

# LASER SENSORS

## D Series



### Applications



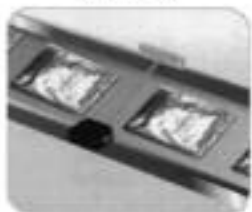
For thin workpieces on a fluttering conveyor. (BGS-DL10T)



Any transparent object, PET / Glass / Plastic. (DR-Q150)



Positioning for ink printer (DR-500)



Stable sensing of aluminum pouch (DR-500)

**BGS-DL Series**  
**Pushbutton Teach Type**  
 (Sensing range : 40 - 100mm)  
 • BGS-DL10TN / TP / TCN / TCP  
 (Sensing range : 100 - 250mm)  
 • BGS-DL25TN / TP / TCN / TCP

**Manual Adjust Type**  
 (Sensing range : 40 - 100mm)  
 • BGS-DL10N / P / CN / CP  
 (Sensing range : 100 - 300mm)  
 • BGS-DL30N / P / CN / CP

**DR-Q Series**  
**Transparent Detection Type**  
 (Sensing range : 1.5m)  
 • DR-Q150TN / TP / TCN / TCP  
 (Sensing range : 4m)  
 • DR-Q400TN / TP / TCN / TCP

**DT Series**  
**Thru-beam Type**  
 (Sensing range : 40m)  
 • DT-4000N / P / CN / CP

**DR Series**  
**Retro-reflective Type**  
 (Sensing range : 5m)  
 • DR-5000N / P / CN / CP

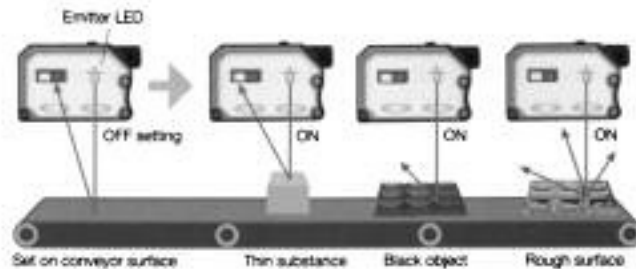
- **CMOS Image Sensor + Digital Monitor for easy setting.**
- **DR-Q series, transparent detection with AGC (Automatic Gain Control) function.**
- **BGS-DL series, the leading edge of BGS type sensors, the ultimate in Diffuse Reflective sensing.**
- **DT series, long distance Thru-beam sensor (max. 100 meters).**

### Features

#### FGS Function, the best solution for detection on a conveyor.

The BGS-DL series sensors also have a built-in FGS Function. The FGS function monitors the surface of the conveyor, if the reflected light from the surface of the conveyor is interrupted by a workpiece the output is activated.

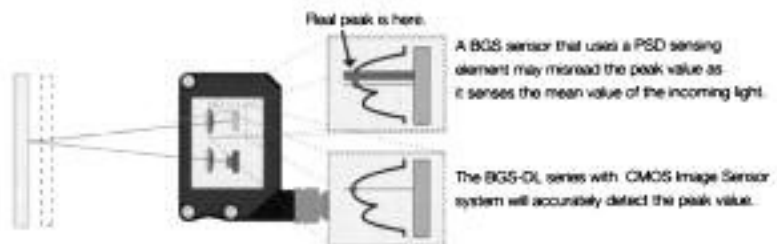
The FGS sensor is similar to a retro-reflective sensor but it operates in a diffuse mode. Therefore, the FGS sensor is best for detecting black, reflective, thin or rough surfaces moving on a conveyor.



#### Laser Light Source and CMOS Image Sensor combination.

The CMOS Image Sensor system is able to detect the quantity of light at each CMOS pixel with a well controlled shutter speed. It can precisely detect the peak value in the view field of the sensor. A sensor with a PSD sensing element is only able to detect the mean value of the peaks as shown below.

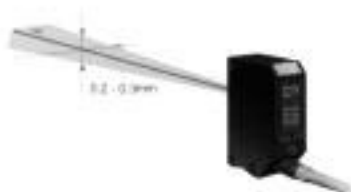
The CMOS Image system will be more accurate than a sensor with a PSD sensing element when detecting targets that have reflective and/or rough surfaces.



# LASER SENSORS

## Repeat Accuracy

Very tight Repeat Accuracy, 0.2 - 0.3 mm for BGS type. Even Thru-beam and Retro types have 0.3mm Repeat Accuracy (\*).



