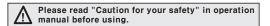
Miniature and built-in amplifier for long sensing distance

■ Features

- •Long sensing distance with high quality lens
- •Waterproof structure IP65 by rubber injection (IEC standard)
- Compact size
- •Detects up to 15m(Transmitted beam type)
- ●Long sensing distance: Diffuse reflective type 1m, Polarized reflective type 3m(MS-3S)
- •Light ON / Dark ON selectable
- •Built-in sensitivity adjuster(Except for BJG30-DDT)
- •Mutual interference prevention function (Retroreflective type, Diffuse reflective type)
- •Stable detection for transparent object(LCD, PDP, glass etc) by BJG30-DDT.



(MS-2A)



Specifications

Collector output Sensing type Transmitted beam Polarized retroreflective Diffuse reflective	NPN Open collector output PNP Open		BJ15M-TDT	BJ10M-TDT	BJ3M-PDT	BJ1M-DDT	BJ300-DDT	BJ100-DDT	BJG3	0-DDT
Sensing type Sensing distance O-15m O-10m O-10m O-10m O-10m O-10m O-30mm O-10m Non-glossy white paper 100×100mm Max. 20% at rated setting distance Max. 20% at rated setting distance Max. 20m Max. 30mA Infrared LED (660nm) (650nm) (650nm) O(660nm) O(650nm) O(660nm) O(660nm) O(650nm) O(660nm) O(650nm) O(650nm) O(650nm) O(660nm) O(650nm) O(660nm) O(650nm) O(650nm) O(660nm) O(650nm) O(650nm) O(600nm) O(650nm) O(650nm) O(660nm) O(650nm) O(650nm) O(650nm) O(650nm) O(650nm) O(650nm) O(650nm) O(650nm) O(650nm) O(660nm) O(650nm) O(600nm) O(600nm) O(600nm) O(600nm) O(600nm) O(600nm) O(600	PNP Op collecto	en or output	BJ15M-TDT-P	BJ10M-TDT-P	BJ3M-PDT-P	BJ1M-DDT-P	BJ300-DDT-P	BJ100-DDT-P	_	
Sensing target Opaque material over \$12mm Opaque material over \$75mm Opaque material over \$75mm Opaque material over \$75mm Max. 20% at rated setting distance Max. Ims Max. 20% at rated setting distance Max. Ims Power supply 12-24VDC ±10F(Ripple P-P: Max.10%) Current consumption Emitter/Receiver : Max.20mA Light source Infrared LED (850nm) G650nm) Sensitivity adjustment Operation mode Light ON/Dark ON selectable Light ON/Dark ON selectable **NPN open collector output* **Load voltage : Max. 26.4VDC **Load current : Max.100mA **Residual voltage : Max. 1V PNP open collector output **Load voltage : Max. 26.4VDC **Load current : Max.100mA **Residual voltage : Min. (Power supply -2.5V) Protection circuit Protection Operation : Red, Stable : Green(Emitter of power indicator for transmitted beam : Red) Operation resistance Max. 20M2 (at 500VDC) Dielectric strength 1.5mm or 300mm amplitude at frequency of 10 ~ 55Hz in each of X, Y, Z directions for 2 hours Shock Ambient illumination Sunlight : Max. 11,000K, Incandescent lamp : Max. 3,000K (Receiver illumination) Ambient temperature Ambient humidity Protection Fixing bracket, Bolt, Adjustment driver Fixing bracket, Bolt, Adjustment	Sensing type		Transmit	ted beam		Diffuse reflective				
Sensing target	Sensing distance		0~15m	0~10m	0.1~3m(★)	0~1m	0~300mm	0~100mm	0~30mm	0~15mm
Response time Max. 1ms	Sensing target		1			white paper Non-glossy white paper glass 50×50mm				
Power supply	Hysteresis					 				
