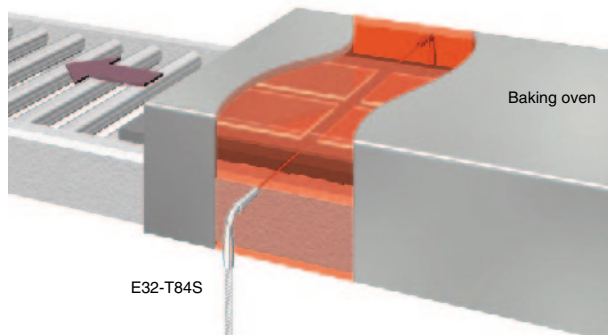




1. Detecting Glass Substrates in Baking Ovens

An L-shaped side-view sensor requiring little space and providing 200°C heat resistance is used. The detection distance of 1,300 mm (for E3X-DA-N Standard Mode) is more than sufficient to detect even large glass substrates.

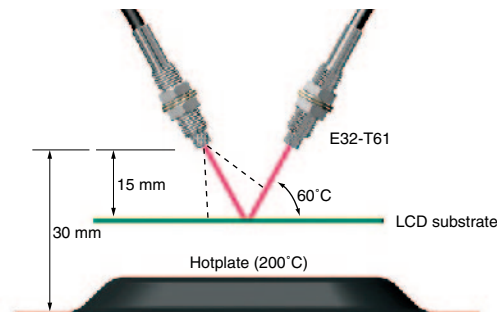


E32-T84S (page A-2)

Heat-resistant, Narrow-beam Fiber Unit

2. Detecting Liquid Crystal Substrates in Ovens

Regular reflective light from the LCD substrates is received with a fiber to detect the presence or absence of the substrates. The large spot ensures stable detection of substrates even if positioning is not completely consistent.

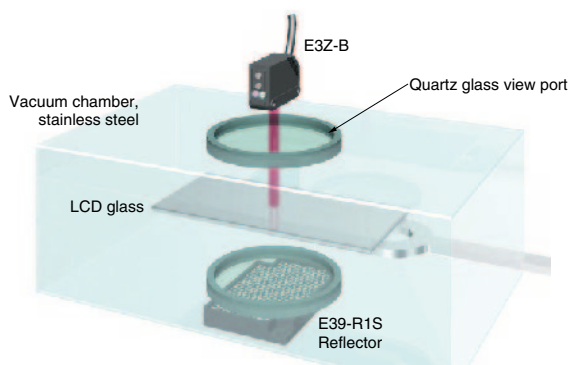


E32-T61 (page A-2)

Heat-resistant Fiber Unit

3. Detecting Glass Substrates in Vacuum Chambers

The E3Z-B is a retroreflective sensor that enables accurate detection even of transparent glass.

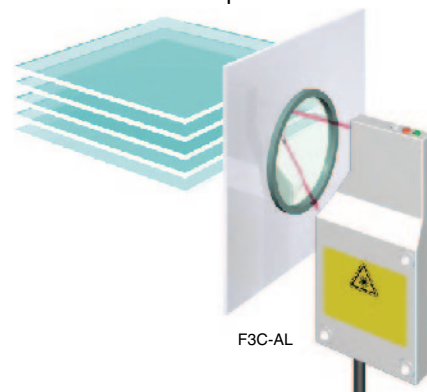


E3Z-B (page A-94)

Photoelectric Sensors for Detecting Transparent Objects

4. Detecting the Edges of Liquid Crystal Glass through a View Port

The edges of the liquid crystal glass substrates are detected from outside of the view port.

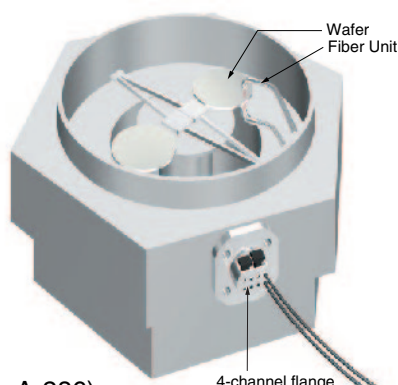


F3C-AL (page A-248)

Distance-controlled Laser Photoelectric Sensors

5. Detecting Wafers in a Vacuum Conveyance System

The E32-V provides an easy-connecting fiber and easy-to-use 4-channel flange system, making it ideally applicable to vacuum systems.

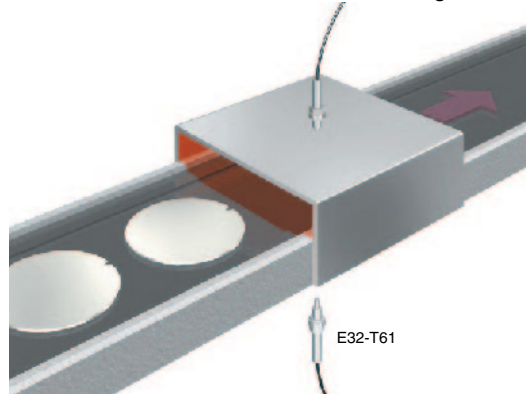


E32-V (page A-286)

Vacuum Sensors

6. Detecting Wafers under High Temperatures

The E32-T61 features a temperature-resistant fiber for stable detection of wafers baked at 300°C or higher.



E32-T61 (page A-2)

Heat-resistant Fiber Unit

7. Mapping Wafers with a Through-beam Side-view Sensor

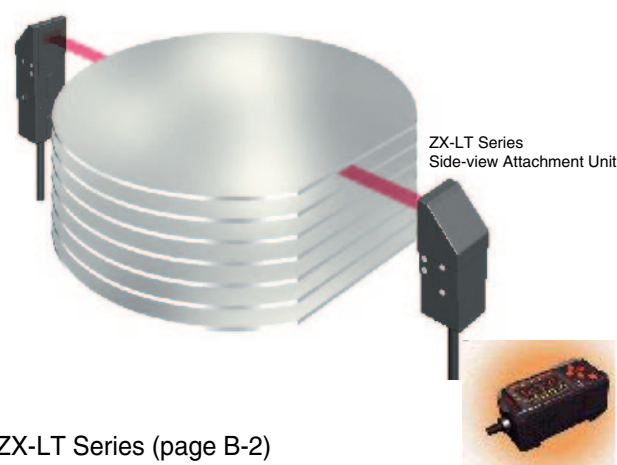
The narrow beam permits the detection of single wafers, even of wafers with mirror surfaces.



E32-A03/A04 (page A-2)
Mapping Fiber Units

8. Mapping Wafers with a Through-beam Laser Sensor

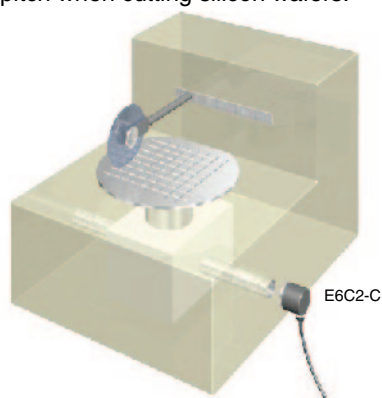
The ZX-LT Series even detects transparent objects and glossy wafers.



ZX-LT Series (page B-2)

9. Positioning for Wafer Cutting Machines

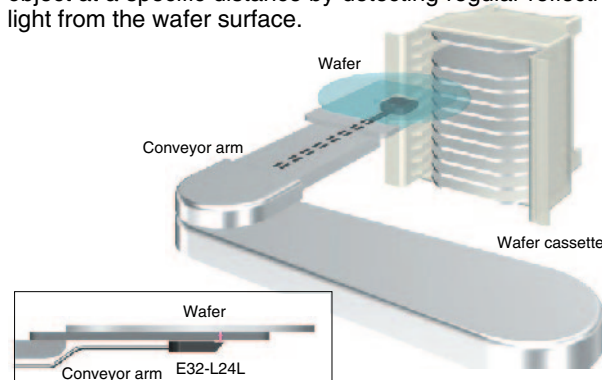
This sturdy rotary encoder enables positioning at a consistent cutting pitch when cutting silicon wafers.



E6C2-C (page F-5)
Incremental Rotary Encoders

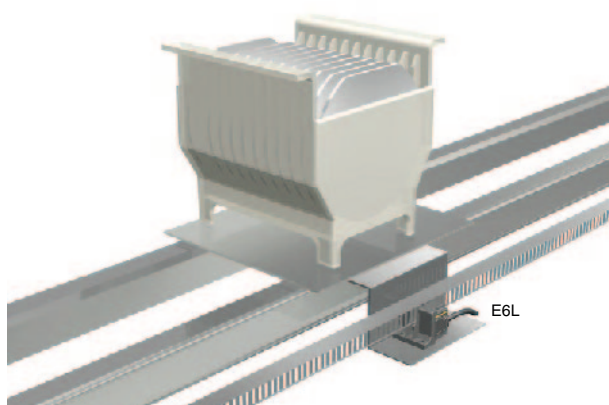
10. Detecting the Bottom Wafer

Using convergent reflective operation enables detecting an object at a specific distance by detecting regular reflective light from the wafer surface.



E32-L24L (page A-2)
Convergent Reflective Fiber Unit

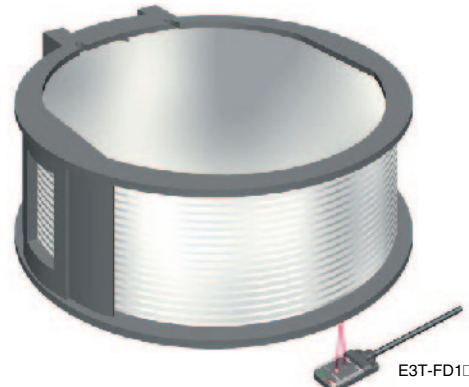
11. Wafer Positioning and High-speed Detection



E6L (page F-13)
Easy-scale Linear Encoder

12. Wafer Cassette Mounting Confirmation

This slim sensor is only 3.5 mm thick to allow installation in small gaps and spaces.

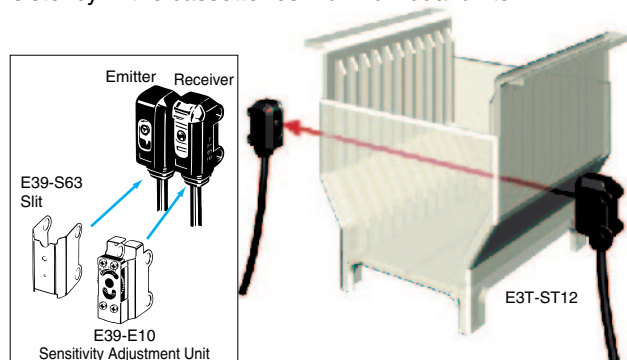


E3T (page A-120)
Subminiature Photoelectric Sensors with a Built-in Amplifier



13. Detecting Wafer Cassette Racks

The installation of a Slit and Adjustment Unit permits a restricted light for stable detection even when there is inconsistency in the cassette resin or individual units.



E3T (page A-120)

Subminiature Photoelectric Sensors with a Built-in Amplifier

14. Positioning Wafer Notches

The small spot with a 0.1 mm diameter allows high-precision notch positioning.

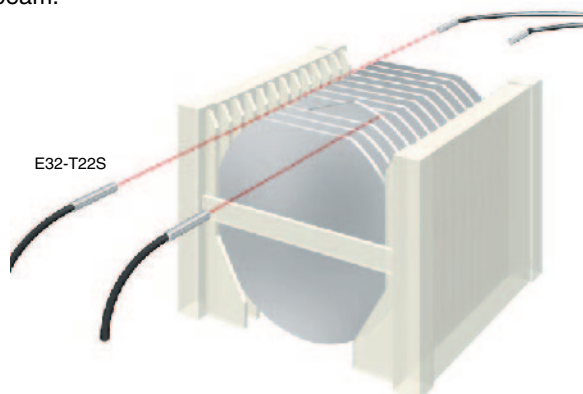


E32-T16J (page A-2)

Area-detecting Fiber Unit

15. Checking Orientation Flat Directions with a Fiber Unit

High-precision detection is possible using a narrow-view beam.

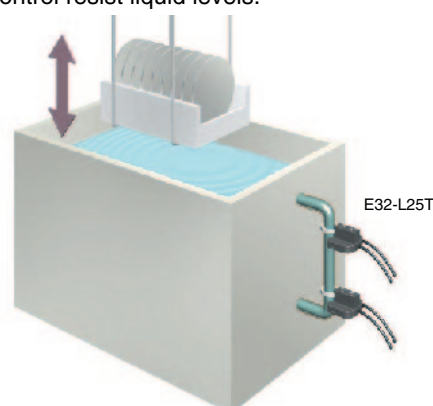


E32-T22S (page A-2)

Narrow-view Fiber Unit

16. Chemical Level Detection with Pipe Mounting

A minimum level difference of 4 mm can be detected in stages to control resist liquid levels.

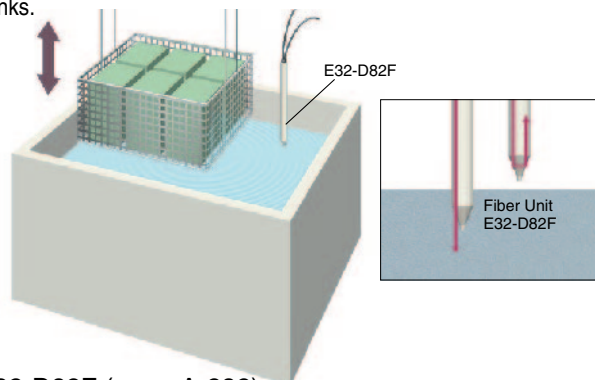


E32-L25T (page A-284)

Fiber Pipe-mounting Liquid Level Sensor

17. Level Detection in Heated Chemicals

The Fiber Unit uses Teflon* so that chemical levels can be precisely and directly detected in cleaning tanks or chemical processing tanks.



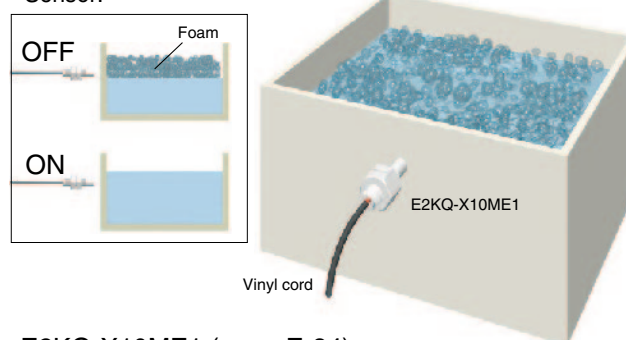
E32-D82F (page A-282)

Contact Liquid Level Sensors

*Teflon is a registered trademark of DuPont Company and Mitsui DuPont Chemical Company for their fluoride resin.

