FIBER SENSORS

LASER SENSORS

PHOTO-ELECTRIC SENSORS MICRO PHOTO-ELECTRIC

AREA SENSORS

LIGHT CURTAINS PRESSURE / FLOW SENSORS

PARTICIII AR

SENSORS SENSOR OPTIONS

SIMPLE WIRE-SAVING UNITS

WIRE-SAVING SYSTEMS MEASURE-MENT SENSORS

STATIC CONTROL DEVICES

ENDOSCOPE

LASER MARKERS

PLC / TERMINALS

HUMAN MACHINE INTERFACES ENERGY CONSUMPTION VISUALIZATION COMPONENTS

COMPONENTS

MACHINE VISION SYSTEMS UV CURING SYSTEMS

Selection Guide Wafer Detection Liquid Leak Detection Liquid Level Detection Water Detection

Detection

Color Mark
Detection

Hot Melt Glue
Detection

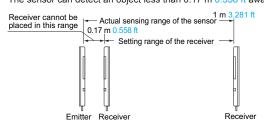
Ultrasonic

Small / Sim Object Detection Obstacle Detection Other Products

### ORDER GUIDE

Туре	Appearance	Sensing range (Note1)	Model No.(Note2)	Output
NPN output	Sensing height:		NA1-11	NDN open collector transister
5 m 16.404 ft cable length	100 mm 3.937 in	0.17 to 1 m 0.558 to 3.281 ft	NA1-11-C5	NPN open-collector transistor
PNP output	No. of elements per emitter / pitch: 10 mm receiver: 11 0.394 in		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

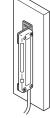
### **OPTIONS**

Designation	Model No.	Description	
Sensor	MS-NA1-1	Four bracket set  Four M4 (length 15 mm 0.591 in) screws with washers,	
mounting bracket	MS-NA2-1	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.)	

