

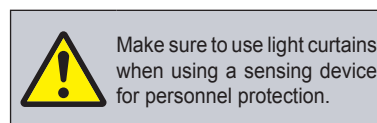
## Related Information

■ General terms and conditions..... F-17

■ Sensor selection guide ..... P.475~

■ Glossary of terms..... P.1359~

■ General precautions ..... P.1405



## Even a slim hand is detectable by the 25 mm 0.984 in pitch beam area sensor

### 10 mm 0.394 in thick: half the thickness of conventional models

Space saving is now possible. The ultra-thin design does not obstruct picking operation.



Cable can be freely arranged in any position

### Clearly visible job indicators

Bright, easy-to-see job indicators, 55 mm 2.165 in in length, have been incorporated into both the emitter and the receiver.

This sensor is optimal for picking. With the **NA1-PK5**, we've enhanced visibility even further by using 8 orange LED lights.



## BASIC PERFORMANCE

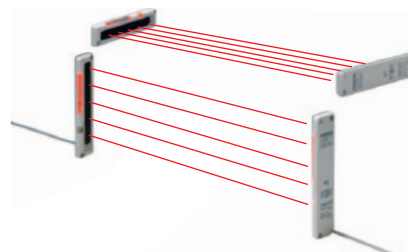
Long sensing range: 3 m 9.843 ft **NA1-5**

Its long sensing range of 3 m 9.843 ft is sufficient for confirming access to a parts shelf.

## FUNCTIONS

Two unit installation is possible

Sensor units can now be set to different light emission frequencies in order to prevent mutual interference. Two units can now be operated in a side-by-side configuration without interference, for problem-free detection over wider areas.



FIBER SENSORS

LASER SENSORS

PHOTOELECTRIC SENSORS

MICRO PHOTOELECTRIC SENSORS

AREA SENSORS

LIGHT CURTAINS

PRESSURE / FLOW SENSORS

INDUCTIVE PROXIMITY SENSORS

PARTICULAR USE SENSORS

SENSOR OPTIONS

SIMPLE WIRE-SAVING UNITS

WIRE-SAVING SYSTEMS

MEASUREMENT SENSORS

STATIC CONTROL DEVICES

ENDOSCOPE

LASER MARKERS

PLC / TERMINALS

HUMAN MACHINE INTERFACES

ENERGY CONSUMPTION VISUALIZATION COMPONENTS

FA COMPONENTS

MACHINE VISION SYSTEMS

UV CURING SYSTEMS

Selection Guide

Slim Body

Picking

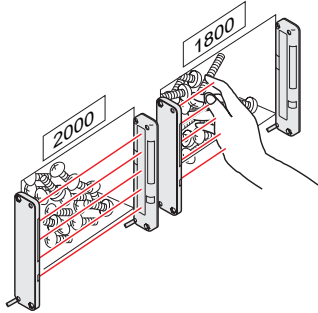
Other Products

NA1-PK5/NA1-5

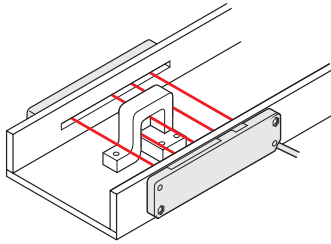
NA1-PK3

## APPLICATIONS

### Preventing wrong parts picking



### Detecting parts having wide positioning area



Never use this product in any personnel safety application.

## FUNCTIONS

### Lighting pattern selectable

The job indicator operation can be selected as either continuous lighting or blinking.

Continuous lighting



Blinking

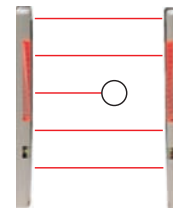


Changeover

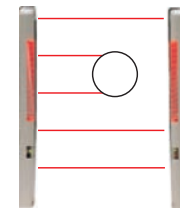
### Selectable detection operation

Either of the two different detection operations may be selected in order to suit the particular application. Sensor units can be set to detect the interruption of 1 or more beam channels, or can be set to detect only the interruption of 2 or more beam channels.

Single beam interruption



Double beam interruption



Changeover

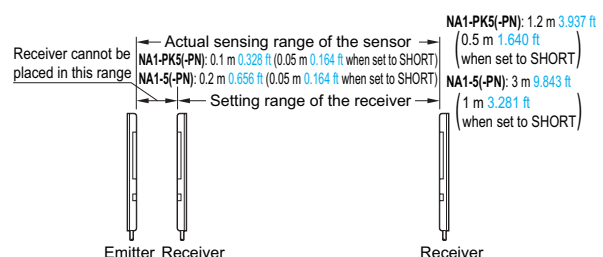
All opaque bodies with  $\varnothing 35$  mm  $\varnothing 1.378$  in or greater will be detected.

The accidental passage of small objects through the beam axis will not trigger detection, yet the operator's hands will always be accurately detected. This function is also useful when small objects regularly interrupt the beam axis.