18. Detecting Levels of Corrosive Liquids

Sensitivity adjustment can prevent detection errors previously caused by foam in cleaning tanks containing soap. Application in corrosive liquids is also possible by using a Teflon* Sensor.



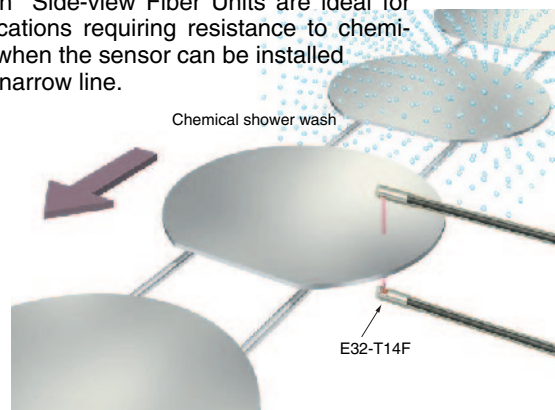
E2KQ-X10ME1 (page E-84)

Chemical-resistant Capacitive Proximity Sensor

*Teflon is a registered trademark of DuPont Company and Mitsui DuPont Chemical Company for their fluoride resin.

19. Detection on Narrow Lines for Chemical Washing

Teflon[®] Side-view Fiber Units are ideal for applications requiring resistance to chemicals when the sensor can be installed on a narrow line.



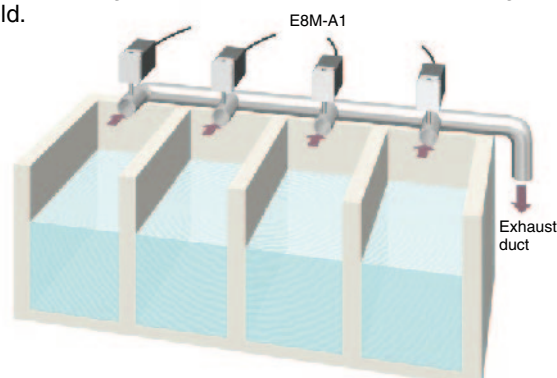
E32-T14F (page A-2)

Teflon Side-view Fiber Unit

*Teflon is a registered trademark of DuPont Company and Mitsui DuPont Chemical Company for their fluoride resin.

20. Controlling Exhaust Pressure for Individual Cleaning Tanks

Sensors detect the exhaust pressure of each cleaning tank, enabling independent control and improving wafer yield.

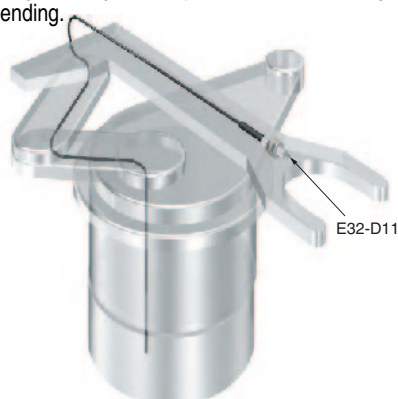


E8M-A1/K3C-MP8-T1Z (page G-4)

Minute Pressure Sensors

21. Detecting Workpieces by Robot Hand

An allowable bending radius of 4 mm enables the E32-D11/D21 to withstand repeated bending, making it ideally applicable to moving parts subject to frequent bending.

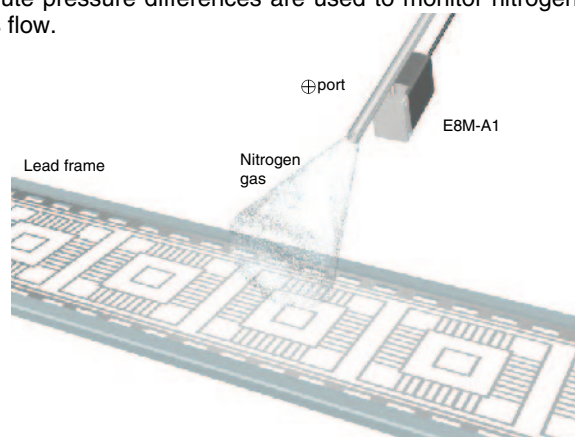


E32-D11/D21 (page A-2)

Moving-piece-mounting Fiber Unit

22. Controlling Nitrogen Gas Pressure

Minute pressure differences are used to monitor nitrogen gas flow.

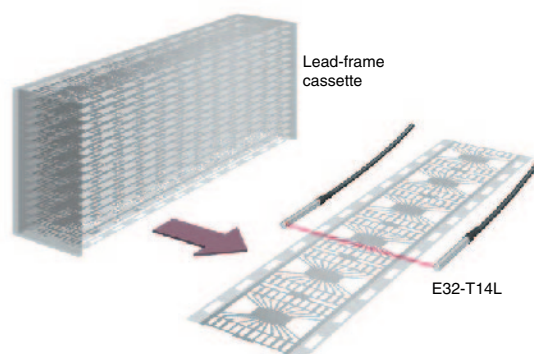


E8M-A1 (page G-4)

Minute Pressure Sensors

23. Detecting Lead Frames in Tight Spaces

Side-view configuration allows use in spaces that are too small to install ordinary through-beam sensors. Highly effective, space-saving installation.



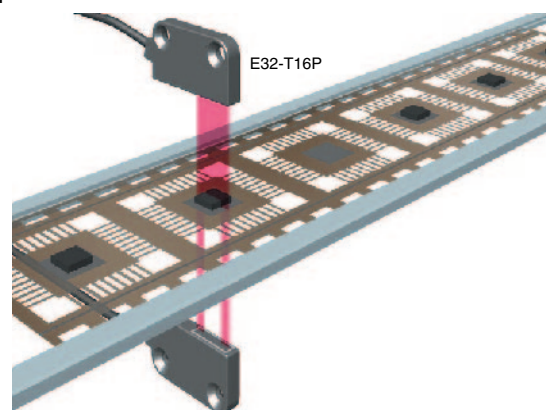
E32-T14L (Through-beam) /

E32-D24 (Reflective) (page A-2)

Side-view Fiber Units

24. Detecting Chips on TAB Films

Chips are detected in an area of 11 mm.



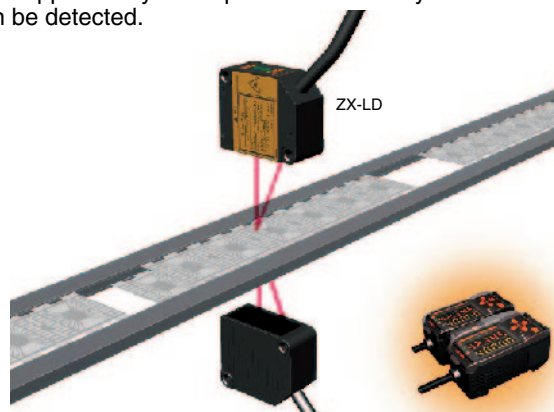
E32-T16P (page A-2)

Area-detecting Fiber Unit



25. Detecting Overlapped Lead Frames and Other Shiny Metals

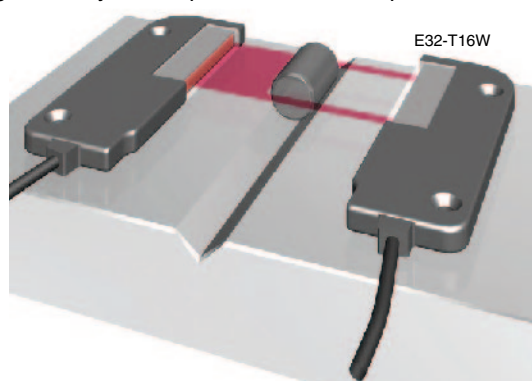
Overlapped shiny metal plates that are only 0.15 mm thick can be detected.



ZX Series (page B-2)
Smart Sensors

26. Distinguishing the Length of IC Resin Tablets

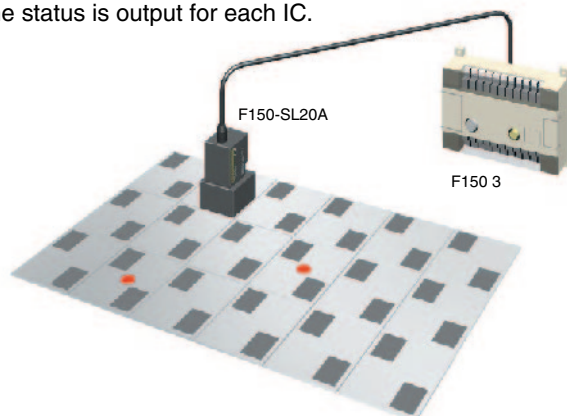
The length of resin tablets for different IC types can be distinguished by the amplifier's monitor output.



E32-T16W Area-detecting Fiber Unit (page A-2)
E3X-DA-21-N Digital Fiber Amplifier with Monitor Output

27. Determining Defective IC Chips by Identifying Bad Marks

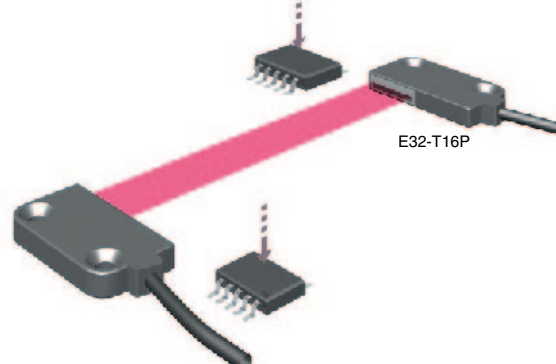
The bad marks applied to ICs on wafer plates are read, and the status is output for each IC.



F150-3 (page C-46)
Vision Sensors

28. Detecting the Passage of Chip Components

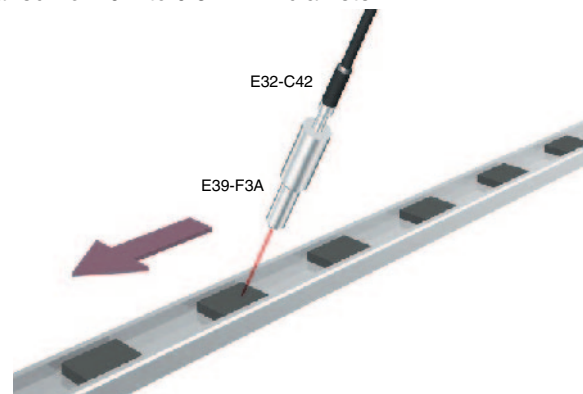
The passing of chip components is detected even if the passing location varies within a width of 11 mm, regardless of whether they are metallic or non-metallic.



E32-T16P Area-detecting Fiber Unit (page A-2)
E3X-DAD Digital Fiber Amplifier with Differential Output

29. Detecting Chip Components

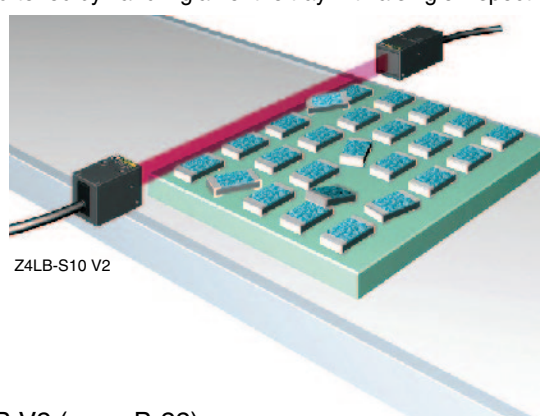
Adding a Lens Unit to a fiber sensor enables the spot to be varied from 0.1 to 0.6 mm in diameter.



E32-C42 Fiber Unit (page A-2)
E39-F3A Lens Unit

30. Detecting the Alignment of Chip Components

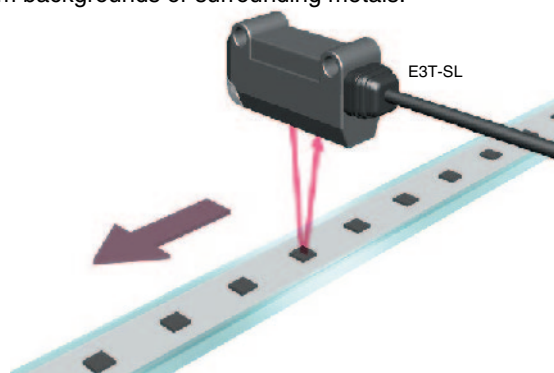
Raised or angled chips can be found on trays. Inspection time is shortened by handling an entire tray with a single inspection.



Z4LB V2 (page B-22)
Parallel Beam Linear Sensors with a Separate Amplifier

31. Detecting Chip Components on the Tapes of Taping Machines

The E3T is capable of detecting objects as small as 0.15 mm. Detection remains stable, with minimal effect from backgrounds or surrounding metals.

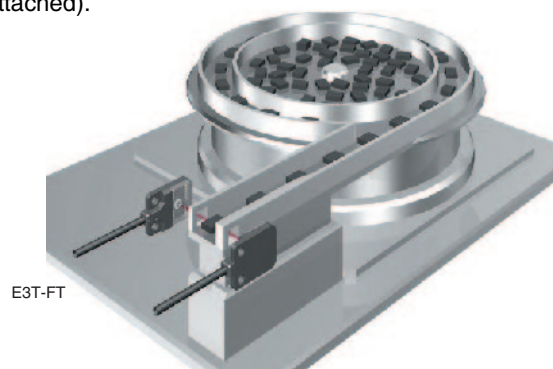


E3T (page A-120)

Subminiature Photoelectric Sensors with a Built-in Amplifier

32. Detecting the Passage or Retention of Components by a Parts Feeder

The use of a visible pinpoint beam permits the detection of workpieces smaller than 0.5 mm in diameter (when slit is attached).

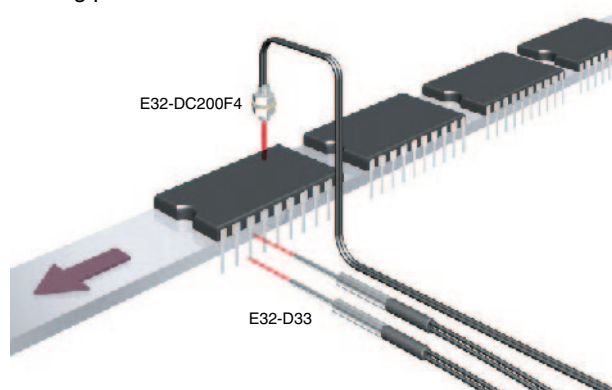


E3T (page A-120)

Subminiature Photoelectric Sensors with a Built-in Amplifier

33. Detecting Bent or Missing IC Pins

Three sensors are used to simultaneously detect bent or missing pins.

