

## Upgraded cylindrical( $\phi$ 18mm) photoelectric sensor

### Features

- Realizes long installation distance (20m) (Through-beam type)
- Superior noise resistance with digital signal processing
- High-speed response time under 1ms
- Built-in reverse power polarity and short-circuit (overcurrent) protection circuit
- Suitable for sensing in narrow space (Narrow beam type)
- External sensitivity adjustment (except Through-beam type)
- Light ON, Dark ON switchable by control wire (white) (except Through-beam type)
- Excellent environment-resistance performance with glass lens (BR4M)
- Protection structure IP66 (IEC standard)

**⚠ Please read "Caution for your safety" in operation manual before using.**



Connector Type

### Specifications

\* The model name with '-C' is connector type.

Model	NPN open collector	BRP100-DDT	BR100-DDT	BRP400-DDT	BR400-DDT	BRP200-DDTN	BR200-DDTN	BRP3M-MDT	BR3M-MDT	BR4M-TDTD	BR4M-TDTL
		BRP100-DDT-C	BR100-DDT-C	BRP400-DDT-C	BR400-DDT-C	BRP200-DDTN-C	BR200-DDTN-C	BRP3M-MDT-C	BR3M-MDT-C	BR4M-TDTD-C	BR4M-TDTL-C
Model	PNP open collector	BRP100-DDT-P	BR100-DDT-P	BRP400-DDT-P	BR400-DDT-P	BRP200-DDTN-P	BR200-DDTN-P	BRP3M-MDT-P	BR3M-MDT-P	BR4M-TDTD-P	BR4M-TDTL-P
		BRP100-DDT-C-P	BR100-DDT-C-P	BRP400-DDT-C-P	BR400-DDT-C-P	BRP200-DDTN-C-P	BR200-DDTN-C-P	BRP3M-MDT-C-P	BR3M-MDT-C-P	BR4M-TDTD-C-P	BR4M-TDTL-C-P
Sensing type		Diffuse reflective			Narrow beam reflective		Retroreflective		Through-beam		
Sensing distance		100mm(★1)		400mm(★2)		200mm(★2)		0.1 to 3m(★3)		4m / 20m	
Sensing target		Translucent, Opaque materials						Opaque materials of min. $\phi$ 60mm		Opaque materials of min. $\phi$ 15mm	
Hysteresis		Max. 20% at rated setting distance									
Response time		Max. 1ms									
Power supply		12-24VDC $\pm$ 10% (Ripple P-P : Max. 10%)									
Current consumption		Max. 45mA									
Light source		Infrared LED(940nm)	Infrared LED(850nm)			Red LED(660nm)		Infrared LED(850nm)			
Sensitivity adjustment		Adjustable (VR)								Fixed	
Operation mode		Selectable Light ON or Dark ON by control cable (White)								Dark ON	Light ON
Control output		• NPN open collector output $\Rightarrow$ Load voltage : Max. 30VDC, Load current : Max. 200mA, Residual voltage : Max. 1V • PNP open collector output $\Rightarrow$ Output voltage : Min. power voltage-2.5V, Load current : Max. 200mA									
Protection circuit		Reverse polarity protection circuit, Output short-circuit protection circuit									
Indicator		Operation indicator : Red LED, Power indicator : Red LED (only for emitter of through-beam type)									
Connection		Outgoing cable									
Insulation resistance		Min. 20M $\Omega$ (at 500VDC megger)									
Noise resistance		$\pm$ 240V the square wave noise (pulse width : 1 $\mu$ s) by the noise simulator									
Dielectric strength		1000VAC 50/60Hz for 1 minute									
Vibration		1.5mm amplitude at frequency of 10 to 55Hz (for 1 min.) in each of X, Y, Z directions for 2 hours									
Shock		500m/s <sup>2</sup> (50G) in X, Y, Z directions for 3 times									
Ambient illumination		Sunlight : Max. 11,000lx, Incandescent lamp : Max. 3,000lx (Receiver illumination)									
Storage temperature		-10 to 60 $^{\circ}$ C (at non-freezing status) Storage : -25 to 75 $^{\circ}$ C									
Ambient humidity		35 to 85%RH, Storage : 35 to 85%RH									
Protection		IP66 (IEC standard)									
Material		• Case $\Rightarrow$ BRP : PA (Black) BR : Brass, Ni-plate (BR-C : Ni-plate) • Sensing part $\Rightarrow$ PC					• Case $\Rightarrow$ BRP3M : PA (Black) BR3M : Brass, Ni-plate (BR-C : Ni-plate) • Sensing part $\Rightarrow$ Acrylic			• Case $\Rightarrow$ Brass, Ni-plate (BR-C : Ni-plate) • Sensing part $\Rightarrow$ BR4M : Glass BR20M : PC	
Cable		$\phi$ 5mm, 4P, Length:2m (Emitter of through-beam type: $\phi$ 5mm, 2P, Length:2m / Receiver: $\phi$ 5mm, 3P, Length:2m) (AWG 22, Core wire diameter : $\phi$ 0.08, Number of core wire : 60, Insulator out diameter : $\phi$ 1.2)									
Accessory	Separate	VR adjustment driver					VR adjustment driver, Reflector (MS-2)				
	Common	BR : Fixing nuts, Washer / BRP : Fixing nuts									
Approval		<b>CE</b>									
Unit weight		• BRP Series : Approx. 100g, BR Series : Approx. 120g • BRP-C Series : Approx. 20g, BR-C Series : Approx. 35g					• BR Series: Approx. 300g • BR-C Series: Approx. 110g				

