http://www.optex-fa.com

- 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.

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74558-02-RD0705

Digital amplifier with modular laser optics

D2SA Series

Digital Amplifier with Modular Laser Optics.
Two independent outputs, high speed response up to 60μsec.

Max. 70 meter sensing distance with coaxial beam light source.
(Retro-reflective Type)

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

(Stand Alone Type)

D2SA-MNS	2CH with Analogue, NPN
D2SA-MPS	2CH with Analogue, PNP
D2SA-MN3S	1CH, NPN
D2SA-MP3S	1CH, PNP
D2SA-MNS-M8	1CH, NPN, M8-QD
D2SA-MPS-M8	1CH, PNP, M8-QD

(Interconnect Type - Master Units)

D2SA-MN	2CH with Analogue, NPN
D2SA-MP	2CH with Analogue, PNP
D2SA-MN3	1CH, NPN
D2SA-MP3	1CH, PNP
D2SA-MN-M8	1CH, NPN, M8-QD
D2SA-MP-M8	1CH, PNP, M8-QD

(Interconnect Type - Slave Units)

D2SA-SN	2CH with Analogue, NPN
D2SA-SP	2CH with Analogue, PNP
D2SA-SN1	1CH, NPN
D2SA-SP1	1CH, PNP

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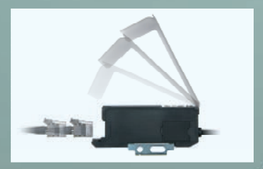
The Master and Slave Amplifiers reduce installation time and save on wiring.
By using the lens attachment the spot beam can be changed into a Large area beam or a 40 mm wide line.

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

All the DS Series sensor heads secures IP67 Water tightness with its rugged housing.

Sensor head and Amplifier List

Sensor head

Type	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) Remark (2)	Long	0.5 - 50 meter
		Standard	0.3 - 35 meter
		Fast	0.1 - 20 meter
Diffuse Reflective	DSD-100	Long	1.0 meter
		Standard	0.7 meter
		Fast	0.25 meter
Thru-beam Cable type	DSTC-200	Standard	2 meter
	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

Amplifier

Type	Mode	Specifications
Stand Alone Type	D2SA-MNS	2CH with Analogue, NPN
	D2SA-MPS	2CH with Analogue, PNP
	D2SA-MN3S	1CH, NPN
	D2SA-MP3S	1CH, PNP
	D2SA-MNS-M8	1CH, NPN, M8-QD
	D2SA-MPS-M8	1CH, PNP, M8-QD
Interconnect Type Master Units	D2SA-MN	2CH with Analogue, NPN
	D2SA-MP	2CH with Analogue, PNP
	D2SA-MN3	1CH, NPN
	D2SA-MP3	1CH, PNP
	D2SA-MN-M8	1CH, NPN, M8-QD
	D2SA-MP-M8	1CH, PNP, M8-QD
Interconnect Type Slave Units	D2SA-SN	2CH with Analogue, NPN
	D2SA-SP	2CH with Analogue, PNP
	D2SA-SN1	1CH, NPN
	D2SA-SP1	1CH, PNP

Remark (1) Lens attachment BL-W130L-1 will change the sensing distance of DSR-800 head as follows ;
Line Beam : Long mode / 2m, Standard/1.5m, Fast / 1m
Area Beam : Long mode / 1.5m, Standard / 1m, Fast / 0.6m

Remark (2) The MP-45 reflector is used when the sensing distance will be less than 10 meters.
MP45 : Long mode / 0.5 - 20m, Standard / 0.3 - 10m, Fast / 0.1 - 5m

Remark (3) The sensing distance of the DSD-100 is defined with a 200 x 200 mm white paper target.

Remark (4) Fast Mode is not available when using the "DSTA" sensing heads in Measurement Mode.
Measurement Mode is only possible when using the 2CH type amplifiers.

