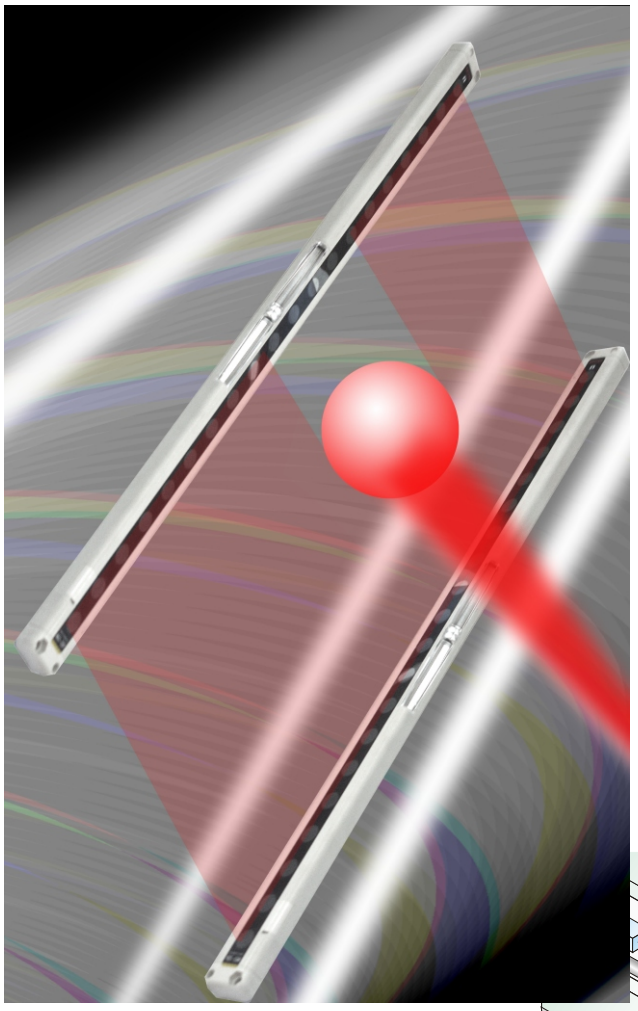
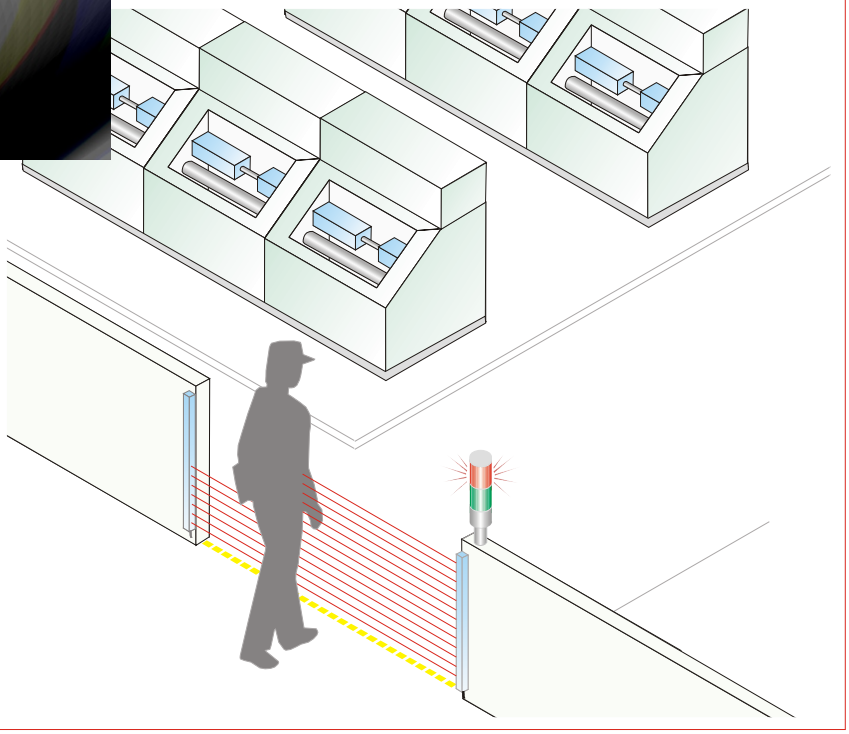
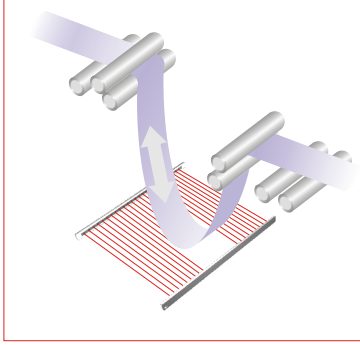
PAS2 SERIES



