

## Cross-beam Area Sensor

### ■ Features

- 3-point cross-beam netting method minimizes non-sensing area and increases sensing ability
- Long sensing distance 7m
- 7 models of number of optical axes (4 to 20EA) and optical axis pitch(40,80mm), sensing height(120 to 1,040mm)
- Easy installation by installation mode function
- Built-in interference protection, self-diagnosis function
- High luminance indicators for emitter and receiver to check the status at side, front, and long distance
- Protection structure IP65(IEC structure)

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



**NEW**



### ■ Applications

Screen door for subway platform and dangerous industry environment

### ■ Ordering information

**BWC** **40** - **14** **H**

|      |                        |                        |            |
|------|------------------------|------------------------|------------|
| Item | Operation mode         | H                      | Light ON   |
|      |                        | HD                     | Dark ON    |
|      | Number of optical axes | Number                 | 4 to 20EA  |
|      | Optical axis pitch     | 40                     | 40mm pitch |
|      |                        | 80                     | 80mm pitch |
|      | BWC                    | Cross-beam area sensor |            |

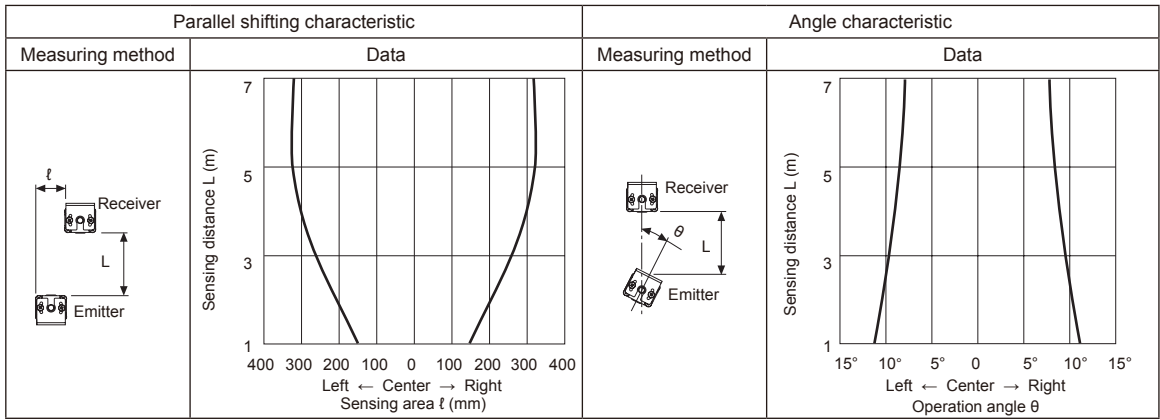
### ■ Specifications

| Model                       | BWC40-□□H  | BWC40-□□HD   | BWC80-14H                     | BWC80-14HD |         |
|-----------------------------|--|--|-------------------------------|------------|---------|
| Sensing type                | Through-beam type  |  |                               |            |         |
| 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      | 4/10/12/16/18/20EA   |  | 14EA                          |            |         |
| 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%)   |  |                               |            |         |
| Reverse polarity protection | Built-in   |  |                               |            |         |
| Current consumption         | Max. 100mA   |  |                               |            |         |
| Control output              | NPN open collector output •Load voltage: max. 30VDC, •Load current: Max. 100mA, •Residual voltage: Max. 1V             |  |                               |            |         |
|                             | Operation mode   | Light ON   | Dark ON                       | Light ON   | Dark ON |
|                             | Short-circuit protection   | Built-in   |                               |            |         |
|                             | Response   | Max. 50ms  |                               |            |         |
| 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                              |  |                               |            |         |
| Interference protection     | Interference protection by frequency changing setting  |  |                               |            |         |
| Environment                 | Ambient illumination   | Ambient light: Max. 100,000lx (received light side illumination) |                               |            |         |
|                             | Ambient temperature  | -10 to 55°C, storage: -20 to 60°C                                |                               |            |         |
|                             | Ambient humidity   | 35 to 85%RH, storage: 35 to 85%RH                                |                               |            |         |
| Protection                  | IP65(IEC standard)   |  |                               |            |         |
| Noise resistance            | ±240V the square wave noise (pulse width: 1μs) by the noise simulation   |  |                               |            |         |
| Dielectric strength         | 1,000VAC 50/60Hz for 1 min.  |  |                               |            |         |
| Insulation resistance       | Min. 20MΩ (at 500VDC megger)   |  |                               |            |         |
| Vibration                   | 1.5mm amplitude or 300m/s <sup>2</sup> at frequency of 10 to 55Hz(for 1 min.) in each of X, Y, Z directions for 2 hour |  |                               |            |         |
| Shock                       | 500m/s <sup>2</sup> (approx. 50G) in each of X, Y, Z directions for 3 times  |  |                               |            |         |
| Material                    | Case: Aluminum, Sensing part and indicator: Acrylic  |  |                               |            |         |
| Cable                       | Ø5, 4-core, length: 300mm, M12 connector   |  |                               |            |         |
| Accessory                   | Bracket A : 4EA, Bracket B : 4EA, Fixing bolt: 8EA   |  |                               |            |         |
| Approval                    | CE   |  |                               |            |         |
| Unit weight                 | Approx. 1.7kg (based on BWC80-14H)   |  |                               |            |         |

