

THE JEWELS AT EMO 2011

For over 50 years Marposs has been supplying high-precision gauging systems that operate in the most difficult environments, such as in workshops, in production lines and on machine tools. The main customers are the most varied: machine tool manufacturers, automotive industries and their subcontractors, aerospace, railway, naval, consumer, hi-tech, biomedical and energy production. The background of Marposs is really broad, then, but at EMO Hannover the company exhibits its range of specific products for machine tools.

High-precision probing

The touch probe T25P is an extra-compact wire transmission probing system designed for sharpening machines, gear and profile grinding machines and in general for all machine tools that need high gauging accuracy. The advanced concept of this system, based on a piezoelectric, allows attaining null pre-travel and the reduction of the stylus bending. The synergy of all these factors allows higher repeatability limits than a traditional mechanical probe's, making it ideal on applications that call for very high-precision measurements, such as sculptured surfaces (3D), gears and cutting tools. The probe has been designed to withstand high pressures and the typical coolant flow of new processes. The goal has been reached thanks to the double jacket that, despite the diameter of 25 mm only, protects its body and assures resistance to collisions and to thermal variations.



Optical transmission in probing

The newly-born in the family of optical probing systems, composed by the optical transmission probe VOP and by the receiver with integrated interface VOI, has been conceived for machining centres, lathes and milling machines of all sizes. VOP is available both in modular version and with integrated probe. The proprietary optical system provides protection against environmental disturbances, reliability of the in-process gauging, wide transmission range, long battery autonomy and sturdiness. VOI, reduces setup times through the remote control and all adjustments can be carried out at any time. Besides, VOI can manage more probes and operate in conjunction with another VOS system in double-spindle applications.



Non-contact tool breakage detection

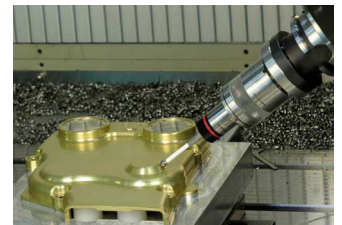
Conceived to verify the tool presence or breakage under machining conditions directly on machine board, TBD proves to be fast and reliable: its compact design, consisting of a single device, and the small sizes make its installation easy and quick also outside the working area. The system works by laser beam triangulation: the laser beam is projected on the tool surface, normally at tool breakage tolerance, and the light reflected is captured by a highly sensitive receiver. TBD recognizes a variety of solid-body concentric tools (drills, taps, end mills, ball nose cutters etc.), with different surface treatments and colours, positioned at a distance



ranging from 0.3 m to 2 m. The system works at different spindle rotation speeds (200, 1,000, 2,000, 3,000, 4,000 and 5,000 rpm) to permit the recognition procedure also on machines with low revolution number. The control algorithm, supported by dedicated electronics, analyzes the signal generated by the reflection of the incident light on the rotating tool. That signal consists of a characteristic sequence that depends on the shape and on the number of the tool cutting edges: this allows distinguishing tools from coolant, making the detection cycle reliable. Thanks to a high-sensitivity photodiode and to a dedicated optical solution, TBD needs no regulations on the receiver according to the tool position. The adjustment of the focusing distance, corresponding to the position in which the tool is placed in the verification phase, minimizes the spot size and permits the recognition of the minimum tool diameter even at the maximum distance.

Compact radiofrequency probing

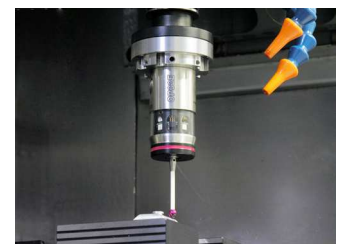
The applied transmission frequency band of 2.4 GHz permits this single system to be used in all applications in most parts of the world. The spherical transmission characteristics and 15 m operating range make WRS both flexible and powerful. The system automatically searches for the best radio channel among the 79 available, in order to guarantee optimum communication conditions between the probe and the receiver at all times. Additional sub-channels permit the use of multiple probes on the same machine by means of a simple NC selection code. The WRS receiver with integrated interface is programmable through optical pushbuttons or remote control.



A four-digit display assures that user messages are clear and precise, providing a user-friendly interface for programming and diagnosis. The characteristics of this radiofrequency transmission system make it ideal for use on large and 5-axis machines, such as milling machines, machining centers, lathe cutters, lathes and wood, glass and marble working machines.

Solutions for narrow spaces

The OP32 optical probing system, available in the OP32 and OP32E versions, is designed to operate on medium-big size micro-milling machines and machining centres as well as in environments where the overall length is a pressing constraint. In the OP32 system, the probe and the transmitter form an integrated whole that transmits measuring data to the CNC via a receiver and an interface.



The OP32E «endurance» version is characterized by the high operation autonomy supported by the use of higher-capacity batteries. Besides, the minor glass surface exposure makes the probe suitable for very hostile environments.

Wireless radiofrequency bore gauge systems

The new WRG bore gauge system with radio transmission has been intended for the dimensional bore inspection on machining centres. The gauge, due to its sturdiness and gauging precision, is very suitable for mass production. WRG gauges are picked from the tool magazine for performing the dimensional control of the workpiece just machined. It is based on radio frequency transmission technology not requiring line-of-sight between the transmitter and the receiver and assures precise bore inspection in the typical machine tool environment without being affected by the internal machine tool lighting. The communication system is fully compatible



with WRS touch probe. Communication channels are isolated one another to allow the use of multiple bore gauges and touch probes on the same machine. Marposs P7 and E9066 amplifiers can be used to display measure results, plug recoil status, battery status, radio channel in use and statistical production data.

Absolute gauge for grinders

Connected with a control unit that optimizes and automates its operation, the new absolute gauge Protomar can perform the real-time control of multi-diameter parts of broaches, railway axles, mill rolls, printing rolls and wind power generators up to 300 mm.

The diameter is the result of the combination of cell measurement and incremental transducer position. The control and processing units maximises the motion speed of the cell-holding arms to reduce downtimes in the opening and closing phase. The autonomous positioning of the two gauges on the workpiece and the mechanical closed chain architecture of the gauging head are the essential requisites to assure precision, flexibility and constant performances under the typical working conditions on a grinder. In addition to control functions of the machining cycle, the same unit processes the controlled diameter profile at the end of the grinding machining and, through polar graph, displays the piece shape, its position as to the calculated ideal profile and the exceeding of tolerance limits.



Vibration balancing and Monitoring

Over the last few years the increase of the spindle rotation speed on machine tools represents a constant trend. This is true in the grinding sector and, as far as the stock removal is concerned, in the high speed milling and turning fields. Regardless of the used technology, it is more and more important to attain higher quality surface finishing of the piece. In this context it becomes essential to keep under control the vibrations brought about on the machine by mechanical rotating components, above all the spindle (toolholder, wheelhead or piece-holder). Marposs, also through the controlled Company Artis, a long term leader of this application sector, provides Genior, a modular solutions suited where monitoring needs to be automatically adapted to the process and operation without operator intervention.

