Digital laser type

# DR-Q series

**If you have a difficult clear target that you need to sense - call the experts at Ramco today!**

# Easy to Set-Up Laser Sensor for All Transparent Targets

**Sensing distance: Max. 4 m**

**Digital adjustment function**

**Built-in ASC (Automatic Sensitivity Correction) function**

**Related products**

Low cost type
**Z3R-Q**
● P.404

## Selection table

| Type | Shape | Sensing distance | Model (Models in parentheses are connector types) | |
|---|---|---|---|---|
| | | | NPN type | PNP type |
| Laser type |  | 0 to 1.5 m | **DR-Q150TN** (DR-Q150TCN) | **DR-Q150TP** (DR-Q150TCP) |
| | | 1 to 4 m | **DR-Q400TN** (DR-Q400TCN) | **DR-Q400TP** (DR-Q400TCP) |

● For the connector type, please purchase an optional JCN series connector cable.

## Options/Accessories

### Reflector

**Standard (included)**

**P250F**
Sensing distance (refer to the table to the right)
61 × 51 mm

**Small (optional)**

**PL20F**
Sensing distance (refer to the table to the right)
60 × 20 mm

**Ultra-small (optional)**

**PL10F**
Sensing distance (refer to the table to the right)
32 × 20 mm

Sensing distance when each reflector is used

| | P250F | PL20F | PL10F |
|---|---|---|---|
| DR-Q400 | 1 to 4 m | 1 to 2.8 m | 0.5 to 1 m |
| DR-Q150 | 0 to 1.5 m | 0 to 1 m | 0 to 0.5 m |

### Connector cables

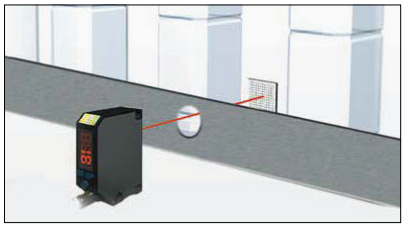
**Straight**

**JCN-S**
Cable length: 2 m
**JCN-5S**
Cable length: 5 m
**JCN-10S**
Cable length: 10 m

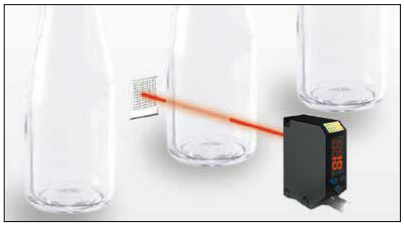
**L-shaped**

**JCN-L**
Cable length: 2 m
**JCN-5L**
Cable length: 5 m
**JCN-10L**
Cable length: 10 m

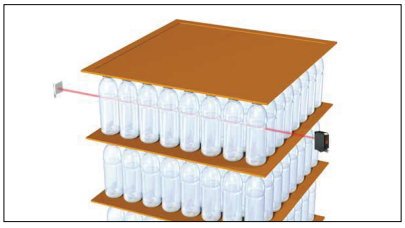
### Detection of plastic bottles



### Detection of glass bottles



### Detection of plastic bottles in large machines

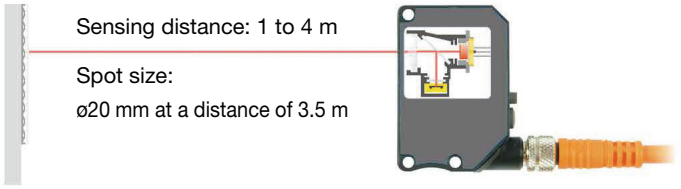


## Sensing distance: Max. 4 m

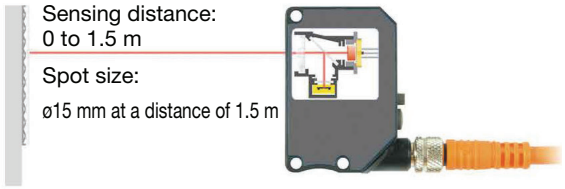
**Achieves long range transparent object detection**

A sensing distance of 4 m, the longest class in transparent object sensors, has been realized. Additionally, by employing a red laser (Class 2) for the light source as well as a coaxial reflection structure, high-accuracy position detection is possible.

