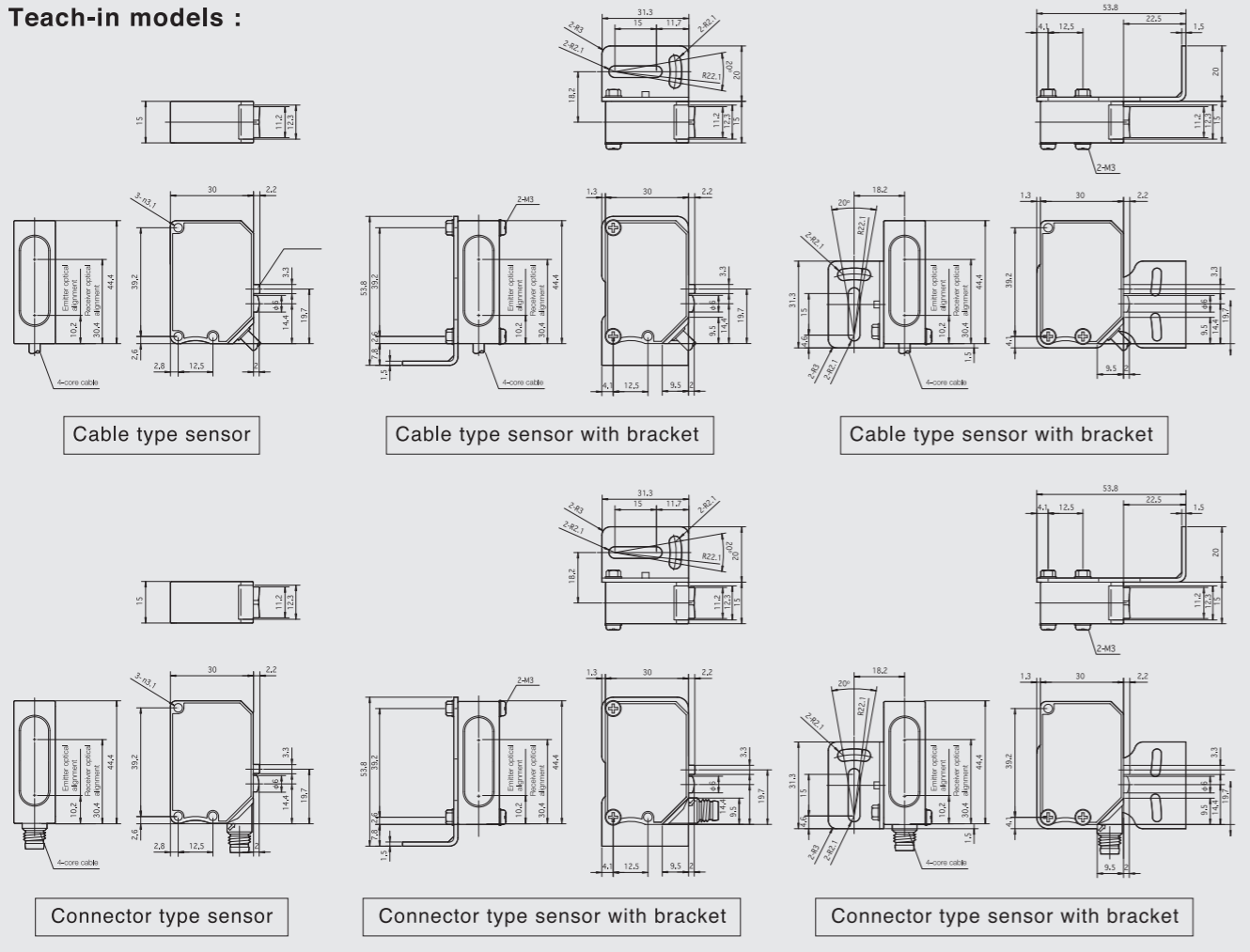


Dimensions

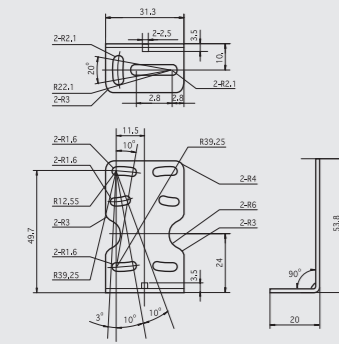
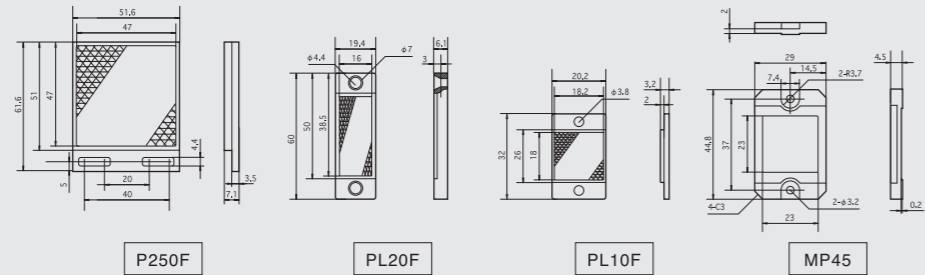
Teach-in models :



