Autonics

• Observe all 'Safety Considerations' for safe and proper operation to avoid hazards.

• ▲ symbol indicates caution due to special circumstances in which hazards may occur.

Warning Failure to follow instructions may result in serious injury or death.

- 01. Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss. (e.g., nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime/disaster prevention devices, etc.) Failure to follow this instruction may result in personal injury, economic loss or fire.
- 02. Do not use the unit in the place where flammable/explosive/corrosive gas, high humidity, direct sunlight, radiant heat, vibration, impact or salinity may be present.
- Failure to follow this instruction may result in explosion or fire. **03. Do not disassemble or modify the unit.**
- Failure to follow this instruction may result in fire.
- 04. Do not connect, repair, or inspect the unit while connected to a power source.
- Failure to follow this instruction may result in fire. **05. Check 'Connections' before wiring.**

Failure to follow this instruction may result in fire.

- ▲ Caution Failure to follow instructions may result in injury or product damage.
- 01. Use the unit within the rated specifications.
- Failure to follow this instruction may result in fire or product damage.**02. Use a dry cloth to clean the unit, and do not use water or organic solvent.**Failure to follow this instruction may result in fire.

Cautions during Use

Safety Considerations

- Follow instructions in 'Cautions during Use'. Otherwise, It may cause unexpected accidents.
- When connecting an inductive load such as DC relay or solenoid valve to the output, remove surge by using diodes or varistors.
- Use the product after 0.5 sec of the power input.
 When using a separate power supply for the sensor and load, supply power to the sensor first.
- The power supply should be insulated and limited voltage/current or Class 2, SELV power supply device.
- Wire as short as possible and keep it away from high voltage lines or power lines to prevent surge and inductive noise.
- When using switching mode power supply (SMPS), ground F.G. terminal and connect a condenser between 0V and F.G. terminal to remove noise.
- When using a sensor with a noise-generating equipment (e.g., switching regulator, inverter, and servo motor), ground F.G. terminal of the equipment.
- This unit may be used in the following environments.
 Indoors (in the environment condition rated in 'Specifications')
 Altitude max. 2,000 m
- Pollution degree 3
- Installation category II
- installation category i

Product Components

Sensing type	Through-beam	Polarized retroreflective	Diffuse reflective	
Product components	Product, instruction manual			
Reflector	-	MS-2A	-	
Adjustment screwdriver	×1	×1	×1	
M18 fixing nut	× 4	× 2	× 2	

Cylindrical Photoelectric Sensors



BRQ Series (front sensing type) PRODUCT MANUAL

For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.

The specifications, dimensions, etc. are subject to change without notice for product improvement. Some models may be discontinued without notice.

Features

- Excellent noise immunity and minimal influence from ambient light
- Reverse power protection circuit, reverse output protection circuit, output short overcurrent protection circuit
- Mutual interference prevention function (except through-beam type)
- Sensitivity adjuster
- · Light ON/Dark ON mode selectable by control wire
- Various materials : Plastic, Metal (Ni-plated Brass), SUS316L
- Long sensing distance : 30 m (through-beam type)
- Body size
- BRQT, BRQM : Standard
- BRQP : Standard, Short body
- Protection rating
- BRQT : IP67 (IEC standard), IP69K (DIN standard)
- BRQM, BRQP : IP67 (IEC standard)



Ordering Information

This is only for reference, the actual product does not support all combinations. For selecting the specified model, follow the Autonics website.

BRQ 0 0 0 - 0	5 6 7 8 - 9 - 10				
• Material T: SUS316L M: Brass, Ni-plate P: Plastic	Output T: Solid state (transistor)				
O Sensing direction No mark: Front	• Emitter/Receiver No mark: Integrated type 1: Emitter 2: Receiver				
Sensing distance Number: Sensing distance (unit: mm) Number+M: Sensing distance (unit: m)	③ Appearance A: Standard B: Short body (plastic material model)				
© Sensing type T: Through-beam P: Polarized retroreflective D: Diffuse reflective	O Connection No mark: Cable type C: Connector type				
Power supply D: 10 - 30 VDC	© Control output No mark: NPN open collector output P: PNP open collector output				