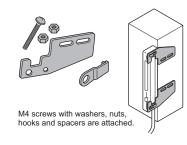
#### Sensor mounting bracket

• MS-NA1-1





• MS-NA2-1

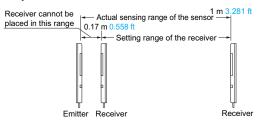


### **SPECIFICATIONS**

Insing neight  100 mm 3.937 in  101 mm 0.394 in  101 mm 0.394 in  101 mm 0.394 in  111 Nos each on the emitter and the receiver, respectively insing object  112 to 24 V DC ±10 % Ripple P-P 10 % or less  Insing object  112 to 24 V DC ±10 % Ripple P-P 10 % or less  Institution of the emitter and the receiver, respectively insing object with the property of the prope		Туре	NPN output	PNP output	
ment pitch  10 mm 0.394 in  11 Nos. each on the emitter and the receiver, respectively  ment pitch  11 Nos. each on the emitter and the receiver, respectively  ment power indicator: Orange LED (lights up when the power is ON)  Large indicator: Green LED (lights up when the output is ON)  Large indicator: Green LED (lights up when the output is ON)  Large indicator: Green LED (lights up when the output is ON)  Large indicator: Green LED (lights up when the power is ON)  Large indicator: Green LED (lights up when the	em N	Model No.	NA1-11	NA1-11-PN	
ment pitch  mitter of emitting / receiving ments  11 Nos, each on the emitter and the receiver, respectively  a13.5 mm a0.531 in or more opaque object (Note 3)  12 to 24 V DC ±10 % Ripple PP-10 % or less ments  NPN open-collector transistor  **Nashrum solk current** 100 mA  **Applied voltage 30 V DC or less (between output and 0 V)  **Residual voltage: 1 V or less (at 160 mA sink current)  0.4 V or less (at 160 mA sink current)  0.4 V or less (at 160 mA sink current)  0.4 V or less (at 160 mA source current)  Utilization category  Output operation  ON or OFF when beam channel is interrupted, selectable by operation mode switch  Short-circuit protection  Incorporated  In Dark state: 5 ms or less, in Light state: 10 ms or less  Power indicator: Green LED (lights up when the power is ON) Large indicator: Orange LED (lights up when the power is ON) Large indicator: Orange LED (lights up when the power is ON) Large indicator: Orange LED (lights up when the power is ON) Large indicator: Orange LED (lights up when the power is ON) Large indicator: Orange LED (lights up when the output is ON) Large indicator: Orange LED (lights up when the output is ON) Large indicator: Orange LED (lights up when the power is ON) Large indicator: Orange LED (lights up when the power is ON) Large indicator: Orange LED (lights up when the output is ON) Large indicator: Orange LED (lights up when the output is ON) Large indicator: Orange LED (lights up when the output is ON) Large indicator: Orange LED (lights up when the output is ON) Large indicator: Orange LED (lights up when the output is ON) Large indicator: Orange LED (lights up when the output is ON) Large indicator: Orange LED (lights up when the output is ON) Large indicator: Orange LED (lights up when the output is ON) Large indicator: Orange LED (lights up when the output is ON) Large indicator: Orange LED (lights up when the output is ON) Large indicator: Orange LED (lights up when the output is ON) Large indicator: Orange LED (lights up when the output is ON) Large indicator:	ensing height		100 mm	3.937 in	
Interest of emitting / receiving  11 Nos. each on the emitter and the receiver, respectively  a13.5 mm e0.531 in or more opaque object (Note 3)  12 to 24 V DC ±10 % Ripple P-P 10 % or less  Interest consumption  PNP open-collector transistor  • Maximum sink current: 100 mA  • Applied voltage: 30 V DC or less (between output and of V)  • Residual voltage: 1 V or less (at 10 mA sink current)  • OA V or less (at 10 mA sink current)  • OA V or less (at 10 mA sink current)  • OA V or less (at 10 mA sink current)  • OA V or less (at 10 mA source current 100 mA  • Applied voltage: 30 V DC or less (between output and of V)  • Residual voltage: 1 V or less (at 10 mA sink current)  • OA V or less (at 10 mA source current 100 mA  • Applied voltage: 30 V DC or less (cheween output and of V)  • Residual voltage: 1 V or less (at 10 mA sink current)  • OA V or less (at 10 mA source current 100 mA  • Applied voltage: 30 V DC or less (cheween output and of V)  • Residual voltage: 1 V or less (at 10 mA source current 100 mA  • Applied voltage: 30 V DC or less (cheween output and of V)  • Applied voltage: 30 V DC or less (cheween output and of V)  • Residual voltage: 1 V or less (at 10 mA source current 100 mA  • Applied voltage: 30 V DC or less (cheween output and of V)  • Residual voltage: 1 V or less (at 10 mA source current 100 mA  • Residual voltage: 1 V or less (at 10 mA source current 100 mA  • Residual voltage: 1 V or less (at 10 mA source current 100 mA  • Residual voltage: 1 V or less (at 10 mA source current 100 mA  • Residual voltage: 1 V or less (at 10 mA source current 100 mA  • Residual voltage: 30 V DC or less (cheween output and of V)  • Residual voltage: 1 V or less (at 10 mA source current 100 mA selected by operation mode switch 100 mA selected 10 by operation mode switch 100 mA selected 10 by operation mode switch 100 mA selected 10 by operation mode switch 100 part 100 mA selected 10 part 1	ensing range (Note	2)	0.17 to 1 m 0.558 to 3.281 ft		
