



The sonar proximity switch checks whether the place in the tool changer is really free before reinserting the tool

Sonar proximity switches ensure smooth tool changes

ASSURANCE INSTEAD OF RUSSIAN ROULETTE

Machine tools today live off tool change intervals that are as short as possible. Crucial for their success – besides the short cycle time – is also the assurance that the required tool is placed in the magazine at the right spot and at the right time as well as sorted back without collision. For this purpose, the tool change systems of a leading supplier residing in Schorndorf are equipped with ultrasonic proximity switches that have proven to be extremely reliable and adaptable.

Tool and workpiece handling are the core business areas of the ktc Handhabungstechnik GmbH in the Swabian Schorndorf, whose manufacturing specializes in tool and workpiece change systems for the metal-processing industry. With approximately 25 employees, the medium-sized company supplies all well-known machine tool manufacturers in Europe and – since 2004 – also increasingly in the USA.

The tool change systems from ktc are available in all kinds of different designs – from simple drum magazines for only a few tools and chain magazines for a maximum of 80 tools up to table, shelf and tower magazines for correspondingly higher tool counts. Often, multiple chain magazines are joined together. In addition to the drive technology and the sensors, the systems also include the required cabling for the connection to the automation of the machine tools, whose manufacturers – in most instances – specify Siemens components.

Order is half of Life

Apart from the reliable identification of the tools, which takes place via a tool code, one of the main problems during a tool change lies in making sure,

that the requested tool is actually located at the removal position of the magazine. Furthermore, the controller must receive a corresponding signal, if a tool is to be returned from the machine to the magazine.

For both tasks, ktc employs an ultrasonic sensor from Siemens. The Simatic sonar proximity switch of the type M18S checks for the presence of the tool before each removal – so that the swivel arm in fact transports a tool – and whether the corresponding place in the magazine is free before each insertion. Gerhard Struppe, sales manager at ktc, on this: “The M18S impressed us above all by its wide measuring range. Since we always have to develop customized solutions with frequently changing geometries, its universal set of properties are exactly right to meet the high safety expectations of our customers.”

In doing so, the reliability even under the most adverse conditions is paramount. The operation in an atmosphere dominated by cutting oil mist is one of those critical boundary conditions, which the sonar proximity switch



The modular concept of the tool change systems with chain magazines from ktc offers room – if required – for multiple magazines and also an additional workpiece changer.

with its IP67 degree of protection masters exemplary – provided the sensor is installed in such a way so that no material can deposit itself directly on the surface of the ultrasonic transducer. If this cannot be avoided while in operation, the sensor has to be positioned at a different location, which normally does not pose a problem: “I know of no second sensor that combines a comparable detection range from 3 to 70 cm with such a great flexibility in application and installation position,” emphasizes Struppe. “In difficult installation situations, we often employ the M18S at an angle to the object, which so far has only worked with this sensor.”

Integration

Since about 80% of the ktc customers specify automation technology from Siemens, the use of Simatic sonar proximity switches also makes sense with regard to the integration of the components. “In cooperation with the Sinumerik solutions for the tool management and the tool change, all components of our tool and workpiece changers can be controlled with established and standardized commands, which simplifies the engineering from the viewpoint of our customers and increases the reliability of the total system at the operators,” says Struppe and – in this context – also points to the consistently employed Siemens drive solutions.

The tool change is already included as a function in the basic version of the CNC controller Sinumerik 840D/840Di/810D and can be expanded to a comprehensive management program via the option “tool management”. With it, not only the tool service lives and exchange intervals can automatically be checked, but also up to 30 real magazines be managed – each with up to 600 spaces for tools possessing up to 12 cutting edges (max. 1500 cutting edges). The number of the effectively possible tools depends on whether a tool requires one or two magazine spaces.

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