## ORDER GUIDE

Type	Appearance	Sensing range (Note)	Model No.	Output
High-luminous job indicator type	<p>Sensing height 100 mm 3.937 in</p> <p>Beam pitch 25 mm 0.984 in</p> <p>5 beam channels</p>	0.1 to 1.2 m 0.328 to 3.937 ft (0.05 to 0.5 m 0.164 to 1.640 ft when set to SHORT.)	<b>NA1-PK5</b>	NPN open-collector transistor
			<b>NA1-PK5-PN</b>	PNP open-collector transistor
Long sensing range type		0.2 to 3 m 0.656 to 9.843 ft (0.05 to 1 m 0.164 to 3.281 ft when set to SHORT.)	<b>NA1-5</b>	NPN open-collector transistor
			<b>NA1-5-PN</b>	PNP open-collector transistor

- Notes: 1) The sensing range is the possible setting distance between the emitter and the receiver.  
2) The model No. with "P" shown on the label affixed to the product is the emitter, "D" shown on the label is receiver.  
(e.g.) Emitter of **NA1-PK5**: **NA1-PK5P**,  
Receiver of **NA1-PK5**: **NA1-PK5D**



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Selection Guide
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Picking
Other Products

NA1-PK5/NA1-5
NA1-PK3

## ORDER GUIDE

### 5 m 16.404 ft cable length type

5 m 16.404 ft cable length type (standard: 2 m 6.562 ft) is also available.  
Model No.: **NA1-5-C5**

### Pigtailed type

Pigtailed type is also available. When ordering this type, suffix “-J” to the model No.  
Please order the mating cable separately.  
(e.g.) Pigtailed type of **NA1-PK5-PN** is “**NA1-PK5-PN-J**”.

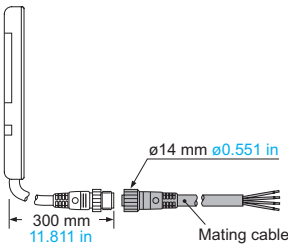
#### • Mating cable (2 cables are required.)

Model No.	Description
<b>CN-24-C2</b>	4-core, cable length 2 m 6.562 ft
<b>CN-24-C5</b>	4-core, cable length 5 m 16.404 ft

### S-LINK direct hook-up picking sensor

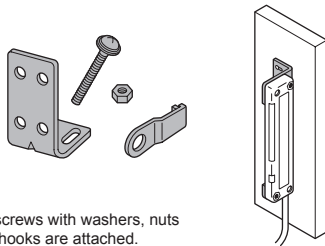
**SL-N15** can be hooked up to the sensor & wire-saving link system **S-LINK**.

Model No.	Description
<b>SL-N15</b>	<div><div>Sensing range: 0.2 to 3 m 0.656 to 9.843 ft (0.05 to 1 m 0.164 to 3.281 ft when the switch is set to SHORT) Beam pitch: 25 mm 0.984 in Sensing height: 100 mm 3.937 in Sensing object: ø35 mm ø1.378 in or more opaque object</div><div>It is a parts-taking verification sensor with five sensing beams and can be hooked up to the <b>S-LINK</b> cable without any interface. Both the emitter and the receiver are incorporated with bright orange LED job indicators that are easily visible to the operator.</div></div>

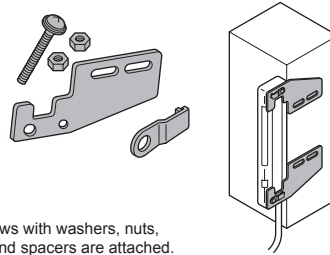


**OPTIONS**

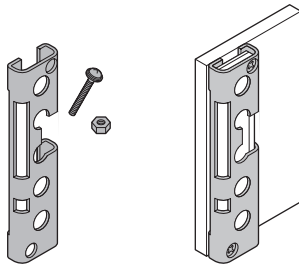
Designation	Model No.	Description
Sensor mounting bracket	<b>MS-NA1-1</b>	Four bracket set [ Four M4 (length 15 mm 0.591 in) screws with washers, eight nuts, four hooks, four spacers and eight M4 (length 18 mm 0.709 in) screws with washers are attached. (Spacers are not attached with <b>MS-NA1-1</b> .) ]
	<b>MS-NA2-1</b>	
Sensor protection bracket	<b>MS-NA3</b>	It protects the sensor body. Two silver bracket set [ Four M4 (length 15 mm 0.591 in) screws with washers, and four nuts are attached. ]
	<b>MS-NA3-BK</b>	
Slit mask	<b>OS-NA1-5</b> 10 pcs. per set	The slit mask restrains the amount of beam emitted or received. (Seal type)
Y-shaped connector	<b>SL-WY</b> 5 pcs. per set	This connector is able to combine the cables of receiver and emitter into one.

**Sensor mounting bracket**• **MS-NA1-1**

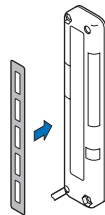
M4 screws with washers, nuts and hooks are attached.

• **MS-NA2-1**

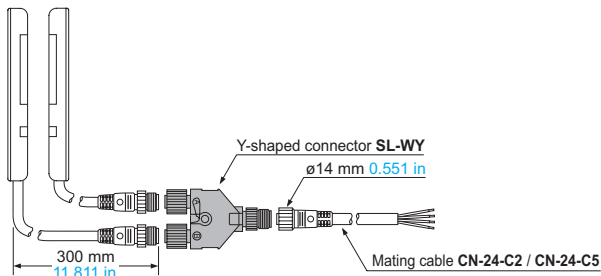
M4 screws with washers, nuts, hooks and spacers are attached.