ments 1 17 Nos. Seato of the emitter and the receiver, respectively making object and a first receivery. Respectively mining object and the receivery of the same and the receiver of the same a	lement pitch		10 mm 0.394 in		
Imply voltage  12 to 24 V DC ±10 % Ripple P-P 10 % or less  Emitter: 80 mA or less. Receiver: 100 mA or less.  PAPP open-collector transistor  • Maximum sink current: 100 mA  • Applied voltage: 30 V DC or less (between output and of V)  • Residual voltage: 1 V or less (at 100 mA sink current)  Output operation  Short-circuit protection  Short-circuit protection  In Dark state: 5 ms or less. In Light state: 10 ms or less  Power indicator: Green LED (lights up when the power is ON) Large indicator: Orange LED (lights up when the power is ON) Large indicator: Orange LED (lights up when the power is ON) Large indicator: Orange LED (lights up when the power is ON) Large indicator: Orange LED (lights up when the power is ON) Large indicator: Orange LED (lights up when the power is ON) Large indicator: Orange LED (lights up when the power is ON) Large indicator: Orange LED (lights up when the power is ON) Large indicator: Orange LED (lights up when the power is ON) Large indicator: Orange LED (lights up when the power is ON) Large indicator: Orange LED (lights up when the power is ON) Large indicator: Orange LED (lights up when the power is ON) Large indicator: Orange LED (lights up when the output is ON) Power indicator: Orange LED (lights up when the output is ON) Power indicator: Orange LED (lights up when the output is ON) Power indicator: Orange LED (lights up when the output is ON) Power indicator: Orange LED (lights up when the output is ON) Power indicator: Orange LED (lights up when the output is ON) Power indicator: Orange LED (lights up when the output is ON) Power indicator: Orange LED (lights up when the output is ON) Power indicator: Orange LED (lights up when the output is ON) Power indicator: Orange LED (lights up when the output is ON) Power indicator: Orange LED (lights up when the output is ON) Power indicator: Orange LED (lights up when the output is ON) Power indicator: Orange LED (lights up when the output is ON) Power indicator: Orange LED (lights up when the output is ON) Power indicator: Orang	umber of emitting / ements	receiving	11 Nos. each on the emitter and the receiver, respectively		
Interest consumption  Emitter: 80 mA or less, Receiver: 100 mA or less  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 160 mA sink current)  Output operation  ON or OFF when beam channel is interrupted, selectable by operation mode switch  Short-circuit protection  In Dark state: 5 ms or less, in Light state: 10 ms or less  In Dark state: 5 ms or less, in Light state: 10 ms or less  Power indicator: Green LED (lights up when the power is ON)  Large indicator: Orange LED / lights up or blinks when the large indicator: Orange LED / lights up or blinks when the large indicator: Orange LED / lights up or blinks when the large indicator: Orange LED / lights up or blinks when the large indicator: Orange LED / lights up or blinks when the large indicator: Orange LED / lights up or blinks when the large indicator: Orange LED / lights up or blinks when the large indicator: Orange LED / lights up or blinks when the large indicator: Orange LED / lights up or blinks when the large indicator: Orange LED / lights up or blinks when the large indicator: Orange LED / lights up or blinks when the large indicator: Orange LED / lights up or blinks when the large indicator: Orange LED / lights up or blinks when the large indicator: Orange LED / lights up when the power is ON Large indicator: Orange LED / lights up when the power is ON Large indicator: Orange LED / lights up when the power is ON Large indicator: Orange LED / lights up or blinks when the large indicator: Orange LED / lights up or blinks when the large indicator: Orange LED / lights up or blinks when the large indicator: Orange LED / lights up when the power is ON Large indicator: Orange LED / lights up or blinks when the large indicator: Orange LED / lights up or blinks when the large indicator: Orange LED / lights up or blinks when the large indicator: Orange LED / lights up or blinks when the large indicator: Orange LED / lights up or blinks when the lar	ensing object		ø13.5 mm ø0.531 in or more opaque object (Note 3)		
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)  • Maximum source current 100 mA  • Applied voltage: 30 V DC or less (between output and 4 V)  • Residual voltage: 1 V or less (at 100 mA sink current)  • DC-12 or DC-13  **Output operation**  **Output operation**  **On or OFF when beam channel is interrupted, selectable by operation mode switch  **Short-circuit protection**  **In Dark state: 5 ms or less, in Light state: 10 ms or less  **Bonne Implies Impl	upply voltage		12 to 24 V DC ±10 % Ripple P-P 10 % or less		
