Autonics BWC Series Cross-Beam Area Sensor Instruction Manual

Contents

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Safety Considerations

※Please observe all safety considerations for safe and proper product operation to avoid hazards.
※ symbol represents caution due to special circumstances in which hazards may occur.

Warning

1. 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.
2. 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.
3. Do not connect, repair, or inspect the unit while connected to a power source.
   Failure to follow this instruction may result in fire.
4. Check 'Connections' before wiring.
   Failure to follow this instruction may result in fire.
5. Do not disassemble or modify the unit.
   Failure to follow this instruction may result in fire.
6. This product is not safety sensor and does not observe any domestic nor international safety standard.
   Do not use this product with the purpose of injury prevention or life protection, as well as in the place where economic loss maybe present.

⚠ Caution

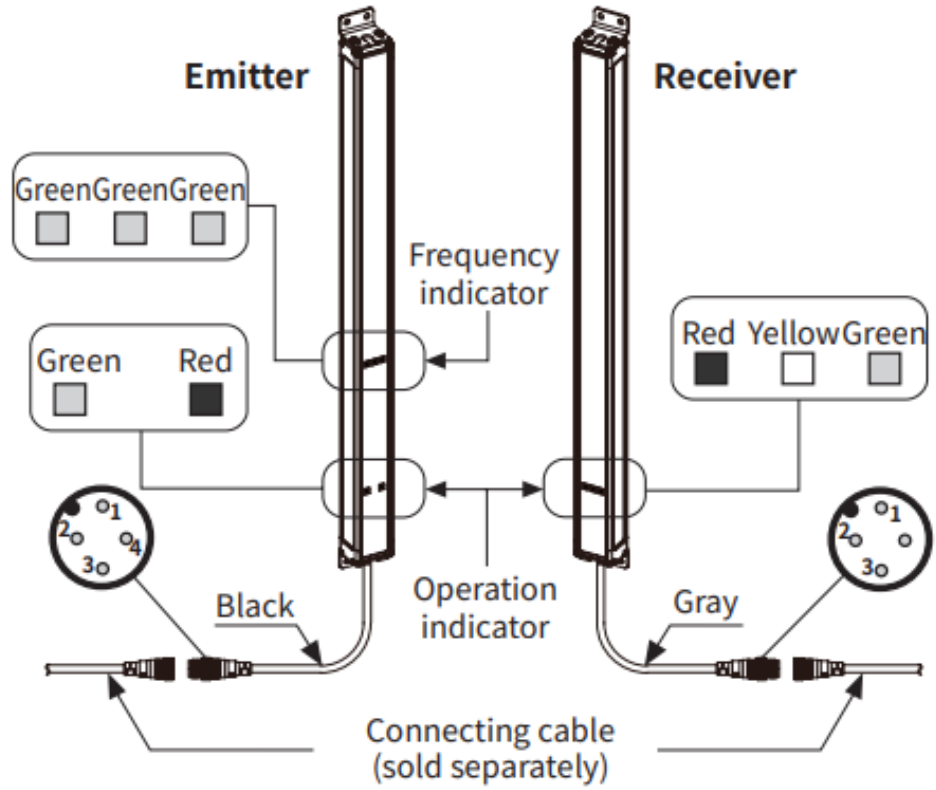
1. Use the unit within the rated specifications.
   Failure to follow this instruction may result in fire or product damage.
2. Use dry cloth to clean the unit, and do not use water or organic solvent.
   Failure to follow this instruction may result in fire.

Ordering Information

BWC 40 – 14 H

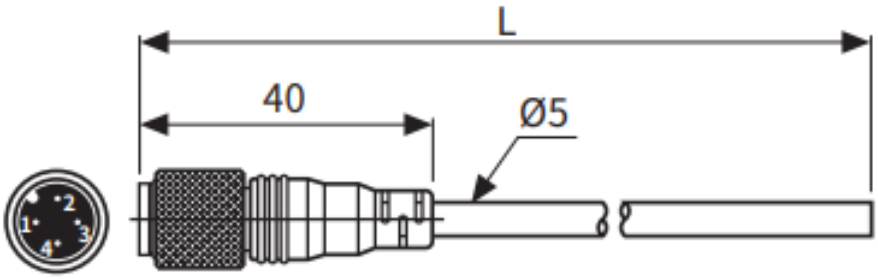
Operation mode	**H**	Light ON
	HD	Dark ON
Number of optical axes	**Number**	4 to 20pcs
Optical axis pitch	**40**	40mm pitch
	80	80mm pitch
Item	**BWC**	Area sensor

