

## Related Information

■ General terms and conditions..... F-3

■ Selection guide ..... P.419~

■ Glossary of terms..... P.1549~

■ General precautions..... P.1552~


[panasonic.net/id/pidsx/global](http://panasonic.net/id/pidsx/global)


Make sure to use safety light curtains when using a sensing device for personnel protection. Refer to p.455~ for details of safety light curtains.



## 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.



## BASIC PERFORMANCE

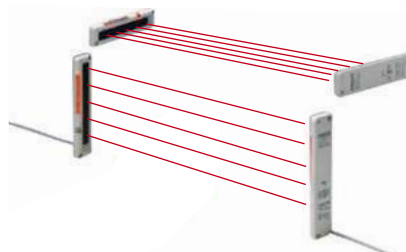
### Long sensing range: 3 m 9.843 ft NA1-5

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.



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MEASUREMENT SENSORS

STATIC CONTROL DEVICES

LASER MARKERS

PLC

HUMAN MACHINE INTERFACES

ENERGY MANAGEMENT SOLUTIONS

FA COMPONENTS

MACHINE VISION SYSTEMS

UV CURING SYSTEMS

Selection Guide

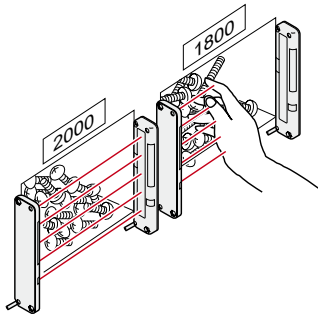
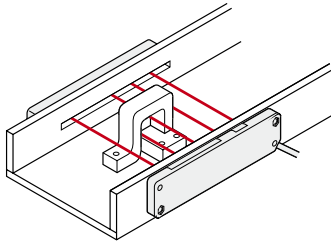
Slim Body

Picking

Other Products

NA1-PK5/NA1-5

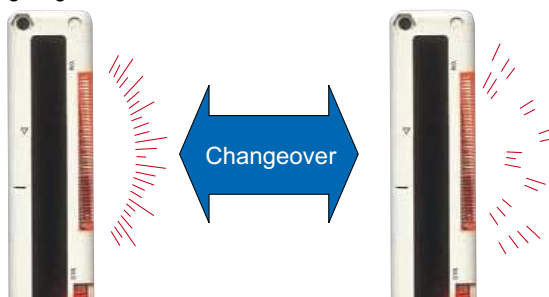
NA1-PK3

**APPLICATIONS****Preventing wrong parts picking****Detecting parts having wide positioning area****FUNCTIONS****Lighting pattern selectable**

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

Continuous lighting

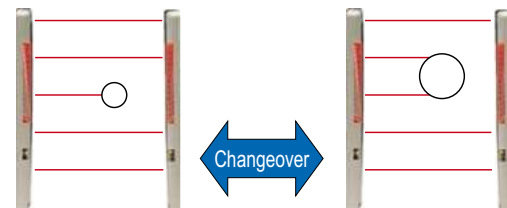
Blinking

**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



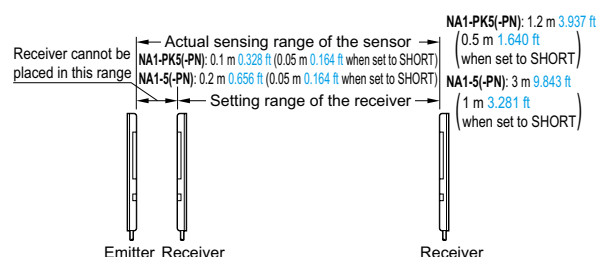
All opaque bodies with  $\varnothing 35$  mm  $\varnothing 1.378$  in or greater will be detected.

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                        |
|-------------------------|------------|----------------------|-------------------|-------------------------------|
| Standard type           |            |                      | <b>NA1-PK5</b>    | NPN open-collector transistor |
|                         |            |                      | <b>NA1-PK5-PN</b> | PNP open-collector transistor |
| Long sensing range type |            |                      | <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.



