Ultra-slim Body Picking Sensor

NA1-PK5 SERIES NA1-5 SERIES

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NA1-PK3

■ General terms and conditions......F-7

■ Glossary of terms......P.1455~

■ Sensor selection guideP.461~

■ General precautionsP.1458~







Make sure to use light curtains when using a sensing device

for personnel protection. Refer to p.495~ for details of

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.

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



BASIC PERFORMANCE

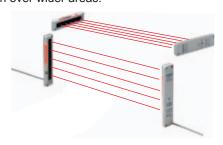
Long sensing range: 3 m 9.843 ft NA1-5

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

FUNCTIONS

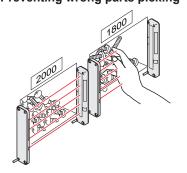
Two unit installation is possible

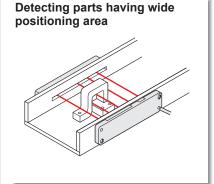
Sensor units can now be set to different light emission frequencies in order to prevent mutual interference. Two units can now be operated in a side-by-side configuration without interference, for problem-free detection over wider areas.



APPLICATIONS

Preventing wrong parts picking





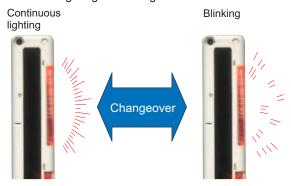


Never use this product in any personnel safety application.

FUNCTIONS

Lighting pattern selectable

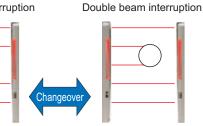
The job indicator operation can be selected as either continuous lighting or blinking.



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



All opaque bodies with ø35 mm ø1.378 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.

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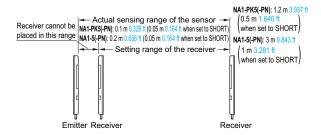
MACHINE VISION SYSTEMS

UV CURING SYSTEMS

ORDER GUIDE

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



Selection Guide Slim Body

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NA1-FK3 NA1-FK3

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

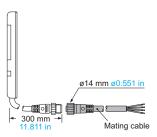
Pigtailed type

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	
CN-24-C2 4-core, cable length 2 m 6.562 ft		
CN-24-C5	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 p.1033 \sim for the sensor & wire-saving link system **S-LINK**.

Model No.	Description		
SL-N15	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	It is a parts-taking verification sensor with five sensing beams and can be hooked up to the S-LINK 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.	

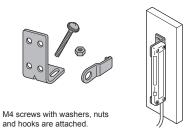


OPTIONS

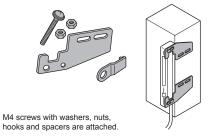
Designation	Model No.	Description	
Sensor	MS-NA1-1	Four bracket set Four M4 (length 15 mm 0.591 in) screws with washers, eight	
mounting bracket	MS-NA2-1	nuts, four hooks, four spacers and eight M4 (length 18 mm 0.709 in) screws with washers are attached. (Spacers are not attached with MS-NA1-1.)	
Sensor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

Sensor mounting bracket

• MS-NA1-1

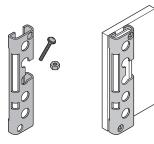


• MS-NA2-1



Sensor protection bracket

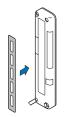
- MS-NA3
- MS-NA3-BK



M4 screws with washers, and nuts are attached.

Slit mask

• OS-NA1-5

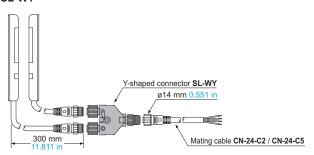


Since the slit mask is of seal type, it can be used by sticking to the detection surface.

