# Instruction Manual

*Expert Wide-Beam Retroreflective Sensor*



- Wide beam retroreflective sensor for reliable leading edge detection of irregular shaped objects or pallets
- Visible red beam for simple alignment and bright LEDs for visual indication
- Up to 4 meter range for mounting flexibility
- Two sensitivity levels for detection of challenging targets such as shrink wrapped pallets, small objects and film or perforated packaging
- Easy set-up, adjustment and LO/DO selectable via single push button
- 250 Hz switching frequency for high speed production lines
- IP67 and IP69 with ECOLAB® certification for washdown applications

**WARNING:**

- **Do not use this device for personnel protection**
- Using this device for personnel protection could result in serious injury or death.
- This device does not include the self-checking redundant circuitry necessary to allow its use in personnel safety applications. A device failure or malfunction can cause either an energized (on) or de-energized (off) output condition.

## Models

| Model | Range | Input | Output | Connection |
|---|---|---|---|---|
| Q76E-VP-ZLVC-Q5 | 0.4 m to 4.0 m (1.3 ft to 13.1 ft)[1] | 10 V dc to 30 V DC | Complementary PNP | 200 mm (7.5 in) PUR cable with a 4-pin M12/Euro-style male quick disconnect |
| Q76E-VP-ZLVC-Q8 | | | | Integral 4-pin M12/Euro-style male quick disconnect |
| Q76E-VP-ZLVC-2M | | | | 2 m (6.5 ft) unterminated 4-wire PVC cable |
| Q76E-VN-ZLVC-Q5 | | | Complementary NPN | 200 mm (7.5 in) PUR cable with a 4-pin M12/Euro-style male quick disconnect |
| Q76E-VN-ZLVC-Q8 | | | | Integral 4-pin M12/Euro-style male quick disconnect |
| Q76E-VN-ZLVC-2M | | | | 2 m (6.5 ft) unterminated 4-wire PVC cable |
| Q76E-KP-ZLVC-Q5 | | | 1 PNP/NPN Light Operate with IO-Link; 1 PNP Dark Operate | 200 mm (7.5 in) PUR cable with a 4-pin M12/Euro-style male quick disconnect |

[1] Range with a BRT-92X92CB reflector.

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ПРОМЭЛЕКТРОНИКА/ sales@prom-elec.com

## Features and Indicators

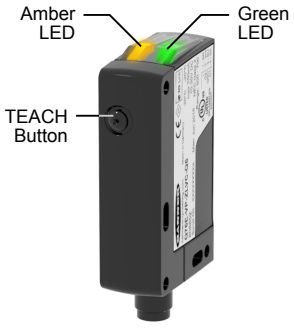



*Figure 1. Q76 Features*

| LED Status | | Sensor Status |
|---|---|---|
| **Green LED** | **Amber LED** | |
| Green on | Off | Ready |
| Green on | Amber on | Light path clear (Light Operate mode only) |
| Green flashing | Amber flashing | TEACH in process |

## Installation

### Sensor Orientation

Optimize sensor performance with correct sensor-to-target orientation.

The small gap in the sensing beam allows precise alignment of the sensor with the object to be detected or with the reflector. Install the sensor so that the object to be detected moves horizontally to the sensor.

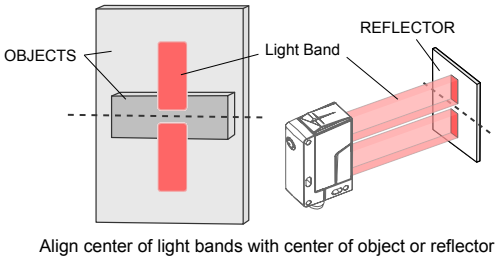



*Figure 2. Beam Alignment*

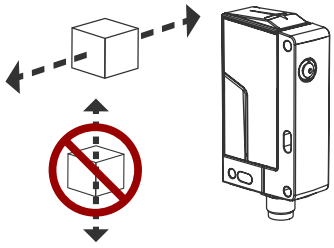


*Figure 3. Sensing Beam Alignment*

The reflector opposite the sensor must have a complete reflective surface that is at least 50 mm (2 in) wide and 30 mm (1.2 in) tall.