\* = Tested at the middle point of sensing range.

## Timer functions

The pushbutton teach models of the D series have built-in Timer functions for added flexibility.



Depends on set time of delay

Set time is referred as below ;

Time	0	10	20	...	980	990	1	2	...	10
ms	0	1	2	...	98	99	01	02	...	10

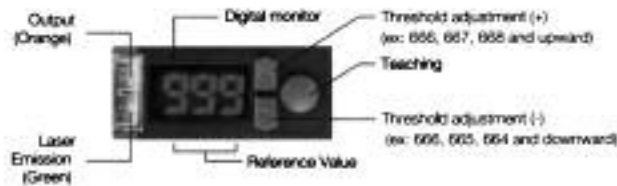
- \* 1msc increment for 0-999 msec.
- \* Timer is not available for Manual adjust type sensors
- \* 1sec increment from 1sec to 10 sec.
- \* Dispersion always happens from zero up to +5msec. For instance your setting at "10msec" means setting between "10msec and 15msec".
- \* Therefore please make sure to select Normal Operation if you are not in need of timer function.

## Class 2/Class II IEC, FDA Regulation

The D series conforms to Class 2 (IEC) and Class II (FDA) regulations.

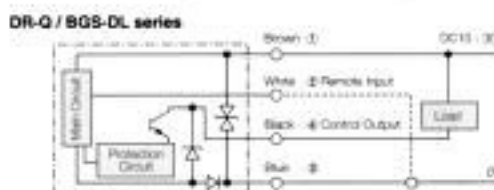


## Pushbutton Teach with Fine Adjustment



## Remote Input

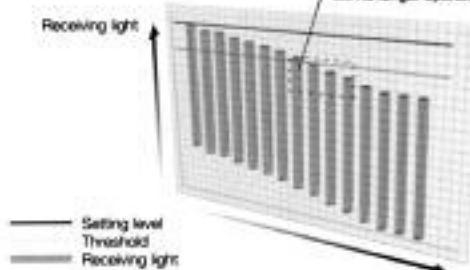
The DR-Q and BGS-DL sensors have a Remote Teach input that can be used to remotely set the sensor sensitivity.



**Automatic Power Control (APC)** monitors the received light intensity level to maintain proper operation of the sensor in dusty / dirty conditions.

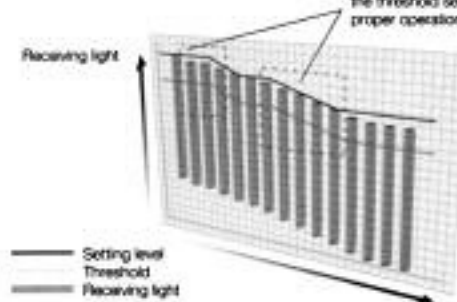
## Conventional Retro Reflective Sensor

The level of the receiving light can decline to less than the threshold setting due to water, dust, steam, etc., when this occurs the sensor will no longer operate.



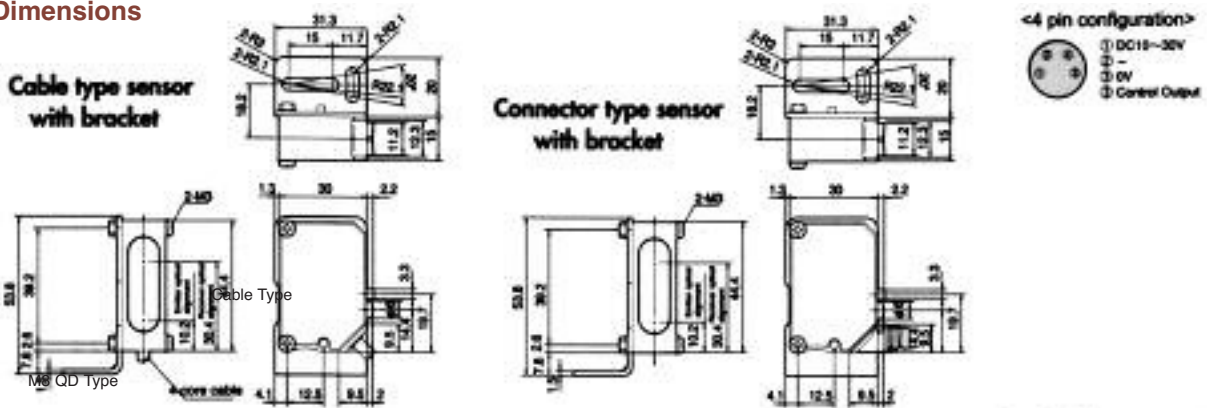
## DR-Q Series

The APC circuit monitors the received light level and adjusts the threshold setting to maintain proper operation of the sensor.