Ordering Information



Wiring connection			
Pin no	Cable color	Emitter	Receiver
1	Brown	12-24VDC	12-24VDC
2	White	SYNC	SYNC
3	Blue	0V	0V
4	Black	MODE	OUT

Connection Cable (sold separately)



Function

Interference Protection

You can change transmitted light frequency to prevent interference from several units.
To change transmitted light frequency, input 0V for over 1 second to 4th terminal, (black) MODE, in installation mode.
Frequency type is displayed by frequency indicator.

Transmitted light frequency	Frequency indicator		
	Green1	Green2	Green3
Frequency A			
Frequency B			
Frequency C			
Frequency D			
Frequency E			

Installation Mod

This function is for stable installation.
Inputting 0V to 4th terminal of emitter which is (black) MODE, supply power to the product to enter to the installation mode.

Self-Diagnosis Output

This function outputs self-diagnosis signal, when front screen is contaminated with dust, optical axis is misaligned due to vibration, emitter is damaged due to the long-term usage, or light t is not received due to obstacle such as

leaves and trash on the product.
It operates in the operation mode, and you can check the status through an external device which is connected to 4th terminal of emitter, (black) MODE.

Self-Diagnosis

If there is checked malfunction during normal operation by regular self-diagnosis, control output

● Diagnosis item

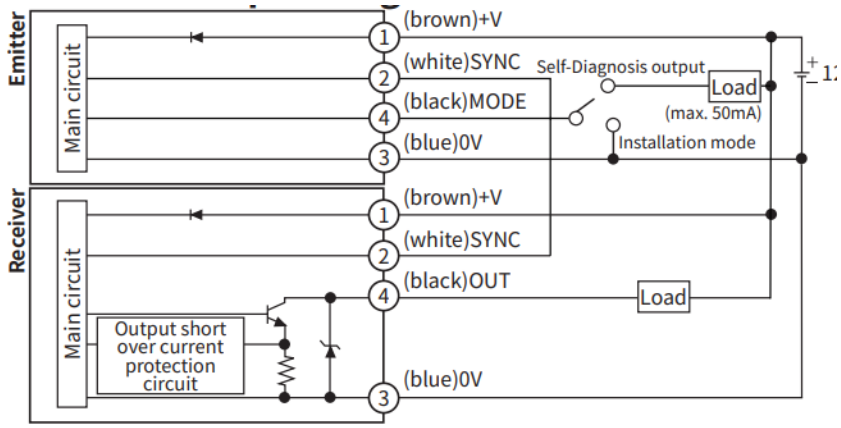
① Break of light emitting element
② Break of emitter
③ Break of adjacent emitting element more than 2.
④ Break of receiver
⑤ Emitter failure
⑥ Receiver failure
⑦ Malfunction of synchronous cable