Sold Separately

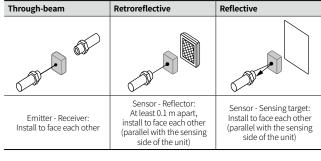
- Reflector: MS Series
- Retroreflective tape: MST Series • M12 connector cable: C D(H)4- -
- · Fixing cap for plastic short body: BK-BR-B

Cautions during Installation

 Be sure to install this product by following the usage environment, location, and specified ratings. Consider the listed conditions below. - Installation environment and background (reflected light)

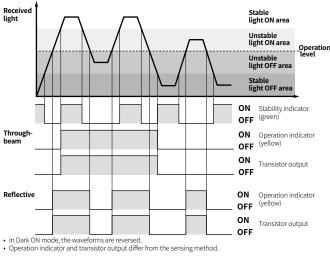
• Bracket: BK-BR-A

- Sensing distance and sensing target
- Direction of target's movement Characteristic curves
- When installing multiple sensors closely, it may result in malfunction due to mutual interference.
- For installation, tighten the screw with a torque of 14.7 N m (SUS316L, Brass, Niplate material model), 0.39 N m (plastic material model). Mount the brackets correctly to prevent the twisting of the sensor's optical axis.
- Do not impact with a hard object or bend the cable excessively. That could decrease the product's water resistance.
- Use this product after the test. Check whether the indicator works appropriately for the positions of the detectable object



Operation Timing Chart and Indicators

Light ON mode

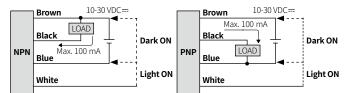


Connections

Cable type: Emitter

Brown		
Blue	Ţ	10-30 VDC=

■ Cable type: Receiver, Polarized retroreflective, Diffuse reflective type



Connector type





Connector pin ②, ④ are N.C (not connected) terminal for the emitter.

Operation mode selection

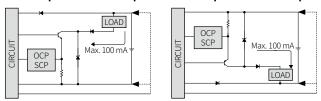
 Δ Be sure to connect the control wire when selecting the operation mode Failure to this instruction may result in product damage.

Operation mode	Wiring
Dark ON	Connect the control wire (white) to +V (brown)
Light ON	Connect the control wire (white) to 0 V (Blue)

Circuit

NPN open collector output

PNP open collector output



OCP (over current protection), SCP (short circuit protection)
 If short-circuit the control output terminal or supply current over the rated specification, normal control signal is not output due to the protection circuit.

Sensitivity Adjustment

- Set the adjuster for stable Light ON area, minimizing the effect of the installation environment.
 Use the offered adjustment screwdriver. Do NOT turn with excessive force to prevent product damage
- The steps below are based on Light ON mode.

STEP	Status	Description	
01	Received		Turn the adjuster from MIN to MAX sensitivity and check the position (A) where the operation indicator activates under the light ON area.
02	Interrupted		Turn the adjuster from (A) to MAX and check the position (B) where the operation indicator activates under the light OFF area. If the operation indicator does NOT activate at the MAX (maximum sensitivity): MAX = (B).
03	-		Set the adjuster at the mid position between (A) and (B) for optimal sensitivity.

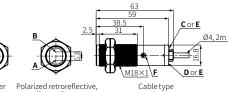
Dimensions

Emitter

- · Unit: mm, For the detailed drawings, follow the Autonics website
- · This dimensions shows the cable type. Refer to the 'Specifications' for the core, wiring, and connector,

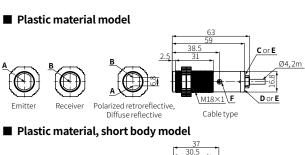
Α	Optical axis of emitter	D	Stability indicator (green)
В	Optical axis of receiver	E	Power indicator of emitter (red)
с	Operation indicator (yellow)	F	Sensitivity adjuster

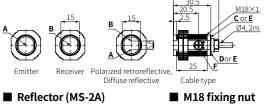
SUS316L, Ni-plate, Brass material model



Receiver

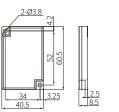
Diffuse reflective

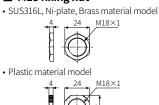




Reflector (MS-2A)

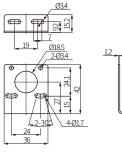
Specifications





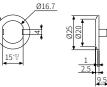
Sold Separately: Bracket (BK-BR-A)

• Unit: mm, For the detailed drawings, follow the Autonics website.