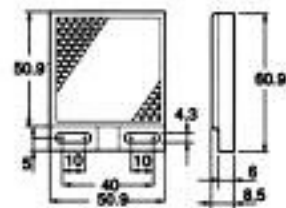


# LASER SENSORS

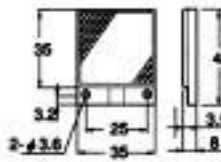
## Dimensions



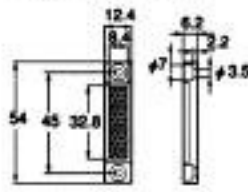
### Standard reflector V-61



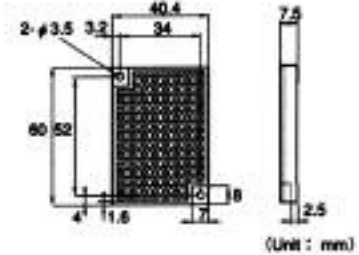
### Small reflector V-42



### Tiny reflector P-45



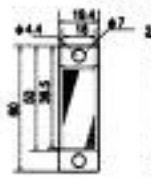
### Anti-cloud reflector V-60K



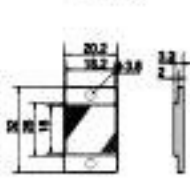
### P250F



### PL20F



### PL10F



Detection distance by reflector size

	PL250F	PL20F	PL10F
DR-0400T	4.0	2.8	1.9
DR-0500T	1.5	1.0	0.5
DR-930	5.0	3.5	1.2

(Unit : meter)

## Options

JCN-S : M8 Straight type

JCN-L : M8 L-shape type



JCN-S : 2 meter  
JCN-S5 : 5 meter  
JCN-10S : 10 meter



JCN-L : 2 meter  
JCN-SL : 5 meter  
JCN-SL : 10 meter

## Specifications (DT Series / DR Series)



Control LED

The D Series Laser Sensors offer a long sensing distance in conventional Thru-beam and Retro-reflective sensors. The Co-axial Laser light source gives extremely tight alignment to the target. Alignment of the sensor is easy thanks to the bright projected laser spot. The DT Series Thru-beam detects at 100 meters distance while the actual Margin Spec is set at 40 meters.

Model	Potentiometer adjustment type	
Type	Through-Beam	Retro reflection
Cable type	DT-4000N (or 4000P)	DR-500N (or 500P)
M8 connector type	DT-4000CN (or 4000CP)	DR-500CN (or 500CP)
Sensing range	40 meter	5 meter
Spot size	15mm/5 meter	20mm/3.5 meter
Range adjustment	1- $\mu$ m potentiometer	
Supply voltage	DC10-30V including 10% ripple (P-P)	
Current consumption	40mA	30 mA
Response time	0.5msec	
Light source	Red Laser Diode 650nm, Max 2mW 4 $\mu$ s, Class 2	
Indicator	Output indicator (orange), Laser emission (green)	
Digital indicator	N/A	
Control output	NPN or PNP open collector DC30V 100mA max	
Operation mode	Light/Dark On switchable	
Ambient temp/humid	-10 to 50 °C / 35-95% RH	
Insulation resistance	20M Ohm or more (at 500V DC)	
Protection category	IP67	
Noise resistance	IEC, CE	
Shock resistance	50G (500m/52), XYZ 3 directions	
Environmental illuminance	Sunlight : 10,000 lux, Incandescent lamp : 3,000 lux max	
Material	Anti-bacterial ABS (housing), PMMA (lens)	

Remarks : Scanning range taken with P250F reflector

## Specifications (BGS-DL Series)

BGS type sensors provide an accurate method of diffuse sensing that is able to detect objects without being influenced by the background or color of the workpiece. Conventional LED light source - BGS sensors are accurate, but Laser CMOS - Laser BGS sensors are able to reliably detect even black and reflective objects.