**DR-Q400T□**



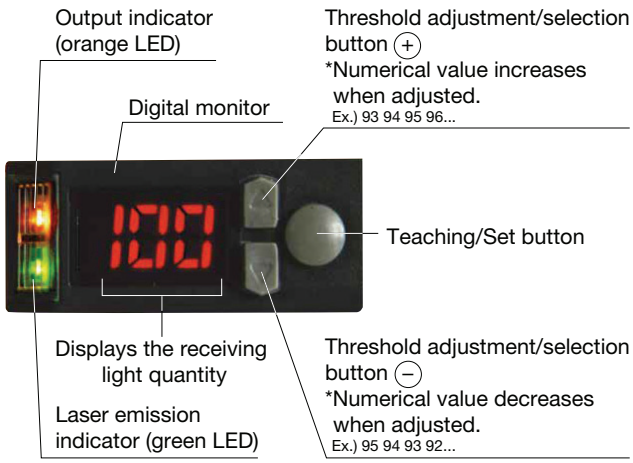

**DR-Q150T□**




## Digital adjustment function

### Adjustment while watching values possible

Simple settings and fine adjustments are possible. Thanks to the teaching method, setting is possible by simply pressing a button. There are also buttons for fine adjustments, making it possible to configure sensitivity settings to the desired level while viewing the digital display.

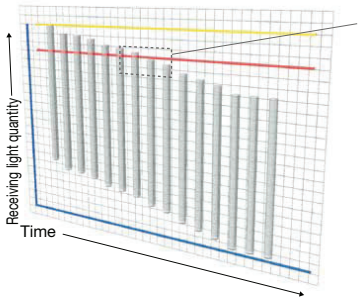



## Built-in ASC (Automatic Sensitivity Correction) function

### Contamination resistant

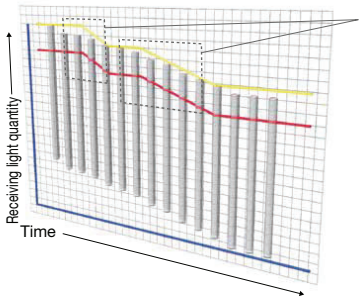
The ASC function automatically corrects threshold values to reduce the amount of light generated when dust, water, vapor, etc., on site adheres to the reflector or lens, thereby maintaining optimum sensitivity over long periods of time. (The diagram below shows a decrease in the amount of light received due to dust and steam in the atmosphere)

<Conventional models>




If the receiving light quantity decreases and its level goes lower than the threshold, it will not be possible to detect transparent objects.

<DR-Q>




Automatic sensitivity corrections are performed for decreases in rreceiving light quantity by way of a dedicated circuit

Periodically monitors the receiving light quantity and corrects the teaching level and threshold in accordance with changes in the receiving light quantity.

Teaching level by way of reflector
Receiving light quantity
Threshold (borderline of ON/OFF)

## High utility

### Convenient functions tailored to fit the application

- ○ External teaching is possible
- ○ Built-in ON / OFF / One-shot delay functions
- ○ Enables detection of transparent containers filled with transparent liquid causing a lens effect

