

NA40

SERIES

40mm Beam Pitch General Purpose Area Sensor

SF2-EH

SF1-A

SF1-N

NA40

SF1-F

NA2

NA1-11

NA1-5

Global Conformance to Safety Standards

General Use

Individual Beam Outputs

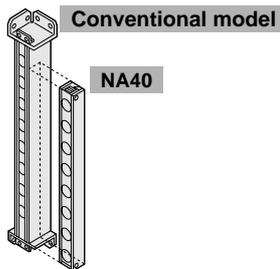
Slim Body



Slim and Intelligent

Slim Body

The **NA40** saves space as the volume is reduced to 1/3 of a conventional model.

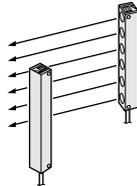


Failure Monitoring

When one of the following errors occurs, the self-diagnosis output is generated and three color indicators reveal the failure condition.

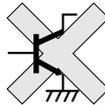
① Reduction of incident light intensity

The **NA40** monitors the incident light intensity for reduction due to dust or dirt on the front faces, or beam misalignment.



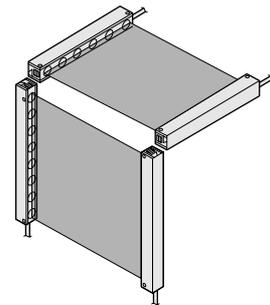
② Failure of the output transistor

Any failure of the output transistor is monitored.



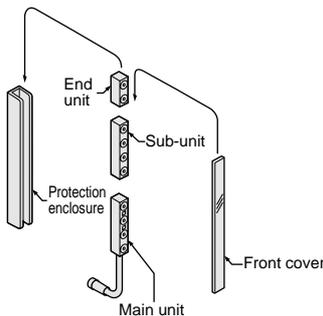
Close Mounting

Two sets of sensors can be closely mounted by setting different emission frequencies to prevent mutual interference.



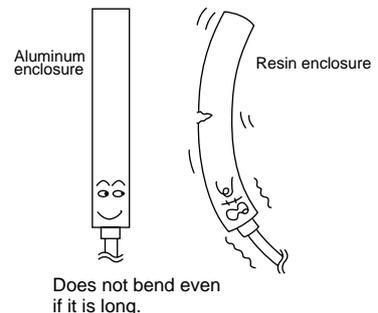
Easy Modification of Length

The modular construction enables modification of the number of beam channels. It makes a design change or maintenance on the site very simple.



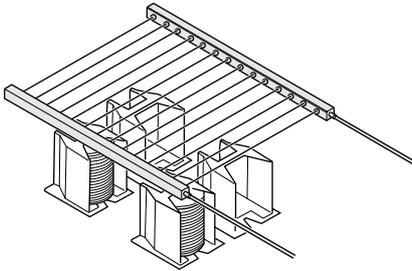
Robust Aluminum Enclosure

The modules are protected by a robust aluminum enclosure conforming to IP65 protection.

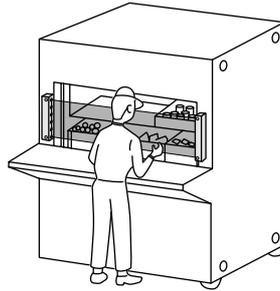


APPLICATIONS

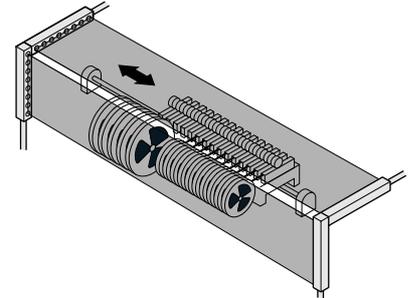
Detecting intrusion into loader or unloader



Verifying picking of parts from shelf



Controlling access on tape feeder



WARNING Never use this product in any personnel safety application.

