

Autonics

Cross-beam Area Sensor BWC Series

INSTRUCTION MANUAL



Thank you for choosing our Autonics product.

Please read the following safety considerations before use.

■ 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** Failure to follow these instructions may result in serious injury or death.
- Caution** Failure to follow these instructions may result in personal injury or product damage.

⚠ Warning

- 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.
- 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.
- Do not connect, repair, or inspect the unit while connected to a power source.**
Failure to follow this instruction may result in fire.
- Check 'Connections' before wiring.**
Failure to follow this instruction may result in fire.
- Do not disassemble or modify the unit.**
Failure to follow this instruction may result in fire.
- 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 may be present.

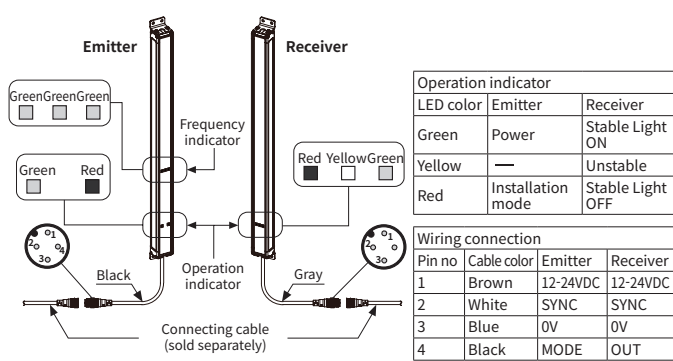
⚠ Caution

- Use the unit within the rated specifications.**
Failure to follow this instruction may result in fire or product damage.
- Use dry cloth to clean the unit, and do not use water or organic solvent.**
Failure to follow this instruction may result in fire.
- Do not use a load over the range of rated relay specification.**
Failure to follow this instruction may result in fire, relay broken, contact melt, insulation failure or contact failure.

■ Ordering Information

BWC	40	-	14	H
Operation mode				
Number of optical axes				
Optical axis pitch				
Item				
H	Light ON			
HD	Dark ON			
Number	4 to 20pcs			
40	40mm pitch			
80	80mm pitch			
BWC	Area sensor			

■ Structure



■ Connection Cable (sold separately)

Type	Model	L	Cable color
Emitter	CID4-3T	3m	Black
	CID4-5T	5m	
	CID4-7T	7m	
	CID4-10T	10m	
	CID4-15T	15m	
Receiver	CID4-3R	3m	Gray
	CID4-5R	5m	
	CID4-7R	7m	
	CID4-10R	10m	
	CID4-15R	15m	

※Connecting cable is sold separately as one set, each of emitter's and receiver's.

■ 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	Green1	Green2	Green3
Frequency A	●	●	●
Frequency B	●	●	●
Frequency C	●	●	●
Frequency D	●	●	●
Frequency E	●	●	●

○ Installation Mode
 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 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.

Item	Emitter operation indicator	Control output	Self-diagnosis output
Front screen contamination level 1	Red, flashing at 1 sec interval	Light ON / Dark ON	ON / OFF
Front screen contamination level 2, covering optical axis	Red, flashing at 0.25 sec interval	ON / OFF	ON

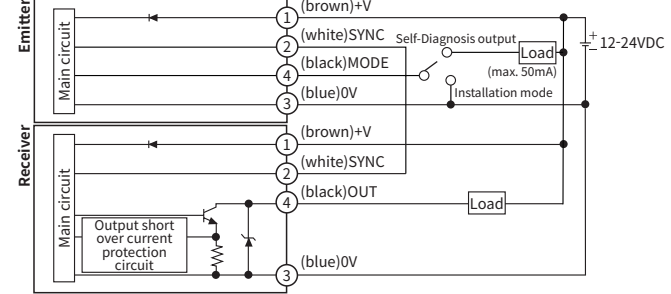
- Self-Diagnosis**
 If there is checked malfunction during normal operation by regular self-diagnosis, control output turns OFF and operation indicator displays the state. (Refer to 'Operation Indicator'.)
- Diagnosis item**
- | | |
|---------------------------------------------------|---------------------|
| 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 | |
- ※The above specifications are subject to change and some models may be discontinued without notice.
 ※Be sure to follow cautions written in the instruction manual and the technical descriptions (catalog, homepage).