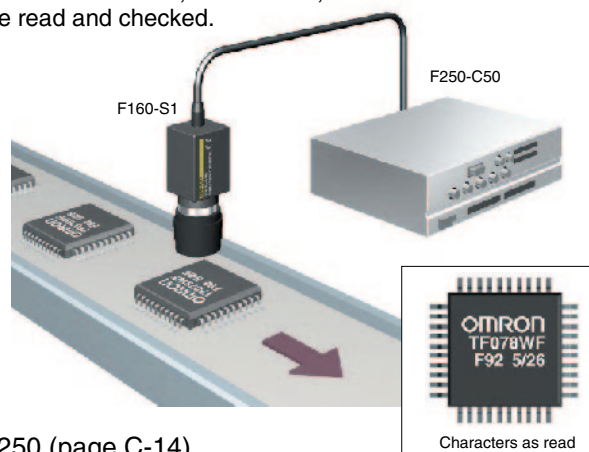


E32-D33 (page A-2)

Thin Head Fiber Unit

34. Verifying IC Models, Lot Numbers, and Printed Characters

IC model numbers, lot numbers, and other information can be read and checked.

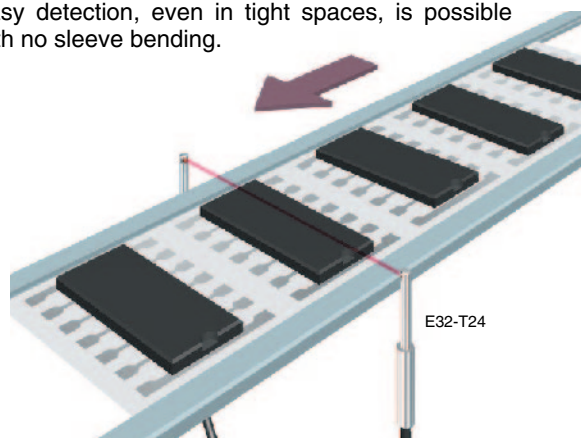


F250 (page C-14)

High-performance Vision Sensor

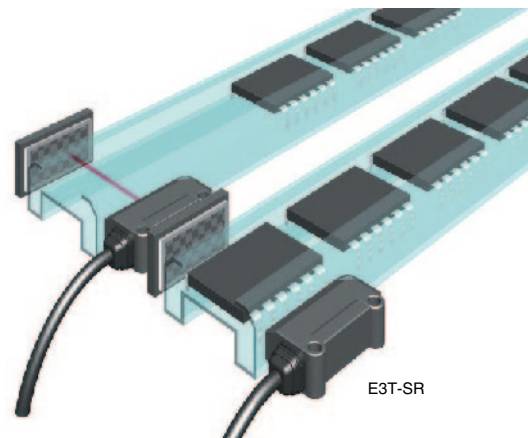
35. Detecting Rises in Lead Frames

Easy detection, even in tight spaces, is possible with no sleeve bending.



E32-T24 (page A-2)

Thin Side-view Fiber Unit

36. Detecting Full IC Sticks

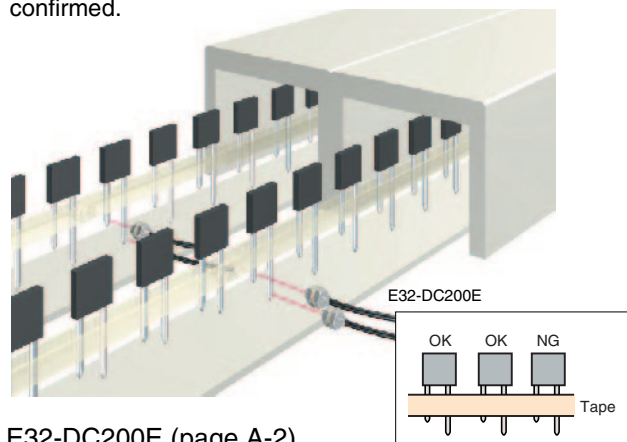
E3T (page A-120)

Subminiature Photoelectric Sensors with a Built-in Amplifier



37. Distinguishing Lead Wire Defects in Components

The length of lead wires of electronic components can be confirmed.

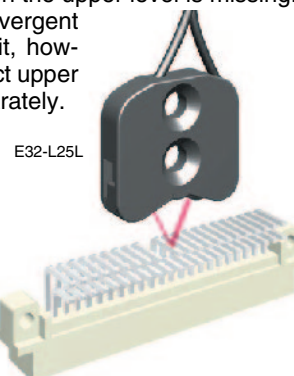


E32-DC200E (page A-2)
Fiber Unit

38. Detecting Connector Pins

When inspecting two levels of connector pins with an ordinary fiber unit, the lower set of connector pins caused an ON signal even when the upper level is missing.

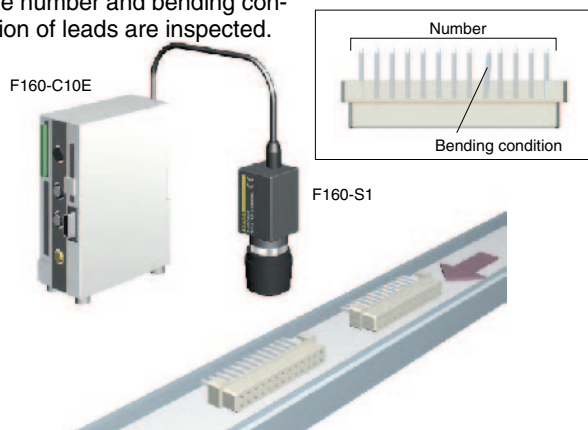
The E32-L25L Convergent Reflective Fiber Unit, however, is able to detect upper and lower sets separately.



E32-L25L (page A-2)
Convergent Reflective Fiber Unit

39. Inspecting Connector Leads

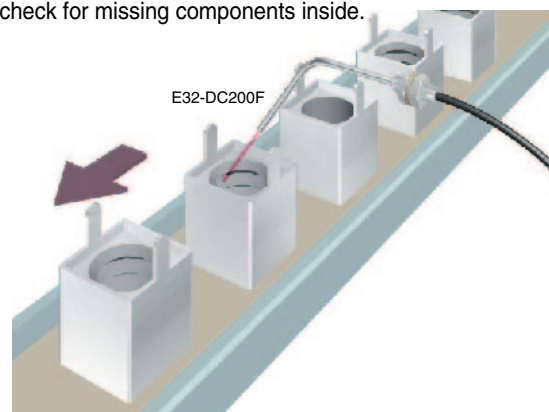
The number and bending condition of leads are inspected.



F160 (page C-2)
Vision Sensor

40. Detecting Parts Inside Metal Cases

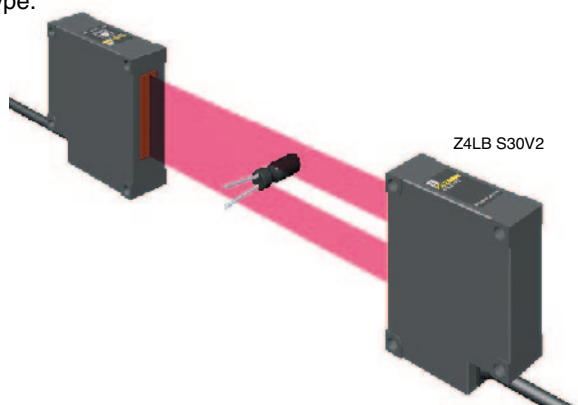
The E32-DC200F detects reflected light from internal threads to check for missing components inside.



E32-DC200F (page A-2)
Thin Sleeve Fiber Unit

41. Classifying Capacitors

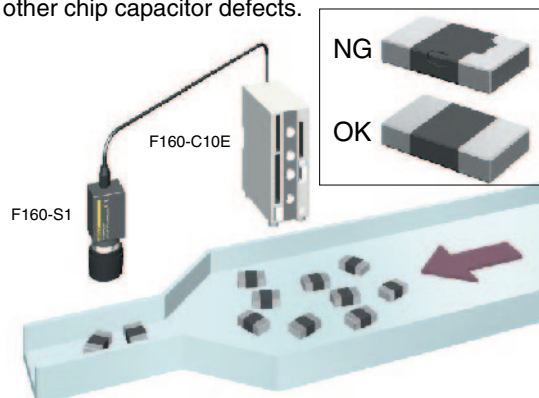
The diameter of each capacitor is used to determine its type.



Z4LB V2 (page B-22) and ZX-Series (page B-2)
Parallel Beam Linear Sensors with a Separate Amplifier

42. Inspecting for Defects on Chip Capacitors

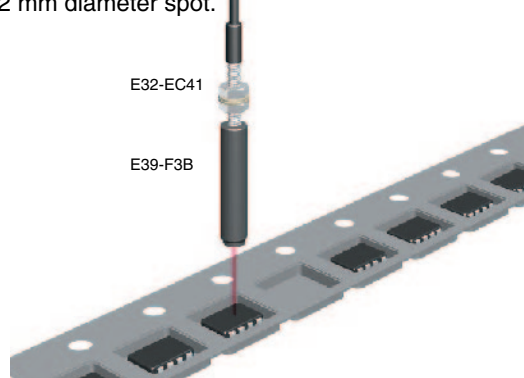
Inspection is possible for mold defects, missing terminals, and other chip capacitor defects.



F160 (page C-2)
Vision Sensor

43. Detecting Missing Chips on Embossed Tape

Adding a Lens Unit to a fiber sensor permits the detection of very small workpieces at a detection distance of 17 mm with a 0.2 mm diameter spot.

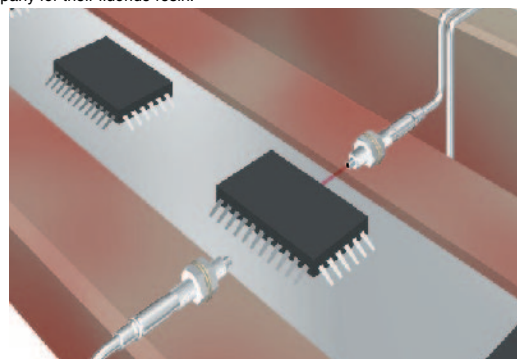


E32-EC41 Fiber Unit (page A-2)
E39-F3B Lens Unit

44. Detecting ICs in a High-temperature Handler

A Teflon* coating eliminates the weak spot of heat-resistance fibers (i.e., hard and difficult to bend) to achieve a bending radius of 10 mm.

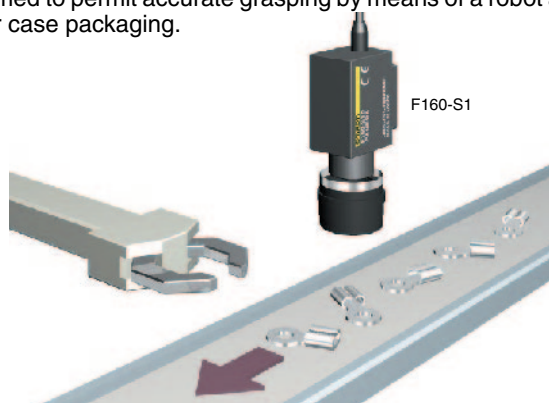
*Teflon is a registered trademark of DuPont Company and Mitsui DuPont Chemical Company for their fluoride resin.



E32-T81R (page A-2)
Heat-resistant Fiber Unit

45. Terminal Picking

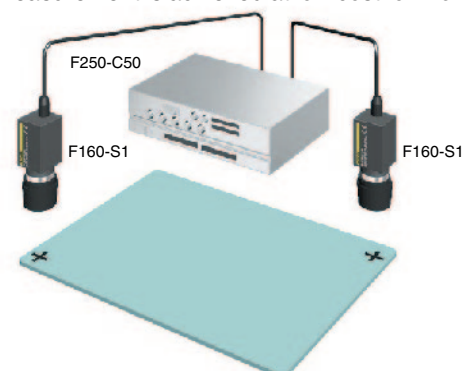
The position and orientation of workpieces can be confirmed to permit accurate grasping by means of a robot arm for case packaging.



F250 (page C-14)
High-performance Vision Sensor

46. Liquid Crystal Position Measurement

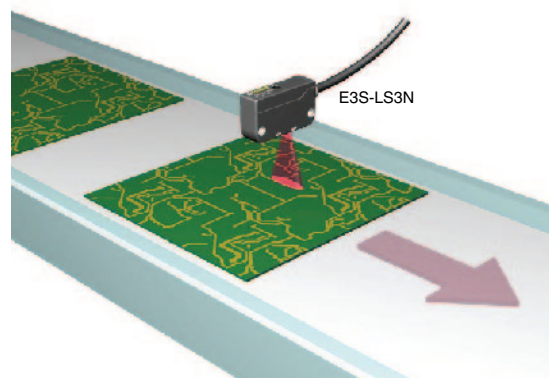
The positions of liquid crystal reference marks can be measured using two cameras to determine the overall position. Stable measurement is achieved at low cost for moving objects.



F250 (page C-14)
High-performance Vision Sensor

47. Detecting PCBs

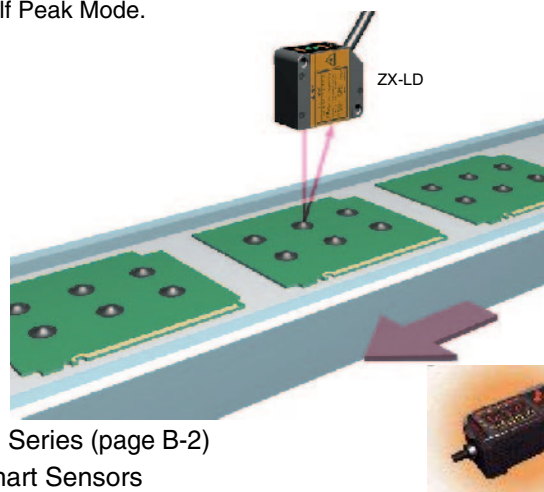
Stable detection is possible because the large spot is not affected by the color, holes or notches of the boards.



E3S-LS3N (page A-290)
PCB Sensors

48. Inspecting Board Mold Height

The peak height of a board can be measured by using the Self Peak Mode.



