# LD30xx-IO

## Smart Photoelectric Laser Sensors with IO-Link

Launch Presentation

November 2023

# LD30 LASER IO-LINK 'PROBLEM SOLVER' NEW PRODUCT INTRODUCTION

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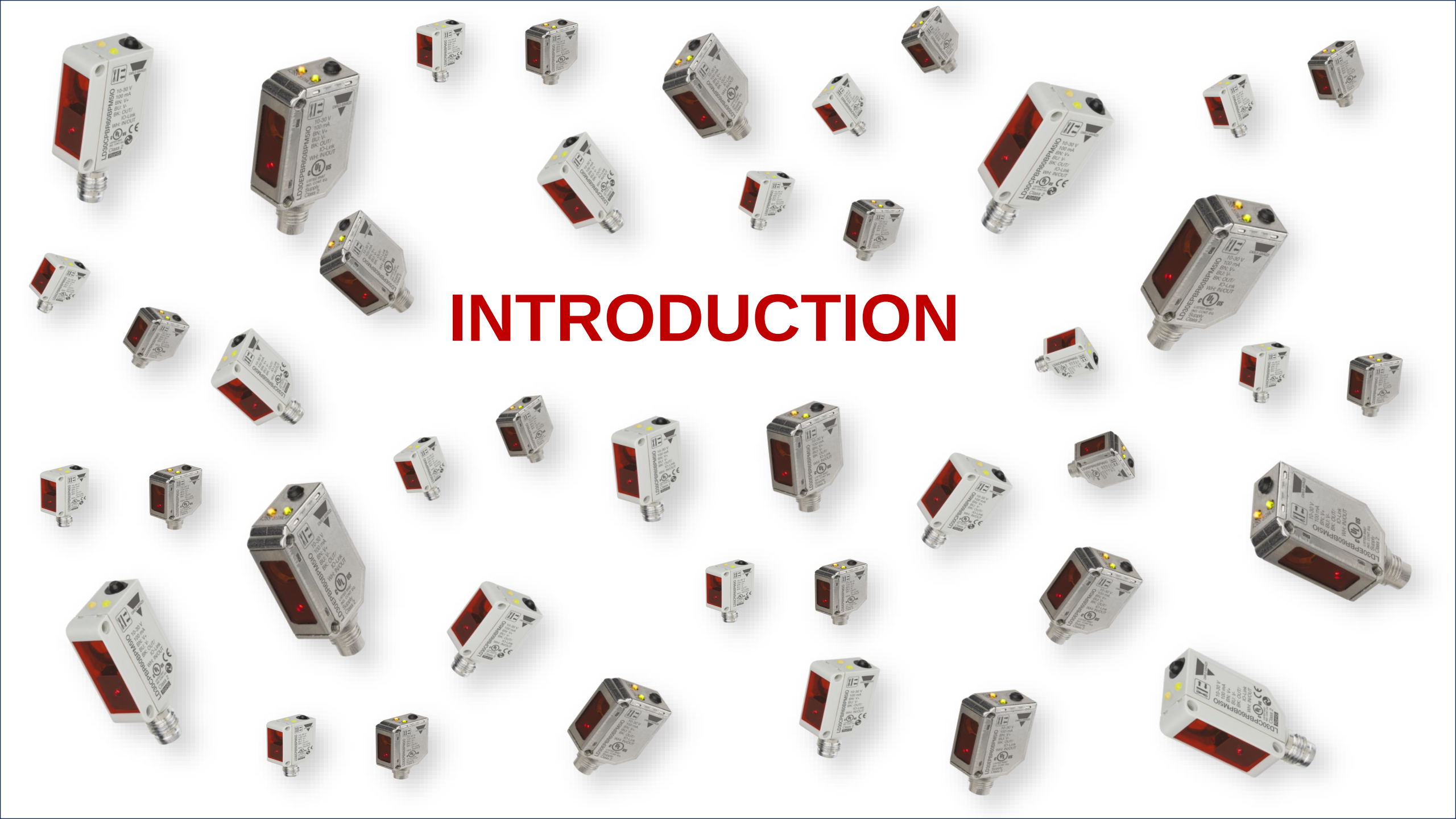
IO-Link



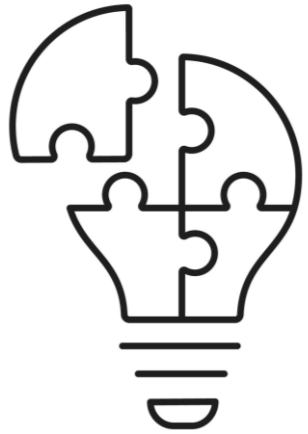
# INTRODUCTION

## Why this launch?

- In order to offer customers a superior option for challenging applications in Packaging, Material Handling, Food & Beverage, and Machine Tooling.  Specifically focusing on:
  - Shiny objects on a conveyor belt
  - Objects with variation of size, shape, or color
  - Transparent bottles
  - Presence or absence of small objects
  - Edge detection
- Each of these applications can be tricky, requiring unique settings within the sensor, which is possible using IO-Link!
- This new LD30 sensor family competes with the trendsetters in the market but offering a significantly smaller housing (stainless steel) and light spot size

# LD30 LASER IO-LINK 'PROBLEM SOLVER' NEW PRODUCT INTRODUCTION

## Introduction - Benefits



### ▼ PROBLEM SOLVER for TRICKY APPLICATIONS

- Background suppression, foreground suppression, and *new* dual detection along with the ability to uniquely configure each sensor allows customized performance for every application
- Small, visible laser light spot easy to align and detects small parts / holes for excellent quality inspection
- Reliable detection of transparent bottles without a reflector reduces setup time and cost
- Endless configurations allow a customized solution for each unique application

### ▼ PREVENTATIVE MAINTENANCE CAPABILITIES

- Avoid downtime due to early warning capabilities and even schedule planned maintenance prior to failure
- More accurate sensor performance from optimal setup
- Faster troubleshooting using logging functions saved inside the sensor

### ▼ APPLICATION FUNCTIONS

- Faster sensor response time due to algorithms directly in the sensor
- Simplified machine control system layout thanks to decentralization
- Reduced programming optimizes production processes

# THE PRODUCT

# LD30 LASER IO-LINK 'PROBLEM SOLVER' NEW PRODUCT INTRODUCTION

## Part Numbers

| Housing | Light | Distance | Cable | Plug (M8 4-Pin) |
|---|---|---|---|---|
| **Plastic (ABS) Versions** | | | | |
| Short Range | Red | 100 mm | LD30CPBR10BPA2IO | LD30CPBR10BPM5IO |
| Medium Range | Red | 300 mm | LD30CPBR30BPA2IO | LD30CPBR30BPM5IO |
| Long Range | Red | 600 mm | LD30CPBR60BPA2IO | LD30CPBR60BPM5IO |
| **Stainless Steel (AISI316L) versions** | | | | |
| Short Range | Red | 100 mm | LD30EPBR10BPA2IO | LD30EPBR10BPM5IO |
| Medium Range | Red | 300 mm | LD30EPBR30BPA2IO | LD30EPBR30BPM5IO |
| Long Range | Red | 600 mm | LD30EPBR60BPA2IO | LD30EPBR60BPM5IO |

ECOLAB®
LD..E types Only

IO-Link

# LD30 LASER IO-LINK 'PROBLEM SOLVER' NEW PRODUCT INTRODUCTION

## Internal Positioning

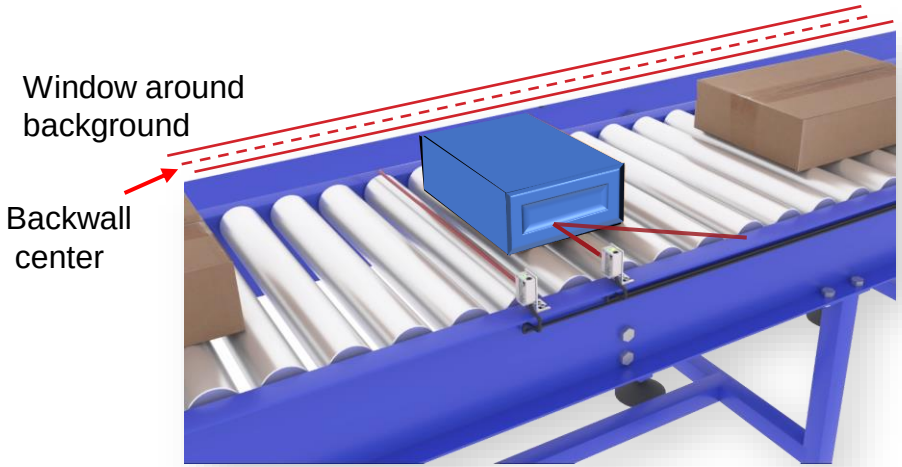
| | NEW LD30 Triangulation LD30CPBR (plastic) and LD30EPBR (stainless steel) | EXISTING LD30 ToF LD30CNBI (plastic) and LD30ETBI (stainless steel) |
|---|---|---|
| Sensing principle | Triangulation | Time of Flight |
| Sensing range | 100mm, 300mm, 600mm | 1000mm |
| Light source | Visible red laser (easy alignment) | Infrared laser |
| Light spot size | 1mm @ 300mm | 18mm @ 500mm |
| Frequency of Operating Cycles | 1000 Hz (depending on settings) | 5 Hz |
| Adjustment | Teach button & IO-Link | Potentiometer & IO-Link |

