

# BR Series

## Upgraded cylindrical photoelectric sensor

### ■ Features

- Detects up to 20m (Transmitted beam type)
- Noise resistant with digital signal processing
- Narrow beam type diffuse reflective sensor using in a narrow space
- 1ms High speed response time
- Reverse power polarity and short-circuit (Overcurrent) protection circuit
- External sensitivity adjustment (Diffuse reflective type, Retroreflective type)
- High environmental resistance BR4M Series with mirror lens



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



### ■ Specifications

Model	NPN open collector	BRP100-DDT	BR100-DDT	BRP400-DDT	BR400-DDT	BRP200-DDTN	BR200-DDTN	BRP3M-MDT	BR3M-MDT	BR4M-TDTD BR20M-TDTD	BR4M-TDTL BR20M-TDTL
	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 BR20M-TDTD-P	BR4M-TDTL-P BR20M-TDTL-P
Sensing type	Diffuse reflective (Diffusion type)				Diffuse reflective (Narrow beam type)		Retroreflective		Transmitted beam		
Sensing distance	100mm (★1)		400mm (★2)		200mm (★2)		0.1~3m (★3)		4m / 20m		
Sensing target	Transparent, 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	Light ON / Dark ON selectable by control wire (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	Short-circuit protection, Reverse polarity protection										
Indication	Power indicator (Emitter):Red LED, Operation indicator (Receiver):Red LED										
Connection	Outgoing cable										
Insulation resistance	Min. 20M $\Omega$ (at 500VDC mega)										
Noise strength	$\pm$ 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 ~ 55Hz 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										
Storage temperature	-10 ~ +60 $^{\circ}$ C (at non-freezing status) Storage : -25 ~ +70 $^{\circ}$ C										
Ambient humidity	35 ~ 85%RH, Storage : 35 ~ 85%RH										
Protection	IP66 (IEC standard)										
Material	<ul style="list-style-type: none"> <li>• BR <math>\Rightarrow</math> Case : Brass (Cr-plate), Lens : PC</li> <li>• BRP <math>\Rightarrow</math> Case : PA (Nylon, Black), Lens : PC</li> </ul>						<ul style="list-style-type: none"> <li>• Case <math>\Rightarrow</math> BR3M : Brass (Cr-plate), BRP3M : PA (Nylon, Black)</li> <li>• Lens <math>\Rightarrow</math> PMMA</li> </ul>			<ul style="list-style-type: none"> <li>• Case <math>\Rightarrow</math> Brass (Cr-plate)</li> <li>• Lens <math>\Rightarrow</math> BR4M-Glass, BR2M-PC</li> </ul>	
Cable	4P, $\phi$ 5mm, Length : 2m									Emitter:2P, $\phi$ 5mm, Length:2m Receiver:3P, $\phi$ 5mm, Length:2m	
Accessory	Individual	Adjustment driver					Adjustment driver, Reflector (MS-2)				
	Common	BR : Fixing nuts, Washer / BRP : Fixing nuts									
Approval	<b>CE</b>										
Unit weight	• BR series : Approx. 120g						• BRP series : Approx. 100g			Approx. 300g	

※ (★1) Non-glossy white paper 50×50mm (★2) Non-glossy white paper 100×100mm.

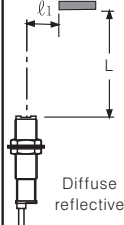
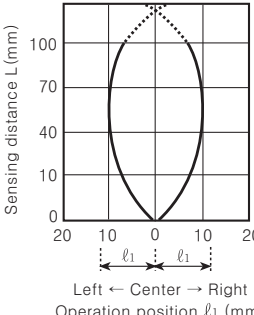
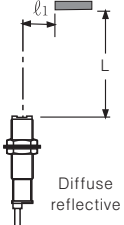
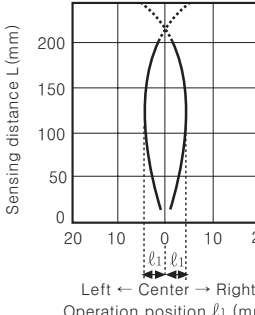
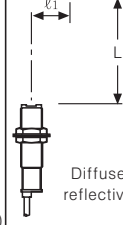
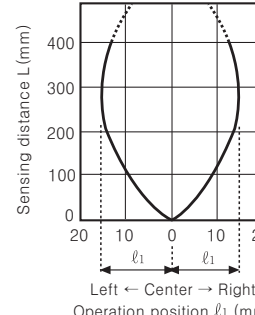
(★3) Detecting distance and detecting target for Retroreflective type is rated based on mirror (MS-2). Detecting distance indicates possible reflective mirror setting range. Sensing under 0.1m is also available.