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SENSORS

AREA  
SENSORS

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FLOW  
SENSORS

INDUCTIVE  
PROXIMITY  
SENSORS

PARTICULAR  
USE SENSORS

SENSOR  
OPTIONS

SIMPLE  
WIRE-SAVING  
UNITS

WIRE-SAVING  
SYSTEMS

MEASUREMENT  
SENSORS

STATIC  
CONTROL  
DEVICES

LASER  
MARKERS

PLC

HUMAN MACHINE  
INTERFACES

ENERGY  
MANAGEMENT  
SOLUTIONS

FA COMPONENTS

MACHINE VISION  
SYSTEMS

UV CURING  
SYSTEMS

Selection  
Guide

Slim Body

Picking

Other Products

NA1-PK5/  
NA1-5

NA1-PK3

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SENSORSLASER  
SENSORSPHOTO-  
ELECTRIC  
SENSORSMICRO  
PHOTO-  
ELECTRIC  
SENSORSAREA  
SENSORSSAFETY LIGHT  
CURTAINS/  
SAFETY  
COMPONENTSPRESSURE /  
FLOW  
SENSORSINDUCTIVE  
PROXIMITY  
SENSORSPARTICULAR  
USE  
SENSORSSENSOR  
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SYSTEMSMEASURE-  
MENT  
SENSORSSTATIC  
CONTROL  
DEVICESLASER  
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PLC

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MACHINE  
INTERFACESENERGY  
MANAGEMENT  
SOLUTIONSFA  
COMPONENTSMACHINE  
VISION  
SYSTEMSUV  
CURING  
SYSTEMSSelection  
GuideSlim  
Body

Picking

Other  
ProductsNA1-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**”.

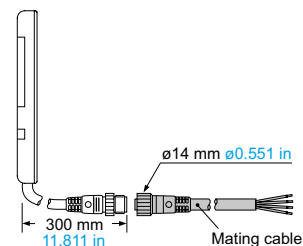
#### • Mating cable (2 cables are required.)

| 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**. Refer to our website for the sensor & wire-saving link system **S-LINK**.

| Model No.     | Description   |
|---------------|---|
| <b>SL-N15</b> | <p>Sensing range: 0.2 to 3 m 0.656 to 9.843 ft<br/>(0.05 to 1 m 0.164 to 3.281 ft when the switch is set to SHORT)</p> <p>Beam pitch: 25 mm 0.984 in</p> <p>Sensing height: 100 mm 3.937 in</p> <p>Sensing object: ø35 mm ø1.378 in or more opaque object</p> <p>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.</p> <p>Both the emitter and the receiver are incorporated with bright orange LED job indicators that are easily visible to the operator.</p> |

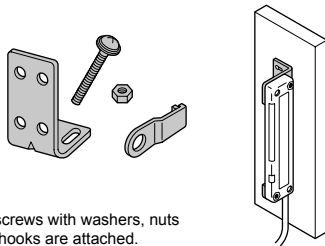


## OPTIONS

| Designation               | Model No.                          | Description   |
|---------------------------|------------------------------------|---|
| Sensor mounting bracket   | <b>MS-NA1-1</b>                    | Four bracket set<br>[ Four M4 (length 15 mm <b>0.591 in</b> ) screws with washers, eight nuts, four hooks, four spacers and eight M4 (length 18 mm <b>0.709 in</b> ) screws with washers are attached.<br>(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.<br>Two silver bracket set<br>[ Four M4 (length 15 mm <b>0.591 in</b> ) screws with washers, and four nuts are attached. ]  |
|                           | <b>MS-NA3-BK</b>                   |   |
| Slit mask                 | <b>OS-NA1-5</b><br>10 pcs. per set | The slit mask restrains the amount of beam emitted or received. (Seal type)   |
| Y-shaped connector        | <b>SL-WY</b><br>5 pcs. per set     | This connector is able to combine the cables of receiver and emitter into one.  |

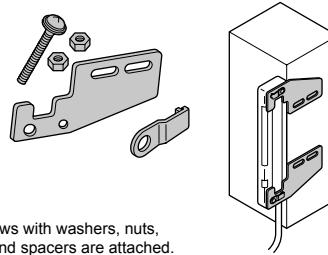
### Sensor mounting bracket

#### • MS-NA1-1



M4 screws with washers, nuts and hooks are attached.