Current consumption Light source Infrared LED Red LED Red LED (660nm) (660nm) (660nm) (850nm) (8	Response	time				Max. 1	ns			
Light source	Power sup	ply			12-24VD0	= ±10% (Rippl	e P-P: Max.10)%)		
Control output Co	Current co	nsumption	Emitter/Receiv	er:Max.20mA			Max.3	30mA		
Operation mode Light ON/Dark ON selectable NPN open collector output *Load voltage: Max. 26.4VDC Load current: Max.100mA * Residual voltage: Max. 1V PNP open collector output *Load voltage: Min. (Power supply−2.5V) Protection circuit Reverse polarity protection, Output short—circuit protection Reverse polarity protection, Output short—circuit protection Operation: Red, Stable: Green(Emitter of power indicator for transmitted beam: Red) Connection Indicator Operation: Red, Stable: Green(Emitter of power indicator for transmitted beam: Red) Outgoing cable type Insulation resistance Max. 20M2 (at 500VDC) Dielectric strength 1000VAC 50/60Hz for 1minute Vibration 1.5mm or 300mm amplitude at frequency of 10 ~ 55Hz in each of X, Y, Z directions for 2 hours Shock 500m/s² X, Y, Z directions for 3 times Ambient illumination Sunlight: Max. 11,000/x, Incandescent lamp: Max. 3,000/x (Receiver illumination) Ambient temperature -25 ~ 55℃(Storage: -40 ~ 70℃) at non—freezing status Ambient humidity 35 ~ 85%RH(at non—freezing status) Protection Material Case: PC+ABS, Lens: PMMA, LED Cap: PC Cable Ø 3.5mm, 3P, Length:2m (Emitter of transmitted beam type: Ø 3.5mm, 2P, Length:2m) Fixing bracket, Bolt, Adjustment driver Reflector (MS−2A)	Light source	ce							1	
NPN open collector output **Load voltage: Max. 26.4VDC **Load current: Max.100mA **Residual voltage: Max. 1V PNP open collector output **Load voltage: Max. 26.4VDC **Load current: Max.100mA **Residual voltage: Max. 26.4VDC **PNP open collector output **Load voltage: Max. 26.4VDC **Load current: Max.100mA **Residual voltage: Max. 26.4VDC **PNP open collector output **Load voltage: Max. 26.4VDC **Load current: Max.100mA **Residual voltage: Max. 26.4VDC **PNP open collector output **Load voltage: Max. 26.4VDC **Load voltage: Max. 26.4VDC **Load current: Max.100mA **Residual voltage: Max. 26.4VDC **Load current: Max.100mA **Residual voltage: Max. 26.4VDC **Load current: Max.100mA **Residual voltage: Max. 26.4VDC **Connection	Sensitivity	adjustment		;	Short rotator a	djuster(210°)		_	
*Load voltage : Max. 26.4VDC *Load current : Max.100mA * Residual voltage : Max. 1V PNP open collector output *Load voltage : Max. 26.4VDC *Load current : Max.100mA * Residual voltage : Max. 26.4VDC *Load current : Max.100mA * Residual voltage : Max. 26.4VDC *Load current : Max.100mA * Residual voltage : Max. 26.4VDC *Load current : Max.100mA * Residual voltage : Max. 26.4VDC *Load current : Max.100mA * Residual voltage : Max. 26.4VDC *PNP open collector output * Load voltage : Max. 26.4VDC *Reverse polarity protection, Interference prevention function, Output short—circuit protection *Protection Output short—circuit protection *Output short—circuit protection *Outpu	Operation	mode			Light ON/Dark	ON selectable	9		Light ON	mode fixed
