TAKEX

Ultra thin
Light Curtain Sensor

ESN SERIES Instruction Manual

TAKENAKA ELECTRONIC INDUSTRIAL CO.,LTD.

Head office : 20-1 Shinomiya Narano-cho, Yamashina-ku, Kyoto 607-8032, Japan
Telephone : +81-75-581-7111
FAX : +81-75-581-7118

- This sensor is a through-beam type light curtain sensor with a 20mm optical pitch. Objects with 30mm in diameter or more can be detected in all through the detection area.
- Do not use this product for life or safety critical applications such as for power press machines. This product does not comply with any domestic or international standard or regulation as a device of human body protection.
- This sensor is designed to detect a passing object at irregular position within the detection area.

⚠ CAUTION

SPECIFICATIONS CE

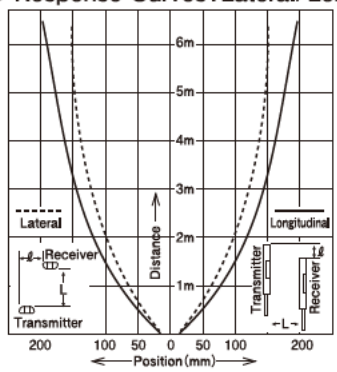
Model		ESN-T8	ESN-T12	ESN-T16	ESN-T20
	NPN	ESN-T8PN	ESN-T12PN	ESN-T16PN	ESN-T20PN
Detection method		Through beam			
Detecting distance		5m or less			
Detection object		Opaque Φ30mm or more			
Beam interval		20mm			
Number of light axes		8	12	16	20
Detecting width		140mm	220mm	300mm	380mm
Power supply		12 to 24VDC ±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			
Operating 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 : 850nm)			
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 : 3m Cable : 0.2mm² × 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

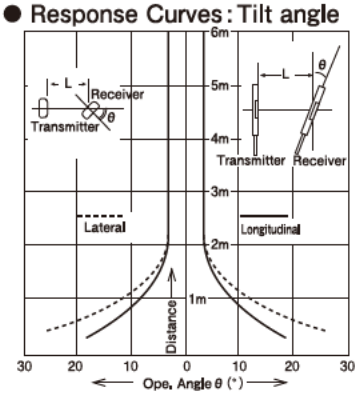
Ambient light	10,000 lx or less
Ambient temperature	−10 to +55℃ (non-freezing)
Ambient humidity	35 to 85%RH (non-condensing)
Vibration	10 to 55Hz / 1.5mm double amplitude / 2 hours each in 3 directions
Protective structure	IP40
Dielectric withstanding	1000VAC for 1 minute / between entire live part and case
Insulation resistance	500VDC, 20MΩ

PERFORMANCE CURVES (typical)

● Response Curves : Lateral/Longitudinal gap



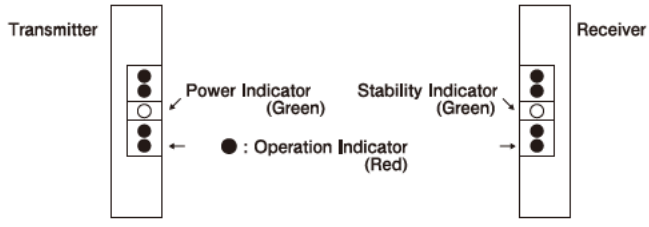
● Response Curves : Tilt angle



INDICATORS

	Indicator	Color	Status
Trns.	Power Indicator	Green	Power is On.
	Operation Ind.	Red	Dark-On.
Rcvr.	Stability Ind.	Green	Operating Level ×1.2
	Operation Ind.	Red	Dark-On.

● INDICATOR ARRANGEMENT



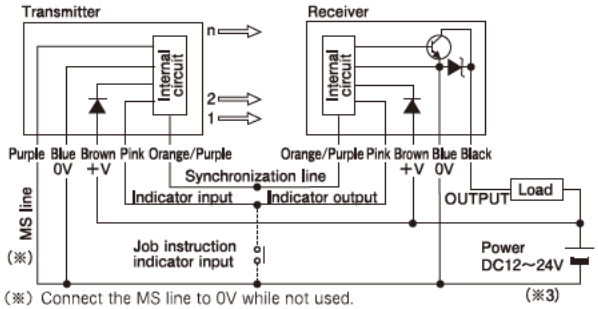
- When use the Operation Indicator as a job instruction indicator, refer to the next page.