Specifications

Model		BWC40-□□H	BWC40-□□HD	BWC80-14H	BWC80-14HD
Sensing method		Through-beam			
Sensing distance		1.0 to 7.0m			
Sensing target		Opaque material of min Ø50mm		Opaque material of min Ø90mm	
Optical axis pitch		40mm		80mm	
Number of optical axes		4/10/12/16/18/20pcs		14pcs	
Sensing height		120 to 760mm		1,040mm	
Beam pattern		3-point cross beam netting type			
Power supply		12-24VDC⎓±10% (ripple P-P: max. 10%)			
Protection circuit		Reverse polarity protection circuit, output short over current protection circuit			
Current consumption		Max. 100mA			
Operation mode		Light ON	Dark ON	Light ON	Dark ON
Response time		Within 50ms			
Control output		NPN open collector output • Load voltage: max. 30VDC⎓ • Load current: max. 100mA (self-diagnosis output: max 50mA) • Residual voltage: max. 1VDC⎓			
Light source		Infrared LED (850nm modulated light type)			
Synchronization type		Timing method by synchronous cable			
Self-diagnosis		Transmitted-received light monitoring, direct light monitoring, output circuit monitoring, self-diagnosis output (checking whether there is contamination on the front screen, or any obstacle on optical axis)			
Interference protection		Interference protection by frequency changing setting			
Noise immunity		±240V the square wave noise (pulse width 1μs) by the noise simulator			
Dielectric strength		1,000VAC 50/60Hz for 1minute			
Insulation resistance		Over 20MΩ (at 500VDC megger)			
Vibration		1.5mm amplitude at frequency of 10 to 55Hz (for 1 min) in each X, Y, Z direction for 2 hours			
Shock		500m/s^2 (approx. 50G) in each X, Y, Z direction for 3 times			
Environ-ment	Ambient illum.	Ambient light: max. 100,000lx			
	Ambient temp.	-10 to 55℃, storage: -20 to 60℃			
	Ambient humi.	35 to 85%RH, storage: 35 to 85%RH			
Material		Case: aluminum, sensing part and indicator: acrylic			
Cable		Ø5mm, 4-wire, length: 300mm, M12 connector			
Accessory		Bracket A: 4, bracket B: 4, fixing bolt: 8			
Protection		IP67 (IEC standard)			
Korean Railway Standards		—			KRS SG 0068
Approval		CE			CE,
Weight※1		Approx. 2.1kg (approx. 1.7kg) (based on BWC80-14H)			

※Environment resistance is rated at no freezing or condensation.
※1: The weight includes packaging. The weight in parenthesis is for unit only.

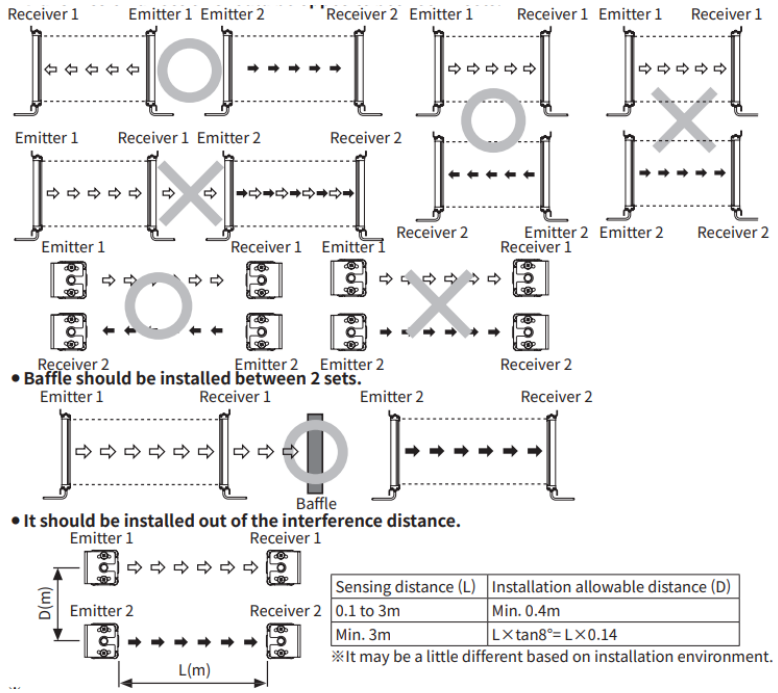
Control Output Diagram



Operating Mode

	Light ON	Dark ON
Emitter/ Receiver	Received light Interrupted light	Received light Interrupted light
Operation Indicator (Green LED)	ON OFF	ON OFF
Transistor output	ON OFF	ON OFF

Operation Timing Diagram



Sensing distance (L)	Installation allowable distance (D)
0.1 to 3m	Min. 0.4m
Min. 3m	L×tan8°= L×0.14