PNP open collector output	Control ou	thut	• Load voltage: Max. 26.4VDC • Load current: Max.100mA • Residual voltage: Max. 1V							
Protection circuit Output short-circuit protection function, Output short-circuit protection Indicator Operation : Red, Stable : Green (Emitter of power indicator for transmitted beam : Red) Connection Outgoing cable type Insulation resistance Max. 20MΩ (at 500VDC) Dielectric strength 1000VAC 50/60Hz for 1minute Vibration 1.5mm or 300mm amplitude at frequency of 10 ~ 55Hz in each of X, Y, Z directions for 2 hours Shock 500m/s² X, Y, Z directions for 3 times Ambient illumination Sunlight : Max. 11,000/x, Incandescent lamp : Max. 3,000/x (Receiver illumination) Ambient temperature −25 ~ 55 °C (Storage : −40 ~ 70 °C) at non-freezing status Ambient humidity 35 ~ 85%RH (at non-freezing status) Protection IP65 (IEC standard) Material Case : PC+ABS, Lens : PMMA, LED Cap : PC Cable ∮ 3.5mm, 3P, Length:2m (Emitter of transmitted beam type : ∮ 3.5mm, 2P, Length:2m) Accessory Individual — Reflector (MS-2A) — — Fixing bracket, B	Oontroi ou		• Load cui	• Load current : Max.100mA • Residual voltage : Min. (Power supply-2.5V)						
Connection Outgoing cable type Insulation resistance Max. 20MΩ (at 500VDC) Dielectric strength 1000VAC 50/60Hz for 1minute Vibration 1.5mm or 300mm amplitude at frequency of 10 ~ 55Hz in each of X, Y, Z directions for 2 hours Shock 500m/s² X, Y, Z directions for 3 times Ambient illumination Sunlight: Max. 11,000/x, Incandescent lamp: Max. 3,000/x (Receiver illumination) Ambient temperature −25 ~ 55 ℃ (Storage: −40 ~ 70 ℃) at non-freezing status Ambient humidity 35 ~ 85%RH(at non-freezing status) Protection IP65 (IEC standard) Material Case: PC+ABS, Lens: PMMA, LED Cap: PC Cable ∮ 3.5mm, 3P, Length: 2m (Emitter of transmitted beam type: ∮ 3.5mm, 2P, Length: 2m) Accessory Individual Reflector (MS-2A) Individual Reflector (MS-2A)	Protection	circuit	Output short-circuit protection function, Output short-circuit protection							
Insulation resistance Max. 20MΩ (at 500VDC) Dielectric strength 1000VAC 50/60Hz for 1minute	Indicator									
Dielectric strength 1000VAC 50/60Hz for 1minute Vibration 1.5mm or 300mm amplitude at frequency of 10 ~ 55Hz in each of X, Y, Z directions for 2 hours Shock 500m/s² X, Y, Z directions for 3 times Ambient illumination Sunlight: Max. 11,000/x, Incandescent lamp: Max. 3,000/x (Receiver illumination) -25 ~ 55 °C (Storage: -40 ~ 70 °C) at non-freezing status Ambient humidity 35 ~ 85%RH(at non-freezing status) Protection IP65 (IEC standard) Material Case: PC+ABS, Lens: PMMA, LED Cap: PC Cable Ø 3.5mm, 3P, Length: 2m (Emitter of transmitted beam type: Ø 3.5mm, 2P, Length: 2m) Fixing bracket, Bolt, Adjustment driver Reflector (MS-2A) Approval C€	Connectio	n								
