

# INSTRUCTION MANUAL

## Slim Body Area Sensor NA2-N Series

### 1 SPECIFICATIONS

Item	Number of beam channels							
	8	12	16	20	24	28		
Model No.	NPN output	<b>NA2-N8</b>	<b>NA2-N12</b>	<b>NA2-N16</b>	<b>NA2-N20</b>	<b>NA2-N24</b>	<b>NA2-N28</b>	
	PNP output	<b>NA2-N8-PN</b>	<b>NA2-N12-PN</b>	<b>NA2-N16-PN</b>	<b>NA2-N20-PN</b>	<b>NA2-N24-PN</b>	<b>NA2-N28-PN</b>	
Sensing height	140mm	220mm	300mm	380mm	460mm	540mm		
Sensing range	5m							
Beam pitch	20mm							
Sensing object	φ30mm or more opaque object							
Supply voltage	12 to 24V DC ± 10% Ripple P-P 10% or less							
Power consumption	Emitter	Job indicator ON	0.5W or less	0.5W or less	0.6W or less	0.6W or less	0.7W or less	0.7W or less
		Job indicator OFF	0.4W or less	0.4W or less	0.5W or less	0.5W or less	0.6W or less	0.6W or less
	Receiver	Job indicator ON	0.7W or less	0.8W or less	0.9W or less	1.0W or less	1.1W or less	1.2W or less
		Job indicator OFF	0.6W or less	0.7W or less	0.8W or less	0.9W or less	1.0W or less	1.1W or less
Output	(NPN output type) NPN open-collector transistor • Maximum sink current: 100mA • Applied voltage: 30V DC or less (between output and 0V) • Residual voltage: 1V or less (at 100mA sink current) 0.4V or less (at 16mA sink current)					(PNP output type) PNP open-collector transistor • Maximum source current: 100mA • Applied voltage: 30V DC or less (between output and +V) • Residual voltage: 1V or less (at 100mA source current) 0.4V or less (at 16mA source current)		
	Output operation	ON when all beams are received (OFF when one or more beams are interrupted)						
Short-circuit protection	Incorporated							
Response time	10ms or less (12ms or less when the interference prevention function is used)							
Indicators	Emitter	Emitting indicator: Green LED × 2 (light up when the power is ON; one LED lights up for Frequency A setting, both LEDs light up for Frequency B setting) Job indicator: Red LED (lights up, blinks or lights off when the job indicator input is applied, selected by operation mode switch)						
	Receiver	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 stably received) Job indicator: Red LED (lights up, blinks or lights off when the job indicator input is applied, selected by operation mode switch) ※ When an excess current flows through the output, the stable incident beam indicator and the operation indicator on the receiver blink simultaneously due to the operation of the short-circuit protection circuit.						
Ambient temperature	- 10 to +55°C (No dew condensation or icing allowed), Storage: - 10 to +60°C							
Ambient humidity	35 to 85% RH, Storage: 35 to 85% RH							
Emitting element	Infrared LED (modulated)							
Material	Enclosure: Heat-resistant ABS, Front cover: Polyacetal, Indicator cover: Acrylic							
Cable	0.2mm <sup>2</sup> 4-core oil-resistant cable, 3m long							
Weight	350g approx.	400g approx.	450g approx.	500g approx.	550g approx.	600g approx.		

### 2 CAUTIONS

- Make sure to carry out the wiring in the power supply off condition.
- Verify that the supply voltage variation is within the rating.
- If power is supplied from a commercial switching regulator, ensure that the frame ground (F.G.) terminal of the power supply is connected to an actual ground.
- In case noise generating equipment (switching regulator, inverter motor, etc.) is used in the vicinity of this product, connect the frame ground (F.G.) terminal of the equipment to an actual ground.
- Do not use during the initial transient time (500ms approx.) after the power supply is switched on.
- Extension up to total 25m is possible, for both emitter and receiver, with 0.2mm<sup>2</sup>, or more, cable. However, in order to reduce noise, make the wiring as short as possible.
- Do not run the wires together with high-voltage lines or power lines or put them in the same raceway. This can cause malfunction due to induction.
- Take care that the sensor is not directly exposed to fluorescent light from a rapid-starter lamp or a high frequency lighting device, as it may affect the sensing performance.
- Avoid dust, dirt, and steam.
- Take care that the sensor does not come in direct contact with water, oil, grease, or organic solvents, such as, thinner, etc.
- Do not use in an environment containing inflammable or explosive gas.
- Make sure to use an isolation transformer for the DC power supply. If an auto-transformer (single winding transformer) is used, this product or the power supply may get damaged.
- In case a surge is generated in the used power supply, connect a surge absorber to the supply and absorb the surge.
- The emitter and the receiver must face each other with their cable ends on the same side. If they are set upside down, the sensor will not work correctly.