### Mount the Sensor

1. If a bracket is needed, mount the sensor onto the bracket.
2. Mount the sensor (or the sensor and the bracket) to the machine or equipment at the desired location. Do not tighten the mounting screws at this time.
3. Check the sensor alignment.
4. Tighten the mounting screws to secure the sensor (or the sensor and the bracket) in the aligned position.

## Wiring

Quick disconnect wiring diagrams are functionally identical.

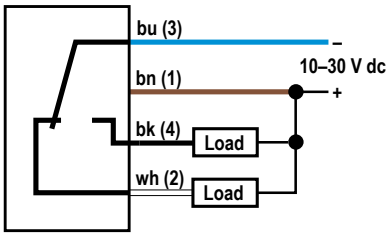



*Figure 4. Complimentary NPN*

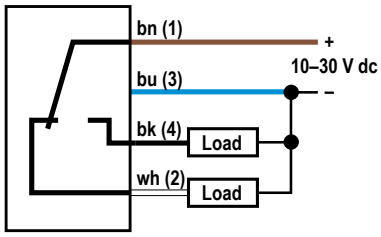



*Figure 5. Complimentary PNP*

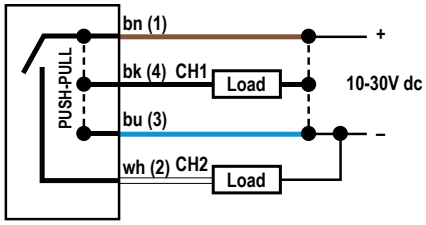
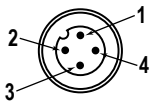



*Figure 6. IO-Link*




4-pin M12/Euro-style Models (Male)

1 = Brown
2 = White
3 = Blue
4 = Black

## Configure the Sensor

Use the button to set the sensor sensitivity or switching behavior.

**Important:** Configure the sensor before the first use. The sensor is factory-set to the maximum operating range.

| Sensitivity Setting | Max Range 100×100 reflector | Max Range 40×60 reflector | Minimum Object Detection Size |
|---|---|---|---|
| Standard | 4.0 m | 3.0 m | 19 mm |
| Increased | 4.0 m | 3.0 m | 12 mm |
| Increased with Fine Adjustment | 4.0 m | 3.0 m | 8 mm |

### TEACH Sensor Sensitivity

Use the following procedure to set the sensor sensitivity as Standard or Increased.

Configure the sensor before it is used for the first time. The default setting is the maximum operating range.

- Standard sensitivity—the sensor switches when 28% of the sensing beam is covered by the object to be detected. Standard sensitivity is suitable for detection of opaque objects.
- Increased sensitivity—the sensor switches when 18% of the sensing beam is covered by the object to be detected. Increased sensitivity is suitable for detection of containers with openings and transparent objects.

1. Make sure that the sensing beam is aligned with the center of the object and reflector.
2. Clear the path to the reflector.
3. Configure the sensitivity.

| Sensitivity | Action | Result |
|---|---|---|
| **Standard** | Press and hold the TEACH button 2 to 7 seconds until both the green and the amber LEDs flash synchronously, then release the TEACH button. | **TEACH Accepted**<br>Both LEDs remain on. |
| **Increased** | Press and hold the TEACH button 7 to 12 seconds until both the green and the amber LEDs flash alternately, then release the TEACH button. | **TEACH Not Accepted**<br>The amber LED flashes. Repeat the Teach procedure. |

The sensitivity is set and the sensor is ready for use.

## TEACH Sensitivity Fine Adjustment

Use the following procedure to adjust the sensor sensitivity in small steps using the teach button during normal operation.

| Sensitivity | Action | Result |
|---|---|---|
| **Increase Sensitivity (reduce switching threshold)** | Press and release the TEACH button (2 to 200 ms). | Sensitivity is increased slightly and the switching threshold is reduced slightly. The sensor confirms the button press by flashing both LEDs one time. |
| **Reduce Sensitivity (increase switching threshold)** | Press and hold the TEACH button 200 ms to 2 seconds, then release the TEACH button. | Sensitivity is reduced slightly and the switching threshold is increased slightly. The sensor confirms the button press by flashing both LEDs one time. |

If the upper or lower end of the adjustment range is reached, both LEDs flash at a much higher frequency.