Model	Laser CMOS BGS (Teach-in type)		Laser BGS (Potentiometer type)	
Type	Accurate type	Long distance type	Accurate type	Long distance type
Cable type	BGS-DL10TN (or DL10TP)	BGS-DL25TN (or DL25TP)	BGS-DL10N (or DL10P)	BGS-DL30N (or DL30P)
M8 connector type	BGS-DL10TCN (or DL10TCP)	BGS-DL25TCN (or DL25TCP)	BGS-DL10CN (or DL10CP)	BGS-DL30CN (or DL30CP)
Sensing range	40-100mm	100-250mm	40-100mm	100-300mm
Spot size	ø1mm / 80mm	ø2mm / 200mm	ø3mm / 80mm	ø6mm / 200mm
Range adjustment	Teach-in, with fine adjustment button		4-µm potentiometer	
Hysteresis	3% / 80mm	10% / 200mm	5% / 80mm	5% / 200mm
Supply voltage	DC10-30V including 10% ripple (P-P)			
Current consumption	40mA max (12V), 27mA max (24V)		35mA	
Response time	1.5msec		0.7msec	
Timer	Off delay/On delay/One shot delay (1msec increment : 0-999msec, 1sec increment for 1-10 sec)		N/A	
Light source	Red Laser Diode 650nm, Max 1mW 300µs, Class 2		Red Laser Diode 650nm, Max 2mW 6µs, Class 2	
Indicator	Output indicator (orange), Laser emission (green)			
Digital indicator	7 segment, 3 digit Red LED		N/A	
Control output	NPN or PNP open collector DC30V 100mA max			
Operation mode	Light/Dark On selectable			
Ambient temp/humid	-10 to 40 °C / 35-85% RH		-10 to 50 °C / 35-85% RH	
Insulation resistance	20M Ohm or more (at 500V DC)			
Protection category	IP57			
Noise resistance	IEC, CE			
Shock resistance	50G (500m/S <sup>2</sup> ), XYZ 3 directions			
Environmental illuminance	Sunlight : 10,000 lux, Incandescent lamp : 3,000 lux max			
Material	Anti-bacterial ABS (housing), PMMA (lens)			

Remarks : (1) Scanning range with 100mm X 100mm gray 18% paper.  
(2) Details of hysteresis by color/distance shall be referred in technical chart provided in this catalogue.

## Specifications (DR-Q Series)



Coaxial LED

The DR-Q series is the ultimate in Transparent Detection Laser sensors. It features a high speed response of 0.7 msec. even with clear bottles. The D series utilizes a co-axial laser light source for accurate detection. The APC (Automatic Power Control) circuit will automatically adjust the sensor if the light level goes down due to dust or dirt, eliminating the need to wipe the lens clean or adjust the sensor.

Model	Transparent type	
Type	Accurate type	Long distance type
Cable type	DR-Q150TN (or Q150TP)	DR-Q400TN (or Q400TP)
M8 connector type	DR-Q150TCN (or Q150TCP)	DR-Q400TCN (or Q400TCP)
Sensing range	1.5 meter	4 meter
Spot size	15mm / 1.5 meter	20mm / 3.5 meter
Range adjustment	Teach-in, with fine adjustment button	
Supply voltage	DC10-30V including 10% ripple (P-P)	
Current consumption	35mA	
Response time	0.7 msec	
Timer	Off delay/On delay/One shot delay (1msec increment : 0-999msec, 1sec increment for 1-10 sec)	
Light source	Red Laser Diode 650nm, Max 2mW 4µs, Class 2	
Indicator	Output indicator (orange), Laser emission (green)	
Digital indicator	7 segment, 3 digit Red LED	
Control output	NPN or PNP open collector DC30V 100mA max	
Operation mode	Light/Dark On selectable	
Ambient temp/humid	-10 to 50 °C / 35-95% RH	
Insulation resistance	20M Ohm or more (at 500V DC)	
Protection category	IP57	
Noise resistance	IEC, CE	
Shock resistance	50G (500m/S <sup>2</sup> ), XYZ 3 directions	
Environmental illuminance	Sunlight : 10,000 lux, Incandescent lamp : 3,000 lux max	
Material	Anti-bacterial ABS (housing), PMMA (lens)	

Remarks : Scanning range taken with P250P reflector