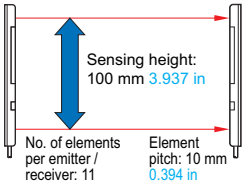
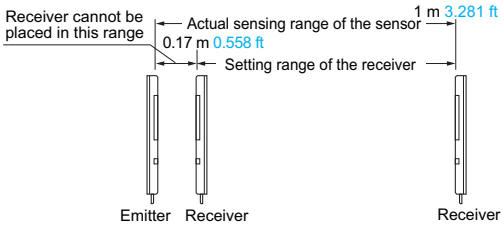
ORDER GUIDE

Type	Appearance	Sensing range (Note1)	Model No.(Note2)	Output
NPN output		 0.17 to 1 m 0.558 to 3.281 ft	**NA1-11**	NPN open-collector transistor
5 m 16.404 ft cable length			**NA1-11-C5**	
PNP output			**NA1-11-PN**	PNP open-collector transistor

Notes: 1) The sensing range is the possible setting distance between the emitter and the receiver.
The sensor can detect an object less than 0.17 m 0.558 ft away.



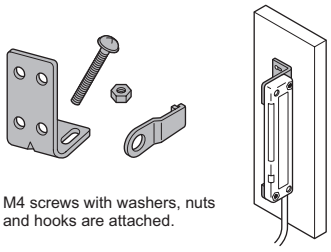
2) The model No. with suffix "**P**" shown on the label affixed to the product is the emitter, "**D**" shown on the label is the receiver.
(e.g.) Emitter of **NA1-11**: **NA1-11P**, Receiver of **NA1-11**: **NA1-11D**

OPTIONS

Designation	Model No.	Description
Sensor mounting bracket	**MS-NA1-1**	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 **MS-NA1-1**.)
	MS-NA2-1	

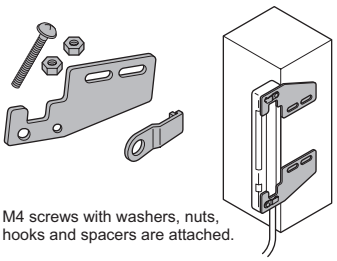
Sensor mounting bracket

• **MS-NA1-1**



M4 screws with washers, nuts and hooks are attached.

• **MS-NA2-1**



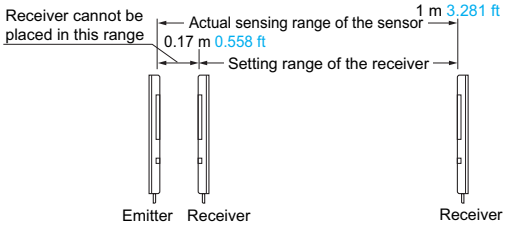
M4 screws with washers, nuts, hooks and spacers are attached.