2 Amplifier Types (Standalone & Interconnect)

The Interconnect Type amplifiers are convenient when using multiple D2SA amplifiers in parallel.
8 amplifiers can be connected together if the ambient temperature does not exceed 50°C.
A maximum of 30 amplifiers can be connected together, the surrounding temperature must be 40°C or less.

The Interconnect Type amplifiers automatically provide Cross-talk prevention for up to 4 amplifiers.
The D2SA series amplifiers can be connected to Optex-FA's D2RF series fiber optic amplifiers.

Stand Alone type

Interconnect type
Cross-talk prevention for up to 4 amplifiers.

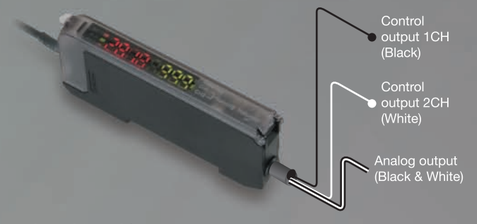
Programmable external input

The External input can be programmed to operate in one of the following modes.

- Remote teach
- Synchronizing signal input
- Laser OFF
- Counter reset

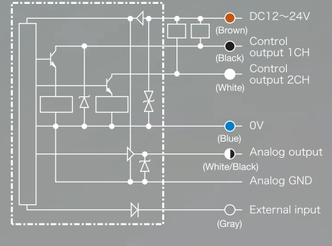
2 Independent outputs & Analog

2CH models have two digital outputs for control and/or alarm, there is also a 4~20 mA analog output. The external input can be configured to operate as needed.

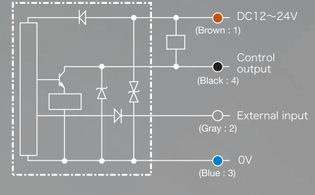


Wiring Diagram : (N = NPN, P=PNP)

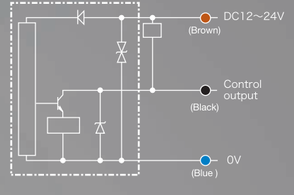
2CH output types
D2SA-MN(P)S / D2SA-MN(P) / D2SA-SN(P)



1CH, M8-QD types
D2SA-MN(P)S-M8, D2SA-MN(P)-M8

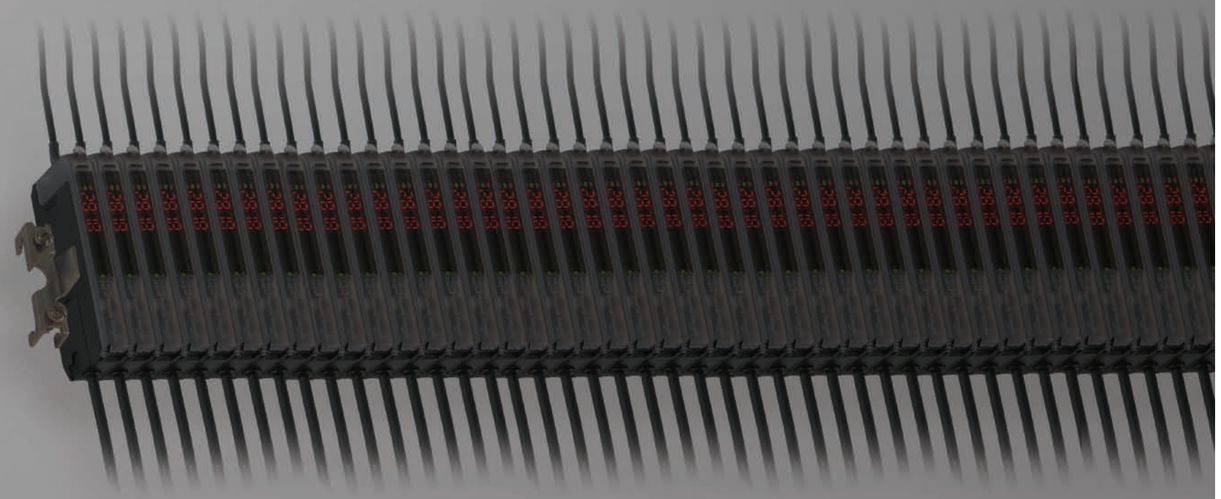


1CH types
D2SA-MN(P)3S / D2SA-MN(P)3 / D2SA-SN(P)1



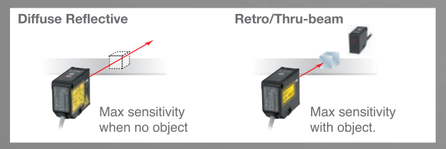
Remark Slave Unit "D2SA-S□□" is powered by Master unit, so power lines are not available.