## Select Light Operate/Dark Operate

Use the following procedure to change the sensor operation to light operate or dark operate for the desired application.

| Action | Result |
|---|---|
| Press and hold the TEACH button for more than 12 seconds until the green LED flashes. | The amber LED indicates the current switching output setting with the beam clear.<br>• LED On = Output 1 light operate, Output 2 dark operate<br>• LED Off = Output 1 dark operate, Output 2 light operate |
| Release the TEACH button. | The change is complete. |

# Specifications

**Sensing Range**
0.4 m to 4.0 m (1.3 ft to 13.1 ft) with 100 × 100 mm reflector, BRT-92X92CB

**Sensing Beam**
Visible red LED, 620 nm

**Operating Voltage**
10 to 30 V DC, ≤15% residual ripple

**Supply Protection Circuitry**
Protected against reverse polarity and transient voltages

**Output Protection Circuitry**
Protected against output short-circuit, continuous overload, and false pulse on power-up

**Output Configuration**
**Discrete output models**
Solid-state complementary (SPDT): NPN or PNP (current sinking or sourcing), depending on model
**IO-Link model**
**Channel 1 (Q1):** IO-Link, Push/pull
**Channel 2 (Q2):** PNP (current sourcing) Dark Operate

**Response Time**
2 ms

**Switching Frequency**
250 Hz

**Resolution**
19 mm standard sensitivity
12 mm increased sensitivity
8 mm when increased sensitivity is manual adjusted

**Delay at Start Up**
<300 ms

**Connection**
**Q5 models:** 200 mm (7.5 in) PUR cable with a 4-pin M12/Euro-style quick disconnect
**Q8 models:** Integral M12/Euro-style quick disconnect
**2M models:** 2 m (6.5 ft) unterminated 4-wire PVC cable

**Construction**
**Housing:** PC-PBT
**Lens cover:** PMMA

**Operating Conditions**
**Operating Temperature:**–40 °C to +60 °C (–40 °F to +140 °F)
**Storage Temperature:**–40 °C to +70 °C (–40 °F to +158 °F)

**Environmental Rating**
IEC IP67, IEC IP69

**Certifications**

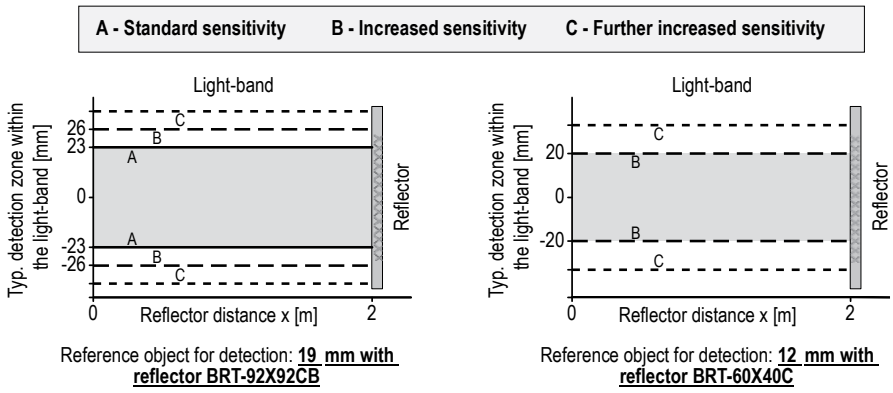
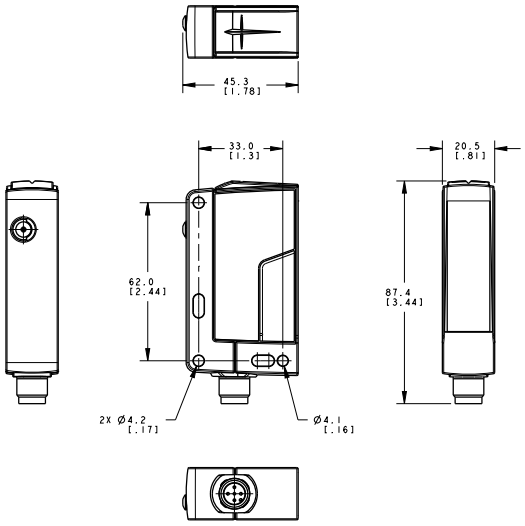