SPECIFICATIONS

Item \ Type		NPN output	PNP output
Model No.		**NA1-11**	**NA1-11-PN**
Sensing height		100 mm 3.937 in	
Sensing range (Note 2)		0.17 to 1 m 0.558 to 3.281 ft	
Element pitch		10 mm 0.394 in	
Number of emitting / receiving elements		11 Nos. each on the emitter and the receiver, respectively	
Sensing object		ø13.5 mm ø0.531 in or more opaque object (Note 3)	
Supply voltage		12 to 24 V DC ±10 % Ripple P-P 10 % or less	
Current consumption		Emitter: 80 mA or less, Receiver: 100 mA or less	
Output		NPN open-collector transistor • Maximum sink current: 100 mA • Applied voltage: 30 V DC or less (between output and 0 V) • Residual voltage: 1 V or less (at 100 mA sink current) 0.4 V or less (at 16 mA sink current)	PNP open-collector transistor • Maximum source current: 100 mA • Applied voltage: 30 V DC or less (between output and +V) • Residual voltage: 1 V or less (at 100 mA source current) 0.4 V or less (at 16 mA source current)
	Utilization category	DC-12 or DC-13	
	Output operation	ON or OFF when beam channel is interrupted, selectable by operation mode switch	
	Short-circuit protection	Incorporated	
Response time		In Dark state: 5 ms or less, In Light state: 10 ms or less	
Indicators	Emitter	Power indicator: Green LED (lights up when the power is ON) Large indicator: Orange LED (lights up or blinks when the large indicator input is Low, lighting pattern is selected by operation mode switch)	Power indicator: Green LED (lights up when the power is ON) Large indicator: Orange LED (lights up or blinks when the large indicator input is High, lighting pattern is selected by operation mode switch)
	Receiver	Operation indicator: Orange LED (lights up when the output is ON) Power indicator: Green LED (lights up when the power is ON) Large indicator: Orange LED (lights up or blinks when the large indicator input is Low, lighting pattern is selected by operation mode switch)	Operation indicator: Orange LED (lights up when the output is ON) Power indicator: Green LED (lights up when the power is ON) Large indicator: Orange LED (lights up or blinks when the large indicator input is High, lighting pattern is selected by operation mode switch)
Environmental resistance	Pollution degree	3 (Industrial environment)	
	Protection	IP62 (IEC)	
	Ambient temperature	–10 to 55 °C +14 to +131 °F (No dew condensation or icing allowed), Storage: –20 to +70 °C –4 to +158 °F	
	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, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each	
	Shock resistance	500 m/s² acceleration (50 G approx.) in X, Y and Z directions for three times each	
Emitting element		Infrared LED (Peak emission wavelength: 880nm 0.035mil, cross-beam scanning system)	
Material		Enclosure: Heat-resistant ABS, Lens: Acrylic, Indicator cover: Acrylic	
Cable		0.3 mm² 4-core (emitter: 3-core) oil resistant cabtyre cable, 2 m 6.562 ft long	
Cable extension		Extension up to total 100 m 328.084 ft 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: 210 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. The sensor can detect an object less than 0.17 m 0.558 ft away.

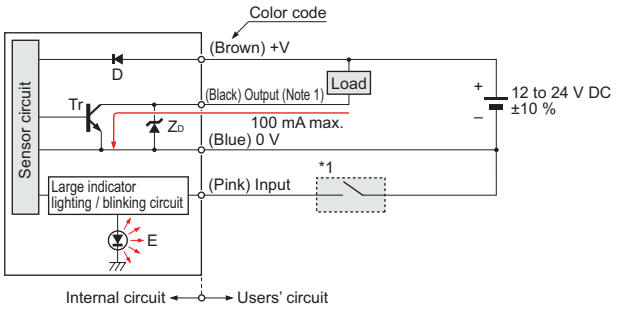


3) Although this product can detect slim objects by using the cross-beam scanning system, the size of the slim object which can be stably detected differs with the setting distance. When this sensor is used to detect slim objects, make sure to confirm stable detection using the actual objects.

I/O CIRCUIT AND WIRING DIAGRAMS

NA1-11 — NPN output type

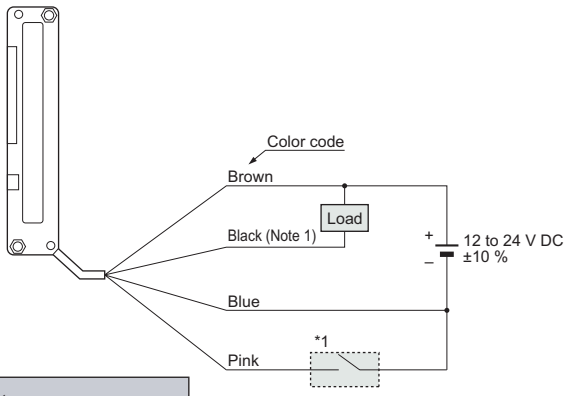
I/O circuit diagram



Notes: 1) The emitter does not incorporate the output (black).
2) Unused wires 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 : Large indicator (INDICATOR)

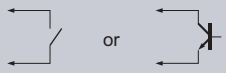
Wiring diagram



Notes: 1) The emitter does not incorporate the black lead wire.
2) Unused wires must be insulated to ensure that they do not come into contact with wires already in use.