\* (★1) Non-glossy white paper 50 $\times$ 50mm (★2) Non-glossy white paper 100 $\times$ 100mm.

(★3) Sensing distance and sensing target for Retroreflective type is rated based on reflector (MS-2). Sensing distance indicates possible reflector setting range. Sensing under 0.1m is also available.

(A) Photo electric sensor

(B) Fiber optic sensor

(C) Door/Area sensor

(D) Proximity sensor

(E) Pressure sensor

(F) Rotary encoder

(G) Connector/Socket

(H) Temp. controller

(I) SSR/Power controller

(J) Counter

(K) Timer

(L) Panel meter

(M) Tacho/Speed/Pulse meter

(N) Display unit

(O) Sensor controller

(P) Switching power supply

(Q) Stepping motor & Driver & Controller

(R) Graphic/Logic panel

(S) Field network device

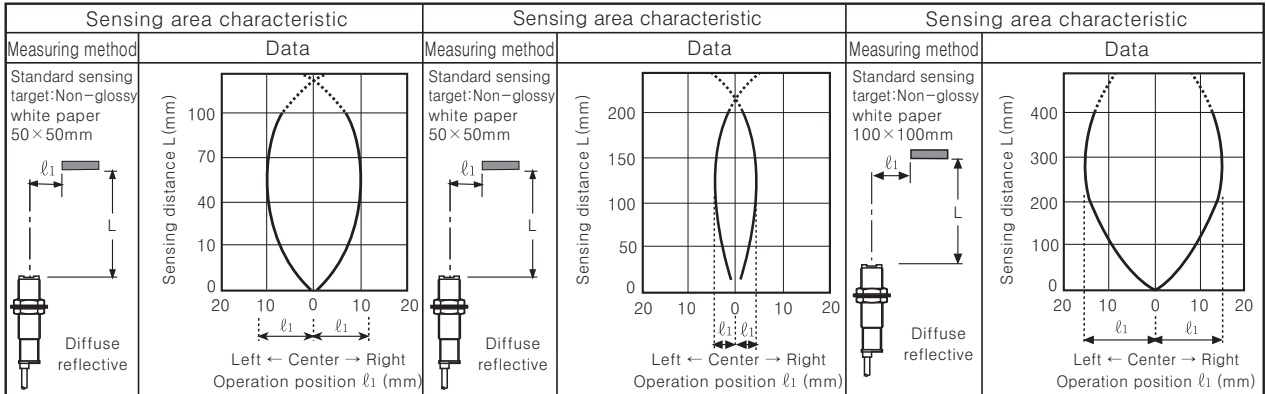
(T) Production stoppage models & replacement

