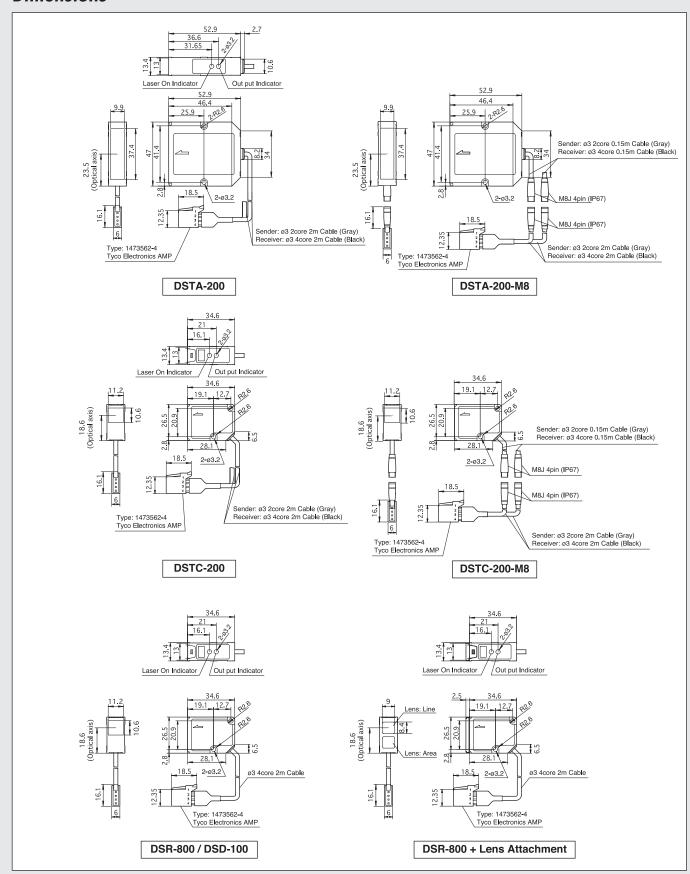
### **Dimensions**



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



607-8085 Kyoto Yamashina Takehanadounomae 46-1, Japan TEL. +81-(0)75-594-8123 FAX. +81-(0)75-594-8124 http://www.optex-fa.com

Digital amplifier with modular laser optics

Digital Amplifier with Modular Optics. Two Independent outputs, high speed response up to 60 msec.

Max 70 meter sensing distance with coaxial beam light source

#### **Sensor head**

**Retro Reflective Type** DSR-800: 8 meter DSR-5000: 70 meter Max

**Diffuse Reflective Type** DSD-100: 1.5 meter Max

Thru-beam type

DSTC-200: 2 meter

DSTC-200-M8: 2 meter, QD type DSTA-200: 2 meter, Line Beam

DSTA-200-M8: 2 meter, Line Beam,

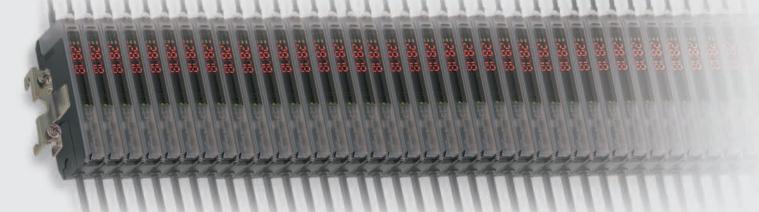
QD type

Amplifier DSA-M: Master Amplifier, 2CH DSA-S: Slave Amplifier, 2CH Master Amplifier, 1CH DSA-M3: DSA-S1: Slave Amplifier, 1CH





(12V DC, 40 Celsius of surroundings)



## **Applications**



#### **DSR-800** for monitoring meandering of Transparent Film

Install two pcs of DSR-800 not touching the both edge of film. DSR-800 lets you know as soon as the beam touches the edge.



# **DSR-800**

for sensing transparent bag of cookies.

Edge of plastic bag is sometimes shrinked that is not good for stable sensing.

DSR-800 with Beam Selector BL-W130L-1 will provide a line beam that can work stably for such kind of object.



#### **DSTA-200**

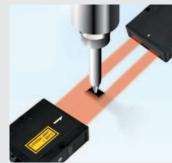
for finding a fine chip vacuumed by picker.

