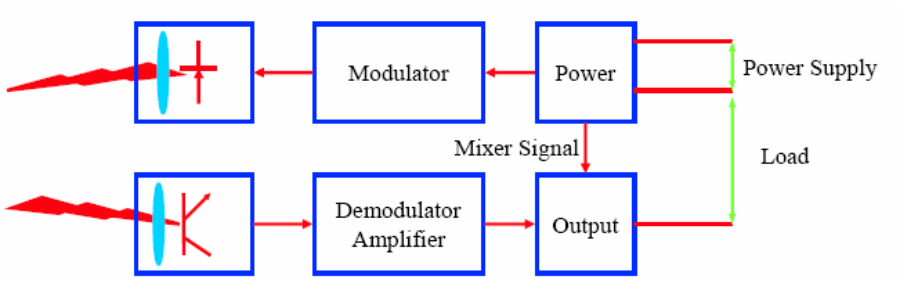
Sensores Opto electrónicos

Consiste de una fuente de luz (LED) y un detector de luz (fototransistor)

Modulación de señal para minimizar condiciones de iluminación ambiental

Varios modelos:

12-30V DC, 24-240V AC, power Output: TTL 5V, Solid-state relay, etc.

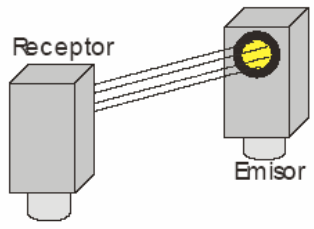


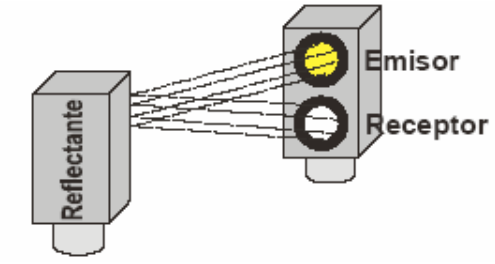
Modos de Operación

- **Barrera de Luz:**
  - rango amplio (20m)
  - El Alineamiento es crítico
- **Retro-reflectivo (Réflex)**
  - Rango 1-3m
  - Popular y barato
- **Reflectivo Difuso**
  - Rango 12-300mm
  - barato y fácil de usar

Célula fotoeléctrica de barrera

En los detectores de barrera, el objeto se interpone entre el emisor del haz luminoso y el receptor. Si la luz no llega al receptor se produce la acción de conmutación.
El emisor suele ser una lámpara ayudada por un difusor luminoso, de tal forma que el haz de luz se direcciona.



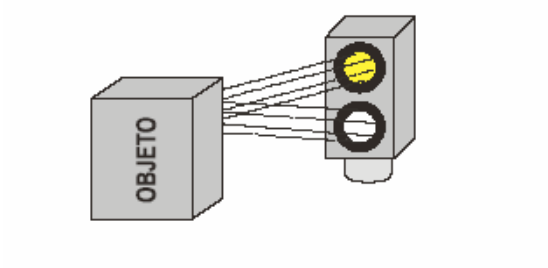


Réflex

Los detectores se denominan réflex, cuando el emisor del haz luminoso y el receptor, están en la misma ubicación y el elemento contrario es un reflector o catadióptrico.

Reflectivo Difuso

En los detectores difusores, un objeto cualquiera realiza la función de reflector. El emisor y receptor están en el mismo espacio. No permiten que la distancia sea elevada.



