

- **Ultra thin**
Slim type of only 13 mm thick and 30 mm wide never affecting work efficiency
- **High intensity red LED indicator**
Large operation indicator of high intensity LEDs in series offering superb visibility, may double as work instruction indicator
- **Objects as small as $\phi 30\text{mm}$ detected**
- **Automatic sensitivity compensation feature**
- **Anti Interference feature**
Allowing adjacent mounting of 2 units for wider range of applications

Type

| Detection method | Detecting distance | Optical axis interval | No. of light axes | Detecting width | Set model No. | Operation mode | Detecting object |
|------------------|--------------------|-----------------------|-------------------|-----------------|----------------------|--|------------------------------------|
| Through beam | 5m | 20mm | 8 | 140mm | ESN-T8 ESN-T8PN | Light ON (Activated when light beams of all axes are received) | Opaque $\phi 30\text{ mm}$ or more |
| | | | 12 | 220mm | ESN-T12 ESN-T12PN | | |
| | | | 16 | 300mm | ESN-T16 ESN-T16PN | | |
| | | | 20 | 380mm | ESN-T20 ESN-T20PN | | |

Mounting brackets are separately available. See "With Mounting Bracket (Optional) Attached" for details. The mounting bracket is available separately. Please see the figure when the mounting bracket is attached.

Transmitter-receiver synchronized operation indicator

High intensity LEDs in series

Wide display offers excellent visibility

Wide display may be used as work instruction indicator

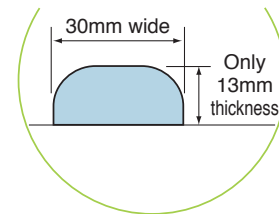
Optimum sensitivity maintained by automatic sensitivity compensation feature

Beam interval: 20mm

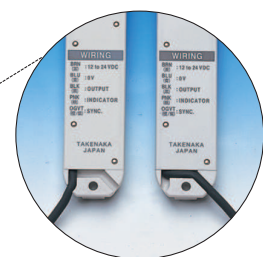
Minimum detection object diameter: $\phi 30\text{ mm}$