# BR Series

## Feature data

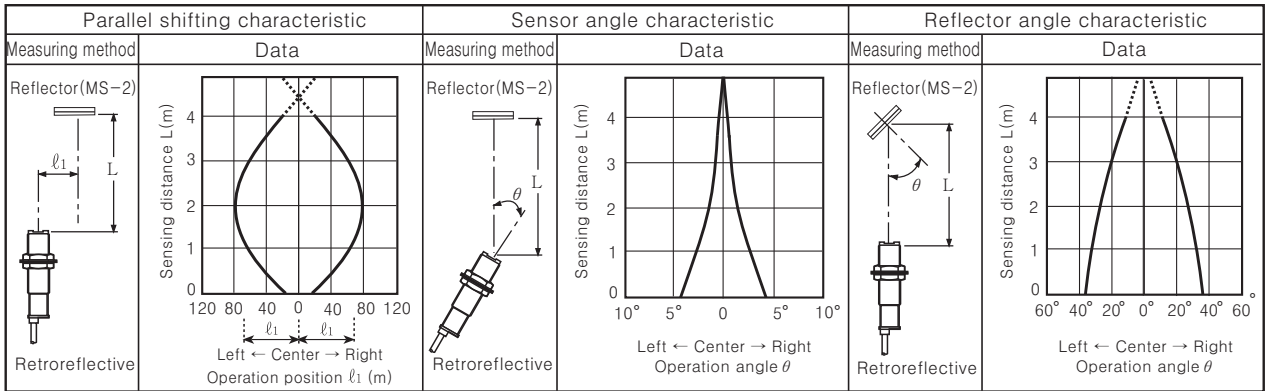
### Diffuse reflective/Narrow beam reflective

●BR100-DDT-□(-P)/BRP100-DDT-□(-P) ●BR200-DDTN-□(-P)/BRP200-DDTN-□(-P) ●BR400-DDT-□(-P)/BRP400-DDT-□(-P)



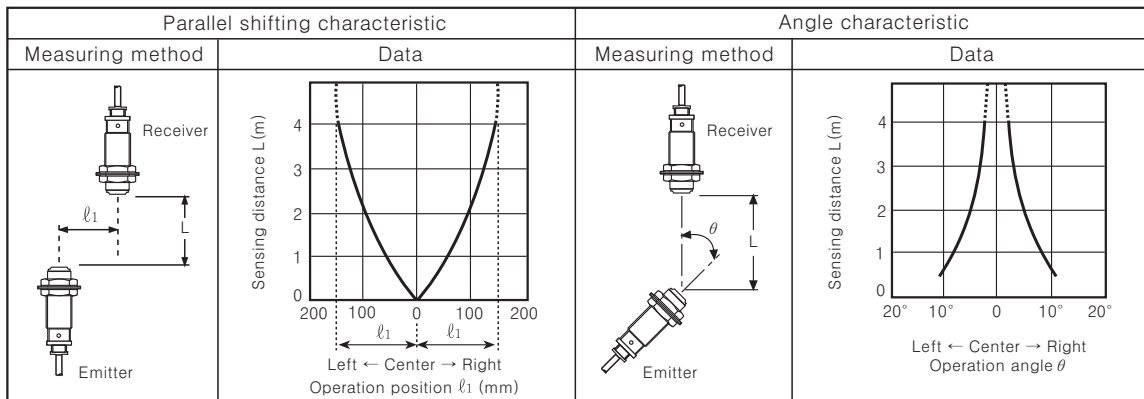
### Retroreflective

●BR3M-MDT-□(-P) / BRP3M-MDT-□(-P)