The Interconnect Type Amplifiers (Master: D2SA-M, Slave: D2SA-S) can be connected in parallel to provide Cross-talk prevention as well as to transfer settings.
It is possible to connect a maximum of 30 amplifiers together. (12 VDC @ 40 °C ambient or less)



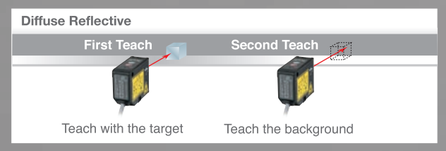
A choice of 6 convenient Teach functions to solve any application.

Single Point Teach



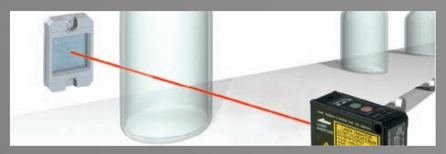
Use this teaching mode when no target is present.
Set the threshold so the sensor does not detect the background.

Two Point Teach



This is the basic setting method for the DSD-100 Diffuse Reflective type sensor. First teach with the target present and then teach the background. The threshold is then set between the target value and the background.

Transparent Object Teach

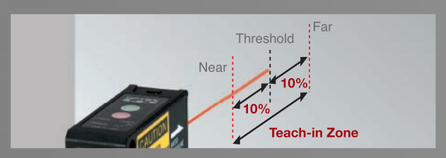


This mode is only for the DSR-800 Retro-Reflective sensor.
Teach without the target present so that the sensor is set to the maximum sensitivity, the DSR-800 is able to easily detect transparent film, bottles, glass, etc.

Automatic Teach

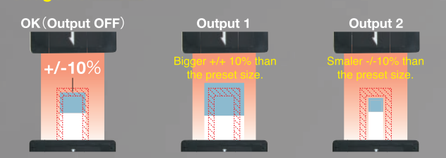
In this mode there is no reason to stop the conveyor. It is possible to teach the sensor while the product is running.

Zone Teach



Select the detection area. Use the Up / Down buttons to set the area within +/- 10%. After teaching this area can be increased or decreased by adjusting the settings.

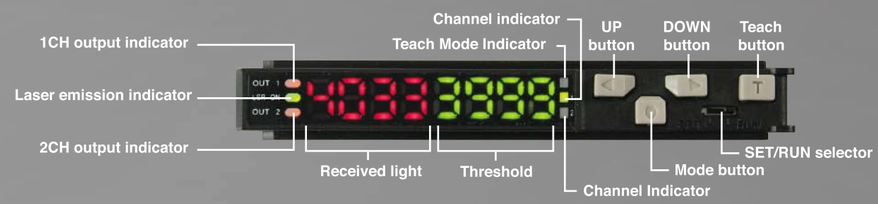
Judgement Teach



This function is exclusive to the DSTA-200 wide beam measurement sensing heads. Used to judge the size and width of a target within +/- 10% of the specified size. Even if the object position changes the sensor will detect it, so this is actually Area Teach.

Dual Digital Display

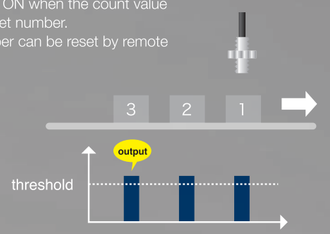
The Threshold value and the Reflected Light level are both indicated at the same time, setting the sensitivity is easy.