Sold Separately: Fixing Cap (BK-BR-B)

- Unit: mm, For the detailed drawings, follow the Autonics website.
- Only for the plasic material short body model Ø25



Sold Separately: M12 Connector Cable

• For detailed information, refer to the 'M8/M12 Connector Cable' manual.

Model	BRQ		1-11-11	BRQ 3M-PDT	BRQ DDT				
Sensing type		h-beam		Polarized retroreflective		Diffuse reflective			
Sensing distance	5 m	20 m	30 m	3 m ⁰¹⁾	100 mm	400 mm	1 m		
Sensing target	Opaque materials		ıls	Opaque materials	Opaque, t	ranslucent i	materials		
Min. sensing target	≥Ø7mm			≥ Ø 75 mm	-				
Hysteresis	-			-	≤ 20 % of	f sensing dis	tance		
Response time	$\leq 1 \text{ms}$								
Light source	Red			Red	Infrared	Red	Red		
Peak emission wavelength	660 nm			660 nm	850 nm	660 nm	660 nm		
Sensitivity adjustment	YES (Ad	juster)		YES (Adjuster)	YES (Adjus	ster)			
Mutual interference				YES	YES				
prevention	-			TES	YES				
Operation mode				mode selectable (Control					
Indicator	Operati	on indica	itor (yello	w), stability indicator (green			04)		
Approval	C€ \kappa €	91 EAC		C € ヒム 。 91 'տ EAE	((光))	Sus EAC			
03) Non-glossy white paper 04) Only for the emitter					Polarizer	l retrorefle	ctive		
Unit weight (packaged)	Materia	al		Through-beam	Diffuse re		cuve,		
	SUS316	iL		≈ 140 g (≈ 220 g)	≈ 70 g (≈				
Cabletrine	Brass, N	li-plate		≈ 140 g (≈ 220 g)	≈ 70 g (≈	: 150 g)			
Cable type	Plastic			≈ 110 g (≈ 160 g)	≈ 60 g (≈ 120 g)				
	Plastic	(short)		≈ 100 g (≈ 150 g)	≈ 50 g (≈ 120 g)				
	SUS316	ίL		≈ 50 g (≈ 160 g)	≈ 30 g (≈	: 140 g)			
Connector type	Brass, N	rass, Ni-plate $\approx 50 \text{ g} (\approx 160 \text{ g})$ $\approx 30 \text{ g} (\approx 140 \text{ g})$: 140 g)					
connector type	Plastic			≈ 25 g (≈ 110 g)	≈ 15 g (≈ 110 g)				
	Plastic	(short)		\approx 20 g (\approx 100 g)	pprox 10 g ($pprox$ 100 g)				
Power supply	10-30 VDC== ± 10 % (ripple P-P: ≤ 10 %) It depends on the sensing type								
Current consumption									
Through-beam		Emitter: ≤ 20 mA, receiver: ≤ 20 mA							
Reflective	≤ 30 m			ut / PNP open collector out					
Control output	≤ 30 VI		tor outp	ut / PNP open collector out	tput model				
Load voltage	$\leq 30 \text{ VL}$ $\leq 100 \text{ r}$								
Load current Residual voltage			, PNP: ≤	2VDC-					
Protection circuit				otection circuit, output sho	ort ovorcurr	ont protocti	on circuit		
Insulation resistance					JILOVEICUII	ent protecti	oncircuit		
Noise immunity	≥ 20 MΩ (500 VDC== megger)					nine nine de	ter		
Noise immunity	1 + 2401	\pm 240 VDC== the square wave noise (pulse width: 1 µs) by the noise simulator					ilor		
				·	Between the charging part and the case: 1,000 VAC \sim 50/60 Hz for 1 min				
Dielectric strength	Betwee	en the ch	arging pa						
Dielectric strength Vibration	Betwee	en the ch 1 double	arging pa	art and the case: 1,000 VAC le at frequency of 10 to 55 P			on		
	Betwee 1.5 mm for 2 ho	en the ch n double ours	arging pa amplitud		Hz in each X		on		
Vibration	Betwee 1.5 mm for 2 ho 500 m/	en the ch n double ours ′s² (≈ 50	arging pa amplituc G) in eac	le at frequency of 10 to 55 l	Hz in each X		on		
Vibration Shock Ambient illuminance (receiver)	Betwee 1.5 mm for 2 ho 500 m/ Sunligh	en the ch n double burs $(s^2) (\approx 50)$ tt: $\leq 11,0$	arging pa amplitud G) in eac 100 lx, inc	le at frequency of 10 to 55 H h X, Y, Z direction for 3 time andescent lamp: \leq 3,000 k	Hz in each X es x		on		
Vibration Shock Ambient illuminance	Betwee 1.5 mm for 2 ho 500 m/ Sunlight -25 to 6	en the ch n double burs $(s^2 \approx 50)$ t: $\leq 11,0$ 0 °C, stor	arging pa amplitud G) in eac 100 lx, inc age: -30 t	le at frequency of 10 to 55 l h X, Y, Z direction for 3 time	Hz in each X es x densation)	r, Y, Z directi	on		