* 1

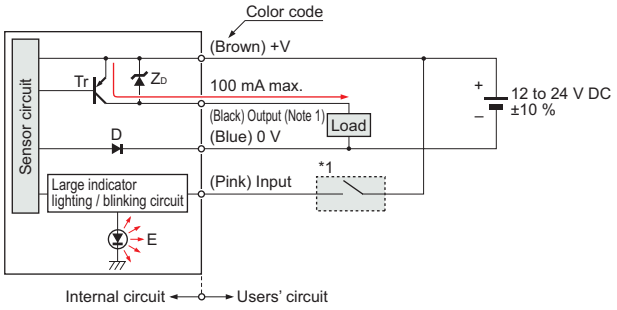
Non-voltage contact or
NPN open-collector transistor



- Input
  Low (0 to 2 V): Lights up or blinks
  High (5 to 30 V, or open): Lights off

NA1-11-PN — PNP output type

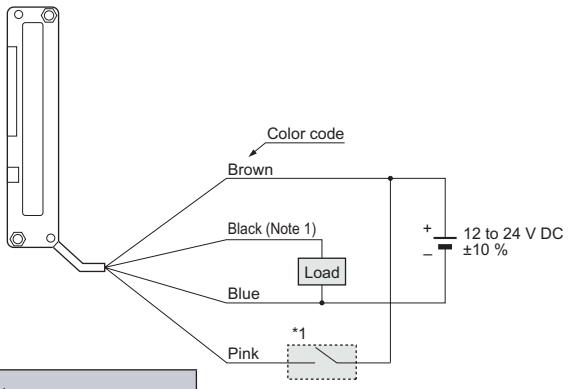
I/O circuit diagram



Notes: 1) The emitter does not incorporate the output (black).
2) Unused wires 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 : Large indicator (INDICATOR)

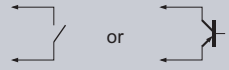
Wiring diagram



Notes: 1) The emitter does not incorporate the black lead wire.
2) Unused wires must be insulated to ensure that they do not come into contact with wires already in use.

* 1

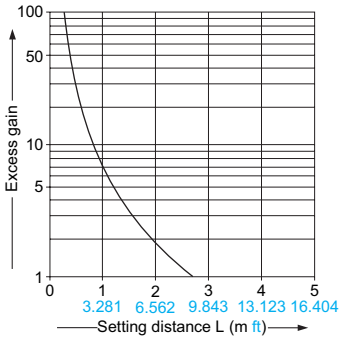
Non-voltage contact or
PNP open-collector transistor



- Input
  Low (4 V or more): Lights up or blinks
  High (0 to 0.6 V, or open): Lights off

SENSING CHARACTERISTICS (TYPICAL)

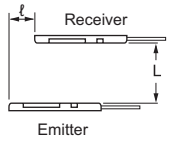
Correlation between setting distance and excess gain

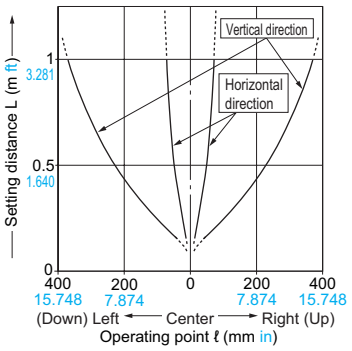


SENSING CHARACTERISTICS (TYPICAL)

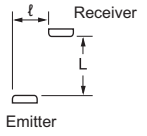
Parallel deviation

Vertical direction



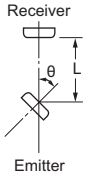


Horizontal direction

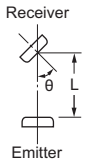


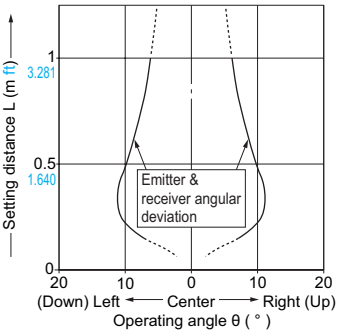
Angular deviation

Emitter angular deviation

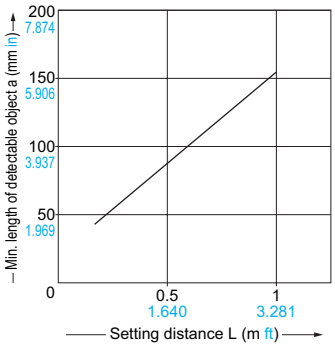


Receiver angular deviation

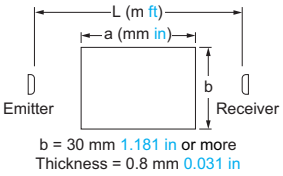




Correlation between setting distance and minimum length of detectable object



The minimum length of the detectable object, which lies in a plane perpendicular to the sensor front surface, varies with the setting distance, as shown in the left graph. However, note that the minimum length of the detectable object also varies with the object thickness.