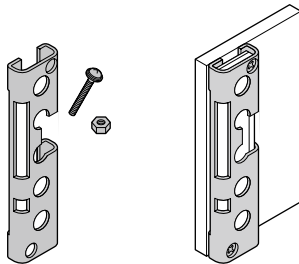
#### • MS-NA2-1



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

### Sensor protection bracket

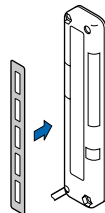
#### • MS-NA3 • MS-NA3-BK



M4 screws with washers, and nuts are attached.

### Slit mask

#### • OS-NA1-5

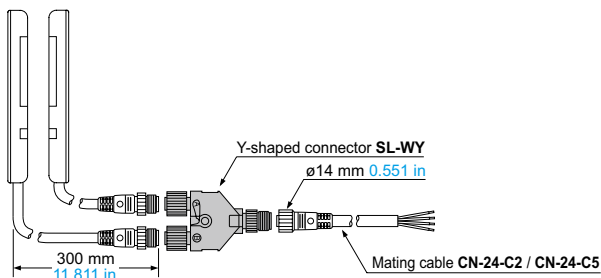


Since the slit mask is of seal type, it can be used by sticking to the detection surface.

Take care that the sensing range will be reduced when the slit mask is used.

### Y-shaped connector

#### • SL-WY



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PRESSURE / FLOW SENSORS

INDUCTIVE PROXIMITY SENSORS

PARTICULAR USE SENSORS

SENSOR OPTIONS

SIMPLE WIRE-SAVING UNITS

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MEASURE-MENT SENSORS

STATIC CONTROL DEVICES

LASER MARKERS

PLC

HUMAN MACHINE INTERFACES

ENERGY MANAGEMENT SOLUTIONS

FA COMPONENTS

MACHINE VISION SYSTEMS

UV CURING SYSTEMS

Selection Guide

Slim Body

Picking

Other Products

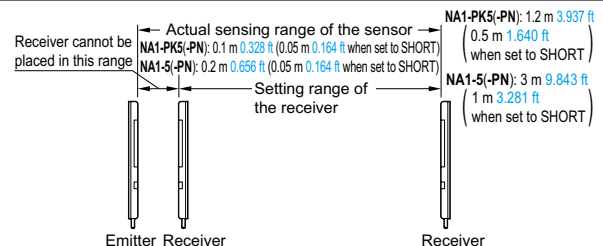
NA1-PK5/NA1-5

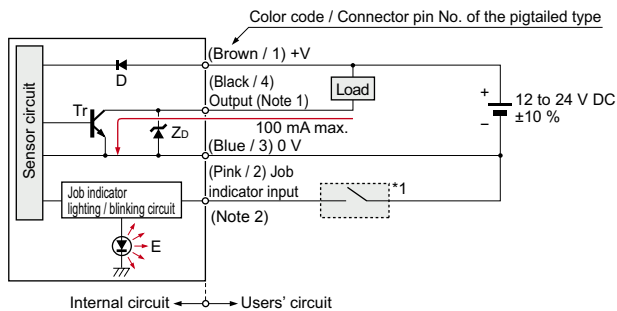
NA1-PK3

## SPECIFICATIONS

| Type                             |  | NPN output   |   | PNP output  |   |
|----------------------------------|--|--|---|---|---|
|                                  |  | Standard type  | Long sensing range type   | Standard type   | Long sensing range type   |
| Item                             | Model No.  | NA1-PK5  | NA1-5   | NA1-PK5-PN  | NA1-5-PN  |
| CE marking directive compliance  |  | EMC Directive, RoHS Directive  |   |   |   |
| 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><br>(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><br>(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><br>(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><br>(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)</li><li>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)</li><li>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 /<br>ON or OFF when two or more beam channels are interrupted,<br>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)<br>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)<br>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)<br>Stable incident beam indicator: Green LED (lights up when all beam channels are stably received)<br>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)<br>Stable incident beam indicator: Green LED (lights up when all beam channels are stably received)<br>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 or less at the light-receiving face   |   |   |   |
|                                  | 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> double amplitude in X, Y and Z directions for two hours each   |   |   |   |
| Shock resistance                 | 490 m/s <sup>2</sup> acceleration (50 G approx.) in X, Y and Z directions 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 mm <sup>2</sup> 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 mm <sup>2</sup> , or more, cable.   |   |   |   |
| Weight                           |  | Net weight:<br>Emitter 80 g approx.<br>Receiver 85 g approx.<br>Gross weight: 270 g approx.  | Net weight:<br>Emitter 70 g approx.<br>Receiver 80 g approx.<br>Gross weight: 270 g approx.     | Net weight:<br>Emitter 80 g approx.<br>Receiver 85 g approx.<br>Gross weight: 270 g approx.   | Net weight:<br>Emitter 70 g approx.<br>Receiver 80 g approx.<br>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