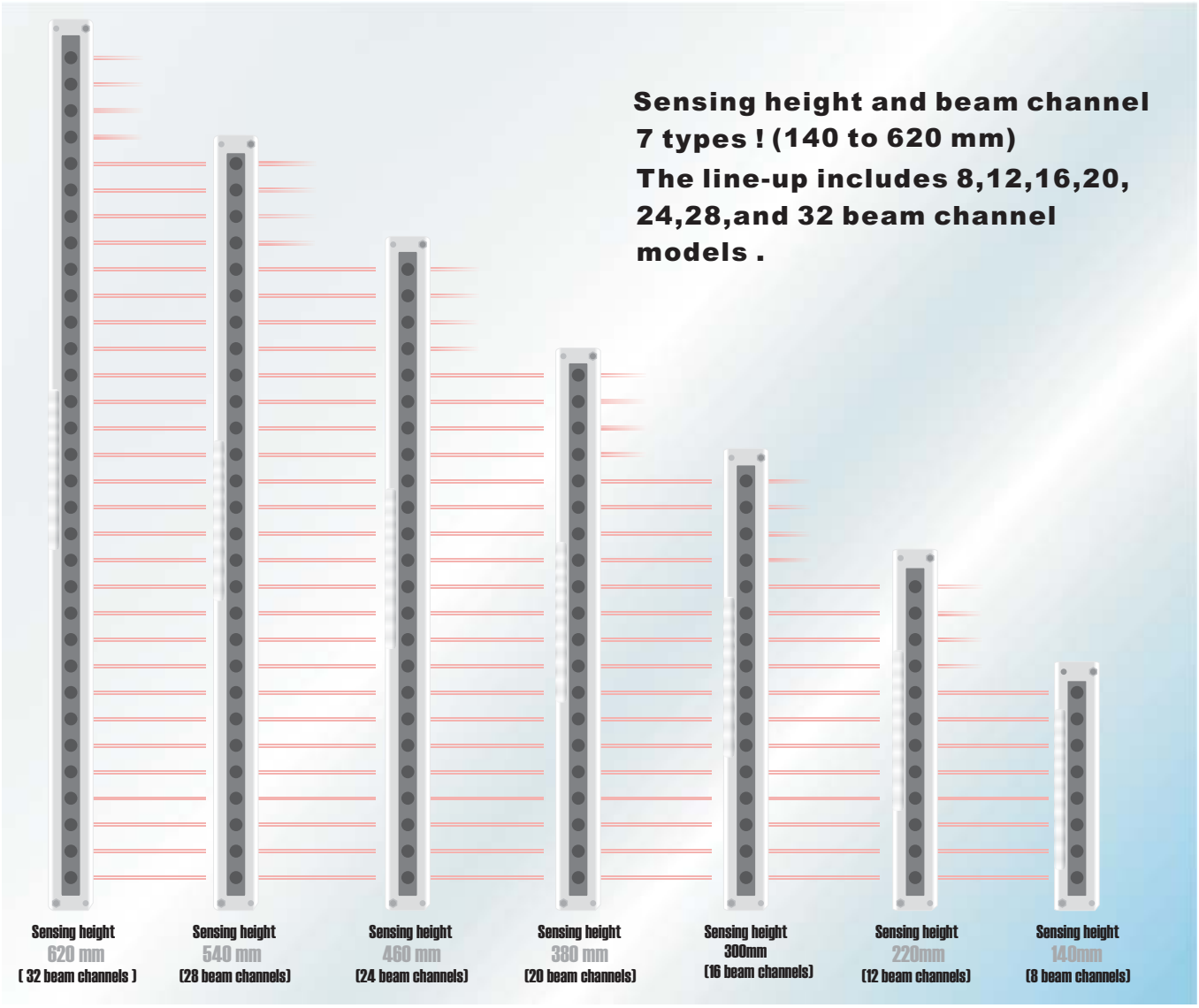




PHOTOELECTRIC

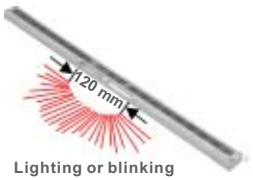
20 MM BEAM PITCH AREA SENSOR

PAS2 SERIES



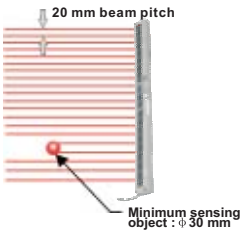
Clearly visible wide job indicator

Both the receiver and the emitter feature job indicators , 102 mm wide , which use red bright LEDS . When the sensing output and the job indicator input are connected , the job indicator can be used as a large size operation indicator .



20 mm beam pitch

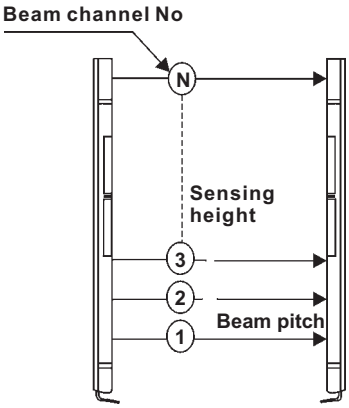
The beam pitch of 20 mm enables detection of an object , having 30 mm min diameter . Because of its perfect Light -ON operation (the output is turned ON only when all beams are received), it ensure operation to the safe side (same as beam interrupted condition) if the cable breaks accidentally .



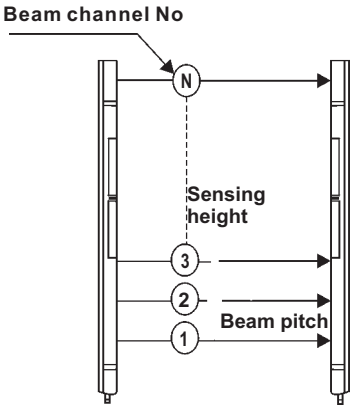
Slim body and three connecting ways

The slim body PAS2 aesthetically in your equipment , since it is just 13 mm thick .