# LD30 LASER IO-LINK ‘PROBLEM SOLVER’ NEW PRODUCT INTRODUCTION

## Background Suppression vs Foreground Suppression

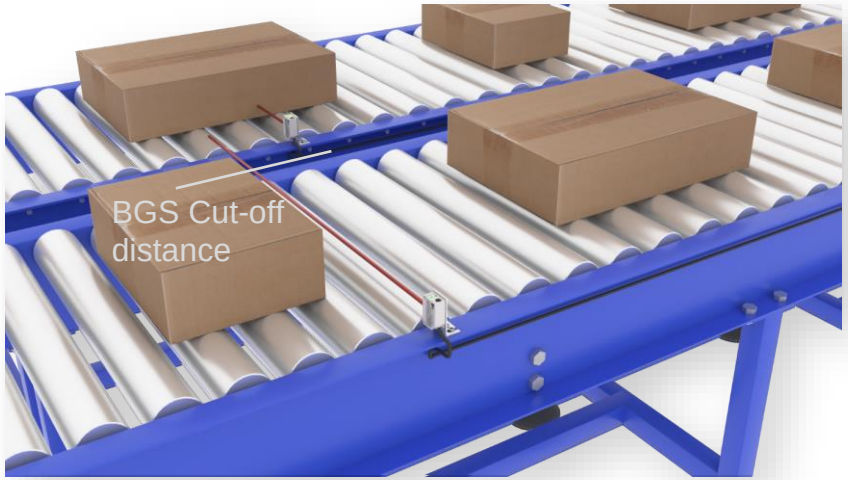
**Foreground Suppression (FGS)**

- Using the background of a conveyor as ”reflector”, the sensor sets up a window function around the background.  (Also common to look down at the conveyor – needs to be over a roller even for belt conveyors for steady detection)
- All objects that prevent the sensor from seeing the background are detected as objects e.g.
  - Light absorbing objects, dead black
  - Shiny objects that reflects the light away from the sensor.




**Background Suppression (BGS)**

- Detects objects until a certain ”cut-off” distance
- Prevents the sensor detecting e.g. objects beyond the cut-off distance on a parallel conveying belt



# LD30 LASER IO-LINK 'PROBLEM SOLVER' NEW PRODUCT INTRODUCTION

## Background Suppression vs Foreground Suppression

**Foreground Suppression (FGS)**

- Needs a steady, physical background to operate used as reference target. An object is detected if:
  - The sensor does not recognize the background
  - The distance measured ís between the set background and the sensor.
  - The laser light is absorbed so no light is reflected e.g. dead black objects
  - The laser light is deflected so no light reaches the sensor e.g. highly reflective objects.

NOTE:

- The FGS does not have a Blind Zone
- In case reflected light from highly reflective objects are momentarily detected, an OFF timer can be added to keep the output steady.

**Background Suppression (BGS)**

- Does not need a physical background to operate.
- Prevents an object beyond the set distance from being detected.
- Detects objects within the set distance based upon the position of the received light on the receiver.
- Is almost independent of the object color since it uses the position of the reflected light for detection.

NOTE: Does NOT detect:

- Dead black objects.
- Shiny objects that reflects the laser light away from the sensor.
- If the object is too close to the sensor (Blind Zone)

## Dual Detection

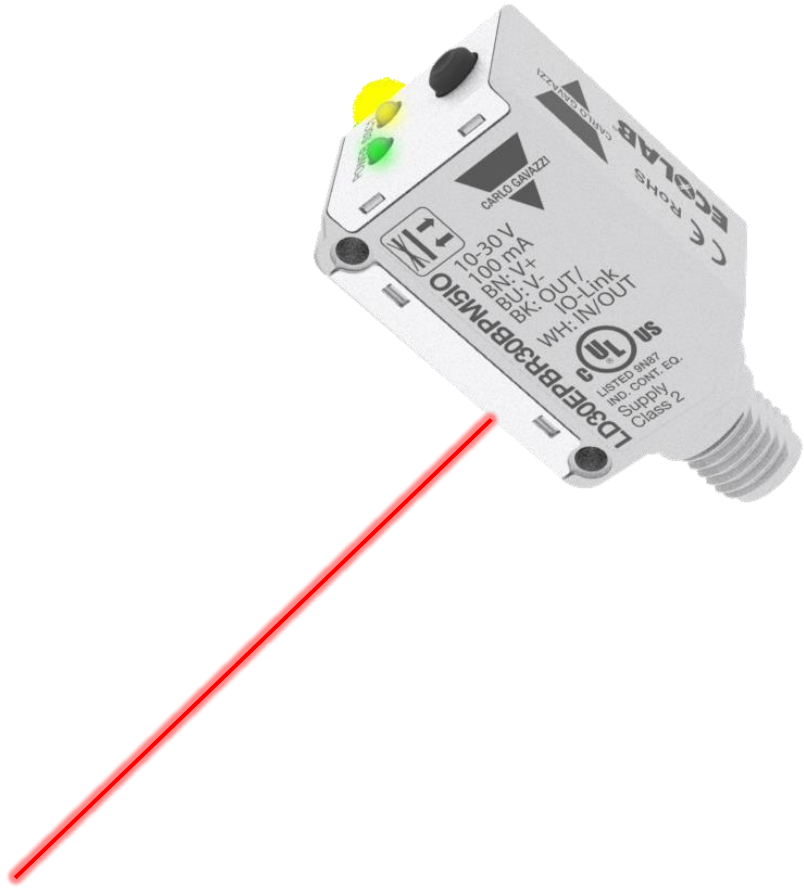
- A standard **Foreground Suppression**
  sensor expects to see a background and any objects that blocks the view of the background will be detected.
- A standard **Diffuse Reflective (energetic)** sensor detects the object by evaluating the energy of the reflected light
- A **Dual Detection sensor** combines a foreground suppression and a diffuse reflective sensing principle.
  The sensor evaluates both the position change and the light intensity of the received light.

## Benefits of Dual Detection

- A sensor with dual detection will be capable of detecting small objects close to a background
  - Quality inspection for missing e.g. small screws or clips
- The sensor is capable of detecting a wide range of transparent and translucent objects without re-teaching the sensor, allowing faster line changeover and keeping operating intervention to a minimum. No reflector is needed , just with a reference background
  - E.g. Glass bottles, Plastic bottles, Plastic containers/trays, Pharmaceutical vials
  - Presence or absence of parts close to a conveying belt
  - Inspection of missing transparent glue or sealing on products before closing the product

## Laser spot

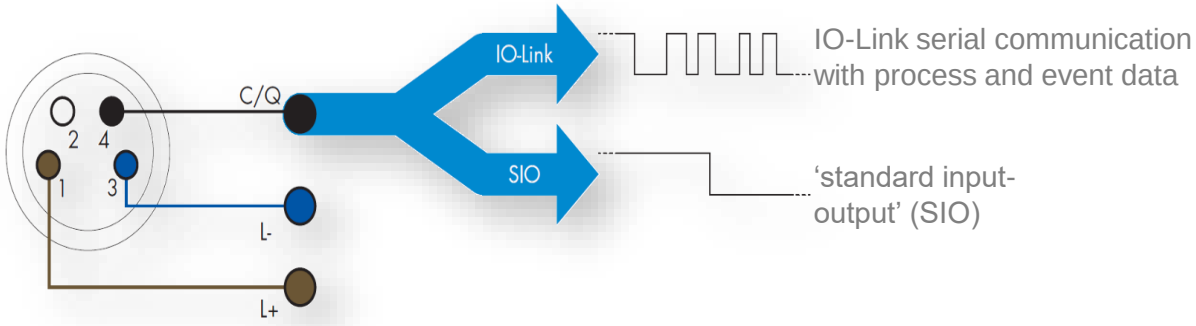
- The LD30xPBR…IO laser sensor used a Class 1 laser that is considered safe based upon current medical knowledge (protective glasses not required.)
- The red light laser beam is only Ø 1 mm in diameter
  - The small light spot allows detection of very small objects at a precise position.
- The beam is circular at full distance
  - A visible spot makes it easier to aim the sensor at the object
- Expected lifetime on a Laser diode is 50.000 hours vs a standard LED at 100.000 hours (standard
  - This is due to the physics of a laser diode and valid for all manufacturer of laser sensors.