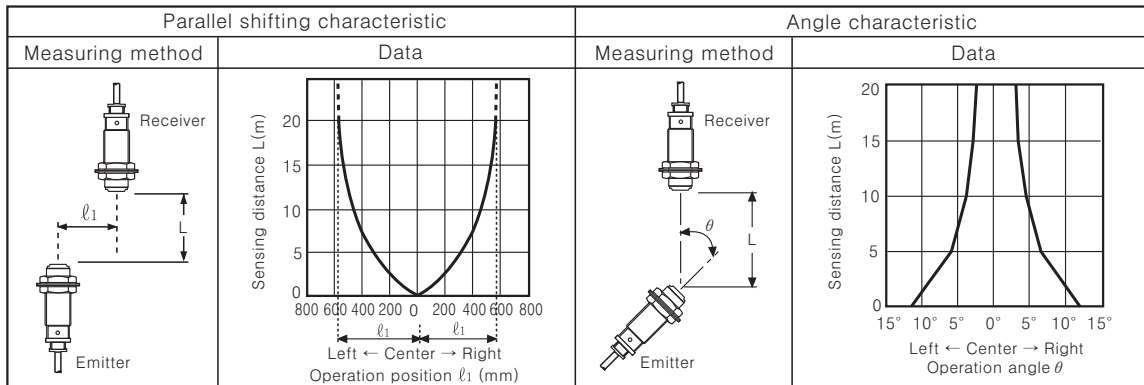


### Through-beam

●BR4M-TDT□-□ / BR4M-TDT□-□-P



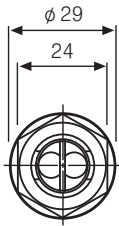
●BR20M-TDT□-□ / BR20M-TDT□-□-P



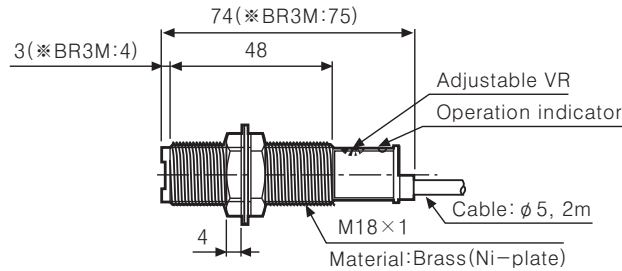
# Cylindrical Type

## Dimensions

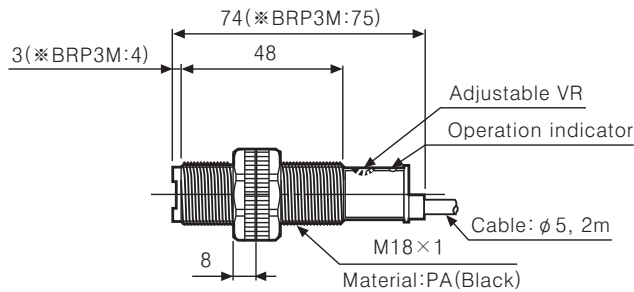
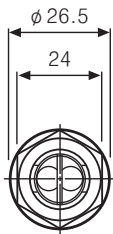
- BR100-DDT / BR100-DDT-P
- BR400-DDT / BR400-DDT-P



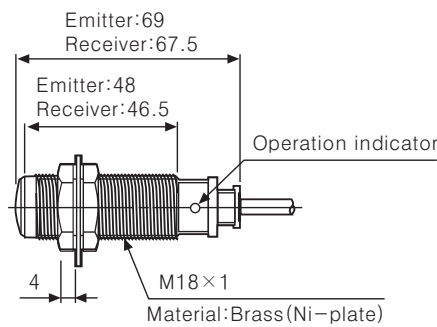
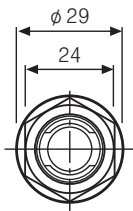
- BR200-DDTN / BR200-DDTN-P
- BR3M-MDT / BR3M-MDT-P (\*)



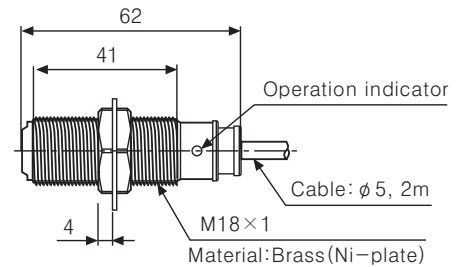
- BRP100-DDT / BRP100-DDT-P
- BRP400-DDT / BRP400-DDT-P



