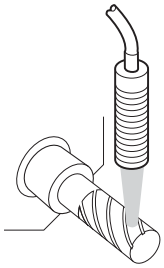
Overview

The sensor applications on the following pages range from basic problems to complex problems that can be solved only with specific sensors from Eaton's electrical sector.

The solution is summarized along with the catalog numbers of suggested models to be used. Note that many sensors are interchangeable; slight differences in the application may dictate the choice of one sensor over another. When full catalog numbers are listed, that specific model is suggested. Where no suffix is given (for example, **1451E**) or only one family is listed, the choice of a specific model within the suggested type would be determined by operating voltage, sensing range, choice of cable or connector base, and so on.

Sensor Applications

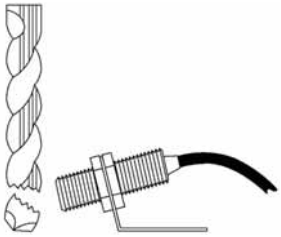
Broken Tool Detection



Description	Catalog Number
E58 Perfect Prox® sensor	**E58-30DP or E58-18DP Sensor**

An E58 Harsh Duty Perfect Prox sensor is used to sense for the presence of the bit on a mill. The high sensing power and background rejection of the Perfect Prox allows reliable detection through high levels of cutting fluids, while ignoring objects just beyond the bit. The rugged harsh duty sensor survives constant exposure to lubricants, cutting fluids and flying metal chips.

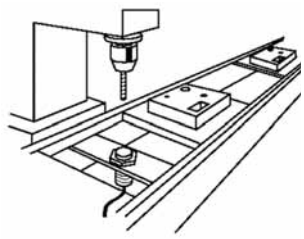
Broken Bit Detection



Description	Catalog Number
Tubular inductive proximity sensor	**E57 product family or iProx**

A tubular E57 proximity sensor is used to detect the presence of a drill bit—should the drill bit be broken the sensor would signal a controller.

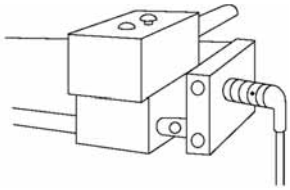
Machining Processes



Description	Catalog Number
Tubular inductive proximity sensor	**E57 product family or iProx**

A ferrous only sensor is used in a process where aluminum is being machined. The ferrous only sensor ignores the aluminum (non-ferrous) chips from the machining process and only detects the ferrous target.

Tool Position



Description	Catalog Number
Tubular inductive proximity sensor	**E57 product family or iProx**

A tubular E57 proximity sensor is used to detect the position of a tool chuck.

For assistance with these or other applications, call us at 1-800-426-9184.

Sensor Applications

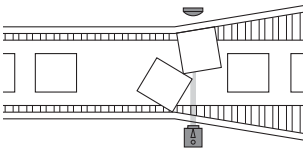
Sensing Solutions Summary

Bottle Filling Detection

Description	Catalog Number
E65 clear object sensor	**E71-CON-XX** **E71-COP-XX**

A clear object sensor is used to sense the presence of bottles at a filling operation. The sensor offers high reliability in sensing clear bottles of different colors and thicknesses.

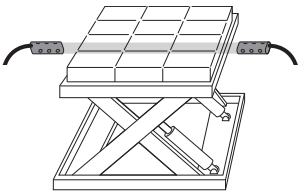
Jam Detection



Description	Catalog Number
Enhanced 50 series reflex sensor with timer	**1451E-XXXX**
3 in dia. retroreflector	**6200A-6501**

A reflex control with a time delay module set for "delay dark" ignores momentary beam breaks. If the beam is blocked longer than the delay period, the output energizes to sound an alarm or stop the conveyor.

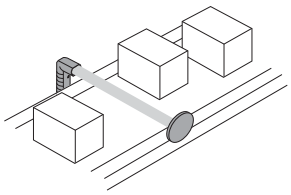
Stack Height Control



Description	Catalog Number
Comet® series thru-beam source	**11100A**
Comet series thru-beam detector	**12100A**

A set of thru-beam sensors determines the height of a scissor lift. For example, when the control is set for "dark-to-light" energize, the lift rises after a layer has been removed and stops when the next layer breaks the beam again.