# DC Cylindrical Housing Type

## Feature data

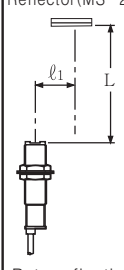
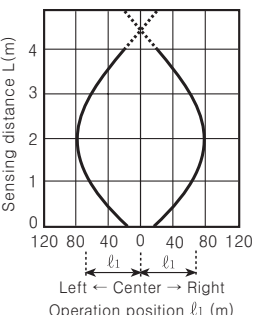
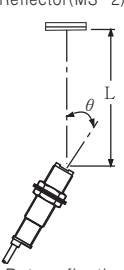
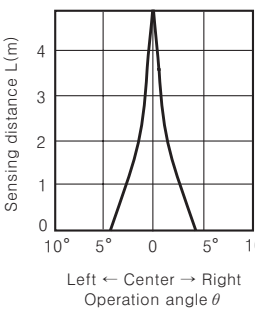
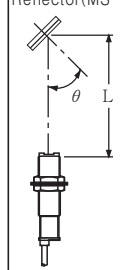
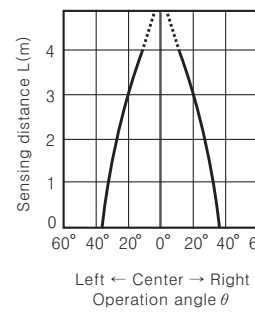
### Diffuse reflective

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

Sensing area(Diffusion type)		Sensing area(Narrow beam type)		Sensing area(Diffusion type)	
Measuring method	Data	Measuring method	Data	Measuring method	Data
Standard sensing target: Non-glossy white paper 50×50mm  Diffuse reflective		Standard sensing target: Non-glossy white paper 50×50mm  Diffuse reflective		Standard sensing target: Non-glossy white paper 100×100mm  Diffuse reflective	

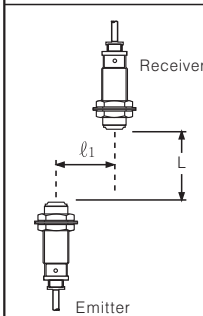
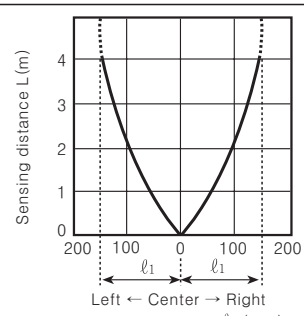
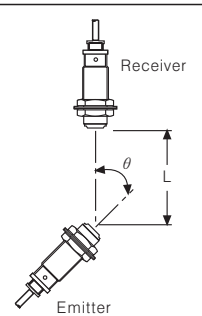
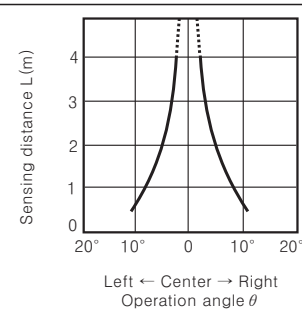
### Retroreflective

●BR3M-MDT(-P) / BRP3M-MDT(-P)

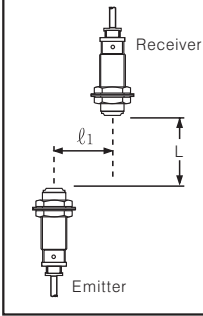
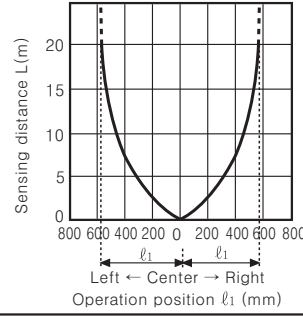
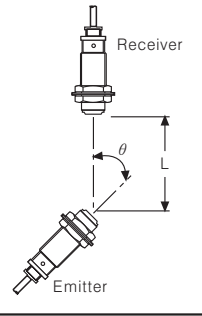
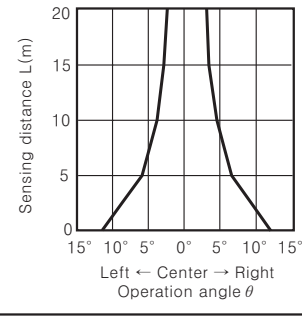
Parallel shifting characteristic		Sensor angle characteristic		Reflector angle characteristic	
Measuring method	Data	Measuring method	Data	Measuring method	Data
Reflector(MS-2)  Retroreflective		Reflector(MS-2)  Retroreflective		Reflector(MS-2)  Retroreflective	

