool, thereby increasing the manufacturing capacity even more.