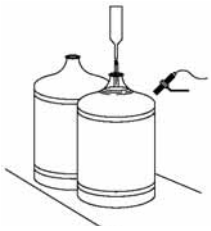
Box Counting



Description	Catalog Number
Prism™ polarized reflex sensor	**14151R**
3 in dia. retroreflector	**6200A-6501**

A Prism right-angle reflex sensor detects boxes anywhere on a four foot wide conveyor. Interfacing the control with a programmable controller provides totals at specific time intervals. Polarized reflex optics prevent false triggering on shiny objects, while the high optical power burns through box dust and contamination.

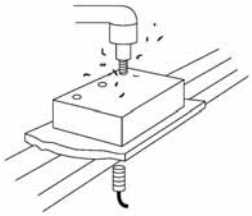
Process Control



Description	Catalog Number
Tubular capacitive proximity sensor	**E53 Product Family**

A capacitive proximity sensor used to verify fill level of bottled water on a filling process line.

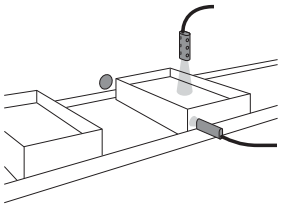
Conveyor System Control



Description	Catalog Number
Tubular inductive proximity sensor	**E57 product family or iProx**

A tubular inductive proximity sensor is used to detect the presence of metal carriers holding parts to be machined.

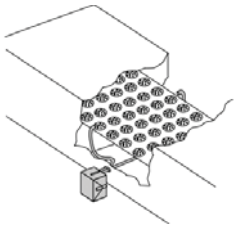
Carton Fill-Level Detection



Description	Catalog Number
Comet visible-beam reflex sensor	**14102A**
Comet 9 in Perfect Prox sensor	**13103A**
3 in dia. retroreflector	**6200A-6501**
Adjustable background surpression	**E75**

Two sensors work together to inspect the fill level in cartons on a conveyor. A reflex sensor senses the position of the carton and energizes the Perfect Prox or background surpression sensor located over the contents. If the Perfect Prox sensor does not "see" the fill level, the carton does not pass inspection.

Cookie Motion Detection

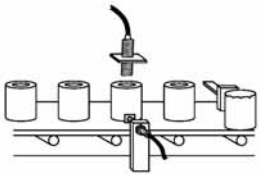


Description	Catalog Number
Fiber optic sensor	**1550E-85XX**
Fiber optic thru-beam cable (two required)	**E51KE823**

High temperature environments are accommodated by the use of fiber optics. Here conveyor motion in a 450°F (232°C) cookie oven is detected. If the motion stops, the one-shot logic module detects light or dark for too long, and the output device shuts the oven down.

For assistance with these or other applications, call us at 1-800-426-9184.

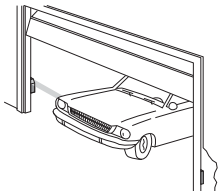
Lid Detection



Description	Catalog Number
Tubular inductive proximity sensor	**E57 product family or iProx**

A pair of tubular proximity sensors used to, a) detect the presence of a can on a conveying line, and b) check for presence of a lid.

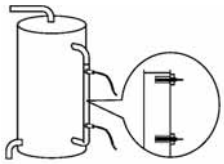
Garage Door Control



Description	Catalog Number
Enhanced 50 series thru-beam	**1150E/SRC 1250E/RCVR**

A safe and secure garage is achieved through the use of thru-beam controls interfaced to the door controller. The door shuts automatically after a car leaves, and if the beam is broken while the door is lowering, the motor reverses direction and raises the door again.

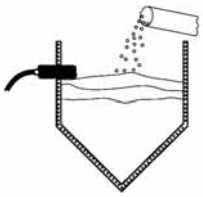
Liquid Level Detection



Description	Catalog Number
Tubular capacitive proximity sensor	**E53 Product Family**

A pair of E53 capacitive proximity sensors are used to sense high and low liquid levels in a tank through a sight glass. This arrangement starts a pump to fill the tank when the lower sensor is energized and shuts the pump off when the top sensor is energized.