**Sensor protection bracket**• **MS-NA3**  
• **MS-NA3-BK**

M4 screws with washers, and nuts are attached.

**Slit mask**• **OS-NA1-5**

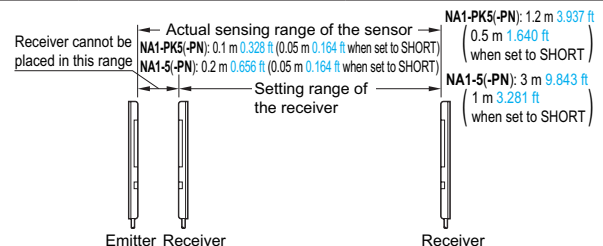
Since the slit mask is of seal type, it can be used by sticking to the detection surface.  
Take care that the sensing range will be reduced when the slit mask is used. Please contact our office for details.

**Y-shaped connector**• **SL-WY**

**SPECIFICATIONS**

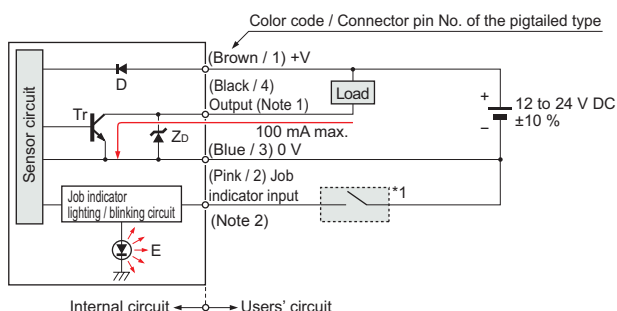
Type		NPN output		PNP output	
		High-luminous job indicator type	Long sensing range type	High-luminous job indicator type	Long sensing range type
Item	Model No.	NA1-PK5	NA1-5	NA1-PK5-PN	NA1-5-PN
Sensing height		100 mm <b>3.937 in</b>			
Sensing range (Note 2)		0.1 to 1.2 m <b>0.328 to 3.937 ft</b> (0.05 to 0.5 m <b>0.164 to 1.640 ft</b> when set to SHORT)	0.2 to 3 m <b>0.656 to 9.843 ft</b> (0.05 to 1 m <b>0.164 to 3.281 ft</b> when set to SHORT)	0.1 to 1.2 m <b>0.328 to 3.937 ft</b> (0.05 to 0.5 m <b>0.164 to 1.640 ft</b> when set to SHORT)	0.2 to 3 m <b>0.656 to 9.843 ft</b> (0.05 to 1 m <b>0.164 to 3.281 ft</b> when set to SHORT)
Beam pitch		25 mm <b>0.984 in</b>			
Number of beam channels		5 beam channels			
Sensing object		ø35 mm <b>ø1.378 in</b> or more opaque object (completely beam interrupted object)			
Supply voltage		12 to 24 V DC ±10 %    Ripple P-P 10 % or less			
Power consumption (Note 3)		Emitter: 0.5 W or less, Receiver: 0.8 W or less		Emitter: 0.6 W or less, Receiver: 0.9 W or less	
Output		NPN open-collector transistor <ul style="list-style-type: none"><li>Maximum sink current: 100 mA</li><li>Applied voltage: 30 V DC or less (between output and 0 V)</li><li>Residual voltage: 1 V or less (at 100 mA sink current) 0.4 V or less (at 16 mA sink current)</li></ul>		PNP open-collector transistor <ul style="list-style-type: none"><li>Maximum source current: 100 mA</li><li>Applied voltage: 30 V DC or less (between output and +V)</li><li>Residual voltage: 1 V or less (at 100 mA source current) 0.4 V or less (at 16 mA source current)</li></ul>	
		Utilization category		DC-12 or DC-13	
		Output operation		ON or OFF when one or more beam channels are interrupted / ON or OFF when two or more beam channels are interrupted, selectable by operation mode switch	
		Short-circuit protection		Incorporated	
Response time		10 ms or less (when the interference prevention is used, in Light state: 30 ms or less, in Dark state: 13 ms or less)			
Indicators	Emitter	Power indicator: Green LED (lights up when the power is ON) Job indicator: Orange LED (lights up or blinks when the job indicator input is Low, lighting pattern is selected by operation mode switch)		Power indicator: Green LED (lights up when the power is ON) Job indicator: Orange LED (lights up or blinks when the job indicator input is High, lighting pattern is selected by operation mode switch)	
	Receiver	Operation indicator: Red LED (lights up when one or more beam channels are interrupted, but lights up when two beam channels or more are interrupted in the double-beam-interruption mode) Stable incident beam indicator: Green LED (lights up when all beam channels are stably received) Job indicator: Orange LED (lights up or blinks when the job indicator input is Low, lighting pattern is selected by operation mode switch)		Operation indicator: Red LED (lights up when one or more beam channels are interrupted, but lights up when two beam channels or more are interrupted in the double-beam-interruption mode) Stable incident beam indicator: Green LED (lights up when all beam channels are stably received) Job indicator: Orange LED (lights up or blinks when the job indicator input is High, lighting pattern is selected by operation mode switch)	
Interference prevention function		Incorporated			
Environmental resistance	Pollution degree	3 (Industrial environment)			
	Protection	IP62 (IEC)			
	Ambient temperature	-10 to +55 °C <b>+14 to +131 °F</b> (No dew condensation or icing allowed), Storage: -20 to +70 °C <b>-4 to +158 °F</b>			
	Ambient humidity	35 to 85 % RH, Storage: 35 to 85 % RH			
	Ambient illuminance	Incandescent light: 3,000 lx at the light-receiving face			
	EMC	EN 60947-5-2			
	Voltage withstandability	1,000 V AC for one min. between all supply terminals connected together and enclosure			
	Insulation resistance	20 MΩ, or more, with 250 V DC megger between all supply terminals connected together and enclosure			
	Vibration resistance	10 to 150 Hz frequency, 0.75 mm <b>0.030 in</b> amplitude in X, Y and Z directions for two hours each			
Shock resistance		490 m/s² acceleration (50 G approx.) in X, Y and Z directions for three times each			
Emitting element		Infrared LED (Peak emission wavelength: 950 nm <b>0.037 mil</b> , synchronized scanning system)			
Material		Enclosure: Heat-resistant ABS, Lens cover: Acrylic, Indicator cover: Acrylic			
Cable		0.3 mm² 4-core (emitter: 3-core) oil resistant cabtyre cable, 2 m <b>6.562 ft</b> long			
Cable extension		Extension up to total 100 m <b>328.084 ft</b> is possible for both emitter and receiver with 0.3 mm², or more, cable.			
Weight		Net weight: Emitter 80 g approx. Receiver 85 g approx. Gross weight: 270 g approx.	Net weight: Emitter 70 g approx. Receiver 80 g approx. Gross weight: 270 g approx.	Net weight: Emitter 80 g approx. Receiver 85 g approx. Gross weight: 270 g approx.	Net weight: Emitter 70 g approx. Receiver 80 g approx. Gross weight: 270 g approx.

- Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +23 °C **+73.4 °F**.
- 2) The sensing range is the possible setting distance between the emitter and the receiver.
- 3) Obtain the current consumption by the following equation.  
Current consumption = Power consumption ÷ Supply voltage  
(e.g.) When the supply voltage is 12 V,  
the current consumption of the emitter is:  
0.5 W ÷ 12 V ≈ 0.042 A = 42 mA



**I/O CIRCUIT AND WIRING DIAGRAMS****NA1-PK5 NA1-5**

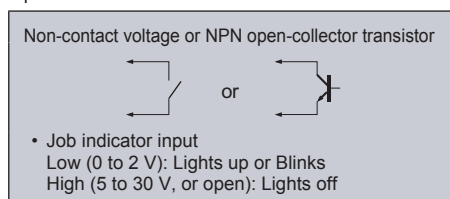
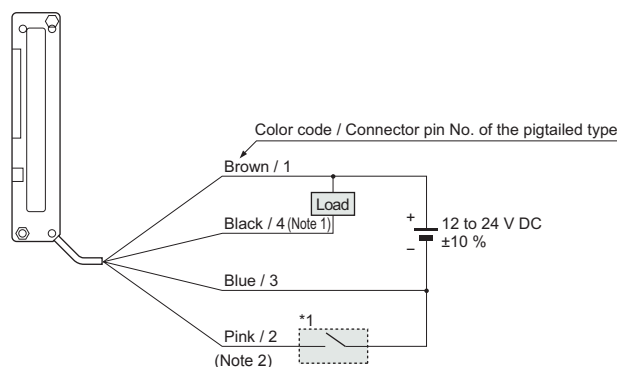
NPN output type

**I/O circuit diagram**

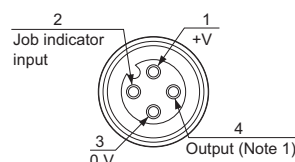
- Notes: 1) The emitter does not incorporate the output (black).  
 2) If a connection cable is connected to the relay connector type, then the lead wire color is "white".  
 3) Unused wire must be insulated to ensure that they do not come into contact with wires already in use.

Symbols ... D : Reverse supply polarity protection diode  
 Zd: Surge absorption zener diode  
 Tr : NPN output transistor  
 E : Job indicator (IND.)

\* 1

**Wiring diagram**

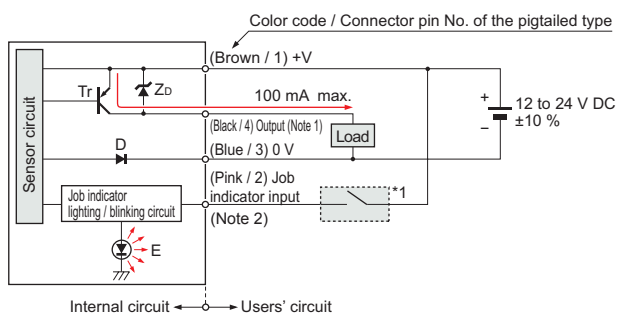
- Notes: 1) The emitter does not incorporate the black lead wire.  
 2) If a connection cable is connected to the relay connector type, then the lead wire color is "white".  
 3) Unused wires must be insulated to ensure that they do not come into contact with wires already in use.

