

# AUTOMATION TRENDS

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OMRON

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## Taming the Challenges of Bottle Labeling

Like monsters from mythology and sci-fi, finding clear bottles and applying labels in just the right place present formidable challenges for automated equipment. Three main problems have to be solved: accurate bottle detection, label placement and verification of label. All these inspections have to happen at lightning speed so as not to slow the pace and reduce productivity.

### Finding the Clear Bottle in Front of You

Clear bottles, whether made of glass or plastic, often thwart reliable detection by photoelectric sensors due to extraneous reflections as bottles jiggle and jostle down conveyors. Polarizing filters over the light source in addition to a retro-reflective sensing technique helps reduce the false signal rate. Bottles made of PET plastic present special challenges, now solved with specially tuned gain and optics. Omron was the first to deliver a solution for PET bottle detection. Once the bottle is filled, proper positioning to receive the label becomes the priority. Usually positioning notches designed into the container resolve the problem. In other cases, a colored ink dot can be applied to aid in orienting the bottle.

### Label Materials and Color Combinations

Whether the bottle holds shampoo, nail polish, beer or pasta sauce, the combination of label material and color characteristics play a big part in how accurately the label can be placed on the bottle. Photoelectric sensors used for label detection range from simple contrast detectors, to color sensors using position-sensing diodes, to sensors with background and foreground suppression. The color of the label and its background determine if a contrast type sensor will provide the high-speed, repeatable results required. Models with blue or green light sources enhance the contrast to improve detection of certain color combinations. For labels with metallic or highly reflective backgrounds, a sensor with position-detection diode detection eliminates problems caused by reflection, color and variable surface textures. For clear bottles with clear labels, foreground or background suppression can increase the accuracy of detection.



### Is the Label Where You Expect It to Be?

The low-cost vision sensors on the market today offer specific functionality ideal for confirming label application. One type can identify a label regardless of positional rotation. Others search a specific target area for critical label elements to assure proper label positioning. These simple vision sensors take just a few minutes to set up since they incorporate lighting, camera and detection circuitry all in one piece. An economical alternative to vision sensors for complex label applications is a compact diffuse sensor that detects labels regardless of label color or luster, bottle color or clarity. In space-restricted processes, fiber-optic amplifiers with sensing heads and cables can provide corner-to-corner placement inspection using simple-to-set controls located a safe distance from the machinery.

## Lot Numbers, Plant and Date Codes

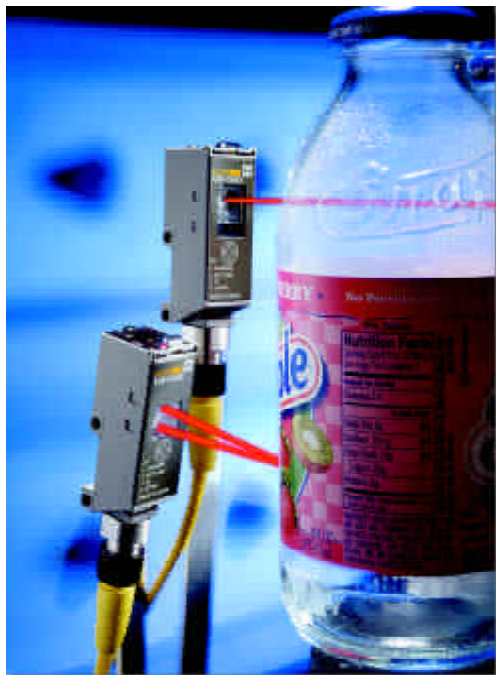
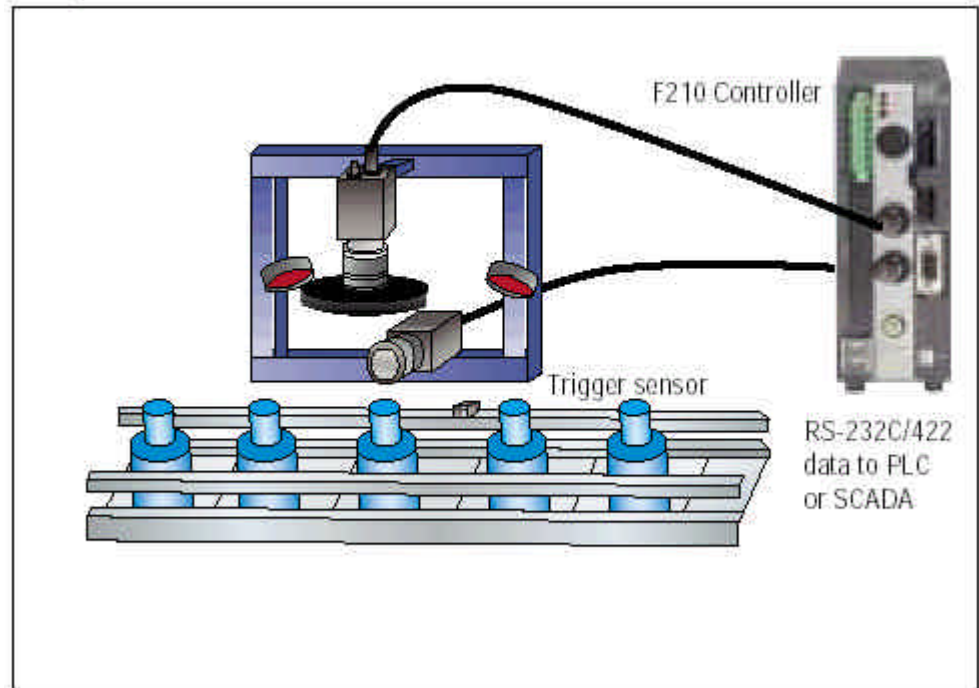
With the heightened security measures recommended by FDA and other agencies charged with protection of food, beverage and cosmetic purity, renewed attention has been focused on quickly tracing products back to their sources. Proper marking of lot numbers as well as plant and date codes on the product itself was reinforced in Spring 2003 with