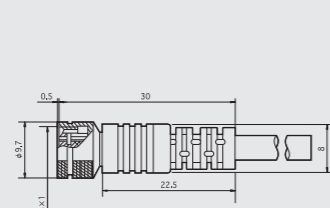
Detection distance by reflectors

	PL250F	PL20F	PL10F
DR-Q400T	4.0	2.8	1.0
DR-Q150T	1.5	1.0	0.5
DR-500	5.0	3.5	1.2

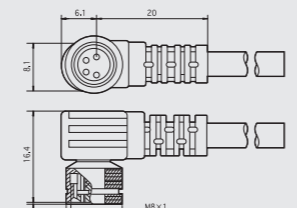
(Unit : meter)



Mounting Bracket



JCN-S, Straight M8 connector (common to JCN-5N and JCN-10N)



JCN-L, L-shape M8 connector (common to JCN-5L and JCN-10L)

- Specifications and technical information not mentioned here are written in Operation Manual. Or visit our website for getting details.
- All the warnings and cautions to know prior to use are given in Operation Manual.

OPTEX
FA

Digital Laser Sensor D Series

- BGS-DL series BGS type
- DR-Q series Transparent type
- DM series RGB color type
- DT series Thru-beam type
- DR series Retro-reflective type



High Accuracy Digital Laser Sensors

BGS (Background Suppression) and Transparent Object Detection sensors offer superior performance and high repeat accuracy.

OPTEX
FA **OPTEX FA CO., LTD.**

600-8815 Kyoto, Shimogyo-ku, Chudoji Awata 93, Japan
TEL. +81-(0)75-325-2920 FAX. +81-(0)75-325-2921
<http://www.optex-fa.com>

74535-04-QL0706

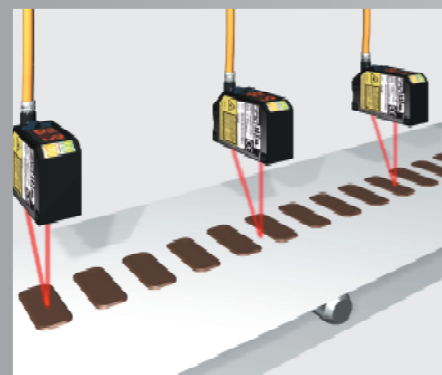
<http://www.optex-fa.com>



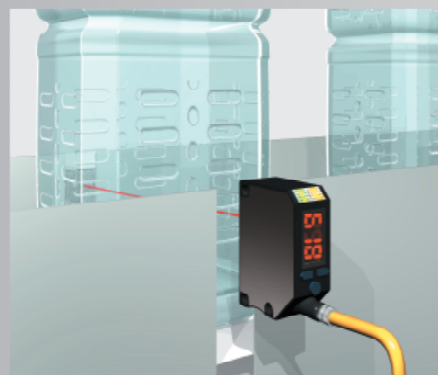
D series

Up to date CMOS Image Sensor + Digital Monitor.

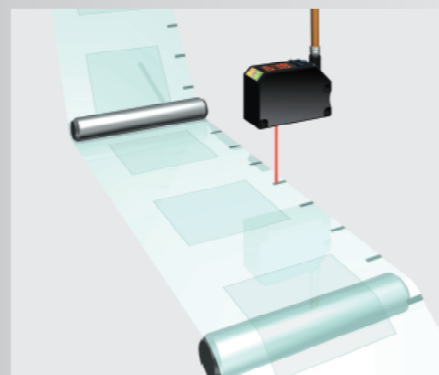
The D Series Laser Sensors are the best solution for applications that require "accuracy".



Detecting thin material on a moving conveyor.

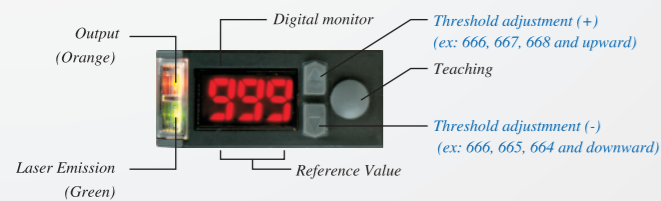


PET / Glass / Plastic etc. Transparent Object Detection

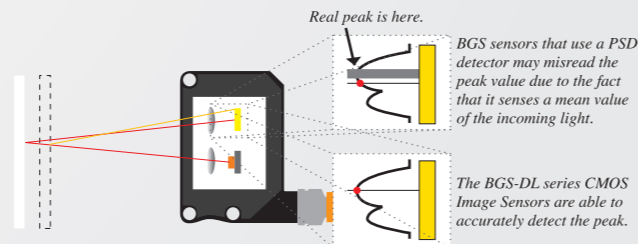


Mark detection and RGB color sensing.