It never disturbs your access to the machine .

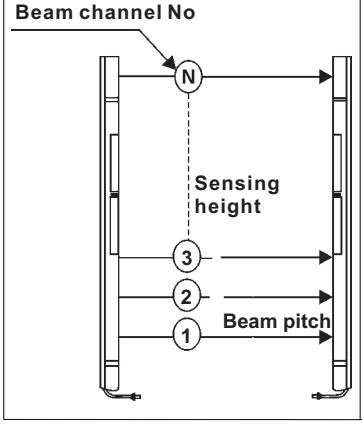
Cable

Appearance	Sensing range	Number of beam channels	Sensing height	Output mode	Part number
	5m	8	140mm	Emitter	PAS2-T5000D-EY9C4L2-8
				NPN	PAS2-T5000N-CY9C4U2-8
				PNP	PAS2-T5000P-CY9C4U2-8
		12	220mm	Emitter	PAS2-T5000D-EY9C4L2-12
				NPN	PAS2-T5000N-CY9C4U2-12
				PNP	PAS2-T5000P-CY9C4U2-12
		16	300mm	Emitter	PAS2-T5000D-EY9C4L2-16
				NPN	PAS2-T5000N-CY9C4U2-16
				PNP	PAS2-T5000P-CY9C4U2-16
		20	380mm	Emitter	PAS2-T5000D-EY9C4L2-20
				NPN	PAS2-T5000N-CY9C4U2-20
				PNP	PAS2-T5000P-CY9C4U2-20
		24	460mm	Emitter	PAS2-T5000D-EY9C4L2-24
				NPN	PAS2-T5000N-CY9C4U2-24
				PNP	PAS2-T5000P-CY9C4U2-24
		28	540mm	Emitter	PAS2-T5000D-EY9C4L2-28
				NPN	PAS2-T5000N-CY9C4U2-28
				PNP	PAS2-T5000P-CY9C4U2-28
		32	620mm	Emitter	PAS2-T5000D-EY9C4L2-32
				NPN	PAS2-T5000N-CY9C4U2-32
				PNP	PAS2-T5000P-CY9C4U2-32