new proposed guidelines on retaining records of ingredients used in each lot. To validate that codes actually appear on the labels, multiple-camera vision systems provide the reliable solution. Their high-speed processing of multiple views is combined with algorithms already programmed for text recognition and positioning within an acceptable range, so setup and operation are quick and effective. Depending on regulatory requirements, images of the date/lot/plant codes can be stored as graphics along with other statistical data for long-term recordkeeping.

Omron pioneered many of the solutions used in bottle labeling worldwide. The information below shows a few of the products that can be used at each stage of labeling processes.

## OCR and Packaging Inspection

Seal presence/absence and label defect, lot/date confirmation.



### Clear Bottle Detection

**E3Z-B Photoelectric sensor** with "inner view" optics to detect PET and other clear bottles

**E3S-CR62/CR67 Clear bottle sensor** with easy-to-aim, narrow visible red beam detects accurately even with lens effect present

**E3X-DA-TWS or E3X-DA-RMS amplifier** offers comparative outputs using E32-R16 retroreflective fiber-optic sensing head/cable

### Label Presence/Absence by Contrast

**E3S-VSR Mark sensor** with visible red light source, compact metal body

**E3S-VSG Mark sensor** with green light source, compact metal body

**E3X-DAG11-S Amplifier** with green light source for mark detection; use with E32-DC200 fiber-optic sensing head/cable

**E3X-DAB11-S Amplifier** with blue light source for market detection; use with E32-DC200 fiber-optic sensing head/cable

### Label Presence/Absence by Position Diode and/or Color LEDs

**E3S-CD63/68 Label sensor** accurately detects presence/absence regardless of label color combination or texture

**E3M-V High-speed color registration mark** sensor uses color LEDs

**E3MC Color sensor** with RGB light sources provides fast, accurate mark and label detection, stores up to 8 banks of color settings for quick production change over

## **Label Presence/Absence with Foreground/Background Suppression**

**E3Z-LS Miniature photoelectric sensor** with selectable foreground and background suppression detects labels regardless of glossiness or texture

**E3NT-L Rugged, NEMA 4X waterproof photoelectric sensor** detects labels at long distance with great accuracy using selectable foreground and background suppression

Label Placement Vision Sensors

**F10 inspects for label pattern match**, print verification, label placement, and conformity (rejects upside-down, tilted or double labels)

## **Inspection for Label Markings Vision Systems**

**F210 Vision system uses 1 or 2 cameras** for high-speed measurement and inspection in packaging applications. The compact, DIN track mounting controller conserves cabinet space for other machine controls. Advanced algorithms included support inspections for lot/date codes using OCR/OCV and correct label orientation using edge code positioning.

**F250 Vision system uses up to 4 cameras** to support simultaneous inspection of multiple locations on a package at high production line speeds.

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