

Laser Sensors

A laser light source is ideally suited for BGS sensing, it is also very good for transparent object detection. This type of sensor offers excellent repeat accuracy and performance.



Laser Sensor D2SA series

Sensor head Retro reflective type

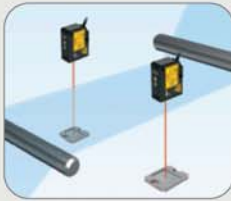
(Sensing distance : 2-8m) (Sensing distance : 0.1-50m)
 • DSR-800 • DSR-5000

Diffuse reflective type

(Sensing distance : 0.25-1m)
 • DSD-100

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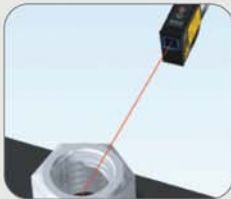
Applications



Edge guiding of Transparent film



Sensing transparent bags



Checking for the presence of threads



Locating a small IC chip held by a vacuum pickup

- **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

Type	Model	Mode	Sensing Distance
Retro Reflective	DSR-800 (Reflector MP45)	Long	8 meter (*1)
		Standard	5 meter
		Fast	2 meter
	DSR-5000 (Reflector P250F) (*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
		Standard	2 meter
	DSTA-200-M8	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
	D2SA-SN-M8	1CH, NPN, M8-QD
	D2SA-SP-M8	1CH, PNP, M8-QD

*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

*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

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

*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.

Thru-beam type

(Sensing distance : 2m) (Sensing distance : 0.5 - 2m)
 · DSTC-200 / - M8 · DSTA-200 / - M8

Amplifier

Stand alone type

· DSA-MNS / MN3S / MNS-M8
 · DSA-MPS / MP3S / MPS-M8

Interconnect type Master units

· D2SA-MN / MN3 / MN-M8
 · D2SA -MP / MP3 / MP-M8

Amplifier

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. (12VDC @ 40°C ambient or less)

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

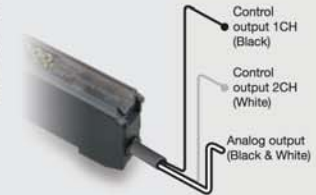
The External input can be programmed to operate in one of the following modes.

- 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.



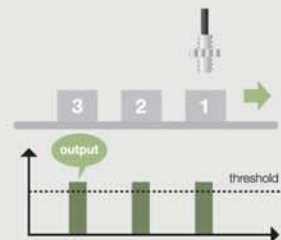
Dual Digital Display

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



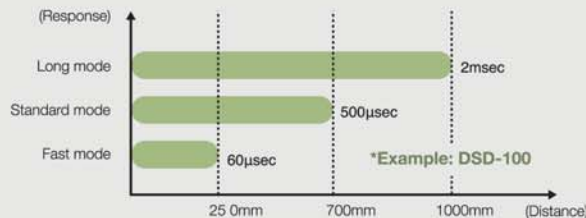
Counter Mode

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.



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.



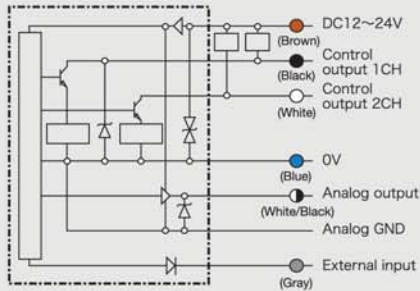
Interconnect type Slave units

- D2SA-SN / SN1 / SN-M8
- D2SA-SP / SP1 / SP-M8

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

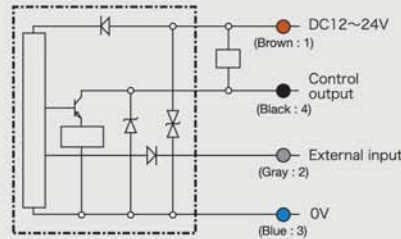
2CH output types

D2SA-MN(P)S / D2SA-MN(P) / D2SA-SN(P)



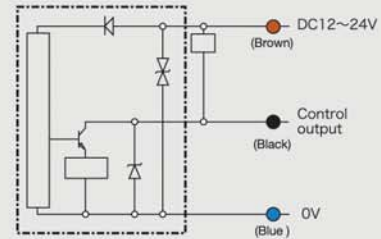
1CH, M8-QD types

D2SA-MN(P)S-M8, D2SA-MN(P)-M8



1CH types

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



*1 Slave Unit "D2SA-S???" is powered by Master unit, so power lines are not available.