Quick disconnect

Appearance	Sensing range	Number of beam channels	Sensing height	Output mode	Part number
	5m	8	140mm	Emitter	PAS2-T5000D-EY9Q4LP-8
				NPN	PAS2-T5000N-CY9Q4UP-8
				PNP	PAS2-T5000P-CY9Q4UP-8
		12	220mm	Emitter	PAS2-T5000D-EY9Q4LP-12
				NPN	PAS2-T5000N-CY9Q4UP-12
				PNP	PAS2-T5000P-CY9Q4UP-12
		16	300mm	Emitter	PAS2-T5000D-EY9Q4LP-16
				NPN	PAS2-T5000N-CY9Q4UP-16
				PNP	PAS2-T5000P-CY9Q4UP-16
		20	380mm	Emitter	PAS2-T5000D-EY9Q4LP-20
				NPN	PAS2-T5000N-CY9Q4UP-20
				PNP	PAS2-T5000P-CY9Q4UP-20
		24	460mm	Emitter	PAS2-T5000D-EY9Q4LP-24
				NPN	PAS2-T5000N-CY9Q4UP-24
				PNP	PAS2-T5000P-CY9Q4UP-24
		28	540mm	Emitter	PAS2-T5000D-EY9Q4LP-28
				NPN	PAS2-T5000N-CY9Q4UP-28
				PNP	PAS2-T5000P-CY9Q4UP-28
		32	620mm	Emitter	PAS2-T5000D-EY9Q4LP-32
				NPN	PAS2-T5000N-CY9Q4UP-32
				PNP	PAS2-T5000P-CY9Q4UP-32

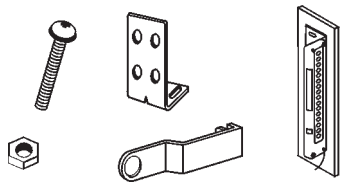
Pig tail

Appearance	Sensing range	Number of beam channels	Sensing height	Output mode	Part number
	5m	8	140mm	Emitter	PAS2-T5000D-EY9P4LP-8
				NPN	PAS2-T5000N-CY9P4UP-8
				PNP	PAS2-T5000P-CY9P4UP-8
		12	220mm	Emitter	PAS2-T5000D-EY9P4LP-12
				NPN	PAS2-T5000N-CY9P4UP-12
				PNP	PAS2-T5000P-CY9P4UP-12
		16	300mm	Emitter	PAS2-T5000D-EY9P4LP-16
				NPN	PAS2-T5000N-CY9P4UP-16
				PNP	PAS2-T5000P-CY9P4UP-16
		20	380mm	Emitter	PAS2-T5000D-EY9P4LP-20
				NPN	PAS2-T5000N-CY9P4UP-20
				PNP	PAS2-T5000P-CY9P4UP-20
		24	460mm	Emitter	PAS2-T5000D-EY9P4LP-24
				NPN	PAS2-T5000N-CY9P4UP-24
				PNP	PAS2-T5000P-CY9P4UP-24
		28	540mm	Emitter	PAS2-T5000D-EY9P4LP-28
				NPN	PAS2-T5000N-CY9P4UP-28
				PNP	PAS2-T5000P-CY9P4UP-28
		32	620mm	Emitter	PAS2-T5000D-EY9P4LP-32
				NPN	PAS2-T5000N-CY9P4UP-32
				PNP	PAS2-T5000P-CY9P4UP-32