Pushbutton Teach with Fine Adjustment



CMOS Image Sensor



Product Type : D series

Cable/QD	Output	BGS / Accurate type	
		Laser CMOS Teach-in	Potentiometer
Distance		40 - 100 mm	
Cable	NPN	BGS-DL10TN	BGS-DL10N
	PNP	BGS-DL10TP	BGS-DL10P
M8-QD	NPN	BGS-DL10TCN	BGS-DL10CN
	PNP	BGS-DL10TCP	BGS-DL10CP

Cable/QD	Output	Mark / Color type
		Distance
Cable	NPN	DM-18TN
	PNP	DM-18TP
M8-QD	NPN	DM-18TCN
	PNP	DM-18TCP

Cable/QD	Output	BGS / Longer distance	
		Laser CMOS Teach-in	Potentiometer
Distance		100 - 250 mm	100 - 300 mm
Cable	NPN	BGS-DL25TN	BGS-DL30N
	PNP	BGS-DL25TP	BGS-DL30P
M8-QD	NPN	BGS-DL25TCN	BGS-DL30CN
	PNP	BGS-DL25TCP	BGS-DL30CP

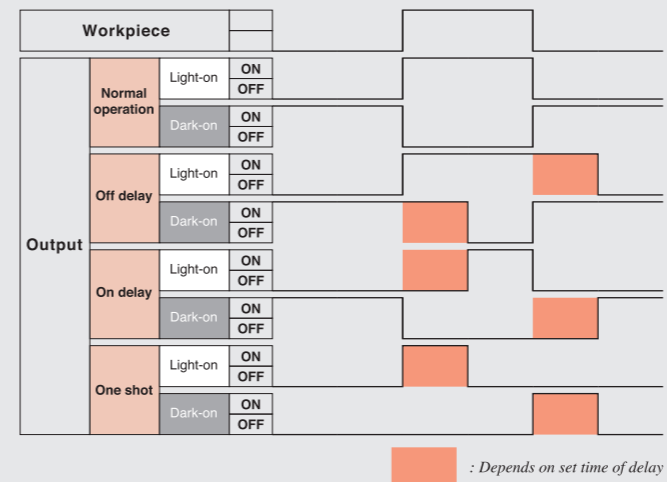
Cable/QD	Output	Thru-Beam Type (with potentiometer)
		Distance
Cable	NPN	DT-4000N
	PNP	DT-4000P
M8-QD	NPN	DT-4000CN
	PNP	DT-4000CP

Cable/QD	Output	Transparent type (with teach-in)	
		Filled bottle	Empty bottle
Distance		1.5 meter	4.0 meter
Cable	NPN	DR-Q150TN	DR-Q400TN
	PNP	DR-Q150TP	DR-Q400TP
M8-QD	NPN	DR-Q150TCN	DR-Q400TCN
	PNP	DR-Q150TCP	DR-Q400TCP

Cable/QD	Output	Retro-reflective Type (with potentiometer)
		Distance
Cable	NPN	DR-500N
	PNP	DR-500P
M8-QD	NPN	DR-500CN
	PNP	DR-500CP

Timer functions

For added flexibility the BGS-DL (T type), DR-Q and DM-18 sensors have a built-in Timer (On-delay, Off-delay or One-shot delay).



Set time is referred as below ;

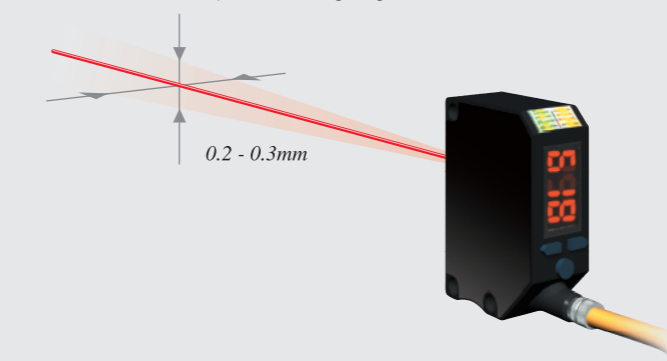
Time	Milliseconds						Seconds			
	0	10	20	...	980	990	1	2	...	10
Display	0	1	2	...	98	99	01	02	...	10

- * 1msec increment for 0-999msec. (10msec increment only for DM-18T series)
- * Timer functions are not available on the Manual adjust potentiometer type sensors.
- * 1sec increment from 1sec to 10 sec.
- * A slight variation of the set time value from zero up to 5 msec. can occur. For example setting the timer value at "10 msec" actually means between "10 and 15 msec".
- * Therefore please make sure to select Normal Operation if you are not in need of timer function.

Repeat Accuracy

Very tight Repeat Accuracy, 0.2 - 0.3 mm for BGS type. Thru-beam and Retro-reflective type sensors have 0.3 mm Repeat Accuracy*.