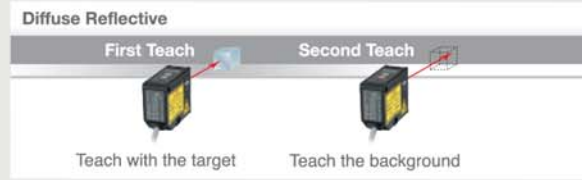
A choice of 6 convenient Teach functions to solve any application.

Single Point Teach



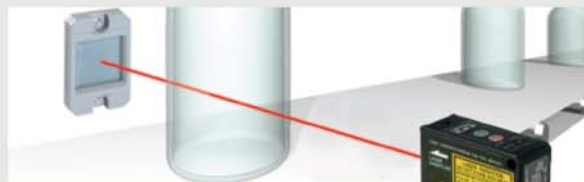
Use this teaching mode when no target is present. Set the threshold so the sensor does not detect the background.

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



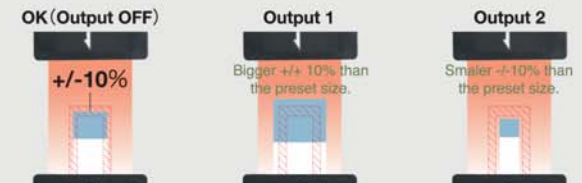
In this mode there is no reason to stop the conveyor. It is possible to teach the sensor while the product is running.

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.

Specifications

1CH Output Type Specifications

Model		Stand-alone type	Interconnect type	
			Master Unit	Slave Unit
Cable type	NPN	D2SA-MN3S	D2SA-MN3	D2SA-SN1
	PNP	D2SA-MP3S	D2SA-MP3	D2SA-SP1
M8 Connector type	NPN	D2SA-MNS-M8	D2SA-MN-M8	D2SA-SN-M8
	PNP	D2SA-MPS-M8	D2SA-MP-M8	D2SA-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 function 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)			
Operating mode	Light ON / Dark ON selectable			
Crosstalk prevention	4pcs Max.			
Sensitivity adjustment	Teach-in (manual adjustment is possible)			
LED Indicator	Green (laser power), Orange (output), Red (teaching), Green (active CH)			
Digital display	8 digits (7 segments)			
Power consumption	45mA Max, 24V DC			
Supply voltage	12 - 24V DC +/- 10%, ripple 10%			
Operating temp / humidity (*3)	-25 to 55 °C (-13 to 131 °F) / 35 to 85% RH (no freezing)			
Storage temp / humidity	-40 to 70 °C (-40 to 158 °F) / 35 to 85% RH (no condensation)			
Shock resistance	50G (500m/s ²) , 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	D2SA-MNS	D2SA-MN	D2SA-SN
	PNP	D2SA-MPS	D2SA-MP	D2SA-SP
M8 Connector 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)			
Operating mode	Light ON / Dark ON selectable			
Crosstalk prevention	4pcs Max.			
Sensitivity adjustment	Teach-in (manual adjustment is possible)			
LED Indicator	Green (laser power), Orange (output), Red (teaching), Green (active CH)			
Digital display	8 digits (7 segments)			
Power consumption	45mA Max, 24V DC			
Supply voltage	12 - 24V DC +/- 10%, ripple 10%			
Operating temp / humidity (*3)	-25 to 55 °C (-13 to 131 °F) / 35 to 85% RH (no freezing)			
Storage temp / humidity	-40 to 70 °C (-40 to 158 °F) / 35 to 85% RH (no condensation)			
Shock resistance	50G (500m/s ²) , XYZ 3-ways			
Protection category	IEC IP50			
Materials	PC			

* 1 The teach mode preset at amplifier will be done with External Teach

* 2 Load impedance 300Ω Max

* 3 Up to 3pcs of interconnection. Up to 30 pcs with 40 °C (104 °F) surroundings operated in 12V DC.