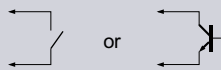
**I/O CIRCUIT AND WIRING DIAGRAMS****NA1-PK5 NA1-5****NPN output type****I/O circuit diagram**

- 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.

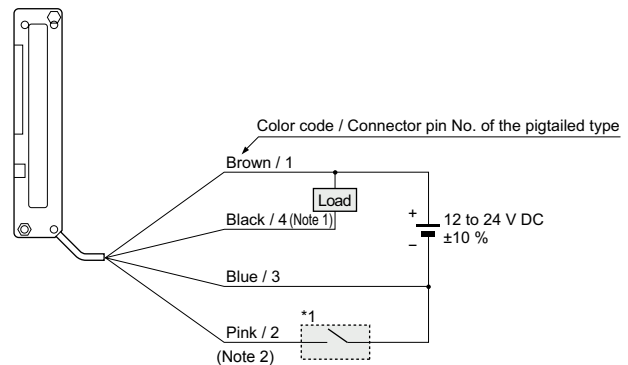
Symbols ... D : Reverse supply polarity protection diode  
 Zd : Surge absorption zener diode  
 Tr : NPN output transistor  
 E : Job indicator (IND.)

\* 1

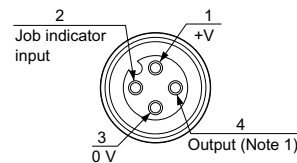
Non-contact voltage or NPN open-collector transistor



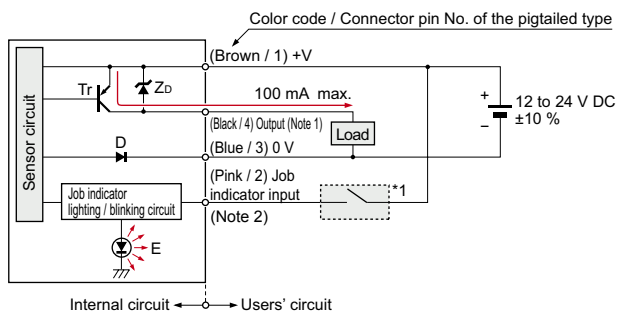
- Job indicator input
- Low (0 to 2 V): Lights up or Blinks
- High (5 to 30 V, or open): Lights off

**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.

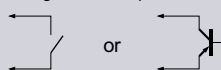
**NA1-PK5-PN NA1-5-PN****PNP output type****I/O circuit diagram**

- Notes: 1) The emitter does not incorporate the output (black).  
 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.

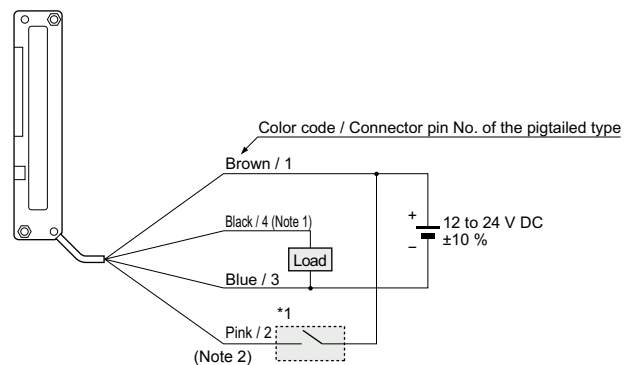
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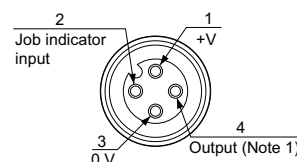
Non-contact voltage or PNP open-collector transistor