**Maximum sink current: 100 mA ** Applied voltage: 30 Y DC or less (between output and 0 V) **Residual voltage: 11 Vor less (at 100 mA sink current)	urrent consumption	า	Emitter: 80 mA or less, Receiver: 100 mA or less		
Output operation Short-circuit protection Short-circuit protection Short-circuit protection Short-circuit protection  In Dark state: 5 ms or less, In Light state: 10 ms or less  Power indicator: Green LED (lights up when the power is ON) Large indicator: Orange LED   lights up or blinks when the large indicator: Orange LED   lights up or blinks when the large indicator: Orange LED   lights up or blinks when the large indicator: Orange LED   lights up or blinks when the large indicator: Orange LED   lights up or blinks when the large indicator: Orange LED   lights up or blinks when the large indicator: Orange LED (lights up when the output is ON) Power indicator: Orange LED (lights up when the power is ON) Large indicator: Orange LED (lights up when the power is ON) Large indicator: Orange LED (lights up when the power is ON) Large indicator: Orange LED (lights up when the power is ON) Large indicator: Orange LED (lights up when the power is ON) Large indicator: Orange LED (lights up when the power is ON) Large indicator: Orange LED (lights up when the power is ON) Large indicator: Orange LED (lights up when the power is ON) Large indicator: Orange LED (lights up when the power is ON) Large indicator: Orange LED (lights up when the power is ON) Large indicator: Orange LED (lights up when the power is ON) Large indicator: Orange LED (lights up when the power is ON) Large indicator: Orange LED (lights up when the power is ON) Large indicator: Orange LED (lights up when the power is ON) Large indicator: Orange LED (lights up when the power is ON) Large indicator: Orange LED (lights up when the power is ON) Large indicator: Orange LED (lights up when the output is ON) Power indicator: Orange LED (lights up when the output is ON) Power indicator: Orange LED (lights up when the output is ON) Large indicator: Orange LED (lights up when the output is ON) Large indicator: Orange LED (lights up when the output is ON) Large indicator: Orange LED (lights up when the output is ON) Large indicator: Orange LED (lights up when	Output		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)	· ·	
Short-circuit protection  In Dark state: 5 ms or less, In Light state: 10 ms or less  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  Pollution degree  Pollution degree  Pollution degree  Pollution resistance  Ambient Illiuminance  EMC  EMC  EMC  EMC  EMC  EMC  EMC  EM	Utilization cate	gory	DC-12 (	or DC-13	
In Dark state: 5 ms or less, In Light state: 10 ms or less  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) Large indicator: Orange LED (lights up when the output is ON) Large indicator: Orange LED (lights up when the output is ON) Power indicator: Orange LED (lights up when the output is ON) Large indicator: Orange LED (lights up when the output is ON) Large indicator: Orange LED (lights up when the output is ON) Large indicator: Orange LED (lights up when the output is ON) Large indicator: Orange LED (lights up when the output 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: Orange LED (lights up when the output is ON) Large indicator: Orange LED (lights up when the output is ON) Large indicator: Orange LED (lights up when the output is ON) Power indicator: Orange LED (lights up when the output is ON) Large indicator: Orange LED (lights up when the output is ON) Large indicator: Orange LED (lights up when the output is ON) Large indicator: Orange LED (lights up when the output is ON) Large indicator: Orange LED (lights up when the output is ON) Large indicator: Orange LED (lights up when the output is ON) Large indicator: Orange LED (lights up when the output is ON) Large indicator: Orange LED (lights up when the output is ON) Power indicator: Orange LED (lights up when the output is ON) Large indicator: Orange LED (lights up when the output is ON) Power indicator: Orange LED (lights up when the output is ON) Large indicator: Orange LED (lights up when the output is ON) Power indicator: Orange LED (lights up when the output is ON) Power indicator: Orange LED (lights up when the output is ON) Large indicator: Orange LED (lights up when the output is ON) Power indicator: Orange	Output operation	on	ON or OFF when beam channel is interru	pted, selectable 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: 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: Orange LED (lights up when the output is ON) Power indicator: Orange LED (lights up when the output is ON) Power indicator: Orange LED (lights up when the output is ON) Large indicator: Orange LED (lights up when the power is ON) Large indicator: Orange LED (lights up when the power is ON) Large indicator: Orange 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: Orange LED (lights up when the output is ON) Power indicator: Orange LED (lights up or blinks when the large indicator input is Individual in the power is ON) Large indicator: Orange LED (lights up when the output is ON) Power indicator: Orange LED (lights up when the output is ON) Power indicator: Orange LED (lights up when the output is ON) Power indicator: Orange LED (lights up when the output is ON) Large indicator: Orange LED (lights up when the output is ON) Power indicator: Orange LED (lights up when the output is ON) Power indicator: Orange LED (lights up when the output is ON) Large indicator: Orange LED (lights up when the output is ON) Power indicator: Orange LED (lights up when the output is ON) Power indicator: Orange LED (lights up when the output is ON) Large indicator: Orange LED (lights up when the output is ON) Power indicator: Orange LED (lights up when the output is ON) Power indicator: Orange LED (lights up when the output is ON) Power indicator: Orange LED (lights up when the output is ON Power indicator: Orange LED (lights up when the output is ON Power indicator: Orange LED (lights up when the output is ON Power indicator: Orange LED (lights up wh	Short-circuit pro	otection			