# LD30 LASER IO-LINK ‘PROBLEM SOLVER’ NEW PRODUCT INTRODUCTION

## Configurability through IO-Link


- Globally recognized communication protocol **IEC 61131-9**
- **Point-to-Point** serial communication interface
- Data transmission via a **standard, unshielded cable**





- Sensor waits for ‘**handshake**’ signal from an IO-Link master
- If signal is not received, sensor operates in **SIO mode**
- Still access to the **intelligence** inside the sensor in an IO-Link environment or traditional operation

# LD30 LASER IO-LINK 'PROBLEM SOLVER' NEW PRODUCT INTRODUCTION

## 1) Configurable Sensors

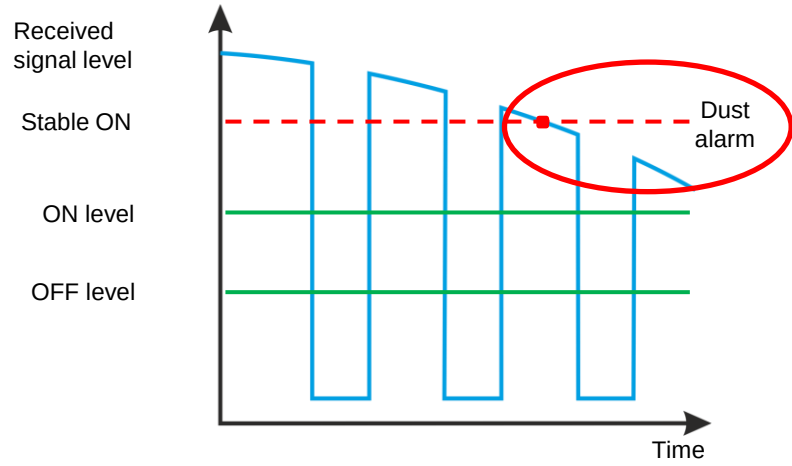

| | |
|---|---|
| Local or Remote Adjustment | • 'Teach Button', 'Teach-by-Wire' using external input, or disable teach button by selecting 'IO-Link Adjustment' |
| Teach-in Range | • Value between 20…125mm, 20…325mm, 20….625mm depending on type |
| Process Data | • Selection of active process data, including analog |
| Sensor Measurement Selection | • Sensing presets Fine detection, Robust detection, Fast detection |
| Temp Alarm Threshold | • Min and max thresholds for temperature alarm |
| Safe Limits | • Set in % of the SP1 and SP2 and can be set individually for SSC1 and SSC2; used for calculating the 'Stable OFF' and 'Stable ON' signals |
| Event Configurator | • Selection of IO-Link event data |
| Filter Scaler | • Increases immunity towards unstable targets and/or electromagnetic disturbances<br>• The higher the value the lower the switching frequency |
| Mutual Interference | • Mode 1 – protects against high electromagnetic or light disturbances<br>• Mode 2 – protects against two sensors disturbing each other<br>• Mode 3 – protects against three sensors disturbing each other |
| LED Indication | • Inactive, active, find my sensor |
| Hysteresis | • Manual or automatic |
| Cutoff Distance | • Objects beyond set cutoff distance will be truncated<br>• Cut-off is the distance shown in the process data if no object is detected |

# LD30 LASER IO-LINK 'PROBLEM SOLVER' NEW PRODUCT INTRODUCTION

## 2) Advanced Detection

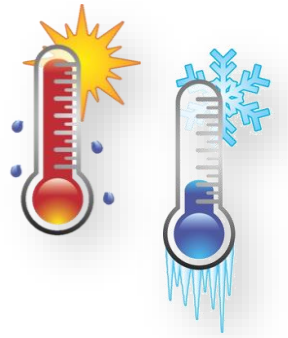

### DUST ALARM

- Alarm is sent if the light received by the sensor falls below 'stable ON' (minimum excess gain)
- Indicates sensor lens may require cleaning due to dust / residue buildup allowing for correction prior to failure or even planned maintenance scheduling




### TEMPERATURE ALARM

- Temperature is monitored inside the sensor (will always be higher than ambient) & can be monitored real-time via IO-Link process data
- Alarm sent if temperature exceeds the individually set max (up to 150 °C) or min (down to 50 °C) alarm levels (thresholds configurable)
- Change in temperature of multiple sensors can give early warning of a larger issue (blocked fan, broken AC, etc.)



# LD30 LASER IO-LINK 'PROBLEM SOLVER' NEW PRODUCT INTRODUCTION

## 3) Reduced Inventory


**SENSING MODES**

- Single point
- Two point
- Window
- Foreground suppression
- Dual detection (selectable as an application function)

**LOGIC**

- Function between channel A & channel B
- AND, OR, XOR, gated set-reset, direct (no logic)

**TIME DELAY**

- Set individually for output 1 and output 2
- Units set in ms, sec, or min with values from 0 to 32,767
- On delay, off delay, on delay & off delay, one-shot leading edge, one-shot trailing edge, direct (no delays)

**OUTPUT INVERTER**

- Normally open (NO)
- Normally closed (NC)

**OUTPUT**

- PNP, NPN, push-pull, external input (active high, pull-down), external input (active low, pull-up), external teach-in (active high) input, disabled

# LD30 LASER IO-LINK 'PROBLEM SOLVER' NEW PRODUCT INTRODUCTION

## 4) Automatic Parameter Setting

- **IO-LINK ENVIRONEMNT**
  - **Device identification** – sensor parameters / configurations and unique internal ID can be accessed via IO-Link
  - **Automatic parameter settings** – setup of a new sensor is smooth and easy using previously stored parameters. Once a sensor has been replaced, the IO-Link master transmits parameters stored from the previous sensor.

**YL2… & YN1…**
IO-Link Masters


- **SENSOR MEASUREMENT PRESETS**
  - **Fine Detection** – applications that require detection close to a background
    - Hysteresis – minimum
    - Safe margin – 1% of the distance
    - Detection mode – precise mode with more samples
  - **Robust Detection** – applications that require high immunity towards electromagnetic disturbance and where the background is further away from the object to be detected
    - Hysteresis – 3x minimum
    - Safe margin – 4%of the distance
    - Detection mode – precise mode with more samples
  - **Fast Detection** – applications that require fast detection speed with the background further away from the object to be detected
    - Hysteresis – 3x minimum
    - Safe margin – 4% of the distance
    - Detection mode – fast mode for minimum response time

# LD30 LASER IO-LINK 'PROBLEM SOLVER' NEW PRODUCT INTRODUCTION

## 5) Advanced Diagnostics


**Operating Hours**
- Every full hour the sensor is operational saved in sensor memory

**# of Power Cycles**
- Number of times the sensor has been powered-up saved in sensor memory

**Max & Min Temperatures**
- Highest and lowest temperatures (˚C) since last power-up saved in sensor memory
- All time high and low temperatures (˚C) saved in sensor memory
- Current temperature (˚C)
- Minutes above max temperature & minutes below min temperature saved in sensor memory

**Detection Counter**
- Number of times SSC1 state changes saved in sensor memory

**Download Counter**
- Number of times parameters have been edited saved in sensor memory

# LD30 LASER IO-LINK 'PROBLEM SOLVER' NEW PRODUCT INTRODUCTION

## 6) Plug & Play

- **Backwards compatible** – can be used in a traditional or IO-Link environment

- **Manufacturer independent** – IO-Link globally recognized communication standard; IO-Link master and sensors can be mixed and matched

- **Fieldbus independent** – IO-Link masters are a 'translator' giving visibility into sensor intelligence to industry-leading protocols (EtherNet/IP, PROFINET IO, MODBUS TCP, and OPC UA to the cloud)