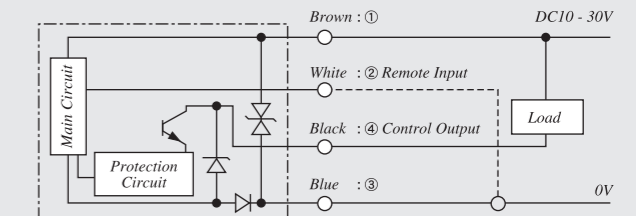
* = Tested at the middle point of sensing range.



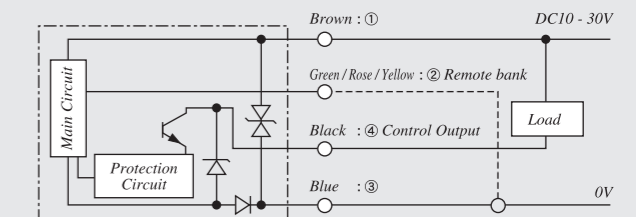
Remote Input

The BGS-DL (T type) and DR-Q sensors have an Remote Teach input that can be used to set the Sensitivity and Distance remotely. The DM-18 has three Remote Bank inputs to select the bank number remotely.

DR-Q / BGS-DL series



DM series



8 Banks selectable - DM Series RGB Color/Mark Sensor

The DM-18 can store up to 8 complete sets of parameters, these can be accessed remotely using the three input wires.

Bank No.	Wire color		
	Green	Rose	Yellow
1	0	0	0
2	0	0	1
3	0	1	0
4	0	1	1
5	1	0	0
6	1	0	1
7	1	1	0
8	1	1	1

Remarks : 0 = Connect to +V, or leave unconnected
1 = Connect to 0V

Class 2/Class II IEC, FDA Regulation

D series conforms to Class 2 (IEC) as well as Class II (FDA) regulations.



Options

M8 Connector cable

JCN-S : M8 Straight type	JCN-L : L-shape M8 cable
JCN-S : 2 meter JCN-S5 : 5 meter JCN-10S : 10 meter	JCN-L : 2 meter JCN-SL : 5 meter JCN-10L : 10 meter

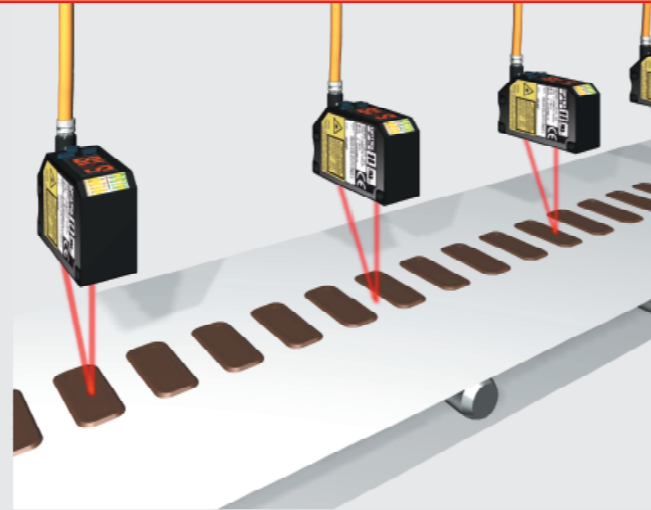
Reflectors

P250F : Standard reflector	PL20F : Small reflector	PL10F : Miniature reflector	MP45 : Small reflector	MP225 : Miniature reflector
61.6 x 51.6 mm Standard accessory for any D series Retro type	60 x 19.4 mm For space saving	32 x 20.2 mm For limited space	44.8 x 29mm Fine pixels of surface. Ideal for use of fine positioning.	225 x 225mm Free-cut reflector sheet of MP45 material.

BGS-DL series

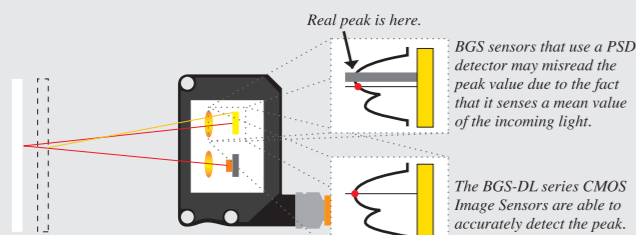
- Pushbutton Teach** BGS-DL10T, Teach-in, Range 4-10cm
BGS-DL25T, Teach-in, Range 10-25cm
- Manual Adjust** BGS-DL10, 4-turn trimmer tuning, Range 4-10cm
BGS-DL30, 4-tune trimmer tuning, Range 10-30cm
BGS-DL70, 4-tune trimmer tuning, Range 10-70cm

BGS (Background Suppression) type sensors are the most accurate method of diffuse sensing, BGS sensors are able to detect objects without being influenced by either the background or the color of the workpiece. A conventional LED - BGS sensor is accurate, but a Laser CMOS - Laser BGS sensor is able to detect black and/or highly reflective surfaces reliably.