Vibration 1.5mm or 300mm amplitude at frequency of 10 ~ 55Hz in each of X, Y, Z directions for 2 hours 500m/s² X, Y, Z directions for 3 times Ambient illumination Sunlight: Max. 11,000lx, Incandescent lamp: Max. 3,000lx (Receiver illumination) Ambient temperature -25 ~ 55 ℃ (Storage: -40 ~ 70 ℃) at non-freezing status Ambient humidity 75 ~ 85%RH (at non-freezing status) Protection IP65 (IEC standard) Material Case: PC+ABS, Lens: PMMA, LED Cap: PC Cable ∮3.5mm, 3P, Length:2m (Emitter of transmitted beam type: ∮3.5mm, 2P, Length:2m) Fixing bracket, Bolt, Adjustment driver Reflector (MS-2A) Approval C€€	Insulation	resistance	Max. 20MΩ (at 500VDC)							
Shock 500m/s² X, Y, Z directions for 3 times Ambient illumination Sunlight: Max. 11,000/x, Incandescent lamp: Max. 3,000/x (Receiver illumination) Ambient temperature -25 ~ 55 °C (Storage: -40 ~ 70 °C) at non-freezing status Ambient humidity 35 ~ 85 %RH (at non-freezing status) Protection IP65 (IEC standard) Material Case: PC+ABS, Lens: PMMA, LED Cap: PC Cable \$\phi 3.5 \text{mm}, 3P, \text{Length}: 2m (\text{Emitter of transmitted beam type}: \$\phi 3.5 \text{mm}, 2P, \text{Length}: 2m)} Accessory Individual Reflector (MS-2A) CE	Dielectric	strength	1000VAC 50/60Hz for 1minute							
Ambient illumination Ambient temperature Ambient humidity Protection Material Case: PC+ABS, Lens: PMMA, LED Cap: PC Cable Accessory Individual Approval Sunlight: Max. 11,000/x, Incandescent lamp: Max. 3,000/x (Receiver illumination) And Accessory Ambient humidity 35 ~ 85%RH (at non-freezing status) IP65 (IEC standard) Case: PC+ABS, Lens: PMMA, LED Cap: PC Fixing bracket, Bolt, Adjustment driver Reflector (MS-2A) Fixing bracket, Bolt, Adjustment driver Reflector (MS-2A) CE	Vibration									
Ambient temperature	Shock		500m/s ² X, Y, Z directions for 3 times							
Ambient humidity $35 \sim 85\%$ RH (at non-freezing status) Protection IP65 (IEC standard) Material Case: PC+ABS, Lens: PMMA, LED Cap: PC Cable \emptyset 3.5mm, 3P, Length: 2m (Emitter of transmitted beam type: \emptyset 3.5mm, 2P, Length: 2m) Accessory Individual Reflector (MS-2A) Approval \mathbb{C}	Ambient ill	lumination								
Protection	Ambient temperature		-25 ~ 55℃ (Storage: -40 ~ 70℃) at non-freezing status							
Material Case: PC+ABS, Lens: PMMA, LED Cap: PC Cable	Ambient humidity		35 ~ 85%RH(at non-freezing status)							
Cable \$\ \text{\pi} 3.5mm, 3P, Length:2m(Emitter of transmitted beam type : \pi 3.5mm, 2P, Length:2m)}{ Common Fixing bracket, Bolt, Adjustment driver Fixing bracket, Bolt, Adjustment driver Accessory Individual Reflector (MS-2A) Approval CE	Protection		IP65 (IEC standard)							
Accessory Individual Approval Common Fixing bracket, Bolt, Adjustment driver Fixing bracket, Bolt, Adjustment driver Reflector (MS-2A) CE	Material		Case: PC+ABS, Lens: PMMA, LED Cap: PC							
Accessory Individual — Reflector (MS-2A) Approval	Cable		ø 3.5mm, 3P, Length:2m (Emitter of transmitted beam type : ∅ 3.5mm, 2P, Length:2m)							
Approval (MS-2A)		Common	Fixing bracket, Bolt, Adjustment driver Fixing bracket,					acket, Bolt		
	Accessory	Individual								
	Approval					(€			
	Unit weigh	t	Appro	x. 90g	Approx. 60g			prox. 45g		