**Connector pin position (Pigtailed type)**

- Notes: 1) No connection is required for the emitter.  
 2) The pin arrangement of the **SL-WY** Y-shaped connector (optional) is identical to the receiver.

**NA1-PK5-PN NA1-5-PN**

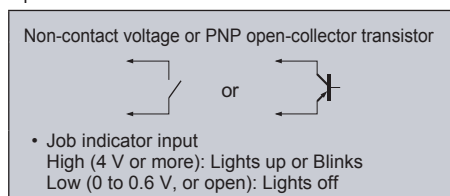
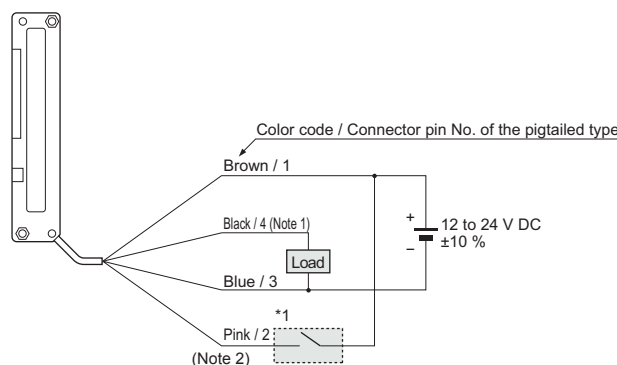
PNP output type

**I/O circuit diagram**

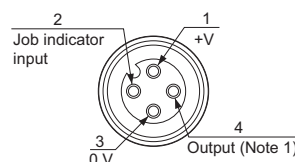
- Notes: 1) The emitter does not incorporate the output (black).  
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Symbols ... D : Reverse supply polarity protection diode  
 Zd: Surge absorption zener diode  
 Tr : PNP output transistor  
 E : Job indicator (IND.)

\* 1

**Wiring diagram**

- Notes: 1) The emitter does not incorporate the black lead wire.  
 2) If a connection cable is connected to the relay connector type, then the lead wire color is "white".  
 3) Unused wires must be insulated to ensure that they do not come into contact with wires already in use.

**Connector pin position (Pigtailed type)**

- Notes: 1) No connection is required for the emitter.  
 2) The pin arrangement of the **SL-WY** Y-shaped connector (optional) is identical to the receiver.

