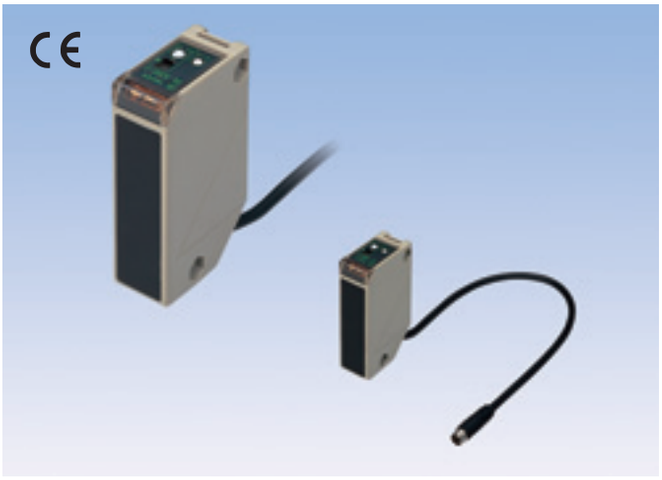
DL-S series

Background suppression photo sensors



- High-intensity red LED for ease of light axis adjustment <DL-S100R (-J)>
- Light intensity for long distance offering adverse environment
- Compact size and enhanced functions
- IP 66 protective structure

Type

Type	Detecting distance	Model	Operation mode	Output mode	Power supply
Long-range	0.2～1 m	**DL-S100R**	Light-ON/ Dark-ON selectable (with switch)	NPN/PNP open collector 2 outputs	12-24VDC
		DL-S100R-J			
	0.2～2 m	**DL-S202(R)**			
		DL-S202-J			

Optional parts

Type	Model	Shape
Special mounting bracket	**AC-BDL1**	Vertical mounting
	AC-BDL2	Back mounting
Cord with M8 connector	**FBC-4R2S**	Straight
	FBC-4R2L	Angled

Panel display and functions

Operation indicator (red)

Illuminated when output is activated. High-intensity red LED for excellent visibility.

Light-ON/Dark-ON selector switch

Turn the switch to L.ON or D.ON for Light-ON or Dark-ON mode respectively.
Be sure to turn all the way to the end.

Stability indicator (green)

Illuminated when received light intensity is about 120% of operation level or higher. Use of the sensor at an operation level allowing illumination of the stability indicator ensures stable detection.

Distance setting indicator

The position on the distance setting scale is shown in accordance with the 5-turn sensitivity adjustment, allowing easy reading of setting during fine-tuning.

Distance adjustment

5-turn adjustment is employed for easy fine-tuning of detecting position. Turn to FAR or NEAR for longer or shorter detecting distance respectively.

Rating/Performance/Specification

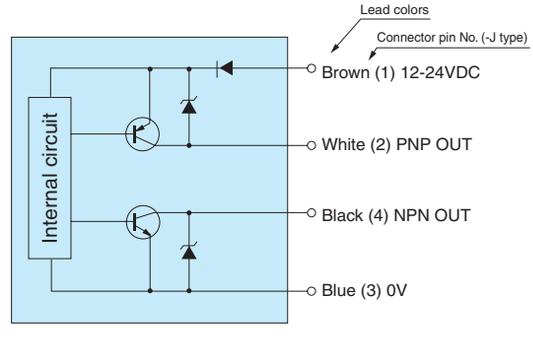
	Model	DL-S100R	DL-S100R-J	DL-S202(R)	DL-S202-J
Rating/performance	Detection method	Distance limited reflection			
	Range	0.2 – 1m (with 200×200mm white drawing paper)		0.2 – 2m (with 200×200mm white drawing paper)	
	Detecting distance	0.1 – 1m (with adjustment at MAX.)		0.1 – 2m (with adjustment at MAX.)	
	Power supply	12-24V DC ±0% / Ripple 10% or less			
	Current consumption	30mA max.			
	Output mode	NPN/PNP open collector 2 outputs Rating: 100 mA (30 VDC) max. NPN: sink current / PNP: source current			
	Operation mode	Light-ON/Dark-ON selectable (with switch)			
	Response time	2 ms max.			
	Hysteresis	10% max of detecting distance			
Specification	Light source	Red LED (650 nm)		Infrared LED (880 nm)*	
	Light-sensitive element	2-division photodiode			
	Indicator	Red LED: operation indicator / Green LED: stability indicator			
	Volume (VR)	NEAR/FAR: 5-turn optical distance adjustment			
	Switch (SW)	Light-ON/Dark-ON selector switch			
	Short circuit protection	Provided			
	Material	Case and lens: polyarylate			
	Connection	Permanently attached cord (Outer dimension: dia.4) 0.2sq. 4 core 2m length	Cord with M8 connector (cord: Outer dimension: dia.4 0.2sq. 4 core 3m length End: M8 4-pin connector)	Permanently attached cord (Outer dimension: dia.4) 0.2sq. 4 core 2m length	Cord with M8 connector (cord: Outer dimension: dia.4 0.2sq. 4 core 3m length End: M8 4-pin connector)
	Mass	100g max.	60g max.	100g max.	60g max.