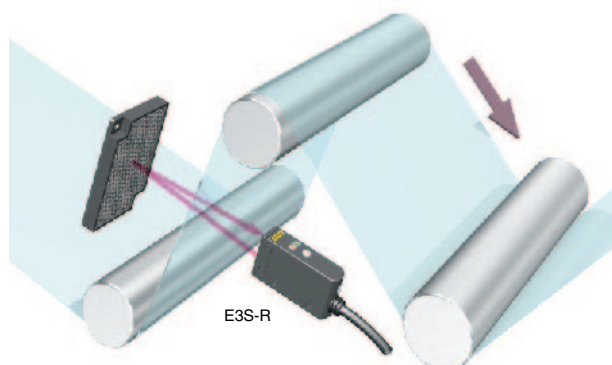
ZX Series (page B-2)
Smart Sensors



Packing, Food Products, Chemicals, and Sanitation

49. Detecting Clear Film

Clear film can be detected with a reflector, reducing the amount of wiring.

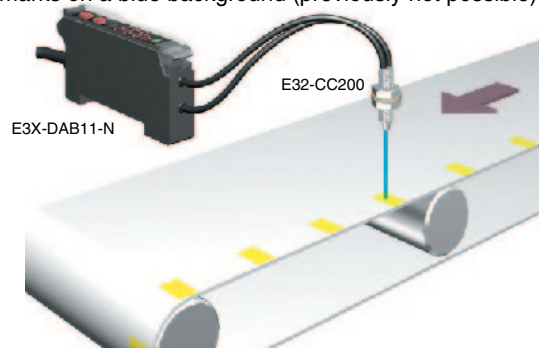


E3S-R (page A-274)

Transparent Object Photoelectric Sensors

50. Detecting Registration Marks

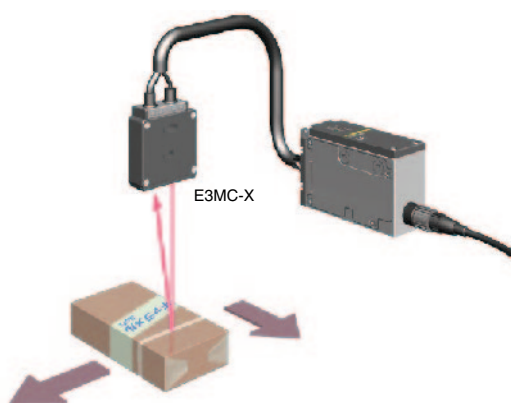
Teaching is also possible, and sensitivity can be adjusted without aligning the register marks. A blue LED light source enables detecting yellow marks on a white background or purple marks on a blue background (previously not possible).



E3X-DAB11-N (page A-2)

Blue LED Teaching Fiber Amplifier

51. Detecting Out-of-place Candy Wrapper Tapes



E3MC (page A-226)

RGB Color Sensors

52. Detecting Shrink Tubes

Stable detection is possible even for clear shrink tubes.

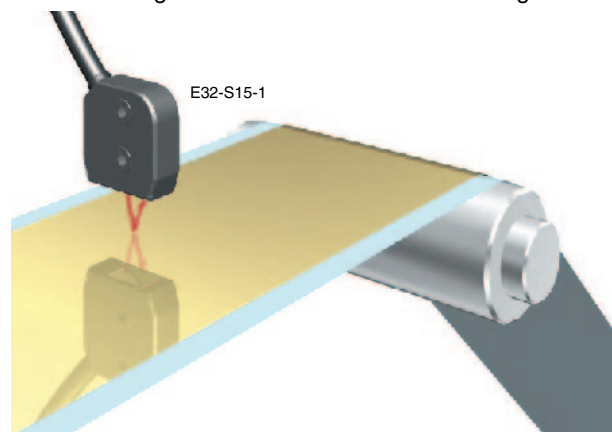


E3X-NL (page A-256)

Optical Fiber Glossy Object Sensor

53. Detecting Coatings on Paper or Metal

Differences in gloss can be used to detect coatings.

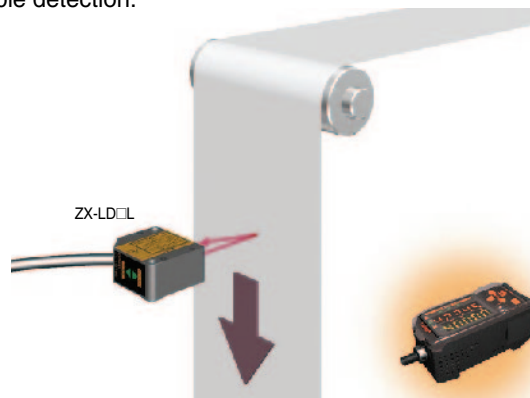


E3X-NL (page A-256)

Optical Fiber Glossy Object Sensor

54. Detecting Looseness in Sheets

Small surface variations can be averaged out to enable stable detection.

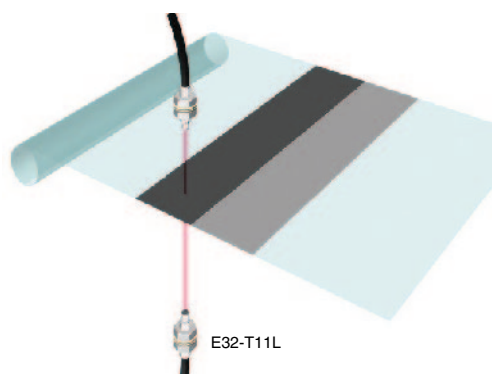


ZX Series (page B-2)

Smart Sensors

55. Detect Shades of Black on Sheets

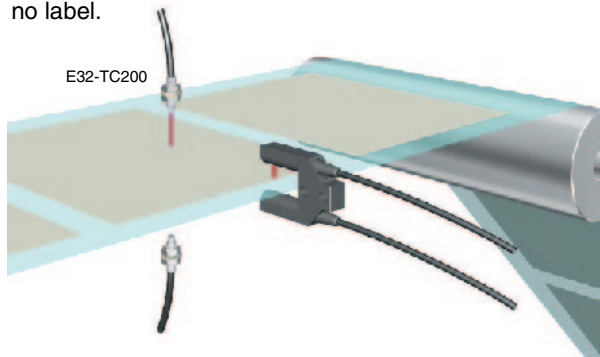
Differences in mark density can be used to permit detection using an infrared light source and through-beam sensor.



E3X-DAH11-N Infrared Digital Fiber Amplifier (page A-2)
E32-T11L Long-distance Fiber Unit

56. Detecting Labels

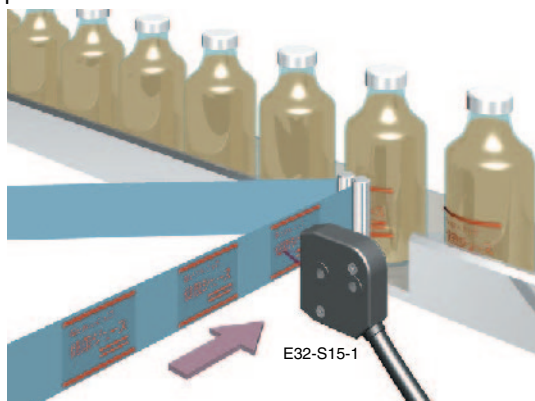
Detection is possible with a through-beam fiber sensor if the backing material is translucent. The light beam is interrupted when a label is detected and received when there is no label.



E3X-DAB11-N Blue LED Teaching Fiber Amplifier (page A-2)
E32-TC200 Fiber Unit

57. Detecting Clear Labels on Support Paper

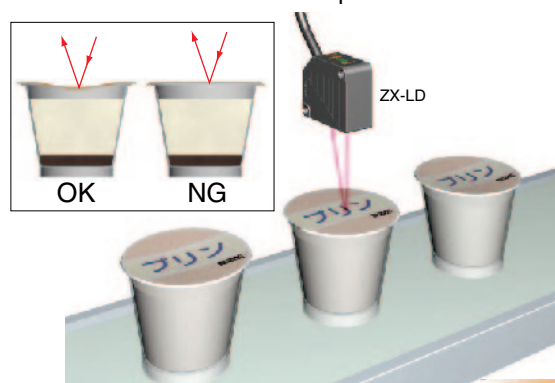
Even clear labels at close intervals on support paper can be positioned without contact.



E32-S15-1/E3X-NL11 (page A-256)
Optical Fiber Glossy Object Sensor

58. Detecting Pinholes in Sealed Containers

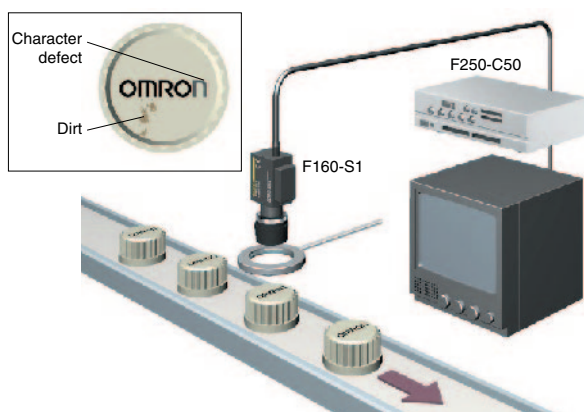
Differences in the depression of the film on the top of the container can be used to detect pinholes.



ZX Series (page B-2)
Smart Sensors

59. Detecting Dirt on Caps

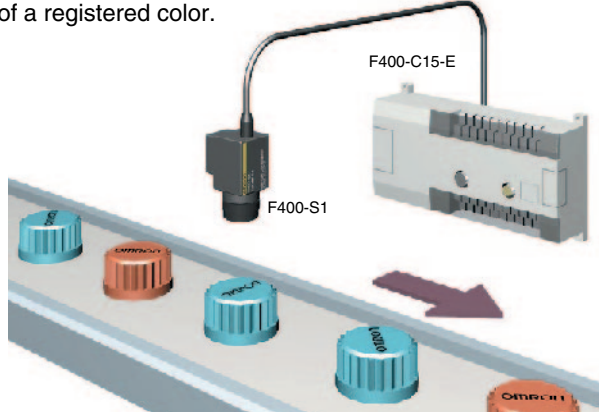
Character defects and other defects can also be detected.



F250 (page C-14)
High-performance Vision Sensor

60. Detecting Incorrect Caps

Any caps of a different type can be detected using the area of a registered color.



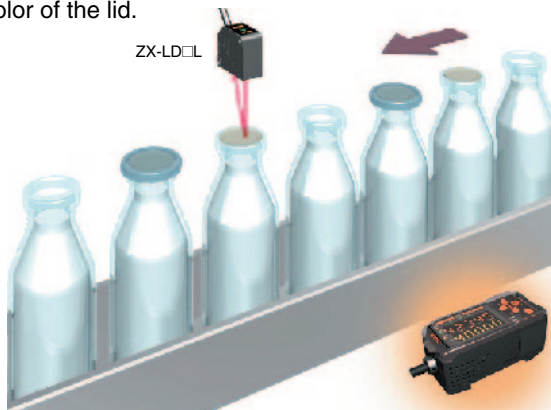
F400 (page C-66)
Color Vision Sensor



Packing, Food Products, Chemicals, and Sanitation

61. Detecting Lids on Milk Bottles

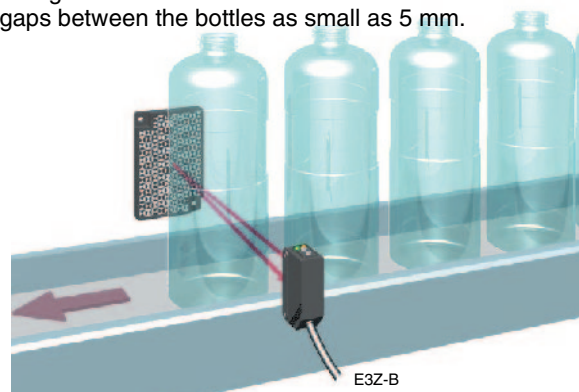
Stable detection is possible without being affected by the color of the lid.



ZX Series (page B-2)
Smart Sensors

62. Detecting PET Bottles

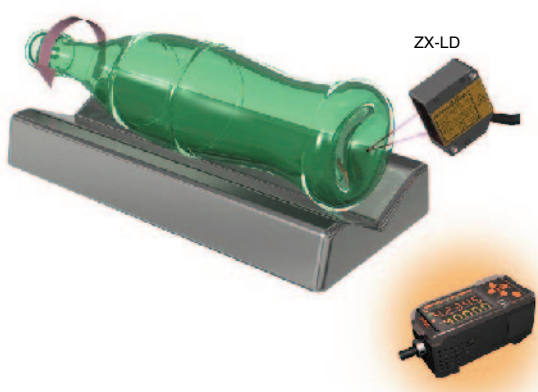
A retrospective reflex sensor that saves both space and wiring can achieve stable detection of PET bottles with gaps between the bottles as small as 5 mm.



E3Z-B (page A-94)
Photoelectric Sensors for Detecting Transparent Bottles

63. Position Detection of Glass Bottle Hollows

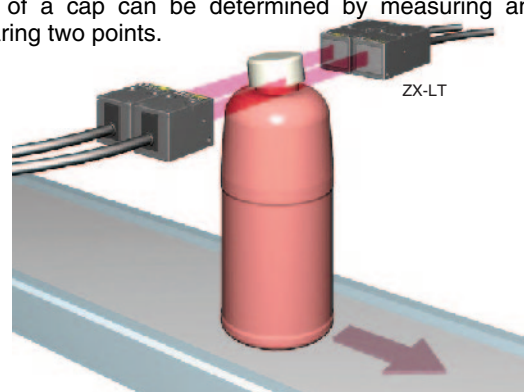
The 2- to 3-mm hollow on the bottom of bottles can be used for positioning and other operations.



ZX Series (page B-2)
Smart Sensors

64. Detecting Cap Height

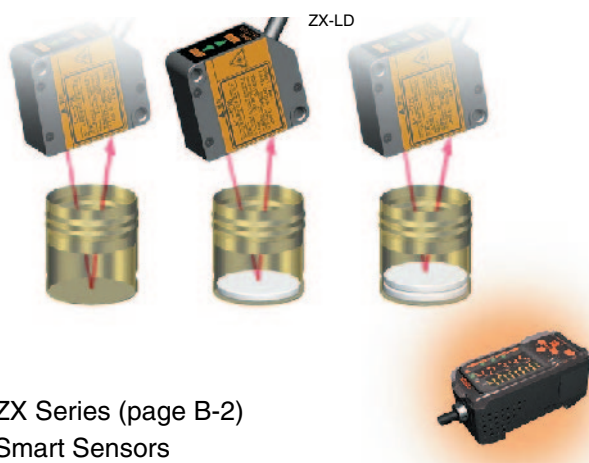
A check can be made for caps that are not straight by comparing the height of a cap left-to-right. The height and inclination of a cap can be determined by measuring and comparing two points.