Vibration Shock Ambient illuminance (receiver) Ambient temperature	Betwee 1.5 mm for 2 hd 500 m/ Sunlight -25 to 6 35 to 85 IP67 (IE	en the ch n double purs $(s^2 \ \approx 50)$ t: $\leq 11,0$ 0 °C, stor 5 %RH, st C standa	G) in eac amplitud G) in eac 000 lx, inc age: -30 t orage: 35 rd)	le at frequency of 10 to 55 h h X, Y, Z direction for 3 time andescent lamp: \leq 3,000 h o 70 °C (no freezing or cond	Hz in each X es x densation) condensati	s, Y, Z directi	on		
Vibration Shock Ambient illuminance (receiver) Ambient temperature Ambient humidity	Betwee 1.5 mm for 2 hd 500 m/ Sunlight -25 to 6 35 to 85 IP67 (IE SUS316	en the ch n double burs $s^2 (\approx 50)$ t: $\leq 11,0$ 0 °C, stor 5 %RH, st C standa 5 materi	G) in eac G) in eac 00 lx, inc age: -30 t orage: 35 rd) al model	le at frequency of 10 to 55 l h X, Y, Z direction for 3 time andescent lamp: ≤ 3,000 l: o 70 °C (no freezing or cond to 85 %RH (no freezing or	Hz in each X es x densation) condensati	s, Y, Z directi	on		
Vibration Shock Ambient illuminance (receiver) Ambient temperature Ambient humidity Protection rating	Betwee 1.5 mm for 2 ho 500 m/ Sunligh -25 to 6 35 to 85 IP67 (IE SUS316 Cable ty	en the ch n double burs $s^2 (\approx 50)$ t: $\leq 11,0$ 0 °C, stor 5 %RH, st C standa 5L materi ype / Cor	arging pa amplituc G) in eac 000 lx, inc age: -30 t orage: 35 rd) al model nnector ty	le at frequency of 10 to 55 l h X, Y, Z direction for 3 time andescent lamp: ≤ 3,000 l o 70 °C (no freezing or cone to 85 %RH (no freezing or IP67 (IEC standard), IP69K	Hz in each X es x densation) condensati	s, Y, Z directi	on		
Vibration Shock Ambient illuminance (receiver) Ambient temperature Ambient humidity Protection rating Connection	Betwee 1.5 mm for 2 hd 500 m/ Sunligh -25 to 6 35 to 85 IP67 (IE SUS316 Cable ty Ø 4 mm	en the ch n double purs $s^2 (\approx 50)$ $t: \le 11,0$ $0^{\circ}C, stor5^{\circ}RH, stC standasL$ materi ype / Cor n, 4-wire,	G) in eac G) in eac 00 lx, inc age: -30 t orage: 35 rd) al model nnector ty (Emitter:	le at frequency of 10 to 55 l h X, Y, Z direction for 3 time andescent lamp: \leq 3,000 l o 70 °C (no freezing or cont to 85 %RH (no freezing or IP67 (IEC standard), IP69K pe model	Hz in each X es x densation) condensati	s, Y, Z directi	on		
Vibration Shock Ambient Illuminance (receiver) Ambient temperature Ambient tumidity Protection rating Connection Cable spec.	Betwee 1.5 mm for 2 hd 500 m/ Sunligh -25 to 6 35 to 85 IP67 (IE SUS316 Cable ty Ø 4 mm AWG26	en the ch n double purs $s^2 (\approx 50)$ $t: \le 11,0$ $0^{\circ}C, stor5^{\circ}RH, stC standasL$ materi ype / Cor n, 4-wire,	G) in eac G) in eac G) in eac MO lx, inc age: -30 t orage: 35 rd) al model nnector ty (Emitter: n, 20-core	le at frequency of 10 to 55 l h X, Y, Z direction for 3 time andescent lamp: \leq 3,000 l o 70 °C (no freezing or cont to 85 %RH (no freezing or :IP67 (IEC standard), IP69K (pe model 2-wire), 2 m	Hz in each X es x densation) condensati	s, Y, Z directi	on		
Vibration Shock Ambient illuminance (receiver) Ambient temperature Ambient temperature Ambient numidity Protection rating Connection Cable spec.	Betwee 1.5 mm for 2 hd 500 m/ Sunligh -25 to 6 35 to 85 IP67 (IE SUS31E Cable ty Ø 4 mm AWG26 M12 4-p Case: It	en the ch n double purs $(s^2 \ \approx 50)$ $t: \le 11,0$ $0^{\circ}C, stor5^{\circ} (RH, stC standa3^{\circ} (C $	G) in eac G) in eac	le at frequency of 10 to 55 l h X, Y, Z direction for 3 time andescent lamp: \leq 3,000 l o 70 °C (no freezing or cont to 85 %RH (no freezing or IP67 (IEC standard), IP69K per model 2-wire), 2 m e), insulator outer diameter nodel. (refer to 'Ordering in	Hz in each X es x densation) condensati (DIN stand COIN stand	on) ard)	on		