b = 30 mm 1.181 in or more
Thickness = 0.8 mm 0.031 in

* The sensing object is considered to be placed at the center of the sensing area.

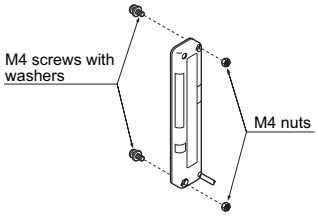
PRECAUTIONS FOR PROPER USE

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 laws and 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.
  Type 4: **SF4B** series
  Type 2: **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.)



Selection of large indicator operation

- Lighting / Blinking is selected by the operation mode switch on the emitter and the receiver.

Operation of large indicator	Operation mode switch	
	Emitter	Receiver
Lighting	LIGHT ■□ BLINK	LIGHT ■□ BLINK
Blinking	LIGHT □■ BLINK	LIGHT □■ BLINK

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.)

Operation mode switch (Receiver)		Output operation	Operation indicator (Orange)
D-ON	D/ON ■□ L/ON	ON in Dark state	Lights up when the output is ON
L-ON	D/ON □■ L/ON	OFF in Dark state	Lights up when the output is ON

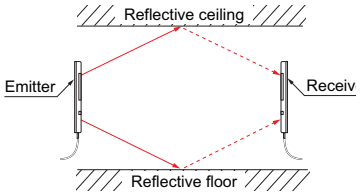
Note: LIGHT / BLINK switch is not related to the output operation selection.

PRECAUTIONS FOR PROPER USE

Refer to General precautions.

Others

- Do not use during the initial transient time (0.5 sec.) after the power supply is switched on.
- Although this sensor can detect slim objects by using the cross-beam scanning system, the size of the slim object which can be stably detected differs with the setting distance. Hence, when the sensor is used to detect slim objects, make sure to confirm stable detection using the actual objects.
- In case of this sensor, light from the emitter spreads above and below the sensor. Hence, take care that if there is a reflective object above or below the sensor it will affect the sensing.



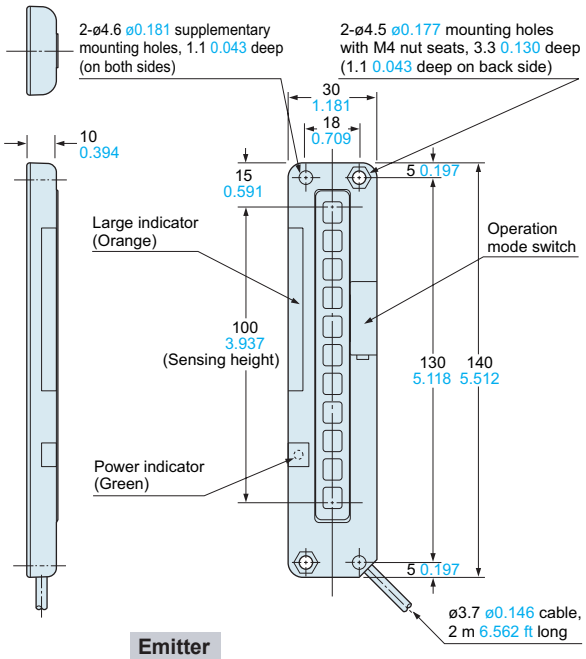
* Refer to "**Parallel deviation**" in "**SENSING CHARACTERISTICS (TYPICAL)**".