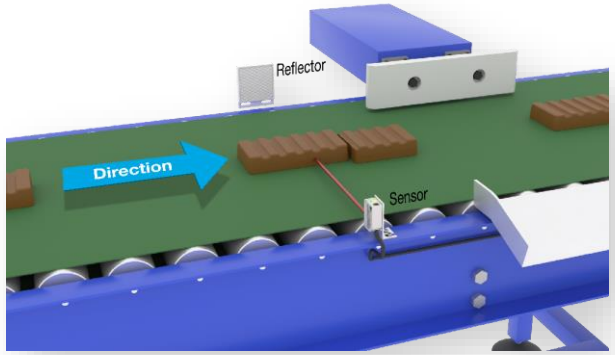

**YL2… & YN1…**
IO-Link Masters


**SCTL55**
IO-Link Configurator

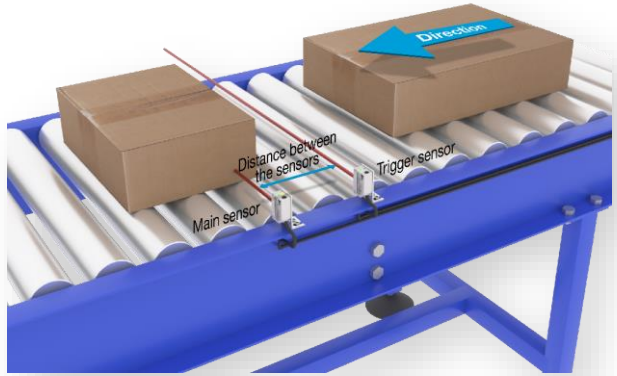
# LD30 LASER IO-LINK 'PROBLEM SOLVER' NEW PRODUCT INTRODUCTION

## 7) Multi-Function

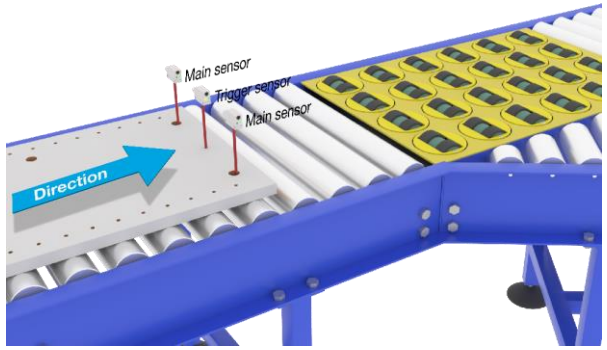

- Object & Gap monitoring



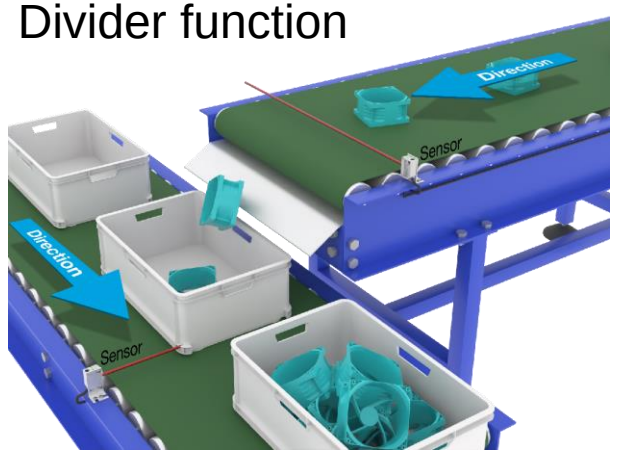

- Speed and Length monitoring




- Pattern Recognition




- Divider function



# LD30 LASER IO-LINK 'PROBLEM SOLVER' NEW PRODUCT INTRODUCTION

## 8) Predictive Maintenance

**Excess Gain**
- Calculated every time the sensor detects an object / target
- Measurement of the amount of light on the receiver beyond the minimum amount of light required for the sensor to operate
- Provides insight into reliability

**Quality of Teach (QoT)**
- Evaluates ratio between TeachPoint1 (TP1), TeachPoint2 (TP2), hysteresis, & safe limits
- Overall sensor teach performance summarized in a single value from 0 to 255%

**Quality of Run (QoR)**
- Constant monitoring and evaluation of max & min signal levels, hysteresis, SP & safe limits
- Overall sensor status summarized in a single value from 0 to 255% which can be monitored for trends giving notice prior to sensor failure

$$\text{Excess Gain} = \frac{\text{Light received by the sensor}}{\text{Light required to switch the output}}$$

| Operating Environment and Minimum Excess Gain Required | Condition of Operating Env't |
|---|---|
| **Clean air.** No dirt buildup on lens or reflector | 1.5x |
| **Slightly dirty.** Slight buildup of debris, dust, moisture, or film on lens or reflector; Regular cleaning | 5x |
| **Moderately dirty.** Obvious contamination of lenses and reflector, but not obscured; Occasional cleaning | 10x |
| **Very dirty.** Obvious contamination of lens and reflector, but not obscured; Occasional cleaning | 50x or more |


| Value & Condition | QoT Definition | QoR Definition |
|---|---|---|
| > 150%<br>Excellent | Sensor not expected to have maintenance issues. | Sensor is not expected to have maintenance issues. |
| 100%<br>Good | Sensor has been taught with the safe limits set at standard safe limits<br>• Long term reliability expected for all environmental conditions.<br>• Maintenance not expected | Sensor performs as well as initial teach with safety margin twice the standard hysteresis.<br>• Long term reliability expected for environmental conditions.<br>• Maintenance not expected |
| 50%<br>Average | • Short-term reliability and maintenance expected due to environmental conditions.<br>• Reliable detection expected with restricted environmental influence. | • Short-term reliability and maintenance expected due to environmental conditions.<br>• Reliable detection expected with restricted environmental influence. |
| 0%<br>Poor | Poor to unreliable working sensing conditions are expected. | Poor to unreliable working sensing conditions are expected. |

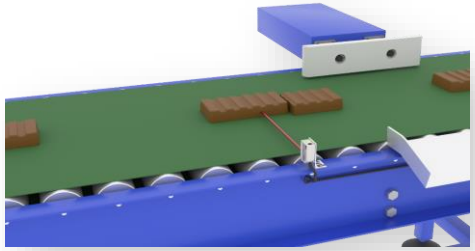
# THE MARKET

# LD30 LASER IO-LINK 'PROBLEM SOLVER' NEW PRODUCT INTRODUCTION

Industries & Applications

## INDUSTRIES

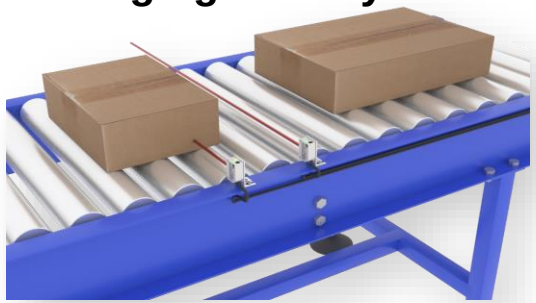
### Packaging Conveyors



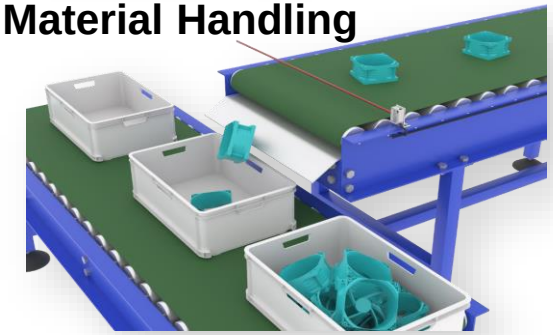
### Material Handling

### Food & Beverage Conveyors

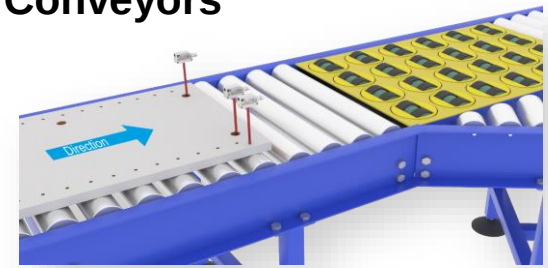
### Packaging Conveyors



### Material Handling

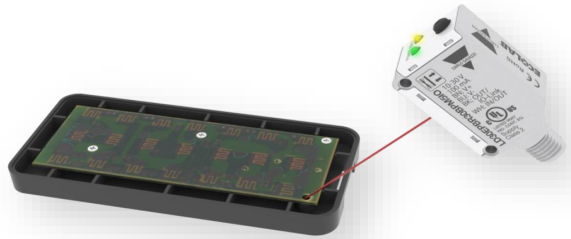


### Inspection Control Conveyors

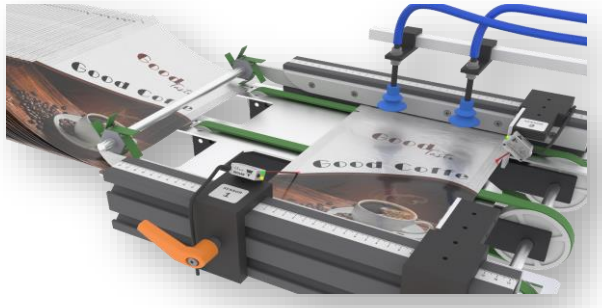



## APPLICATIONS

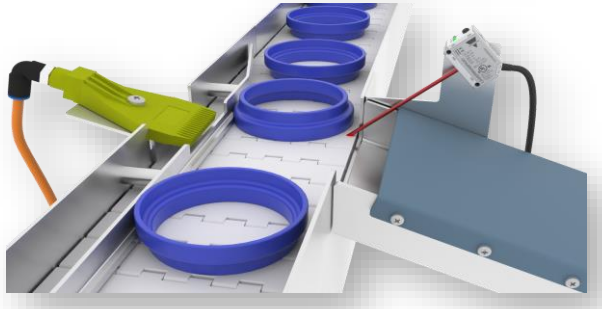
### Quality Control



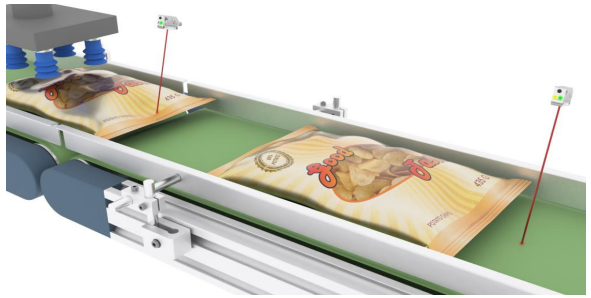
### Packaging



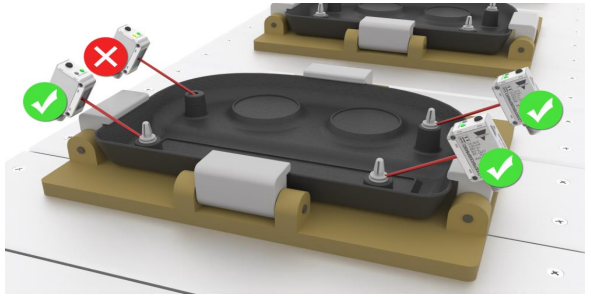
### Part Sorting



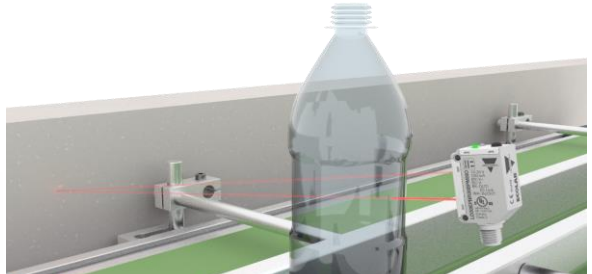
### Packaging Line



### Part Inspection



### Transparent Detection



## **Applications - Packaging,** Pouch feeder for horizontal packaging lines

### Customer Need

Pouches must be fed to the horizontal packaging line. The pouches can be highly shiny or dead black, making their detection very difficult with standard photoelectric sensor. The mechanical guides need to be adjusted for each pouch to make sure that the pouch is stopped at the right position. Once the pouch is in the right position it is moved with vacuum cups to the horizontal packaging line.