Appearance	Power	Connector 1	Connector 2	Length	Feature	Model		
				2 m		CIDH4-2		
				3 m	Oil resistant	CIDH4-3		
				5 m	PVC	CIDH4-5		
	DC	M12 (Socket- Female)	4-wire	7 m		CIDH4-7		
	DC	4-pin	4-0010	2 m		CIDH4-2-A		
				3 m	Oil resistant PVC	CIDH4-3-A		
				5 m	: % us	CIDH4-5-A		
				7 m		CIDH4-7-A		
				2 m		CLDH4-2		
				3 m	Oil resistant	CLDH4-3		
				5 m	PVC	CLDH4-5		
m	DC	M12 (Socket- Female)	4-wire	7 m		CLDH4-7		
	DC	4-pin, L type	4-0010	2 m		CLDH4-2-A		
				3 m	Oil resistant PVC	CLDH4-3-A		
				5 m	c A) us	CLDH4-5-A		
				7 m		CLDH4-7-A		
		M12 (Socket- Female) 4-pin	M12 (Plug- Male) 4-pin	1 m	Oil resistant PVC	C1DH4-1		
	DC F			3 m		C1DH4-3		
				5 m		C1DH4-5		
				7 m		C1DH4-7		
				1 m		C2DH4-1		
m #	DC	M12 (Socket-			M12 (Plug-	3 m	Oil resistant	C2DH4-3
	DC	Female) 4-pin, L type	Male) 4-pin, L type	5 m	PVC	C2DH4-5		
			1 / 21.	7 m		C2DH4-7		
			1 m	1 m	Oil resistant PVC	C3DH4-1		
		M12 (Socket-	M12 (Plug-	3 m		C3DH4-3		
	DC	Female) 4-pin	Male) 4-pin, L type	5 m		C3DH4-5		
				7 m		C3DH4-7		
				1 m		C4DH4-1		
m		M12 (Socket-	M12 (Plug-	3 m	Oil resistant	C4DH4-3		
	DC	Female) 4-pin, L type	Male) 4-pin	5 m	PVC	C4DH4-5		
				7 m	1	C4DH4-7		
				2 m		C1D4-2P		
••••••••••• D	DC M12 (Plug- Male) 4-pin	M12 (Plug- Male) 4-pin	5 m	PVC	C1D4-5P			