DIMENSIONS (Unit: mm in)

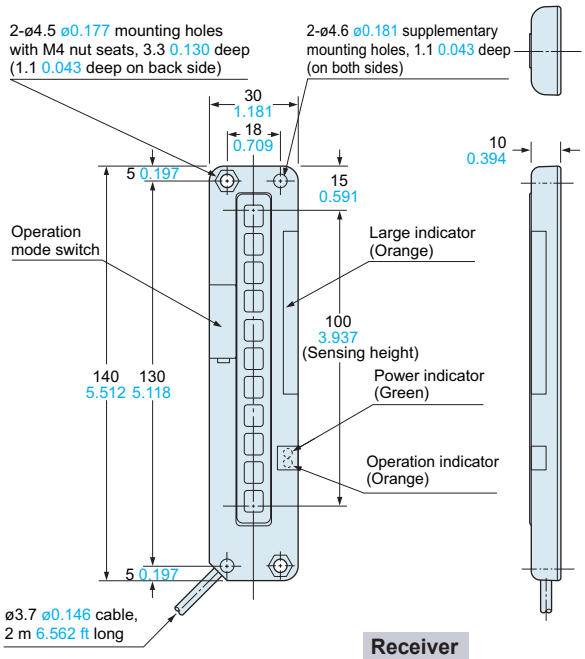
The CAD data in the dimensions can be downloaded from our website.

NA1-11 NA1-11-PN

Sensor



Emitter



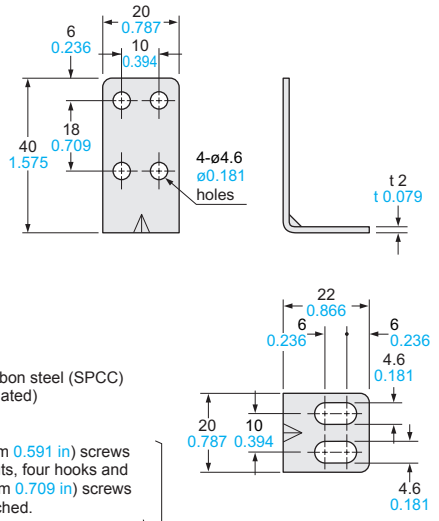
Receiver

DIMENSIONS (Unit: mm in)

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

MS-NA1-1

Sensor mounting bracket (Optional)



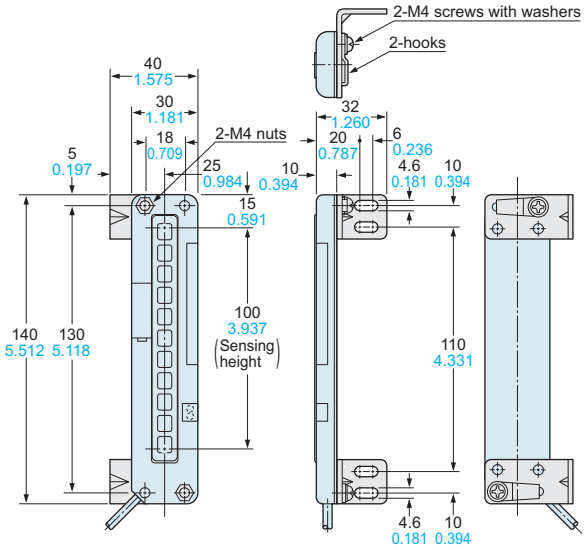
Material: Cold rolled carbon steel (SPCC)
(Uni-chrome plated)

Four bracket set

Four M4 (length 15 mm 0.591 in) screws with washers, eight nuts, four hooks 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 **NA1-11**.)

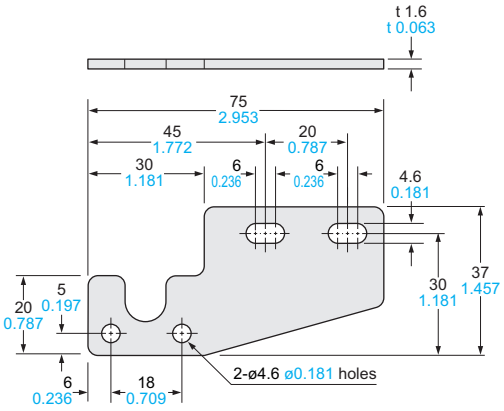
Assembly dimensions

Mounting drawing with the receiver



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