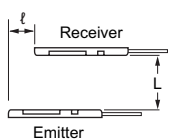


## SENSING CHARACTERISTICS (TYPICAL)

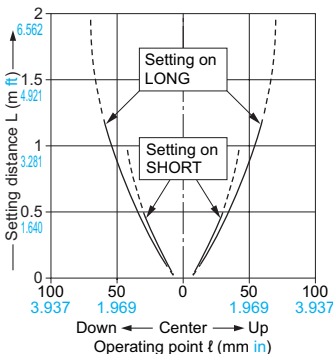
### NA1-PK5 NA1-PK5-PN

#### Parallel deviation

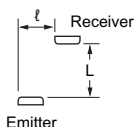
##### Vertical direction



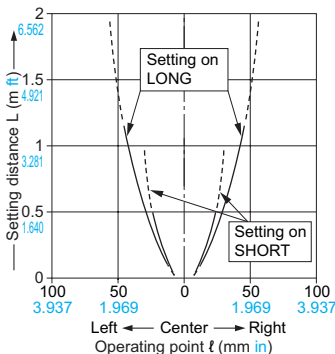
##### • Vertical direction



##### Horizontal direction

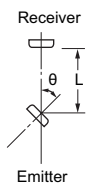


##### • Horizontal direction

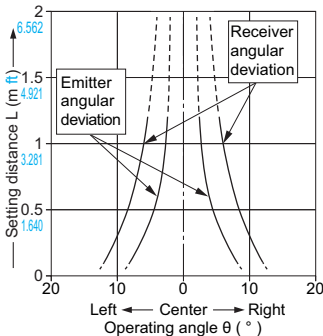


#### Angular deviation

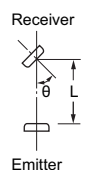
##### Emitter angular deviation



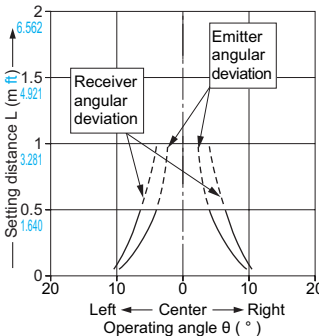
##### • Setting on LONG



##### Receiver angular deviation



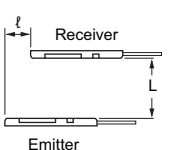
##### • Setting on SHORT



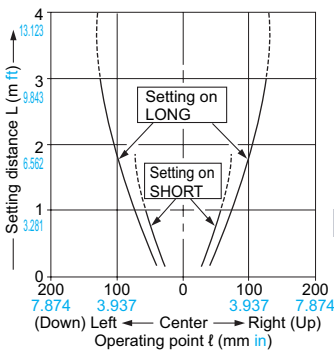
### NA1-5 NA1-5-PN

#### Parallel deviation

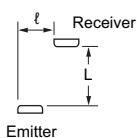
##### Vertical direction



##### • Common for both horizontal and vertical directions

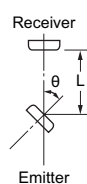


##### Horizontal direction

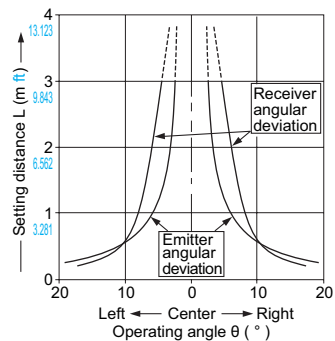


#### Angular deviation

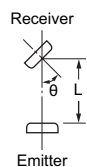
##### Emitter angular deviation



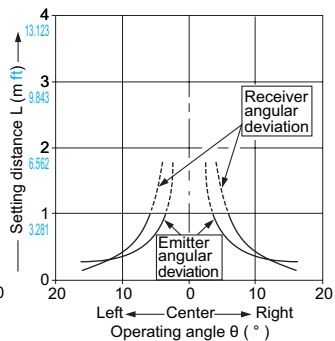
##### • Setting on LONG



##### Receiver angular deviation



##### • Setting on SHORT



**PRECAUTIONS FOR PROPER USE**

Refer to General precautions.

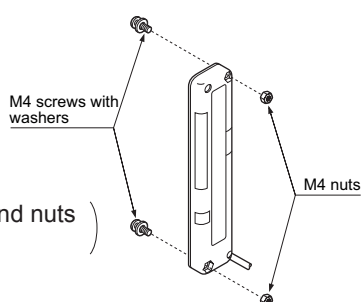


- Never use this product as a sensing device for personnel protection.
- For sensing devices to be used as safety devices for press machines or for personnel protection, use products which meet standards, such as OSHA, ANSI or IEC etc., for personnel protection applicable in each region or country.
- If this product is used as a sensing device for personnel protection, death or serious body injury could result.
- For a product which meets safety standards, use the following products.  
Type4: **SF4B** series  
Type2: **SF2B** series

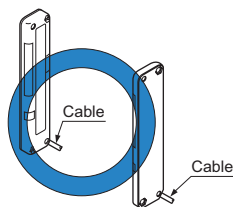
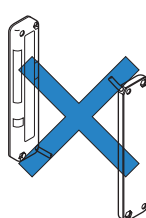
**Mounting**

- Use M4 screws with washers and M4 nuts. The tightening torque should be 0.5 N·m or less.

(Purchase the screws and nuts separately.)

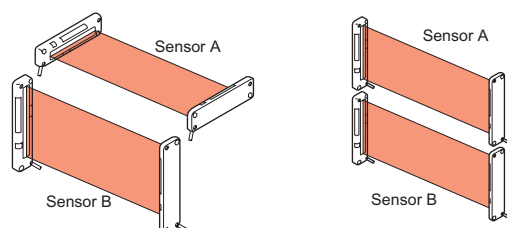
**Orientation**

- The emitter and the receiver must face each other correctly. If they are set upside down, the sensor does not work.

**Correct****Incorrect****Interference prevention function**

- By setting different emission frequencies, two units of the sensor can be mounted close together, as shown in the figure below.

(The switches must be set with the power supply off.  
The operation mode does not change if the switch setting is changed with the power supplied.)



	Operation mode switch	
	Emitter	Receiver
Sensor A (FREQ. A)	FREQ. A  FREQ. B	FREQ. A  FREQ. B
Sensor B (FREQ. B)	FREQ. A  FREQ. B	FREQ. A  FREQ. B

**LONG / SHORT selection switch (incorporated on the emitter)**

- Select the switch setting according to the setting distance between the emitter and the receiver as given below.  
(The switches must be set with the power supply off.  
The operation mode does not change if the switch setting is changed with the power supplied.)

Setting distance	Operation mode switch
0.05 to 0.5 m <b>0.164 to 1.640 ft [NA1-PK5(-PN)]</b> 0.05 to 1 m <b>0.164 to 3.281 ft [NA1-5(-PN)]</b>	LONG  SHORT
0.5 to 1.2 m <b>1.640 to 3.937 ft [NA1-PK5(-PN)]</b> 1 to 3 m <b>3.281 to 9.843 ft [NA1-5(-PN)]</b>	LONG  SHORT

**Selection of output operation**

- The output operation mode is selected by the operation mode switch on the receiver.  
(The switches must be set with the power supply off.  
The operation mode does not change if the switch setting is changed with the power supplied.)

Output operation	Operation mode switch
ON when one or more beam channels are interrupted (OFF when all beam channels are received).	SINGLE D / ON  DOUBLE L / ON
OFF when one or more beam channels are interrupted (ON when all beam channels are received).	SINGLE D / ON  DOUBLE L / ON
ON when any two or more beam channels are interrupted.	SINGLE D / ON  DOUBLE L / ON
OFF when any two or more beam channels are interrupted.	SINGLE D / ON  DOUBLE L / ON

**Job indicator operation selection**

- Lighting / Blinking is selected by the operation mode switch on the emitter and the receiver.  
(The switches must be set with the power supply off.  
The operation mode does not change if the switch setting is changed with the power supplied.)

