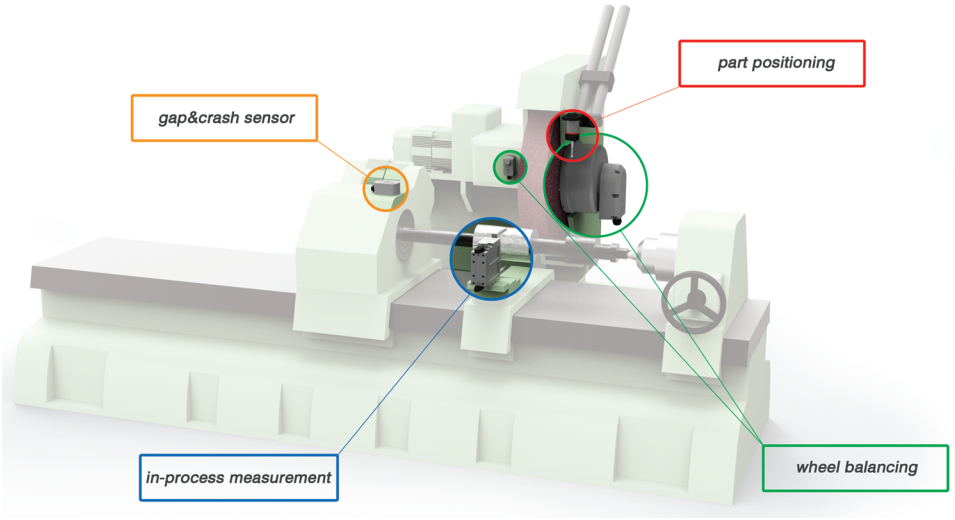
Gauging, Balancing and Sensors Bring New Life to Aging Grinders

Remaining competitive today requires flexibility, higher production rates and lower costs—in short, constantly improving productivity. This has to be accomplished while customers are requiring higher quality, tighter dimensional and geometric tolerances and better surface finishes and regulators are enforcing increasingly stringent safety and environmental standards.

In an economy where the capital investment for a new grinder may be hard to justify, retrofitting new automation and monitoring equipment to existing machines often is the most cost-effective solution to all of these challenges. Whether it is done by the user or a professional re-builder/retrofitter, there are five different technologies that should be included in every machine upgrade.



Pre-Process Check: Workpiece Positioning

Automatic control of the machining process actually starts before the process itself (pre-process) through the verification of the workpiece position in the machine and its tolerance with respect to the grinding wheel. This is typically accomplished with a touch probe, such as the Marposs MIDA, to detect the position and orientation of the workpiece without operator intervention. This technology nearly always reduces cycle time and boosts performance.

In-Process Measurement

Measuring a workpiece in real time while stock is being removed allows automatic control of machining and cycle optimization. By monitoring the workpiece continuously during the grinding process, the feedrate can be varied to obtain programmed stock removal values, adjust the spark-out timing to the real conditions of the workpiece and stop the cycle when the nominal dimension is reached.

Modern generation in-process gauges, such as the Marposs UNIMAR, have a large measuring range and a quick zero setting to handle different workpieces, enhanced thermal stability and a compact design to reach even the most inaccessible points. In-process gauging is a highly cost-effective way to improve quality while optimizing cycle time to maximize productivity.

Wheel Balancing

A properly balanced wheel is critical for achieving high surface quality and avoiding geometric errors. A balanced wheel can also be run at higher speed to achieve higher stock removal rates and greater productivity. A balanced wheel eliminates the most common causes of spindle damage while reducing wheel wear—actually extending average wheel life up to 35%.

Contemporary balancing systems, like the Marposs/Dittel products, support retrofit applications with different versions of balancing systems to accommodate either internal or external mounting to the spindle and a choice of hard-wired or contactless transmission.

Air Gap and Collision Check, Optimization of Dressing Cycle

Detecting subtle changes in the noise emitted by the machine during grinding and dressing cycles allows real-time monitoring of the gap between wheel and workpiece and the persistence of contact between dresser and wheel. The feedrate and the moment of contact with the wheel are controlled along with dressing depth.

By preventing collisions, products like Marposs/Dittel Acoustic Emission (AE) sensors can help prevent serious damage to the machine while enhancing operator safety. Because they allow higher infeed speeds prior to workpiece or wheel contact, they can shorten both grinding and dressing cycle times to increase throughput and productivity.

Contemporary systems from Marposs and others offer a variety of options including fixed, contactless, ring-shaped and split sensors to support retrofit applications and different working environments.

Electronic Display and Data Collection

Programming and monitoring of all the parameters impacting workpiece quality, cycle time and tool wear typically is accomplished with an electronic unit that serves as an operator display and communicates with the machine control and other plant systems, usually via field-bus. These units are often modular to accommodate varying numbers of connected devices.

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They range from simple mono-function amplifiers with needle-type analogue displays to more complex multifunction devices with graphic displays and touchscreen keyboards. The more sophisticated units often run data collection and processing software.

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