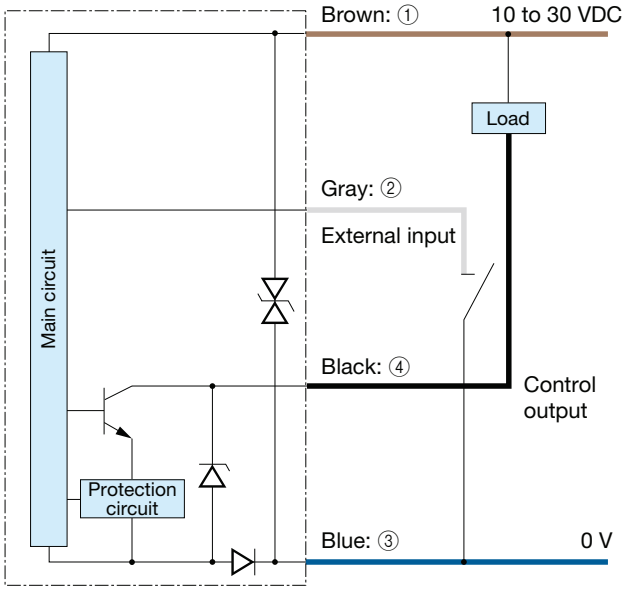
## Specifications

| Type | | | Sensor head for amplifier separate type | |
|---|---|---|---|---|
| Model | NPN | Cable type | **DR-Q150TN** | **DR-Q400TN** |
| | | Connector type | **DR-Q150TCN** | **DR-Q400TCN** |
| | PNP | Cable type | **DR-Q150TP** | **DR-Q400TP** |
| | | Connector type | **DR-Q150TCP** | **DR-Q400TCP** |
| Sensing distance | | | 0 to 1.5 m*1 | 1 to 4 m*1 |
| Light source | | | Red semiconductor laser Class 2 (IEC/JIS)*2 Wavelength: 650 nm Pulse width: 4 µs Maximum output: 2 mW | |
| Spot size | | | Approx. ø15 mm at a distance of 1.5 m | Approx. ø20 mm at a distance of 3.5 m |
| Response time | | | Can be switched to 0.35 ms, 0.7 ms, 2 ms, or 5 ms | |
| Distance adjustment | | | Teaching method | |
| Threshold adjustment | | | Manual adjustment is possible after teaching | |
| Indicators | | | Output indicator (orange LED), laser emission indicator (green LED) | |
| Digital display | | | 7-segment, 3-digit display | |
| Control output | | | NPN/PNP open collector Max. 100 mA / 30 VDC | |
| External input | | | Laser OFF input or teaching input (selectable by setting) | |
| Timer function | | | ON delay / OFF delay / One-shot 0 to 999 ms (setting is possible in 1 ms increments), 1 to 10 s (setting is possible in 1 s increments) | |
| Output mode | | | Light ON / Dark ON selectable by setting | |
| Connection type | | | Cable type: Cable length: 2 m (ø4 mm) / Connector type: M8, 4-pin | |
| Insulation resistance | | | 20 MΩ or more (with 500 VDC) | |
| Rating | Supply voltage | | 10 to 30 VDC, including 10% ripple (p-p) | |
| | Current consumption | | 35 mA or less | |
| Applicable regulations | | | EMC directive (2004/108/EC) / FDA regulations (21 CFR 1040.10) | |
| Applicable standards | | | EN 60947-5-2 | |
| Company standards | | | Noise resistance: Feilen Level 3 cleared | |
| Environmental resistance | Ambient temperature/humidity | | -10 to +40°C / 35 to 85% RH (no freezing or condensation) | |
| | Ambient illuminance | | Sunlight: 10,000 lx or less Incandescent light: 3,000 lx or less | |
| | Vibration resistance | | 10 to 55 Hz; double amplitude 1.5 mm; 2 hours in each of the X, Y, and Z directions | |
| | Shock resistance | | Approx. 50 G (500 m/s$^2$), 3 times in each of the X, Y, and Z directions | |
| | Degree of protection | | IP67 | |
| Material | | | Housing: ABS Lens front cover: PMMA | |
| Weight without cable | | | Approx. 20 g (excluding cable) | |
| Included accessories | | | Mounting bracket: BEF-WK-190 Reflector: P250F | |