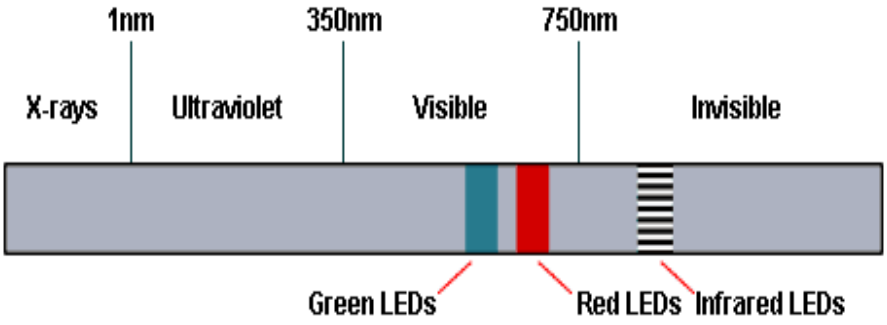
Cuando usar un sensor de proximidad Opticos

- **Pros**
  - **Sin contacto, sin partes móviles,pequeño.**
  - **conmutación rápida, interruptor sin rebote.**
  - **Insensitivo a vibración y golpes**
  - **Hay muchas configuraciones posibles**

- **Contras**
  - siempre es requerido alineamiento
  - pueden ser cegados por condiciones de iluminación ambiental (por ejemplo en soldado)
  - Requiere ambiente limpio ,libre de polvo y agua.

Luz Modulada

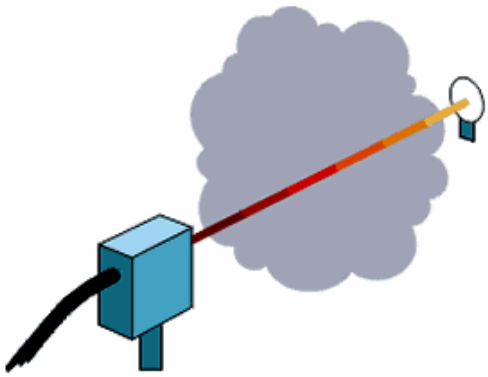
- El uso de luz modulada incrementa el rango de sensado y además reduce el efecto de la luz ambiental.
- La luz modulada es pulsada a una frecuencia entre 5 y 30Khz. Esto permite al sensor distinguir la luz modulada de la luz ambiental.
- Las fuentes de luz usadas por estos sensores dentro del espectro de luz caen entre el verde visible al infrarrojo invisible.
- Como fuente de luz se usan típicamente diodos emisores de luz (LED)



Sensores Optoelectrónicos

Excess Gain

Excess gain is the amount of light emitted by the transmitter in excess of the amount required to operate the receiver. In clean air, an excess gain equal to or greater than 1 is usually sufficient. On the other hand, if an environment contained enough airborne contaminants to absorb 50% of the light emitted by the transmitter, a minimum excess gain of 2 would be required to operate the sensor.

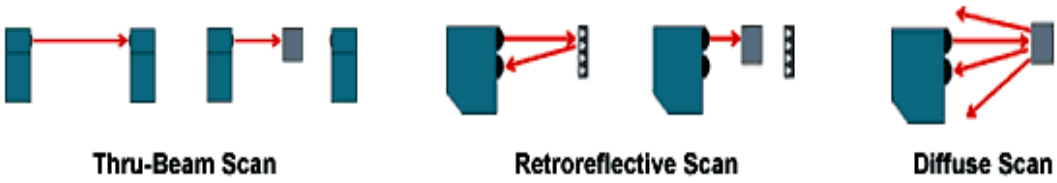


Sensores Optoelectrónicos

Photoelectric Sensor Scan Techniques

A scan technique is a method used by photoelectric sensors to detect an object (target). In part, the best technique to use depends on the target. Some targets are opaque and others are highly reflective. In some cases it is necessary to detect a change in color. Scanning distance is also a factor in selecting a scan technique. Some techniques work well at greater distances while others work better when the target is closer to the sensor.