- Job indicator input
- High (4 V or more): Lights up or Blinks
- Low (0 to 0.6 V, or open): Lights off

**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.

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LASER MARKERS

PLC

HUMAN MACHINE INTERFACES

ENERGY MANAGEMENT SOLUTIONS

FA COMPONENTS

MACHINE VISION SYSTEMS

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Selection Guide

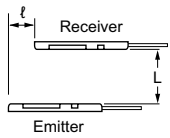
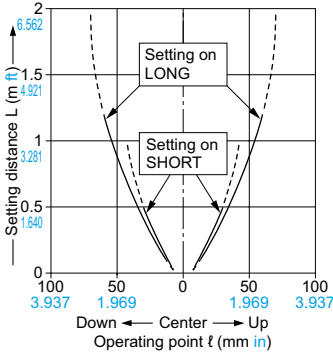
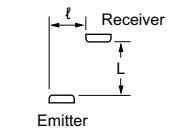
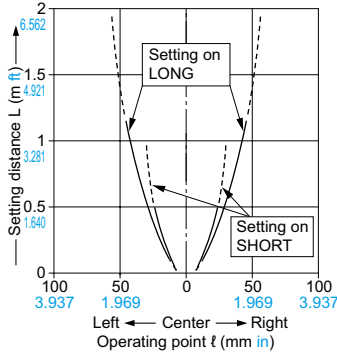
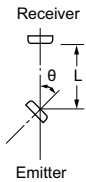
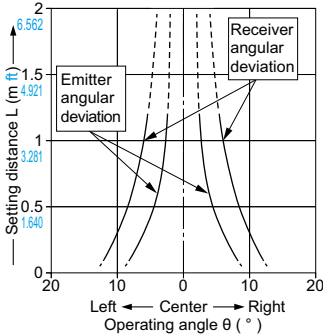
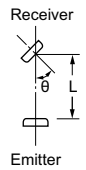
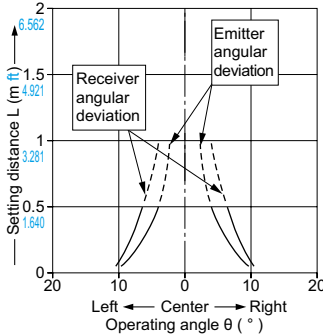
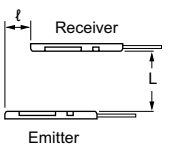
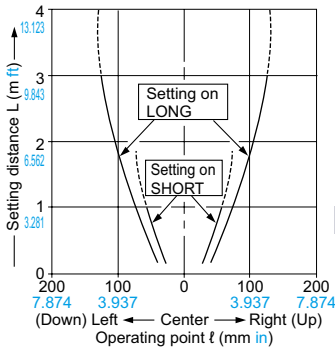
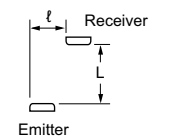
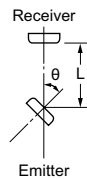
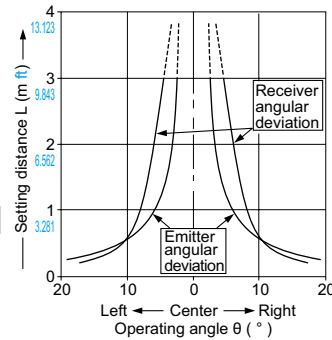
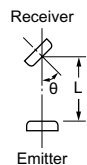
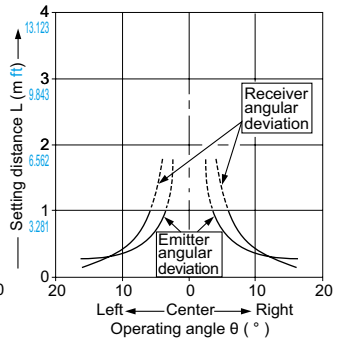
Slim Body