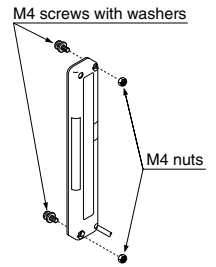
Thank you very much for using SUNX sensors. Please read this Instruction Manual carefully and thoroughly for the correct and optimum use of this sensor. Kindly keep this manual in a convenient place for quick reference.



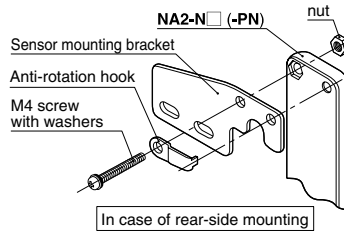
- This product is not a safety sensor. Its use is not intended or designed to protect life and prevent body injury or property damage from dangerous parts of machinery. It is a normal object detection sensor.
- This sensor is not for press machine safeguard. Do not use this sensor for any press machine.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

### 3 MOUNTING

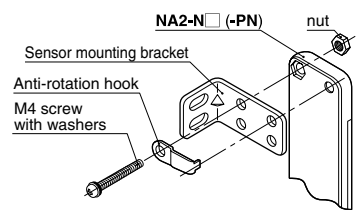
- Use M4 screws with washers and M4 nuts. The tightening torque should be 0.5N·m or less. During mounting, do not apply any bending or twisting force to the sensor. (Please arrange the screws and nuts separately.)
- Sensor mounting brackets (**MS-NA2-1**, **MS-NA1-1**) are also available.



#### MS-NA2-1 assembly drawing

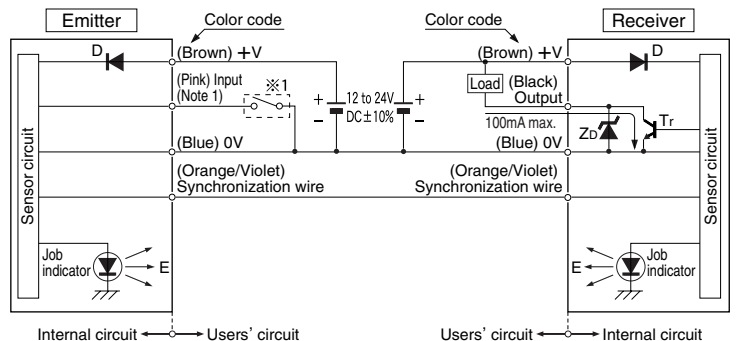


#### MS-NA1-1 assembly drawing



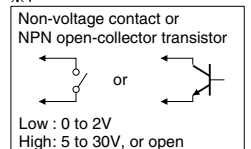
### 4 I/O CIRCUIT DIAGRAMS

- **NA2-N□ / NPN output type**

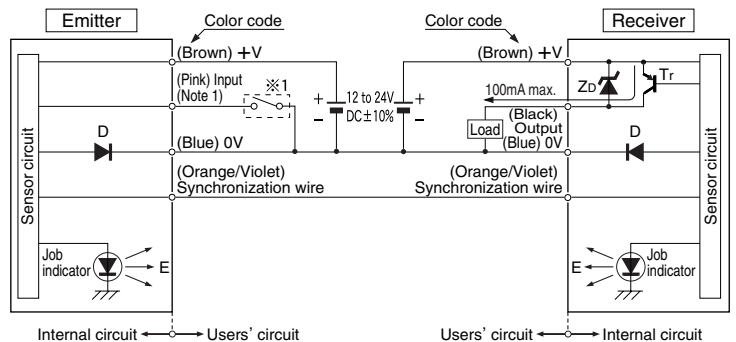


- Notes: 1) Input (pink) is the job indicator input when No. 4 of the operation mode switch on the emitter is set to the OFF side, and it is the test input when the switch is set to the ON side.  
2) In order to use the job indicator as a large operation indicator, connect the input (pink) of the emitter to the output (black) of the receiver.  
3) When the test input is set, the job indicator does not light up or blink.

Symbols...D : Reverse supply polarity protection diode  
Z<sub>D</sub>: Surge absorption zener diode  
Tr: NPN output transistor  
E : Job indicator

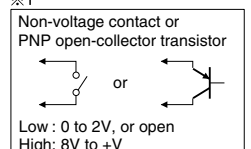


- **NA2-N□-PN / PNP output type**

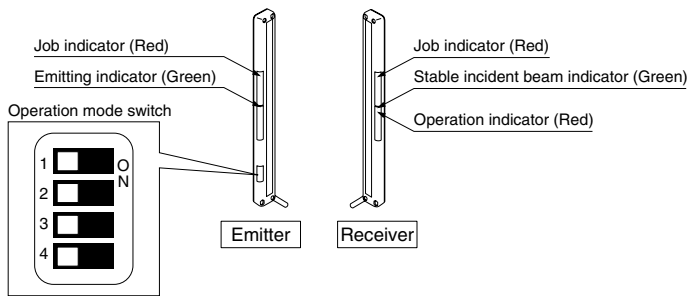


- Notes: 1) Input (pink) is the job indicator input when No. 4 of the operation mode switch on the emitter is set to the OFF side, and it is the test input when the switch is set to the ON side.  
2) In order to use the job indicator as a large operation indicator, connect the input (pink) of the emitter to the output (black) of the receiver.  
3) When the test input is set, the job indicator does not light up or blink.