Bulk Material Detection



Description	Catalog Number
Tubular capacitive proximity sensor	**E53 Product Family**

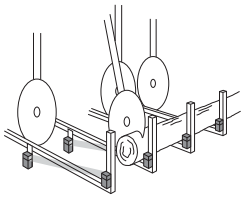
A capacitive proximity is used to control fill level of solids such as plastic pellets in a hopper or bin.

Tollbooth Control

Description	Catalog Number
20 series Thru-beam source	**1141D-6501**
20 series thru-beam detector	**1241D-6501**
DPDT relay output device	**8526A-6501**
E67 long range Perfect Prox	**E67-LRDP**

Thru-beam source/detector or the long range Perfect Prox diffuse sensor controls are used to time the toll gate. To eliminate toll cheating, the gate lowers the instant the rear of the paid car passes the control. The E67 Long Range Perfect Prox allows you to mount the sensor on one side, instead of both. Plus with Perfect Prox, the E67 will detect cars with different colors and finishes while ignoring all other background objects. The rugged control handles harsh weather, abuse and 24-hour operation.

Cut-Off Saw Control

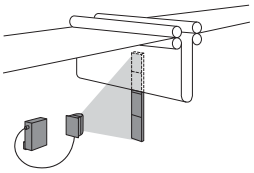


Description	Catalog Number
E51 thru-beam source	**E51ELA**
E51 thru-beam detector	**E51CLC1**

Note: All products listed are required for each two-foot increment.

An array of thru-beam controls detect the length of the log in standard two-foot increments. The correct saw is then activated to cut the log at its longest standard length. High optical performance is a must in this dusty and dirty environment.

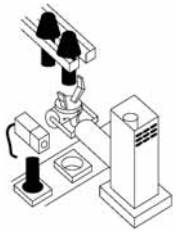
Web Loop Control



Description	Catalog Number
70 series analog control unit	**8172A**
70 series reflex curtain-of-light sensor	**1471A**
Analog isolation module	**8272A**
Strip retroreflector	**6210A**

A sensor that generates a "curtain-of-light" detects the length of a loop on a web drive system by measuring the amount of light returned from an array of retro-reflectors. With this information, the analog control unit instructs a motor controller to speed up or slow down the web drive.

Parts Presence

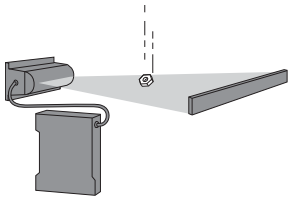


Description	Catalog Number
Limit switch inductive proximity sensor	**E51 Product Family**
Comet Perfect Prox	**1310**
iProx™ inductive proximity sensor	**E59-M**

A limit switch style proximity sensor, a Comet Perfect Prox or the iProx Sensor may be used to detect the presence of a part in a pick-and-place application for inspection. The Comet will detect any target material, color or finish while rejecting the background. The iProx can be programmed to sense a specific metal target while rejecting all other metal.

For assistance with these or other applications, call us at 1-800-426-9184.

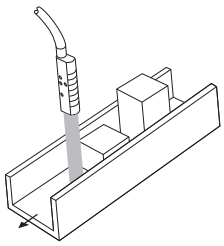
Small Parts Detection



Description	Catalog Number
70 series high power control unit	**8171B**
Low contrast logic module	**8215A**
70 series reflex curtain-of-light sensor	**1471A**
Strip retroreflector	**6210A**
Triac output relay or other selection	**8572A**

Small objects moving through a "curtain-of-light" are counted by detecting a change in reflected light. A low contrast logic module inside the control unit responds to slight but abrupt signal variations while ignoring slow changes such as dust build-up.

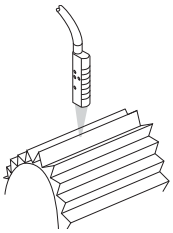
Parts Detection



Description	Catalog Number
Comet series 4 in Perfect Prox sensor	**13101A**

A four inch Perfect Prox sensor detects parts of various heights from 0.5 to 3 inches passing through a channel, while ignoring the channel bottom.