*Red LED type (R added at the end of model No.) separately available

Environmental Specification

Environmental specification	Ambient light	Sunlight: illumination on light receiving surface 10,000 lx max. Incandescent lamp: illumination on light receiving surface 3,000 lx max.
	Ambient temperature	–25 - +55°C (non-freezing)
	Ambient humidity	35-85%RH (non-condensing)
	Noise	Power supply line: 250 V / Cycle: 10 ms / Pulse width: 1 μs Radiation: 1 kV / Cycle: 10 ms / Pulse width 1 μs (with noise simulator)
	Protective structure	IP66
	Vibration	10-55 Hz / 1.5 mm amplitude / 2 hours each in 3 directions
	Shock	500 m/s² / 3 times each in 3 directions
	Dielectric withstanding	1,000 VAC for 1 minute
	Insulation resistance	500 VDC, 20 MΩ or higher

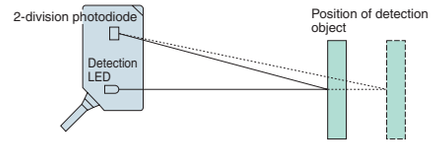
Input/Output Circuit and Connection



- The output transistor turns off when load short circuit or overload occurs. Check the load and turn the power back on.

Distance detection with 2-division photodiode

While ordinary reflective-type sensors operate based on the received light intensity, sensors with 2-division photodiode judge distances based on the angle of the received light.
This makes sensors with 2-division photodiode to be less susceptible to variation in the received light intensity due to change of the color or material of the detection object, reflection on the background or soiling of the sensors, allowing stable detection.



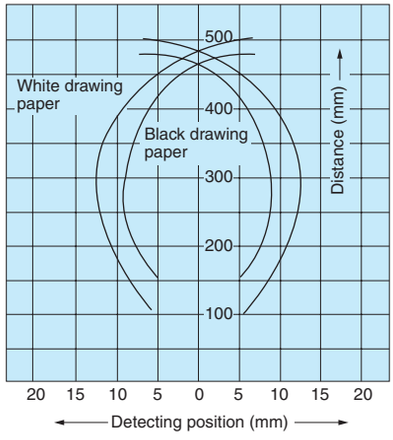
Detection based on change of angle of received light according to change of distance from detection object.

DL-S

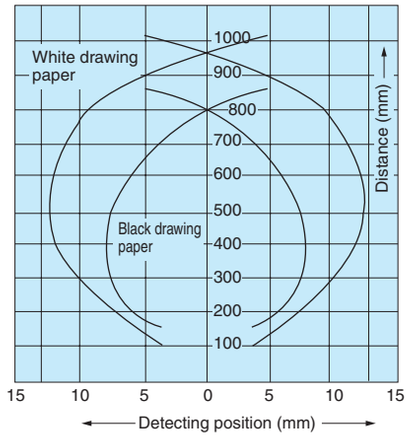
Model: DL-S100R Characteristics (Typical Example)