Emitter  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 Dower indicator: Orange LED / lights up when the output is ON Large indicator: Orange LED / lights up when the power is ON Large indicator: Orange LED / lights up or blinks when the large indicator: Orange LED / lights up when the power is ON Large indicator: Orange LED / lights up or blinks when the large indicator: Orange LED / lights up or blinks when the large indicator: Orange LED / lights up or blinks when the large indicator: Orange LED / lights up or blinks when the large indicator input is Low, lighting pattern is selected by operation mode switch  Pollution degree  Protection  Protection  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  Incandescent light: 3,000 t x at the light-receiving face  EMC  EN 6947-5-2  Voltage withstandability  1,000 V AC for one min. between all supply terminals connected together and enclosure  Vibration 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  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for three times each  Infrared LED (Peak emission wavelength: 880m 0.036mil, cross-beam scanning system)  Enclosure: Heat-resistant ABS, Lens: Acrylic, Indicator cover: Acrylic  able  Extension up to total 100 m 328.084 ft is possible, for both emitter and receiver, with 0.3 mm², or more, cable.	Response time				
lighting pattern is selected by operation mode switch     Receiver		Large indicator: Orange LED / lights up or blinks when the \			
Receiver    Large indicator: Orange LED   Tights up or blinks when the large indicator input is Low, lighting pattern is selected by operation mode switch			lighting pattern is selected	lighting pattern is selected	
large indicator input is Low, lighting pattern is selected by operation mode switch   large indicator input is High, lighting pattern is selected by operation mode switch   large indicator input is High, lighting pattern is selected by operation mode switch   large indicator input is High, lighting pattern is selected by operation mode switch   large indicator input is High, lighting pattern is selected by operation mode switch   large indicator input is High, lighting pattern is selected by operation mode switch   large indicator input is High, lighting pattern is selected by operation mode switch   large indicator input is High, lighting pattern is selected by operation mode switch   large indicator input is High, lighting pattern is selected by operation mode switch   large indicator input is High, lighting pattern is selected   large indicator input is High, lighting pattern is selected   large indicator input is High, lighting pattern is selected   large indicator input is High, lighting pattern is selected   large indicator input is High, lighting pattern is selected   large indicator input is High, lighting pattern is selected   large indicator input is High, lighting pattern is selected   large indicator input is High, lighting pattern is selected   large indicator input is High, lighting pattern is selected   large indicator input is High, lighting pattern is selected   large indicator   large indic			Power indicator: Green LED (lights up when the power is ON)	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	
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 £x 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  Infrared LED (Peak emission wavelength: 880nm 0.035mil, cross-beam scanning system)  Enclosure: Heat-resistant ABS, Lens: Acrylic, Indicator cover: Acrylic  0.3 mm² 4-core (emitter: 3-core) oil resistant cabtyre cable, 2 m 6.562 ft long  Extension up to total 100 m 328.084 ft is possible, for both emitter and receiver, with 0.3 mm², or more, cable.	Receiver		large indicator input is Low, lighting pattern is selected	large indicator input is High lighting pattern is selected	
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  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  Shock resistance  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for three times each  Infrared LED (Peak emission wavelength: 880nm 0.035mil, cross-beam scanning system)  Enclosure: Heat-resistant ABS, Lens: Acrylic, Indicator cover: Acrylic  10 3 mm² 4-core (emitter: 3-core) oil resistant cabtyre cable, 2 m 6.562 ft long  Extension up to total 100 m 328.084 ft is possible, for both emitter and receiver, with 0.3 mm², or more, cable.	Pollution degre	e			