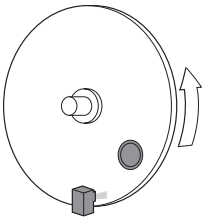
Filter Paper Length Control



Description	Catalog Number
Comet focused diffuse reflective sensor	**13102A**

A focused diffuse reflective sensor interfaces with a programmable controller to measure a specific length of corrugated automotive filter paper. The control detects the presence or absence of a corrugation. When a predetermined number of corrugations has been detected, the programmable controller directs a shear to cut the paper.

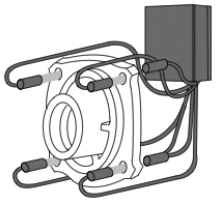
Over/Underspeed Control



Description	Catalog Number
50 series reflex sensor	**1450B**
Motion detection logic module	**8253A**
Solid-state switch output device	**8562B**
3 in diameter retroreflector	**6200A-6501**

A reflex sensor with a motion detection module counts the revolutions of the wheel. Speed is controlled by a programmable controller. Provides timing ranges from 2.4 to 12,000 counts per minute.

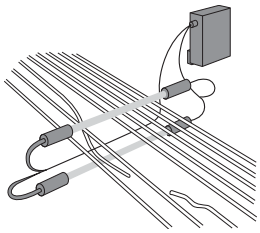
Multi-Hole Casting Inspection



Description	Catalog Number
70 series modular control unit (four required)	**8771A**
70 series 35 ft thru-beam source (four required)	**1173A-300**
70 series 35 ft thru-beam detector (four required)	**1273A-300**
Panel mount socket for control unit (four required)	**8905A**

Remote sensors inspect for the presence of holes in a metal casting. Because each hole has its own inspection system, accurate defect information is recorded. Rugged sensor housing and extremely high signal strength handle dirt and grease with minimum maintenance. Using the modular control unit allows for dense packaging in small enclosures.

Broken Thread Detection

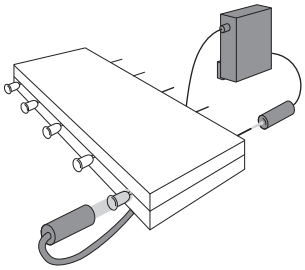


Description	Catalog Number
70 series high power control unit	**8171B**
Low contrast logic module	**8215A**
70 series 375 ft thru-beam source (two required)	**1173A-100**
70 series 375 ft thru-beam detector (two required)	**1273A-100**
DPDT relay	**8530A**
Mounting brackets	**6142A**

A pair of remote thru-beam sensors scan over and under multiple strands of thread. If a thread breaks and passes through one of the beams, the low-contrast logic module detects the sudden change in signal strength and energizes the output. Because this logic module does not react to slow changes in signal strength, it can operate in a dusty environment with little maintenance.

For assistance with these or other applications, call us at 1-800-426-9184.

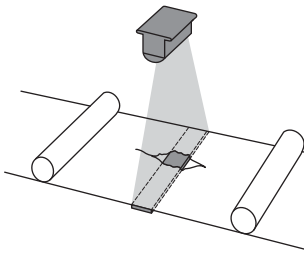
Hypodermic Needle Quality Control



Description	Catalog Number
70 series high power control unit	**8171B**
70 series 300 ft thru-beam source	**1173A-300**
70 series 300 ft thru-beam detector	**1273A-300**
Triac output relay	**8573A**

A remote source and detector pair inspects for passage of light through a hypodermic needle. Their small design and waterproof stainless steel housing are appropriate for crowded machinery spaces and frequent washdowns. High signal strength allows quality inspection with hole sizes down to 0.007 in.

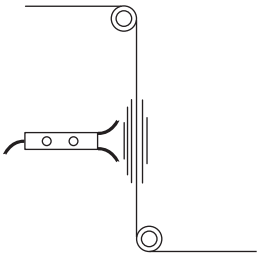
Web Flaw Detection



Description	Catalog Number
70 series high power control unit	**8171B**
Low contrast logic module	**8215A**
DPDT relay	**8530A**
70 series reflex curtain-of-light sensor	**1471A**
Strip retroreflector	**6210A**

A web passes over an array of retroreflectors. When light is returned to the sensor head, the output is energized and the web shuts down. Because of the superior response time of the control unit, high web speeds can be maintained.