ZX-LT-Series (page B-2)
Smart Sensors

65. Determining the Number of Inner Linings in Bottle Caps

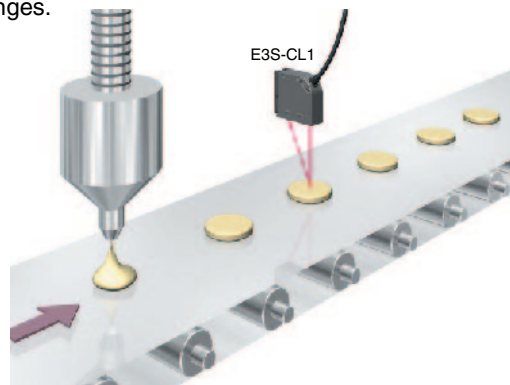
The evaluation output of the amplifier can be used to determine the number of cap linings.



ZX Series (page B-2)
Smart Sensors

66. Detecting Candy and Cookies on Conveyor Belts

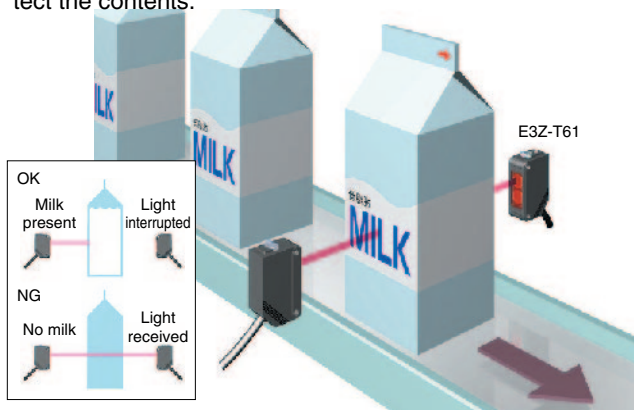
Detection is even possible from overhead. Sensitivity adjustment is not required even if the color of the product changes.



E3S-CL Distance-controlled (page A-156)
Photoelectric Sensors

67. Detecting Liquid in Paper Cartons

A powerful light beam can penetrate paper cartons to detect the contents.

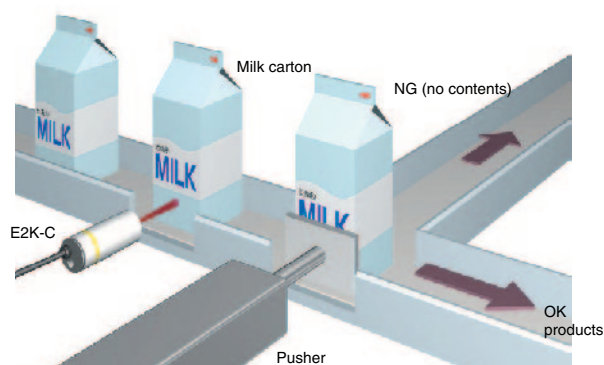


E3Z (page A-94)

Photoelectric Sensors with a Built-in Amplifier

68. Detecting Milk in Paper Cartons

Milk in opaque paper cartons can be detected using a capacitive sensor.

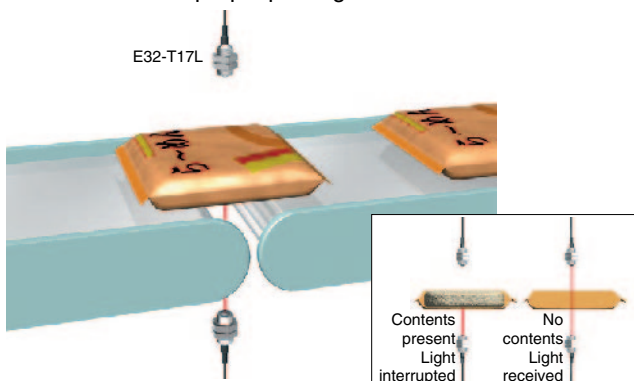


E2K-C (page E-74)

Long-distance Capacitive Proximity Sensors

69. Detecting the Contents of Opaque Packages

The E3X-DA-N Long-distance Sensor enables detecting the contents of opaque packages.

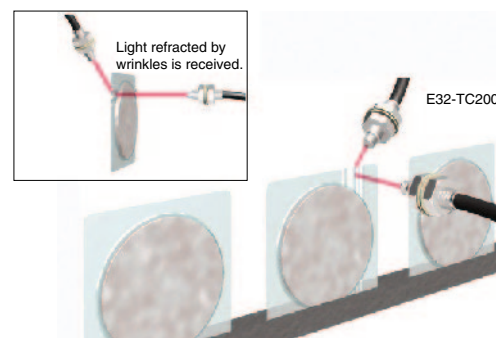


E32-T17L (page A-2)

Long-distance Fiber Unit

70. Inspecting Food Packages

Wrinkles in package materials can be detected. As shown below, light refracted by wrinkles in the package is received if the emitter and receiver are installed at an angle to each other.

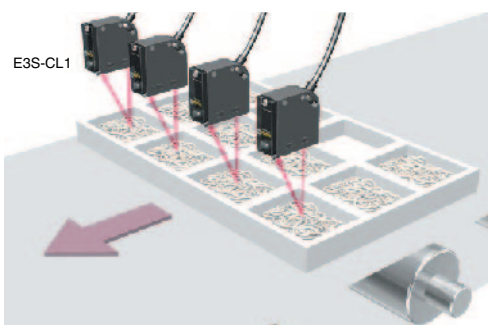


E32-TC200 (page A-2)

Fiber Unit

71. Detecting Noodles in Trays

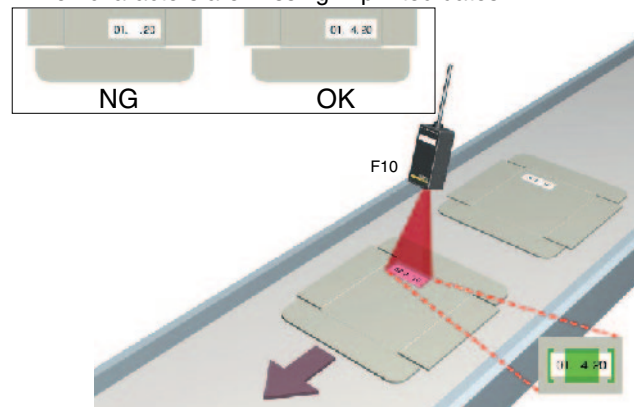
Being able to differentiate between the tray separators and the tray bottoms enables stable detection of noodles without chattering. Water resistance of IP67 is provided for application in water rinsing processes in the food industry.



E3S-CL Distance-controlled (page A-156)
Photoelectric Sensors

72. Inspecting for Missing Characters in Dates

The F10 Pattern-matching Sensors are able to determine when characters are missing in printed dates.



F10 (page C-22)

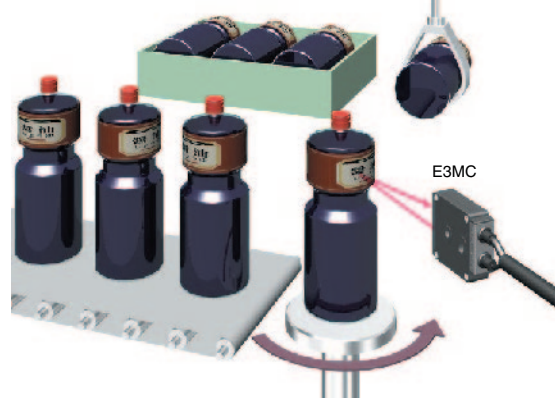
Pattern-matching Sensors



Packing, Food Products, Chemicals, and Sanitation

73. Aligning Object Direction during Packing

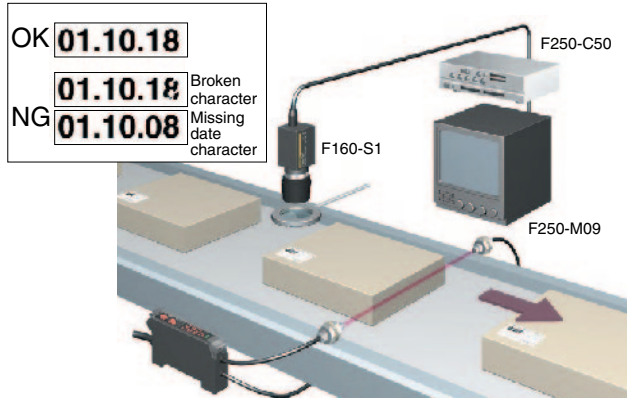
The direction of objects can be aligned during packing by detecting minute color differences and marks.



E3MC (page A-226)
RGB Color Sensors

74. Verifying Expiration Dates

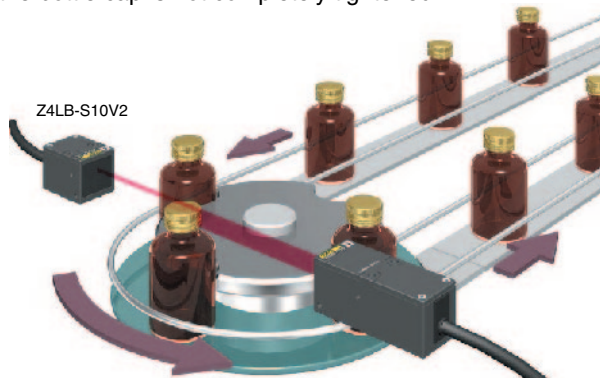
The characters in expiration dates can be read and confirmed.



F250 (page C-14)
High-performance Vision Sensor

75. Inspecting the Tightening Condition of Caps on Bottled Chemicals

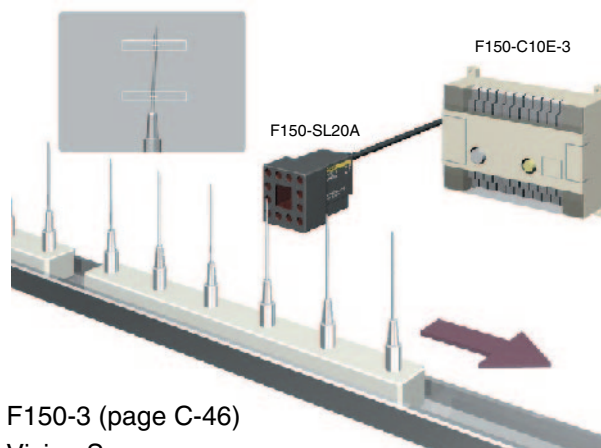
The amount of blocked light is measured at the end of the rotary table. The amount that is blocked increases when the bottle cap is not completely tightened.



Z4LB V2 (page B-22)
Parallel Beam Linear Sensors with a Separate Amplifier

76. Inspecting for Bent Hypodermic Needles

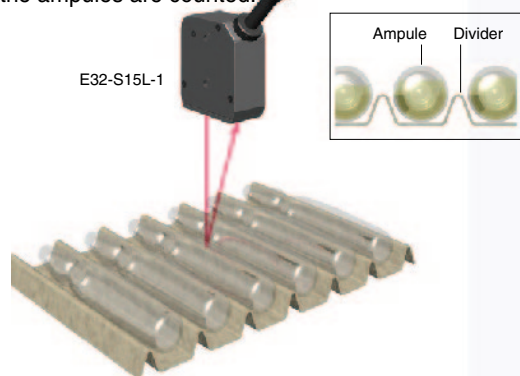
Bending can be determined by measuring the difference between the base and the tip of the needle.



F150-3 (page C-46)
Vision Sensors

77. Counting Glass Ampules

The difference in glossiness is used to differentiate between the ampules and the dividers between them, to ensure that only the ampules are counted.



E3X-NL (page A-256)
Optical Fiber Glossy Object Sensor

78. Detecting the Powdered Chemicals Passing through a Transparent Tube

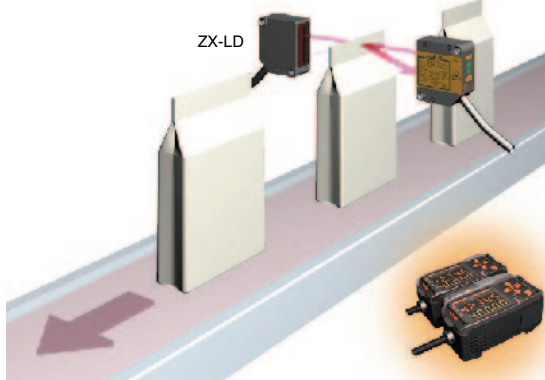
Powdered chemicals passing within a specific area can be detected, and adjustments can be made by teaching. Teaching can be done without a workpiece.



E32-D36P1 (page A-2)
Area-detecting Fiber Unit

79. Detecting Adhesive Application on Bags of Chemicals

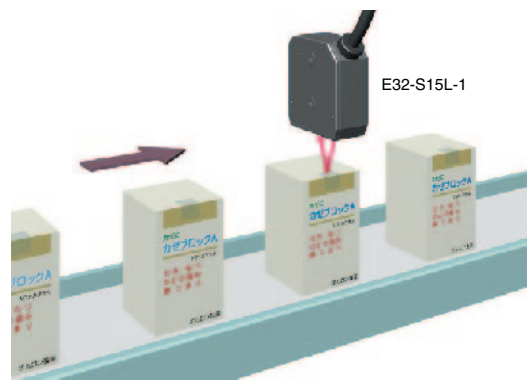
The application of adhesive is detected by using two sensors to measure the thickness of the bag.



ZX Series (page B-2)
Smart Sensors

80. Checking Sealing Tape on Boxes of Pharmaceuticals

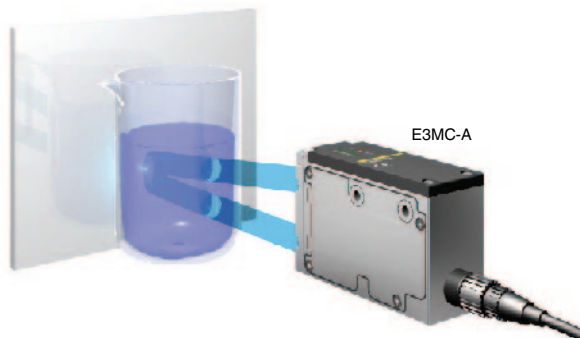
The difference in glossiness is used to detect sealing tape without being affected by the colors or patterns on the box.