- BR4M-TDTD / BR4M-TDTD-P / BR4M-TDTL / BR4M-TDTL-P
- BR20M-TDTD / BR20M-TDTD-P / BR20M-TDTL / BR20M-TDTL-P

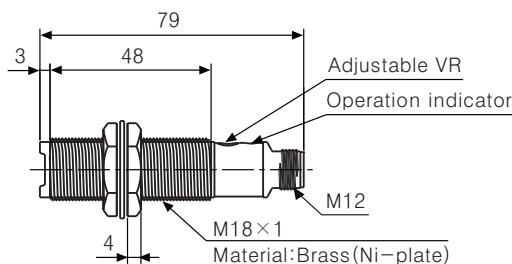
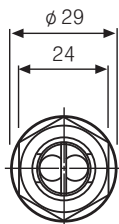


< BR4M >



< BR20M >

- BR100/200/400/3M-DDT(N)-C(-P)



(A) Photo electric sensor

(B) Fiber optic sensor

(C) Door/Area sensor

(D) Proximity sensor

(E) Pressure sensor

(F) Rotary encoder

(G) Connector/Socket

(H) Temp. controller

(I) SSR/Power controller

(J) Counter

(K) Timer

(L) Panel meter

(M) Tacho/Speed/Pulse meter

(N) Display unit

(O) Sensor controller

(P) Switching power supply

(Q) Stepping motor & Driver & Controller

(R) Graphic/Logic panel

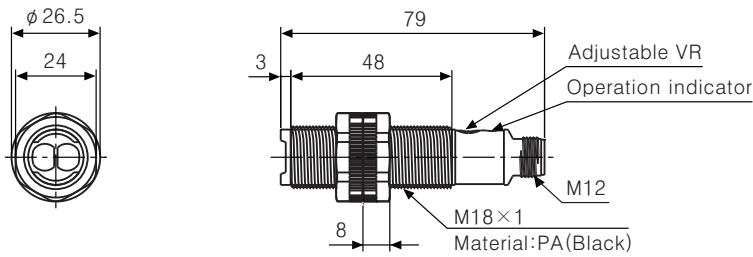
(S) Field network device

(T) Production stoppage models & replacement

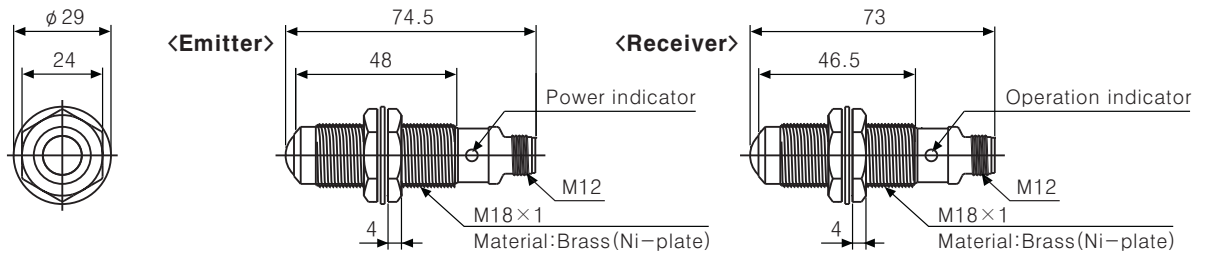
(Unit:mm)

# BR Series

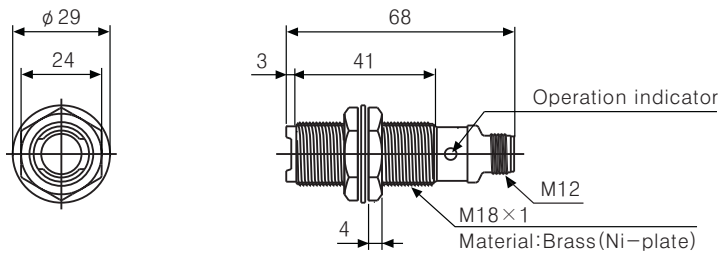
## ●BRP100/200/400/3M-DDT(N)-C(-P)