	Operation mode switch	
	Emitter	Receiver
Lighting	LIGHT  FLASH	LIGHT  FLASH
Blinking	LIGHT  FLASH	LIGHT  FLASH

**Others**

- Do not use during the initial transient time (0.5 sec.) after the power supply is switched on.

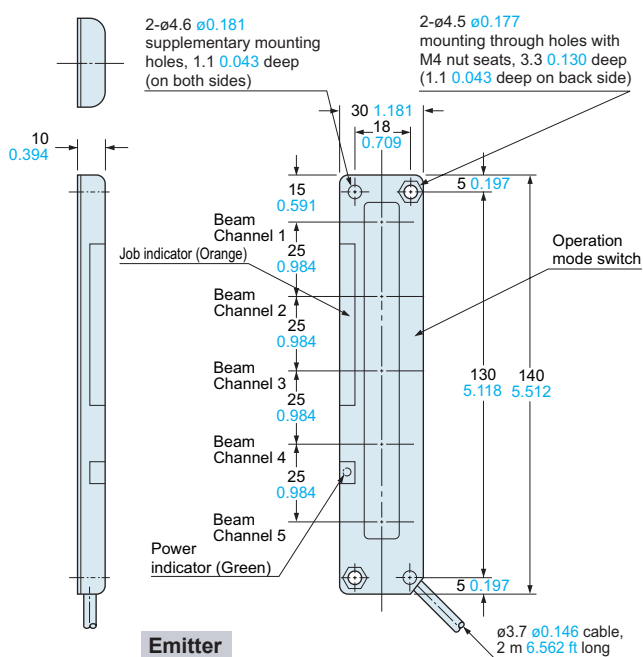
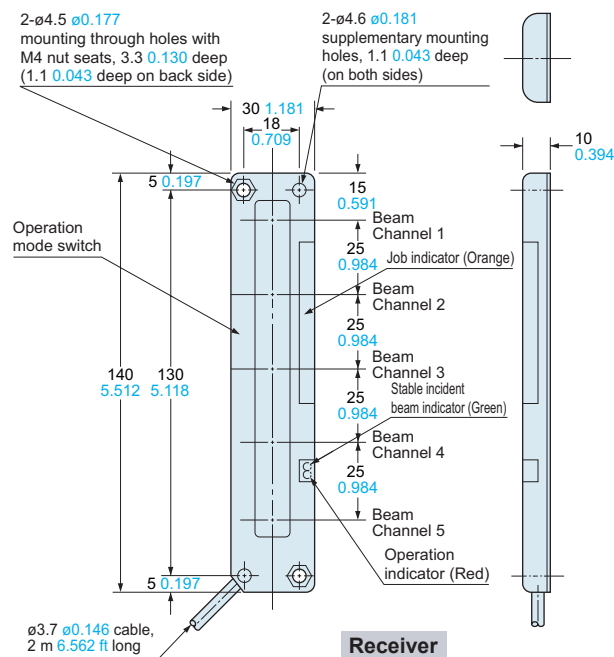


**DIMENSIONS (Unit: mm in)**

The CAD data in the dimensions can be downloaded from our website.

**NA1-PK5(-PN) NA1-5(-PN)**

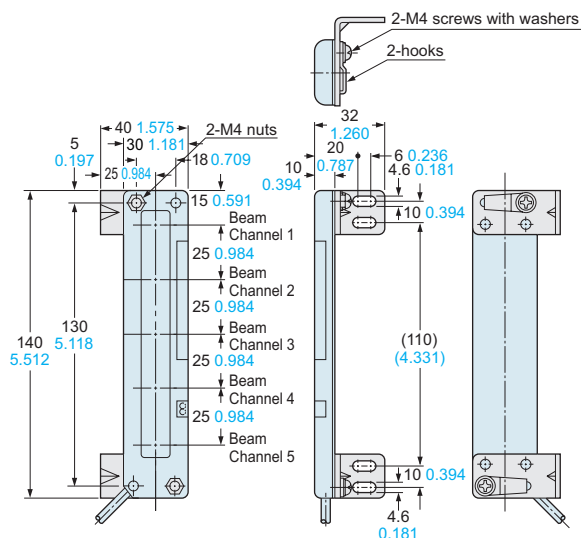
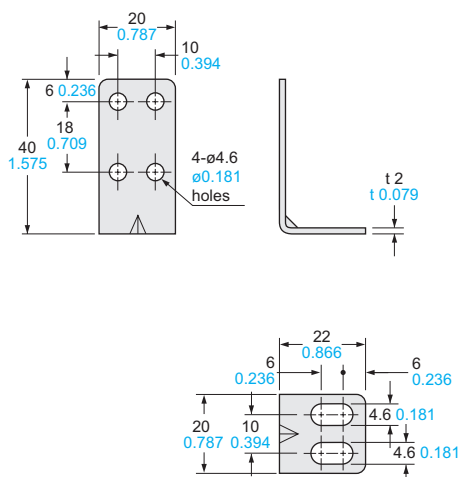
Sensor

**Emitter****Receiver****MS-NA1-1**

Sensor mounting bracket (Optional)