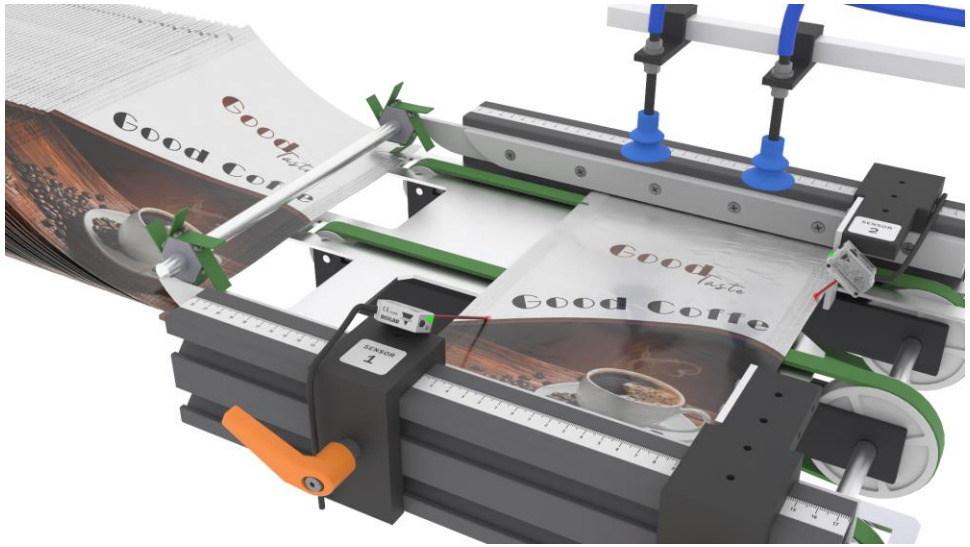
### Our Solution

The LD30CPBR…IO or the LD30CPBR…IO can be set as Background Suppression or in this case as foreground suppression mode via an IO-Link master or our SCTL55 Smart Configurator.
The small 1 mm round laser spot is easy to align, so the setting of the guides can be adjusted correctly.
The sensors have been taught in Foreground Suppression mode to detect a background below the conveyor, allowing reliable detection of pouches, even if all the laser light is reflected away from the sensor or absorbed by a dead black pouch.

By means of IO-Link the sensor can be configured to a variety of functions.

### Benefits

- The foreground suppression mode, and the small visible red laser spot, allows reliable detection of highly reflective or dead black objects avoiding unnecessary production stops.
- In IO-link mode valuable downtime can be avoided thanks to the predictive maintenance functions such as Quality of Run, Quality of Teach, Temperature and dust alarms, Excess Gain and Auto Adjustment.
- In addition, the IO-Link allows easy customization of distances, timers, logic functions as well as different output configuration




| | |
|---|---|
| Subject: | Pouch feeder for horizontal packaging lines |
| Industry: | Conveyors in packaging lines |
| Product: | LD30xPBR…IO |
| Customer: | OEMs, System integrators |

## **Applications - Packaging,** Bowl feeder system for part orientation

### Customer Need

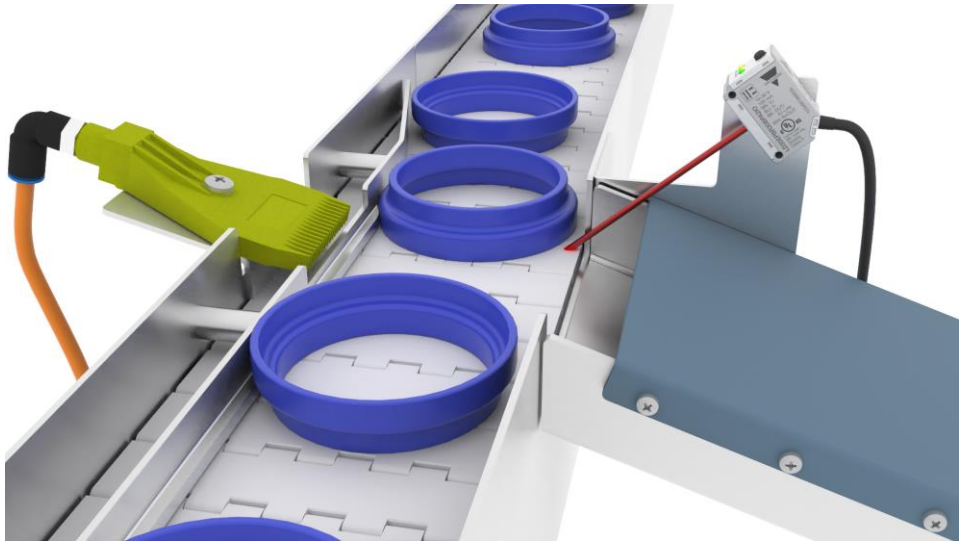
It is required to sort parts from a vibratory bowl feeder, so the parts are orientated correctly. The correct orientation is with the largest diameter pointing upwards. If the largest diameter is pointing downwards it need to be blown back into the vibratory bowl feeder

### Our Solution

The LD30CPBR…IO or LD30CPBR…IO can be set as Background Suppression or in this case as foreground suppression mode via an IO-Link master or our SCTL55 Smart Configurator.
The small 1 mm visible round red laser spot is aligned on the white conveying belt and taught in foreground suppression mode to recognize the belt. If the large diameter is blocking the sensor from seeing the belt, the blow nozzle sends the part back into the vibratory bowl.
By means of IO-Link the sensor can be configured to a variety of functions.

### Benefits

- The foreground suppression mode, and the small visible red laser spot, allows reliable detection of the white conveyor. Only a small part of the large diameter has to block the view if the white conveyor to detect the object.
- In IO-link mode, valuable downtime can be avoided thanks to the predictive maintenance functions such as Quality of Run, Quality of Teach, Temperature and dust alarms, Excess Gain and Auto Adjustment.
- In addition, the IO-Link allows easy customization of distances, timers, logic functions as well as different output configuration



| | |
|---|---|
| Subject: | Bowl feeder system for part orientation |
| Industry: | Conveyors in material handling and packaging lines |
| Product: | LD30xPBR…IO |
| Customer: | OEMs, System integrators |

## Applications - Quality Inspection missing Part

### Customer Need

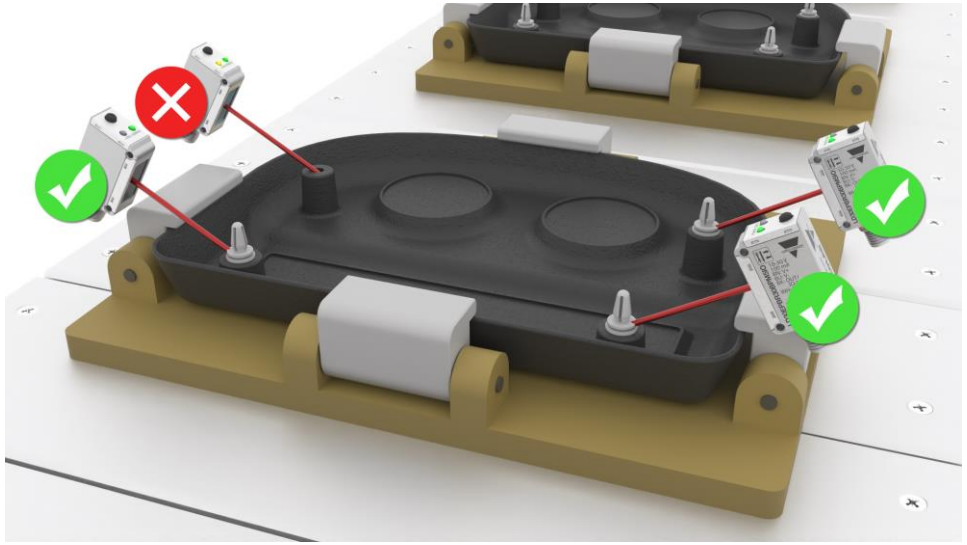
In inspection control stations, placed along assembly lines of different industries, it is a requirement to verify that all mounting clips are present before moving to the final assembly line.

### Our Solution

The LD30CPBR…IO or LD30CPBR…IO can be set as Background Buppression or in this case as Dual Detection mode via an IO-Link master or our SCTL55 Smart Configurator.
The small 1 mm visible, round, red laser spot is aligned to the background surface with the clips missing and taught in Dual Detection mode to recognize the background. If the clip has been correctly mounted, it will block the sensor from seeing the background and the clip will be detected.
By means of IO-Link the sensor can be configured to a variety of functions.