Detecting distance: 5m

Thin and slim size requiring minimal mounting space



Flexible cable outlet (left/right/rear) for easy installation



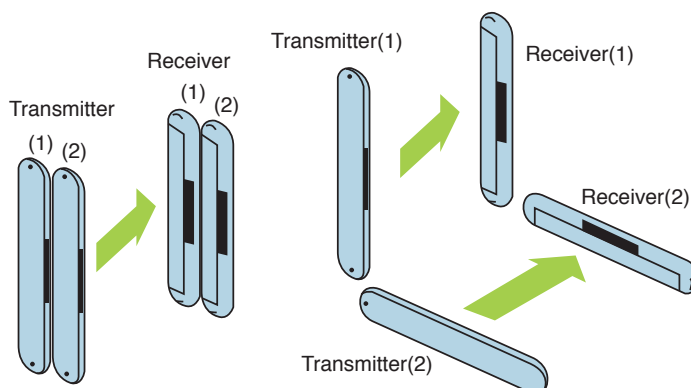
Rating/Performance/Specification

| Set model No. | NPN | ESN-T8 | ESN-T12 | ESN-T16 | ESN-T20 |
|-------------------------|--|---|---------------|---------------|--------------|
| | PNP | ESN-T8PN | ESN-T12PN | ESN-T16PN | ESN-T20PN |
| Detection method | Through beam | | | | |
| Detecting distance | 5m or less | | | | |
| Detection object | Opaque ϕ 30mm or more | | | | |
| Beam interval | 20mm | | | | |
| Number of light axes | 8 | 12 | 16 | 20 | |
| Detecting width | 140mm | 220mm | 300mm | 380mm | |
| Power supply | 12 - 24V DC \pm 10% / Ripple 10% or less | | | | |
| Current consumption | 100mA or less | 110mA or less | 120mA or less | 130mA or less | |
| Output mode | NPN | Open collector output Rating : Sink current 100mA (30VDC) or less | | | |
| | PNP | Open collector output Rating : Source current 100mA (30VDC) or less | | | |
| Operation mode | Activated when light beams of all axes are received (deactivated when light beam of any axis is blocked) | | | | |
| Response time | 7ms or less | | | | |
| Light source | Infrared LED (wavelength: 850 nm) | | | | |
| Light-sensitive element | Photo IC | | | | |
| Indicator | Transmitter: Power indicator (green LED) / Operation indicator (red LED) Receiver: Stable light reception indicator (green LED) / Operation indicator (red LED) | | | | |
| Material | Case: ABS / Indicator window: acrylic | | | | |
| Connection | Attached Cable (Outer dimension: dia.4.3mm) Cable: 3 m Cable: With five 0.2 mm ² 5 cores, gray (transmitter) or black (receiver) covering | | | | |
| Weight | Transmitter | Approx. 160g | Approx. 180g | Approx. 200g | Approx. 220g |
| | Receiver | Approx. 160g | Approx. 180g | Approx. 200g | Approx. 220g |
| Auxiliary functions | Automatic sensitivity compensation, Anti Mutual Sensitivity feature for adjacent installation, Output short circuit protection | | | | |
| Accessory | Operation manual Note: Mounting brackets are separately available. | | | | |

Environmental Specification

| | |
|-------------------------|---|
| Ambient light | 10000lx or less |
| Ambient temperature | -10 - +55°C (non-freezing) |
| Ambient humidity | 35 - 85%RH (non-condensing) |
| Vibration | 10 - 55 Hz / 1.5 mm double amplitude / 2 hours each in 3 directions |
| Protective structure | IP40 |
| Dielectric withstanding | 1000VAC for 1 minute / between entire live part and case |
| Insulation resistance | 500 VDC, 20 M Ω . |

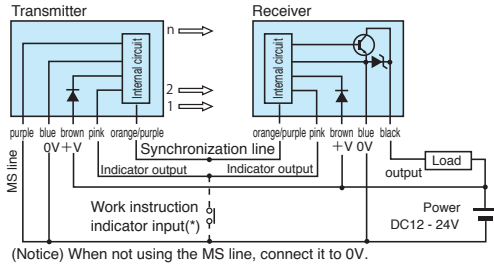
Adjacent or face to face installation of two pairs of sensors will not cause interference.



Input/Output Circuit and Connection

NPN output

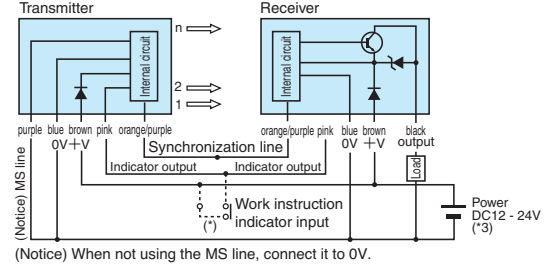
- Connection for single set use



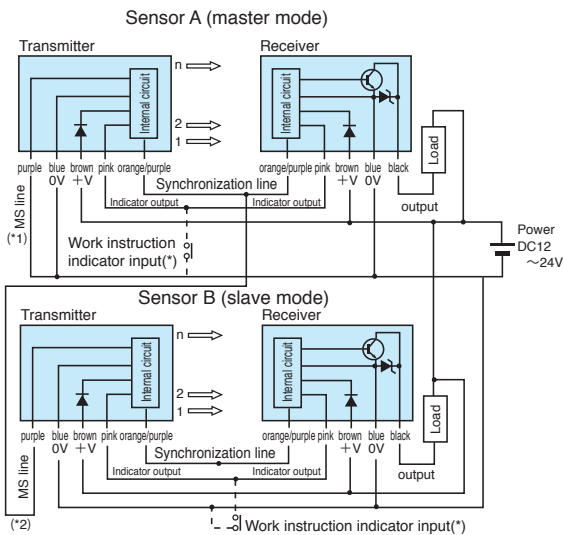
In the condition of load short circuit or overload, the output transistor turns off. Check the load condition before restarting.