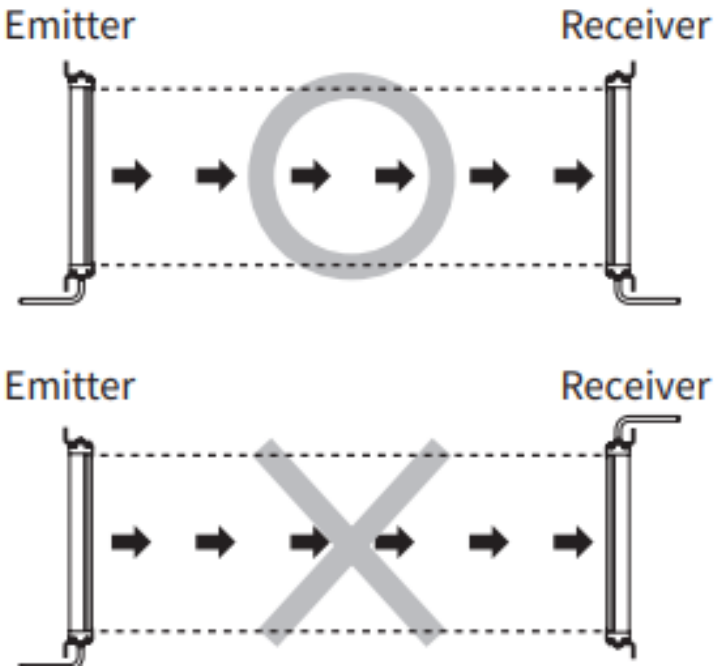
※It may be a little different based on installation environment.

Installations

For the first installation, enter installation mode.
①Entry method for installation mode: Supply power with inputting 0V to 4th terminal (Black) MODE.
②After entering installation mode, install the unit at the position where green LED of receiver operation indicator turns ON.
③After installation, re-supply power to the unit.

For Direction Of Installation

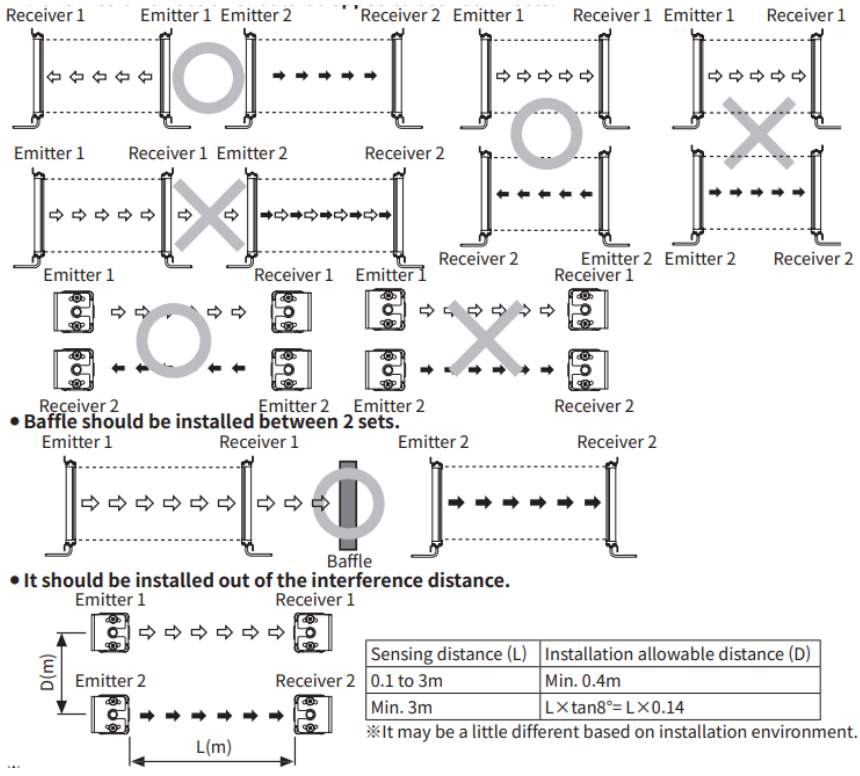
Emitter and receiver should be installed in same up/down direction.
For Reflection From The Surface Of Wall And Flat When installing it as below, the light reflected from the surface of wall and flat is not shaded. Please check whether it operates normally or not with a sensing



For Protection Of Interference

It may cause interference when installing more than 2 sets of the sensor. In order to avoid the interference of the sensor, please install as following figures and use the transmitted light frequency changing function.

● Transmission direction should be opposite between 2 sets.