ORDER GUIDE

Sensors

Type	Appearance	Sensing range	Model No.	Number of beam channels	Sensing height (mm)	
Area sensor		5m	NA40-4	4	120	
			NA40-6	6	200	
			NA40-8	8	280	
			NA40-10	10	360	
			NA40-12	12	440	
			NA40-14	14	520	
			NA40-16	16	600	
			NA40-20	20	760	
			NA40-24	24	920	
				NA40-4-H	4	120
				NA40-6-H	6	200
				NA40-8-H	8	280
	NA40-10-H	10		360		
	NA40-12-H	12		440		
	NA40-14-H	14		520		
	NA40-16-H	16		600		
	NA40-20-H	20		760		
	NA40-24-H	24		920		

Mating cable is not supplied with the sensor. Please order it separately.

Mating cables

Appearance	Model No.	Description
	NA40-CC3	Length: 3m Weight: 600g approx. 0.5mm ² 3-core (receiver: 4-core) cabtyre cable with connector on one end, two cables per set. Cable outer diameter: ϕ 6.7mm Connector outer diameter: ϕ 14mm max.
	NA40-CC7	Length: 7m Weight: 950g approx.

Global Conformance to Safety Standards
SF1-A
SF2-EH

General Use
SF1-N
NA40

Individual Beam Outputs
SF1-F

NA2

Slim Body
NA1-11

NA1-5

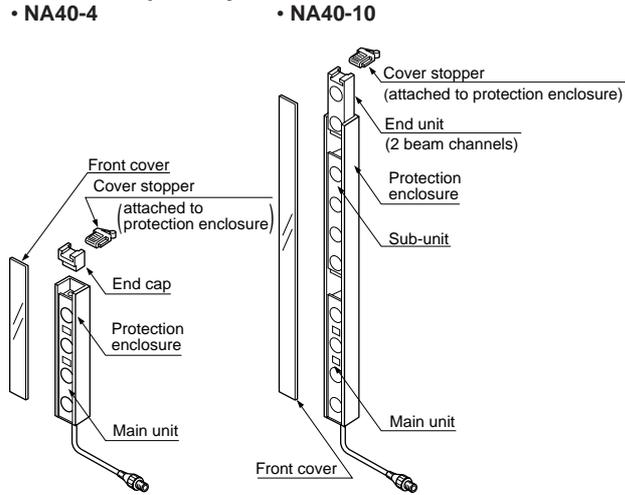
NA40

ORDER GUIDE

Individual units and associated components can be purchased separately.

Designation	Number of beam channels	Model No.	
		Emitter	Receiver
Main unit	4	NA40-MUP	NA40-MUD
Sub-unit	4	NA40-4SUP	NA40-4SUD
End unit	2	NA40-2EUP	NA40-2EUD
	4	NA40-4EUP	NA40-4EUD
End cap (Note)	—	NA40-ECP	NA40-ECD

Note: It is required only for **NA40-4** or **NA40-4-H**.



Designation		Applicable beam channels	4 beam channels	6 beam channels	8 beam channels	10 beam channels	12 beam channels	14 beam channels	16 beam channels	20 beam channels	24 beam channels
		Model No.	MC-NA40-4	MC-NA40-6	MC-NA40-8	MC-NA40-10	MC-NA40-12	MC-NA40-14	MC-NA40-16	MC-NA40-20	MC-NA40-24
Protection enclosure	Model No.										
	With spatter protection hood	Model No.	MC-NA40-4H	MC-NA40-6H	MC-NA40-8H	MC-NA40-10H	MC-NA40-12H	MC-NA40-14H	MC-NA40-16H	MC-NA40-20H	MC-NA40-24H
Front cover	Model No.	FC-NA40-4	FC-NA40-6	FC-NA40-8	FC-NA40-10	FC-NA40-12	FC-NA40-14	FC-NA40-16	FC-NA40-20	FC-NA40-24	

Note: The model Nos. given above denote a single unit, not a pair of units.

OPTIONS

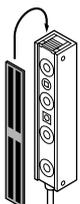
Designation		Applicable beam channels	4 beam channels	6 beam channels	8 beam channels	10 beam channels	12 beam channels	14 beam channels	16 beam channels	20 beam channels	24 beam channels
		Model No.	OS-NA40-4	OS-NA40-6	OS-NA40-8	OS-NA40-10	OS-NA40-12	OS-NA40-14	OS-NA40-16	OS-NA40-20	OS-NA40-24
Slit mask	Model No.										