The line beam of 30mm width doesn't matter the position of object as far as it's in the 30mm



#### **DSD-100** for sensing thread inside the bolt.

DSD-100 can focus on 1mm spot in 1 meter distance. As being designed in Coaxial optics, it can look in the depth of bolt.



# Sensor head and Amplifier List

#### Sensor head

Туре	Model	Mode	Sensing Distance	
Retro Reflective	DSR-800 (Reflector MP45)	Long	8 meter (remark 1)	
		Standard	5 meter	
		Fast	2 meter	
	DSR-5000 (Reflector P250F)	Long	0.5 - 50 meter (remark 2)	
		Standard	0.3 - 35 meter	
		Fast	0.1 - 20 meter	
Diffuse Reflecrive	DSD-100	Long	1.5 meter	
		Standard	0.7 meter	
		Fast	0.25 meter	
Thur been	DSTC-200	Standard	2 meter	
Thru-beam Cable type	DSTA-200	Standard	2 meter	
		Measurement	0.5 meter	
Thru-beam M8 QD type	DSTC-200-M8	Standard	2 meter	
	DSTA-200-M8	Standard	2 meter	
		Measurement	0.5 meter	

### **2CH Amplifier**

Mode	Specifications
DSA-MN	2CH, NPN Master Amplifier, 6 wires
DSA-MP	2CH, PNP Master Amplifier, 6 wires
DSA-SN	2CH, NPN Slave Amplifier, 4 wires
DSA-SP	2CH, PNP Slave Amplifier, 4 wires

### 1CH Amplifier

Specifications
1CH, NPN Master Amplifier, 3 wires
1CH, PNP Master Amplifier, 3 wires
1CH, NPN Slave Amplifier, 1 wire
1CH, PNP Slave Amplifier, 1 wire
M8QD, 1CH, NPN Master Amplifier, 4pins
M8QD, 1CH, PNP Master Amplifier, 4pins

Remark(1) Use of Lens Attachment for Line/Area beam for DSR-800 will change the sensing distance. Please see Page 5.

Remark(2) The distance in the Long Distance Mode of Retro Reflective Types will be extended at Sensitivity Compensation Status. DSR-800 : 0.2 - 20 meter

DSR-5000: 1 - 70 meter

Remark(3) The distance of DSD-100 is defined with 200 X 200 mm white paper.

4-20mA output available for displacement sensing applications. (Thru-beam type)	DSA-M amplifier
e-con, the easy connection	
Just snap-in the e-con to connect to amplifiers. All the sensor heads are connectable to any amplifier with the preset e-con mechanics.	IP67 water tightness
-3x20 //	All the DS Series sensor heads secures IP67 Water tightness with its rugged housing.

By fitting Lens Attachment, you can select the beam of

### SENSOR HEAD LINEUP (All IP67 protection. All visible red laser for easy alignment.)

Reflector

DSR-800 with Line Beam

of 40 X 1mm (at 300mm distance)

You need to attach

BL-W130L-1 Lens attachme

#### **Retro Reflective Type**

You can select the beam of 2mm spot, Area beam, or Line beam by changing optional Lens Attachment BL-W130L-1.

DSR-5000 senses Max 70 meter at its Long Distance Mode. Distance is varied upon Response time you will need. (see Page3)

DSR-800 senses 8 meter even for glass and PET bottle application. Both types can give minimum spot of 2mm size at 2 meter distance.

# **Diffuse Reflective Type**

Max 1.5 meter distance at Long Mode. Coaxial spot beam is given for accurate sensing, so you don't have to mind orientation of workpiece.

1mm spot size at 1 meter distance, that is convenient for sensing over the nitch of wall.



DSR-800 with Area Beam of

35 X 35mm (at 300mm distance)

You need to attach

BL-W130L-1 Lens attachment

DSD-100, coaxial small spot size of 1mm round.

DSR-800 (8 meter) and

DSR-5000 (70 meter) with

2mm round spot (at 2 meter distance).