### Benefits

- The Dual Detection mode, and the small, visible, red laser spot, allows reliable detection of the missing parts. Only a small part of the clip has to block the view of the background to detect the clip.
- In IO-link mode costly downtime can be avoided thanks to the predictive maintenance functions such as Quality of Run, Quality of Teach, Temperature and dust alarms, Excess Gain and Auto Adjustment.
- Further the IO-Link allows easy customization of distances, timers, logic functions as well as different output configuration



Subject: Quality Inspection – Missing part

Industry: Conveyors in material handling

Product: LD30xPBR…IO

Customer: OEMs, System integrators

## Applications - Quality Inspection missing Part

### Customer Need

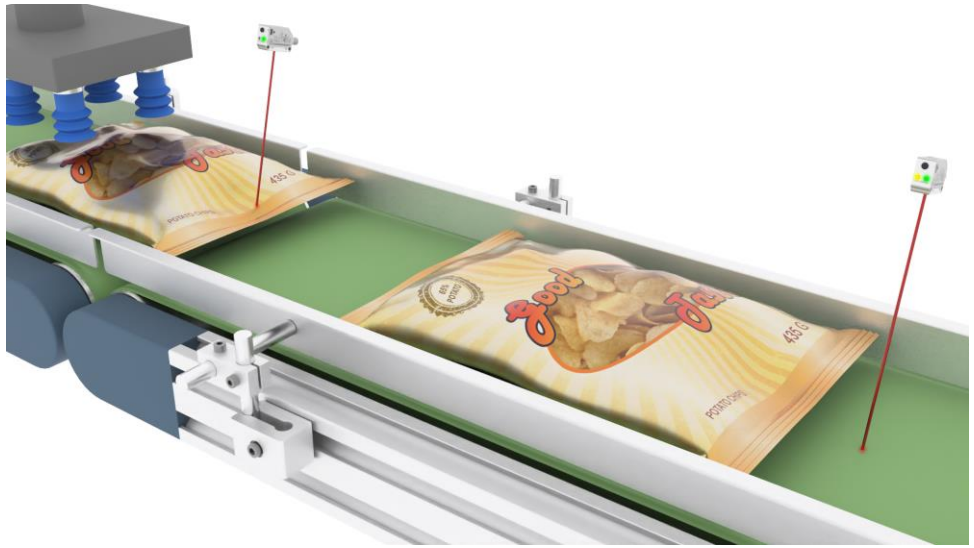
Manufacturers of packaging lines need to have a flexible machine to pack a variety of products. The packaging machine has a buffer conveyor and a packaging station moving the objects into a case. It is not possible to constantly readjust the sensors as to adapt to the variety of objects to be packed.

### Our Solution

The LD30CPBR…IO or LD30CPBR…IO can be set as background suppression or in this case as Foreground Suppression mode via an IO-Link master or our SCTL55 Smart Conf.
The small 1 mm round laser spot facilitates easy alignment of the sensor.
The sensors can be set if Foreground Suppression mode to teach the green conveying belt, either with a single teach or dynamic to compensate for movement of the belt and variations of the objects.
The sensor expects to see the conveying belt so if any object blocks the view of the belt, reflects the light away from the sensor or absorbs all the light from the sensor it is detected as an object.
By means of IO-Link the sensor can be configured to a variety of functions, e.g., a build-in time delay that can be set to avoid small dropouts in the detection.

### Benefits

- The Foreground Suppression mode in relation to the small visible red laser spot, allows reliable detection of highly reflective or dead black objects close to a conveying belt avoiding unnecessary production stops.
- In IO-link mode valuable downtime can be avoided thanks to the predictive maintenance functions such as Quality of Run, Quality of Teach, Temperature and dust alarms, Excess Gain and Auto Adjustment.
- Further the IO-Link allows easy customization of distances, timers, logic functions as well as different output configuration




| | |
|---|---|
| Subject: | Case packaging machine with a buffer conveyour |
| Industry: | Conveyors in material handling |
| Product: | LD30xPBR…IO |
| Customer: | OEMs, System integrators |

## Transparent or translucent Bottle detection

### Customer Need

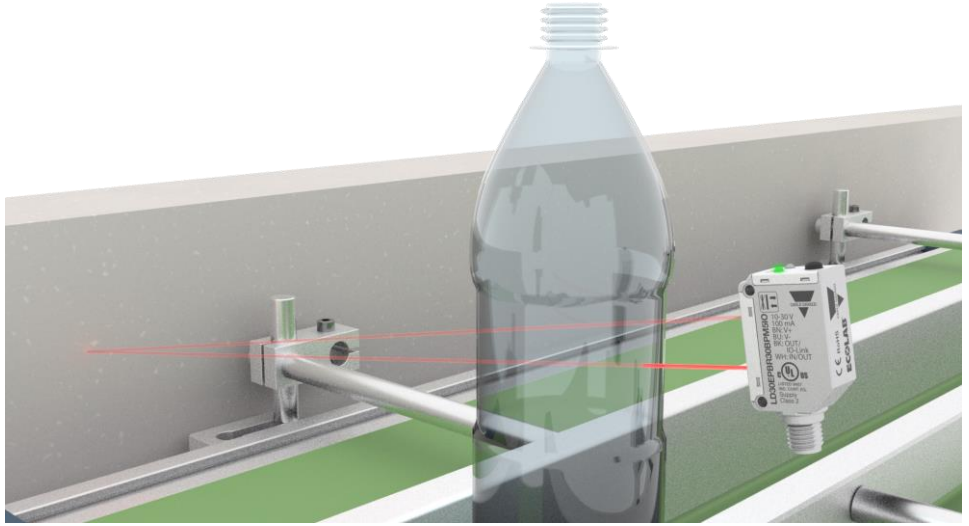
In production filling lines the transparent PET bottles must be detected to monitor constant flow of bottles. If the feeding line is cut off, it must be detected immediately. The bottles can be transparent, translucent or colored.

### Our Solution

The LD30CPBR…IO or LD30CPBR…IO can be set to background suppression or in this case to Dual Detection mode via an IO-Link master or our SCTL55 Smart Configurator. The 1 mm, visible, round, red laser spot is aligned to the background surface and the reflected distance and light intensity of the background are saved in the sensor as reference. A change in reflected light position or intensity caused by presence of a bottle will be detected by the sensor.
By means of IO-Link the sensor can be configured to a variety of functions.

### Benefits

- The Dual Detection mode, and the small visible red laser spot, allows reliable detection of transparent bottles even without the use of a reflector. Change of transparency does not require new settings of the sensor.
- In IO-link mode valuable downtime can be avoided thanks to the predictive maintenance functions such as Quality of Run, Quality of Teach, Temperature and dust alarms, Excess Gain and Auto Adjustment.
- Further the IO-Link allows easy customization of distances, timers, logic functions as well as different output configuration



| | |
|---|---|
| Subject: | Transparent or translucent bottle detection |
| Industry: | Bottling Conveyors in material handling |
| Product: | LD30xPBR…IO |
| Customer: | OEMs, System integrators |

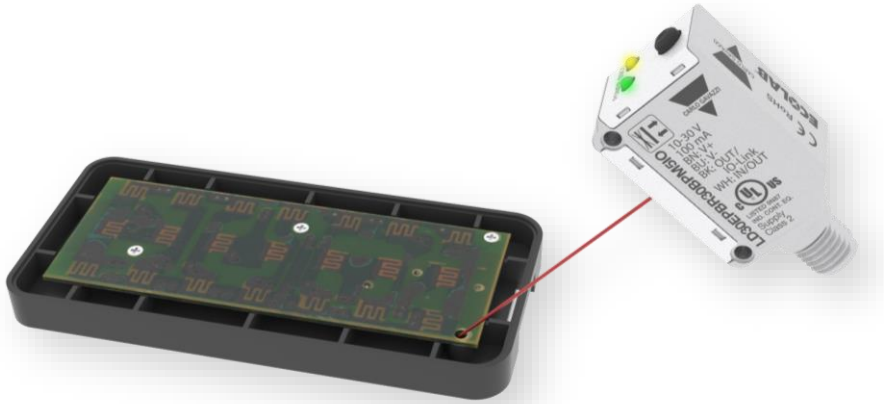
## Applications - Quality Control - Missing Part

### Customer Need

In inspection control stations, placed along assembly lines of  various industries, it is a requirement to verify that all mounting screws are present before moving to the final assembly line.

### Our Solution

The LD30CPBR…IO or LD30CPBR…IO can be set to background suppression or in this case to Dual Detection mode via an IO-Link master or our SCTL55 Smart Configurator. The 1 mm, visible, round, red laser spot is aligned to the far surface of the mounting hole with the small screw missing and taught to recognize it as the background in Dual Detection mode.. If the screw has been correctly mounted, it will block the sensor from seeing the background and the small screw will be detected.
By means of IO-Link the sensor can be configured to a variety of functions.