### Through-beam

●BR4M-TDT□ / BR4M-TDT□-P

Parallel shifting characteristic		Angle characteristic	
Measuring method	Data	Measuring method	Data
			

●BR20M-TDTD(-P) / BR20M-TDTL(-P)

Parallel shifting characteristic		Angle characteristic	
Measuring method	Data	Measuring method	Data
			

(A) Counter

(B) Timer

(C) Temp. controller

(D) Power controller

(E) Panel meter

(F) Tacho/Speed/Pulse meter

(G) Display unit

(H) Sensor controller

(I) Switching power supply

(J) Proximity sensor

(K) Photo electric sensor

(L) Pressure sensor

(M) Rotary encoder

(N) Stepping motor & Driver & Controller

(O) Graphic panel

(P) Field network device

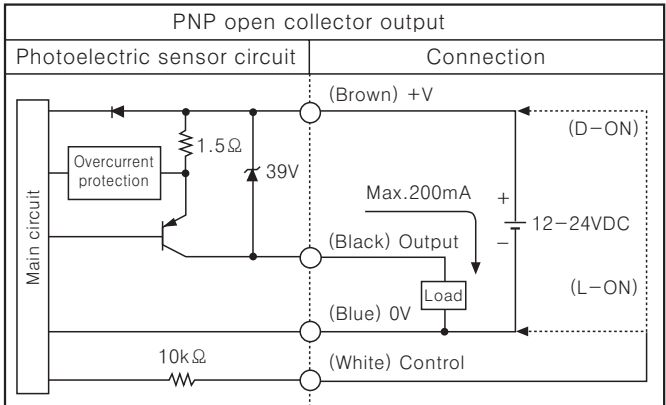
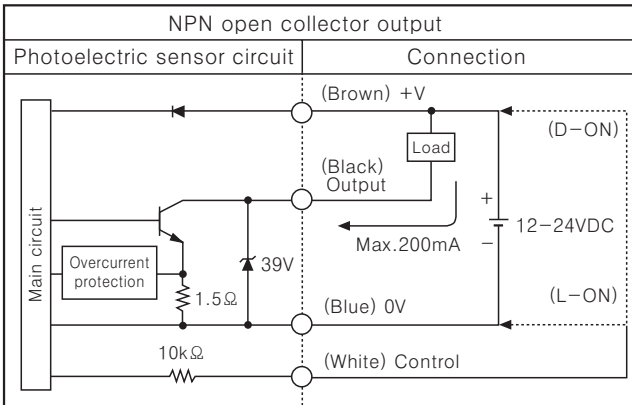
(Q) Production stoppage models & replacement

# BR Series

## Control output diagram

- BR(P)100-DDT / BR(P)200-DDTN / BR(P)400-DDT
- BR(P)3M-MDT
- BR20M-TDTD2 / BR20M-TDTL2 (Receiver)

- BR(P)100-DDT-P / BR(P)200-DDTN-P / BR(P)400-DDT-P
- BR(P)3M-MDT-P
- BR20M-TDTD2-P / BR20M-TDTL2-P (Receiver)



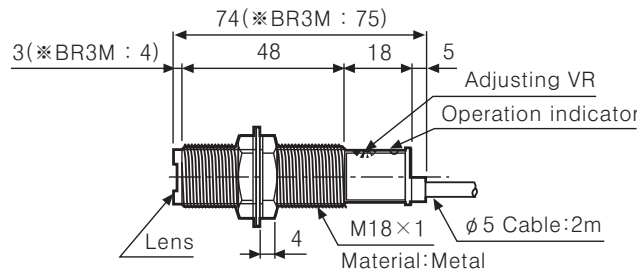
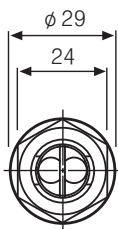
\*Select Light ON / Dark ON by control wire.  Light ON : Connect control wire to 0V  
 Dark ON : Connect control wire to +V

\*Control wire is available only for diffuse reflective type and retroreflective type.