E3X-NL (page A-256)
Optical Fiber Glossy Object Sensor

81. Liquid Color Detection

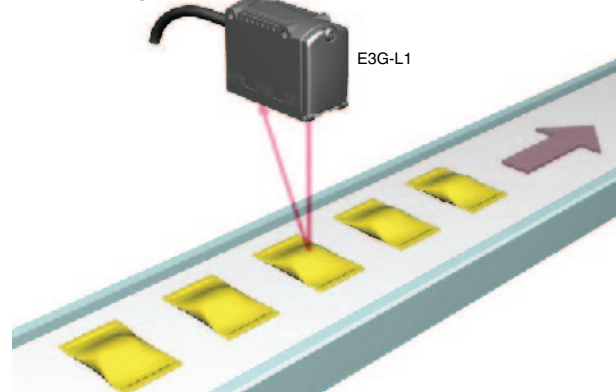
The E3MC RGB Color Sensors distinguish colors by detecting differences between them and registered reference colors. Stability can be further enhanced by placing a white panel in the background.



E3MC (page A-226)
RGB Color Sensors

82. Detecting Wrapped Candies

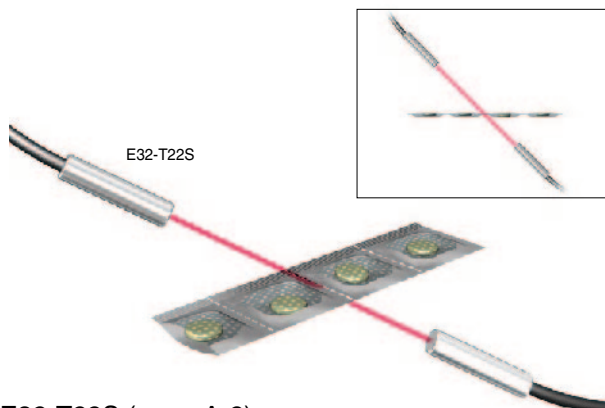
Stable detection is possible without being affected by the color, tilt, or glossiness of the candies.



E3G-L1/L3 (page A-180)
Distance-controlled Photoelectric Sensors

83. Counting Desiccant Packets

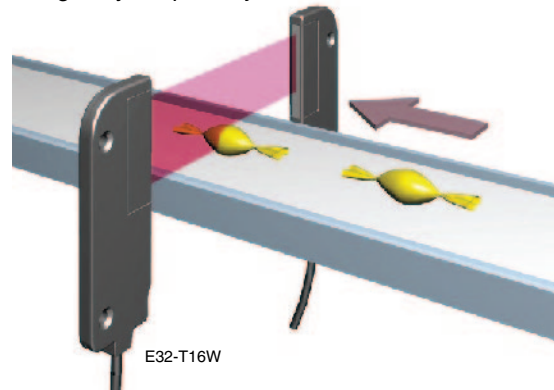
The perforations between desiccant packets are detected by the E32-T22S Narrow-view Fiber Unit.



E32-T22S (page A-2)
Narrow-view Fiber Unit

84. Detecting the Front Edge Location of Candies

Area detection using a screen fiber enables positioning of even irregularly shaped objects.



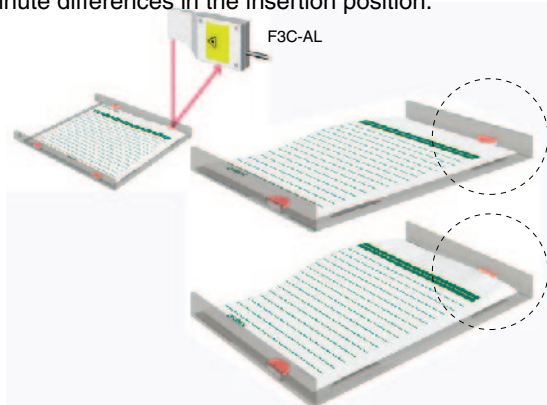
E32-T16W (page A-2)
Area-detecting Fiber Unit



Packing, Food Products, Chemicals, and Sanitation

85. Detecting Title Cards Inside CD Cases

Low hysteresis in the distance setting enables detecting minute differences in the insertion position.

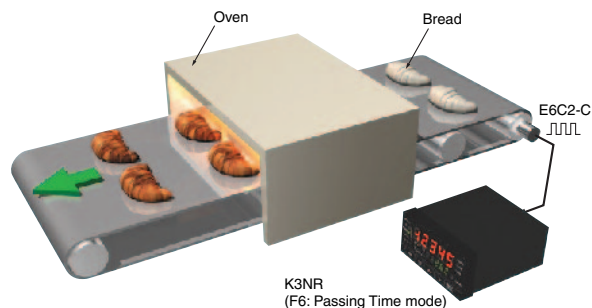


F3C-AL (page A-248)

Distance-controlled Laser Photoelectric Sensors

86. Display of Bread Baking Time

To control the baking condition of conveyor-transported bread by monitoring the time elapsed while passing through the oven, the speed of the conveyor belt is detected by the Rotary Encoder, and the result is converted to passage time and displayed by the frequency/ratemeter.

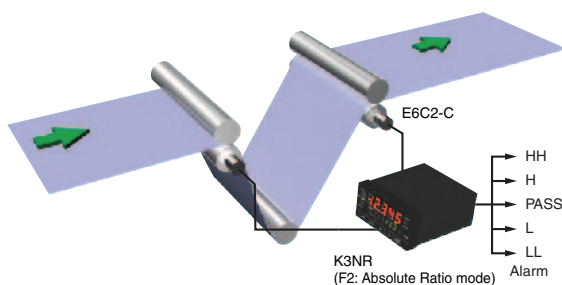


E6C2-C Rotary Encoders (page F-5)

K3NR Frequency/ratemeters

87. Measuring the Rotational Ratio of a Roller

The rotational ratio between two rollers being used to take-up film, textiles, paper, wire, etc., is measured to monitor and control tension and slackness.

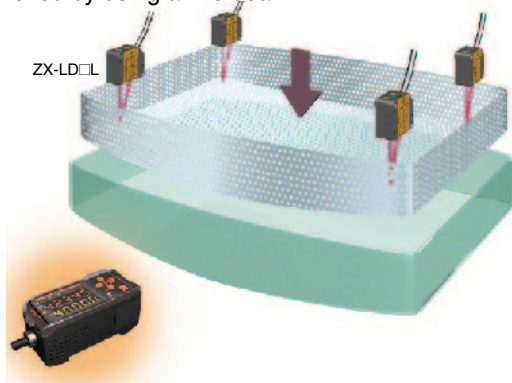


E6C2-C Rotary Encoders (page F-5)

K3NR Frequency/Rate Meters

**88. Confirming the Insertion of Shadow Masks into CRTs**

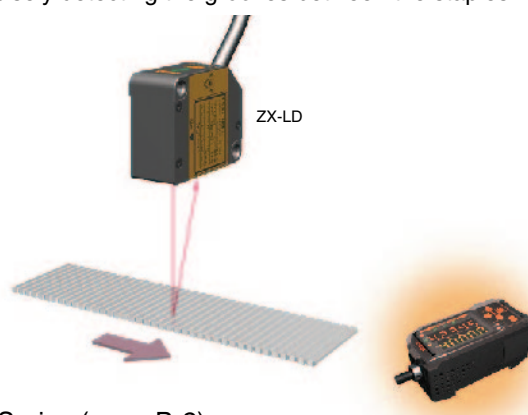
Stable detection of even mesh-type shadow masks is achieved by using a line beam.



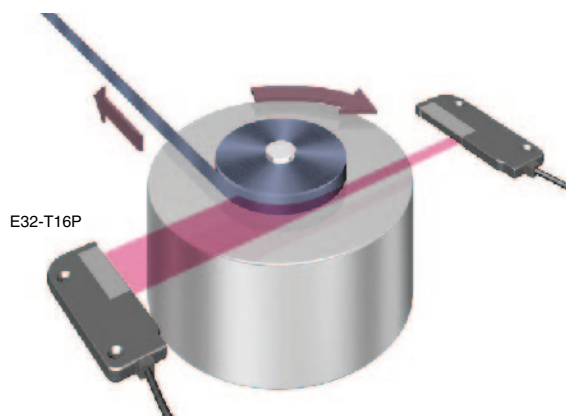
ZX Series (page B-2)
Smart Sensors

89. Counting Copy Machine Staples

The ultra-small spot of the ZX Series enables counting by precisely detecting the grooves between the staples.



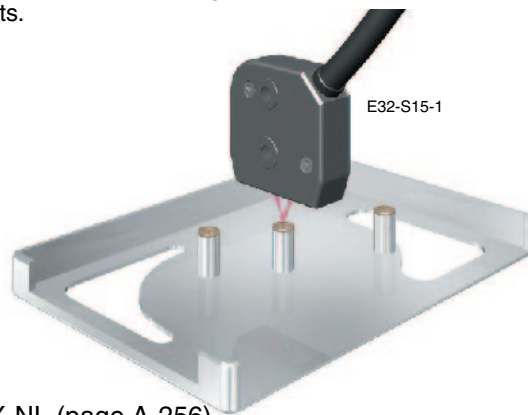
ZX Series (page B-2)
Smart Sensors

90. Inspection of Tape Remaining in Tape Take-up Applications

E32-T16P (page A-2)
Area-detecting Fiber Unit

91. Confirming the Application of Adhesive/Grease onto Components

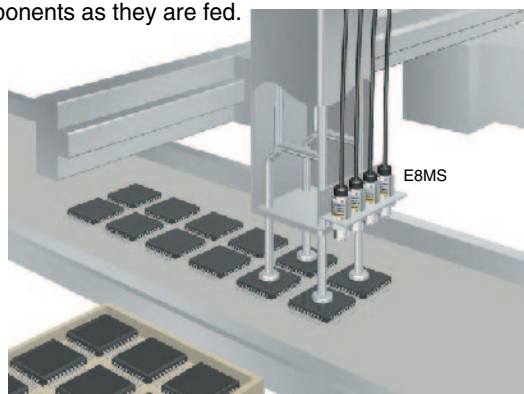
The small 2 mm diameter spot can detect even minute amounts of adhesive or grease applied to precision components.



E3X-NL (page A-256)
Optical Fiber Glossy Object Sensor

92. Confirming Suction of Chip Components

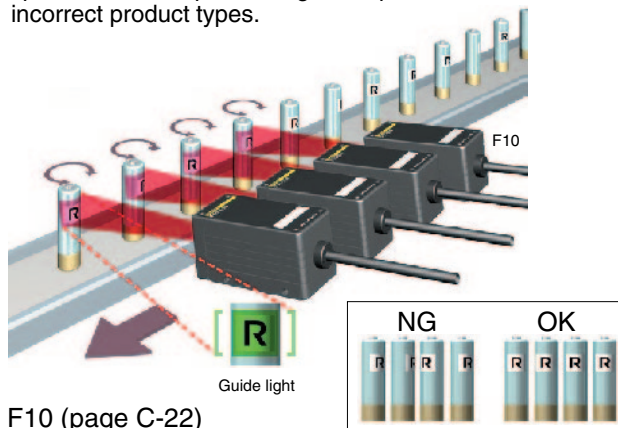
As part of the chip component inspection process, the E8MS/K3C Pressure Sensors are able to confirm the suction of components as they are fed.



E8MS/K3C (page G-4)
Pressure Sensors

93. Rotational Positioning of Batteries

Target patterns can be quickly and easily registered to inspect marks and positioning, or to prevent the inclusion of incorrect product types.



F10 (page C-22)
Pattern-matching Sensors



94. Inspecting the Position of Rotary Switches

The F150-3 Vision Sensors permit the detection of switches and buttons, and the inspection of the position of adjusted dials, prior to shipment.



F150-3 (page C-46)
Vision Sensors



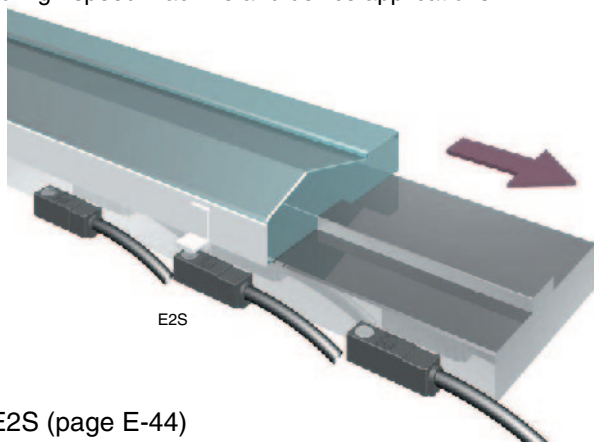
F150-SL50A



Automobiles, Machine Tools, and Robots

95. Inspection of High-speed Table Movement

A response frequency of 1 kHz makes the E2S well suited to high-speed machine and device applications.

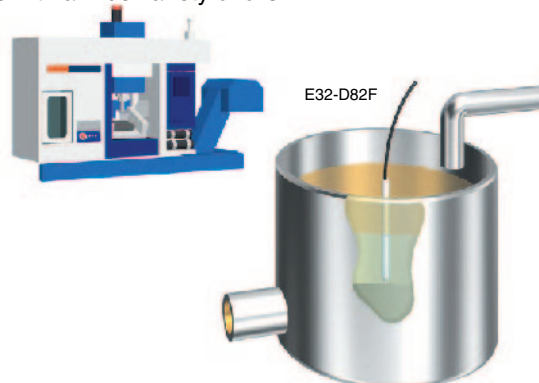


E2S (page E-44)

Compact Square Inductive Proximity Sensors

96. Managing Liquid Level for Lubricating Oils

The use of Teflon* makes these Sensors ideal for applications with a wide variety of oils.



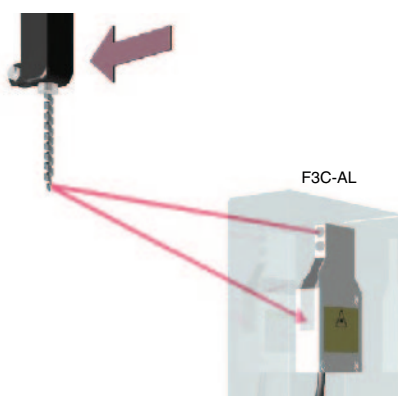
E32-D82F (page A-282)

Contact Liquid Level Sensors

*Teflon is a registered trademark of DuPont Company and Mitsui DuPont Chemical Company for their fluoride resin.

97. Detecting Bent Drill Bits

The installation of a transparent shield in front of these sensors protects them from splattering oil.