Counter Mode

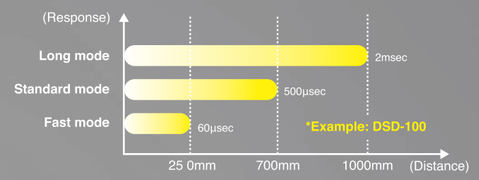
Counter Mode:

The output turns ON when the count value reaches the preset number.
The preset number can be reset by remote teach.



Response Time

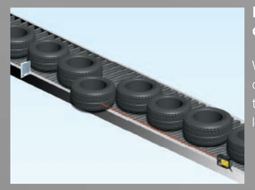
Select the sensing distance and response time based upon your application.



DSR-5000 : Max. 70 meter sensing distance (Long Mode with Sensitivity Compensation ON)

When used with the P250F reflector a 70 meter distance is possible.

When using the smaller MP-45 reflector the sensing distance will be reduced as indicated.



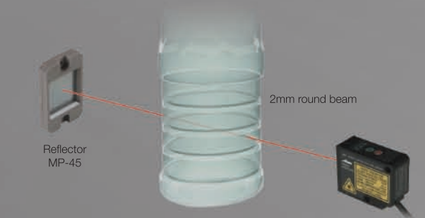
Detecting obstructions on a moving conveyor

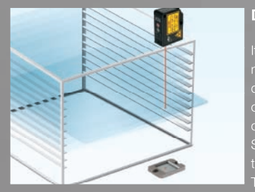
With a 70 meter sensing distance the DSR-5000 is able to detect obstructions along the length of a moving conveyor.

Long Mode : 0.5 - 20 meter
Standard Mode : 0.3 - 10 meter
Fast Mode : 1 meter

DSR-800 : Three kinds of spots are selectable

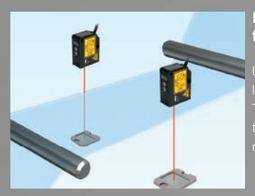
DSR-800 will successfully detect a clear glass object or PET bottle. 2mm of fine spot will help to secure the performance against the glass material thanks to "Glass Teach" function of Amplifier D2SA.





Disposition of glass plate

It's ideal. The DSR-800 has a 2 mm projected beam (at 2 meter distance) with coaxial optics, it can reliably detect even a slight disposition of the glass plate. Sensitivity setting is easy with the D2SA amplifier's Glass Teach setting.



Edge guiding transparent film

Use two DSR-800 sensors located on both sides of the film. The sensor is sensitive enough to detect a slight change in the received light.

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.

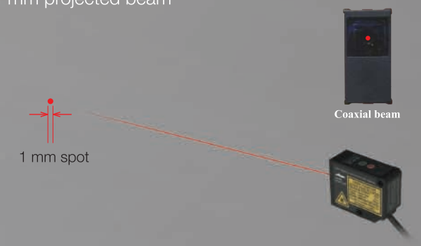
BL-W130-1 beam selector

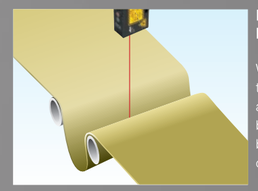
Printing on transparent glass

You can verify the presence of printing on glass by using the DSR-800 and the optional lens attachment BL-W130L-1. If using a small spot or a line type for detection this would not be possible.

DSD-100 : Diffuse Reflective sensor with 1.5 meter sensing distance.

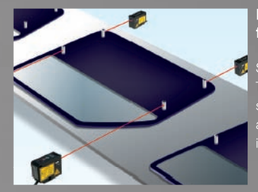
In the Long mode with Sensitivity Compensation ON, a 1.5 meter sensing distance is possible. Ideal for positioning applications due to the coaxial optics and 1 mm projected beam





Loop control of a rubber belt

With two independent outputs the D2SA amplifier can be used as a loop control on a rubber belt. The analog output can also be used to control the amount of the loop.