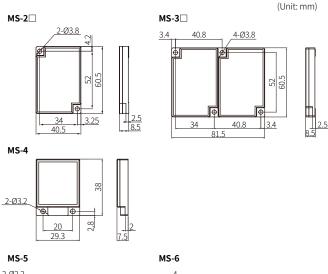
Sold Separately: Reflector MS Series

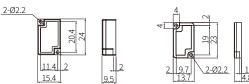
Appearance	Size (W \times H)	Reflectance	Sensing type	Model
- Internet		Typical reflectivity	Retroreflective	MS-2
	40.5 × 60.5 mm	Typical reflectivity	Polarized retroreflective	MS-2A
S States		High reflectivity	Polarized retroreflective	MS-2S
	01.5 \/ 60.5	Typical reflectivity	Retroreflective	MS-3
	81.5 × 60.5 mm	High reflectivity	Polarized retroreflective	MS-3S
	29.3 × 38 mm	Typical reflectivity	Retroreflective	MS-4
	15.4 × 24 mm	Typical reflectivity	Retroreflective	MS-5
	13.7 × 23 mm	Typical reflectivity	Retroreflective	MS-6

• Material: PMMA / ABS (front part / rear part)

Installation: Bolt mounting

Dimensions





Cautions during Installation

- Select a reflector size that is suitable for the installation space and operating environment of the sensors.
- In general, a bigger size of the reflector results in a longer sensing distance.
- · Reflectors with high reflectivity increase the sensing distance compared to typical reflectors.
- The reflectance may vary depending on the operating environment for the sensors.

Sold Separately: Retroreflective Tape MST Series

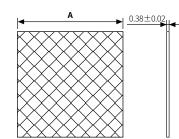
Appearance	Size (W $ imes$ H)	Approval	Packaged unit	Sensing type	Model
	50 × 50 mm	EAC	10	Retroreflective Polarized retroreflective	MST-50-10
	100 × 100 mm	EAC	5	Retroreflective Polarized retroreflective	MST-100-5
	200 × 200 mm	EAC	2	Retroreflective Polarized retroreflective	MST-200-2

Material: PMMA / PC / Acrylic (surface film / prism layer / adhesive layer)
 Ambient temperature: -35 to 65 °C (temperature for adhesion: 10 to 30 °C)
 Installation: Tape cutting (installation distance: ≥ 20 mm)

Reflectance of MST Series

Series	Sensing type	MST-50-10	MST-100-5	MST-200-2
BTS		95%	100%	100%
BM		70%	110%	170%
BMS	Retroreflective	90%	120%	190%
BEN		90%	130%	140%
BX		90%	100%	110%
BJ		40%	60%	100%
BJR		35%	45%	55%
BJX		35%	45%	55%
BH		60%	80%	140%
BEN	Polarized retroreflective	70%	90%	120%
BX	recrorentective	30%	40%	60%
BRQ		40%	50%	80%
BRQP (plastic material type)		40%	80%	85%
BRQPS (side sensing type)		25%	30%	35%

Dimensions



/Iodel	A
AST-50-10	50

100

200

(Unit: mm)

Cautions during Installation

· Select a retroreflective tape that is suitable for the installation space and operating environment of the sensors.