1,000 V AC for one min. between all supply terminals connected together and enclosure  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  Infrared LED (Peak emission wavelength: 880nm 0.035mil, cross-beam scanning system)  Tenclosure: Heat-resistant ABS, Lens: Acrylic, Indicator cover: Acrylic  30 MΩ, or more, with 250 V DC megger between all supply terminals connected together and enclosure  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude i	Protection		IP62	(IEC)	
1,000 V AC for one min. between all supply terminals connected together and enclosure  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  Infrared LED (Peak emission wavelength: 880nm 0.035mil, cross-beam scanning system)  Tenclosure: Heat-resistant ABS, Lens: Acrylic, Indicator cover: Acrylic  30 MΩ, or more, with 250 V DC megger between all supply terminals connected together and enclosure  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude i	Ambient tempe	erature	-10 to 55 °C +14 to +131 °F (No dew condensation of	r icing allowed), Storage: –20 to +70 °C –4 to +158 °F	
1,000 V AC for one min. between all supply terminals connected together and enclosure  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  Infrared LED (Peak emission wavelength: 880nm 0.035mil, cross-beam scanning system)  Tenclosure: Heat-resistant ABS, Lens: Acrylic, Indicator cover: Acrylic  30 MΩ, or more, with 250 V DC megger between all supply terminals connected together and enclosure  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude i	Ambient humid	lity	, , , , , ,		
1,000 V AC for one min. between all supply terminals connected together and enclosure  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  Infrared LED (Peak emission wavelength: 880nm 0.035mil, cross-beam scanning system)  Tenclosure: Heat-resistant ABS, Lens: Acrylic, Indicator cover: Acrylic  30 MΩ, or more, with 250 V DC megger between all supply terminals connected together and enclosure  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude i	Ambient illumin	nance			
1,000 V AC for one min. between all supply terminals connected together and enclosure  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  Infrared LED (Peak emission wavelength: 880nm 0.035mil, cross-beam scanning system)  Tenclosure: Heat-resistant ABS, Lens: Acrylic, Indicator cover: Acrylic  30 MΩ, or more, with 250 V DC megger between all supply terminals connected together and enclosure  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each  10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude i	EMC		EN 60947-5-2		
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  500 m/s² acceleration (50 G approx.) in X, Y and Z directions for three times each  Infrared LED (Peak emission wavelength: 880nm 0.035mil, cross-beam scanning system)  Enclosure: Heat-resistant ABS, Lens: Acrylic, Indicator cover: Acrylic  able  0.3 mm² 4-core (emitter: 3-core) oil resistant cabtyre cable, 2 m 6.562 ft long  Extension up to total 100 m 328.084 ft is possible, for both emitter and receiver, with 0.3 mm², or more, cable.	Voltage withsta	andability	1,000 V AC for one min. between all supply terminals connected together and enclosure		
Shock resistance  500 m/s² acceleration (50 G approx.) in X, Y and Z directions for three times each  Infrared LED (Peak emission wavelength: 880nm 0.035mil, cross-beam scanning system)  Enclosure: Heat-resistant ABS, Lens: Acrylic, Indicator cover: Acrylic  able  0.3 mm² 4-core (emitter: 3-core) oil resistant cabtyre cable, 2 m 6.562 ft long  Extension up to total 100 m 328.084 ft is possible, for both emitter and receiver, with 0.3 mm², or more, cable.	Voltage withsta Insulation resist	stance			
Infrared LED (Peak emission wavelength: 880nm 0.035mil, cross-beam scanning system)  Enclosure: Heat-resistant ABS, Lens: Acrylic, Indicator cover: Acrylic  able  0.3 mm² 4-core (emitter: 3-core) oil resistant cabtyre cable, 2 m 6.562 ft long  Extension up to total 100 m 328.084 ft is possible, for both emitter and receiver, with 0.3 mm², or more, cable.	Vibration resista	ance	10 to 150 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each		
Enclosure: Heat-resistant ABS, Lens: Acrylic, Indicator cover: Acrylic able  0.3 mm² 4-core (emitter: 3-core) oil resistant cabtyre cable, 2 m 6.562 ft long able extension  Extension up to total 100 m 328.084 ft is possible, for both emitter and receiver, with 0.3 mm², or more, cable.	Shock resistance	ce	500 m/s² acceleration (50 G approx.) in X, Y and Z directions for three times each		
able 0.3 mm² 4-core (emitter: 3-core) oil resistant cabtyre cable, 2 m 6.562 ft long  Extension up to total 100 m 328.084 ft is possible, for both emitter and receiver, with 0.3 mm², or more, cable.	Emitting element		Infrared LED (Peak emission wavelength: 880nm 0.035mil, cross-beam scanning system)		
Extension up to total 100 m 328.084 ft is possible, for both emitter and receiver, with 0.3 mm², or more, cable.	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		
eight Net weight: Emitter 80 g approx., Receiver 85 g approx, Gross Weight: 210 g approx.	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				