Picking

Other Products

NA1-PK5/NA1-5

NA1-PK3

**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 p.1552~ for general precautions.

FIBER  
SENSORSLASER  
SENSORSPHOTO-  
ELECTRIC  
SENSORSMICRO  
PHOTO-  
ELECTRIC  
SENSORSAREA  
SENSORSSAFETY LIGHT  
CURTAINS/  
SAFETY  
COMPONENTSPRESSURE /  
FLOW  
SENSORSINDUCTIVE  
PROXIMITY  
SENSORSPARTICULAR  
USE  
SENSORSSENSOR  
OPTIONSSIMPLE  
WIRE-SAVING  
UNITSWIRE-SAVING  
SYSTEMSMEASURE-  
MENT  
SENSORSSTATIC  
CONTROL  
DEVICESLASER  
MARKERS

PLC

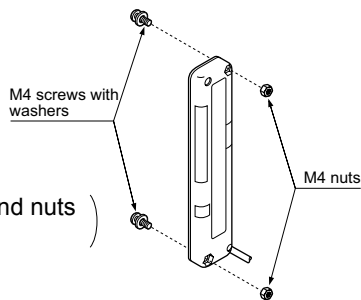
HUMAN  
MACHINE  
INTERFACESENERGY  
MANAGEMENT  
SOLUTIONSFA  
COMPONENTSMACHINE  
VISION  
SYSTEMSUV  
CURING  
SYSTEMSSelection  
Guide  
Slim  
BodyPicking  
Other  
ProductsNA1-PK5/  
NA1-5  
NA1-PK3

- 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 safety light curtain. (p.455~)

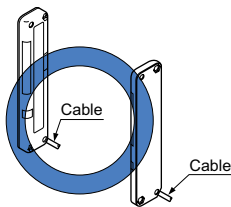
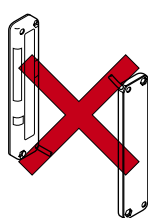
**Mounting**

- 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.)

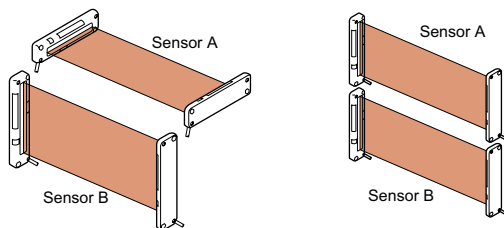
**Orientation**

- 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 0.164 to 1.640 ft [NA1-PK5(-PN)]<br>0.05 to 1 m 0.164 to 3.281 ft [NA1-5(-PN)] | LONG  SHORT           |
| 0.5 to 1.2 m 1.640 to 3.937 ft [NA1-PK5(-PN)]<br>1 to 3 m 3.281 to 9.843 ft [NA1-5(-PN)]     | 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.

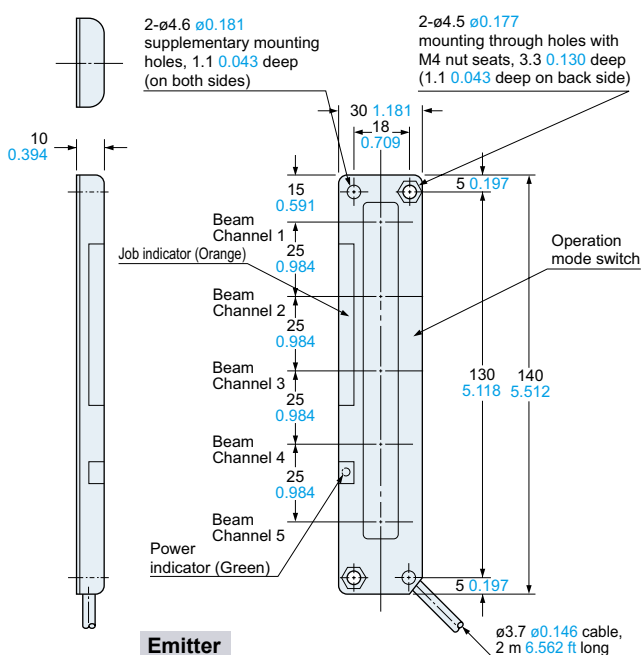
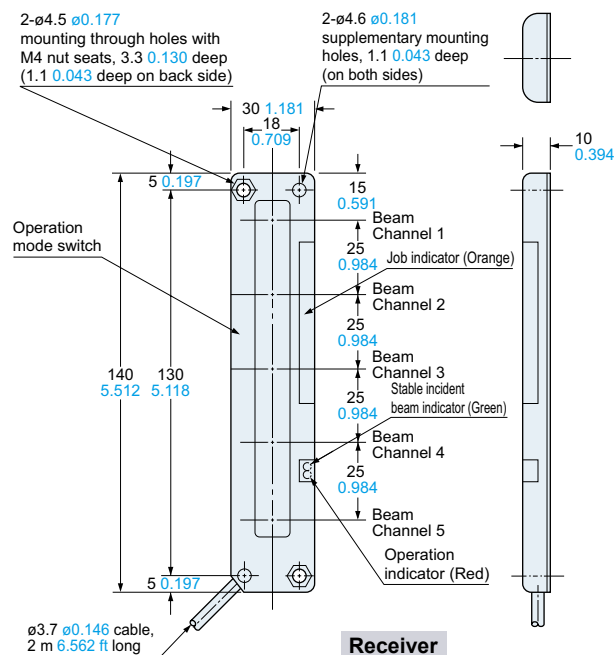