****(★)** The sensing distance is extended to 0.1~4m or 0.1~5m when using optional reflector MS-2S or MS-3S.

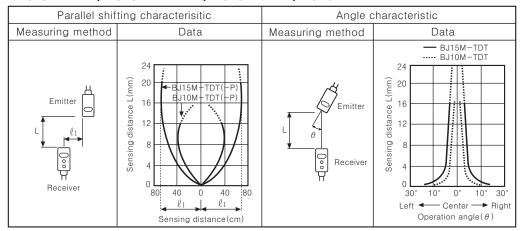
K-9 Autonics

Miniature and built-in amplifier for long sensing distance

■ Feature data

Transmitted beam type

●BJ15M-TDT / BJ15M-TDT-P / BJ10M-TDT / BJ10M-TDT-P



Polarized retroreflective type

●BJ3M-PDT / BJ3M-PDT-P

Parallel shifting characterisitic		Sensor angle characteristic		Reflector angle characteristic	
Measuring method	Data	Measuring method	Data	Measuring method	Data
Reflector	6.0 5.0 5.0 MS - 3S MS - 2S MS - 2	Reflector	$(\widehat{\mathbb{Q}}_{w})^{-1} = (\widehat{\mathbb{Q}}_{w})^{-1} = (\widehat{\mathbb{Q}$	Reflector	4.5 (we 3.5 4.5 3.5 3.5 3.5 4.5 4.5 4.5

●BJ300-DDT / BJ300-DDT-P

ODiffuse reflective

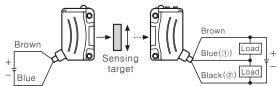
●BJ1M-DDT / BJ1M-DDT-P

Sensir	ng area characteristic	Sensin	g area charact
Measuring method	Data	Measuring method	Da
Standard \$\ell_1\$ sensing target	2000 (mu) 1600 1200 800 800 400 200 40 20 0 20 40 VSensing distance (mm)	Standard larget target	1000 (ww) 800

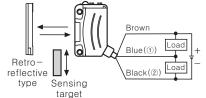
Sensin	g area characteristic	Sensir	ng area characteristic
Measuring method	Data	Measuring method	Data
Standard sensing target	1000 (mm) 800 400 400 200 200 10 0 10 20 Sensing distance (mm)	Standard sensing target	2000 (mu) 1600 1200 800 800 400 200 0 40 20 0 20 40 V Sensing distance (mm)

●BJ100-DDT / BJ100-DDT-P

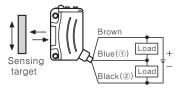
■ Connections • Transmitted beam



Polarized retroreflective type



Diffuse reflective



※① : The load connection of NPN open collector output, ② : The load connection of PNP open collector output

(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

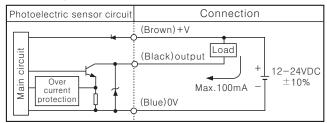
> (P) Production stoppage models & replacement

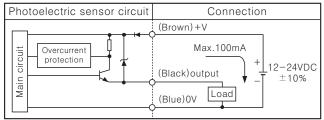
Autonics K-10

■Control output diagram

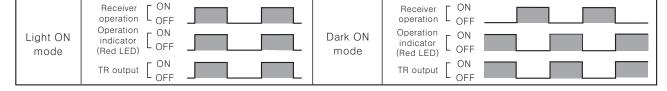
●NPN output

●PNP output

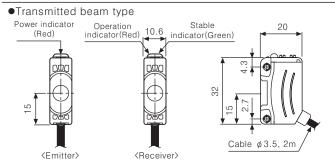


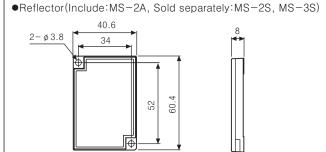


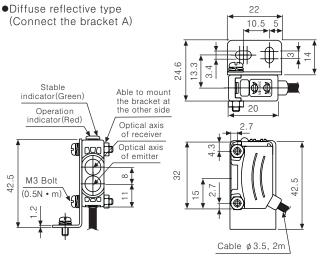
Operation mode

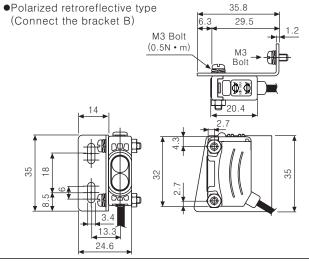


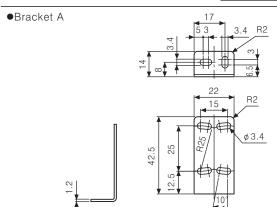
■ **Dimensions** (Unit:mm)