■ Specifications

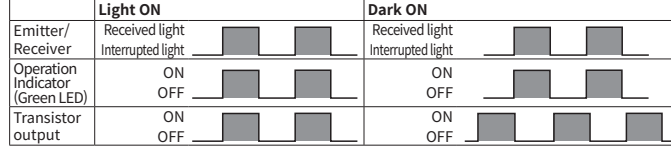
Model	BWC40-□□H	BWC40-□□HD	BWC80-14H	BWC80-14HD
Sensing method	Through-beam			
Sensing distance	1.0 to 7.0m			
Sensing target	Opaque material of min Ø50mm		Opaque material of min Ø90mm	
Optical axis pitch	40mm		80mm	
Number of optical axes	4/10/12/16/18/20pcs		14pcs	
Sensing height	120 to 760mm		1,040mm	
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			
Environment	Ambient illum.	Ambient light: max. 100,000lx		
	Ambient temp.	-10 to 55°C, storage: -20 to 60°C		
	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.

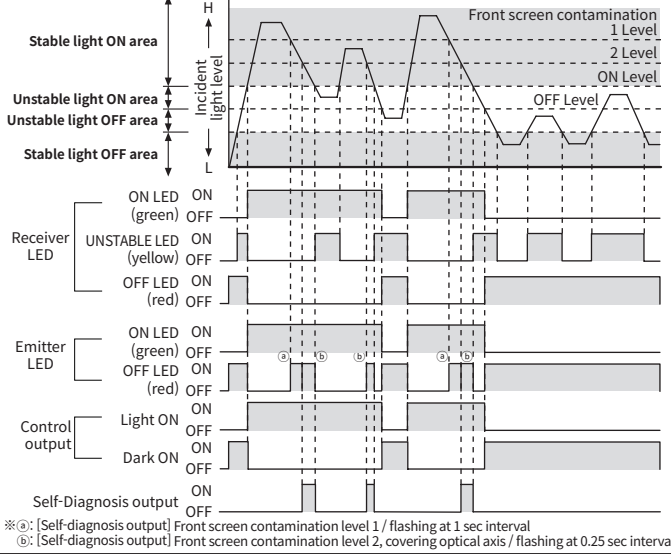
■ Control Output Diagram



■ Operating Mode



■ Operation Timing Diagram

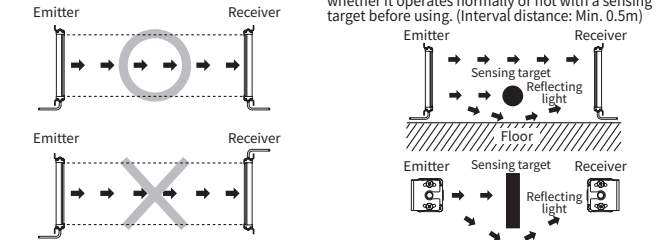


■ Installations

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

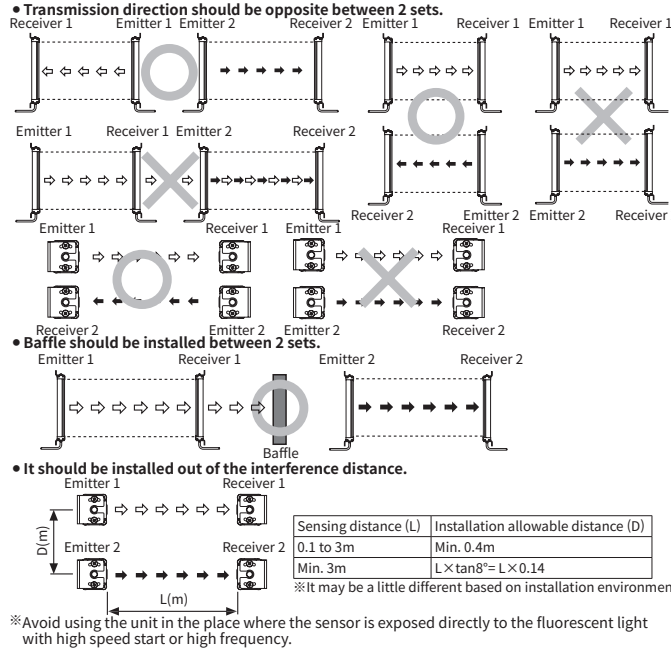
○ For Direction of Installation
 Emitter and receiver should be installed in same up/down direction.