### **Through Beam Type**

You will select either DSTC-200 (2mm spot size) or DSTA-200 (Measurement Type that can provide 30× 2.5mm of line beam as well as 4-20mA analogue signal). M8 QD Connection is availble for easy maintenance by using QD cable DSL-8L04-2-130.



for sensor head DSTA(C)-200-M8



DSTA-200, Line Beam DSTC-200, Standard Thru-beam of of 30 X 2.5mm in the distance of 50cm. 2mm spot size at 2m distance.

# DS SERIES

### **Dual Digital Display**



### 6 ways teach-in method for your convenience

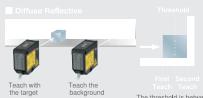
#### **One Point Teaching**



Use this teaching mode when no object is there.

Find the threshold so the sensor would not detect the background.

### **Two Point Teaching**

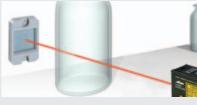


This is the basic way of setting for Diffuse Reflective DSD-100. One teach for the object and another for the background.

You can set the threshold in between the object and background.

The threshold is between the target and the background.

### **Transparency Teaching**



This is for Retro Reflective type DSR-800.

Teach without the object so the sensor works around threshold, then DSR-800 will detetc even transparent object like film, glass, bottle, etc

#### **Automatic Teaching**



You don't have to stop the conveyor.

Possible to teach-in the object that are even on the run.

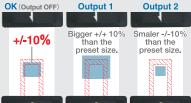
### **Zone Teaching**



You can set the area that you want to detect.

Using UP/DOWN button, set the area within 10% of flexibility.

### **Judgement Teaching**



This function is excusive for DSTA-200, measurement type amplifier.

amplifier.

Used for judging size and width
of object in the range of 10%
allowance. Regaradless of
position you can detect object,
so it is actually Area Teach.

3

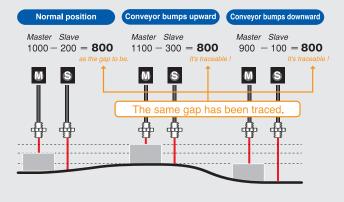
### **Difference Sensing Mode**

Bumpy conveyor always prevents sensors from stable detection. DS series solves this typical problem by its Difference Sensing Mode. The Master and the Slave keep on computing the gap of reflection between background and surface of object. (see the picture below)

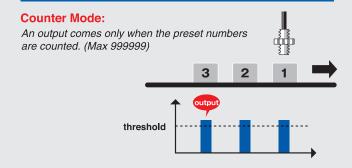
No matter how the background like conveyor surface fluctuates , DS is not influenced with it, and possible to trace the object.



#### How to trace the sensing!

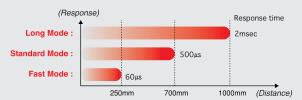


### **Counter Mode**



### Response time

You can select sensing distance and response time upon your applications.  $^*\textsc{Example:}\ \textsc{DSD-100}$ 



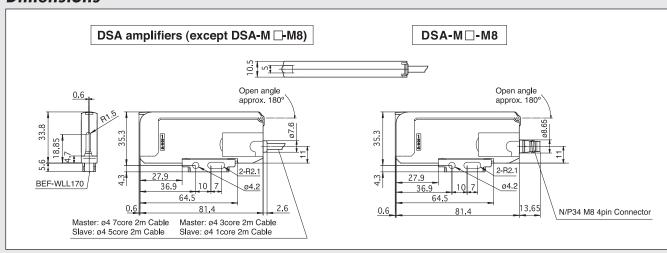
### **Specifications**

MODEL	2CH output type		1CH output type		
	Master unit 6 wires	Slave unit 4 wires	Master unit 3 wires	Slave unit 1 wire	
Cable type	DSA-M(N/P)	DSA-S(N/P)	DSA-M(N/P)3	DSA-S(N/P)1	
M8 connector type	-	-	DSA-M(N/P)-M8		
Adaptable sensor head	DS Series sensor head only				
Response time	60µs / 500µs / 2ms (Fast/Standard/Long)				
Control output	NPN / PNP Open collector Load current: 100 mA or less Residual voltage:1.8 V or less				
Indicator light	Laser emission indicator light: Green, Output Indicator light: Orange				
	Teaching indicator light: Red Channel indicator light: Green				
Digital display	7 segment 8 digit display				
Timer function	OFF, On delay, Off delay, One-shot				
Timer period	1 ms - 9 s				
Mutual interference prevention	4 pcs Max				
Output mode	Light on / Dark on selectable				
Analog output	Current output:4 - 20 mA -				
External setting	External input setting (1 point teaching, synchronizing input, laser off, counter reset)		External input setting (1 point teaching, synchronizing input, laser off, counter reset)		
	Output setting (2CH output analog output)		*Settable only with DSA-M□-M8		
Operating temperature/humidity *1	-25 to +55°C / 35 to 85 % RH (No freezing)				
Store temperature/humidity	-40 to +70°C / 35 to 85 % RH (No condensation)				
Power source, voltage	12 - 24 V DC ± 10 % including a ripple				
Consumption current	45 mA or less / 24 V				
Shock resistance	10 to 55 Hz Double amplitude 1.5 mm 2 hours for each direction of X, Y, and Z				
Protective category	IP50				
Material	PC: Case and cover				
Weight (including the codes)	Cable type: 65 g M8 connector type: 30 g				