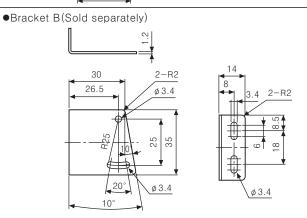








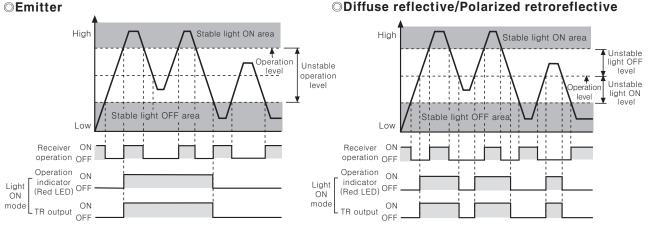




K-11 Autonics

Miniature and built-in amplifier for long sensing distance

■Operation mode and Timing diagram



₩The waveform of 'Operation mode indicator' and 'TR output' is for Light ON mode, it is operated as reverse in Dark ON mode.

■ Mounting and sensitivity adjustment

Switching of operation mode

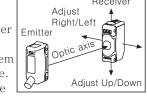
Light ON mode (Light ON)	U//D/	Turn the operation switching adjuster to right(L direction), it is set as Light ON mode.
Light OFF mode (Dark ON)		Turn the operation switching adjuster to left(D direction), it is set as Light OFF mode.

*The operation switching adjuster is installed in the receiver for transmitted beam type.

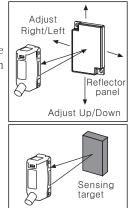
Mounting

- •Transmitted beam type
 - 1. Place the emitter and receiver facing each other and apply the power.

 Receiver
 - 2. After adjust the position of the emitter and receiver and check their stable indicating range, mount them in the middle of the range.



- 3. After mounting, check the operation of sensor and lighting of stable indicator in both status. (None or sensing target status)
- *When the sensing target is translucent or small (Under ϕ 16mm), it can be missed by the sensor because the light can penetrate it.
- Polarized retroreflective type
 - 1. Place the Sensor and retroreflective facing each other and apply the power.
- 2. After adjust the position of the Sensor and retro—reflective and check their stable indicating range, mount them in the middle of the range.
- 3. After mounting, check the operation of sensor and lighting of stable indicating in both status. (None or sensing target status)
- •Diffuse reflective type
 After place a sensing
 target, adjust the sensor to up •
 down, left right. Then, fix the



sensor in center of position where the indicator is operating.

OSensitivity adjustment

Order	Position	Description		
1	(A) MIN MAX	Turn the sensitivity adjuster to the right of min. and check position(A) where the indicator is turned on in "Light ON status".		
2	(A) (C) MIN MAX (B)	Turn the sensitivity adjuster more to the right of position(A), check position(B) where the indicator is turned on. And turn the adjuster to the left, check position(C) where the indicator is turned off in "Dark ON status". **If the indicator is not lighted although the adjuster is turned to the max. position, the max. position is(C).		
3	Optimal sensitivity (A) (C) MIN MAX	Set the adjuster at the center of (A) and (C). To set the optimum sensitivity, check the operation and lighting of stable indicator with sensing target or without it. If the indicator is not lighted, please check the sensing method again because sensitivity is unstable.		

	"Light ON status"	"Light OFF status"
Transmitted beam type	Emitter Receiver	Emitter Sensing Receiver
Polarized retro- reflective type	Sensor Reflector panel	Sensor Sensing Reflector target panel
Diffuse eflective	Sensor target Background object	Background

- *Set the sensitivity to operate in a stable light ON area, the reliability for the environment (Temperature, voltage, dust etc) will be increased.
- *Do not apply an excessive force on adjuster, it can be broken.

(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) Production stoppage models & replacement

Autonics K-12