

- Thank you for using TAKEX products.
- Please read this manual carefully prior to sensor use.

### SPECIFICATIONS



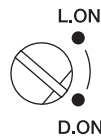
Type		Short range type						Middle range type				
Model	NPN type	DL-S3R	DL-S4R	DL-S5R	DL-S3	DL-S4	DL-S5	DL-S10R	DL-S10	DL-S15	DL-S20R	DL-S20
	PNP type	DL-S3RPN	DL-S4RPN	DL-S5RPN	DL-S3PN	DL-S4PN	DL-S5PN	DL-S10RPN	DL-S10PN	DL-S15PN	DL-S20RPN	DL-S20PN
Detection method		Distance convergent beam										
Range ※1		10-30mm	10-40mm	10-50mm	10-30mm	10-40mm	10-50mm	10-100mm	10-100mm	10-150mm	10-200mm	10-200mm
Adjustable range		-20% from the Maximum range			-20% from the Maximum range			-10% from the Maximum range				
Power supply		12-24VDC ±10% Ripple 10% (Max.)										
Current consumption		NPN type : 27mA or less / PNP type : 35mA or less			NPN type : 27mA or less / PNP type : 30mA or less			NPN type : 30mA or less / PNP type : 33mA or less				
Output mode	control output	NPN open collector Rating : sink current 100mA (30VDC) or less.										
	output	PNP open collector Rating : source current 100mA (30VDC) or less.										
	stability output	NPN open collector Rating : sink current 30mA (30VDC) or less.										
	output	Not available										
Operation mode		Light-on / Dark-on selectable (By exclusive switch)										
Response time		0.35 ms (Max.)										
Hysteresis		5% (Max.)										
Light receiving element		Red LED (700nm)			Infrared LED (880nm)			Red LED (700nm)	Infrared LED (880nm)		Red LED (650nm)	Infrared LED (880nm)
Sensing cell		Half-dividing photodiode										
LED indicator		Operating LED : Red LED, Stability LED : Green LED										
Volume (VR)		Potentiometer VR										
Switch (SW)		Light-on / Dark-on selectable switch										
Short circuit protection		Provided (for control output only)										
Material		Case and Lens : Polyarylate						Case : heat resistant ABS Lens : Polyethersulfon				
Connection	NPN type	Cable type (outer dimension : dia. 3.0mm) 0.15mm <sup>2</sup> 4cores 2m (black)						Cable type (outer dimension : dia. 4.0mm) 0.2mm <sup>2</sup> 4cores 2m (black)				
	PNP type	Cable type (outer dimension : dia. 3.0mm) 0.15mm <sup>2</sup> 3cores 2m (black)						Cable type (outer dimension : dia. 3.0mm) 0.2mm <sup>2</sup> 3cores 2m (black)				
Weight		50g (Max.)						80g (Max.)				
Notes		※1 50×50mm White paper for short range type, 100×100mm White paper for middle range type.										

### ENVIRONMENT

Ambient light	Withstands 5,000 lx
Operating temp.	-25-+55°C (non-freezing)
Humidity	35-85% RH (non-condensing)
Case protection	IP67
Vibration	10-55Hz 1.5mm Amplitude, 2 hours, X.Y.Z direction
Shock	500m/s <sup>2</sup> , 3 times, X.Y.Z direction

### OPERATING MODE

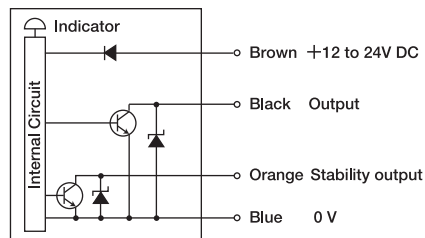
- Selectable switch  
(Light-on mode) Turn the L.ON side.
- (Dark-on mode) Turn the D.ON side.



### OUTPUT CIRCUIT

- Control output is equipped with short-circuit protection. The output transistor turns off when load short circuit or overload. Check the load and restart the power supply to reset the output.

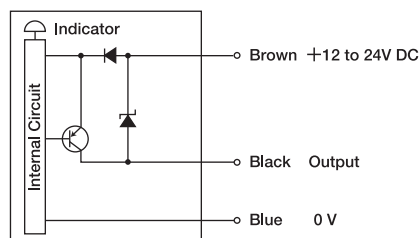
#### (NPN OUTPUT)



- Stability output is not equipped with short circuit protection.

- When the stability output (orange cable) is not used, do not connect other line or take the insulation processing of the cable.

#### (PNP OUTPUT)

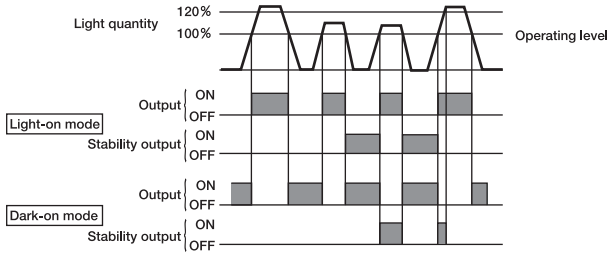


- Stability output is not available for PNP output type.

