



How to Speed Up the Return on Investment When You Purchase Your Next Optical Measuring Machine

ZEISS Industrial Metrology



Increased Capability and Capacity

Multisensor Machines

When you're looking to add measuring capabilities, you're looking for quality results, improved speed and perhaps most of all – a quicker return on investment (ROI). Many manufacturers are utilizing versatile machines with vision capabilities to fill this role.

2D and 3D inspection

CMMs are ideal for 3D inspection. They check the shape and size of parts using contact measurement. However, many shops are looking to add the capabilities of a vision machine – usually to handle 2D applications. Of course, there are pure vision machines available, but multisensor machines with 2D optical and 3D touch capabilities are fast becoming the preferred way to add vision capability. These machines can handle 3D work when not being used for 2D applications, significantly speeding up ROI on your overall quality assurance program.

Role of contact sensors

CMMs utilize a contact probe to take measurements along three orthogonal axes in 3D. That data is used to calculate distance measurements or dimensions, geometric shapes or features, and the relative position of the shapes or feature relationships on the component part.

But contact measurement is not a solution for all situations.

Benefits of vision

Non-contact measurement is ideal for complex, smaller and high-precision parts, or parts that are easily deformed or scratched with contact. Multisensor machines can utilize laser probes or vision-based probes to avoid scratches.

With vision probes, a high-definition camera generates numerous measurement points in one frame. Video probes can also be utilized for measurement of edges and perimeters.

Economies of scale

Most manufacturers looking to add a multisensor capability to the shop will already have a CMM. Selecting that second piece of equipment should provide an economy of scale by building more than capacity. It should also build capability in your quality programs. Utilizing a single machine with multiple capabilities can be more efficient by:

- Taking up less floor space
- Requiring fewer utilities
- Needing less training and service
- Requiring minimal handling and fixturing

Increasing speed

The less impact your measurement plan has on your production speed, the greater ROI it can deliver. The automation inherent in multisensor measurements can provide time efficiencies by following a routine based on the program for each workpiece. This eliminates the transition from machine to machine for different types of measurement.

Optimizing the test plan

A multisensor machine also allows the programmer or operator to choose the sensor best suited to a measuring task. With a variety of sensor types, you can select a specific measuring strategy to optimize the testing plan and make multiple measurements in a single run.



The advantages of a single software platform

Shop's Production Plan	Benefits
The CMM measures: • Larger parts • Smaller 3D parts	• One programmer for both systems • Provides cost savings • Balanced, flexible work plan • Solves production bottlenecks on one machine • Maximizes use of second machine
The multisensor system measures: • 2D jobs • Smaller 3D parts	

Universality of the software

These efficiencies are not automatic with all multisensor machines. Many systems require separate software for optical scanning and contact measurement, even if they are both manufactured by the same company.

Any economy of scale with two systems is lost if they use different software programs. When selecting equipment, be sure to research cross-platform compatibility.

Programming ease

Programming twice to do the same job on both machines is expensive. It's important to look at the ease of transferring a program from one machine to the other.

Offloading work from the CMM to the multisensor machine may not be worth the time and effort if the solution doesn't allow for this transfer.

Talent acquisition

In addition, there's an additional consideration when the software isn't shared across your equipment. Two machines, each running its own software, may require two separate programmers and/or operators, who are experts for each system and its software.

Look for machines that are complementary to each other to increase efficiencies and reduce training. The alternative is hiring two operators – one for each machine.

Shared systems

The ideal situation is a shared software platform on both the CMM and the multisensor machine. This allows one person to program and manage both. With the significant overlap, the two machines can create cost efficiencies – allowing for flexibility in inspecting a component on either machine to meet your lead time and scheduling needs.

CAD/CAM compatibility

Manufacturers continue to move toward model-based definition (MBD) or digital product definition (DPD) in their product design. The advantages of these sophisticated tools can extend to quality management when you utilize embedded tolerances in the design as part of the measurement strategy.

A measurement software's ability to read those embedded tolerances can improve your overall efficiency. Find a solution with software that has a direct CAD interface (DCI) to speed ROI by eliminating steps between the design process and your quality inspection.



Flexibility to Achieve Business Goals

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Fortunately, manufacturers can find a solution to meet these needs. ZEISS Industrial Metrology offers the O-INSPECT multisensor machine with 2D optical and 3D tactile capabilities that uses the same CALYPSO software as its CMMs – such as the CONTURA and ACCURA.



ZEISS multisensor systems and CMMs both use CALYPSO software to give shops additional work plan flexibility.

More flexibility for a better solution

The ZEISS O-INSPECT unites optical and contact measuring technology in a single system to give you a large range of parts and comprehensive analysis options. Integrating the functions of four machines – profile projector, CMM, contour measuring and microscope – it's an ideal solution for plastic and electronic components in a variety of industries.

High-quality visual tools

Measuring the finest structures quickly and without contact is the primary purpose of a visual inspection.

O-INSPECT's telecentric zoom lens achieves superior imaging for extreme precision. Fixed zoom levels guarantee reproducible results. Small and large ring lights produce outstanding light intensity for both lateral illumination and steeper illumination angles.

Coaxial light, transmitted light and coaxial laser pointers provide more versatility to select the best measurement methodology for each project.



Inspection at the speed of production

With the multisensor O-INSPECT, stylus change-outs are fast throughout the measuring run and do not require time-consuming recalibration. Manufacturers can use multiple measurement methodologies on a single component without slowing your process.

When used in combination with other metrology equipment, the increased capabilities offered by O-INSPECT can help you remove bottlenecks and increase inspection uptime to keep pace with the speed demands of your customers.

Software to maximize ROI

Software that accompanies your quality solutions can have a major impact on the deliverability of ROI. With the ZEISS solution, we utilize sophisticated CALYPSO software on multiple machines, satisfying many of the best practices for achieving ROI. Manufacturers can assign one employee to program and supervise both systems, and plan to use them interchangeably in the jobs they can cost effectively handle.

Modern software includes key characteristics

- Support of traditional and more advanced CMMs
- Usage in touch and non-touch measurement styles
- Programming from 3D models and a DCI
- Reorder and organization of the measurement routine via drag and drop
- Correct interpretation of geometric dimensioning and tolerancing (GD&T)
- ISO evaluation routines
- Manual and CNC measurement abilities
- Options for complex geometry, such as free form, gears and turbine blades
- Flexible output and integration options
- Customizable user interface

Conclusion

If you are at a smaller company and are purchasing a vision machine, you'll experience an enhanced ROI on your investment in O-INSPECT through the increased capabilities of two machines in one.

For those at a larger company purchasing a vision machine to supplement your current CMM, the O-INSPECT offers the versatility to perform specific inspection tasks or take on the bottlenecks from an existing CMM.

Manufacturers looking to maximize their investment in metrology equipment can speed ROI by selecting a measuring machine with versatility, speed, high precision and an efficient CAD-based compatible software platform.

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