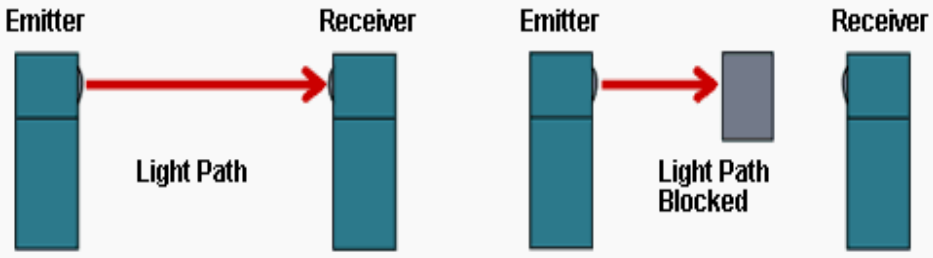
Common scan techniques include:
- Thru-Beam Scan
- Reflective or Retroreflective Scan
- Diffuse Scan

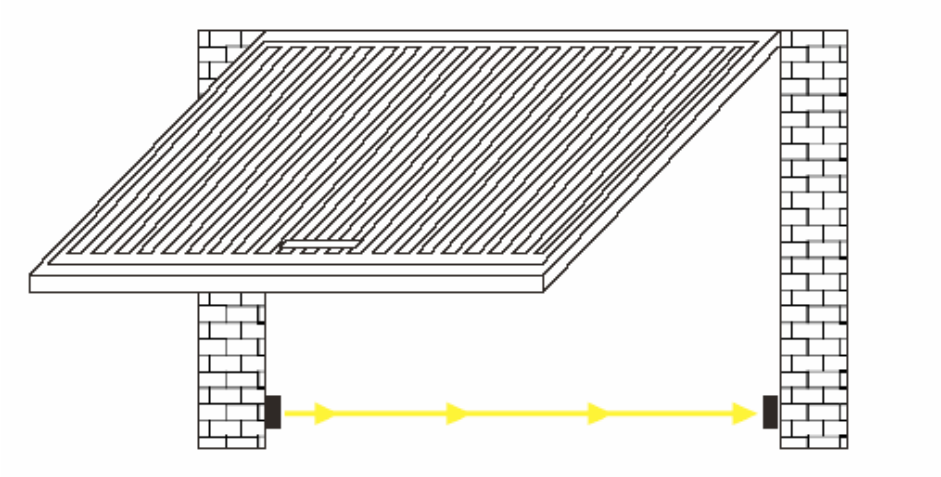


Thru-Beam Scan

The thru-beam scan technique requires separate emitter and receiver units. With this technique, an object placed in the path of the light beam blocks the light to the receiver. This causes the receiver's output to change state. When the target no longer blocks the light path the receiver's output returns to its normal state.

Thru-beam scan is suitable for opaque or reflective targets. Naturally, it will not detect transparent objects. The high excess gain of thru-beam sensors makes this scan technique suitable for environments with airborne contaminants. The maximum sensing range is 300 feet.





Célula fotoeléctrica de seguridad

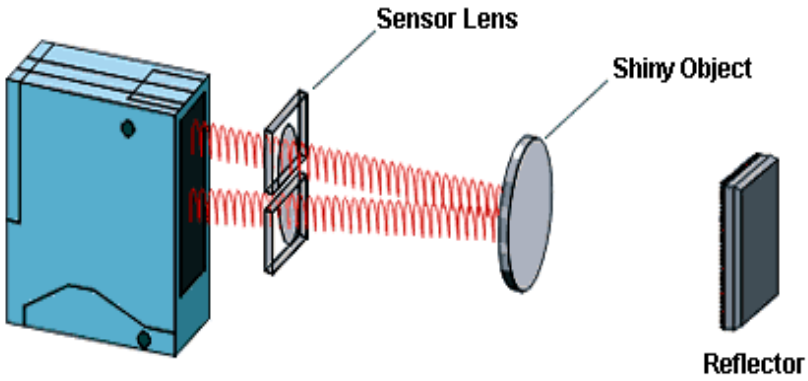
Sensores Fotoeléctricos

Reflective or Retroreflective Scan

In a reflective scan sensor, the emitter and receiver are in one unit. Light from the emitter is transmitted in a straight line to a reflector and returns to the receiver. When a target blocks the light path the output of the sensor changes state. When the target no longer blocks the light path the sensor returns to its normal state. Retroflective scan is another name for this technique. The maximum range is 35 feet.