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



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.

FIBER SENSORS

Ultrasonic

Obstacle Detection

FIBER SENSORS

LASER SENSORS

PHOTO-ELECTRIC SENSORS MICRO PHOTO-ELECTRIC SENSORS

AREA SENSORS LIGHT CURTAINS

PRESSURE / FLOW SENSORS

SENSOR OPTIONS

SIMPLE WIRE-SAVING UNITS WIRE-SAVING SYSTEMS

MEASURE-MENT SENSORS STATIC CONTROL DEVICES

ENDOSCOPE

LASER MARKERS PLC / TERMINALS

HUMAN MACHINE INTERFACES ENERGY VISUALIZATION COMPONENTS COMPONENTS

MACHINE VISION SYSTEMS

CURING SYSTEMS

Selection Guide Wafer Detection Liquid Leak Detection Liquid Level Water Color Mark Detection Hot Melt Glue Detection Ultrasonio Small / Slim Object Detection

Obstacle Detection

### ■ I/O CIRCUIT AND WIRING DIAGRAMS

NA1-11 NPN output type

#### I/O circuit diagram Wiring diagram Color code (Brown) +V **M** D (Black) Output (Note 1) 12 to 24 V DC Sensor circuit ±10 % 100 mA max **☆** Z<sub>D</sub> (Blue) 0 V Color code Brown Large indicator lighting / blinking circuit (Pink) Input Load **▼**E Black (Note 1) . 12 to 24 V DC ±10 % Internal circuit ← → Users' circuit Blue Notes: 1) The emitter does not incorporate the output 2) Unused wires must be insulated to ensure that Non-voltage contact or

they do not come into contact with wires already in use.

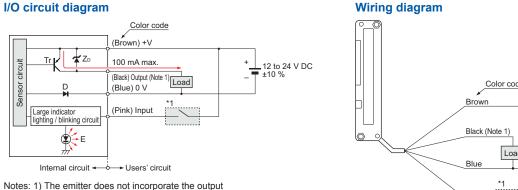
Symbols  $\dots$  D : Reverse supply polarity protection diode ZD: Surge absorption zener diode Tr : NPN output transistor

E : Large indicator (INDICATOR)

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

NA1-11-PN PNP output type



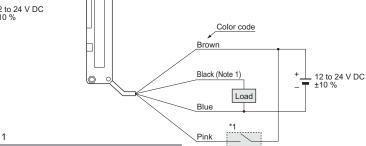
Notes: 1) The emitter does not incorporate the output (black).

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)



Non-voltage contact or PNP open-collector transistor

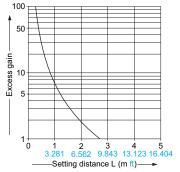
Low (4 V or more): Lights up or blinks High (0 to 0.6 V, or open): Lights off

Notes: 1) The emitter does not incorporate the black

2) Unused wires must be insulated to ensure that they do not come into contact with wires already in use.

# **SENSING CHARACTERISTICS (TYPICAL)**

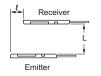
#### Correlation between setting distance and excess gain



### SENSING CHARACTERISTICS (TYPICAL)

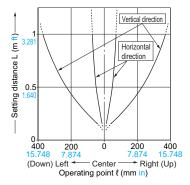
#### Parallel deviation

#### **Vertical direction**



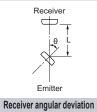
#### **Horizontal direction**



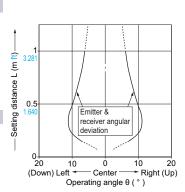


#### Angular deviation

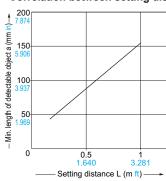
### Emitter angular deviation



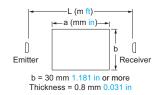




#### Correlation between setting distance and minimum length of detectable object



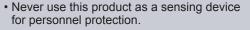
The minimum length of the detectable object, which lies in a plane perpendicular to the sensor front surface, varies with the setting distance, as shown in the left graph. However, note that the minimum length of the detectable object also varies with the object thickness.

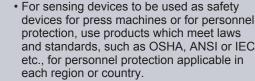


\* The sensing object is considered to be placed at the center of the sensing area.

### PRECAUTIONS FOR PROPER USE

Refer to General precautions.





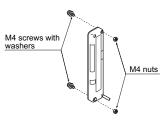


- · If this product is used as a sensing device for personnel protection, death or serious body injury could result.
- · For a product which meets safety standards, use the following products.

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	Operation mode switch		
large indicator	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.

FIBER SENSORS

LASER SENSORS

РНОТО

LIGHT CURTAINS

PRESSURE FLOW SENSORS

SENSOR OPTIONS

MEASURE-MENT SENSORS

CONTROL

ENDOSCOPE

LASER MARKERS

PLC / TERMINALS

HUMAN MACHINE INTERFACES ENERGY CONSUMPTION

VISUALIZATION COMPONENTS

COMPONENTS MACHINE

VISION SYSTEMS

Selection Guide Wafer Detection Liquid Leak Detection

Liquid Level Water Detection Color Mark Detection

Hot Melt Glue Detection Ultrasonio

FIBER SENSORS

LASER SENSORS Others

Refer to General precautions.