Options

JCN-S : M8 Straight type



JCN-L : M8 L-shape type



BEF-EB01-W190 : Fixture terminal



Laser Head Lineup (IP67 protection. Visible red laser for easy alignment)

Retro Reflective Type

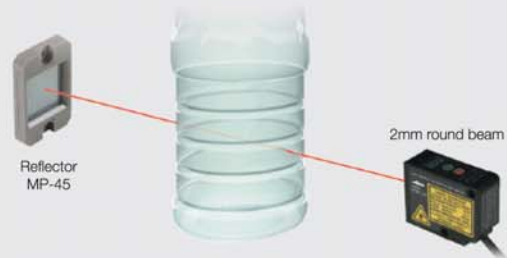
The DSR-800 projects a very small Spot beam that is only 2 mm in diameter. There is an optional lens attachment (BL-W130L-1) that can be used to change the projected beam into a 40 mm wide line or a large circular beam.

The DSR-5000 has a maximum sensing distance of 70 meters in the Long Distance mode. The sensing distance is determined by the Response time that has been selected. The DSR-800 is able to detect Glass and/or PET bottles up to a maximum distance of 8 meters. Both types will project a 2 mm diameter Spot beam at 2 meters.



DSR-800 : Three types of projected beams are possible.

The DSR-800 will reliably detect clear glass and/or PET bottles. The 2 mm diameter projected beam combined with the "Glass Teach" function insure that the detection of clear materials is easy to setup.



The projected beam of the DSR-800 can be changed to a Wide Line beam (40 x 1 mm), or Circular Area beam (35 x 35 mm) by using the optional lens attachment BL-W130L-1.



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

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



Diffuse Reflective Type

The DSD-100 has a maximum sensing distance of 1.5 meters in the Long mode. The co-axial beam provides accurate sensing regardless of the orientation of the workpiece.

With a 1 mm projected beam at 1 meter distance, it is possible to detect the target through a small opening.



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.



Thru-beam type

There are two models, the DSTC-200 (2 mm spot) or the DSTA-200 (30 x 2.5 mm line array). The DSTA-200 is a Measurement type sensor with a 30 mm wide beam. The 4 to 20 mA analog output can be used for measuring the size of objects. M8 QD connector models are available for easy maintenance.

The DSL-8L04-2-130 connecting cable is required for use with the M8 types.

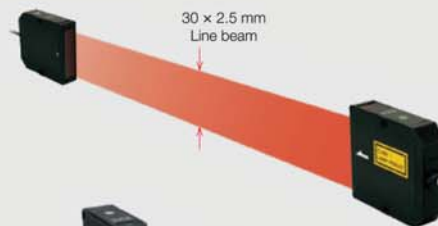


DSL-8L04-2-130, M8 QD cable for sensor head DSTA(C)-200-M8



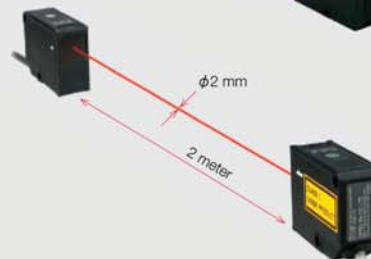
DSTA-200 : 30mm width Line Beam for sorting application with 4-20mA output.