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



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SPECIFICATIONS

		Туре	NPN output		PNP output	
			High-luminous job indicator type Long sensing range type		High-luminous job indicator type Long sensing range typ	
Item	1	Model No.	NA1-PK5	NA1-5	NA1-PK5-PN	NA1-5-PN
Sensing height				100 mm	3.937 in	
Sensing range (Note 2)		Note 2)	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)	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)	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)	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)
Bear	m pitch			25 mm	0.984 in	
Num	ber of beam	channels		5 beam	channels	
Sens	sing object		ø35 mm ø1.378 in or more opaque object (completely beam interrupted object)			
Supp	ply voltage		12 to 24 V DC ±10 % Ripple P-P 10 % or less			
Pow	er consumpt	tion (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			Residual voltage: 1 V or le	r less (between output and 0 V)	PNP open-collector transistor • Maximum source current: 100 mA • Applied voltage: 30 V DC or less (between output and + • Residual voltage: 1 V or less (at 100 mA source currer 0.4 V or less (at 16 mA source currer	
	Utilization of	category		DC-12 c	or DC-13	
	Output ope	eration	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-circu	it protection	Incorporated			
Resp	ponse 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)			
	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)	
Indicators	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)	
Inter	ference prev	ention function	Incorporated			
	Pollution de	egree	3 (Industrial environment)			
Φ	Protection			IP62	(IEC)	
tanc	Ambient ter	mperature	-10 to +55 °C +14 to +131 °F (No dew condensation or icing allowed), Storage: -20 to +70 °C -4 to +158 °F			
esis	Ambient hu	umidity	35 to 85 % RH, Storage: 35 to 85 % RH			
Ambient temperature — Ambient humidity Ambient illuminance EMC			Incandescent light: 3,000 & at the light-receiving face			
neu	EMC		EN 60947-5-2			
iron	Voltage wit	thstandability	1,000 V AC for one min. between all supply terminals connected together and enclosure			
Environ	Insulation r	esistance	20 MΩ, or more, with 250 V DC megger between all supply terminals connected together and enclosure			
	Vibration re		10 to 150 Hz frequency, 0.75 mm 0.030 in 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			
	ting element	t	Infrared LED (Peak emission wavelength: 950 nm 0.037 mil, synchronized scanning system)			
Material			Enclosure: Heat-resistant ABS, Lens cover: Acrylic, Indicator cover: Acrylic			
Cabl			0.3 mm² 4-core (emitter: 3-core) oil resistant cabtyre cable, 2 m 6.562 ft long			
Cabl	le extension		Extension up to total 1	100 m 328.084 ft is possible for b	ooth emitter and receiver with 0.3	s 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.
L. L.			conditions have not been specifie			NA1-PK5(-PN): 1.2 m 3.937

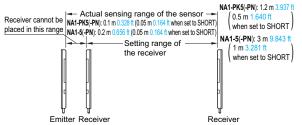
Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +23 °C +73.4 °F.

- 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 \div Supply voltage

(e.g.) When the supply voltage is 12 V,

the current consumption of the emitter is: $0.5 \text{ W} \div 12 \text{ V} \approx 0.042 \text{ A} = 42 \text{ mA}$



I/O CIRCUIT AND WIRING DIAGRAMS

NA1-PK5 NA1-5 NPN output type

I/O circuit diagram

Color code / Connector pin No. of the pigtailed type (Brown / 1) +V (Black / 4) Load 12 to 24 V DC Output (Note 1) ±10 % 100 mA max. Sensor (Blue / 3) 0 V (Pink / 2) Job indicator input lighting / blinking circuit (Note 2) **(1**) → E Internal circuit ← → Users' circuit

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

- 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.

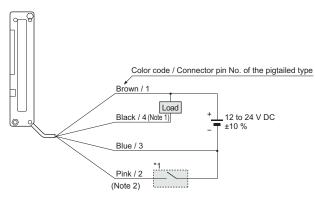
Symbols ... D : Reverse supply polarity protection diode ZD: Surge absorption zener diode Tr : NPN output transistor E : Job indicator (IND.)

Non-contact voltage or NPN open-collector transistor

or

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

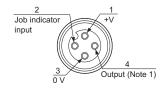
Wiring diagram



Notes: 1) The emitter does not incorporate the black lead wire.

- 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)

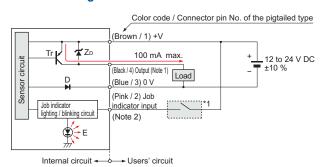


Notes: 1) No connection is required for the emitter.

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).

- 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 : PNP output transistor E : Job indicator (IND.)

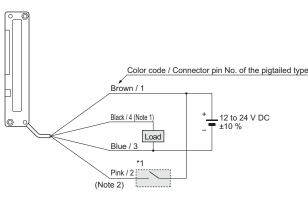
* 1

Non-contact voltage or PNP open-collector transistor

or

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

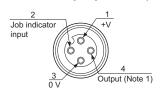
Wiring diagram



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".
- 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.