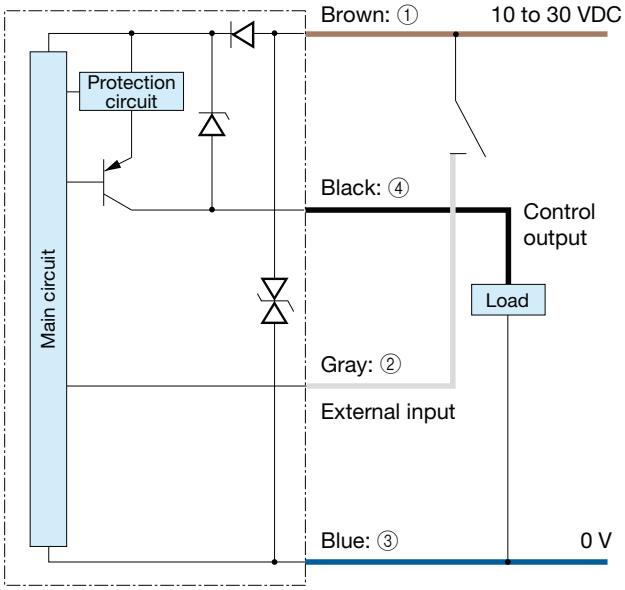
*1. With the P250F reflector
*2. Classified as Class II in the US FDA standards.
● Specifications are subject to change without prior notice for product improvement purposes.

## I/O circuit diagram

### NPN output type

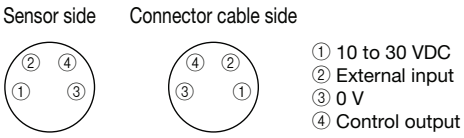



### PNP output type




### Connector type

(Pin configuration)



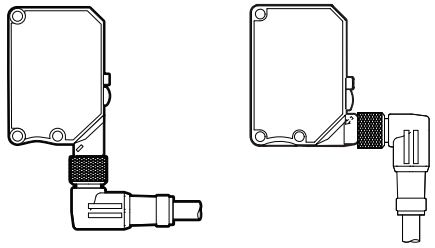

① 10 to 30 VDC
② External input
③ 0 V
④ Control output

### Connecting

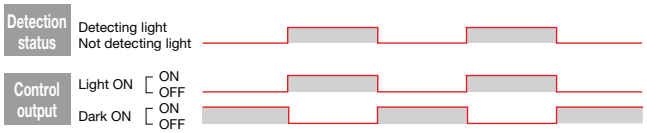
- When not used for external input, cut the lead wire and wrap it individually with insulating tape, and do not connect it to any other terminal.
- ① to ④ are connector pin No.

### Notes

- When using a switching regulator for the power supply, be sure to ground the frame ground terminal.
- Because wiring sensor wires with high-voltage wires or power supply wires can result in malfunctions due to noise, which can cause damage, make sure to wire separately.
- Avoid using the transient state while the power is on (approx. 100 ms).
- The connector direction is fixed as in the drawing below when you use L-shaped connector cable. Be aware that rotation is not possible.



