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OPTICAL

36.

ISOTRON
SYSTEMS

VISION SYSTEMS VS. SENSORS

COGNEX

THE GLOBAL LEADER
IN MACHINE VISION AND INDUSTRIAL BARCODE READING

Cognex® the world's most trusted machine vision and industrial barcode reading company.

With over 1.5 million systems installed in facilities around the world and over thirty six years of experience, Cognex is solely focused on industrial machine vision and image-based barcode reading technology. Deployed by the world's top logistics companies, manufacturers and machine builders, Cognex solutions cut costs, improve efficiencies and maximize throughput.

Smarter automation using Cognex vision and barcode reading systems means fewer errors, which equates to lower costs and higher customer satisfaction. With the widest range of solutions and largest network of vision experts to meet the most challenging applications, Cognex is the best choice to help Build Your Vision.

$748 MILLION
2017 REVENUE

OVER 36
YEARS IN THE BUSINESS

500+
CHANNEL PARTNERS

GLOBAL OFFICES IN
20+ COUNTRIES

1,500,000+
SYSTEMS SHIPPED

VISION SYSTEMS VS. SENSORS

Of the billions of products manufactured and inspected each day, few could be made without some level of industrial automation. Modern manufacturing demands high quality control standards. Manual inspection is slow, prone to error, and impeded by product size, space constraints, lighting conditions, and fast production line speeds. Automated inspection, by contrast, maximizes throughput, increases quality, and lowers manufacturing costs. Most manufacturers use automated machinery like vision sensors or vision systems because they are well-suited for repetitive inspection tasks. Sensors and vision systems are faster, more objective, and work continuously. They can inspect hundreds, or even thousands, of parts per minute, providing more consistent and reliable inspection results.

HOW TO SELECT A MACHINE VISION SOLUTION

Vision sensors and vision systems have many common applications in factory automation. Selecting the right machine vision solution generally depends on the application's requirements, including development environment, capability, architecture, and cost. In some cases, vision sensors and machine vision systems may both be able to satisfy an operation's needs. Different models are designed to meet varying price and performance requirements.

Vision sensors are similar to machine vision systems in their powerful vision algorithms, self-contained and industrial-grade hardware, and high-speed image acquisition and processing. They are both designed to perform highly-detailed tasks on high-speed production lines. And while all perform inspections, they are engineered for different tasks. While machine vision systems perform guidance and alignment, optical character recognition, code reading, and gauging and metrology, vision sensors are purpose-built to determine the presence/absence of parts and generate simple pass/fail results. Vision sensors are also distinguished by their relative ease-of-use and quick deployment. Vision sensors lack the most sophisticated vision tools available on standalone machine vision systems but can perform a great number of vision tasks in factory automation and logistics environments. Vision sensors are also more affordable than machine vision systems and require less expertise to run.
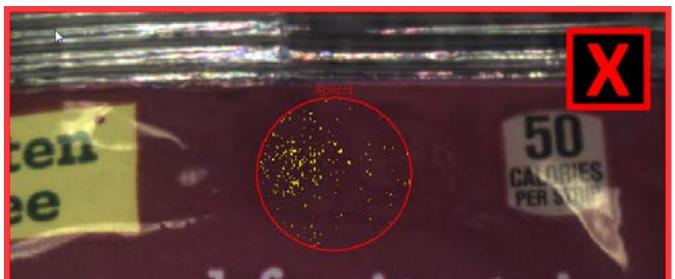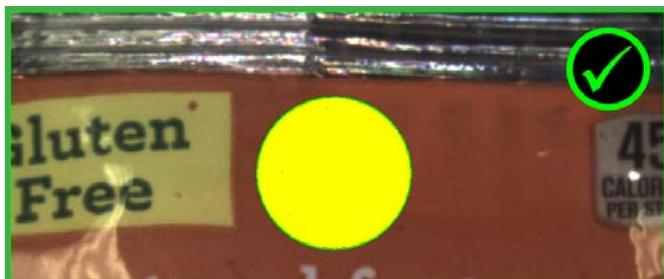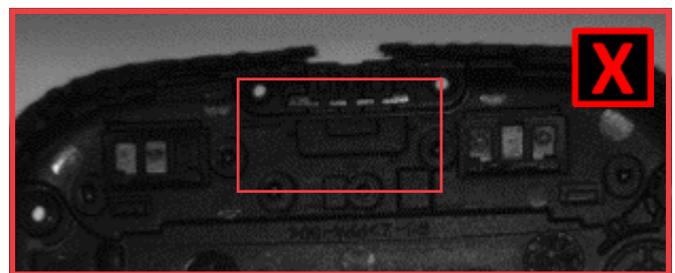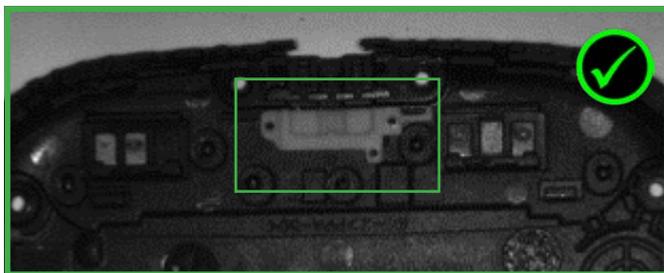
Companies in a wide range of industries including heavy manufacturing, food and beverage, automotive, electronics, logistics, and transportation rely on vision sensors to perform simple pass/fail inspections that help ensure products and packaging are error-free and meet strict quality standards.

