



The Many Faces of Automatic Gaging

Available in a variety of configurations, automatic gaging systems are appropriate for many applications and environments. BY MIKE BOZINOVSKI AND FRANK POWELL

Automatic gaging systems often are thought of as dedicated solutions suitable for only long-run, high-volume applications. While that may have been true in the past, today's technology makes it possible to add a great deal of flexibility to these systems, making them a good choice for many lower volume and family-of-parts applications.

The major benefit of an automatic gaging system is consistency because virtually all operator-related variables are removed from the process. There are, in fact, three variations on the automatic gaging system theme: flexible, re-toolable or dedicated, depending on application requirements.

Knowing the differences is key to a successful implementation.

OVERVIEW

An automatic gaging system is a stand-alone device that measures part attributes without operator intervention. The system may be used for final inspection of a finished part or inter-operational inspection of an in-process

part. It does not have to be part of an automated production system.

Flexible systems can be computer numerical control (CNC)-based and measure part attributes within a given volume, much like a coordinate measuring machine (CMM), but much faster. They also can be optical based, which require no part-touching details. Both



While parts must be clean and dry because of optical measuring sensors, this noncontact system can be changed over for checking virtually any shaft-like part within the measuring envelope. Source: Marposs Corp.

◀ This system is suitable for checking high-volume production of cylindrical parts immediately after a machining or grinding operation. Source: Marposs Corp.

are suited for large family-of-parts applications requiring high precision.

Re-toolable systems require a change of mechanical elements to handle different, but similar, parts. These are suited for small families of parts at lower volumes.

Dedicated systems, as the name implies, are designed specifically to inspect a single part, usually at high volumes during long production runs. They often are used for 100% final inspection of critical parts. These are the systems that typically come to mind when automatic gages are mentioned.

Regardless of the system configuration, parts to be inspected are typically delivered by a robot or other automated handling device and positioned by an integral handling mechanism in a cradle, nest or other fixture for inspection. After measurement, the part often is laser marked or pin stamped and then returned for pickup by the robot or handling system. Automatic gaging systems also may be manually loaded, but this is less common than the automated process.

When used for final inspection, an automatic gaging system will typically have some provision for sorting parts based on test results. This can range from simple good part/scrap part decisions, to sophisticated classification systems based on measured dimensions.

Inter-operational gaging systems usually generate feedback signals to the machine controls, as well as rejecting out-of-tolerance parts. Final inspection gages also may generate compensation signals. Both types can provide statistical information to support quality and process control systems.

SYSTEM COMPONENTS

A typical automatic gaging system consists of a programmable logic controller (PLC) or some other station controller to sequence the material handling components, gage motions, interlocks and other mechanical functions; a display or amplifier to collect gage transducer outputs and process