**DIMENSIONS (Unit: mm in)**

The CAD data can be downloaded from our website.

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

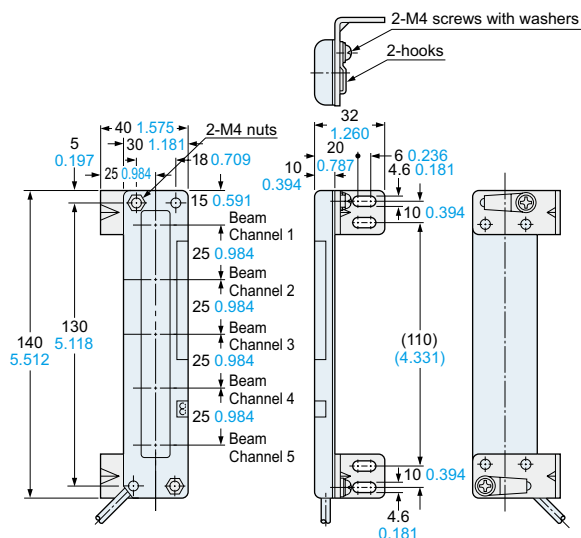
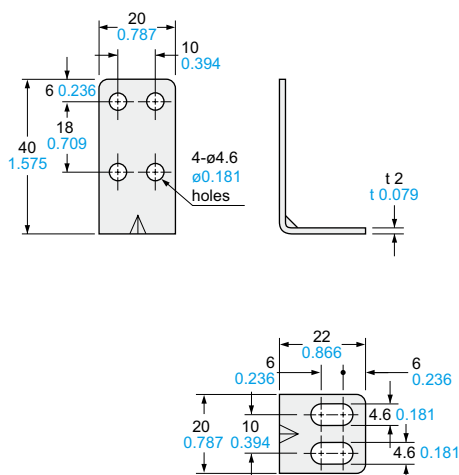
Sensor

**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.]

FIBER  
SENSORSLASER  
SENSORSPHOTO-  
ELECTRIC  
SENSORSMICRO  
PHOTO-  
ELECTRIC  
SENSORSAREA  
SENSORSSAFETY LIGHT  
CURTAINS/  
SAFETY  
COMPONENTSPRESSURE /  
FLOW  
SENSORSINDUCTIVE  
PROXIMITY  
SENSORSPARTICULAR  
USE  
SENSORSSENSOR  
OPTIONSSIMPLE  
WIRED-SAVING  
UNITSWIRED-SAVING  
SYSTEMSMEASURE-  
MENT  
SENSORSSTATIC  
CONTROL  
DEVICESLASER  
MARKERS

PLC

HUMAN  
MACHINE  
INTERFACESENERGY  
MANAGEMENT  
SOLUTIONSFA  
COMPONENTSMACHINE  
VISION  
SYSTEMSUV  
CURING  
SYSTEMSSelection  
GuideSlim  
Body

Picking

Other  
ProductsNA1-PK5/  
NA1-5

NA1-PK3

The CAD data can be downloaded from our website.

Receiver

NA1-PK3