## HOW TO USE STABILITY OUTPUT (NPN type only)

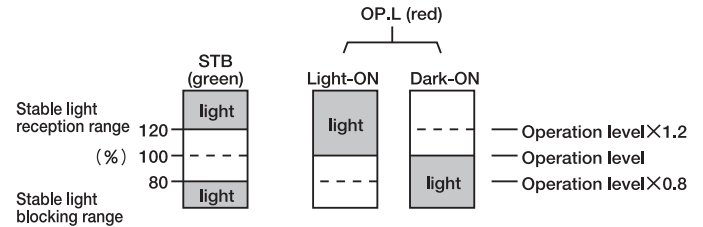
The stability output can be used to check for reduction of the light intensity level along with any change in the operating environment or operation over time or to perform initial check of the operation. When detection has occurred with the level of received light exceeding the operation level but not reaching 120% of the level (stable operation over the level), the stability signal is output when the control output is deactivated.

(The stability output is not built in PNP output model.)



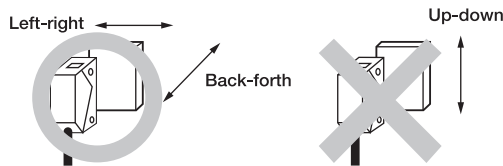
## INDICATOR

- The operation indicator (red LED) and stability indicator (green LED) show the levels of light intensity as described in the figure.
- After aligning the optical axis and adjusting the distance, use a detection object to block and unblock the light beam several times to make sure that the distance is in a range that allows stable activation and deactivation.
- This setting achieves higher reliability against changes in the operating environment generated over time.



## DETECTING DIRECTION

The 2 segment 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.



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

## SETTING

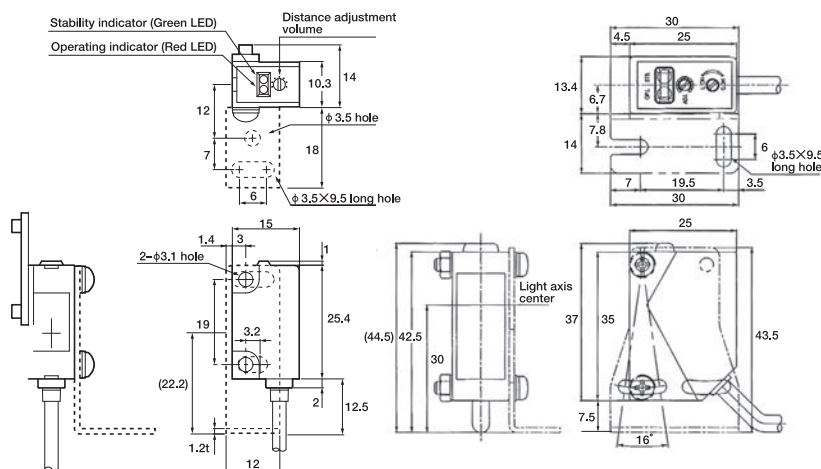
(For Light-ON mode)

- Turn the distance adjustment volume clockwise to the end and the detection distance will be set at the maximum of the specifications.
- Install the sensor so that detecting objects are within the set detection distance. Adjust the volume if the sensor detects the background.
- Confirm the both operation indicator (red LED) and stability indicator (green LED) turn on when the sensor detects an object.
- The distance adjustment volume will decrease the range by 10% for Middle range type and 20% for Short range type respectively.
- 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 object. In such case, mount the sensor at an angle.

## DIMENSIONS (unit : mm)

DL-S3  
DL-S3R  
DL-S4  
DL-S4R  
DL-S5  
DL-S5R

DL-S10  
DL-S10R  
DL-S15  
DL-S20  
DL-S20R



## NOTES

- In cleaning the lens and the case, be sure to use a dry cloth and gently wipe off dusts from them. Do not use thinner or alcohol.
- Do not switching on and off the power source continuously.
- Do not use the sensor at the place with water being sprayed at all times or under the water.
- Don't wire together with power lines.
- Use DC power unit equipped with an insulated transformer. When using switching regulator, ground the frame ground FG.
- Fluorescent lamps and inverters may cause faulty operations.
- Use cable 0.3mm<sup>2</sup> (or more in diameter) for extension.
- Tightening torque is 0.6N·m. (Max.) when mounting by the screw.
- Use with UL class 2 power supply when use the sensor as an UL approved product.
- Do not use the sensor for the purpose of life saving or preventing injuries.

- This sensor is designed to detect a specific object. It is not provided with control functions for prevention of injuries or accidents in itself.
- Takex will not held responsible for any damage or loss incurred due to accidents, faulty installation, abuse, misuse, improper maintenance or acts of God including lightning surge.
- Specifications and dimensions may be subject to change without notice.