- Activation area characteristics

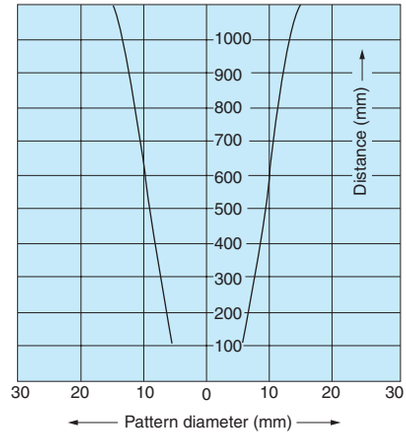
With 200×200mm white paper at 500 mm



With 200×200mm white paper at 1 m

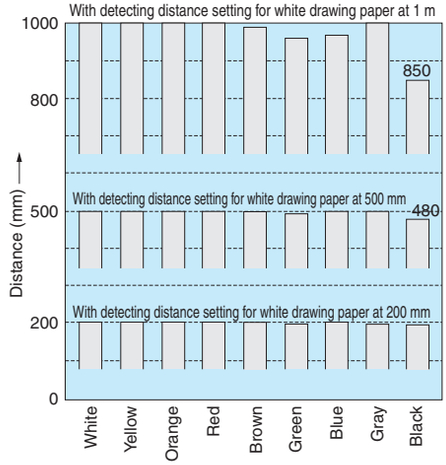


- Emitted light beam diameter

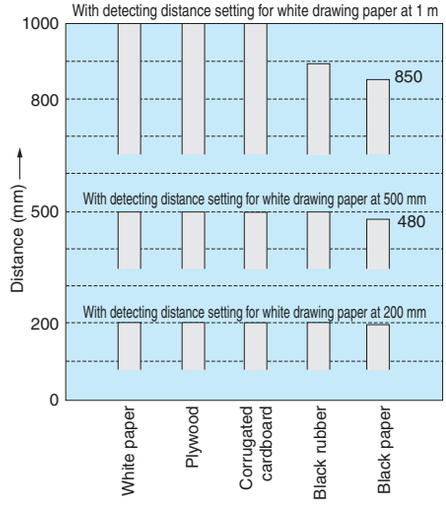


- Color paper detecting distance

150×150mm color paper



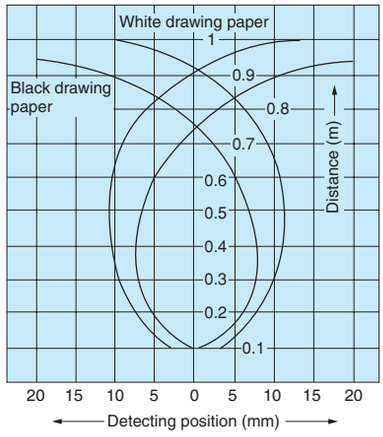
- Detecting distance by material



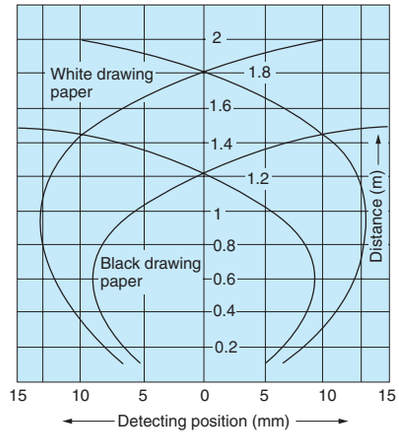
Model: DL-S202R Characteristics (Typical Example)