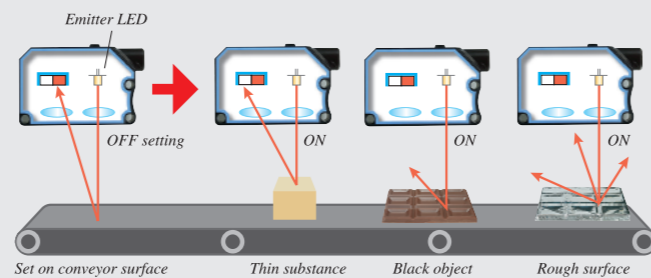
Great combination ; Laser and CMOS Image Sensor shuts out environmental influence.

CMOS Image Sensor system can detect light quantity at each CMOS pixel under well controlled shutter speed, therefore it sharply detects the peak value in the viewfield of sensor while PSD detects mean value of peaks as shown below. Actually it means CMOS Image Sensor System is the ideal way for such objects having reflecting and/or rough surface.



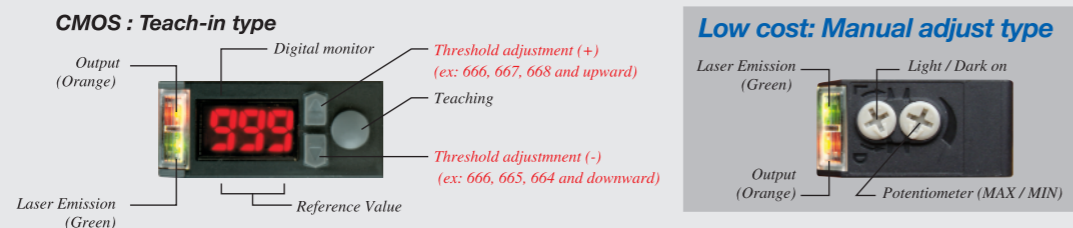
FGS Function, the best solution for fluttering conveyor.

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



Digital Display & Fine Adjustment

In addition to a Teach button there are also two threshold adjustment buttons. Fine adjustments can be made to the threshold value after Teaching by using the adjustment buttons.



Specifications

MODEL	Laser CMOS BGS (Teach-in type)		Manual adjust Potentiometer type		
	Accurate type	Longer type	Accurate type	Longer type	Longer type
Type	BGS-DL10TN (or DL10TP)	BGS-DL25TN (or DL25TP)	BGS-DL10N (or DL10P)	BGS-DL30N (or DL30P)	BGS-DL70N (or DL70P)
Cable Type	BGS-DL10TCN (or DL10TCP)	BGS-DL25TCN (or DL25TCP)	BGS-DL10CN (or DL10CP)	BGS-DL30CN (or DL30CP)	BGS-DL70CN (or DL70CP)
M8 connector type					
Scanning range	40-100mm	100-250mm	40-100mm	100-300mm	100-700mm
Spot size	ø1mm / 80mm	ø2mm / 200mm	ø3mm / 80mm	ø6mm / 200mm	ø6mm / 200mm
Sensitivity adjustment	Pushbutton Teach with fine adjust buttons		4-turn potentiometer		
Hysteresis	3% / 100mm	10% / 200mm	5% / 80mm	5% / 200mm	5% / 300mm
Supply voltage	DC10-30V including 10% ripple (P-P)				
Current consumption	50mA max (12V), 35mA max (24V)		35mA		
Response time	1.5msec Max (fixed sensitivity)		0.7msec		
Timer	Off delay/On delay/One shot delay (1msec increment : 0-999msec, 1sec increment for 1-10 sec)		N/A		
External Input	Remote Teach / Laser OFF selectable		N/A		
Light source	Red Laser Diode 650nm, Max 1mW 300us, Class 2		Red Laser Diode 650nm, Max 2mW 6us, Class 2 (Max 3mW for BGS-DL70)		
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 50 C / 35-85% RH				
Insulation resistance	20M Ohm or more (at 500V DC)				
Protection category	IP67				
Noise resistance	IEC, CE				
Shock resistance	50G (500m/S ²), XYZ 3 directions				
Environmental illuminance	Sunlight : 10,000 lux, Incandescent lamp : 3,000 lux max				
Materials	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.

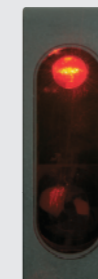
DR-Q series

- For filled bottle** DR-Q150T 1.5 meter distance
For empty bottle DR-Q400T 4 meter distance

The DR-Q Series offers superior performance in Transparent Object detection. With a 0.7 msec. response time it is ideal for use in high speed bottling applications.