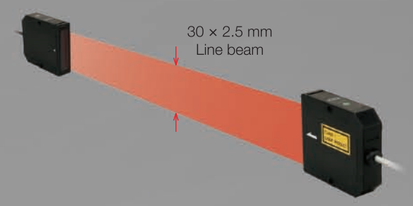


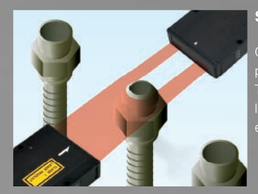
Detecting a small object from a distance

Safe sensing from a distance. This application is an example of sensing a metal part located on a glass plate in the automotive industry.

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.





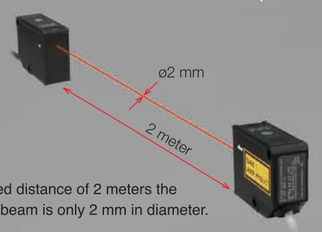
Sorting by size

Checking the shape of a metal part.
The DSTA-200 projects a parallel line beam, it can detect the part even if the position changes.

Finding a fine chip vacuumed by picker.

With a 30 mm wide projected beam it is possible to check for the presence of the object even if the position changes.

DSTC-200 : 2mm sharp and small spot



At the rated distance of 2 meters the projected beam is only 2 mm in diameter.

Counting wafers

The DSTC-200 is ideal for counting wafers in a cassette.
The 2 mm projected beam is small enough to pass between the wafers without worrying about stray reflections. The Counter function in the D2SA amplifier is convenient to verify that the correct number of wafers are present in the cassette.

Sensor Head

Specification

Model		Retro reflective type		Diffuse reflective type	Thru-beam beam type	Thru-beam / Measurement type
Cable		DSR-5000	DSR-800	DSD-100	DSTC-200 Emitter: DSTC-D Receiver: DSTC-200	DSTA-200 Emitter: DSTA-D 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		D2SA-M□□ / D2SA-M□-M8 / D2SA-S□□				
Light source		Visible light semiconductor laser 650nm				
Output		max. 3mW			max. 390μW	
IEC/JIS CLASS		CLASS 2			CLASS 1	
FDA CLASS		Class Ⅱ				
Detection distance	**Long**	0.5 - 50 m	8 m	1 m	2 m	2 m
***1**	**Standard**	0.3 - 35 m	5 m	0.7 m		Length measurement mode : 0.5 m (Only Long and Standard)
	Fast	0.1 - 20 m	2 m	0.25 m		
Spot size *2		Selectable see Page 5		Approx. 1 mmØ (Distance: 1 m)	Approx. 2 mmØ (Distance: 2 m)	Approx. 30 x 2.5 mm (Distance: 2 m)
Repeat accuracy *3		0.2 mm		0.2 mm	0.2 mm	0.3 mm
Indicator light		Laser radiation indictor light: Green Output indicator light: Orange				
Operating temperature/humidity		-10 to +55°C/35 to 85 %RH (No condensation or freezing)				
Store temperature/humidity		-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		PC (Case, Cover) PMMA / Glass (Front glass)				
Weight (including the codes) *4		45g			90g	115g

* 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%).
* 3 There may be leak light other than the specified spot size. The sensor may influenced when there is a highly reflective object around the targets
* 4 Right angle to sensing axis.
* 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 emitter and the detector.

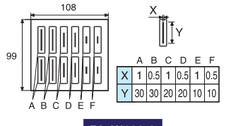
Options

MP-45
Standard reflector DSR-800

P250F
Long distance reflector DSR-5000

MP-225
Miniature reflector

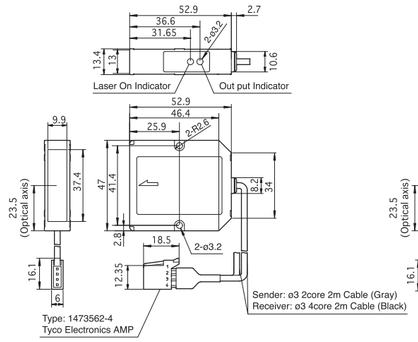
BL-W130L-1
Beam Selector



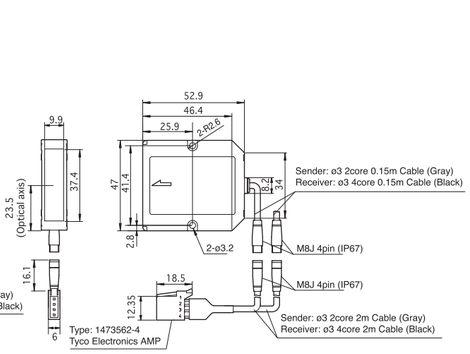
BL-W130-2
Slit Mask for DSTA-200 sensor head