PNP output

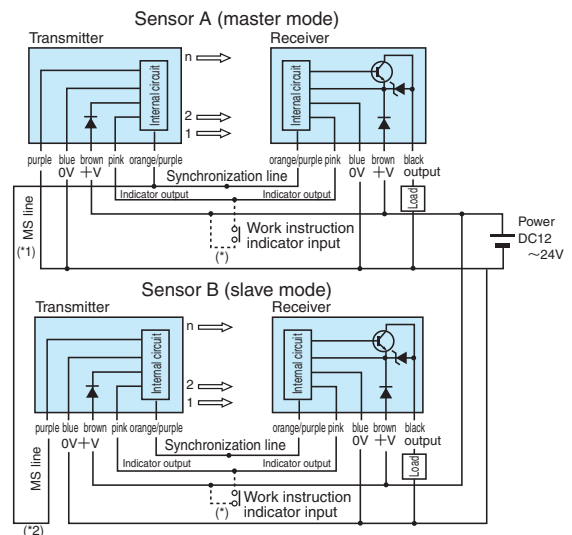
- Connection for single set use



- Connection for Mutual interference prevention



- Connection for Mutual interference prevention



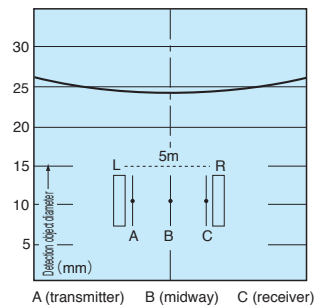
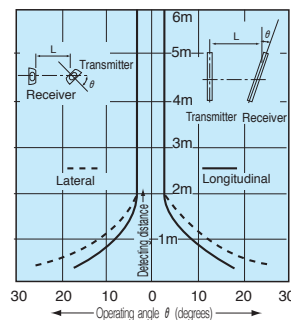
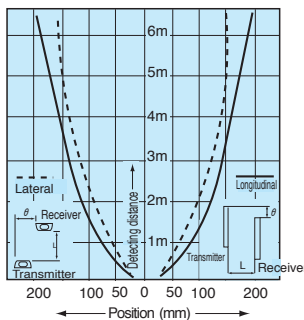
- (*1) Connect the MS line (purple) of the transmitter of either (A) of the two sensors to the ground line (blue), which sets the operation mode of this sensor (Sensor A) to master (M mode).
- (*2) Connect the MS line (purple) of the transmitter of the other sensor (B) to the synchronization line (orange/purple) of Sensor A, which sets the operation mode of Sensor B to slave (S mode).
- (*3) When using different power supplies for the transmitter and the receiver, or for the master and slave sensors, be sure to use the common 0V for each unit.

Caution

- When using two sets as a pair, wire so that the operation mode of either of the two will be master and of the other will be slave.
- Do not connect the synchronization lines (orange/purple) of Sensors A and B to each other.

Performance Curves (typical)

- Response Curves: Lateral gap/longitudinal gap
- Response Curves: Tilt angle
- Response Curves: Minimum detection object



For Correct Use

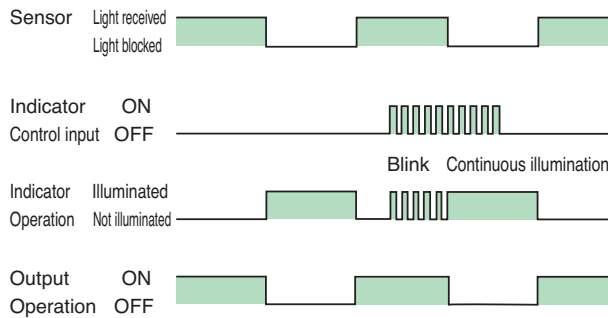


- Be sure to follow the instructions in the operation manual provided for correct use of the product.
- This sensor cannot be used as a press safety device or other safety device for protection of human body that requires conformity to domestic or overseas standards or certification concerning protection of human body. Use for such purposes may lead to death or serious injury in the unlikely event of failure.
- This sensor is intended for detection of ingress of human body or object passing through an arbitrary point.
- When using this sensor for safety purposes, ensure safe operation of the system as a whole including detection and control.