Symbols...D : Reverse supply polarity protection diode  
Z<sub>D</sub>: Surge absorption zener diode  
Tr: PNP output transistor  
E : Job indicator



## 5 PART DESCRIPTION



### ● Operation mode switch

No.	Description	OFF side	ON side
1	Emission frequency selection	Frequency A	Frequency B
2	Job indicator operation selection	Lights up when job indicator input is Low	Lights off when job indicator input is Low
3	Job indicator operation selection	Lights up	Blinks
4	Operation indicator / test input selection	Job indicator input	Test input

## 6 JOB INDICATOR OPERATION SELECTION

- The operation of the job indicator can be selected with the job indicator mode switch.

Operation mode switch	Job indicator operation	
	Job indicator input: Low	Job indicator input: High
	Lights up	Lights off
	Lights off	Lights up
	Lights up	Blinks
	Lights off	Blinks

### Job indicator input signal condition

Output	Signal	Signal condition
NPN output	Low	0 to 2V
	High	5 to 30V, or open (Note)
PNP output	Low	0 to 2V, or open (Note)
	High	8V to +V

Note: Insulate the wire if it is kept open.

## 7 IN CASE OF USING JOB INDICATOR AS LARGE OPERATION INDICATOR

- The job indicators can be used as large operation indicators by setting No. 4 of the operation mode switch to the OFF side and connecting the input (pink) of the emitter to the output (black) of the receiver.

Job indicator mode switch	Light state	Dark state
	Lights up	Light off
	Light off	Lights up
	Lights up	Blinks
	Light off	Blinks

Note: In order to use the job indicators as large operation indicators, make sure to set No. 4 of the operation mode switch to the OFF side. If it is set to the ON side, the job indicator does not light up or blink.

## 8 TEST-RUN FUNCTION

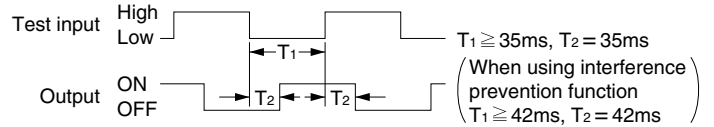
- The emission is stopped when No. 4 of the operation mode switch is set to the ON side and the input (pink) of the emitter is made High (PNP output type: Low).

Since the output can be turned ON/OFF without the sensing object, this function is useful for start-up inspection. If the output follows the application/withdrawal of the test input, the sensor operation is normal, else it is abnormal.

### Operation mode switch setting

OFF	ON

### Time chart

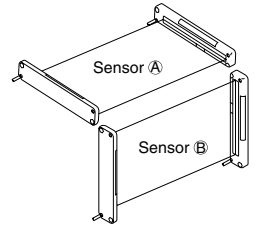


(In case of Light-ON)

- Notes: 1) When the test-run function is set, the job indicator (red) does not light up or blink.  
2) When emission is stopped during the test-run function, the emitter's emitting indicator (green) does not light up.

## 9 INTERFERENCE PREVENTION FUNCTION

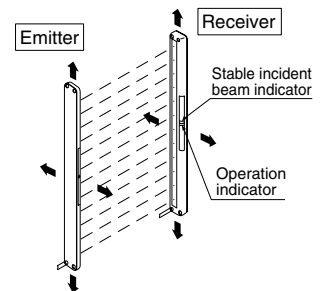
- By setting different emission frequencies, two units of NA2-N can be mounted close together, as shown in the figure on the right. The emission frequency can be checked by the number of LEDs lighting up in the emitting indicator on the emitter.



	Operation mode switch	Emitting indicator (Emitter)
Sensor A	Frequency A	One LED lights up
Sensor B	Frequency B	Two LEDs light up

## 10 BEAM ALIGNMENT

- Place the emitter and the receiver face to face along a straight line.
- After the cables have been correctly connected, switch the power ON.
- Move the emitter in the up, down, left and right directions, in order to determine the range of the beam received condition with the help of the operation indicator on the receiver. Then, set the emitter at the center of this range.
- Similarly, adjust for up, down, left and right angular movement of the emitter.
- Further, perform the angular adjustment for the receiver also.
- Check that the stable incident beam indicator (green) lights up.
- Interrupt each beam channel with the actual sensing object, and confirm that the sensor operates correctly.



Note: The stable incident beam indicator (green) lights up when all the light beams are stably received.

## SUNX Limited

<http://www.sunx.co.jp/>

### Head Office

2431-1 Ushiyama-cho, Kasugai-shi, Aichi, 486-0901, Japan  
Phone: +81-(0)568-33-7211 FAX: +81-(0)568-33-2631

### Overseas Sales Dept.

Phone: +81-(0)568-33-7861 FAX: +81-(0)568-33-8591

PRINTED IN JAPAN