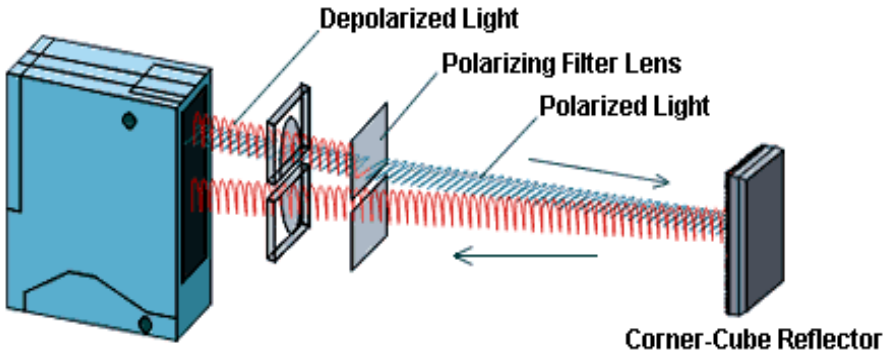
Retroreflective Scan with Shiny Objects

Retroreflective scan sensors may not be able to detect shiny objects. Rather than preventing light from being returned to the sensor, shiny objects reflect light back to the sensor. The sensor is unable to differentiate between light reflected from a shiny object and light reflected from a reflector.



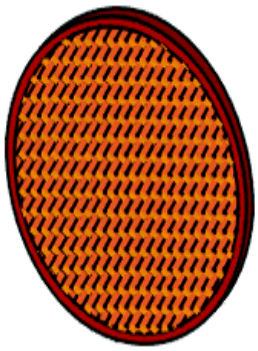
Polarized Retroreflective Scan

Polarized Retroreflective Scan is a variation. Polarizing filters are placed in front of the emitter and receiver lenses. The polarizing filter projects the emitter's beam in one plane only. This light is said to be polarized. A corner-cube reflector must be used to rotate the light reflected back to receiver. The polarizing filter on the receiver allows rotated light to pass through to the receiver. The polarized retroreflective scan technique allows for the detection of shiny objects.



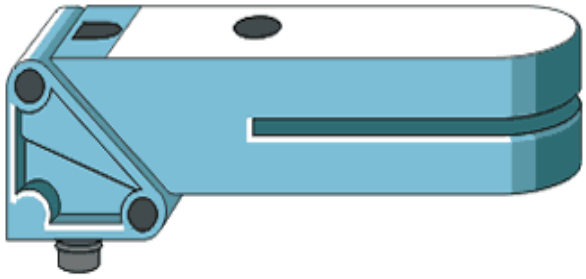
Reflectores

- Los reflectores se compran por separado del sensor.
- Viene en varios tamaños y pueden ser redondos, rectangulares o cinta reflectiva.
- La distancia de sensado es específica de un reflector particular
- Los reflectores de cinta no se deben usar con sensores retroreflectivos polarizados