VISION SENSOR ADVANTAGES

For certain classes of vision applications, visions sensors are an ideal fit. These include simple pass/fail inspections that help ensure products and packaging are error-free and meet strict quality standards. By using vision sensors at key process points, defects can be caught earlier in the manufacturing process and equipment problems can be identified more quickly. With vision sensors, data output is typically binary, delivered as a "yes/no," "present/absent," or "pass/fail" result. Unlike other types of sensors, such as photoelectric, vision sensors can inspect multiple elements per target, differentiate between colors, and respond well to misalignment and planned variability. But while vision sensors can provide information beyond whether a part is simply present or absent, and in some cases provide simple measurement outputs, they are not designed for precision and accuracy.

Vision sensors generally require no programming, and provide easy guided set-up through user-friendly vision software interfaces. Most are easily integrated into larger systems to provide single- and multiple-point inspections with dedicated processing. Most offer built-in Ethernet communications, which enable users to exchange data with other systems to communicate results and trigger subsequent stages of an inspection. A network of vision sensors can be easily linked to plant and enterprise networks, allowing any workstation in the factory to view results, images, and data for process control. Depending on the specific system or application, vision software configures camera parameters, makes the pass/fail decision, communicates with the factory floor, and supports HMI development.

	Vision Sensors	2D Vision Systems
Presence/Absence	✓	✓
Inspection	✓	✓
Guide/Align		✓
OCR/OCV		✓
Code Reading		✓
Gauge/Measure		✓

ISOTRON SYSTEMS

CHOOSING A VISION SENSOR SOLUTION

Technology and application requirements for automated inspections are constantly evolving. Development environment, lighting, and modularity are some of the most important features to consider when selecting a vision sensor.

Standardized Set-Up Environment

Even novice vision users should be able to easily set up, configure, and install a vision sensor. When selecting a vision sensor, consider not only current inspection needs but also future applications that may require more powerful and flexible vision systems. Fast processing and a reliable communications link to other factory automation equipment are essential.

Integrated Lighting

Factory environments and space constraints can make it difficult to achieve proper lighting conditions. This can be problematic for vision sensors, which rely on even, diffuse lighting to fixture parts and perform robust inspections with brightness, contrast, and pixel count tools. Vision sensors typically come with integrated lighting and can be connected to additional external lighting if required. Selecting a vision sensor with built-in lighting saves money on external illumination and mounting fixtures.