WIRING

- Connect cables according to this instruction manual. Wrong wiring may damage the circuit.
- Avoid parallel wiring close to high-voltage lines or power lines, or using the same conduit or duct.
- When extending the cables, use conductors of at least 0.5㎟ cross-sectional area and check the voltage drop. The length of each cable including the synchronization line and the M/S mutual interference prevention line should not exceed 25m for the transmitter and the receiver.
- If a load short circuit or overload occurs, the output transistor turns off. Check the load before restoring the power.
- When using a pair of sensors in close proximity to each other, connect the MS line as below to set master/slave modes and use Mutual interference prevention function.

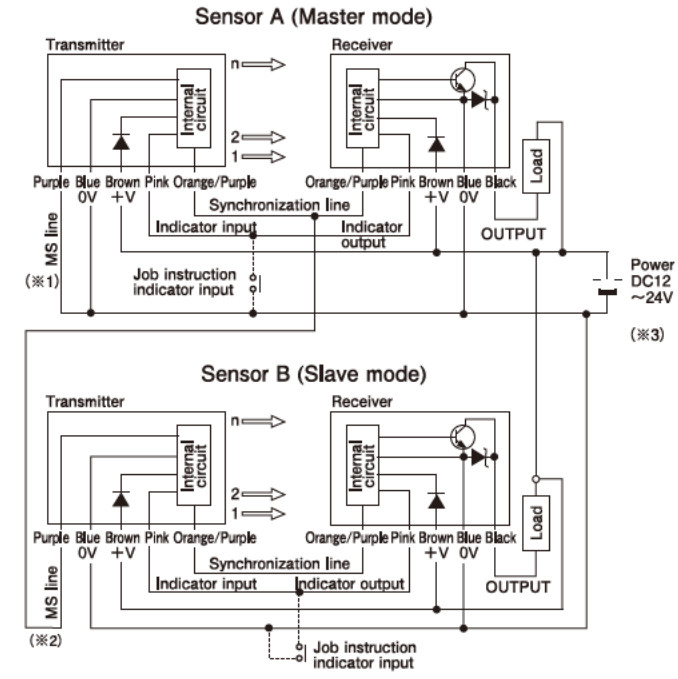
[NPN Type]

◎ Connection for Single set use



(※) Connect the MS line to 0V while not used.

◎ Connection for Mutual interference prevention

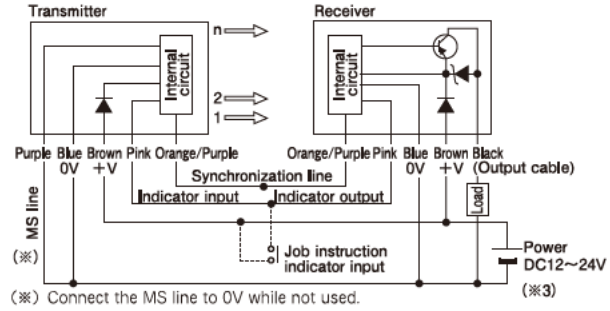


(※1) Connect the MS line to OV (blue), the sensor (A) is set as master mode.
(※2) Connect the MS line to the Synchronization line (orange/purple) of the master mode sensor (A), the sensor (B) is set as slave mode.
(※3) When using a separate power supply for the transmitter and the receiver, or for the master and the slave mode sensor, be sure to common the 0V.

◇ Be sure to use a pair of master and slave mode sensor.
◇ Do not connect the synchronization lines of master and slave mode sensor to each other.

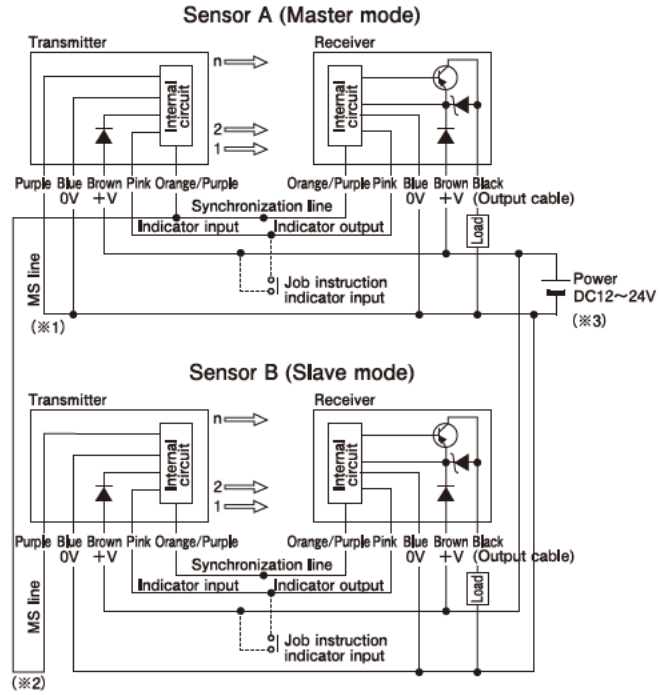
[PNP Type]

◎ Connection for Single set use



(※) Connect the MS line to 0V while not used.