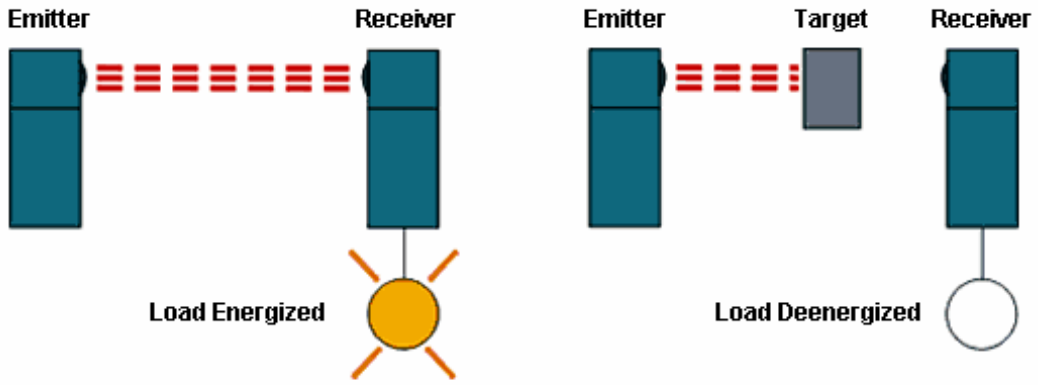
Slot BERO

With the slot BERO sensor, the target is placed inside the slot of the sensor. Emitted light passes through the object. Different contrast, tears, or holes in the target will vary the quantity of light reaching the receiver. This sensor uses Teach In. It is available with infrared or visible red/green light.

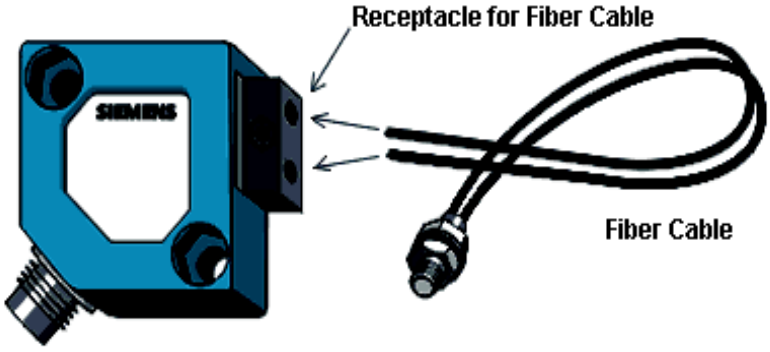


Light Operate

Light Operate (LO) is an operating mode in which the load is energized when light from the emitter reaches the receiver.



Sensores de fibras ópticas



✓Usan fibras ópticas incrustados en el frente del transmisor y receptor para extender el ojo del sensor.

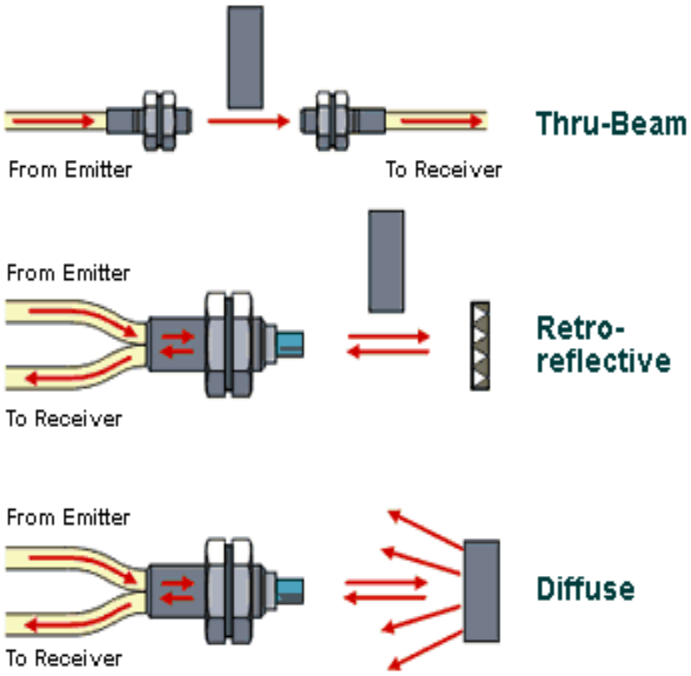
✓Los cables ópticos son pequeños, flexibles y pueden ser usados para sensar en lugares de difícil acceso.

Fiber Optics

Fiber optic sensors use a flexible cable packed with tiny fibers that channel light from emitter to receiver.

Fiber optics can be used with thru-beam, retroreflective scan, and diffuse scan.