 The pin arrangement of the SL-WY Y-shaped connector (optional) is identical to the receiver. FIBER SENSORS

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Selection Guide

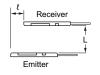
NA1-PK3

SENSING CHARACTERISTICS (TYPICAL)

NA1-PK5 NA1-PK5-PN

Parallel deviation

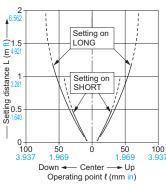
Vertical direction



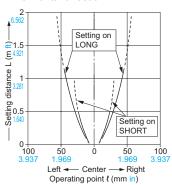
Horizontal direction



Vertical direction



Horizontal direction



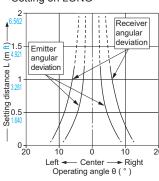
Angular deviation

Emitter angular deviation

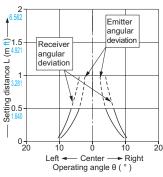


Receiver angular deviation

• Setting on LONG



Setting on SHORT



NA1-5 NA1-5-PN

Emitter

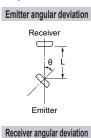
Parallel deviation

· Common for both horizontal and vertical directions Vertical direction





Angular deviation



Receiver

ð

Emitter



angular

Ó

- Center -

Operating angle θ (°)

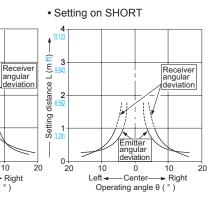
→ Right

10

3 9.84?

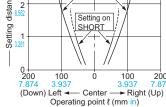
0∔ 20

distance L (m ft)









LONG / SHORT selection switch (incorporated on the emitter) · Select the switch setting according to the setting distance

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.

between the emitter and the receiver as given below.

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

protection, use products which meet standards, such as OSHA, ANSI or IEC etc., for personnel protection applicable in each region or country.

for personnel protection.

If this product is used as a sensing device for personnel protection, death or serious body injury could result.

· Never use this product as a sensing device

For sensing devices to be used as safety

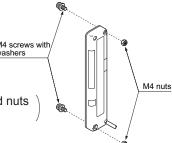
devices for press machines or for personnel

· For a product which meets safety standards, use the following products.

Type4: SF4C series (p.531~) Type2: SF2C series (p.551~)

Mounting

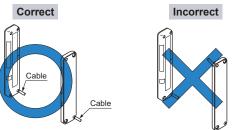
· Use M4 screws with washers and M4 nuts. The tightening torque should be 0.5 N·m or less.



Purchase the screws and nuts separately.

Orientation

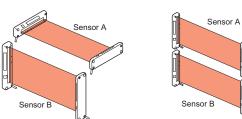
• The emitter and the receiver must face each other correctly. If they are set upside down, the sensor does not work.



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	

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 DOUBLE L/ON
OFF when one or more beam channels are interrupted (ON when all beam channels are received).	SINGLE DOUBLE L/ON
ON when any two or more beam channels are interrupted.	SINGLE DOUBLE L/ON
OFF when any two or more beam channels are interrupted.	SINGLE 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	LIGHT	
Blinking	LIGHT FLASH	LIGHT FLASH	

Others

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

FIBER SENSORS

LASER SENSORS

PHOTO-ELECTRIC SENSORS

COMPONENTS PRESSURE FLOW SENSORS

INDUCTIVE PROXIMITY SENSORS PARTICULAR

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WIRE-SAVING SYSTEMS

MEASURE-

MENT SENSORS

LASER MARKERS

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MACHINE INTERFACES

FA COMPONENTS MACHINE

VISION SYSTEMS UV CURING SYSTEMS

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COMPONENTS

MACHINE
VISION
SYSTEMS

CURING

Selection Guide Slim Body Picking

NA1-PK5/ NA1-5 NA1-PK3

DIMENSIONS (Unit: mm in)

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

25

Beam Channel 5

Receiver

Operation

indicator (Red)