Using Operation Indicator as Job Indicator

Input a flicker signal as a no voltage contact or NPN transistor open collector input shown as the dotted line in the connection diagram.

The indicator blinks in step with the cycle (both transmitter and receiver flicker). When light beam of any axis is blocked, the operation switches to the illuminated state as the operation indicator.

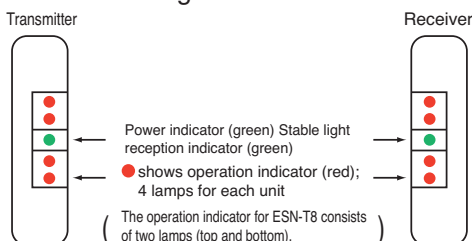


Indicators

Indicator operation

| | Name | Color | Description |
|-------------|----------------------------------|-------|--|
| Transmitter | Power indicator | Green | Illuminated when power is supplied |
| | Operation indicator | Red | Illuminated when the sensor is activated (light beam of any axis is blocked), turned off when light beams of all axes are received |
| Receiver | Stable light reception indicator | Green | Illuminated when the received light intensity level is 120% or more of the operation level |
| | Operation indicator | Red | Illuminated when the sensor is activated (light beam of any axis is blocked), turned off when light beams of all axes are received |

Indicator arrangement



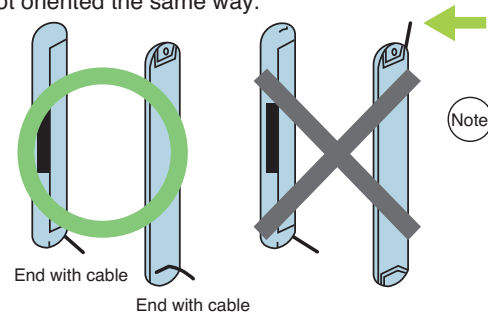
Automatic sensitivity compensation feature

After the optical axis alignment is completed, turn the power off once and back on. The automatic sensitivity compensation feature is enabled and the sensitivity is set at the optimum for the sensor.

If the lens is soiled with dirt or dust, or even after the soil is removed the sensitivity is automatically compensated to achieve the optimum sensitivity.

Sensor Installation Orientation

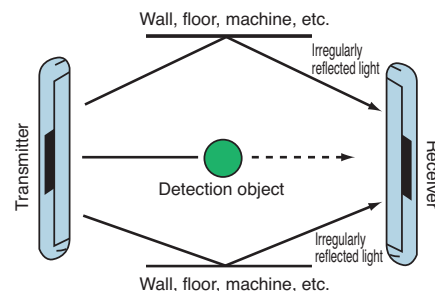
When installing the sensor, make sure that the ends of the transmitter and receiver with the cord are oriented either upward or downward. The sensor does not function if the transmitter and receiver are not oriented the same way.



- The tightening torque for installing the sensor (with M4 screws) should not exceed 0.8 N · m.

Installation Location

If there is a reflecting object such as wall, floor or machine in the detecting range between the transmitter and the receiver, light beam may go around the detection object, and the detection object may not block the whole beams. Be careful about the installing position. (any glossy object such as stainless steel in the surrounding area must be at least 300 mm away from the optical axes both vertically (up and down) and horizontally (left and right)).

