

Q5X Series



High Power Laser Measurement Sensor

- Reliable detection from 9.5 cm to 2 m, even at an angle
- Compact housing and rotatable QD for tight spaces
- Reduce inventory and verify multiple conditions with a single device
- Simplified set up, remote monitoring, control and replacement with optional Remote Sensor Display(RSD)



Mid-Range Laser Triangulation Sensor

Versatile, easy-to-use problem solver

Rated IP67 for reliable performance in wet environments

Protective bracket for use in harsh environments

Class 2 laser with small, highly visible spot for easy alignment and small object detection

270-degree rotatable M12 QD for simple mounting

- 4-digit display and 3 button interface for easy set-up and adjustment
- Distance to target viewable as centimeters (default) or inches

IO-Link®

Program with push button, remote teach, IO-Link, or optional Remote Sensor Display (RSD1QP). Cordset MQDC-4501SS required to use RSD.

Reliably Detects Challenging Targets



Round



Uneven



Shiny or metal



Dark surface



Multicolored

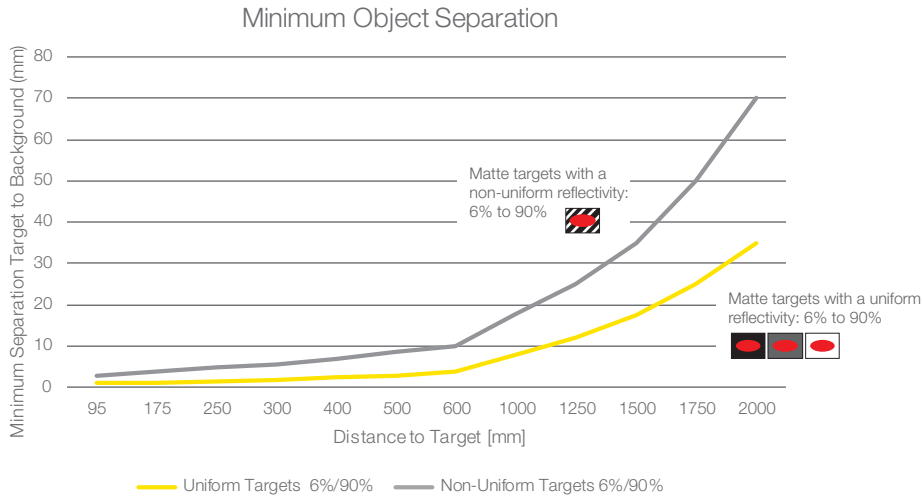
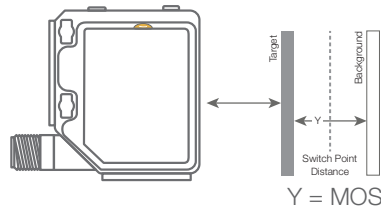


Clear

Dynamically adjusted laser power increases output for dark targets or objects at steep or uneven angles, while reducing power for shiny targets, providing accurate measurements across a wide range of challenging targets. A small beam spot minimizes measurement variation across color transitions.

Minimum Object Separation (MOS)

The minimum distance a target must be from the background to be reliably detected by a sensor. A MOS of 5 mm means the sensor can detect an object that is at least 5 mm from the background.



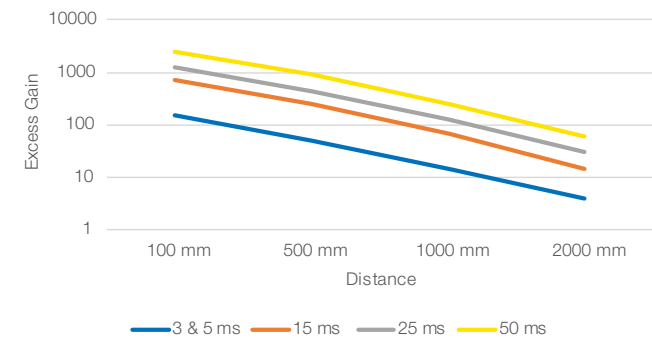
Excess Gain

Excess gain is a measure of the minimum light energy needed for reliable sensor operation. Higher excess gain allows the sensor to detect darker objects at steeper angles.