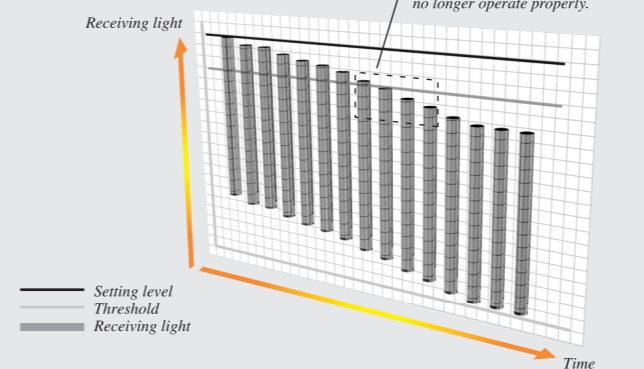
Accurate detection is assured by the use of a Coaxial light source.

The AGC (Automatic Gain Control) circuit will automatically compensate for changes in the incoming light level (due to dust/dirt etc.) by adjusting the threshold setting.

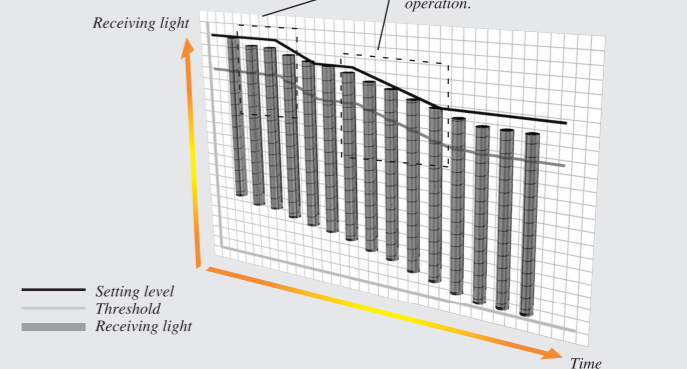


AGC (Automatic Gain Control) circuit monitors the incoming light level to maintain reliable operation even in dusty / dirty conditions.

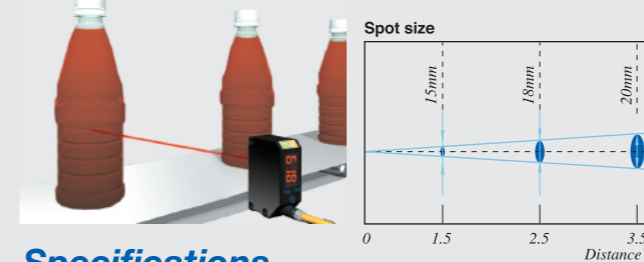
Conventional Retro Reflection sensor



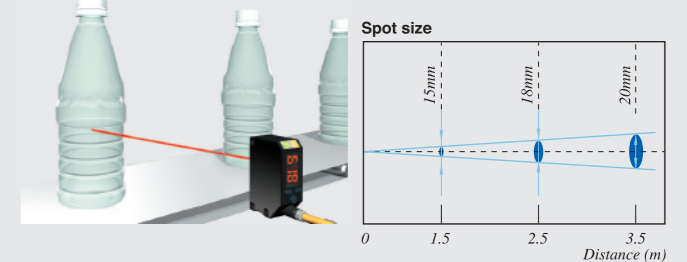
DR-Q series



DR-Q150T



DR-Q400T



Specifications

MODEL	Transparent type	
	Accurate type : For filled bottle	Long distance type : For empty bottle
Type	DR-Q150TN (or Q150TP)	DR-Q400TN (or Q400TP)
Cable Type	DR-Q150TCN (or Q150TCP)	DR-Q400TCN (or Q400TCP)
M8 connector type		
Scanning range	1.5 meter	4 meter
Spot size	15mm / 1.5 meter	20mm / 3.5 meter
Sensitivity adjustment	Pushbutton Teach with fine adjust buttons	
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	IP67	
Noise resistance	IEC, CE	
Shock resistance	50G (500m/S ²), XYZ 3 directions	
Environmental illuminance	Sunlight : 10,000 lux, Incandescent lamp : 3,000 lux max	
Materials	Anti-bacterial ABS (housing), PMMA (lens)	

Remarks : Scanning range taken with P250F reflector

DM-18T series

Color / Mark Sensor DM-18T Range 18+/- 2mm

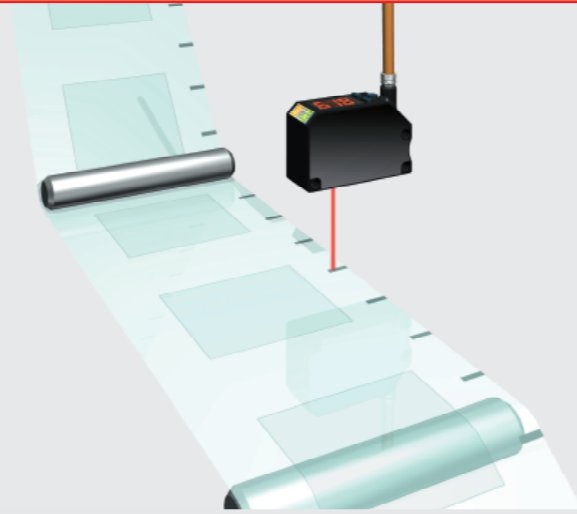
Red, Green, Blue. The internal microcomputer will automatically select the light source from these three colors according to the surface.