DSL-8L04-2-130
M8-QD cable

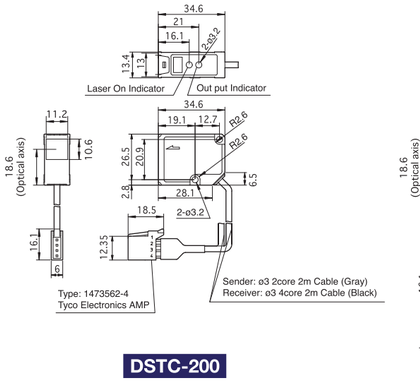
Dimensions (mm)



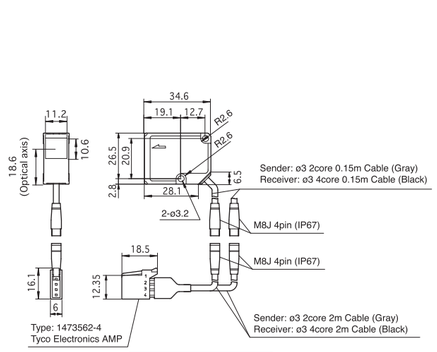
DSTA-200



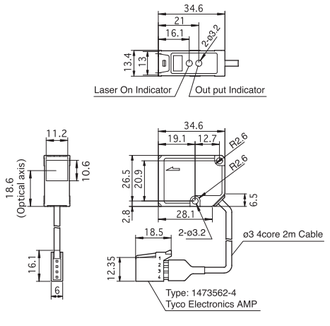
DSTA-200-M8



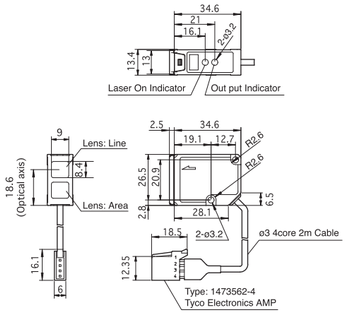
DSTC-200



DSTC-200-M8



DSR-800 / DSR-5000 / DSD-100



DSR-800 + Lens Attachment

Amplifier

1CH Output Type Specifications

Model	Stand-alone type	Interconnect type	
		Master Unit	Slave Unit
Cable type NPN(PNP)	D2SA-MN3S (MP3S)	D2SA-MN3 (MP3)	D2SA-SN 1(SP1)
M8 QD type NPN(PNP)	D2SA-MNS (MPS)-M8	D2SA-MN (MP)-M8	D2SA-SN (SP)-M8
Response Time	60µ /500µ /2msec (Fast/Standard/Long) selectable		
External Input	External Input (*1) : Select one among (1) teach (2) Synchronizing (3) Laser OFF, or (4) Reset Counter (This functrion is available only with M8-QD type except Slave unit of M8-DQ Type)		
Control Output	NPN or PNP Open collector, 100mA Max, residual voltage 1.8V Max		
Analogue Output	N/A		
Timer	On delay / Off delay / One Shot / No delay, 1msec to 9s (1ms increment)		
Output Mode	Light ON / Dark ON selectable		
Crosstalk Prevention	4pcs Max.		
Sensivity Adjustment	Teach-in (manual adjustment is possible)		
LED Display	Green (laser power), Orange (output), Red (teaching), Green (active CH)		
Digital Numerical Display	8 digits (7 segments)		
Current Consumption	45mA Max, 24V DC		
Power Source	12 - 24V DC +/- 10%, ripple 10%		
Operating Temp / Humidity (*3)	-25 to 55 C (-13 to 131 F) / 35 to 85% RH (no freezing)		
Store Temp / Humidity	-40 to 70 C (-40 to 158 F) / 35 to 85% RH (no condensation)		
Shock Resistance	50G (500m/S2) , XYZ 3-ways		
Protection Category	IEC IP50		
Materials	PC		