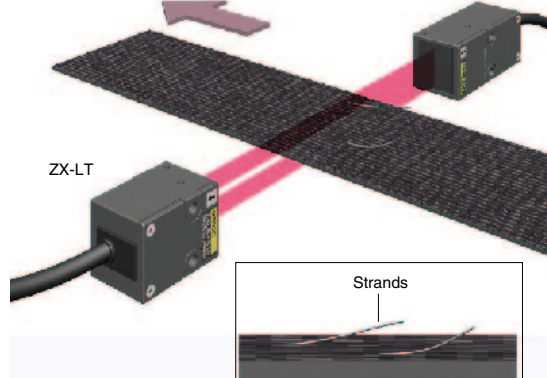


F3C-AL (page A-248)

Distance-controlled Laser Photoelectric Sensors

98. Detecting Frayed Edges on Safety Belts

The ZX-LT can detect the strands of frayed edges during the weaving process in safety belt production.

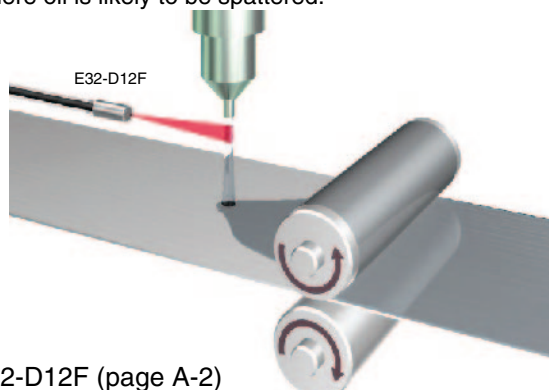


ZX-LT Series (page B-2)

Smart Sensors

99. Detecting Oil Drops

The E32-D12F can detect light reflected from oil drops. The Teflon* fiber can also be safely used in an environment where oil is likely to be splattered.



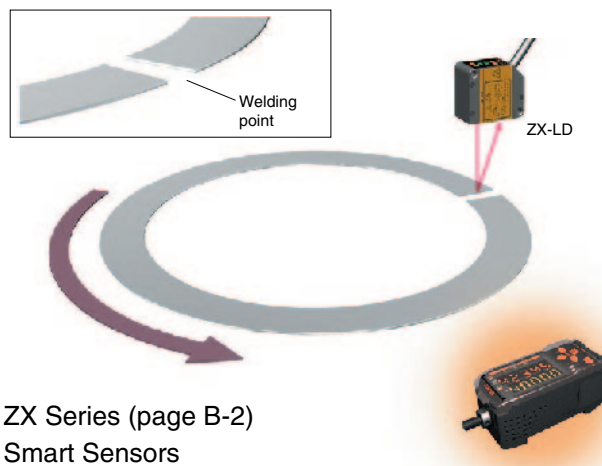
E32-D12F (page A-2)

Chemical-resistant Fiber Unit

*Teflon is a registered trademark of DuPont Company and Mitsui DuPont Chemical Company for their fluoride resin.

100. Positioning the Welding Point on Ring Gears

The compact size makes it possible for these Sensors to be mounted on welding machines in small spaces.



ZX Series (page B-2)

Smart Sensors



Automobiles, Machine Tools, and Robots

101. Detecting Weld Locations on Metal Pipes

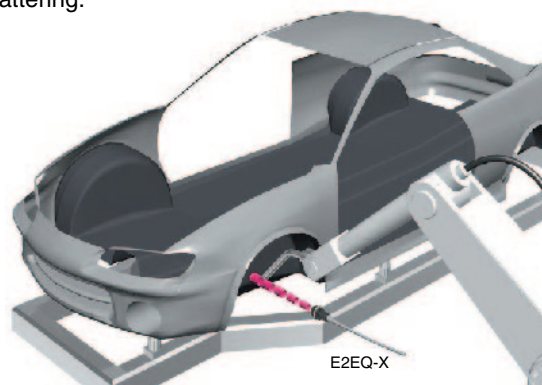
Because teaching without a workpiece is possible for the E3X-DA-N, the sensitivity for detecting weld locations can be set without having to stop the workpiece.



E32-CC200 (page A-2)
Fiber Unit

102. Positioning at the Welding Site

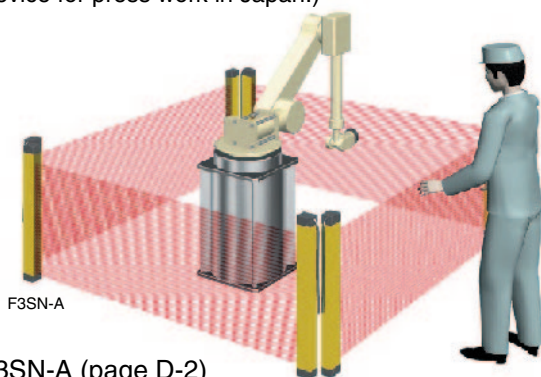
These Sensors are designed for use in places subject to spattering.



E2EQ (page E-32)
Antispatter Proximity Sensors

103. Detection of People Entering the Work Area of Unmanned Robots

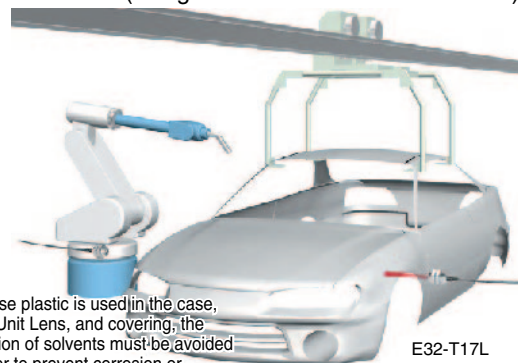
F3SN-A Safety Light Curtains help to provide a liability-protection measure by detecting the entry of people into dangerous areas. (They cannot, however, be used as a safety device for press work in Japan.)



F3SN-A (page D-2)
Safety Light Curtains

104. Detecting Workpieces in the Automotive Coating Process

A fiber length of 10 meters permits a long-distance detection up to 20 meters (using the E3X-DA-N standard mode).

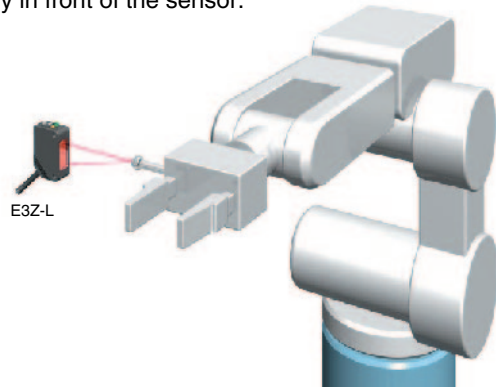


Note: Because plastic is used in the case, Fiber Unit Lens, and covering, the adhesion of solvents must be avoided in order to prevent corrosion or deterioration (such as clouding).

E32-T17L (page A-2)
Fiber Unit with Lens

105. Detecting the Position of Robot Arms

Due to a small metal ball installed on the robot arm, the position of the arm can be detected when the ball moves directly in front of the sensor.

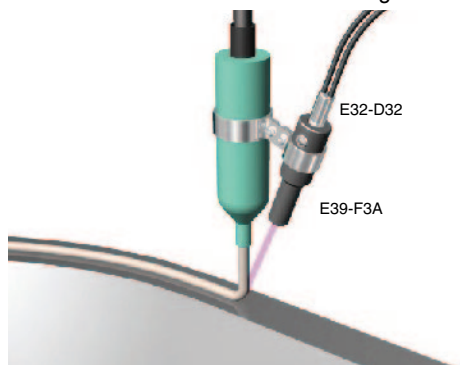


E3Z-L (page A-94)
Narrow-beam Photoelectric Sensors with a Built-in Amplifier



106. Confirming the Application of Sealing Material

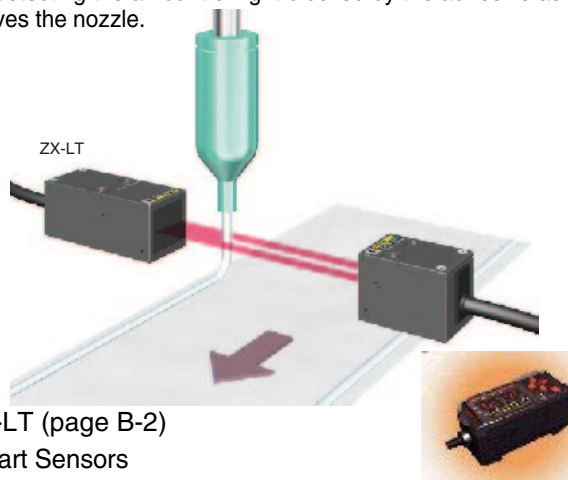
The use of a small-diameter fiber head makes it possible to install the Fiber Unit and Lens Unit on the nozzle tip. The Lens Unit permits a stable detection of the sealing material.



E32-D32 Fiber Unit (page A-2)
E39-F3A Lens Unit

107. Detecting and Determining Proper Quantity of Adhesive during Packing Box Assembly

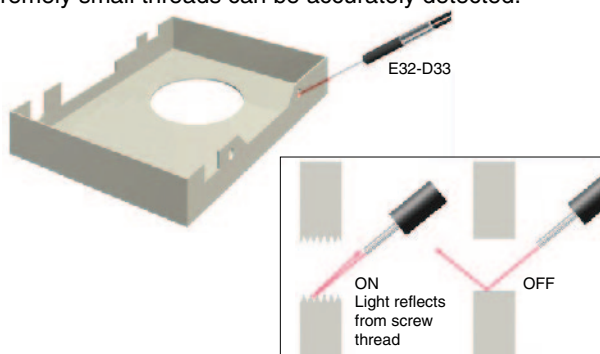
The quantity of adhesive being dispensed can be monitored by detecting the amount of light blocked by the adhesive as it leaves the nozzle.



ZX-LT (page B-2)
Smart Sensors

108. Detection of Screw Threads

The E32-D33 Thin Head Fiber Unit is able to determine whether threads have been cut into aluminum die-cast workpieces. Because the light strikes at an angle, even extremely small threads can be accurately detected.



E32-D33 (page A-2)
Thin Head Fiber Unit

109. Safety Sensor to Protect People from Dangerous Machinery

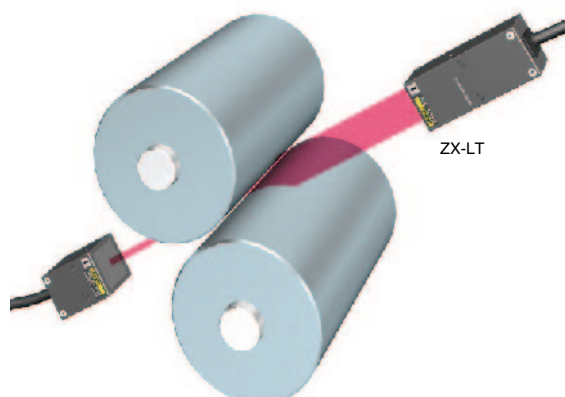
The entry of people into the danger zones on and around high-speed machinery, such as chip inserters, can be detected.



F3SN-A (page D-2)
Safety Light Curtains

110. Measuring the Distance between Rollers

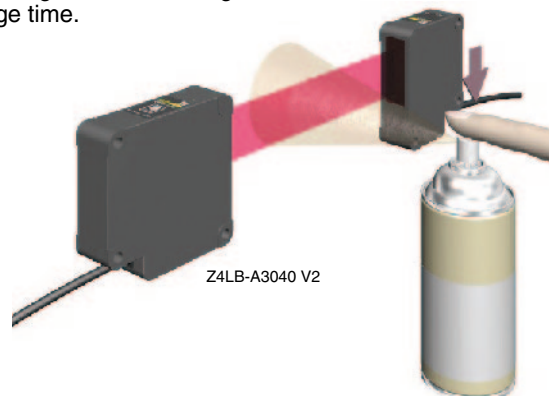
These Sensors ensure the distance between metal rollers to be measured.



ZX-LT-Series (page B-2)
Smart Sensors

111. Inspecting Spraying Coverage by Detecting the Spray Angle

The spray angle of a substance can be measured by detecting the amount of light that it blocks and the total blockage time.



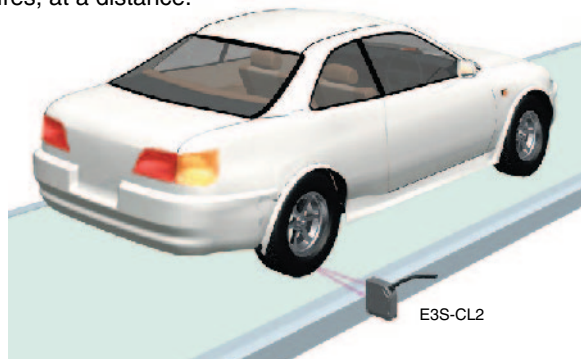
Z4LB V2 (page B-22)
Parallel Beam Linear Sensors with a Separate Amplifier



Rubber, Molding Machines, and Molds

112. Long-distance Detection of Black Tires

These sensors are minimally affected by backgrounds, enabling them to accurately detect black objects, such as tires, at a distance.

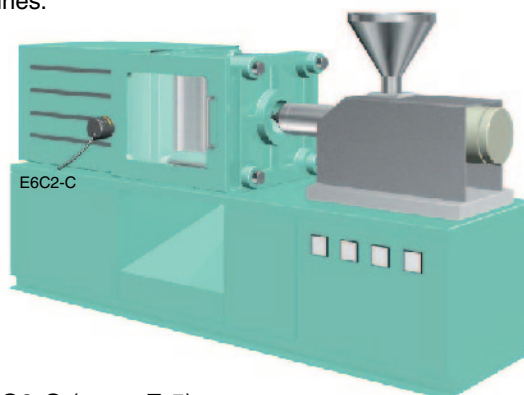


E3S-CL (page A-156)

Distance-controlled Photoelectric Sensors

113. Positioning Dies in Injection Molding Machines

The strengthened axial load of this Rotary Encoder permits clamp positioning for the dies of injection molding machines.

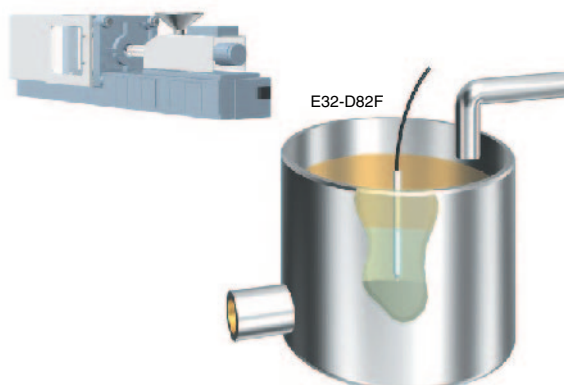


E6C2-C (page F-5)

Rotary Encoders

114. Detecting the Level of Heat-medium Oils

The 200°C heat resistance of these Sensors permits the use with extremely high-temperature liquids.