## Dimensions

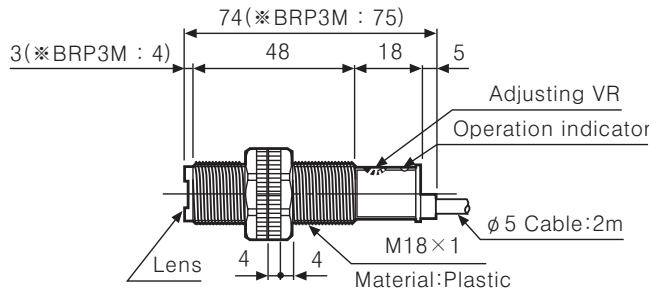
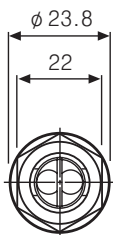
- BR100-DDT / BR100-DDT-P
- BR400-DDT / BR400-DDT-P

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

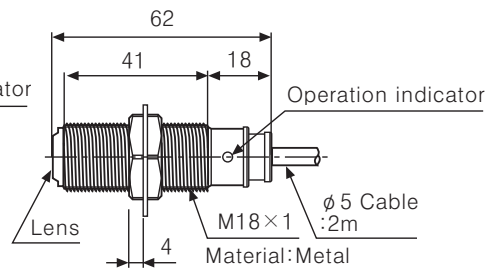
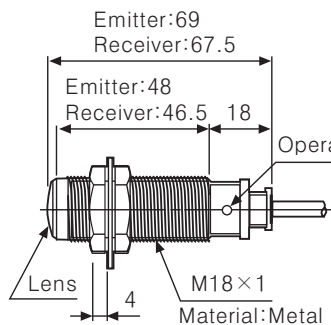
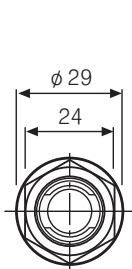


- BRP100-DDT / BRP100-DDT-P
- BRP400-DDT / BRP400-DDT-P

- BRP200-DDTN / BRP200-DDTN-P
- BRP3M-MDT / BRP3M-MDT-P (\*)



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



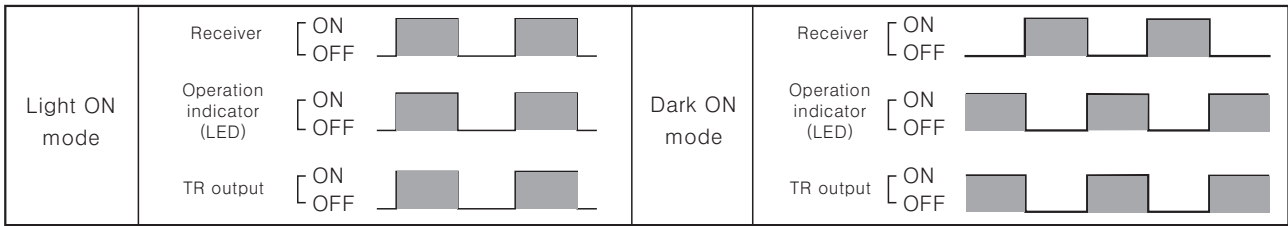
< BR4M Series >

< BR20M Series >

(Unit:mm)

# DC Cylindrical Housing Type

## Operation mode

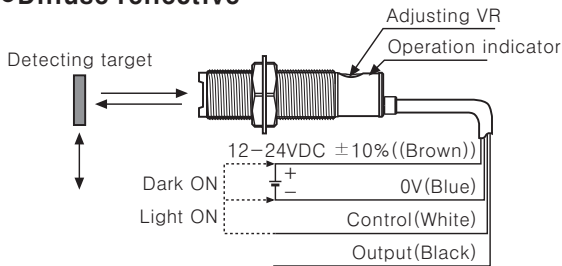


※The control output TR will be held OFF for 0.5 sec. after supplied power in order to prevent malfunction of this photoelectric sensor (Diffuse reflective, retroreflective).

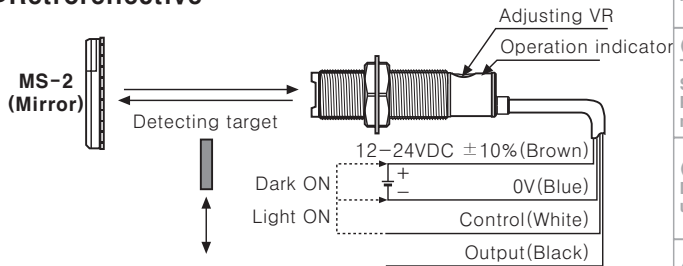
※If the control output terminal is short-circuited or flow beyond rating current, the control signal will not be output normally due to protection circuit.