Note: The model Nos. given above denote a single unit, not a pair of units.

Designation	Model No.	Description
Large indicator	SF-IND	With the large indicators put on the sensors, the operation is easily observable from various directions. (Refer to P.414 for details)

Note: Two **SF-INDs** are required if they are to be mounted on, both, the emitter and the receiver.

Slit mask

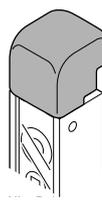


The slit mask restrains the amount of beam emitted or received and hence reduces the interference between neighbouring sensors. Replace the original front cover with the slit mask. However, the sensing range reduces when the slit mask is used.

Sensing range

- Slit on emitter side: 1.3m
- Slit on receiver side: 3m
- Slit on both sides: 0.8m

Large indicator



The large indicator can be easily mounted on the sensor head at the top. It also can be mounted on an **NA40** sensor already being used.

SPECIFICATIONS

Item	Number of beam channels	4	6	8	10	12	14	16	20	24
	Model No.	NA40-4	NA40-6	NA40-8	NA40-10	NA40-12	NA40-14	NA40-16	NA40-20	NA40-24
	With spatter protection hood	NA40-4-H	NA40-6-H	NA40-8-H	NA40-10-H	NA40-12-H	NA40-14-H	NA40-16-H	NA40-20-H	NA40-24-H
Sensing height		120mm	200mm	280mm	360mm	440mm	520mm	600mm	760mm	920mm
Sensing range		5m								
Beam pitch		40mm								
Sensing object		φ60mm or more opaque object								
Supply voltage		12 to 24V DC ± 10% Ripple P-P 10% or less								
Current consumption		Emitter: 30mA or less Receiver: 60mA or less			Emitter: 35mA or less, Receiver: 90mA or less				Emitter: 35mA or less Receiver: 115mA or less	
Sensing output		NPN open-collector transistor • Maximum sink current: 100mA • Applied voltage: 30V DC or less (between sensing output and 0V) • Residual voltage: 1.6V or less (at 100mA sink current)								
	Output operation	ON when all beams are received/OFF when one or more beams are interrupted								
	Short-circuit protection	Incorporated								
Self-diagnosis output		NPN open-collector transistor • Maximum sink current: 50mA • Applied voltage: 30V DC or less (between self-diagnosis output and 0V) • Residual voltage: 1.6V or less (at 50mA sink current)								
	Output operation	OFF when unstable light received condition continues for 5 sec. or more, or the output transistor fails								
	Short-circuit protection	Incorporated								
Response time		12ms or less								
Indicator		Incorporated with the three color indicators on the receiver • Sensing output operation indicator: Red LED (lights up when one or more beams are interrupted) • Stable incident beam indicator: Green LED (lights up when all beams are received stably) • Unstable incident beam indicator: Yellow LED (lights up when one or more beams are received unstably) ※When the output transistor fails, the three color indicators blink simultaneously.								
Interference prevention function		Incorporated (Two units of sensors can be mounted closely.)								
Environmental resistance	Protection	IP65 (IEC)								
	Ambient temperature	- 10 to + 50°C (No dew condensation or icing allowed), Storage: - 10 to + 60°C								
	Ambient humidity	35 to 85% RH, Storage: 35 to 85% RH								
	Ambient illuminance	Sunlight: 11,000ℓx at the light-receiving face, Incandescent light: 3,500ℓx at the light-receiving face								
	Noise immunity	Power line: 240Vp and 0.5μs pulse width (with noise simulator)								
	Voltage withstandability	1,000V AC for one min. between all supply terminals connected together and enclosure								
	Insulation resistance	20MΩ, or more, with 500V DC megger between all supply terminals connected together and enclosure								
	Shock resistance	10 to 55Hz frequency, 1.5mm amplitude in X, Y and Z directions for two hours each								
Emitting element		Infrared LED (synchronized scanning system)								
Material		Protection enclosure: Aluminum, Unit case: ABS, Front cover: Acrylic, Lens: Acrylic								
Cable		0.5mm ² 4-core (emitter: 3-core) cabtyre cable, 0.5m long, with a round connector at the end ※Use together with the optional mating cable								
Cable extension		Extension up to total 100m is possible, for both emitter and receiver, with 0.5mm ² , or more, cable. (However, the interference prevention wire can extend up to 20m between two emitters.)								
Weight		400g approx.	500g approx.	630g approx.	770g approx.	890g approx.	1,020g approx.	1,150g approx.	1,400g approx.	1,660g approx.
	With spatter protection hood	500g approx.	630g approx.	800g approx.	990g approx.	1,150g approx.	1,330g approx.	1,500g approx.	1,840g approx.	2,190g approx.
Accessories		MS-NA40-1 (Sensor mounting bracket): 1 set, Adjusting screwdriver: 1 No.								