## Operation mode



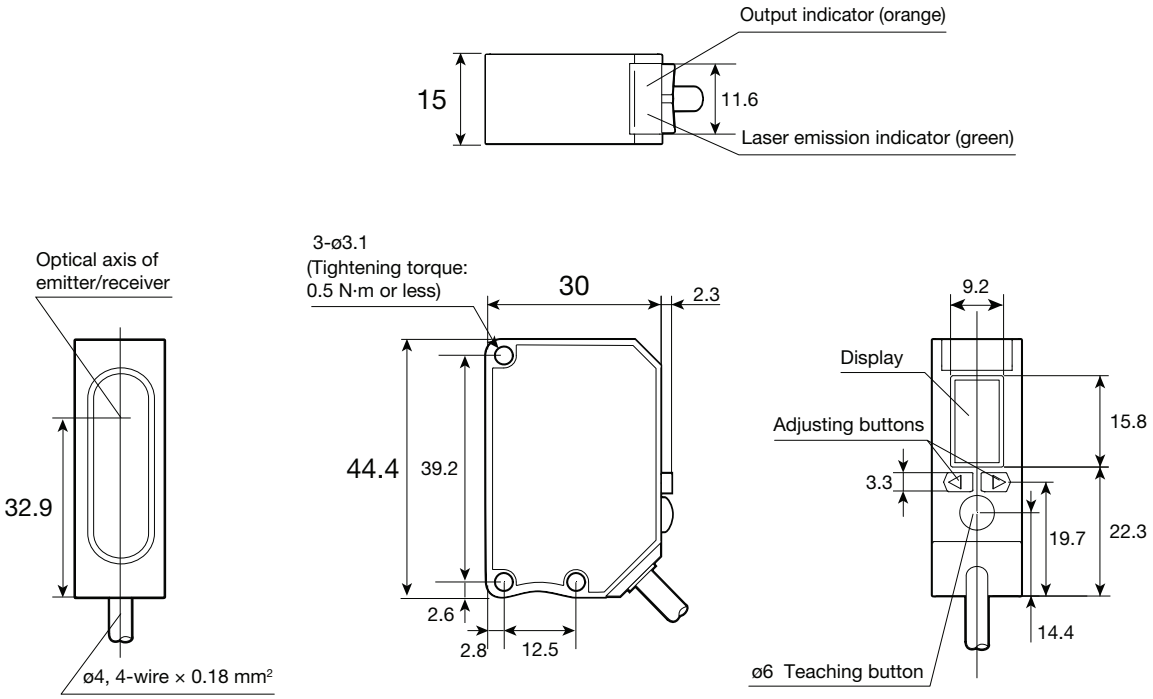

*The operation mode is the same for NPN output and PNP output.

## Dimensions

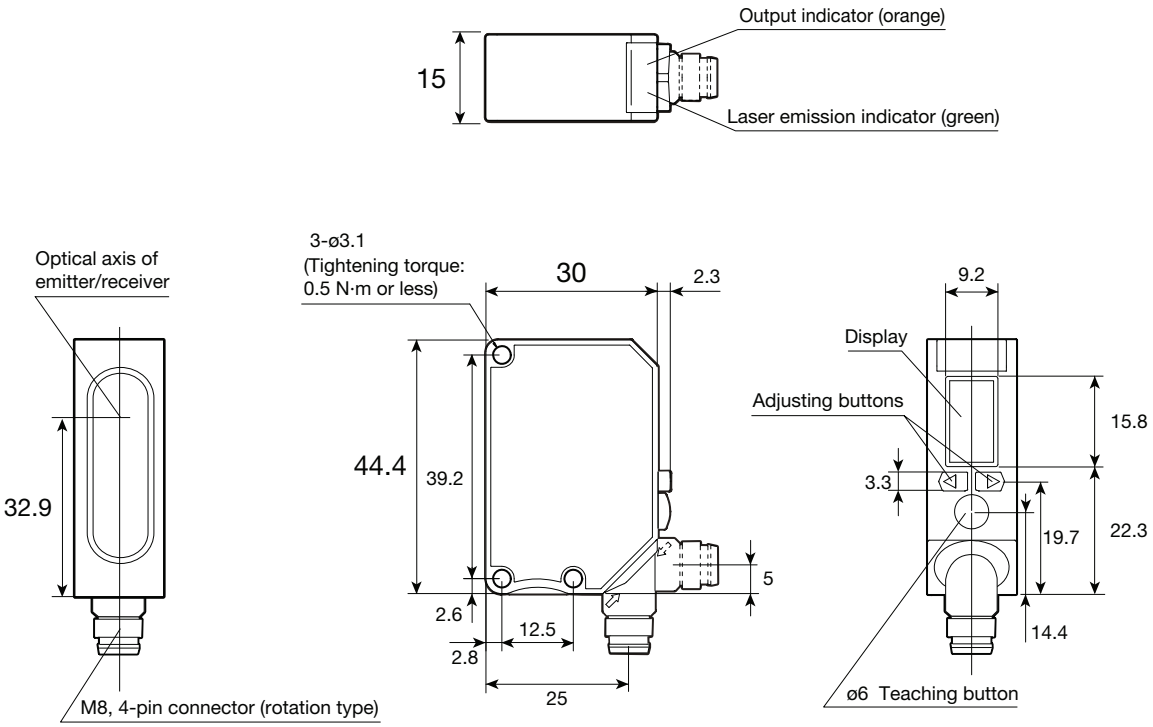
### Sensor

(Unit: mm)