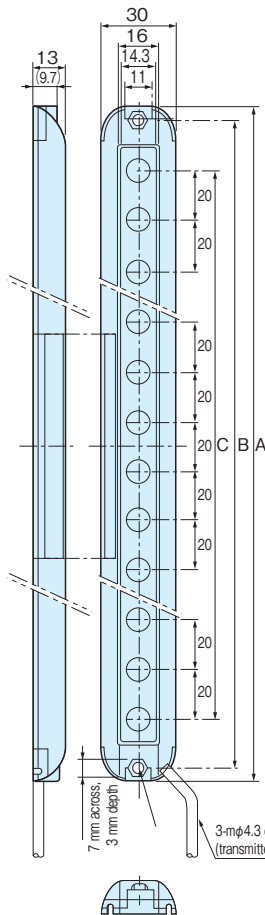


Cable extension

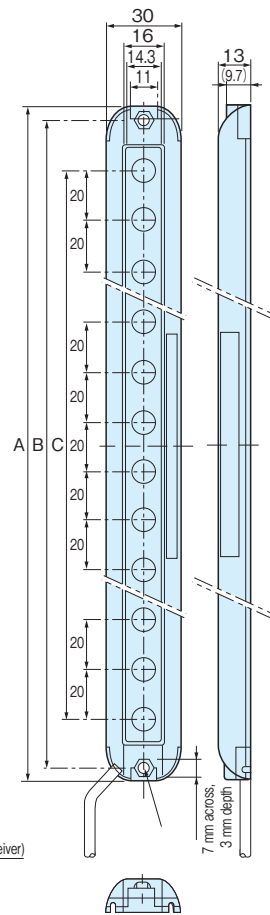
When extending wiring, please use cable with diameter 0.5mm². Make the extension 25m or shorter for transmitter or receiver each.

Dimensions (in mm)

CAD Transmitter



Receiver

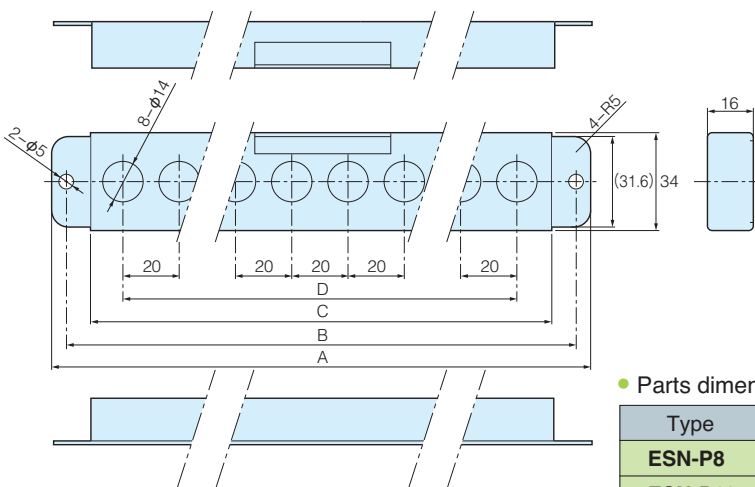


Parts dimensions

in: mm

| Model | A | B | C | No. of optical axes |
|---------|-----|-----|-----|---------------------|
| ESN-T8 | 190 | 180 | 140 | 8 |
| ESN-T12 | 270 | 260 | 220 | 12 |
| ESN-T16 | 350 | 340 | 300 | 16 |
| ESN-T20 | 430 | 420 | 380 | 20 |

CAD Protective cover



- Material
SPC galvanization (trivalent)
t=1.2

Parts dimensions

in: mm

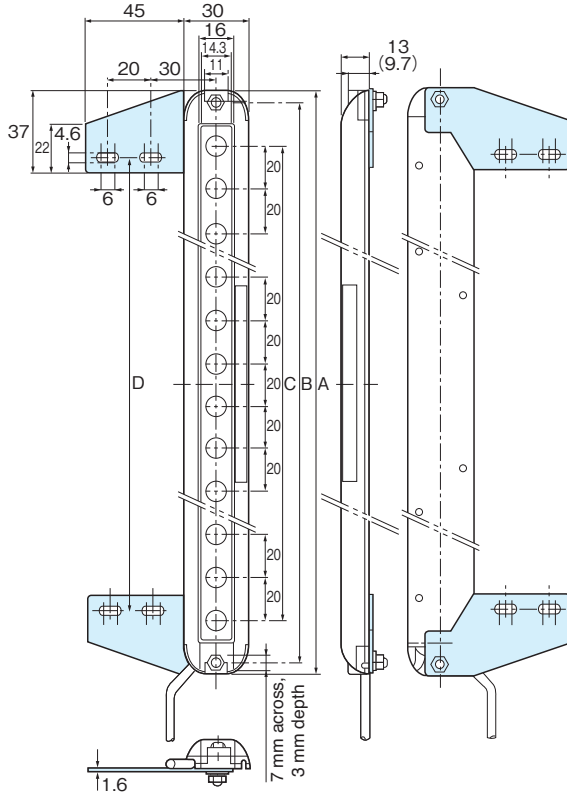
| Type | A | B | C | D |
|---------|-----|-----|-----|-----|
| ESN-P8 | 190 | 180 | 164 | 140 |
| ESN-P12 | 270 | 260 | 244 | 220 |
| ESN-P16 | 350 | 340 | 324 | 300 |
| ESN-P20 | 430 | 420 | 404 | 380 |