※The temperature or humidity mentioned in Environment indicates a non freezing or condensation environment.

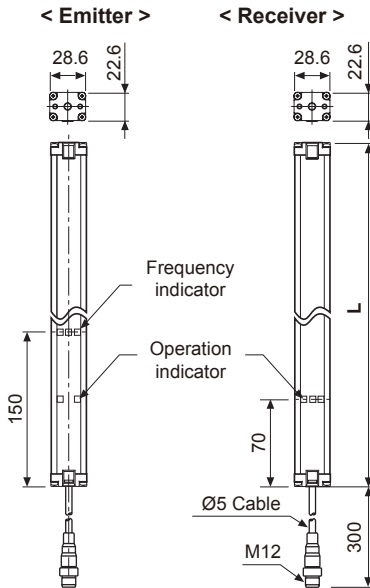
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## Feature data

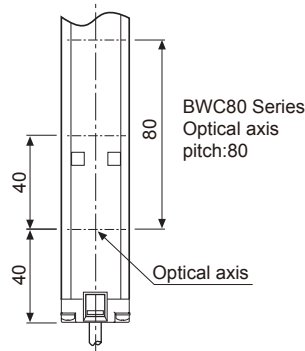


## Dimensions

(unit : mm)

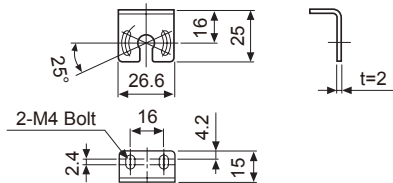


BWC40 Series  
Optical axis  
pitch:40

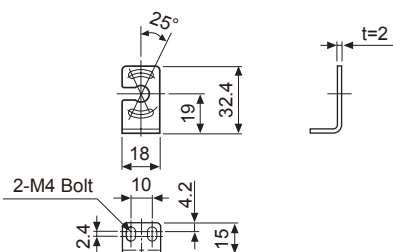


| Model        | L(mm)  |
|--------------|--------|
| BWC40-04H/HD | 180mm  |
| BWC40-10H/HD | 420mm  |
| BWC40-12H/HD | 500mm  |
| BWC40-16H/HD | 660mm  |
| BWC40-18H/HD | 740mm  |
| BWC40-20H/HD | 820mm  |
| BWC80-14H/HD | 1140mm |

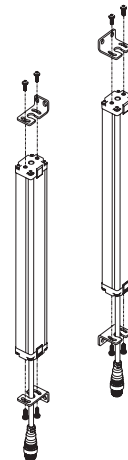
### • Bracket A



### • Bracket B



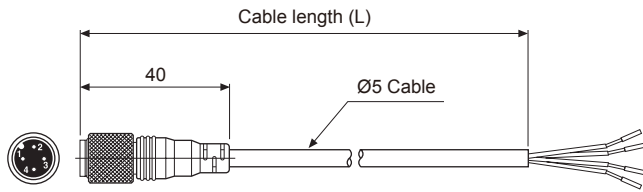
### • Mounting brackets



- (A) Photo electric sensor
- (B) Fiber optic sensor
- (C) Door/Area sensor
- (D) Proximity sensor
- (E) Pressure sensor
- (F) Rotary encoder
- (G) Connector/Socket
- (H) Temp. controller
- (I) SSR/ Power controller
- (J) Counter
- (K) Timer
- (L) Panel meter
- (M) Tacho/ Speed/ Pulse meter
- (N) Display unit
- (O) Sensor controller
- (P) Switching mode power supply
- (Q) Stepper motor& Driver&Controller
- (R) Graphic/ Logic panel
- (S) Field network device
- (T) Software
- (U) Other