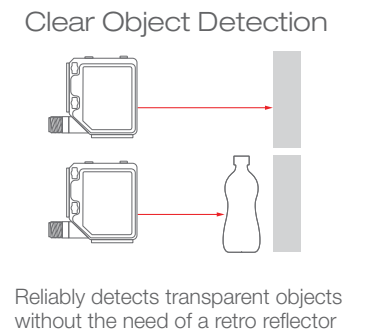
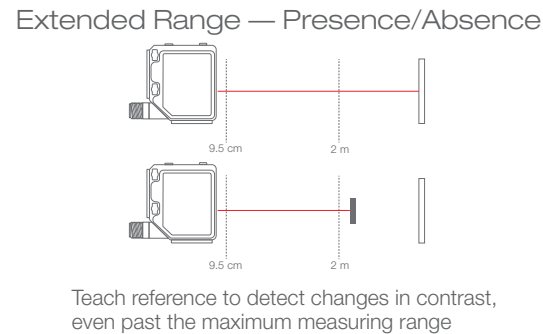
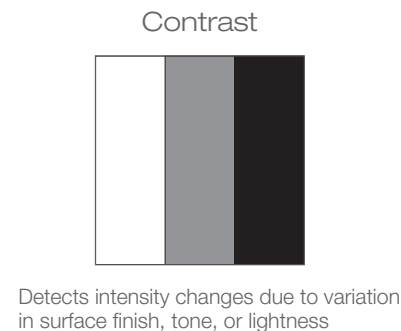
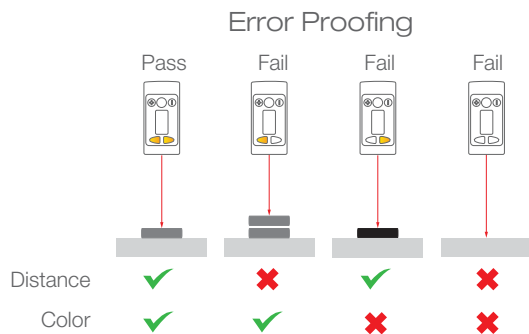
Excess gain can be expressed as the following formula.

$$\text{Excess gain} = \frac{\text{Light energy falling on receiver element}}{\text{sensor's amplifier threshold}}$$

The threshold is the level of sensing energy required by the sensor's amplifier to cause the sensor's output to switch "ON" or "OFF."



Dual Mode: Distance and Intensity to Detect Any Change





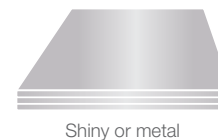
Metal Stamping Press

Challenge

In metal stamping press applications, metal sheets must be placed and properly indexed on the press before stamping. A solution is needed to verify that a metal sheet is present and that it is positioned correctly on the press to reduce the risk of material waste and/or damage to the press die. Metal parts are reflective, which can be difficult for many sensors to detect, and the background is often a similar color.

Solution

The Q5X sensor can both verify part presence and ensure that parts are properly indexed by verifying the leading edge of the material in the press. In addition, the Q5X can reliably detect shiny objects even at an acute angle. With background suppression, the sensor can ignore anything located beyond the cutoff point. Furthermore, with a range of up to 2 m, the Q5X can be mounted safely outside of the harsh process environment, reducing the risk of damage to the sensor, which saves replacement and maintenance costs.



Shiny Target Applications

- Powertrain and Suspension Assembly
- End Effector Part Detection in Rack
- Part-in-Place
- Motion Complete



Automotive Seat Inspection

Challenge

In automotive quality inspections, verifying the presence of dark parts against an equally dark background is extremely common. For example, many car seats consist of black fabric or leather material with black plastic components, such as levers and buttons to adjust seat height and tilt.

Solution

Banner's Q5X problem-solving triangulation-based laser sensor has no difficulty detecting dark targets on dark backgrounds when there is a height difference. The exceptionally high excess gain enables the Q5X sensor to reliably detect even the darkest objects (<6% reflective black targets) even against a dark target at all distances from 9.5 cm to 2 m.



Dark surface

Dark Target Applications

- Black Plastic/Rubber/Leather Detection
- Tire Detection
- Dashboard Assembly
- Interior/Exterior Panel Assembly



Dog Food Pallet Detection

Challenge

In packaging lines, the final step is the stretch wrapper. Bags of dog food are stacked on pallets, each pallet needs to be stretch wrapped to help protect the finished goods during transport. Varying pallet heights require a sensing solution to determine the position of the top of the pallet, in order to ensure that each pallet is fully wrapped.