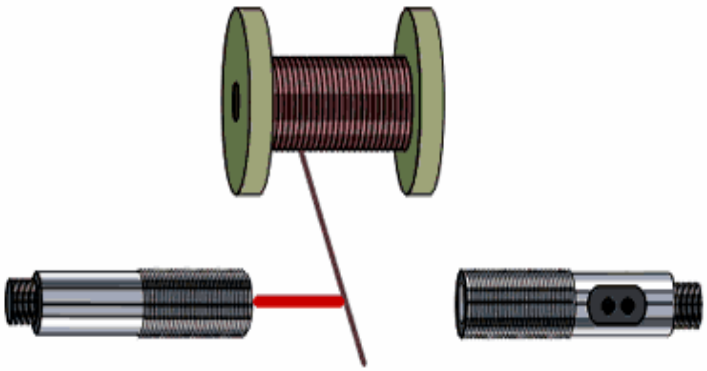
Fiber optic sensors have a shorter sensing range than other photoelectric sensors due to light losses in the fiber optic cables.



Lasers

Class 2 lasers, which have a maximum radiant power of 1 mW, can also be used as sensors. Class 2 lasers require no protective measures and a laser protection officer is not required. A warning notice must be displayed when laser sensors are used.

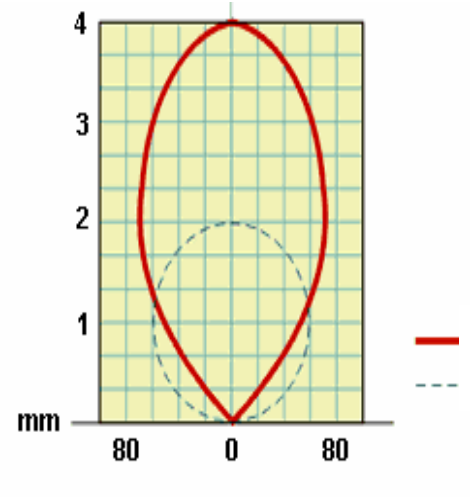
Laser sensors are available in thru-beam, diffuse scan, and diffuse scan with background suppression. Laser technology allows for detection of extremely small objects at a distance. Examples of laser sensor applications include exact positioning, speed detection, or checking thread thickness greater than 0.1 mm.



Zonas de conmutación de los sensores fotoeléctrico

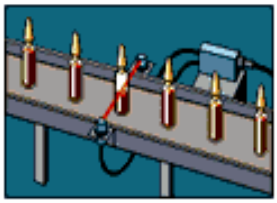
La zona de conmutación de un sensor fotoeléctrico está basada en el patrón y diámetro del haz de la luz del emisor del sensor.

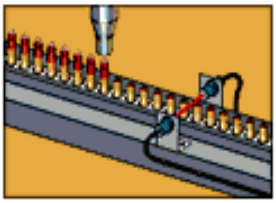
El receptor operará cuando el objeto entra a esta área.

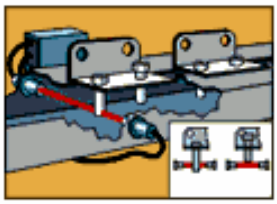


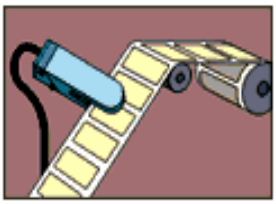
Se usa la supresión del fondo cuando el límite superior del sensor se reduce. La supresión de fondo disminuye la probabilidad de un disparo en falso por el reflejo del fondo.

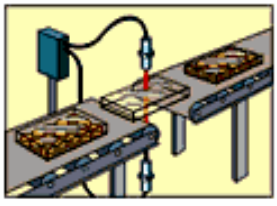
Ejemplos de Aplicación de los sensores Opto-electrónicos