# BWC Series

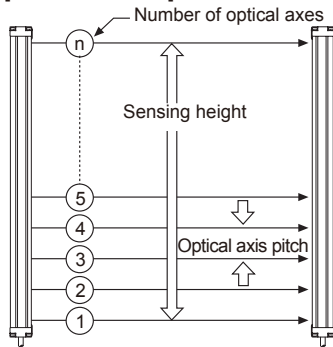
## ■ Connection cable(sold separately)



| Type         | Model    | L   | Cable color |
|--------------|----------|-----|-------------|
| For emitter  | CID4-3T  | 3m  | Black       |
|              | CID4-5T  | 5m  |             |
|              | CID4-7T  | 7m  |             |
|              | CID4-10T | 10m |             |
| For receiver | CID4-3R  | 3m  | Gray        |
|              | CID4-5R  | 5m  |             |
|              | CID4-7R  | 7m  |             |
|              | CID4-10R | 10m |             |

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

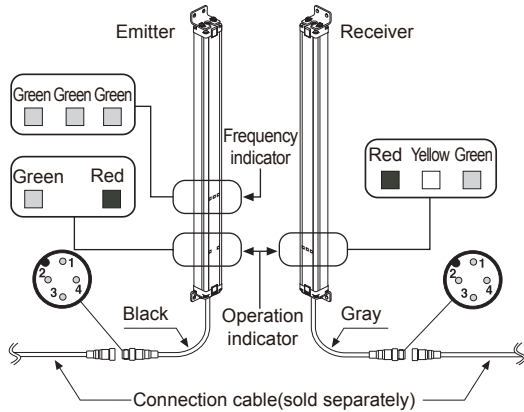
## ■ Optical axis pitch/Number of optical axes/Sensing height



| Model       | Optical axis pitch |
|-------------|--------------------|
| BWC40-□H/HD | 40mm               |
| BWC80-□H/HD | 80mm               |

| Model        | No. of optical axes | Sensing height |
|--------------|---------------------|----------------|
| BWC40-04H/HD | 4EA                 | 120mm          |
| BWC40-10H/HD | 10EA                | 360mm          |
| BWC40-12H/HD | 12EA                | 440mm          |
| BWC40-16H/HD | 16EA                | 600mm          |
| BWC40-18H/HD | 18EA                | 680mm          |
| BWC40-20H/HD | 20EA                | 760mm          |
| BWC80-14H/HD | 14EA                | 1,040mm        |

## ■ Structure



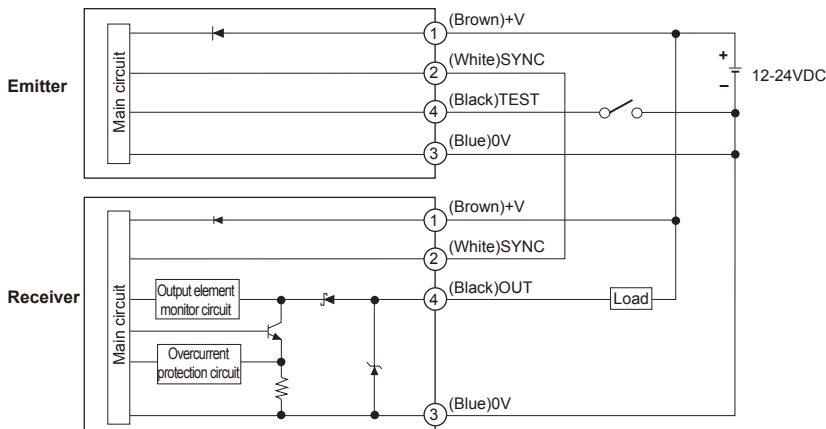
< Operation indicator >

| LED color | Emitter           | Receiver         |
|-----------|-------------------|------------------|
| Green     | Power             | Stable light ON  |
| Yellow    | —                 | Unstable area    |
| Red       | Installation mode | Stable light OFF |