Solution

The Q5X laser distance sensor is mounted to the top of the stretch wrapper to verify the height of dog food bags on the pallet. When the sensor no longer detects product at the taught distance, the stretch wrapper is stopped since the pallet is fully wrapped. The Q5X sensor is unaffected by color transitions and can reliably detect all different varieties of dog food, regardless of package color or reflectivity.



Multicolored

Packaging Target Applications

- End of Line Pallet Detection
- Shrink Wrap Detection
- Carton Full/Empty
- Case Packer
- Flexible Packaging/Pouch Filling



Clear Bottle Detection

Challenge

When bottles are removed from a depalletizer, the bottles are swept off the pallet by a sweeper arm, layer by layer. The bottles then move into a single file and continue downstream. It is important to monitor the bottles in the staging area to make sure that they have moved on before another layer is swept onto the conveyor. The unstable signal from the moving bottles and low contrast objects can be challenging for sensors to reliably detect.

Solution

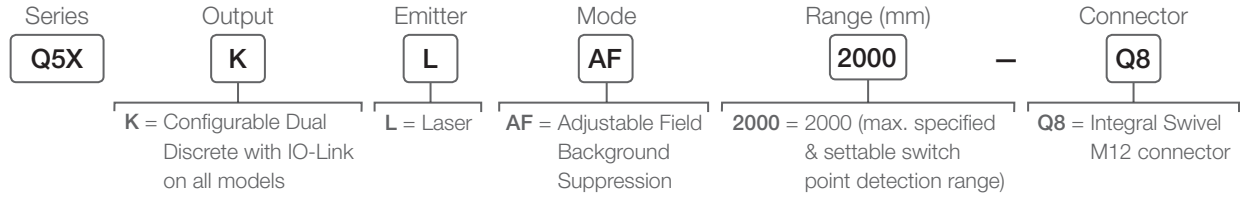
The Q5X background suppression sensor detects when the staging area is clear of bottles, and the system is ready for the next layer of containers. The integral timing logic on the Q5X filters out any small gaps between objects as they move in a cluster. In dual teach mode—which measures both distance and light intensity—the Q5X can reliably detect the presence of clear bottles without the risk of double counting.



Clear

Clear Target Applications

- Glass & Plastic Bottles and Jars
 - Precise Edge Detection
 - Counting – stable output with no double count
- Clear Tray
 - Stack Height
- Shrink Wrap
 - Roll Diameter
 - Detection



Repeatability	95 to 300 mm: ±0.5 mm 300 to 1000 mm: ±0.25% 1000 to 2000 mm: ±0.5%	Construction	Housing: ABS Lens cover: PMMA acrylic Lightpipe and display window: Polycarbonate
Response Speed	User selectable: 3, 5, 15, 25, or 50 ms	Temperature Effect	< 0.5 mm/°C at < 500 mm < 1.0 mm/°C at < 1000 mm < 2.0 mm/°C at < 2000 mm
Operating Conditions	-10 °C to +50 °C (+14 °F to +122 °F) 35% to 95% relative humidity	Certifications	   <small>Industrial Control Equipment 3TJJ</small>
Environmental Rating	IEC IP67 per IEC60529		

Accessories



SMBQ5XFAM10



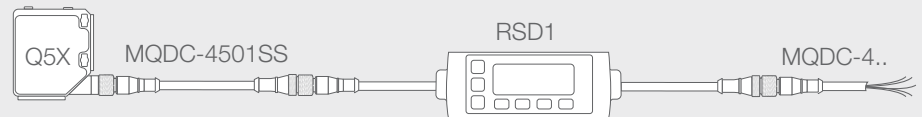
SMBQ5XDT



SMBQ5XM4F



SMBAMSQ5XIPRA



Double-Ended Euro-Style
with 5-pin straight male to 4-pin straight female connectors.
Required for use between RSD and sensor.

- MQDC-4501SS
0.3 m (1')
- MQDC-4506SS
1.83 m (6')

M12 Euro-Style
Straight connector models listed; for right-angle, add RA to the end of the model number (example, MQDEC2-406RA)

- MQDC-406
2 m (6.5')
- MQDC-415
5 m (15')
- MQDC-430
9 m (30')
- MQDC-450
15 m (5')

