CASE STUDY

OMRON

Accurate and affordable sensors are the keys to an effective non-contact inline quality inspection process

Manufacturers understand that "good-enough" quality control is a risky proposition in today's heavily regulated, litigation-prone marketplace. Even small assembly errors can evolve into huge business liabilities once customers take delivery on new products or components.

"Manufacturing is becoming increasingly complex," says Bryan Monty, automotive strategic account manager for Omron Automation Americas. "Omron works with companies to mitigate risk using non-contact inline inspection. We enable them to validate components and detect and resolve issues before anything leaves the factory. We also make it easy to include traceability controls in their processes."

Non-contact inspection is a practical option for high-speed production

Non-contact inspection occurs without touching or probing a part. Instead, the inspection system relies on proximity sensors to capture shapes and measurements from a distance, allowing a higher rate of throughput than contact-based inspection.

In the past, non-contact systems often were not a good fit for high-speed production lines. Inexpensive systems tended to be inaccurate, and more accurate systems tended to be very expensive.

That is no longer the case, says Rick Tomaszewski, territory account manager for Omron Automation America. "Omron makes non-contact inspection accurate, affordable and easy to set up."

Omron enables customers to standardize on a single automation technology and then configure it for a variety of purposes, including non-contact quality inspection.

All-in-one vision sensor improves results and saves automaker $1 million

Jason Field, branch manager for Omron distributor Aztec Electric, recently worked with a major automobile manufacturer to implement the Omron FQ2 Smart Sensor Camera, which integrates the camera, vision processor, and high-power lighting into a single compact enclosure.

The FQ2 Smart Sensor Camera can be used its own or with an NJ series machine automation controller (MAC) or CS, CJ1, or CJ2 series programmable logic controller. This flexibility means that FQ2 owners can use incremental investments to create highly integrated automation environments.

"The customer was using a competitor's quality-inspection system that required five cameras," Tomaszewski says. "The cameras were supposed to provide error proofing when changing models or adding options. But it was unreliable, and employees were always putting the system into bypass mode."

Like many modern facilities, the customer's plant used a combination of natural and artificial light to reduce overhead costs. These conditions were too challenging for the competitor's sensor. But, as Field and Tomaszewski demonstrated, the FQ2 configured with a wide-view, long-distance camera could easily recognize true colors and patterns without issue.

"Our vision sensor was originally developed for the semiconductor industry," Tomaszewski says. "Those environments are very demanding and challenged us to create an extremely accurate sensor."

Field and the customer's staff needed just a few hours to install the FQ2 Smart Sensor Camera and replace the existing five-camera vision system. Since implementation, the new system has never been placed in bypass mode, and the customer estimates that reduced rework and faster production throughput have saved more than $1 million.

Business Need

Automotive manufacturers rely on non-contact inspection to ensure quality and efficiency. Affordable, accurate, and reliable technology is critical for meeting government mandates, avoiding litigation, and ensuring traceability throughout the manufacturing process.

Flexible Solution

The Sysmac automation platform makes non-contact inspection accurate, affordable, and easy to set up. The system supports a variety of sensors, including the Omron FQ2 Smart Sensor Camera and Omron ZW-7000 Confocal Fiber Displacement Sensor.

Customer Benefits

Manufacturers are able to improve throughput, inspection accuracy, and data traceability in a scalable, cost effective manner with unparalleled reliability. When integrated with Omron's real time machine control with database capability and intelligence motion solutions, they provide affordable alternatives to manual-based inspection and error-proofing processes to ensure compliance.

Sysmac with displacement sensor allows OEM to support multiple plants with a single quality system

Sometimes a customer's quality inspection problem is not so much about sensor reliability as overall system complexity. Monty recently worked with an automotive original equipment manufacturer (OEM) that was struggling to support a variety of hardware products, middleware and programming applications installed across sites in multiple countries.

"The customer wanted one global system for automation," Monty says. "When I told them the Sysmac automation platform could meet all their needs, it got their attention."

The customer had an immediate challenge for Monty. Could he simplify quality inspection for a key product being produced at five different plants? Monty suggested combining the Sysmac platform with the Omron ZW-7000 Confocal Fiber Displacement Sensor.

"It was the right way to capture stable measurements without compromising manufacturing speed," he says. "The ZW-7000 can measure many types of materials and shapes using white LED wavelengths and do it quickly and without requiring workers to wear eye protection."

While the ZW-7000 is very accurate, Monty thinks the customer was more impressed by the Sysmac platform's combination of simplicity and flexibility. With the specified Omron NJ-series MAC, the customer was able to deploy a compact, rugged and easily reprogrammable control that is ideal for data-driven production environments.

"The NJ is much more powerful than a traditional controller," Monty says. "It is available with integrated SQL link and can serve as a gateway between a private machine network and a central database. Direct connectivity is important if a customer wants to improve data collection and traceability."

The NJ MAC has built-in connectivity for up to three relational databases over Ethernet (socket service), EtherNet/IP, PROFINET, DeviceNet, or EtherCAT. EtherCAT networks are particularly easy to set up since Sysmac allows the integrator to calculate speed and reaction times in advance.

A single automation platform for improving performance with less complexity

The Sysmac automation platform enables manufacturers to control a single machine, production cell or plant. Because the platform is designed with connectivity in mind, it also provides an architecture for increasing visibility across locations. With granular data, customers can prove adherence to government mandates and industry best practices.

Sysmac is widely used for motion control, vision processing and safety functions. The software supports access through a workstation, browser and mobile device and includes tools for supervisory control and data acquisition (SCADA), human machine interface (HMI), and overall equipment efficiency (OEE) dashboards. It also supports a wide range of third-party automation products, multiple databases and remote-access systems; meets industry audit and verification requirements; and includes tools for adhering to FDA 21 CFR Part 11, EU Annex 11, and Good Automated Manufacturing Practice (GAMP) guidelines.

The Sysmac Studio integrated development environment also reduces project time by allowing operators to test, debug, and simulate programs even before production hardware is in place. The software supports access through workstations, browsers and mobile devices. Operators on the plant floor can also use an Omron NA series HMI to write and insert structured text directly into ladder programs.

"Sysmac is a versatile platform for manufacturing," Tomaszewski says. "Unlike our competitors, Omron makes it even more attractive by offering free 24/7 support and free software updates. It is a powerful and complete solution."

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Omron Automation is a global automation partner that creates, manufactures and services fully integrated automation solutions. We provide controls, vision, safety, motion and robotics for the automotive, semiconductor, food/beverage, packaging, pharmaceutical and infrastructure industries.

For over 80 years, Omron has helped industrial businesses maximize potential by solving problems creatively. Currently headed by President Yoshihito Yamada, our company is 36,000 employees strong—providing products and services in more than 110 countries worldwide.

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