### Benefits

- The Dual Detection mode, and the small, visible, red laser spot, allows reliable detection of the missing part. Only a small part of the screw has to block the view of the background to be detected.
- In IO-link mode costly downtime can be avoided thanks to the predictive maintenance functions such as Quality of Run, Quality of Teach, Temperature- and Dust Alarms, Excess Gain and Auto Adjustment.
- Further the IO-Link allows easy customization of distances, timers, logic functions as well as different output configuration

| | |
|---|---|
| Subject: | Quality Control – Missing part |
| Industry: | Semiconductor  assembly lines |
| Product: | LD30xPBR…IO |
| Customer: | OEMs, System integrators |

## Applications - Food production – slaughterhouse for pigs

### Customer Need

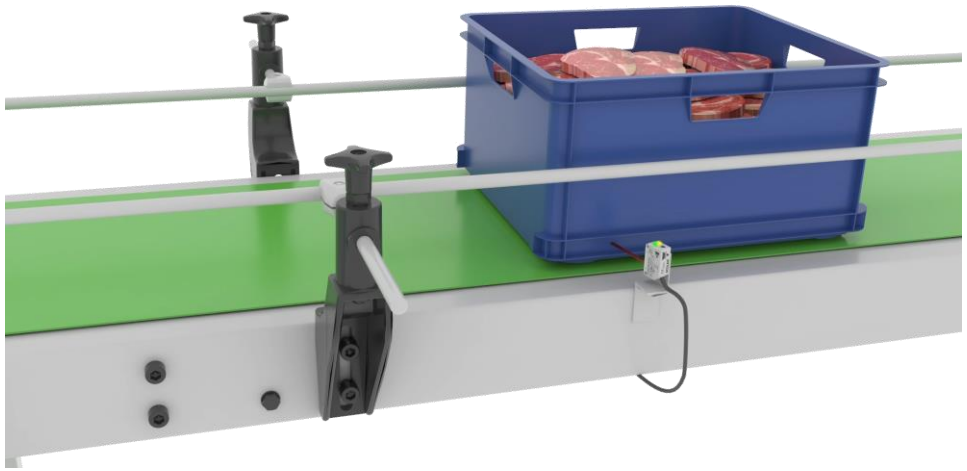
Hygiene and cleanliness are highly demanded and applied to the food industry, where the use of equipment that can withstand daily wash-down at high temperatures, high-pressure cleaning and harsh detergents is required.
The boxed used in the conveyor belt can be of different colors and it is important to correctly detect and handle them.
Downtime reduction is vital to avoid costly stops in the production line.

### Our Solution

The LD30EPBR…IO Background suppression Sensors are suitable for this application. The background suppression sensor superiorly detects all colours of objects at the same distance from the sensor, and its durable design withstands daily cleaning processes including high-pressure water jets (IP69K) as well as aggressive cleaning agents.

### Benefits

The sensor is equipped with IO-Link and has build-in predictive maintenance functions such as Quality of Run, Quality of Teach, Temperature and dust alarms, Excess Gain and Auto Adjustment that will reduce downtime on the production line.
The IO-Link allows easy customization of distances, timers, logic functions as well as different output configuration.
Due to the strong and durable housing the sensor will last longer in the production line.



Subject: BGS senso, IP69K and ECOLAB

Industry: Food Processing

Product: LD30EPBR…IO

Customer: OEMs, System integrators

## Preinstalled Application functions - Object and Gap Monitoring

### Customer Need

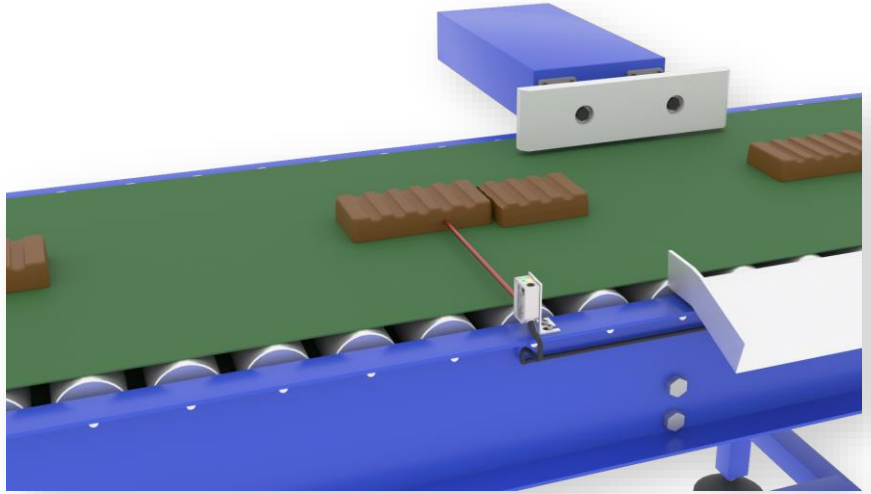
We are packing chocolate bars in individual bags and need to be sure that only a full bar is packed. To ensure that, we need to monitor the length of the chocolate bar as well as the distance between two chocolate bars "Gap" are within certain tolerances. If the tolerances are exceeding, the bar must be pushed a side.

### Our Solution

The LD30CPBR…IO or the LD30EPBR…IO Background suppression versions are suitable for this application.
By means of IO-Link the sensors can be configured to run the operation as a standalone solution. An implemented "Object and Gao" function allows to enter a max/min time for both the object and the gap. If the monitored time for the object or gap the sensor respond on its two outputs, one for object and one for Gap.

### Benefits

You do not need a PLC to run this operation. The sensor itself will monitor the object and gap time and compare it with a preinstalled time. The outputs will respond if either the object or gap time exceed the limits entered in the sensor. Further these sensors are equipped with IO-Link that allows easy customization of distances, timers, logic functions as well as different output configuration



Subject: Object and Gap monitoring

Industry: Packaging Conveyors

Product: LD30xPBR…IO

Customer: OEMs, System integrators

## Preinstalled Application functions - Speed and Length Monitoring

### Customer Need

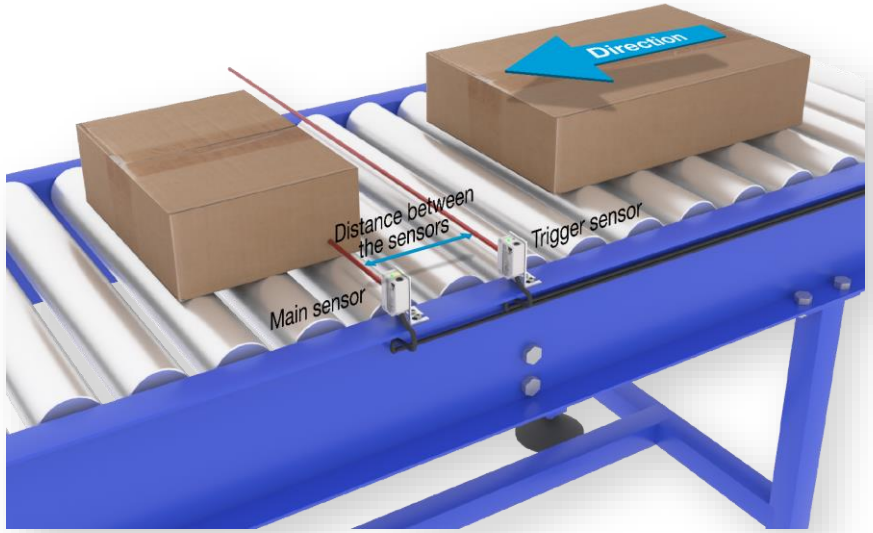
In a packaging line it is necessary to sort the boxed based on their length/size. In case the conveyor can vary in speed, a solution is required that can compensate for it.

### Our Solution

The LD30CPBR…IO or the LD30EPBR…IO Background suppression versions are suitable for this application.
By means of IO-Link the sensor can be configures to run the operation together with an IO-Link master and a PLC. An implemented "Speed and Length" function allow two interconnected sensors to constantly monitor both the Speed of the conveyor and the length of the box.

### Benefits

The two sensors are interconnected and placed with a known distance between them. Once a box has interrupted the two sensors, the main sensor will calculate the conveyor speed. Once the box has fully passed the main sensor, the length is calculated in the sensor. The speed and length result can be read by the PLC through the IO-Link master directly in [mm/s] and [mm]. The IO-Link allows easy customization of distances, timers, logic functions as well as different output configuration




| | |
|---|---|
| Subject: | Speed and Length Monitoring |
| Industry: | Packaging Conveyors |
| Product: | LD30xPBR…IO |
| Customer: | OEMs, System integrators |

## Preinstalled Application function - Divider function

### Customer Need

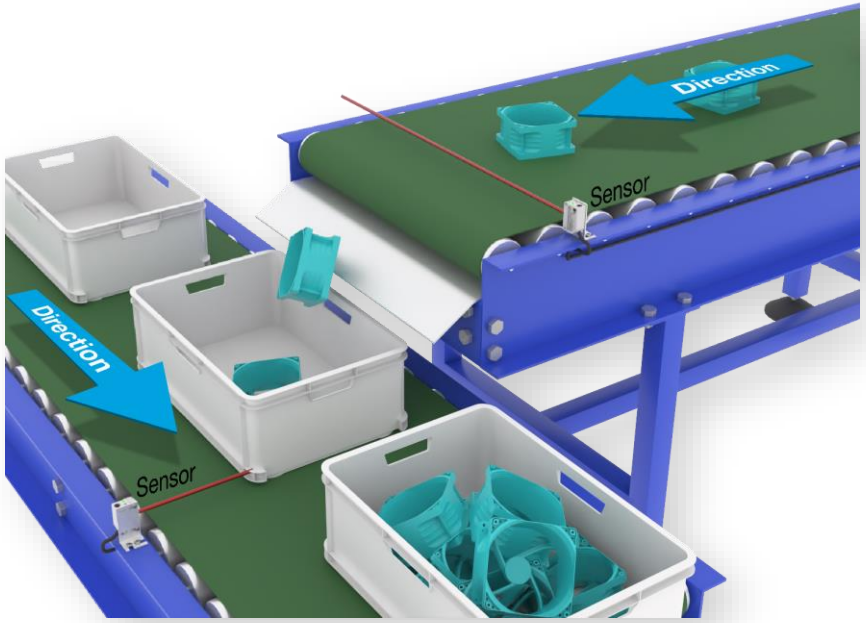
A specific number of items need to be packed in each box. Once the right number is reached a new box must be placed below the main conveyor. We have no preference about the sensing principle to be used.