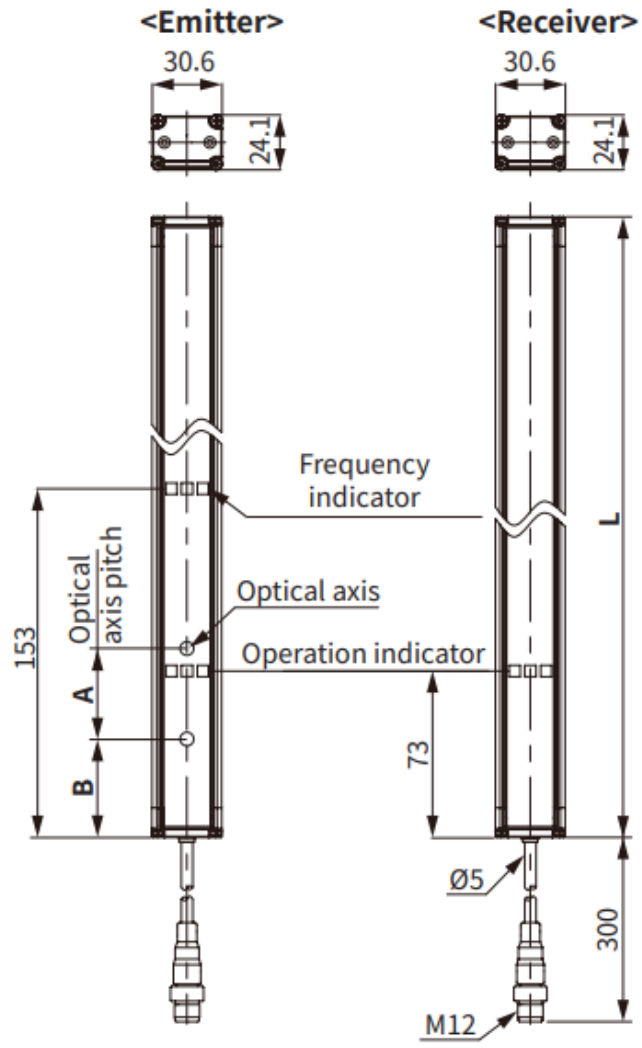
• Baffle should be installed between 2 sets.

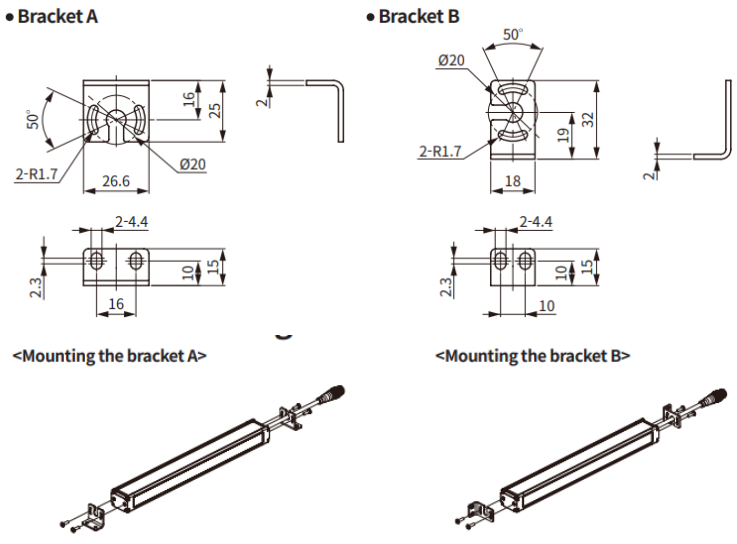
• It should be installed out of the interference distance.

Sensing distance (L)	Installation allowable distance (D)
0.1 to 3m	Min. 0.4m
Min. 3m	L×tan8°= L×0.14

※It may be a little different based on installation environment.