2CH Output Type Specifications

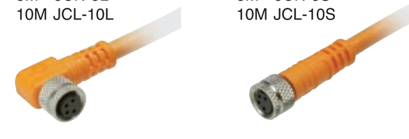
Model	Stand-alone type	Interconnect type	
		Master Unit	Slave Unit
Cable type NPN(PNP)	D2SA-MNS (MPS)	D2SA-MN (MP)	D2SA-SN (SP)
M8 QD type NPN(PNP)	-	-	-
Response Time	60µ /500µ /2msec (Fast/Standard/Long) selectable		
External Input	External Input (*1) : Select one among (1) teach (2) Synchronizing (3) Laser OFF, or (4) Reset Counter Control Output : 2CH, used as Control Output or Alarm output		
Control Output	NPN or PNP Open collector, 100mA Max, residual voltage 1.8V Max		
Analogue Output	4-20mA (*2)		
Timer	On delay / Off delay / One Shot / No delay, 1msec to 9s (1ms increment)		
Output Mode	Light ON / Dark ON selectable		
Crosstalk Prevention	4pcs Max.		
Sensivity Adjustment	Teach-in (manual adjustment is possible)		
LED Display	Green (laser power), Orange (output), Red (teaching), Green (active CH)		
Digital Numerical Display	8 digits (7 segments)		
Current Consumption	45mA Max, 24V DC		
Power Source	12 - 24V DC +/- 10%, ripple 10%		
Operating Temp / Humidity (*3)	-25 to 55 C (-13 to 131 F) / 35 to 85% RH (no freezing)		
Store Temp / Humidity	-40 to 70 C (-40 to 158 F) / 35 to 85% RH (no condensation)		
Shock Resistance	50G (500m/S2) , XYZ 3-ways		
Protection Category	IEC IP50		
Materials	PC		

* 1 The teach mode preset at ampliifer will be done with External Teach
* 2 Load impedence 300Ω Max
* 3 Up to 3pcs of interconnection. Up to 30 pcs with 40 C (104F) surroundings operated in 12V DC.