Global Conformance to Safety Standards

SF2-EH

SF1-A

General Use

SF1-N

NA40

Individual Beam Outputs

SF1-F

NA2

Slim Body

NA1-11

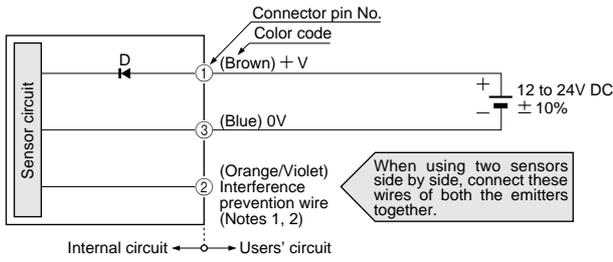
NA1-5

NA40

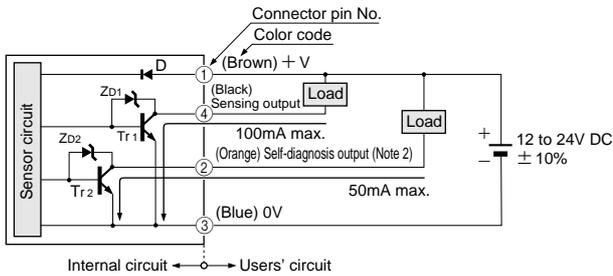
I/O CIRCUIT AND WIRING DIAGRAMS

I/O circuit diagrams

Emitter



Receiver

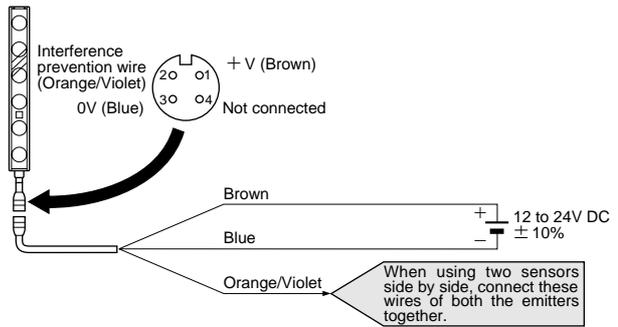


Symbols ... D: Reverse supply polarity protection diode
 ZD1, ZD2: Surge absorption zener diode
 Tr1, Tr2 : NPN output transistor

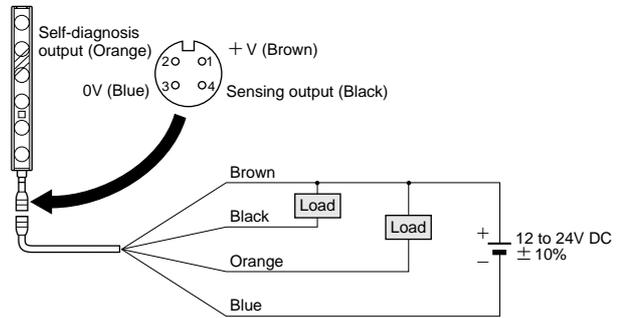
- Notes: 1) If the interference prevention wires (orange/violet) are not used, please insulate them.
 2) Never connect the emitter's interference prevention wire (orange/violet) to the receiver's self-diagnosis output (orange). This can cause damage.