## ●BR4M-TDTD(L)-C(-P)

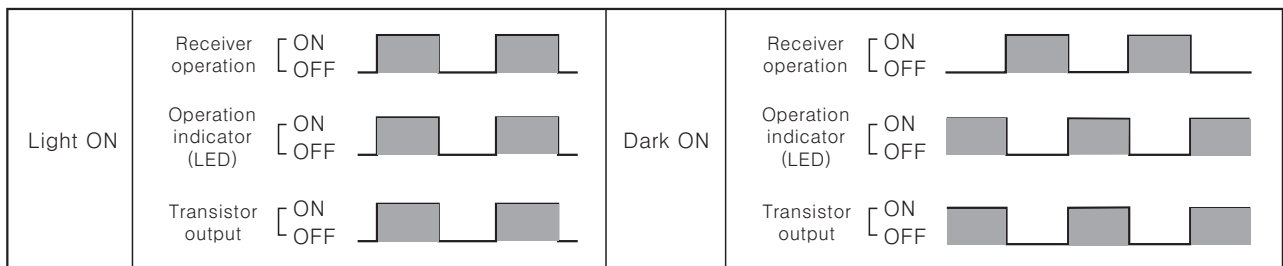


## ●BR20M-TDTD(L)-C(-P)



(Unit:mm)

## ■ Operation mode



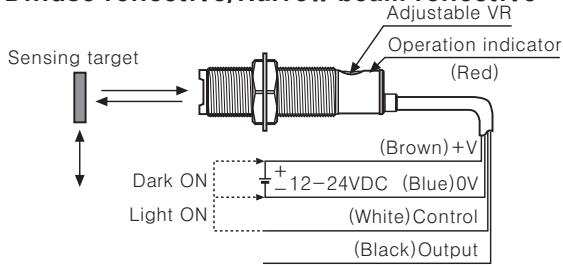
※The transistor output will be held OFF for 0.5 sec. after supplied power in order to prevent malfunction of this photoelectric sensor (Diffuse reflective, retroreflective).

※If the control output terminal is short-circuited or flow beyond rated current, the control signal will not be output normally due to protection circuit.

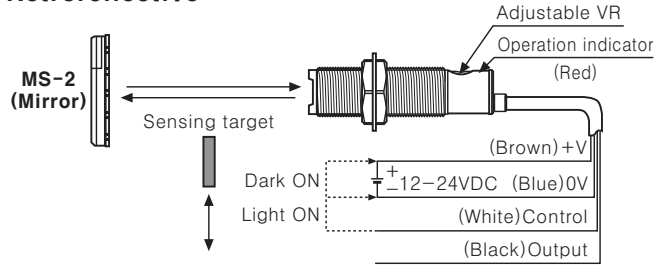
# Cylindrical Type

## Connections

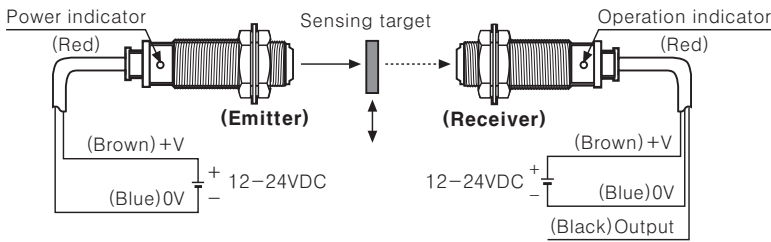
### Diffuse reflective/Narrow beam reflective



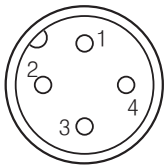
### Retroreflective



### Through-beam



## Connections



M12 Connector pin

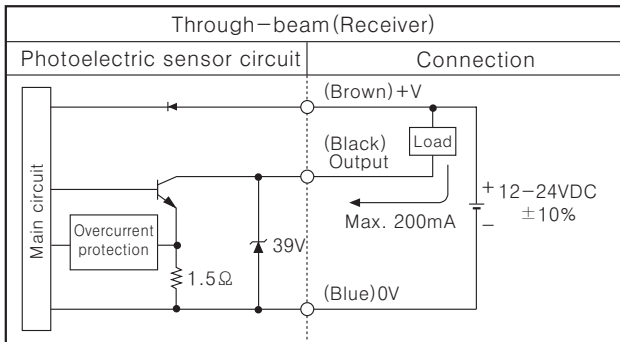
Connector pin No.	Cable colors	Application		
		Diffuse/Narrow beam reflective	Retroreflective	Through-beam
1	Brown	24VDC	24VDC	24VDC
2	White	CONTROL	N.C	GND
3	Blue	GND	GND	GND
4	Black	OUTPUT	N.C	OUTPUT