Dimensions

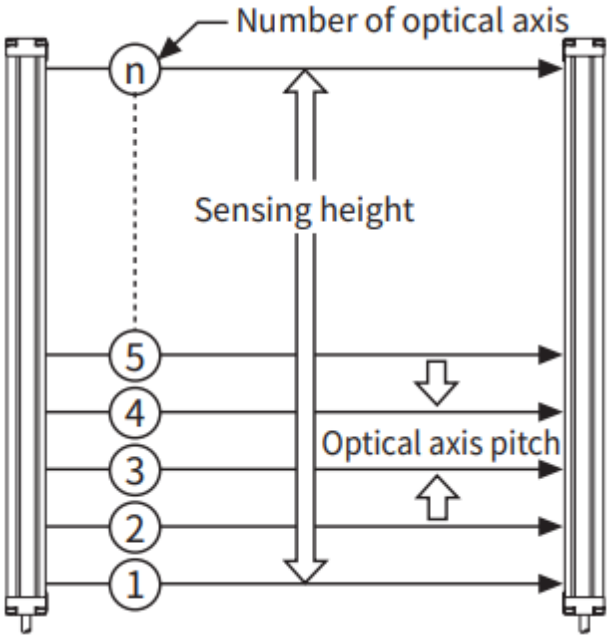




<Mounting the bracket A>

<Mounting the bracket B>

Optical Axis Pitch/Number of Optical Axis/Sensing Height



Model	Number of optica axis	Sensing height	Optical axis pitch
BWC40-04H/HD	4	120mm	40mm
BWC40-10H/HD	10	360mm	
BWC40-12H/HD	12	440mm	
BWC40-16H/HD	16	600mm	
BWC40-18H/HD	18	680mm	
BWC40-20H/HD	20	760mm	
BWC80-14H/HD	14	1,040mm	80mm

Operation Indicator

Item		Emitter		Receiver				
		Indicator		Indicator			Control output	
		Green	Red	Green	Yellow	Red	Light ON	Dark ON
Power supply		☼	●	—	—	—	—	—
Break of emitter		◑◑	◐◐	—	—	—	—	—
Break of light emitting element		◑	◐	◑	◑	◑	OFF	OFF
Break of adjacent emitting element more than 2.		◑	◑	◑	◑	◑	OFF	OFF
Installation mode	Normal installation	☼	◑	☼	●	◑	OFF	OFF
	Hysterisis section	●	◑	●	☼	◑		
	Abnormal installation	●	◑	●	●	◑		
Stable light ON		☼	●	☼	●	●	ON	OFF
Unstable light ON		☼	●	☼	☼	●	ON	OFF
Unstable light OFF		●	☼	•	☼	☼	OFF	ON
Stable light OFF		●	☼	•	•	☼	OFF	ON
Break of receiver		—	—	◑◑	•	◐◐	OFF	OFF
Control output over current		—	—	◑	◐	☼	OFF	OFF
Synchronous line malfunction		—	—	◑	●	◑	OFF	OFF
Emitter failure (time out)		—	—	◑	◑	◑	OFF	OFF
Receiver failure (time out)		◑	◑	—	—	—	OFF	OFF

※Indicator table

☼	Lighting
●	Light out
◑	Flashing at 0.5 sec interval
◑◑ or ◑◑◑	Flashing simultaneously at 0.5 sec interval
◑◐	Cross-flashing at 0.5 sec interval
◑◑◑	Sequence-flashing at 0.5 sec interval

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Troubleshooting

Malfunction	Cause	Troubleshooting
Non-operation	Power supply	Supply the rated power.
	Cable incorrect connection, or disconnection	Check the wiring connection
	Out of rated sensing distance	Use it within rated sensing distance.
Non-operation in sometimes	Pollution by dirt of sensor cover	Remove dirt by soft brush or cloth.
	Connector connection failure	Check the assembled part of the connector
Control output is OFF even though there is not a target object.	Out of the rated sensing distance	Use it within the rated sensing distance.
	There is an obstacle to cut off the emitted light between emitter and receiver.	Remove the obstacle.
	There is strong electric wave or noise generator such as motor, electric generator, or high voltage line, etc.	Put away the strong electric wave or noise generator.
Operation indicator displays break of emitter	Break of emitter	Contact our company.
Operation indicator displays break of receiver	Break of receiver	
Operation indicator displays break of light emitting element	Break of light emitting element	
Operation indicator displays emitter/ receiver failure	Emitter or Receiver failure	
	Bad wiring connection of synchronous cable in emitter and receiver	Check the wiring connection in emitter and receiver.
Check the wiring connection in emitter and receiver.	Control output line is shorted out.	Check the wiring connection.
	Over load	Check the rated load capacity.

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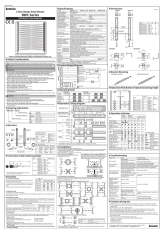	Autonics BWC Series Cross-Beam Area Sensor [pdf] Instruction Manual BWC Series Cross-Beam Area Sensor, BWC Series, Cross-Beam Area Sensor, Beam Area Sensor, Area Sensor, Sensor

References

- autonics.com