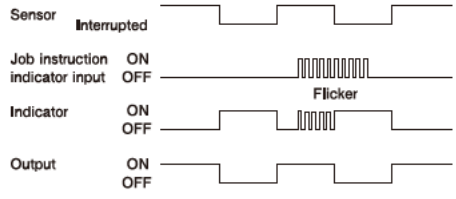
◎ Connection for Mutual interference prevention



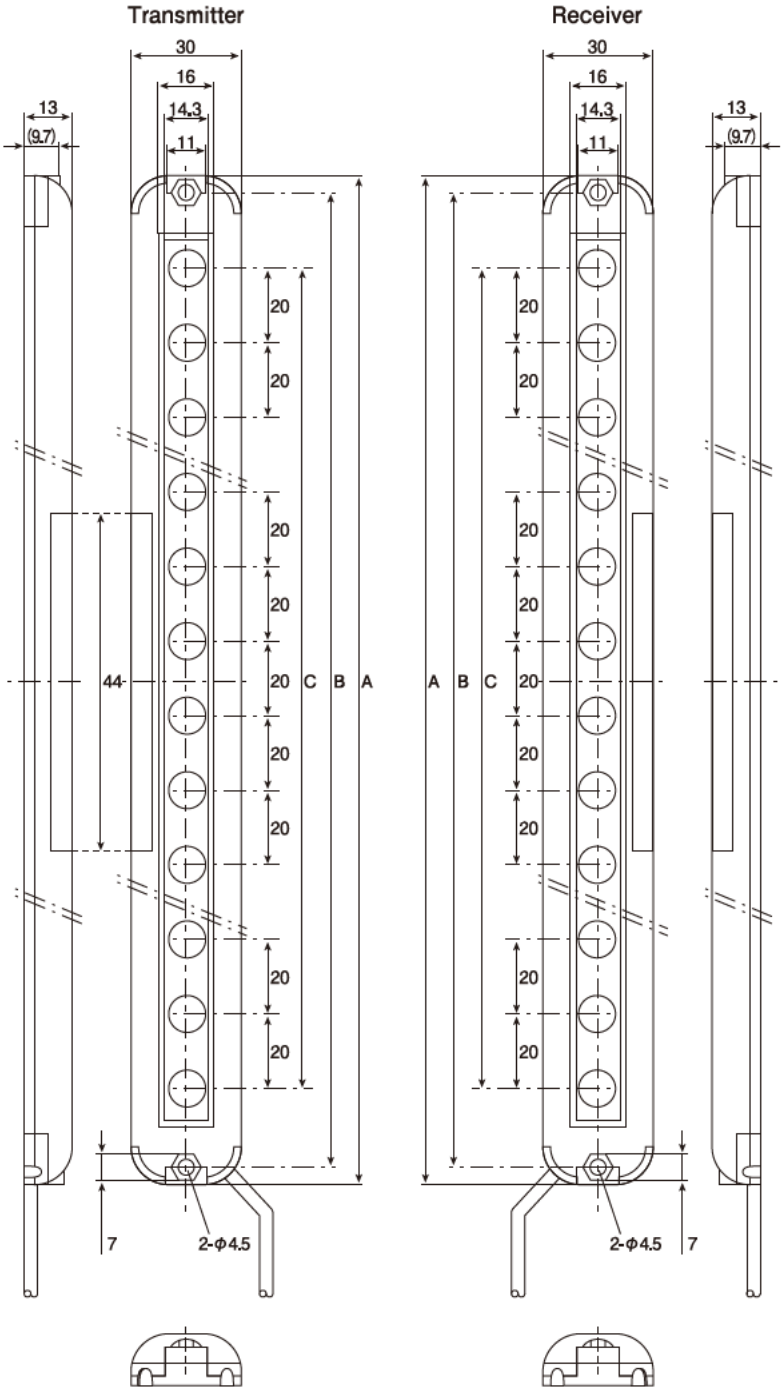
(※1) Connect the MS line to OV (blue), the sensor (A) is set as master mode.
(※2) Connect the MS line to the Synchronization line (orange/purple) of the master mode sensor (A), the sensor (B) is set as slave mode.
(※3) When using a separate power supply for the transmitter and the receiver, or for the master and the slave mode sensor, be sure to common the 0V.