Wiring diagrams

Emitter



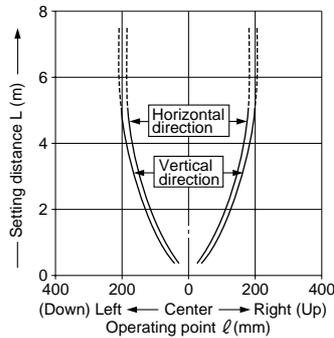
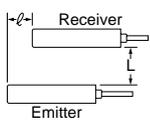
Receiver



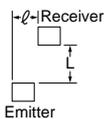
SENSING CHARACTERISTICS (TYPICAL)

Parallel deviation (All models)

Vertical direction

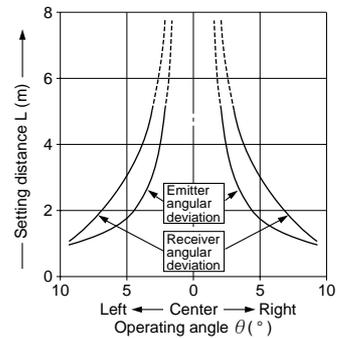
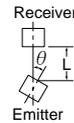


Horizontal direction

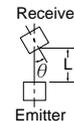


Angular deviation (All models)

Emitter angular deviation



Receiver angular deviation



PRECAUTIONS FOR PROPER USE

Refer to P.820~ for general precautions.



- This sensor cannot be used as a press machine safeguard. Do not use this sensor for any press machine.
- This product is not a safety sensor. Its use is not intended or designed to protect life and prevent body injury or property damage from dangerous parts of machinery. It is a normal object detection sensor.
- Area sensors conforming to safety standards are available. For details, please contact our office.

Mounting

- Do not use the sensor without the front cover or the enclosure. IP protection cannot be maintained and a contact failure may occur between the modular units.
- When mounting the sensor, the tightening torque should be 1.96N·m or less.

Setting of frequency selection switch

- Turn the frequency selection switches with the enclosed screwdriver and select the appropriate frequencies (in power supply off condition).

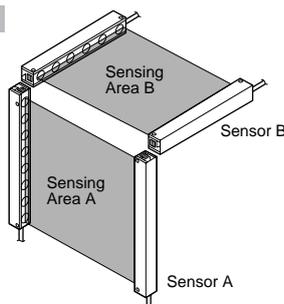
When using one set of sensor

Setting of frequency selection switches	
Emitter	Receiver

Set the switches of both the emitter and the receiver at '1'. The sensor does not function normally at other settings.

When using two sets of sensors

When two sets of sensors are closely mounted as shown in the illustration on the right, set the switches as follows.

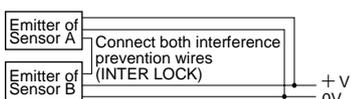


① Select the frequencies.

	Setting of frequency selection switches	
	Emitter	Receiver
Sensor A		
Sensor B		

Set the switches of both the emitter and the receiver of Sensor A at '1', and both switches of Sensor B at '2'. The sensors do not function normally at other settings.

② Connect the interference prevention wires (INTER LOCK) of Sensor A and Sensor B together.



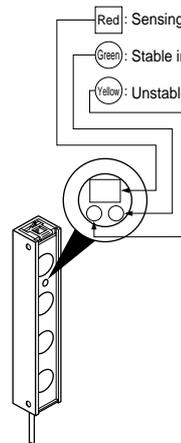
- Connect both the 0V wires in common.
- +V wires need not be connected in common.

Note: The overall wiring distance between Sensor A and Sensor B must be within 20m. The interference prevention wire length and the 0V wire length between the emitters must be within 20m each, too.