Designation	Mode No	Description	
Slit mask	OS-PAS2-N8	For 8 beam channels	The slit mask restrains the amount of beam emitted or received . (Seal type ,10 Nos . Set) Sensing range : 4m (slit on one side), 1.5m(slit on both sides)
	OS-PAS2-N12	For 12 beam channels	
	OS-PAS2-N16	For 16 beam channels	
	OS-PAS2-N20	For 20 beam channels	
	OS-PAS2-N24	For 24 beam channels	
	OS-PAS2-N28	For 28 beam channels	
	OS-PAS2-N32	For 32 beam channels	
Sensor mounting bracket (Node)	MS-PAS2	Four bracket set Eight M4(length 18 mm)screws with washers (Four screws with washers are used), eight nuts ,four hooks four spacers and four M4(length 15mm)screws with washers are attached . Spacers are not attached with MS-PAS2-1 . M4(length 15 mm) screws with washers are not used for PAS2 series .	
Sensor supporting bracket	MS-PAS2-N8	For 8 beam channels	Supports the body of the sensor when used in an environment with strong vibration . Two bracket set
	MS-PAS2-N12	For 12 beam channels	
	MS-PAS2-N16	For 16 beam channels	
	MS-PAS2-N20	For 20 beam channels	
	MS-PAS2-N24	For 24 beam channels	
	MS-PAS2-N28	For 28 beam channels	
	MS-PAS2-N32	For 32 beam channels	

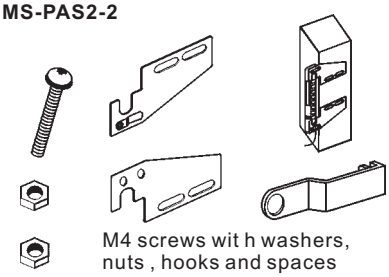
Sensor mounting bracket

- **MS-PAS2-1**



M4 screws with washers , nuts and hooks are attached .

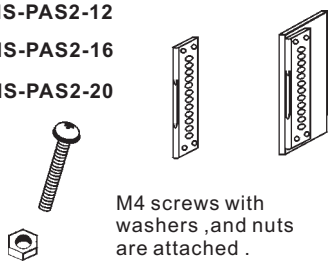
- **MS-PAS2-2**



M4 screws wit h washers, nuts , hooks and spaces are attached .

Sensor protection bracket

- **MS-PAS2-12**
- **MS-PAS2-16**
- **MS-PAS2-20**

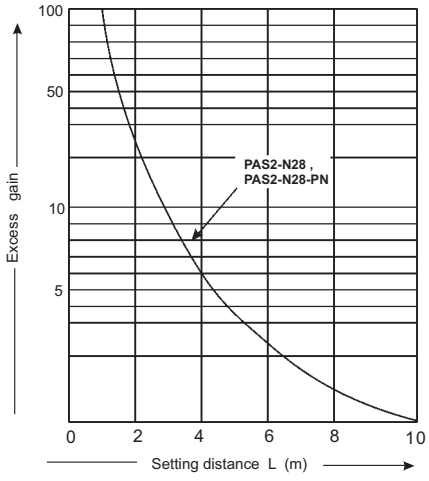


M4 screws with washers ,and nuts are attached .

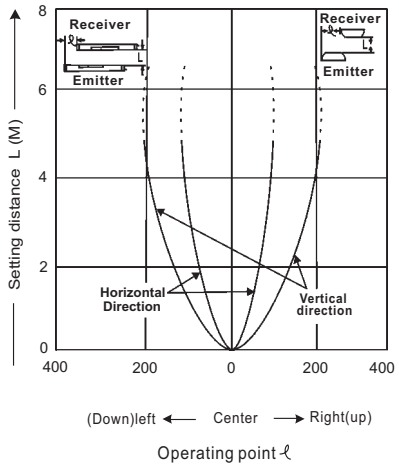
Note: Do not fix the sensor mounting bracket on the front surface of the sensor .

Sensing characteristics (typical)

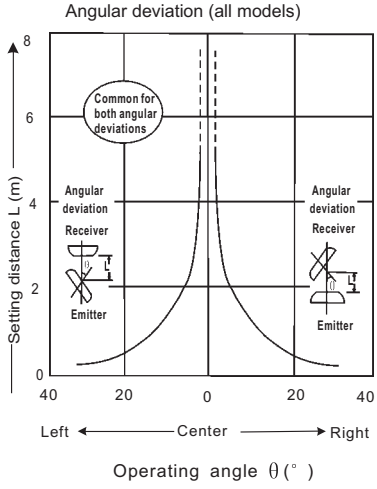
Correlation between distance and excess gain