JOB INSTRUCTION INDICATOR

The operation indicator can be used as a job indicator. The indicators on the transmitter and the receiver flicker synchronized with the pulse (0.5 to 2 cycles per second) input to the points shown in the wiring diagram and it gives an instruction to a worker. The indicators stop flickering and light up as an operation indicator when the light axis of the senor is interruped.



DIMENSIONS (unit : mm)



(unit : mm)

Models	A	B	C	Number of optical axis
ESN−T8 ESN−T8PN	190	180	140	8
ESN−T12 ESN−T12PN	270	260	220	12
ESN−T16 ESN−T16PN	350	340	300	16
ESN−T20 ESN−T20PN	430	420	380	20

OPTICAL AXES ALIGNMENT

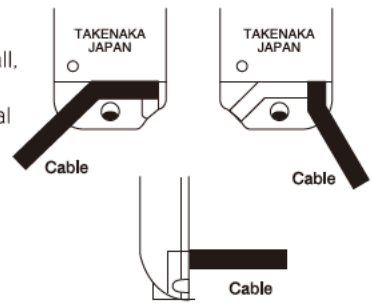
- Check wiring, turn the power on and confirm the power indicator (green) on the transmitter lights up.
- Install the transmitter and the receiver linearly. By moving the transmitter vertically and horizontally, find the range where the stability indicator (green LED) turns on, then direct the sensor in the center of the range.
- Adjust the position of the receiver in the same way.
- Check that the output is generated when blocking the light axis.

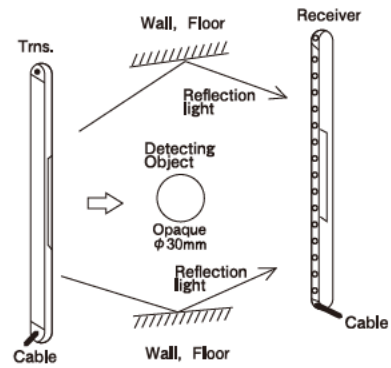
AUTOMATIC SENSITIVITY CONTROL

- The sensitivity is adjusted at an optimum level when the power is restored after the light axes alignment.
- When stain or dirt is on the lens, remove it and restore the power to activate the automatic sensitivity control function.

INSTALLATION

- Securely fix the transmitter and the receiver facing each other directly so as not to shift the position by vibration.
- Use M4 screws and nuts for mounting. The tightening torque should be 0.8N·m or less.
- Three directions (right, left or back) are available for the cable outlet. Use the groove to fit the cable for wall-mount installation.
- When there is any reflective object (wall, floor or equipment) within the directional field between the transmitter and the receiver, the sensor may not detect an object due to unwanted light reflection.
- Install the sensor aligning the cable outlet of the transmitter and the receiver in the same direction. The sensor cannot be used if the orientation differs.
- Two types mounting brackets are separately sold. See "Mounting bracket".





PRECAUTIONS DURING USE

- Limit the current of the power supply to 2A.
- When using a switching regulator, be sure to ground the frame ground (FG) terminal.
- The sensor starts operation after 0.5 second. Always power on the sensor prior to loads.
- High frequency fluorescent lamps or inverters may cause faulty operation as these equipment may emit light or noise of similar modulated frequency that photo sensors generate. Do not install the sensor in the vicinity of high frequency equipment.
- Do not use the sensor in a steam or dust atmosphere or where water or oil is splashing.
- Clean the lens by a soft and dry cloth periodically. Stains or dirt stuck on the lens deteriorates the performance. Do not use organic solvent including alcohol and thinner.

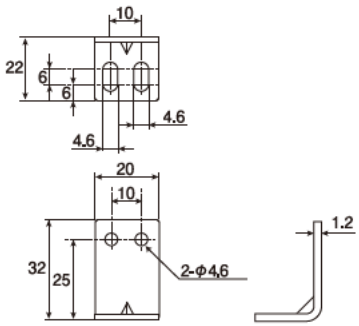
MOUNTING BRACKET

- Push the cable into the groove.
- Use M4 screws and nuts for mounting. The tightening torque should be 0.8N·m or less.