● Connector cable (Sold separately)

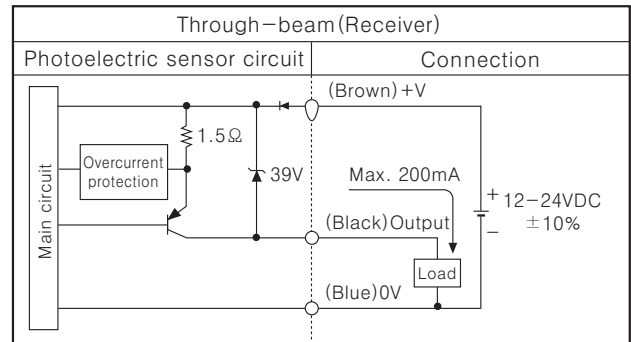
※ Please refer to G-5 for connector cable.

## Control output diagram

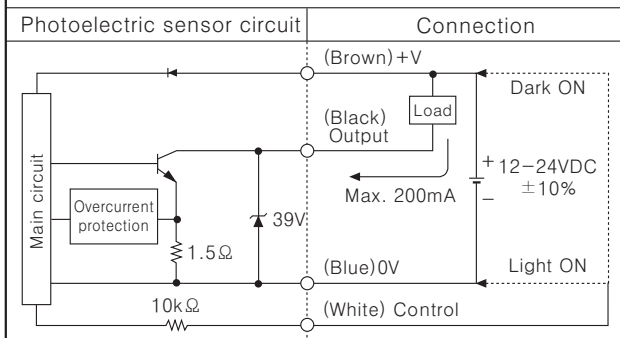
### NPN open collector output



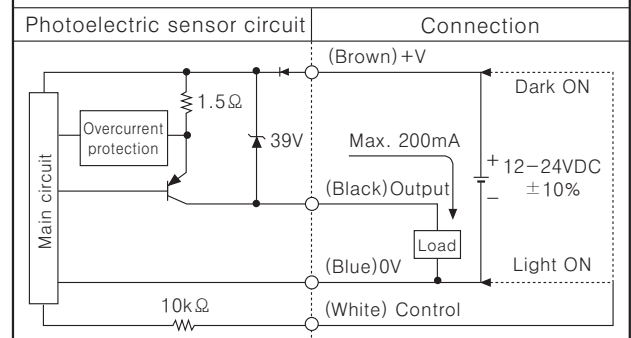
### PNP open collector output



### Diffuse reflective/Narrow beam reflective/Retroreflective



### Diffuse reflective/Narrow beam reflective/Retroreflective



※ Before using this unit, select Light ON/Dark ON with control cable.

(Light ON : Connect control cable with 0V / Dark ON : Connect control cable with +V)

※ Control cable is only for Diffuse reflective/Narrow beam reflective/Retroreflective type.

(A) Photo electric sensor

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(F) Rotary encoder

(G) Connector/Socket

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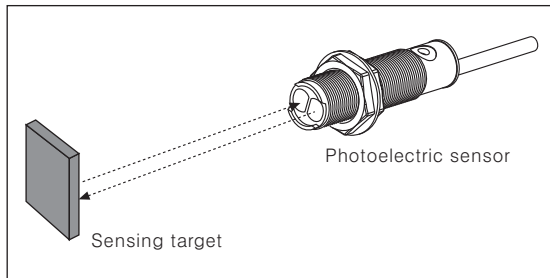
# BR Series