NA1-PK5(-PN) NA1-5(-PN) 2-ø4.5 ø0.177 2-ø4.6 ø0.181 2-ø4.5 ø0.177 mounting through holes with M4 nut seats, 3.3 0.130 deep supplementary mounting holes, 1.1 0.043 deep mounting through holes with supplementary mounting holes, 1.1 0.043 deep M4 nut seats, 3.3 0.130 deep (1.1 0.043 deep on back side) (1.1 0.043 deep on back side) (on both sides) (on both sides) 30 1.181 18 0.709 30 1.181 18 0.709 10 0.394 5 0 , ϕ 15 0.59 15 0.591 Ъ_ (4) Beam Channel 1 Beam Channel 1 Operation Operation mode switch 25 0.98 Job indicator (Orange) Job indicator (Orange) Beam Beam Channel 2 Channel 2 Beam Channel 3 Beam - Channel 3 130 140 5.118 5.512 140 130 5.512 5.118 Stable incident beam indicator (Green) Beam Channel 4 Beam Channel 4

MS-NA1-1 Sensor mounting bracket (Optional)

ø3.7 ø0.146 cable, 2 m 6.562 ft long

20 0.787 10 0.394 6 0.236 4 0 0.394 18 40 0.709 4-ø4.6 ø0.181 holes t 0.079

P

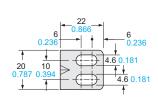
5 0

25

Beam Channel 5

indicator (Green)

Emitter



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

our bracket set

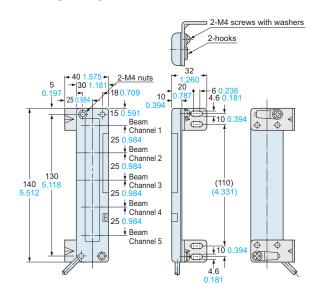
Four M4 (length 15 mm 0.591 in) screws with washers, eight nuts, four hooks and eight M4 (length 18 mm 0.709 in) screws with washers are attached.

[M4 (length 18 mm 0.709 in) screws with washers are not used for NA1-PK5/5 series.]

Assembly dimensions

ø3.7 ø0.146 cable, 2 m 6.562 ft long

Mounting drawing with the receiver



DIMENSIONS (Unit: mm in)

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

Sensor mounting bracket (Optional)

30 30 ₁ 20 0 2-ø4.6 ø0.181 holes 18

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

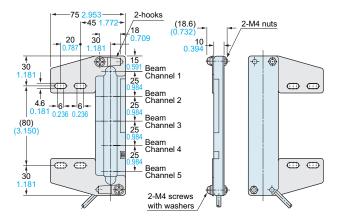
Four bracket set

MS-NA2-1

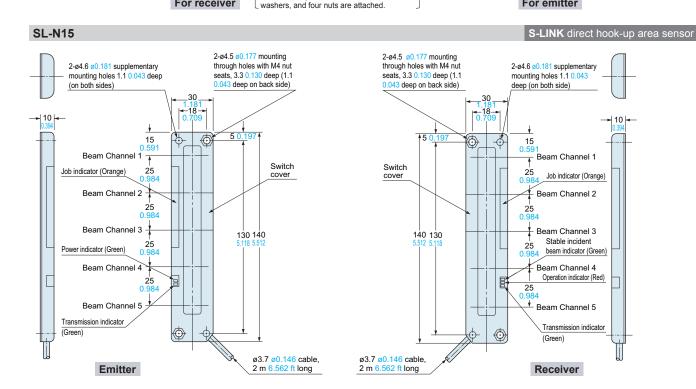
Four M4 (length 15 mm 0.591 in) screws with washers, eight nuts, four hooks, four spacers and eight M4 (length 18 mm 0.709 in) screws with washers are attached.

Assembly dimensions

Mounting drawing with the receiver



MS-NA3 MS-NA3-BK Sensor protection bracket (Optional) 5 0.197 5 0.197 7 0.276 2-ø4.8 ø0.189 2-ø4.8 ø0.189 17 0.669 Ŋ, 23 0 57 57 25.0 12.1 12.1 130 25 0 25 0 984 25 0 25 10.5 10.5 0.413 27 17 0.669 5-ø14 ø0.551 2-ø9 ø0.35 0.177 0.1710.59 Material: Cold rolled carbon steel (SPCC) MS-NA3: Chrome plated. 13.7 10.5 t1.6t0 t 1.6 MS-NA3-BK: Black chromate 10.5 13.7 _31 Four M4 (length 15 mm 0.591 in) screws with For receiver For emitter



COMPONENTS PRESSURE / FLOW SENSORS INDUCTIVE PROXIMITY SENSORS

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