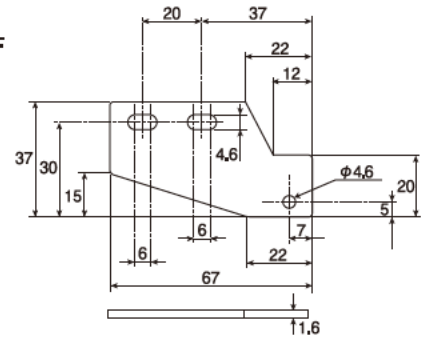
- Mounting Bracket
  - · Material SPCC Zinc plated
  - · 4 pcs/set
  - · M4×15 screw, nut, washer, 4pcs each

● DIMENSION (unit : mm)

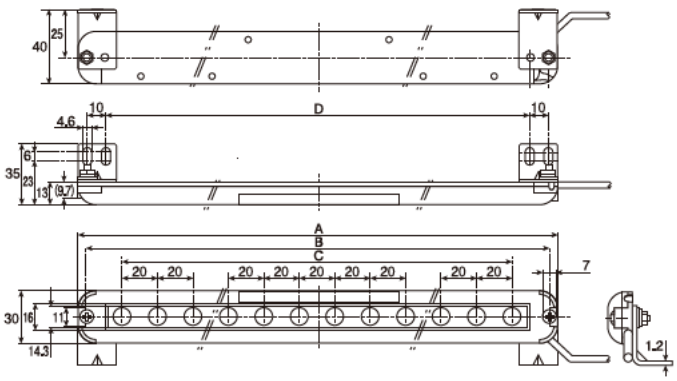
Bracket Model ES-BL



Bracket Model ES-BF



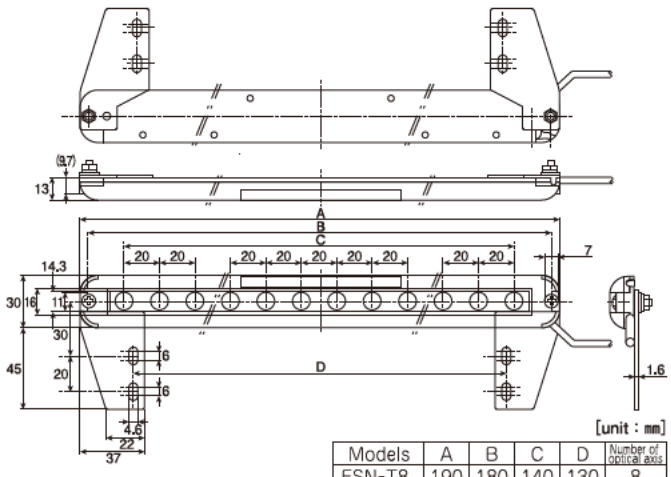
With mounting bracket ES-BL



[unit : mm]

Models	A	B	C	D	Number of optical axis
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

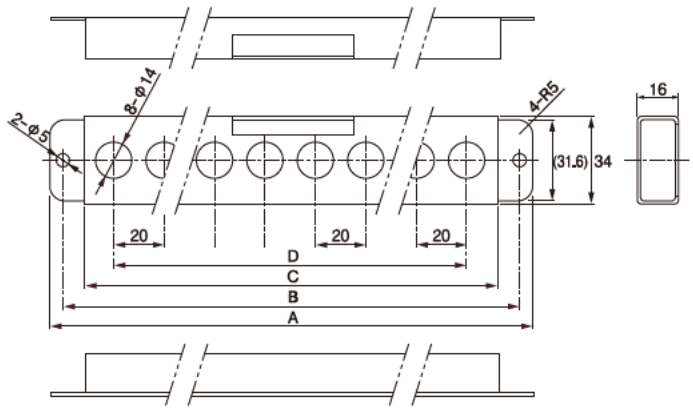
With mounting bracket ES-BF



[unit : mm]

Models	A	B	C	D	Number of optical axis
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

Protective cover



[unit : mm]

Models	A	B	C	D
ESN-T8	190	180	164	140
ESN-T12	270	260	244	220
ESN-T16	350	340	324	300
ESN-T20	430	420	404	380

Material : SPCC Zinc plated t=1.2

- The guarantee period of this product is one year after the delivery.
- If any defect is found during the guarantee period, Takenaka will repair or replace the defective product.
- This product is an industrial sensor which issues an output upon detecting an object. It does not have any function to prevent accidents, death or injuries.
- Takenaka will not held responsible for any damage or loss incurred due to accidents, faulty installation, abuse, misuse, improper maintenance or acts of God including lightning surge.