Verifying Liquid in Vials


Verifying Lipstick Height Before Capping

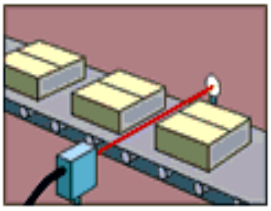

Verifying Screws are Correctly Seated


Detecting Labels with Transparent Background

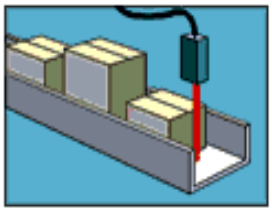

Verifying Cakes are Present in Transparent Package


Monitoring Objects as they Exit Vibration Bowl

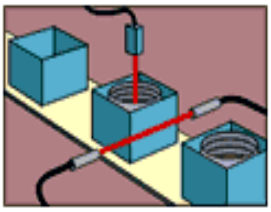
Ejemplos de Aplicación de los sensores Opto-electrónicos



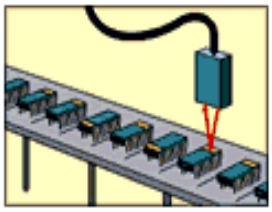
Counting Packages



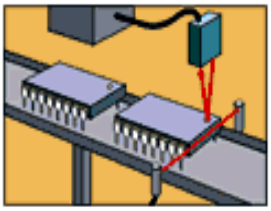
Detecting Items of Varying Heights



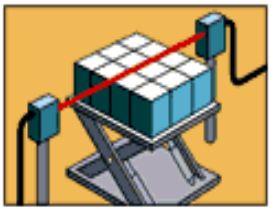
Detecting Components Inside Metal Can



Determining Orientation of IC Chip

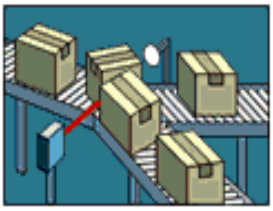


Determining Orientation of IC Chip

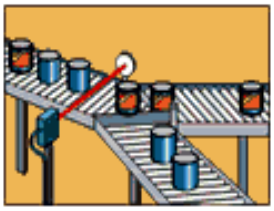


Controlling Height of a Stack

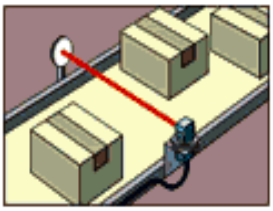
Ejemplos de Aplicación de los sensores Opto-electrónicos



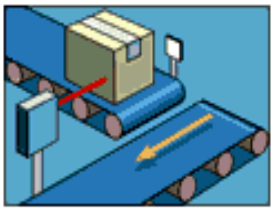
Detecting Jams on a Conveyor



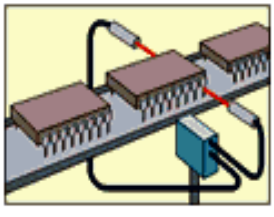
Batch Counting and Diverting Cans Without Lables



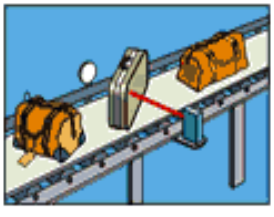
Counting Boxes Anywhere on a Conveyor



Detecting Presence of Object to Start Conveyor

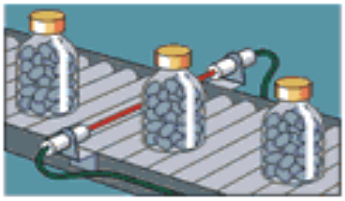


Counting IC Chip Pins

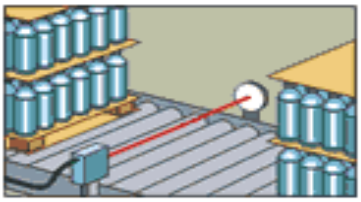


Detecting Reflective Object

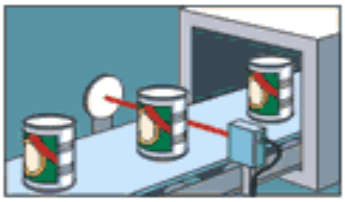
Ejemplos de Aplicación de los sensores Opto-electrónicos



Verificación de objetos en botella claras



Flujo de pallets transportando botellas



Conteo de latas

Conteo de botellas

Conteo de cartone

Lavado de carros