## Connections

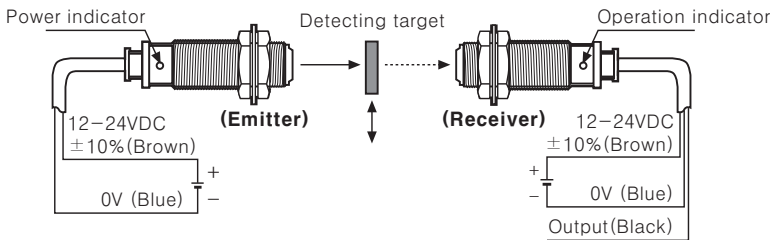
### Diffuse reflective



### Retroreflective



### Transmitted beam

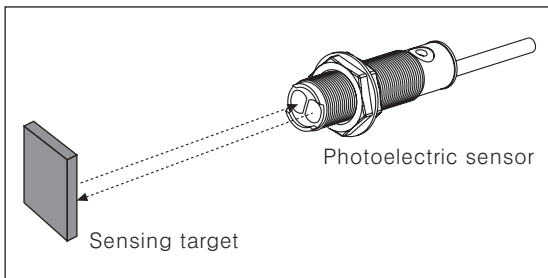


## Mounting and sensitivity adjustment

Please supply the power to the sensor after mount the emitter and the receiver facing each other, and then adjust an optical axis and the sensitivity as follow;

### Diffuse Reflective type

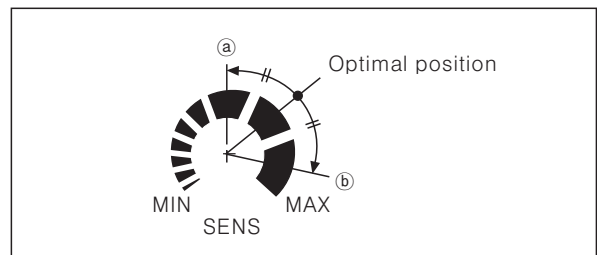
1. The sensitivity should be adjusted depending on a sensing target or mounting place.



2. Set the target at a position to be detected by the beam, then turn the adjuster until position ① in the middle of the operation range of indicator from Min. position of the adjuster.

3. Take the target out of the sensing area, then turn the adjuster until position ② in the middle of the operation range of indicator. If the indicator does not turn on, max. position is position ②.
4. Set the adjuster in the middle of two switching position ①, ②.

※The sensing distance indicated in the specification chart is that of non-glossy white paper in the target size 50×50mm. Be sure that it can be different by size, surface and gloss of target.



(A) Counter

(B) Timer

(C) Temp. controller

(D) Power controller

(E) Panel meter

(F) Tacho/Speed/Pulse meter

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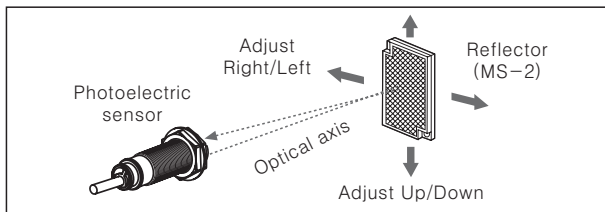
(Q) Production stoppage models & replacement

# BR Series

## ◎Retroreflective type

1. Supply the power to the photoelectric sensor, after set the photoelectric sensor and the reflector (MS-2) facing each other.
2. Set the photoelectric sensor in the middle of the operation range of indicator adjusting the reflector or the sensor right and left, up and down.
3. Adjust up and down direction as the same.
4. After adjustment, check the stability of operation putting the object at the optical axis.

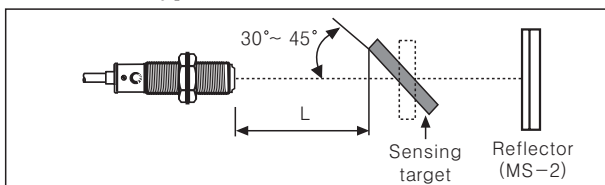
※If use more than 2 photoelectric sensors in parallel, the space between them should be more than 30cm.



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※If reflectance of target is higher than non-glossy white paper, it might cause malfunction by reflection from the target when the target is near to photo sensor. Therefore put enough space between the target and photoelectric sensor or the surface of target should be installed at an angle of  $30^{\circ} \sim 45^{\circ}$  against optical axis. (When detecting target with high reflectance near by, photoelectric sensor with the polarizing filter should be used.)

※Sensitivity adjustment : Please refer to the diffuse reflective type.



※If the mounting place is too small, please use MS-4 instead of MS-2 for same sensing distance.



## ◎Transmitted Beam type

1. Supply the power to the photoelectric sensor, after mount the emitter and the receiver facing each other.
2. Set the receiver in center of position in the middle of the operation range of indicator adjusting the receiver and the emitter right and left, up and down.
3. Fix both units tightly after checking that the unit detect the target.

