Radio transmission probing system with short actuation times

Speed cuts down cycle time

A new radio transmission probing system for the use in machine tools allows for extremely short actuation times. Users will benefit from enhanced process safety and reduced cycle times.

From John Grosspietsch

At Bosch Rexroth, Nuremberg, the average in-process measurement cycles for external gear unit bodies amount to five minutes. *"Measuring accuracy, though, is subject to strong restrictions, as are the operational safety and short actuating times"* said production planner Christoph Cholewa. Bosch Rexroth's strong quality requirements have a favourable effect on the operating conditions of external gear units. They are installed, for example, in building machines, agricultural machines, fork-lift trucks and pumps or are, in reversed function, even used as motors.

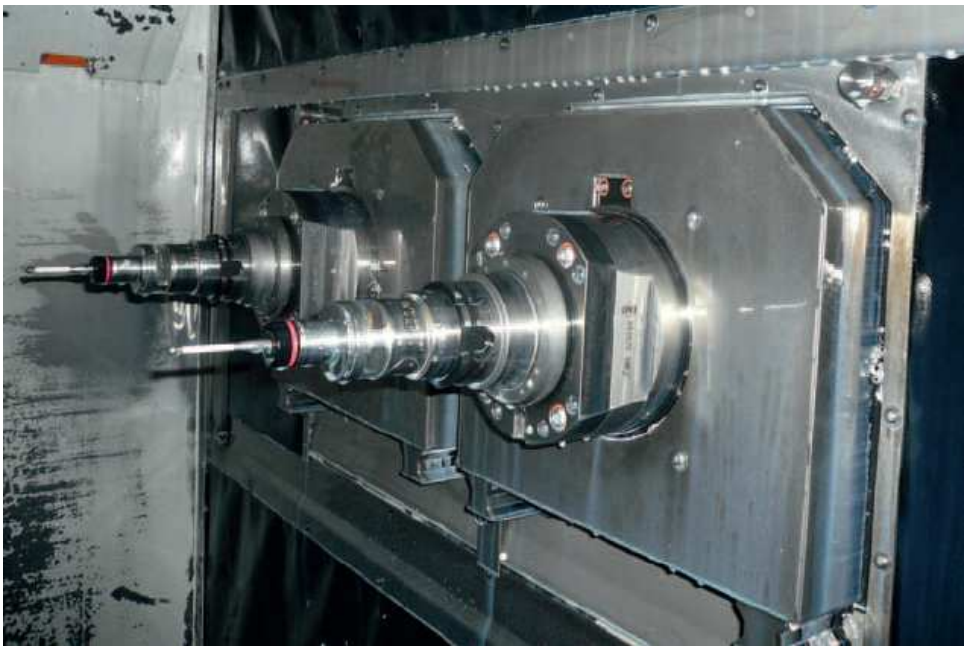

Fig. 1: Marposs' WRS radio transmission system at a twin-spindle SW machine

Probing after any component

„The smallest inaccuracy may cause leakage or impair the product quality, for example owing to degraded efficiency“, Cholewa explains. Consequently, any machined gear body must in fact run through a probing cycle. Thus, the slightly varying machining cycles of the products lead to the five minutes average as previously reported. *„With a total of ten probing points each, the short actuation time of MARPOSS' new WRS radio transmission probing systems helps cut cycle times“*, Cholewa outlines the <measurable> advantage of the systems operating at 2.4 GHz.

Thermal growth compensation with WRS probing system

The cutting process of high-precision components requires, among others, the machine tool's temperature drift be compensated. This phenomenon, called thermal growth, is produced by temperature variations between individual machine elements resulting in thermally induced displacements of the tool position with regard to the machining position. To prevent this, the tool spindle's actual position is cyclically sensed at defined probing points in the working area and allows the control system to make appropriate compensatory motions. Therefore, the machine tools are equipped with probing systems like Mida WRS from MARPOSS, Weinstadt, (Figure 1) which carry out measurements between the machining of the components, from time to time, according to user's requirements.

Radio transmitter, probe and receiver

The WRS probing system consists of a radio transmitter with probe (WRP = World Radio transmission Probe) and a receiver with interface (WRI = World Radio transmission Interface). The fast 2.4 GHz radio communication not only allows for the system's world-wide use and homologation, but also provides extremely short actuation response times of approx. 0.5 s. *„Compared with the approximately five seconds required by former systems, this equals a significant cycle time reduction“*, replies Cholewa enthusiastically, who is also alluding to the operational safety in this context. Apart from the batteries' excellent 700 hours life cycle at permanent activation, he particularly names the 79 radio channels from which the system picks out the strongest one that best fits the operating conditions. Further sub channels make it possible to use several probes on the same machine which are all activated via the machine control, by simple select commands.

What Bosch Rexroth people also value highly is the probe's repeatability of 0.5 µm ≤ 2 Sigma. Two probe models with dia. 25 / 30 mm are available. Lengthening pieces for probing positions with difficult access are an additional feature.

The WRS probing system from MARPOSS qualifies for use in large machines and in 5-axis-machines. Therefore, their components come in a rugged and compact design. As the communication between the transmitter and the receiver does not require direct intervisibility, the system also can easily be fitted into machine areas under harsh conditions. The receiver's magnetic base plate makes it easy for the fitter to establish the receiver's optimal position prior to its final fastening. The receiver should preferably be installed inside the machine tool's working area; but the spherical signal propagation and the coverage range up to 15 m also allow for external installation. A total of 316 transmitters can be installed on a factory shop floor, by splitting up the communication channels.

Its flexible integration, compact components and modular design make MARPOSS' WRS probing systems extraordinarily versatile and suitable for nearly any application. In such ambitious applications like those at Bosch Rexroth in Nuremberg, it provides the long-sought operational safety and speed.

Fig. 2: Marposs offers the complete choice of radio transmission workpiece and tool checking systems