Both Mark Detection and RGB Color sensing are incorporated in the sensor.

The DM-18T* can store up to 8 different settings in memory.

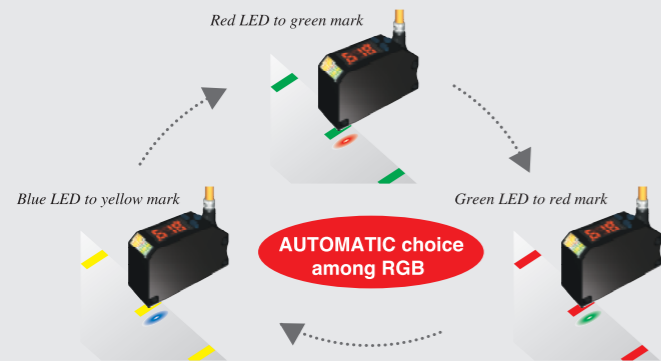
This minimizes the time required to change processes.

* Only the cabled model offers this feature

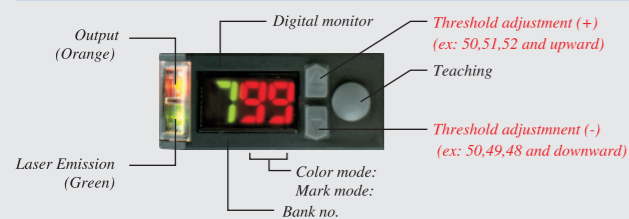


Automatic Choice of RGB light source

RGB, each color is incorporated into the DM-18T the internal microcomputer will select the best light source according to the target workpiece. The DM-18T monitors the contrast between the background and target to determine the best combination. Colors that used to be difficult to detect can now be done automatically.



Digital Display



8 Banks for Data Storage

The DM-18T is able to store eight different color settings. Each bank can be accessed remotely or at the sensor.

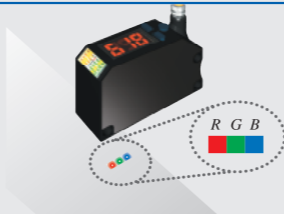
Bank reference

Bank No.	Wire color		
	Green	Rose	Yellow
1	0	0	0
2	0	0	1
3	0	1	0
4	0	1	1
5	1	0	0
6	1	0	1
7	1	1	0
8	1	1	1

Remarks : 0 = Connect to +V, or leave unconnected
1 = Connect to 0V

Color Mode

For the detection of a specific color the DM-18T uses three LED's (RGB). The sensor computes the ratio of the three to determine the color. Accuracy is assured even for objects moving on a conveyor. The DM-18T can be used for Mark Detection (Mark Mode) or Color sensing (Color Mode).



Specifications

MODEL	Mark / RGB Color type
Cable Type	DM-18TN (or 18TP)
M8 connector type	DM-18TCN (or 18TCP)
Scanning range	18 +/- 2mm
Spot size	1 X 6 mm/18mm
Sensitivity adjustment	Pushbutton Teach with fine adjust buttons
Supply voltage	DC10-30V including 10% ripple (P-P)
Current consumption	35mA (12V), 25mA (24V)
Response time	Mark mode : H1/250µs, H2/500µs, L/1200µs Color mode : H1/800µs, H2/1600µs, L/4000µs
Timer	Off delay/On delay/One shot delay (10msec increment : 0-990msec, 1sec increment for 1-10 sec)
Light source	RGB LED
Indicator	Output indicator (orange), Stable detection (green)
Digital Indicator	7 segment, 3 digit Red and Green LED
Control output	NPN or PNP open collector DC30V 100mA max
Operation mode	Light/Dark On selectable
Ambient temp/humid	-25 to 55°C / 35-95% RH
Insulation resistance	20M Ohm or more (at 500V DC)
Protection category	IP67
Noise resistance	IEC, CE
Shock resistance	50G (500m/S ²) , XYZ 3 directions
Environmental illuminance	Sunlight : 10,000 lux, Incandescent lamp : 3,000 lux max
Materials	Anti-bacterial ABS (housing), PMMA (lens)

DT series

Laser Thru-beam type DT-4000

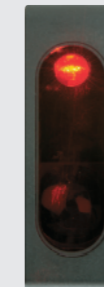
DR series

Laser Retro-reflective type DR-500

The D Series Laser sensors offer a long sensing distance in both Thru-beam and Retro-reflective types.

The Coaxial Laser light source projects a narrow beam for tight alignment to the target, the projected laser spot is easy to view due to the laser light source.