With Mounting Bracket (Optional)(in mm)

With mounting bracket model ES-BF

CAD

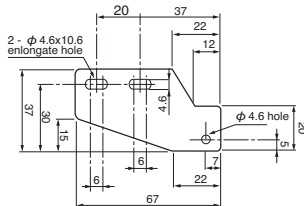
- Materials: SPCC Unichrome



Dimensions of portions

in: mm

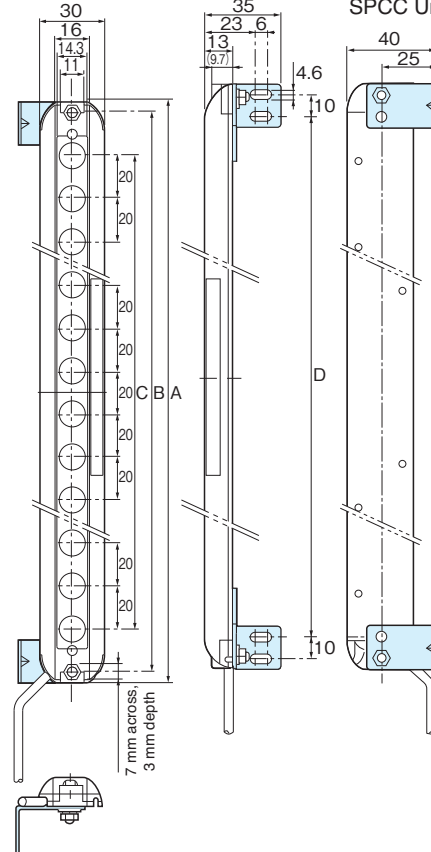
| Model | A | B | C | D | No. of optical axes |
|---------|-----|-----|-----|-----|---------------------|
| ESN-T8 | 190 | 180 | 140 | 130 | 8 |
| ESN-T12 | 270 | 260 | 220 | 210 | 12 |
| ESN-T16 | 350 | 340 | 300 | 290 | 16 |
| ESN-T20 | 430 | 420 | 380 | 370 | 20 |



With mounting bracket model ES-BL

CAD

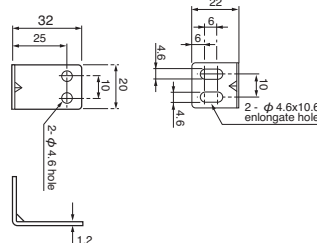
- Materials: SPCC Unichrome



Dimensions of portions

in: mm

| Model | A | B | C | D | No. of optical axes |
|---------|-----|-----|-----|-----|---------------------|
| ESN-T8 | 190 | 180 | 140 | 160 | 8 |
| ESN-T12 | 270 | 260 | 220 | 240 | 12 |
| ESN-T16 | 350 | 340 | 300 | 320 | 16 |
| ESN-T20 | 430 | 420 | 380 | 400 | 20 |



Special mounting brackets (optional)

| Model | Description |
|-------|--|
| ES-BF | 4 brackets for 1 set (with screws, nuts, washers) |
| ES-BL | 4 brackets for 1 set (with screws, nuts, washers) |

Protective cover (optional)

| Type | Description |
|---------|---|
| ESN-P8 | |
| ESN-P12 | |
| ESN-P16 | Use with both the transmitter and receiver (Two sets are necessary for both the transmitter and the receiver.) |
| ESN-P20 | |