#### Cable type



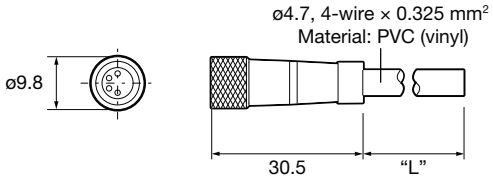

#### Connector type



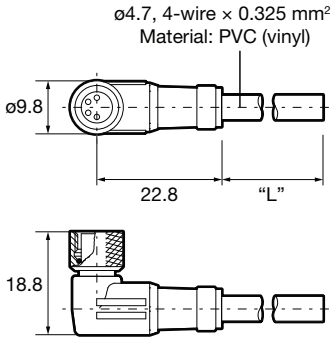
## Connector cable (optional)

(Unit: mm)

### JCN-S, JCN-5S, JCN-10S

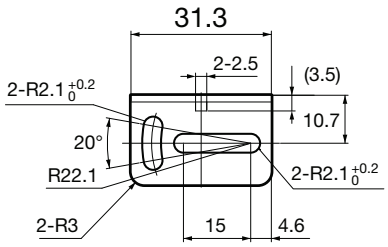


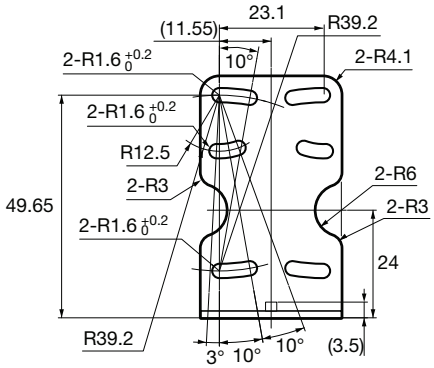

### JCN-L, JCN-5L, JCN-10L

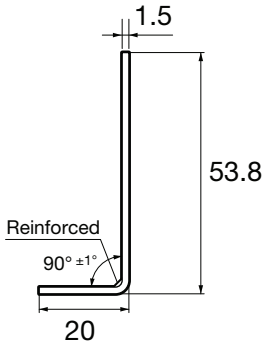



## Mounting bracket

### BEF-WK-190 (included)



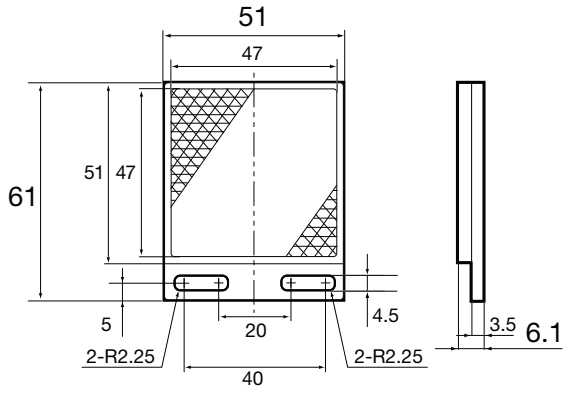



## Dimensions

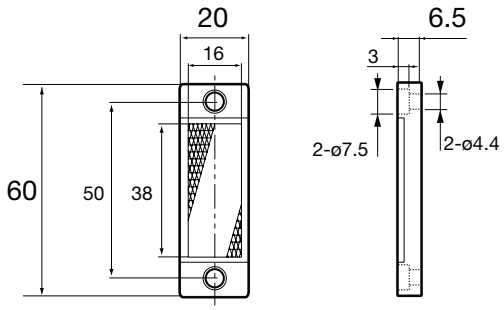
### Reflector

(Unit: mm)

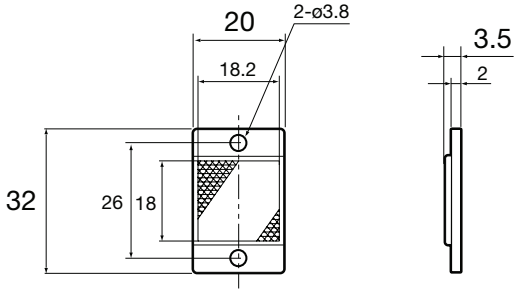
■ P250F (included)




■ PL20F (optional)




■ PL10F (optional)