- Activation area characteristics

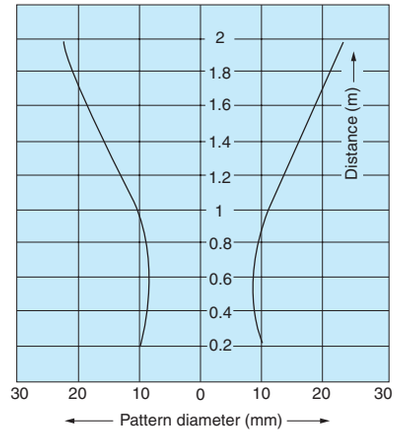
With 200×200mm white paper at 1 m



With 200×200mm white paper at 2 m

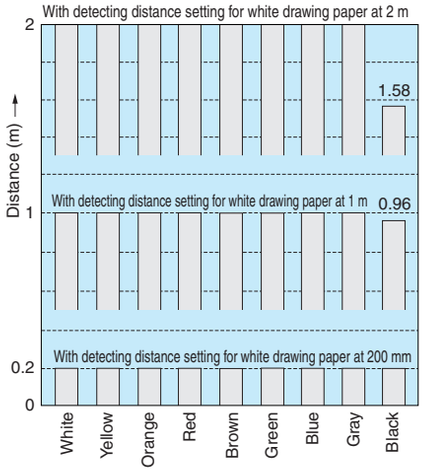


- Emitted light beam diameter

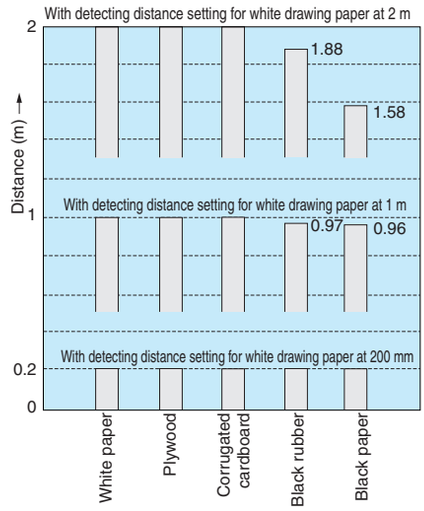


- Color paper detecting distance

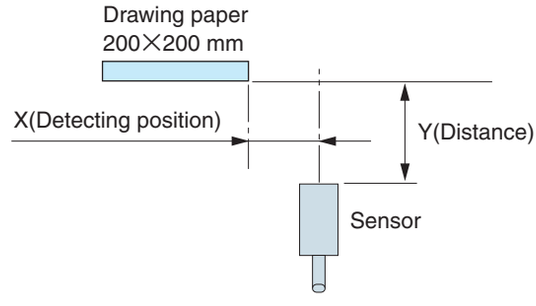
150×150mm color paper



- Detecting distance by material



Activation area characteristics

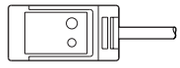


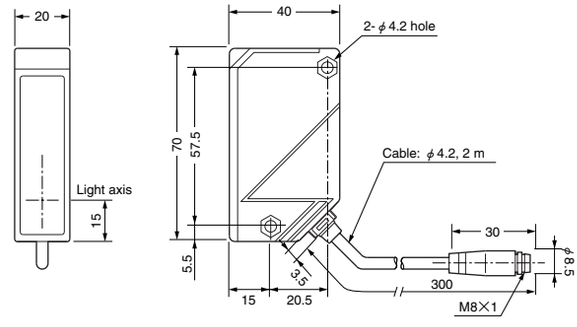
DL-S

Dimensions (in mm)

Body
DL-S100R(-J)
DL-S202(R)(-J)

CAD



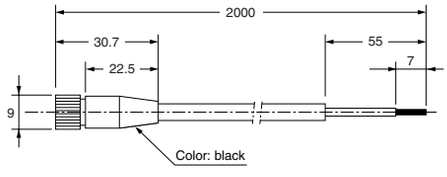


With M8 connector (-J type)

Cord with M8 connector (optional)

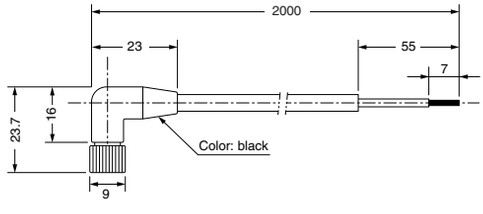
FBC-4R2S (straight)

CAD



FBC-4R2L (angled)

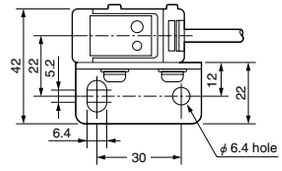
CAD

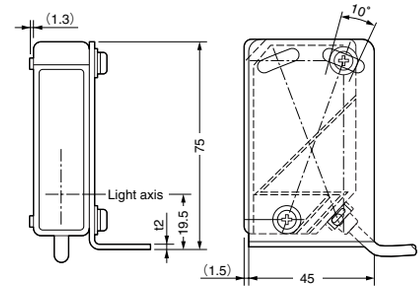


Special mounting bracket (optional)

CAD

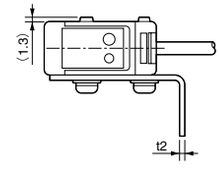
With mounting bracket
AC-BDL1 (vertical)
attached

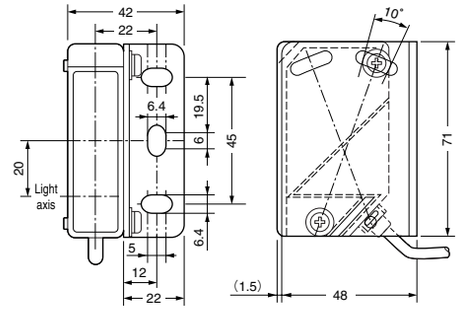




With mounting bracket
AC-BDL2 (back)
attached

CAD



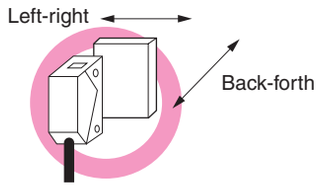


For Correct Use

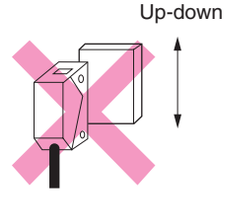
Be sure to follow the instructions in the operation manual provided for correct use of the product.

• Detecting direction

The 2-division photodiode has directionality and the sensor may not be used in a certain direction. The direction of movement of the object must be as shown in the figure.



Permitted direction



Prohibited direction

Up-down movement shown in the figure may be allowed within the detecting distance set with the distance adjustment.

• Background

Any glossy or mirror-like object present in the background of the detection object may cause faulty operation depending on the angle of the background. In such cases, mount the sensor at an angle.

• Stability indicator

The stability indicator does not show the margin of distance but intensity of light with reference to the operation level. The distance at which the indicator is illuminated/not illuminated may vary depending on the reflectance of the detection object. Situations in which the stability indicator is not illuminated may cause unstable detection.

- Do not use the sensor for protection of human body.
- For safety applications, ensure safe operation of the detection and control system as a whole.