<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      |

## ■ Control output circuit

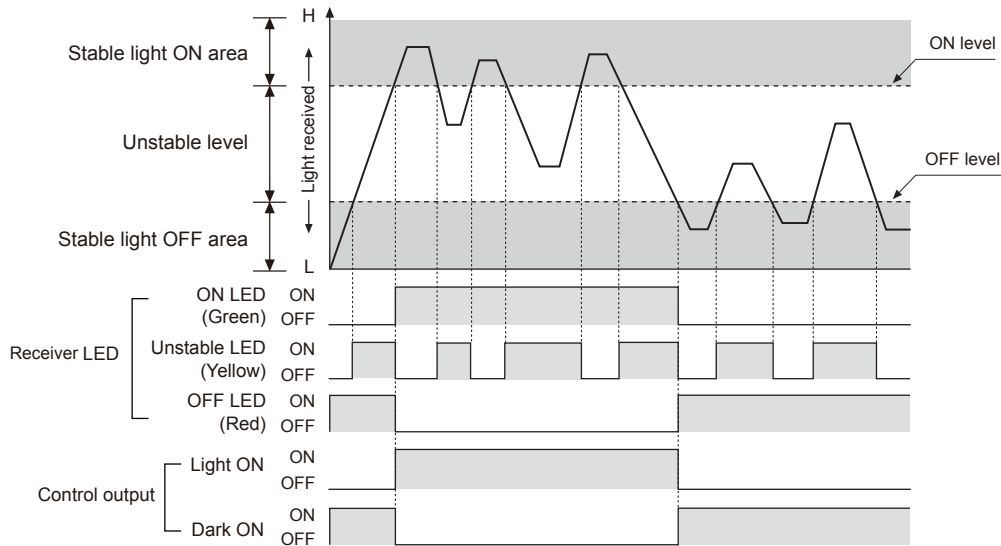


# Cross-beam Area Sensor

## ■ Operation mode

| Operation mode                  | Light ON          |  | Dark ON           |  |
|---------------------------------|-------------------|--|-------------------|--|
| Receiver                        | Received light    |  | Received light    |  |
|                                 | Interrupted light |  | Interrupted light |  |
| Operation indicator (Green LED) | ON                |  | ON                |  |
|                                 | OFF               |  | OFF               |  |
| Transistor output               | ON                |  | ON                |  |
|                                 | OFF               |  | OFF               |  |

## ■ Operation timing diagram



## ■ Functions

### ◎ Interference protection

You can change transmitted light frequency to prevent interference from several units.  
To change transmitted light frequency, input 0V to no. 4 terminal (black) MODE (for over 1 sec.) of Emitter during normal operation.  
Frequency type is displayed by the frequency indicator.

☼ : ON, ● : OFF

| Transmitted light frequency | Frequency indicator |         |         |
|-----------------------------|---------------------|---------|---------|
|                             | Green 1             | Green 2 | Green 3 |
| Frequency A                 | ☼                   | ●       | ●       |
| Frequency B                 | ●                   | ☼       | ●       |
| Frequency C                 | ●                   | ●       | ☼       |
| Frequency D                 | ☼                   | ●       | ☼       |
| Frequency E                 | ☼                   | ☼       | ☼       |

### ◎ Installation mode

This function is for stable installation.  
To enter installation mode, supply the power with inputting 0V to no. 4 terminal (black) MODE of Emitter.

☼ : ON, ● : OFF, ◐ : Flash

| Item                  | Emitter |     | Receiver |        |     | Control output |
|-----------------------|---------|-----|----------|--------|-----|----------------|
|                       | Green   | Red | Green    | Yellow | Red |                |
| Normal installation   | ●       | ◐   | ☼        | ●      | ◐   | OFF            |
| Hysteresis section    | ●       | ◐   | ●        | ☼      | ◐   | OFF            |
| Abnormal installation | ●       | ◐   | ●        | ●      | ◐   | OFF            |

### ◎ Self-diagnosis

If there is malfunction during normal operation by regular self-diagnosis, control output turns OFF and operation indicator displays the state.

#### ●Diagnosis items

- |   |                                    |
|---|------------------------------------|
| ① Break of light emitting element                   | ④ Break of receiver                |
| ② Break of Emitter                                  | ⑤ Emitter failure                  |
| ③ Break of adjacent emitting elements more than 2EA | ⑥ Malfunction of synchronous cable |

※ For more information about operation indication display, refer to "■ Operation indicator DISPLAY" at C-20 page.

(A) Photo electric sensor

(B) Fiber optic sensor

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# BWC Series

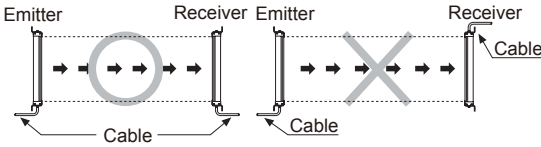
## ■ Installation

For the first installation, enter installation mode.

- ① Entry method for installation mode: Supply the power with inputting 0V to no. 4 terminal (black) MODE of Emitter.
- 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 the power to the unit.

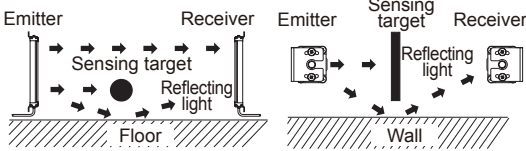
## ◎ For direction of installation

Emitter-Receiver should be installed in same up/down direction.