Other

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

Operation of indicator

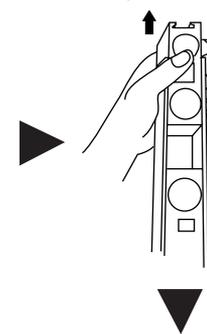
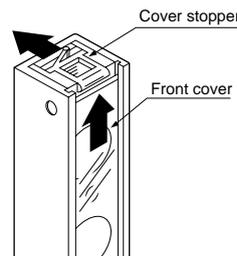


	Output operation	Indicator operation		
		Red Sensing output operation indicator	Green Stable incident beam indicator	Yellow Unstable incident beam indicator
High Incident light intensity (125% to 100%)	Beam received operation (ON)		Lights up	
	Beam interrupted operation (OFF)	Lights up		Lights up
Low Incident light intensity (0%)				

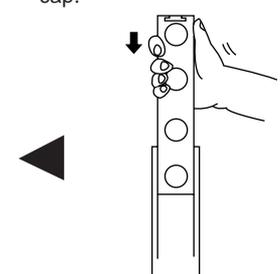
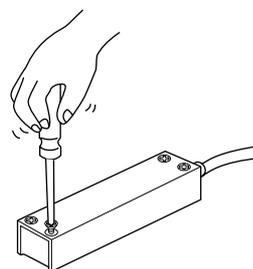
Note: If the sensing output transistor fails, the three color indicators blink.

How to change the number of beam channels

- Slide the cover stopper in the direction of the arrow and pull the front cover upward.
- Remove the four fixing screws on the rear face. Pull the modules upward one by one with your hands.



- Tighten the four fixing screws and insert the front cover by pulling the cover stopper back.
- Prepare the new protection enclosure and front cover that matches the required sensing height. Insert the units and connect the end cap.

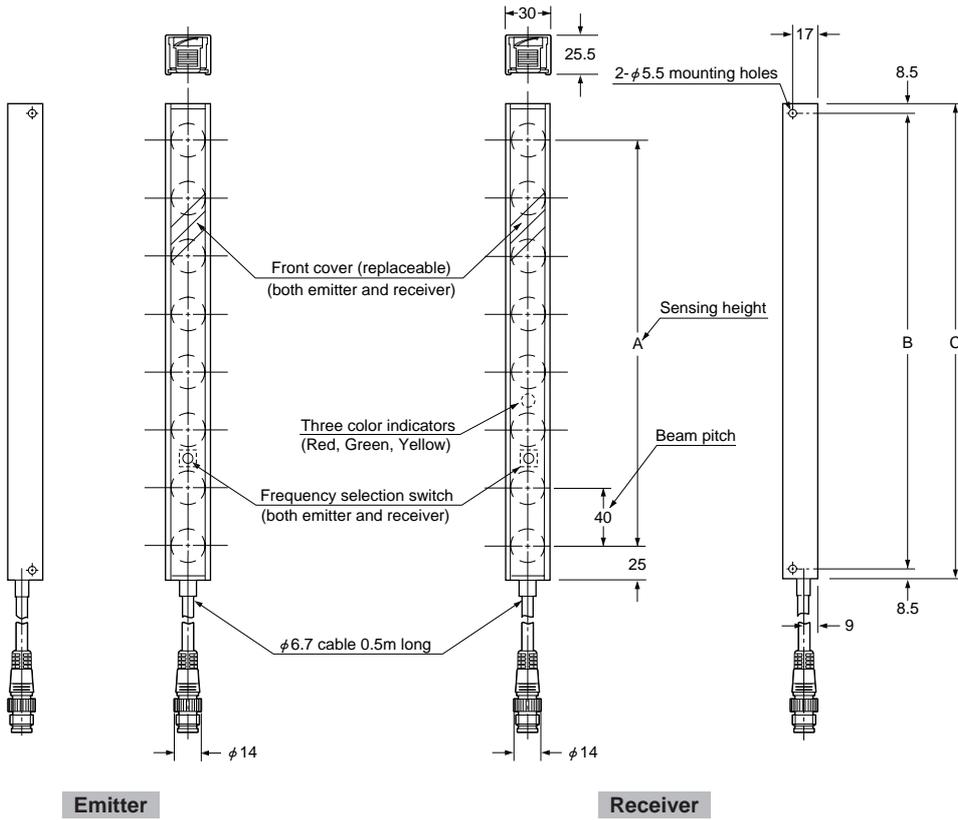


- Notes:
- 1) Be sure to turn the power off before linking units. If this is not done, the sensor may get damaged.
 - 2) The end unit, either 2-channel unit or 4-channel unit, must be connected at the top of the module linkage.
 - 3) Be sure to put the end cap on the top of the 4 beam channel NA40-4 or NA40-4-H.
 - 4) The cover stopper and four fixing screws are attached with the protection enclosure.