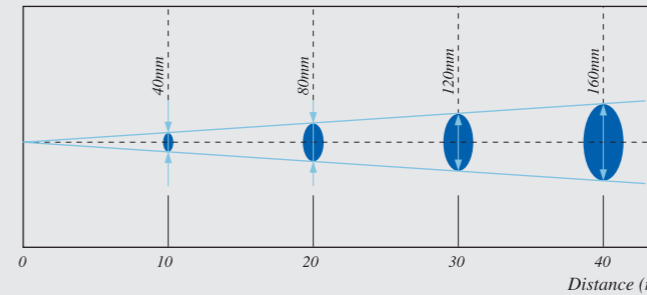
The DT Series Thru-beam type sensor has a rated sensing distance of 40 meters, the actual sensing distance can be up to 100 meters.



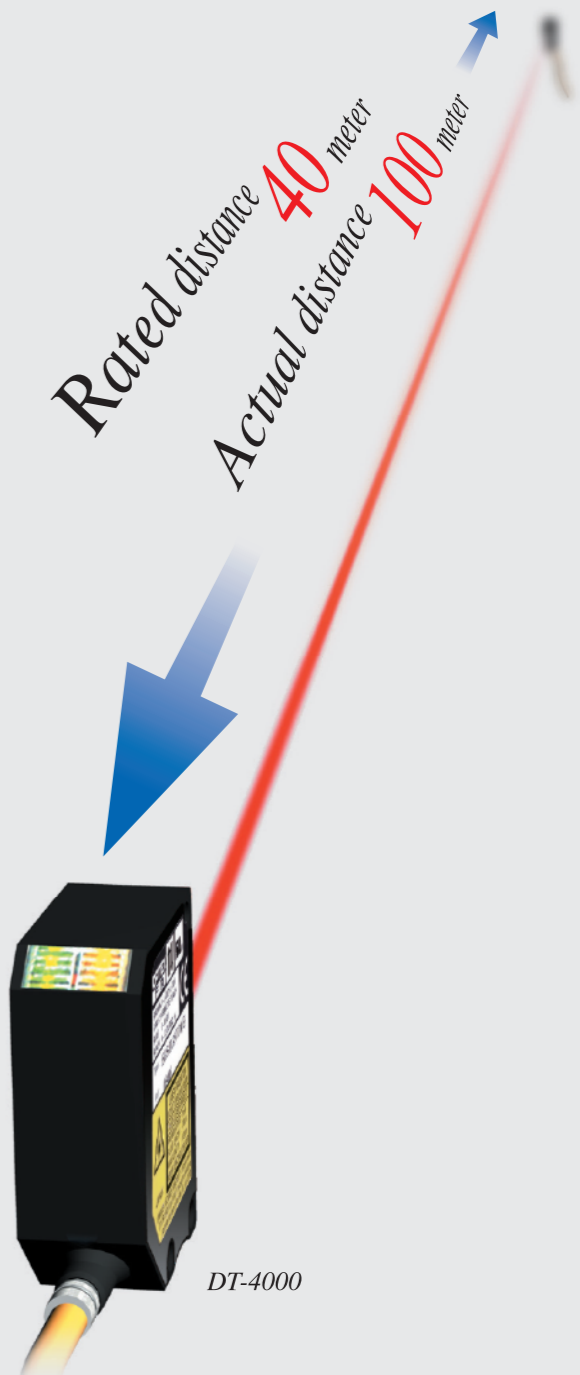
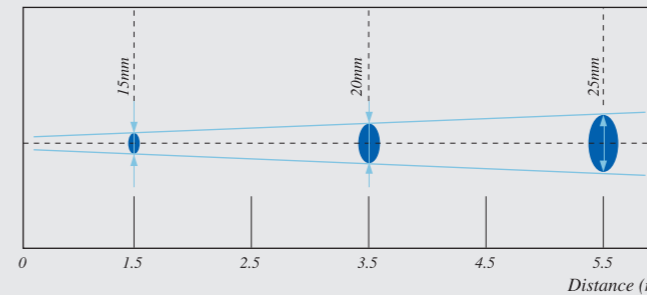
Coaxial Laser

Spot Size

DT-4000



DR-500



Specifications

MODEL	Potentiometer adjustment type	
	Thru-beam	Retro-reflective
Type	DT-4000N (or 4000P)	DR-500N (or 500P)
Cable Type	DT-4000CN (or 4000CP)	DR-500CN (or 500CP)
M8 connector type	DT-4000CN (or 4000CP)	DR-500CN (or 500CP)
Scanning range	40 meter	5 meter
Spot size	15mm/5 meter	20mm/3.5 meter
Sensitivity adjustment	1-turn 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 4µs, 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/S ²) , XYZ 3 directions	
Environmental illuminance	Sunlight : 10,000 lux, Incandescent lamp : 3,000 lux max	
Materials	Anti-bacterial ABS (housing), PMMA (lens)	

Remarks : Scanning range taken with P250F reflector