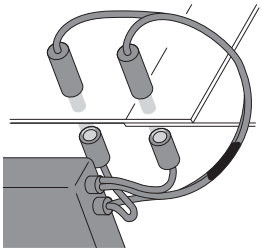
Clear Plastic Web Break Detection



Description	Catalog Number
Comet wide beam diffuse	**13107A**

The clear web is detected by a wide beam diffuse reflective sensor. The wide beam helps it ignore reflection caused by fluttering of the web.

Web Splice Detection



Description	Catalog Number
70 series differential control unit	**9072A**
One-shot logic module	**8213A**
DPDT relay	**8526A**
70 series 30 ft thru-beam source (two required)	**1173A-300**
70 series 30 ft thru-beam detector (two required)	**1273A-300**

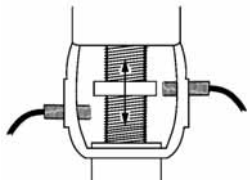
When the two thru-beam detectors see the same signal strength, the output is zero. When the opacity of the web changes, as in a splice, the signal strengths are thrown out of balance and the output is energized. This system can be used on webs of different colors and opacities with no system reconfiguration.

Motion Position Detection

Description	Catalog Number
Tubular inductive proximity sensor	**E57 product family or iProx**

A tubular E57 proximity sensor is used to detect the presence of set screws on a shaft hub providing a control device with signals for speed regulation or detection of rotation.

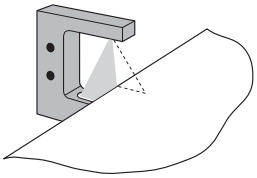
Motion Control



Description	Catalog Number
Tubular inductive proximity sensor	**E57 product family or iProx**

A pair of tubular proximity sensors is used to determine full open and fully closed valve position.

Web Guiding

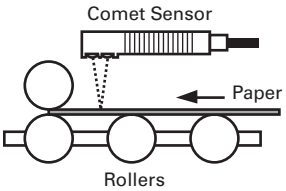


Description	Catalog Number
70 series slot sensor	**1372A-6501**
70 series analog control unit	**8172A**

The 1372A-6501 slot sensor head is mounted so that the edge of the web extends into the slot and blocks half of the source beam. As the web moves into or out of position, a proportional signal is provided by the analog control unit to alert your control system.

For assistance with these or other applications, call us at 1-800-426-9184.

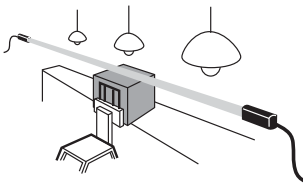
Paper Presence Detection



Description	Catalog Number
Comet Series 2 in right angle Perfect Prox sensor	**13104R**

Right angle viewing and compact size allow the sensor to be mounted in the tight confines of paper handling systems. High gain and sharp optical cut-off ensure that background machinery will be ignored while paper will be detected regardless of color and texture.

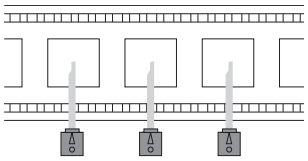
Damage Warning



Description	Catalog Number
E58 Harsh Duty 800 ft thru-beam source	**E58-30TS**
E58 Harsh Duty 800 ft thru-beam detector	**E58-30TD**

Source and detector are mounted at opposite ends of a long warehouse storage shelf with the beam situated a safe distance below overhead obstacles (lighting, conduit, gas lines, ducts, pipes, and so on). If a forklift operator interrupts the beam while moving a load, a siren or flashing light will warn him to stop before any damage occurs.

Zero Pressure Accumulation Conveyor



Description	Catalog Number
E68 Integral sensor valve	**E68-SVS**
200 Series zero pressure accumulation	**14286/14266**

E68 Series or 200 Series sensors detect and control the movement of boxes on the conveyor, to maximize throughput and eliminate line pressure between boxes. The sensor contains all required logic with no need for a PLC.

For assistance with these or other applications, call us at 1-800-426-9184.