NA40

DIMENSIONS (Unit: mm)

NA40-□ Sensor



Model No.	A	B	C
NA40-4	120	163	180
NA40-6	200	233	250
NA40-8	280	313	330
NA40-10	360	393	410
NA40-12	440	473	490
NA40-14	520	553	570
NA40-16	600	633	650
NA40-20	760	793	810
NA40-24	920	953	970

SF2-EH
SF1-A
Global Conformance to Safety Standards

SF1-N
General Use
NA40

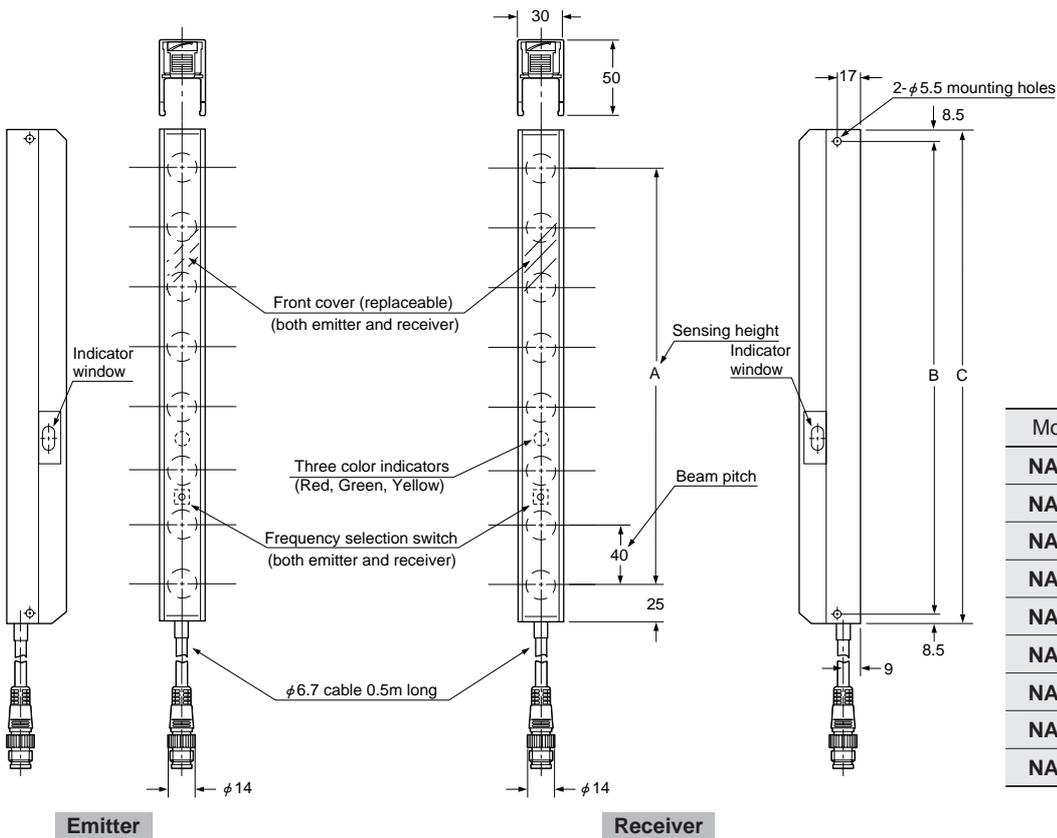
SF1-F
Individual Beam Outputs

NA2

NA1-11
Slim Body

NA1-5

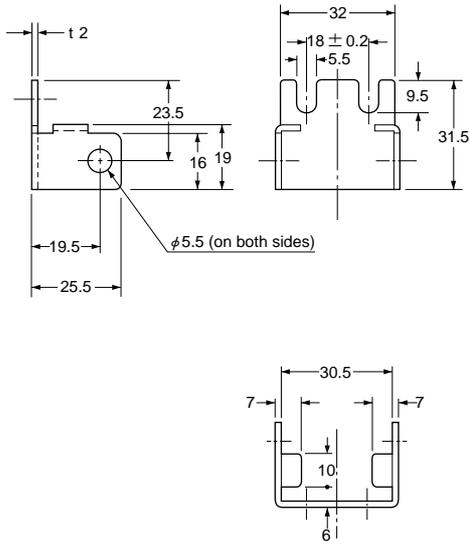
NA40-□-H Sensor



Model No.	A	B	C
NA40-4-H	120	163	180
NA40-6-H	200	233	250
NA40-8-H	280	313	330
NA40-10-H	360	393	410
NA40-12-H	440	473	490
NA40-14-H	520	553	570
NA40-16-H	600	633	650
NA40-20-H	760	793	810
NA40-24-H	920	953	970

DIMENSIONS (Unit: mm)

MS-NA40-1 Sensor mounting bracket (Accessory)

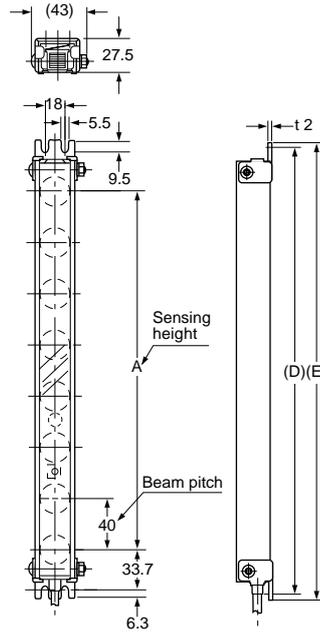


Material: Cold rolled carbon steel (SPCC)
(Uni-chrome plated)

Four bracket set
(4 Nos. each of M6 (length 40mm) truss head screws, nuts and spring washers are attached.)