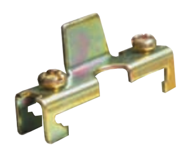
Options

2M JCN-L
5M JCN-5L
10M JCL-10L

2M JCN-S
5M JCN-5S
10M JCL-10S



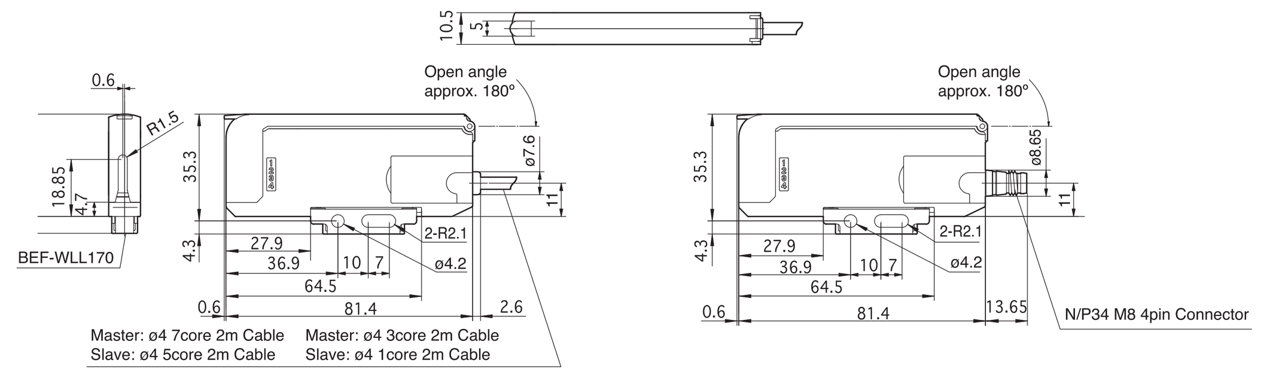
connector cable



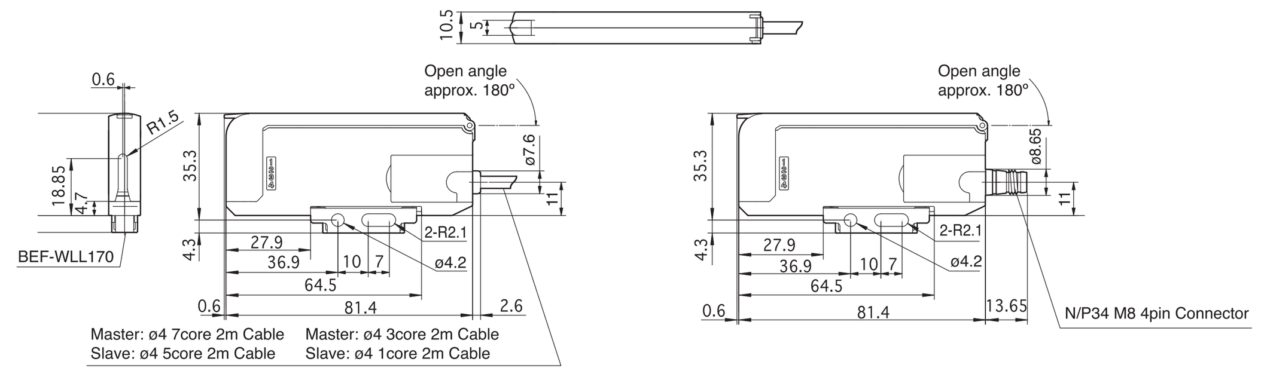
BEF-EB01-W190

Fixture terminal

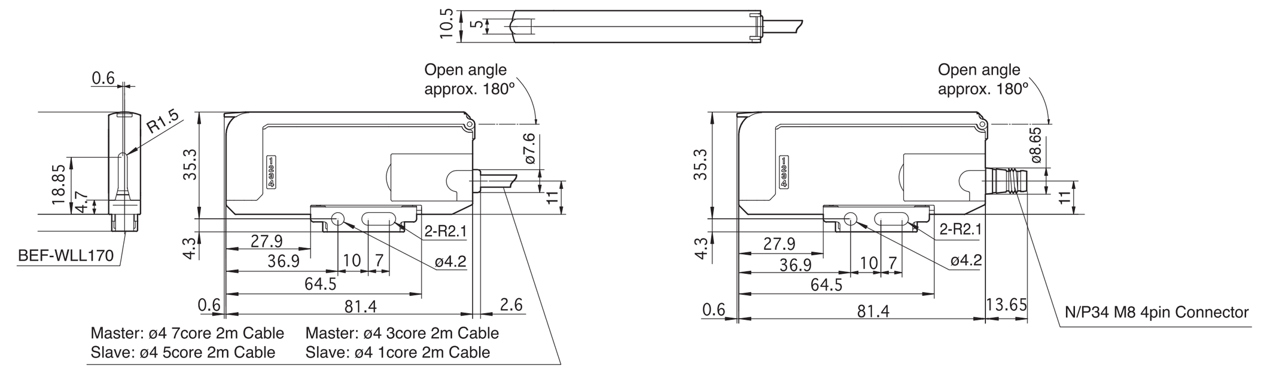
Dimensions (mm)



D2SA amplifiers (except D2SA-M□-M8) D2SA-M□-M8



D2SA amplifiers (except D2SA-M□-M8) D2SA-M□-M8



D2SA amplifiers (except D2SA-M□-M8) D2SA-M□-M8

Pin layout

DSA-M□-M8