**Assembly dimensions**

Mounting drawing with the receiver



Material: Cold rolled carbon steel (SPCC)  
(Uni-chrome plated)

Four bracket set

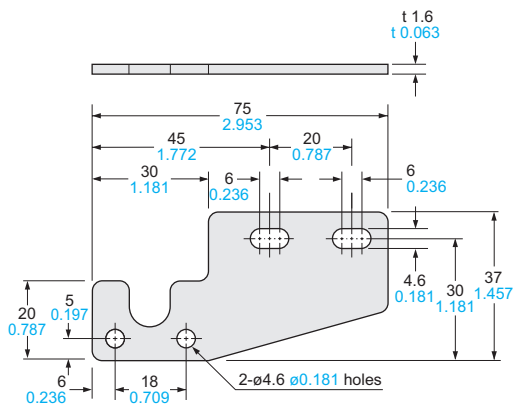
[Four M4 (length 15 mm  $0.591$  in) screws with washers, eight nuts, four hooks and eight M4 (length 18 mm  $0.709$  in) screws with washers are attached.  
[M4 (length 18 mm  $0.709$  in) screws with washers are not used for NA1-PK5/5 series.]

## DIMENSIONS (Unit: mm in)

The CAD data in the dimensions can be downloaded from our website.

## MS-NA2-1

Sensor mounting bracket (Optional)



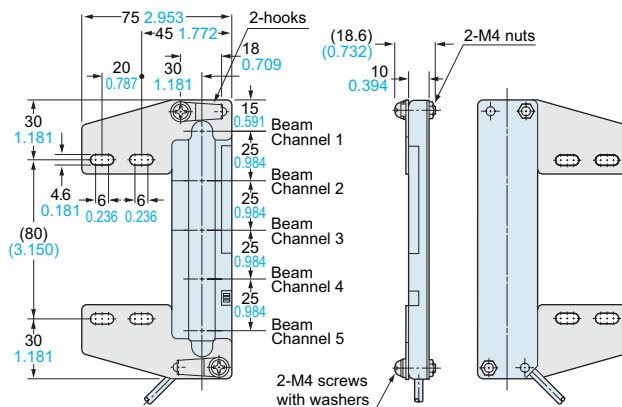
Material: Cold rolled carbon steel (SPCC)  
(Uni-chrome plated)

Four bracket set

Four M4 (length 15 mm 0.591 in) screws with washers, eight nuts, four hooks, four spacers and eight M4 (length 18 mm 0.709 in) screws with washers are attached.

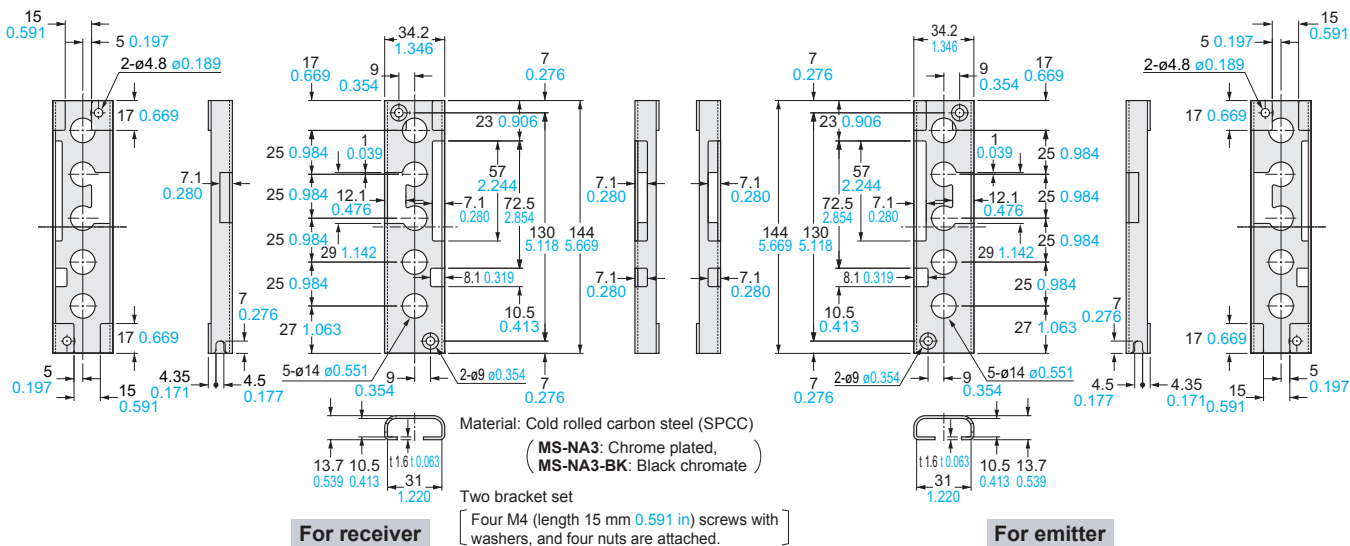
## Assembly dimensions

### Mounting drawing with the receiver



## MS-NA3 MS-NA3-BK

Sensor protection bracket (Optional)



## SL-N15

### S-LINK direct hook-up area sensor