## ◎ For reflection from the surface of wall/flat

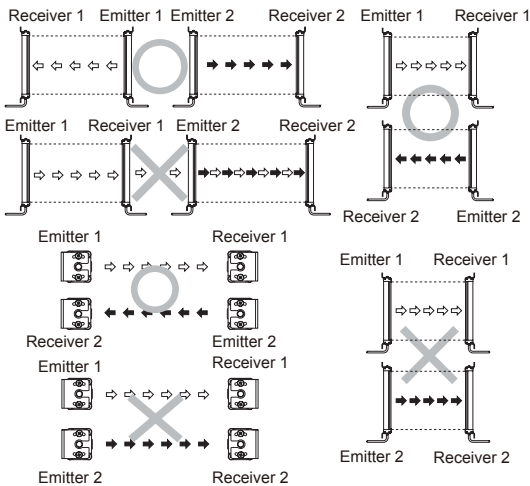
When installing it as below, the light reflected from the surface of wall and flat is not shaded. Please check whether it operates normally or not with a sensing target before using. (interval distance: min. 0.5m)



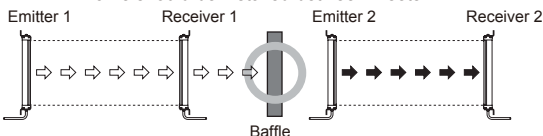
## ◎ For protection of interference

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 interference protection function

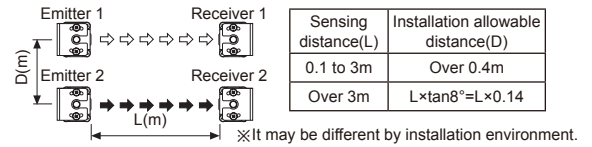
< Transmission direction should be opposite between 2 sets >



< Baffle should be installed between 2 sets >



<It should be installed out of the interference distance>



## ■ Operation indicator DISPLAY

| Item  | Emitter   |           | Receiver  |           |                |                |         |
|---|-----------|-----------|-----------|-----------|----------------|----------------|---------|
|   | Indicator | Indicator | Indicator | Indicator | Control output | Control output |         |
|   | Green     | Red       | Green     | Yellow    | Red            | Light ON       | Dark ON |
| Power supply                                      | ☀         | ●         | —         | —         | —              | —              | —       |
| Break of emitter                                  | ▶▶▶       | ◀◀◀       | —         | —         | —              | —              | —       |
| Break of light emitting element                   | ▶         | ▶         | ◀         | ▶         | ▶              | OFF            | ON      |
| Break of adjacent emitting elements more than 2EA | ◐         | ◐         | ▶         | ▶         | ▶              | OFF            | ON      |
| Stable light ON                                   | —         | —         | ☀         | ●         | ●              | ON             | OFF     |
| Unstable light ON                                 | —         | —         | ☀         | ☀         | ●              | ON             | OFF     |
| Unstable light OFF                                | —         | —         | ●         | ☀         | ☀              | OFF            | ON      |
| Stable light OFF                                  | —         | —         | ●         | ●         | ●              | OFF            | ON      |
| Break of receiver                                 | —         | —         | ▶▶▶       | ●         | ◀◀◀            | OFF            | ON      |
| Control output over current                       | —         | —         | ▶         | ◀         | ☀              | OFF            | ON      |
| Synchronous line malfunction                      | —         | —         | ◐         | ●         | ◐              | OFF            | ON      |
| Emitter failure (time out)                        | —         | —         | ◐         | ◐         | ◐              | OFF            | ON      |

| Indicators   |                                     |
|--------------|-------------------------------------|
| ☀            | Lighting                            |
| ●            | Light out                           |
| ◐            | Flashing by 0.5 sec.                |
| ◐ ◐ or ◐ ◐ ◐ | Flashing simultaneously by 0.5 sec. |
| ▶▶▶          | Cross-flashing by 0.5 sec.          |
| ▶▶▶▶▶        | Cross-flashing by 0.5 sec.          |

## ■ Troubleshooting

| Malfunction   | Causes   | 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.             |
|   | There is an obstacle to cut off the emitted light between emitter and receiver                                 | Remove the obstacle.                                  |
| Operation indicator displays break of emitter                   | There is strong electric wave or noise generator such as motor, electric generator, or high voltage line, etc. | Separate the strong electric wave or noise generator. |
|   | Break of emitter   | Contact our service center.                           |
| Operation indicator displays break of receiver                  | Break of receiver  |   |
| Operation indicator displays break of light emitting elements   | Break of light emitting element  |   |
| Operation indicator displays emitter failure                    | Emitter failure  | Check the wiring connection in emitter and receiver.  |
|   | Bad wiring connection of synchronous cable 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.                        |