*Figure 7. Sensitivity Diagrams*

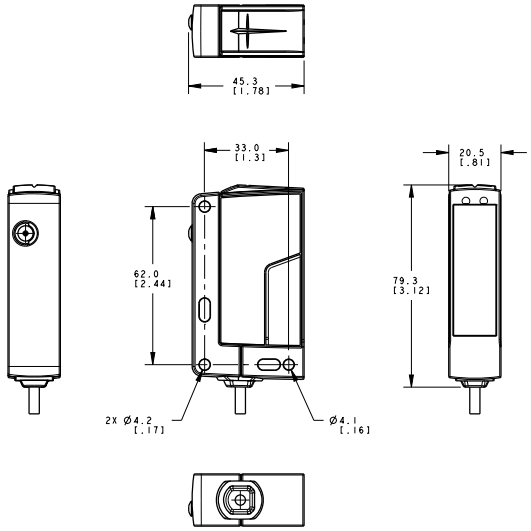
## Dimensions

All measurements are listed in millimeters [inches], unless noted otherwise.

### QD Models

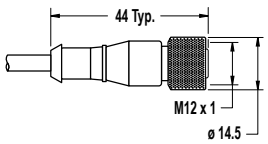
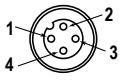


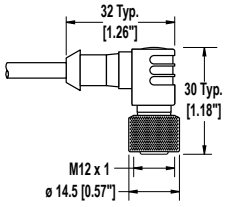

### Cable Models




## Accessories

### Cordsets

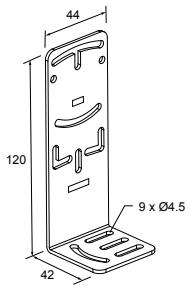
| 4-Pin Threaded M12/Euro-Style Cordsets—Single Ended | | | | |
|---|---|---|---|---|
| **Model** | **Length** | **Style** | **Dimensions** | **Pinout (Female)** |
| MQDC-406 | 2 m (6.56 ft) | Straight |   |   1 = Brown<br>2 = White<br>3 = Blue<br>4 = Black |
| MQDC-415 | 5 m (16.4 ft) | | | |
| MQDC-430 | 9 m (29.5 ft) | | | |
| MQDC-450 | 15 m (49.2 ft) | | | |

| 4-Pin Threaded M12/Euro-Style Cordsets—Single Ended | | | | |
|---|---|---|---|---|
| **Model** | **Length** | **Style** | **Dimensions** | **Pinout (Female)** |
| MQDC-406RA | 2 m (6.56 ft) | Right-Angle |  | |
| MQDC-415RA | 5 m (16.4 ft) | | | |
| MQDC-430RA | 9 m (29.5 ft) | | | |
| MQDC-450RA | 15 m (49.2 ft) | | | |

## Brackets

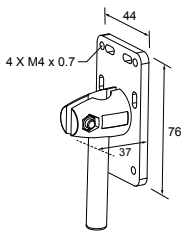
### SMBQ76A

- Right-angle mounting bracket
- 14-ga Stainless Steel
- ±12 degree tilt adjustment
- Clearance for M4 (#8) hardware




### SMBQ76FAM12

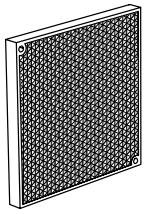
- Swivel bracket with tilt and pan movement for precision adjustment
- Easy sensor mounting to extruded rail T-slots
- No bolt included. Mounts directly to 12 mm (½ in) rods




## Reflectors

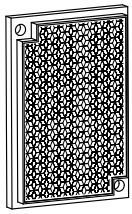
### BRT-92X92CB

- Square, acrylic target with black mounting base
- Reflectivity Factor: 3.0
- Max. Temperature: +50 °C (+122 °F)
- Optional brackets are available
- Approximate size: 92 mm × 92 mm



### BRT-60X40C

- Rectangular, acrylic target
- Reflectivity Factor: 1.4
- Temperature: –20 °C to +60 °C (–4 °F to +140 °F)
- Optional brackets are available
- Approximate size: 40 mm × 60 mm



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