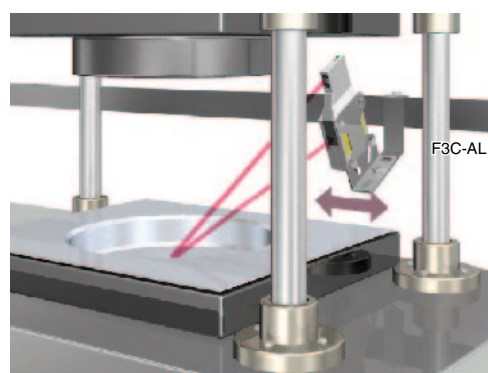


E32-D82F (page A-282)

Contact Liquid Level Sensors

115. Detecting Errors Due to Residual Materials in Press Dies

The edges of materials remaining inside press dies after the pressing process are detected, and an error is output.

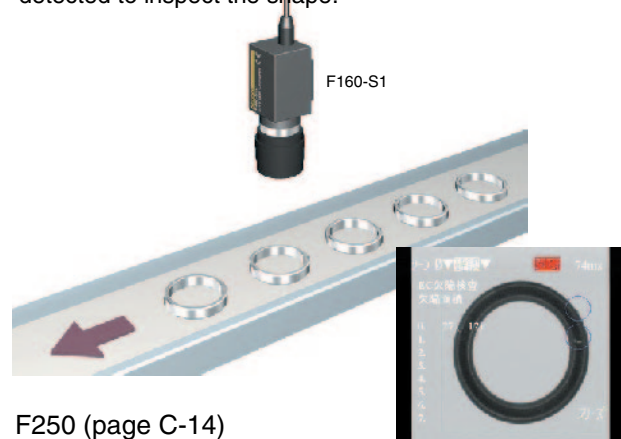


F3C-AL (page A-248)

Distance-settable Laser Photoelectric Sensors

116. Inspecting Component Shapes

The edges of measured objects captured by camera are detected to inspect the shape.

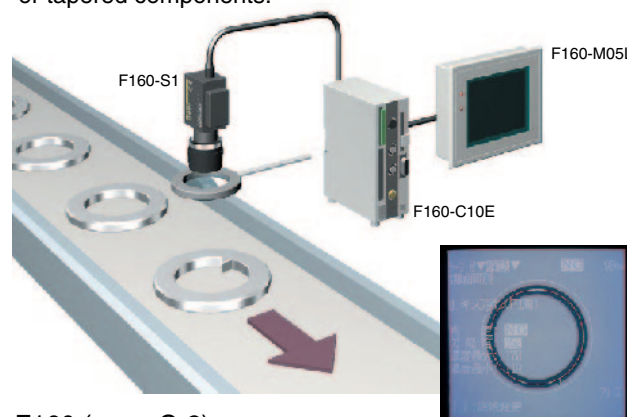


F250 (page C-14)

High-performance Vision Sensor

117. Inspecting for Chipping or Burrs in Components

Chips, burrs, or light-colored dirt can be detected on curved or tapered components.



F160 (page C-2)

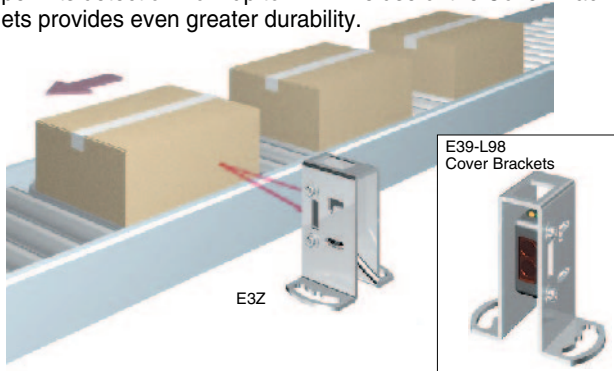
Vision Sensor



Conveyor and Automatic Warehouses

118. Detecting Cardboard Boxes

A diffuse reflective sensor can be used to detect cardboard boxes from a distance of up to 1 m. A retroreflective sensor permits detection from up to 4 m. The use of the Cover Brackets provides even greater durability.

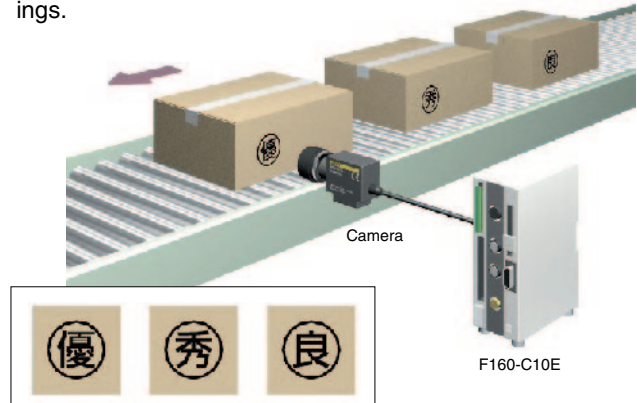


E3Z (page A-94)

Photoelectric Sensors with a Built-in Amplifier
E39-L98 Cover Brackets

119. Sorting Packed Fruit Boxes by Grade

The boxes are sorted by distinguishing printed grade markings.

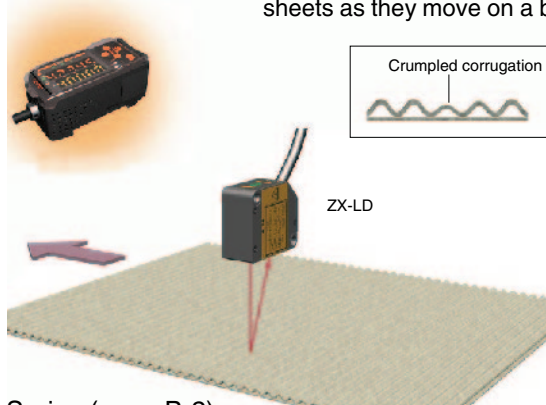


F160 (page C-2)

Vision Sensor

120. Inspecting the Height of Corrugations in Cardboard Boxes

Crumpling can be detected by measuring the distance to the top of the corrugations in the inner layer of cardboard sheets as they move on a belt.

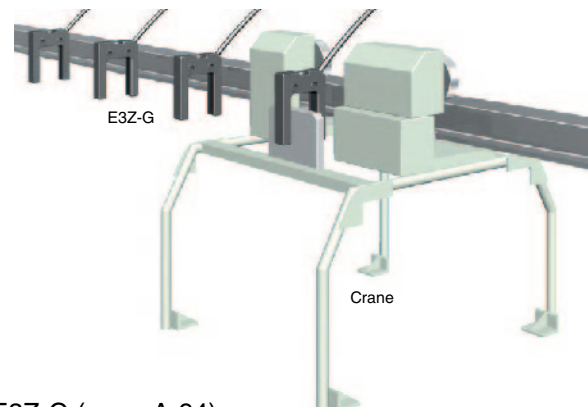


ZX Series (page B-2)

Smart Sensors

121. Warning Alarms for Cranes

The direction of crane movement can be distinguished, and the crane's entry into danger zones can be detected.



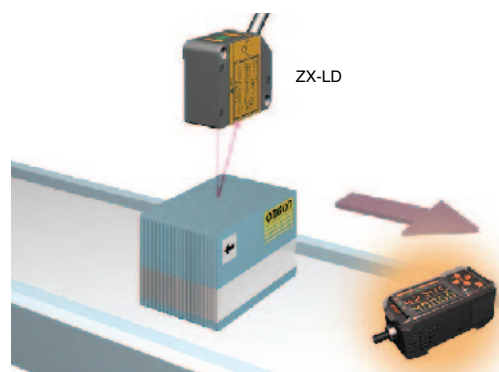
E3Z-G (page A-94)

Grooved-type Photoelectric Sensors with a Built-in Amplifier

etc. Other Applications

122. Counting Cards

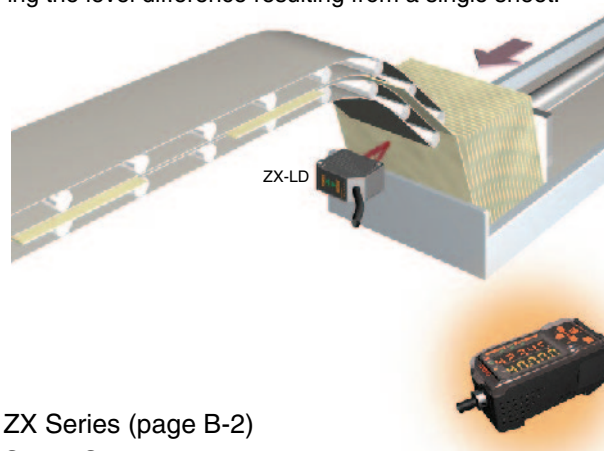
Bundles of cards, such as prepaid telephone cards, can be counted by detecting the card edges.



ZX Series (page B-2)
Smart Sensors

123. Counting Sheets of Paper

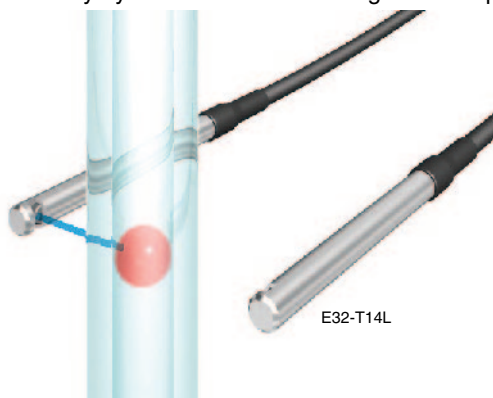
The number of sheets in a stack can be counted by detecting the level difference resulting from a single sheet.



ZX Series (page B-2)
Smart Sensors

124. Detecting Gas Flowmeter Balls

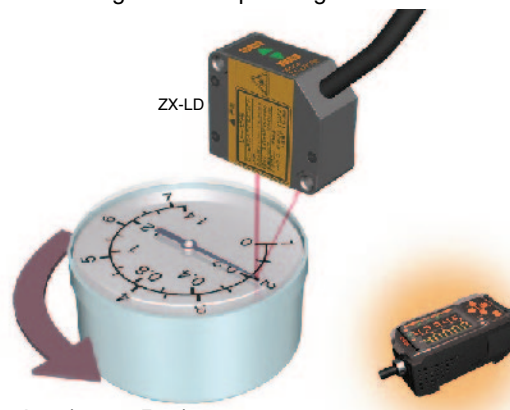
The red transparent ball in gas flowmeters can be detected with high stability by the Blue LED Teaching Fiber Amplifier.



E32-T14L Side-view Fiber Unit (page A-2)
E3X-DAB11-N Blue LED Teaching Fiber Amplifier

125. Inspecting the Gap between the Dial Plate and Indicator Needle in Pressure Indicators

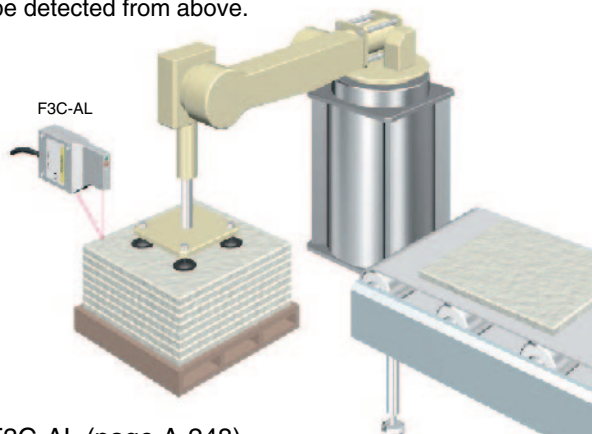
The gap between the dial plate and indicator needle can be measured through the transparent glass cover.



ZX Series (page B-2)
Smart Sensors

126. Detection of Remaining Boards for Construction Use

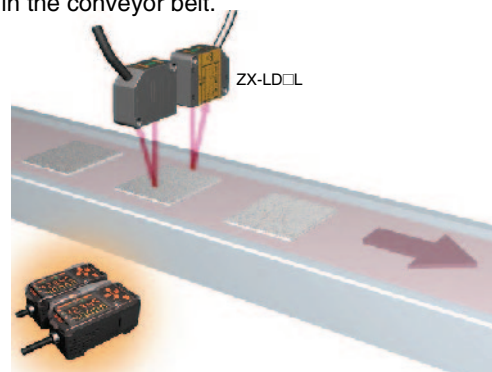
The quantity of boards or other construction materials can be detected from above.



F3C-AL (page A-248)
Distance-controlled Laser Photoelectric Sensors

127. Distinguishing Ceramic Types

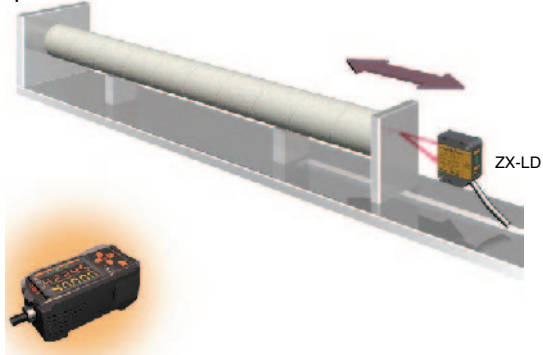
Using two Sensors, the changes in thickness can be measured with high stability, without being affected by fluctuations in the conveyor belt.



ZX Series (page B-2)
Smart Sensors

128. Inspecting the Length of Paper Tubes

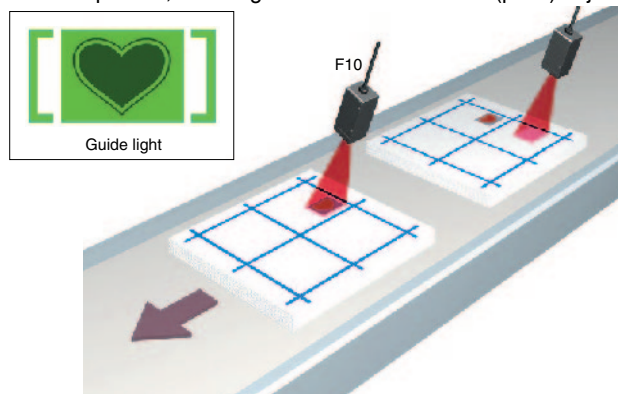
By using an end plate and detecting from the tube side, detection is possible without being affected by paper splinters.



ZX Series (page B-2)
Smart Sensors

129. Inspecting to Check for Missing Pages

These sensors compare the object being inspected with a registered pattern, enabling detection of solid-color (plain) objects.



F10 (page C-22)
Pattern-matching Sensors