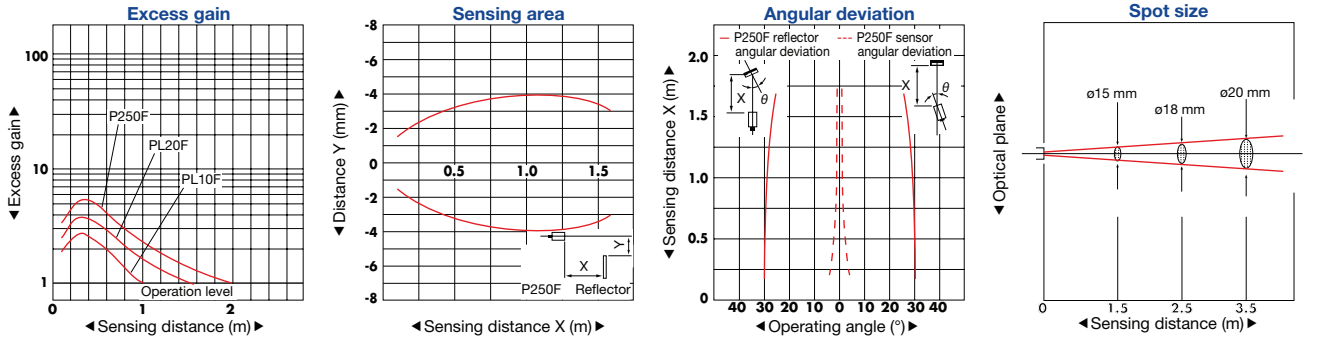



**Sensing distance when each reflector is used**

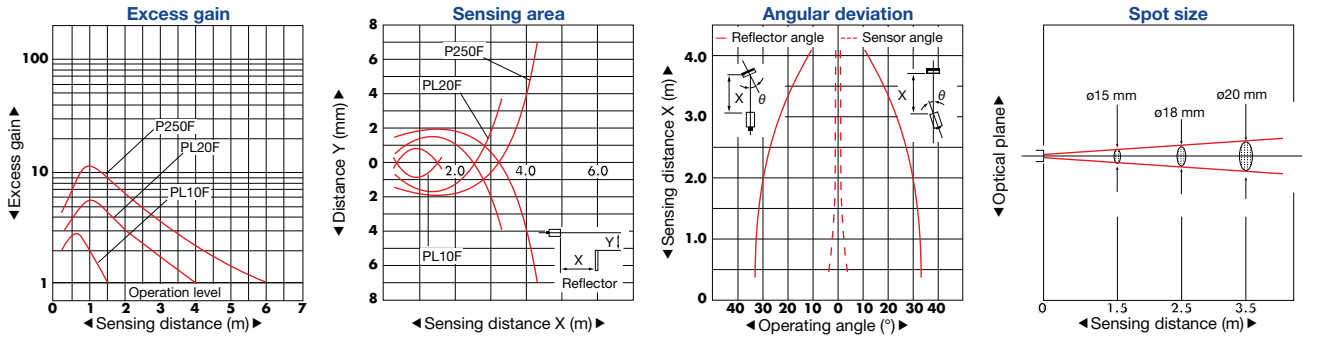
| | P250F | PL20F | PL10F |
|---|---|---|---|
| DR-Q400 | 1 to 4 m | 1 to 2.8 m | 0.5 to 1 m |
| DR-Q150 | 0 to 1.5 m | 0 to 1 m | 0 to 0.5 m |

## Typical characteristic data

### DR-Q150T□



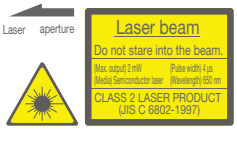

### DR-Q400T□




## Notes for sensor usage

This product emits a Class 2 (II) visible laser beam that is compliant with JIS C6802/IEC/FDA laser safety standards.
Warning and explanation labels are affixed to the sides of the sensor.

**Warning** Do not look directly at the laser or intentionally shine the laser beam in another person's eyes. Doing so may cause damage to the eyes or health.




DR-Q150T□□
DR-Q400T□□