## ■ Installation and sensitivity adjustment

Please supply the power to the sensor after setting the emitter and the receiver in face to face, and then adjust an optical axis and the sensitivity as follow;

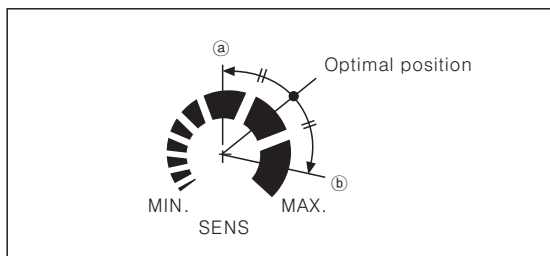
### ◎ Diffuse reflective/Narrow beam reflective

1. Even though the sensor is still available at the max. sensitivity position, it is recommended to adjust sensor sensitivity with considering existence of reflective material in background.



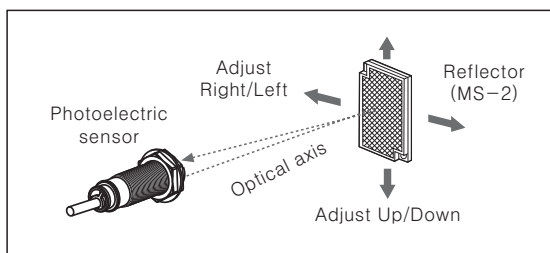
2. Set the target at a position to be detected by the beam, then turn the adjuster until point ㉑ which the indicator turns on from Min. position of the adjuster.
3. Take the target out of the photoelectric sensor, then turn the adjuster until point ㉒ which the indicator turns ON. ( If the indicator does not turn on, max. position is point ㉒.)
4. Set the adjuster at the center of two switching point ㉑, ㉒.

※ The sensing distance indicated in the specification chart is for non-glossy white paper 100×100mm or 50×50mm. It is subject to change depending on the size of sensing target, surface status and gloss, etc.



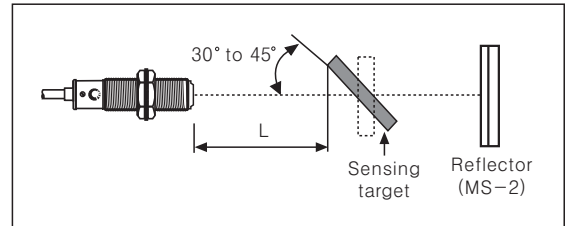
### ◎ Retroreflective

1. Set the sensor and reflector (MS-2) in opposite each other and supply the power.
2. Check stable indicator operation range with moving both sensor and reflector up/down and right/left and adjust the position in the middle.
3. After finishing position adjustment, check whether the sensor is operated normally with placing a sensing target on optical axis.



※ In case of using multiple sensors in parallel, keep each sensor's distance min. 30cm.

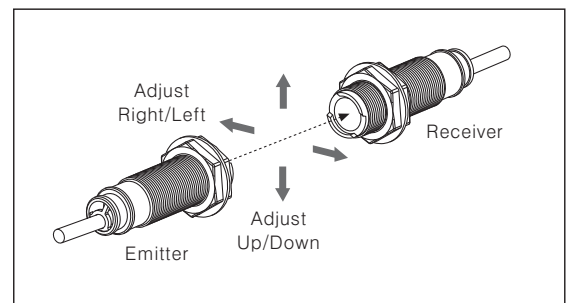
※ In case sensing target has higher reflectivity than non-glassy white paper, the sensor may cause malfunction due to direct reflected light from the target. Keep certain distance between a sensor and sensing target, or install the sensor with making sensing target's surface inclining 30° to 45° to photo sensor's optical axis.



※ Sensitivity adjustment: Please see the diffuse reflective/narrow beam reflective type.

### ◎ Through-beam

1. Set the receiver and emitter in opposite each other and supply the power.
2. Check stable indicator operation range with moving both receiver and emitter up/down and right/left and adjust the position in the middle.
3. After finishing position adjustment, check whether the sensor is operated normally with placing a sensing target on optical axis.



※ If the sensing target is translucent body or smaller than  $\phi 15$ , it might not detect the target cause light passed.