Flexible, Modular Design

It can be difficult to mount a vision sensor in the precise location to achieve optimal FOV, image resolution, and part illumination. Vision sensors with small form factors, which fit into any space and can be configured for in-line and right-angle mounting installation, help get inspections up and running quickly. Modular design simplifies optical paths and cable routing and allows users to change lights, optics, and lenses in the field for quick line changeovers or application modifications. Models with autofocus lenses eliminate the need to manually refocus or adjust mounting height.
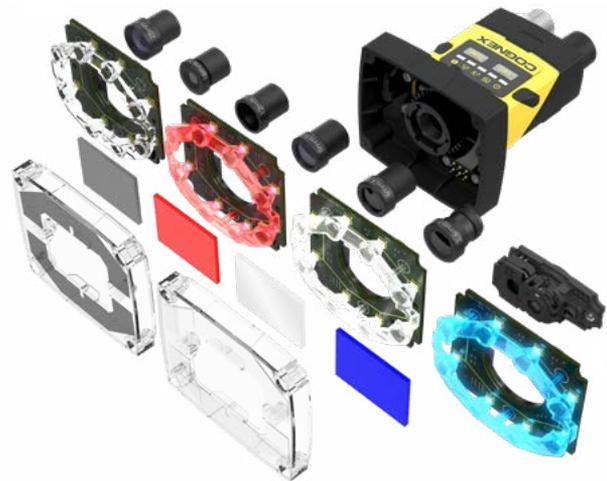
The In-Sight 2000 series offers a modular design with field changeable lights, lenses, filters, and covers. An integrated LED ring light produces even, diffuse illumination across the entire image, minimizing the need for costly external lighting.

CONCLUSION

For many error-proofing applications, vision sensors are the most affordable and easy-to-use machine vision solution. Vision sensors are an ideal solution for presence/absence inspections that require quick pass/fail decision-making about a part's position, quality, and completeness. Vision sensors can detect specific parts within a wide region of interest and can do so dynamically as parts move along the line, detecting their targets by pattern, feature, and color. Perhaps most critically, vision sensors can communicate with upstream and downstream equipment for closed-loop inspection.

ISOTRON SYSTEMS

THE COGNEX DIFFERENCE

Whatever your environment, resource constraints, and specific tool needs, Cognex sensors can help. At speeds up to 6,000 parts per minute, Cognex vision sensors set new standards for value, ease of use, and flexibility thanks to a powerful combination of proven Cognex In-Sight® vision tools, simple set-up, and a flexible, modular design. In-Sight 2000 series vision sensors are compact, configured for inline and right-angle mounting installation in tight spaces. Field-changeable, integrated optics and lighting adjust to changing application requirements and eliminate the cost of external lighting. The In-Sight Explorer EasyBuilder interface provides a fast, step-by-step application setup which allows even novice users to achieve extremely reliable inspection performance in nearly any production environment. In-Sight 2000 vision sensors are configured with In-Sight Explorer software—the world's most widely used environment for configuring and maintaining machine vision applications.

ISOTRON SYSTEMS

BUILD YOUR VISION

2D VISION SYSTEMS

Cognex machine vision systems are unmatched in their ability to inspect, identify, and guide parts. They are easy to deploy and provide reliable, repeatable performance for the most challenging applications.

- Industrial grade with a library of advanced vision tools
- High speed image acquisition and processing
- Exceptional application and integration flexibility

www.cognex.com/machine-vision

3D LASER PROFILERS

Cognex In-Sight laser profilers and 3D vision systems provide ultimate ease of use, power and flexibility to achieve reliable and accurate measurement results for the most challenging 3D applications.

- Factory calibrated sensors deliver fast scan rates
- Industry-leading vision software with powerful 2D and 3D tool sets
- Compact, IP65-rated design withstands harsh factory environments

www.cognex.com/3D-laser-profilers

IMAGE-BASED BARCODE READERS

Cognex industrial barcode readers and mobile terminals with patented algorithms provide the highest read rates for 1-D, 2-D, and DPM codes regardless of the barcode symbology, size, quality, printing method, or surface.

- Reduce costs
- Increase throughput
- Control traceability

www.cognex.com/BarcodeReaders