### Our Solution

The LD30CPBR…IO or the LD30EPBR…IO Background suppression versions are suitable for this application.
By means of IO-Link the sensor can be configures to run the operation as a stand-alone solution. An implemented Divider function allows to enter a specific number into the sensor and once the sensor have counted the correct items the sensor replies with its output.

### Benefits

A PLC is no longer necessary to rum this operation. The sensor itself will count down from the preset value and, once the number is reached, give information to the lower conveyor that a new box is required. The IO-Link allows easy customization of distances, timers, logic functions as well as different output configuration




Subject: Divider function

Industry: Packaging Conveyors

Product: LD30xPBR…IO

Customer: OEMs, System integrators

## Preinstalled Application function - Pattern Recognition

### Customer Need

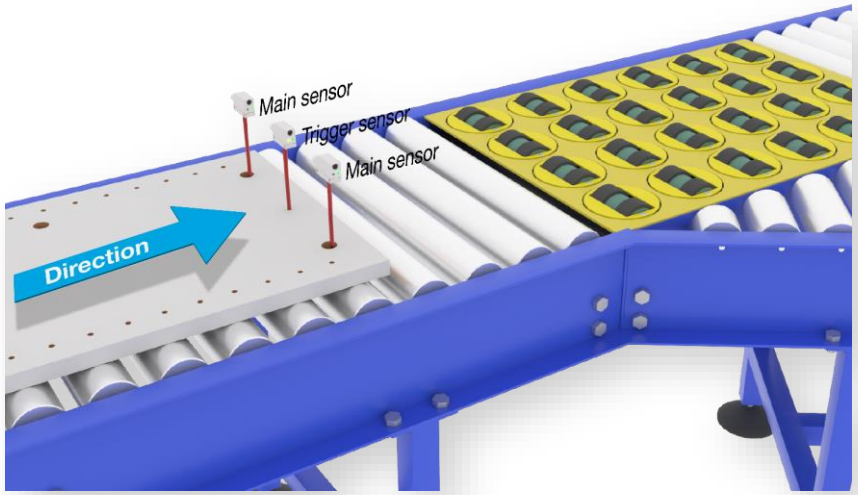
The manufacturer of panels for furniture need to verify that all the drilled holes, or the mounted tabs are present and put at the right position. If an error is detected, the panel must be pushed over to an inspection belt.

### Our Solution

The LD30CPBR…IO or the LD30EPBR…IO Background suppression versions are suitable for this application.
By means of IO-Link the sensor can be configures to run the operation as a standalone solution. An implemented "Pattern recognition function" allow the possibility to record a reference pattern, and the following panels will be compared to the preinstalled reference pattern. If the monitored pattern does not match, the sensor respond on its outputs.

### Benefits

A PLC is no longer necessary to run this operation. A  trigger sensor is needed to detect the full length of the object and one or more main sensors will detect each pattern to be verified.
The sensor itself will compare the pattern on the panel with the pre-recorder pattern and if an error is found each main sensor the sensor will respond. The IO-Link allows easy customization of distances, timers, logic functions as well as different output configuration




Subject: Pattern Recognition

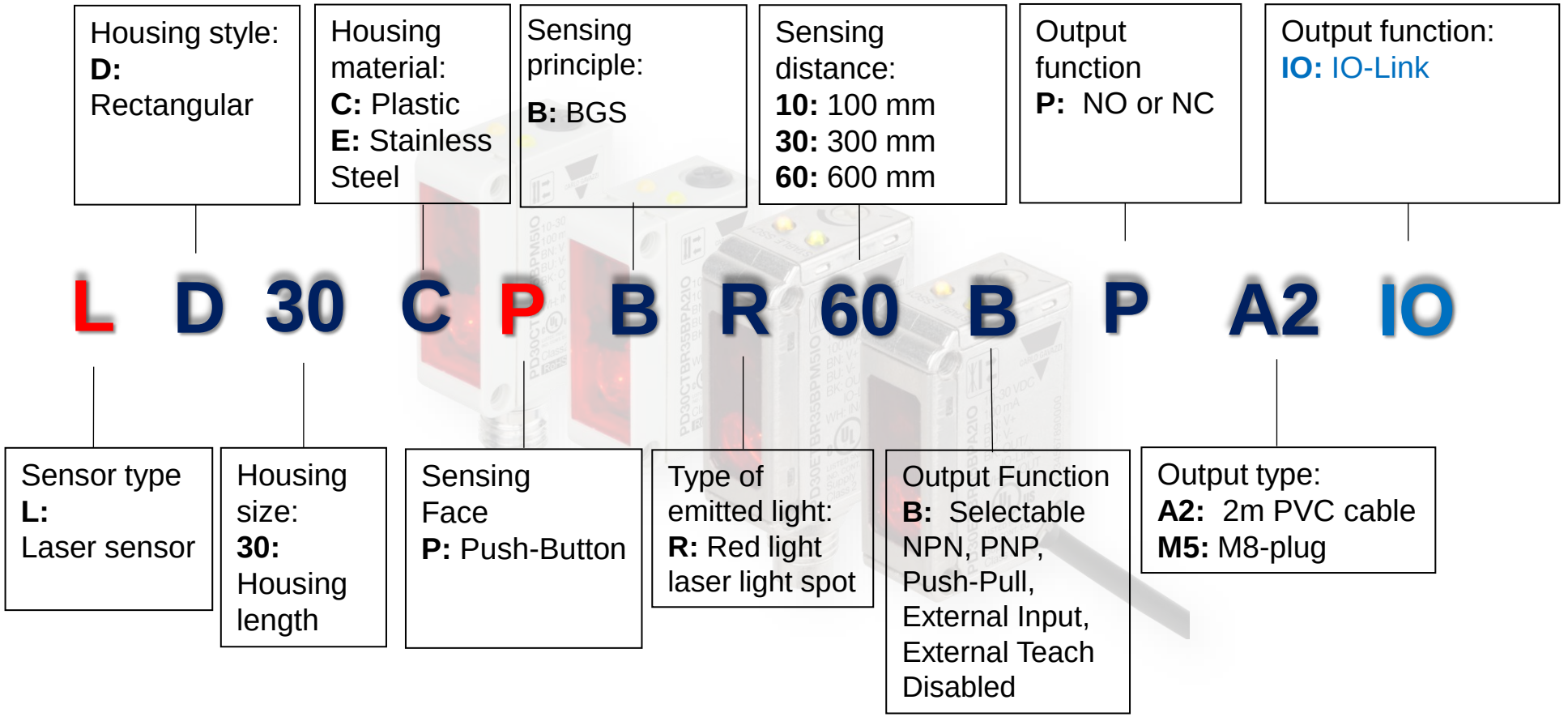
Industry: Inspection Conveyors

Product: LD30xPBR…IO

Customer: OEMs, System integrators

# LD30 LASER IO-LINK 'PROBLEM SOLVER' NEW PRODUCT INTRODUCTION

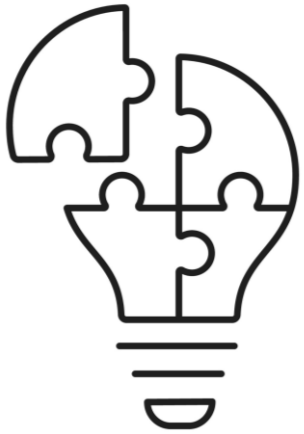
## Part Number Code




IO-Link

# LD30 LASER IO-LINK 'PROBLEM SOLVER' NEW PRODUCT INTRODUCTION

## Conclusions



### ▼ PROBLEM SOLVER for TRICKY APPLICATIONS

- Background suppression, foreground suppression, and *new* dual detection along with the ability to uniquely configure each sensor allows customized performance for every application
- Small, visible laser light spot easy to align and detects small parts / holes for excellent quality inspection
- Reliable detection of transparent bottles without a reflector reduces setup time and cost
- Endless configurations allow a customized solution for each unique application

### ▼ PREVENTATIVE MAINTENANCE CAPABILITIES

- Avoid downtime due to early warning capabilities and even schedule planned maintenance prior to failure
- More accurate sensor performance from optimal setup
- Faster troubleshooting using logging functions saved inside the sensor


### ▼ APPLICATION FUNCTIONS

- Faster sensor response time due to algorithms directly in the sensor
- Simplified machine control system layout thanks to decentralization
- Reduced programming optimizes production processes

# Conclusions

## Carlo Gavazzi LD30xPBR…IO Laser family w. IO-Link


**The Problem Solver**

**Smart Photoelectric Laser Sensors**

IO-Link