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



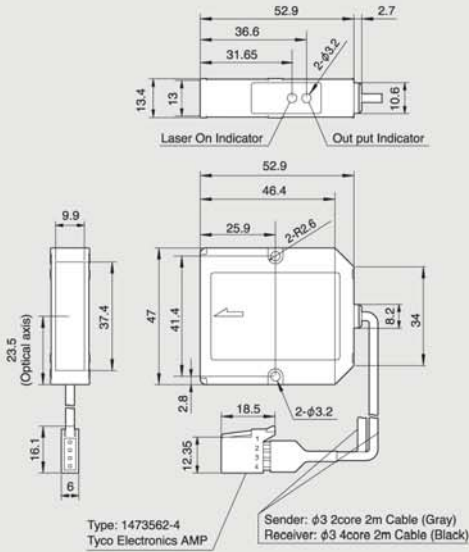
DSTC-200 : 2mm sharp and small spot

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

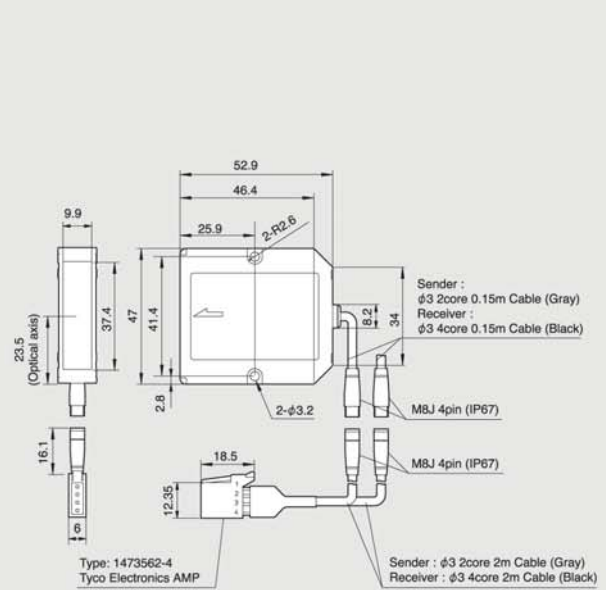


Laser Head Dimensions

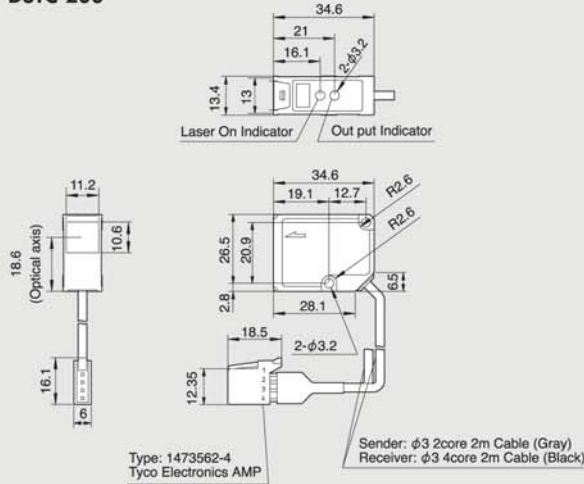
DSTA-200



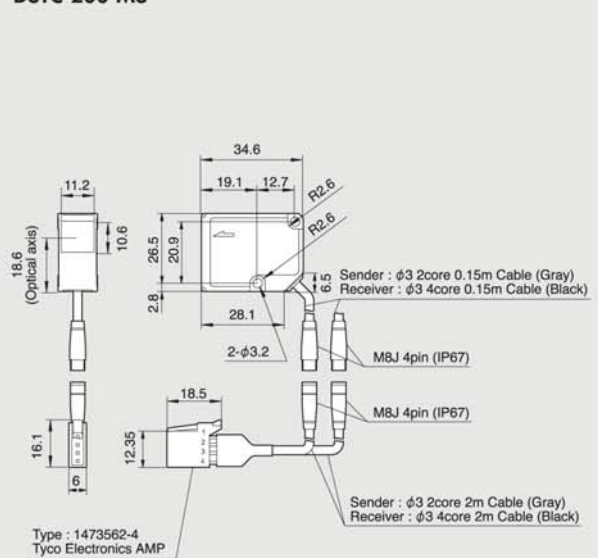
DSTA-200-M8



DSTC-200

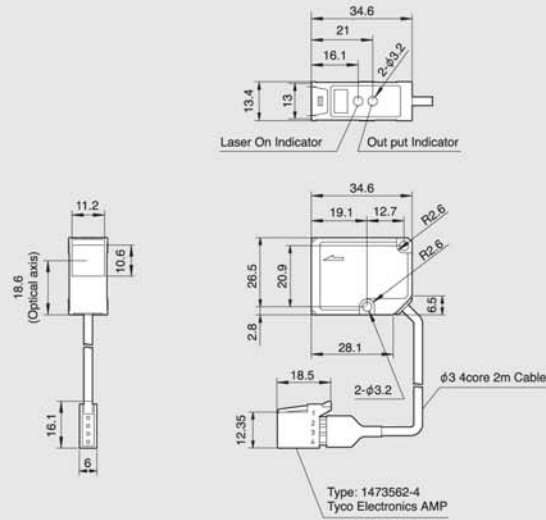


DSTC-200-M8

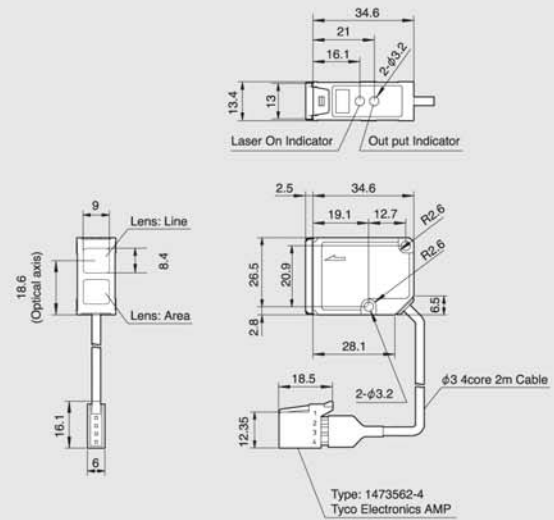


The sensing head dimensions for the DSR-5000, DSR-800 and DSD-100 are the same as the DSTC-200 with the exception of the cable.

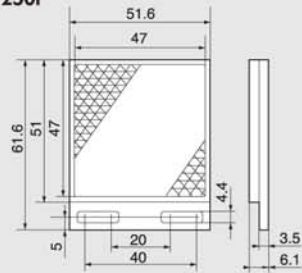
DSR-800 / DSR-5000 / DSD-100



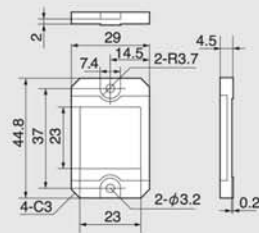
DSR-800 + Lens Attachment



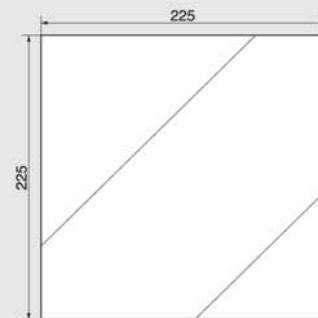
P250F



MP45



MP-225



(Unit : mm)

Specifications

Model	Cable	Retro-reflective type		Diffuse reflective type	Thru-beam type	Thru-beam / Measurement type
		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. 390W		
IEC / JIS CLASS	CLASS 2			CLASS 1		
FDA CLASS	Class II					
Sensing distance (*1)	Long	0.5 - 50 m	8 m	1 m		2 m
	Standard	0.3 - 35 m	5 m	0.7 m	2 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			Approx. 1 mmφ (Distance: 1 m)	Approx. 2 mmφ (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
LED Indicator	Laser radiation indicator light: Green Output indicator light: Orange					
Operating temp / humidity	-10 to +55°C/35 to 85 %RH (No condensation or freezing)					
Storage temp / humidity	-25 to +70°C/35 to 85 %RH (No condensation or freezing)					
Environmental illuminance	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 $1/e^2$ (13.5%).
There may be leak light other than the specified spot size. The sensor may be influenced when there is a highly reflective object around the target.
- * 3 Right angle to sensing axis.
- * 4 The weights of DSTC-200 and DSTA-200 include the emitter and the receiver.
* For the model M8-QD type, replacement is available only for the emitter and the detector.

Class II , FDA Regulation

The D2SA series conforms to FDA Class II .



Options

MP-45 : Standard reflector for DSR-800



P250F : Long distance reflector for DSR-5000



MP225 : Large reflector

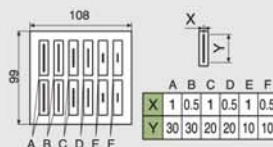


225 x 225mm
Free-cut reflector
sheet of MP45 material.

BL-W130L-1 : Beam Selector



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



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