PHOTO-ELECTRIC SENSORS MICRO PHOTO-ELECTRIC SENSORS

AREA SENSORS

LIGHT CURTAINS

PRESSURE / FLOW SENSORS

INDUCTIVE PROXIMITY SENSORS

PARTICULAR USE SENSORS SENSOR OPTIONS

SIMPLE WIRE-SAVING UNITS

MEASURE-MENT SENSORS

STATIC CONTROL DEVICES

ENDOSCOPE LASER MARKERS

PLC / TERMINALS HUMAN MACHINE INTERFACES

INTERFACES

ENERGY
CONSUMPTION
VISUALIZATION
COMPONENTS

FA
COMPONENTS

MACHINE VISION SYSTEMS UV CURING

Wafer Detection
Liquid Leak Detection
Liquid Level Detection
Water Detection
Color Mark Detection
Hot Melt Glue Detection
Ultrasonic

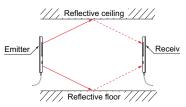
Selection Guide

Ultrasonic Small / Sim Object Detection Obstacle Detection

# PRECAUTIONS FOR PROPER USE

• 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.



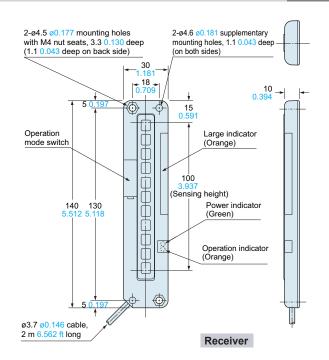
\* Refer to "Parallel deviation" in "SENSING CHARACTERISTICS (TYPICAL)".

## DIMENSIONS (Unit: mm in)

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

### NA1-11 NA1-11-PN

2-ø4.6 ø0.181 supplementary 2-ø4.5 ø0.177 mounting holes with M4 nut seats, 3.3 0.130 deep mounting holes, 1,1 0,043 deep (1.1 0.043 deep on back side) 30 18 10 0.394 <u>5 0.1</u>97 15 0.591 arge indicator Operation (Orange) mode switch 100 (Sensing height) 130 140 Power indicator 5 0.1 ø3.7 ø0.146 cable, 2 m 6.562 ft long Emitter



NA1-11

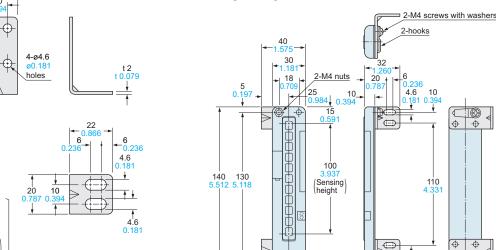
40 0.70 1.575 ± The CAD data in the dimensions can be downloaded from our website.

#### 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.

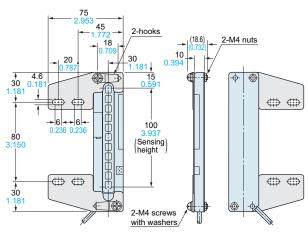
M4 (length 18 mm 0.709 in) screws with washers are not used for **NA1-11**.

Sensor mounting bracket (Optional)

4.6 10 0.181 0.394

### **Assembly dimensions**

Mounting drawing with the receiver



MS-NA2-1

75 2.953 20 1.772 30 1.181 0.236 0.787 0.787 1.181 0.236 0.181 0.787 1.181 0.787 1.181 0.787 1.181 0.787

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.

18 0.709 IBER SENSORS

LASER SENSORS

PHOTO-ELECTRIC SENSORS MICRO

AREA SENSORS

LIGHT CURTAINS

PRESSURE / FLOW SENSORS

INDUCTIVE PROXIMITY SENSORS

PARTICULAR USE SENSORS

SENSOR OPTIONS

SIMPLE WIRE-SAVING UNITS

WIRE-SAVING SYSTEMS

MEASURE-MENT SENSORS

STATIC CONTROL DEVICES

ENDOSCOPE

LASER MARKERS

PLC / TERMINALS

HUMAN MACHINE INTERFACES ENERGY CONSUMPTION VISUALIZATION COMPONENTS

FA COMPONENTS

MACHINE VISION SYSTEMS

UV CURING SYSTEMS

Selection Guide Wafer Detection Liquid Leak Detection

Liquid Level Detection Water Detection

Color Mark Detection Hot Melt Glue Detection

Ultrasonic
Small / Slim
Object Detection

Other Draduate

NA1-11