Ν

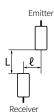
N MST-100-5

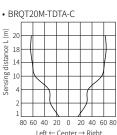
MST-200-2

- In general, a bigger size of retroreflective tape results in a longer sensing distance.
- Be sure to check the reflectance of the MST series for proper use.
- The reflectance may vary depending on the operating environment for the sensors. • Before applying the tape, clean the adhesive side of the reflective tape with a dry cloth.
- Do not press or damage the surface of the retroreflective tape.
- Regularly clean the tape to maintain optimal performance, using only neutral detergents. Do not use chemical solvents.

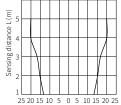
Characteristic Curves: Through-beam Type

Sensing area

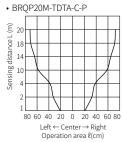




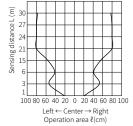


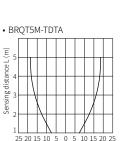


Left ← Center → Right Operation area ℓ(cm)



• BRQP30M-TDTA-C

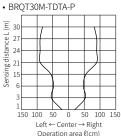


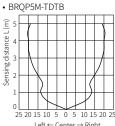


nce L (m)

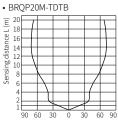
Sensing distar

25 20 15 10 5 0 5 10 15 20 25 Left ← Center → Right Operation area ℓ(cm)

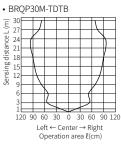


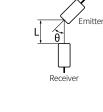


Left ← Center → Right Operation area ℓ(cm)

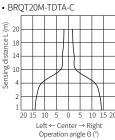


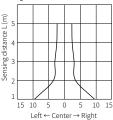
Left ← Center → Right Operation area ℓ(cm)

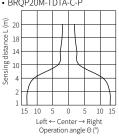




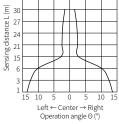
Emitter angle

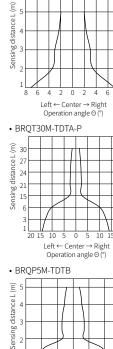






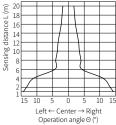


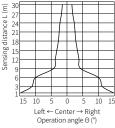




15 10 5 0 5 10 15 Left \leftarrow Center \rightarrow Right Operation angle Θ (°)

• BRQP20M-TDTB





BROP5M-TDTA



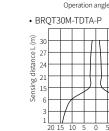
10 5 0 5 10 Left ← Center → Right

Operation angle Θ (°)

• BRQP20M-TDTA-C-P







1 0

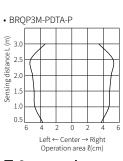
• BRQT5M-TDTA

4

Characteristic Curves: Polarized Retroreflective Type

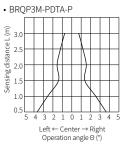
Sensing area



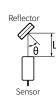


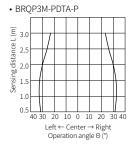
Sensor angle

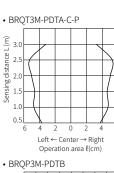


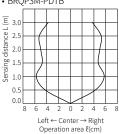


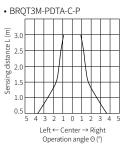
Reflector angle

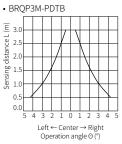


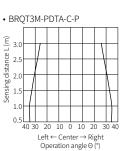


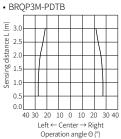


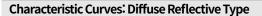




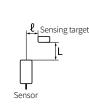


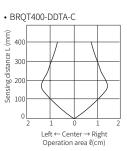


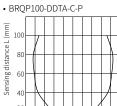




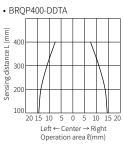
Sensing area

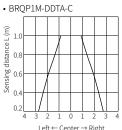






25 20 15 10 5 0 5 10 15 Left \leftarrow Center \rightarrow Right Operation area (mm)





Left ← Center → Right Operation area ℓ(cm)