○ 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 target before using. (Interval distance: Min. 0.5m)

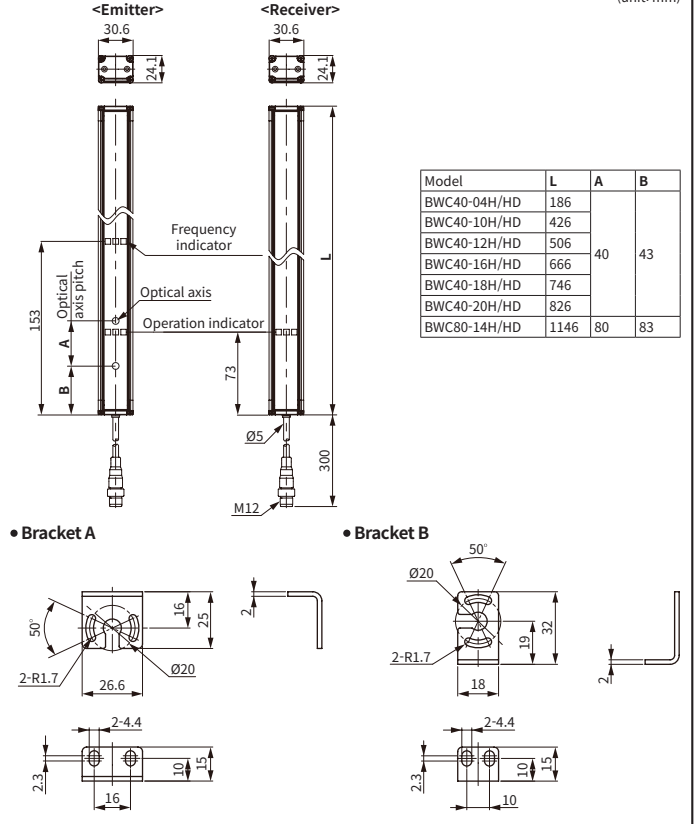


○ For Protection Of Interference

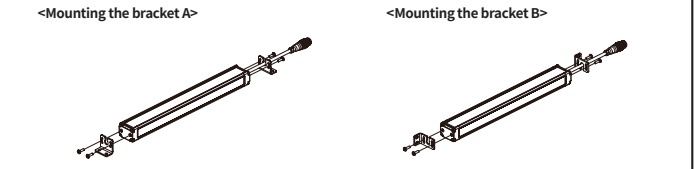
It may cause interference when installing more than 2 sets of the sensor. In order to avoid the interference of the sensor, please install as following figures and use the transmitted light frequency changing function.



■ Dimensions



■ Bracket Mounting



■ Optical Axis Pitch/Number of Optical Axis/Sensing Height

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

※Indicator table

- Lighting
- Light out
- Flashing at 0.5 sec interval
- Flashing simultaneously at 0.5 sec interval
- Cross-flashing at 0.5 sec interval
- Sequence-flashing at 0.5 sec interval

■ Troubleshooting

Malfunction	Cause	Troubleshooting
Non-operation	Power supply	Supply the rated power.
	Cable incorrect connection, or disconnection	Check the wiring connection
Non-operation in sometimes	Out of rated sensing distance	Use it within rated sensing distance.
	Pollution by dirt of sensor cover	Remove dirt by soft brush or cloth.
Control output is OFF even though there is not a target object.	Connector connection failure	Check the assembled part of the connector
	Out of the rated sensing distance	Use it within the rated sensing distance.
Operation indicator displays break of emitter	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 receiver	Break of emitter	Contact our company.
	Break of receiver	
Operation indicator displays break of light emitting element	Break of light emitting element	Check the wiring connection in emitter and receiver.
	Emitter or Receiver failure	
Check the wiring connection in emitter and receiver.	Bad wiring connection of synchronous cable in emitter and receiver	Check the wiring connection.
	Control output line is shorted out.	
Over load	Control output line is shorted out.	Check the rated load capacity.
	Over load	

■ Cautions during Use

- Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents.
- 12-24VDC power supply should be insulated and limited voltage/current or Class 2, SELV power supply device.
- Use the product, 1 sec after supplying power.
 When using separate power supply for the sensor and load, supply power to sensor first.
- When using switching mode power supply to supply the power, ground F.G. terminal and connect a condenser between 0V and F.G. terminal to remove noise.
- When connecting a DC relay or other inductive load, remove surge by using diodes or varistors.
- Wire as short as possible and keep away from high voltage lines or power lines, to prevent surge and inductive noise.
- This unit may be used in the following environments.
 - Indoors (in the environment condition rated in 'Specifications')
 - Altitude max. 2,000m
 - Pollution degree 2
 - Installation category II