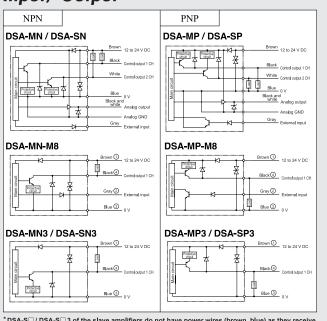
Remark(1) 40°Cat 12V DC in case of inter-connection up to 30 pcs or Parallel installation up to 50 pcs.

Remark(2) BIF series amplifier is not possible to connect with other amplifiers due to different response time.

### **Dimensions**

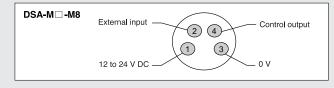


### Input/ Output



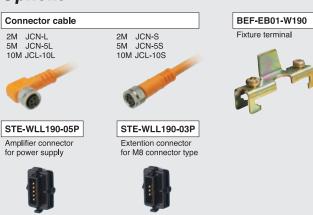
\*DSA-S□ / DSA-S□ 3 of the slave amplifiers do not have power wires (brown, blue) as they receive the power supply from the base unit.

### Pin layout



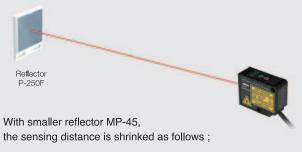
### **Options**

4



### DSR-5000 : Max 70 meter of sensing (at Sensitivity Compensation ON in the Long Mode)

With exlcusive Reflector P250F, 70meter distance is possible.



Lond Mode: 0.5 - 20 meter Standard Mode: 0.3 - 10 meter

Fast Mode: 1 meter



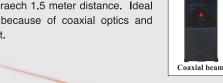
#### Dispositioned workpiece on a running conveyor

DSR-5000 will successfully find a dispositoned object on a running conveyor as far as it's within 70 meter length.

### DSD-100: Diffuse Reflective sensor for 1.5 meter distance.

At Sensitivity Compensation ON under Long mode, you can raech 1.5 meter distance. Ideal for positioning because of coaxial optics and 1mm round spot.

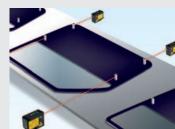
1 mm spot





#### Slack control of rubber belt

With 2CH Amplifier DSA-M (Master) or DSA-S (Slave), you can monitor slack of belt as the amplifier has two channels of control output. Analaogue output will be useful for monitoring depth of slack.

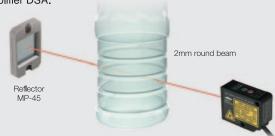


#### Small object in distance

Safe sensing in distance. This example is to sense a metal part stuck on glass plate in Automotive application.

## DSR-800: Three kinds of spots are selectable

DSR-800 will successfully detect a clear glass object or PET bottle. 2mm of fine spot will help to secure the performance against the glass material thanks to "Glass Teach" function of Amplifier DSA.





#### Disposition of glass plate

It's ideal. DSR-800 has 2mm round spot (at 2 meter distance) given in coaxial optics, so will not fail to detect slite disposition of glass plate. Sensivity setting is easy with DSA Amplifier's Galss Teach setting.



#### Meandering of transparent film

Set a pair of DSR-800 outside the edge of transparent film to minor meandering of the film. DSR-800 is so sensitive to sense a slight change of receiving light.