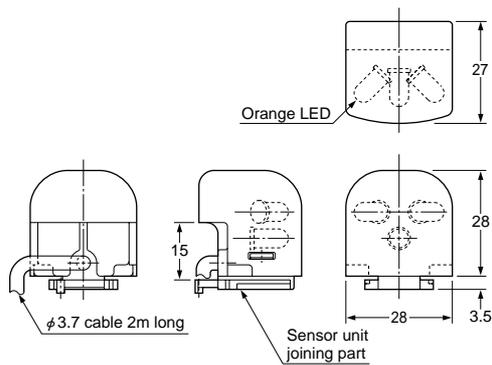
Assembly dimensions

Mounting drawing with NA40-□.
The assembly for the spatter protection hood type (NA40-□-H) is similar.



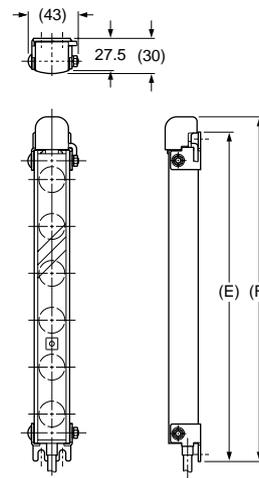
Model No.	A	D	E
NA40-4(-H)	120	200	210
NA40-6(-H)	200	270	280
NA40-8(-H)	280	350	360
NA40-10(-H)	360	430	440
NA40-12(-H)	440	510	520
NA40-14(-H)	520	590	600
NA40-16(-H)	600	670	680
NA40-20(-H)	760	830	840
NA40-24(-H)	920	990	1,000

SF-IND Large indicator (Optional)



Assembly dimensions

Mounting drawing with NA40-□.
The assembly for the spatter protection hood type (NA40-□-H) is similar.



Model No.	E	F
NA40-4(-H)	210	223
NA40-6(-H)	280	293
NA40-8(-H)	360	373
NA40-10(-H)	440	453
NA40-12(-H)	520	533
NA40-14(-H)	600	613
NA40-16(-H)	680	693
NA40-20(-H)	840	853
NA40-24(-H)	1,000	1,013

Global Conformance to Safety Standards
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NA1-5