5

DSR-800 can change its sensing spot into Line beam (40 X 1 mm), or Area spot (35 X 35mm) by using optional beam selector BL-W130L-1.





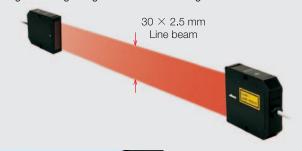
#### Print on a transparent glass

You can know if there is a print on a transparent class if you would use DSR-800 as area sensing sensor using optional lens BL-W130L-1

If the spot was a round or line shape it's impossible, but you can do it focusing the printed area with Area Beam.

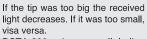
### DSTA-200: 30mm width Line Beam for sorting application with 4-20mA output.

Ideal for sorting by width and size of objects. Measurement Mode will give analogue signal for use in the range of 0.5 meter.



#### Sorting by size

Metal junction in a different shape.



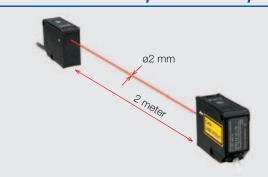
DSTA-200 gives parallel line beam, therefore you can sense it regardless of position of workpiece.



Finding a fine chip vacuumed by picker.

The line beam of 30mm width doesn't matter the position of object as far as it's in the 30mm

### DSTC-200 : 2mm sharp and small spot



DSTC-200 will be ideal for counting wafer to be set in a

2mm round spot in 2 meter distance means direct light to go through, and you don't have to worry about light immunity. Counter function of DSA Amplifier will be convenient to confirm wafer quanity in a cassette.



## **Specifications**

		Retro reflective type		Diffuse reflective type	Through beam type	Through beam / Measurement type	
MODEL	Cable			DSD-100	DSTC-200	DSTA-200	
		DSR-5000	DSR-800		Emitter: DSTC-D	Emitter: DSTA-D	
					Receiver: DSTC-200	Receiver: DSTA-200	
	M8 QD-type	-	-	-	DSTC-200-M8	DSTA-200-M8	
	Emitter M8	-	-	-	DSTC-S	DSTA-S	
	Detector M8	-	-	-	DSTC-R	DSTA-R	
Amplifier unit		DSA-M 🗌 /DSA-M -M8 / DSA-S					
Light source		Visible light semiconductor laser 650nm					
Output		max. 3mW			max. 390 <i>μ</i> W		
IEC/JIS CLASS		CLASS 2			CLASS 1		
FDA CLASS		Class <b>I</b>					
	Long	0.5 <b>-</b> 50 m	8 m	1 m		2 m	
Detection distance	Standard	0.3 - 35 m	5 m	0.7 m	2 m	Length measurement mode: 0.5 m	
*1	Fast	0.1 - 20 m	2 m	0.25 m		(Only Long and Standard)	
	Spot size *2 Selectable see				Approx. 2 mmØ (Distance: 2 m)	Approx. 30 x 2.5 mm (Distance: 2 m)	
Repeat accuracy *3				0.3 mm			
Indicator light		Laser radiation indictor light: Green Output indicator light: Orange					
Operating temperatu		-10 to +55°C/35 to 85 %RH (No condensation or freezing)					
Store temperature/h	umidity	-25 to +70°C/35 to 85 %RH (No condensation or freezing)					
Ambient light		3,000 lx (Incandescent light) 10,000 lx (Sunlight)					
Shock resistance		10 to 55 Hz Double-amplitude 1.5 mm 2 hours at each direction of X, Y and Z					
Protection category		IP67					
Material Material		PC (Case, Cover) PMMA / Glass (Front glass)					
Weight (including the codes) *4 45g				90g	115g		

- $^{\ast}$  1 DSD-100 : With white paper (90 %) of 200 x 200 mm DSR-800 : With the reflector MP-45 (accessory)
- \* 2 Defined with center strength 1/e2 (13.5%).
- There may be leak light other than the specified spot size. The sensor may be damaged when there is a highly reflective object around the targets
- \* 3 Right angle to sensing axis.
  \* 4 The weights of DSTC-200 and DSTA-200 include the emitter and the reciever.
  \* For the model M8-QD type, replacement is available only for the eitter and the

### **Options**

M-45

Standard reflector for DSR-800





BL-W130-1 Beam Selector