Parallel deviation(all model)



Angular deviation (all models)



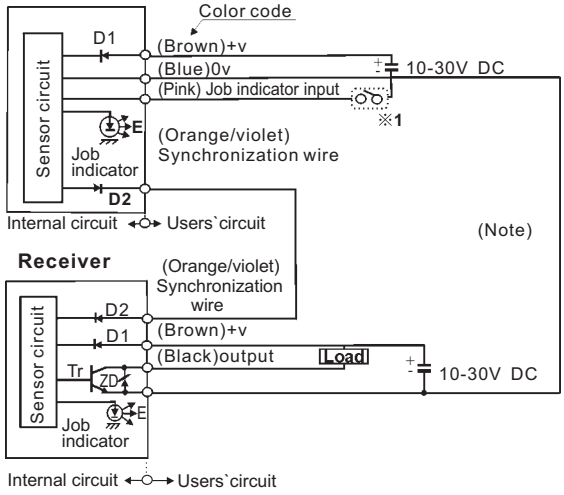
Item		Number of beam channels	8	12	16	20	24	28	32
	Model No	NPN output	PAS2-xxxN-8	PAS2-xxxN-12	PAS2-xxxN-16	PAS2-xxxN-20	PAS2-xxxN-24	PAS2-xxxN-28	PAS2-xxxN-32
		PNP output	PAS2-xxxP-8	PAS2-xxxP-12	PAS2-xxxP-16	PAS2-xxxP-20	PAS2-xxxP-24	PAS2-xxxP-28	PAS2-xxxP-32
Sensing height			140mm	220mm	300mm	380mm	460mm	540mm	620mm
Sensing range			5m						
Beam pitch			20mm						
Sensing object			Φ30mm or more opaque object						
Supply voltage			10-30V DC						
Power consumption (Note)	Emitter	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	1.3W 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	1.2W 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	1.3W 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	1.2W or less
Output			<NPN output type> NPN open-collector transistor ●Maximum sink current : 100mA ●Applied voltage :30 V DC or less (between output and 0V) ●Residual voltage : 1.5V or less			< PNP output type > PNP open-collector transistor ●Maxmum source current : 100mA ●Applied voltage : 30V DC or less (between output and +V) ●Residual voltage : 1.5V or less			
	Utilization category		DC-12 or DC-13						
	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 during emission ; 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 in dicator 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 operation of the short-circuit protection circuit .						
Interference prevention function			Incorporated						
Test-run function			Incorporated						
Environmental resistance	Pollution degree		3 (Industrial environment)						
	Ambient temperature		-10 to +55℃ (No dew condensation or icing allowed) , Storage : -10 to +60℃						
	Ambient humidity		35 to 85 % RH ,Storage : 35 to 85 % RH						
	Ambient illuminance		Sunlight :10,000 ℓ×at the light-receiving face , Incandescent light : 3,000 ℓ×at the light-receiving face						
	EMC		IEC 60947-5-2 ,Parts 7.2.6.1.2.3 or RFI >3V/m (in 30-1000MHZ) ,EFT>1KV , ESD >4KV (contact)						
	Voltage with standability		1,000V AC for one min . between all supply terminals connected together and enclosure						
	Insulation resistance		20MΩ, or more , with 250V DC megger between all supply terminals connected together and enclosure						
	Vibration resistance		IEC 60947-5-2 , Part 7.4.2 or 10-55HZ , 1.0 mm amplitude in x , y and z directions for 30 min						
	Shock resistance		IEC 60947-5-2 , Part 7.4.1 or 30g , 11 ms in x , y and z directions for six time each						
Emitting element			Infrared LED (modulated)						
Material			Enclosure : Heat-resistant ABS , Lens cover : Polyester , Indicator cover : Acrylic						
Cable			0.2mm² 4-core cable , 3m long						
Cable extension			Extension up to total 25 m is possible for both emitter and receiver , with 0.2 m², or more , cable .						
Weight			350g approx .	400g approx .	450g approx .	500g approx .	570g approx .	650g approx .	730g approx .

Note : Obtain the current consumption from the following equation .
Current consumption = Power consumption ÷Supply voltage
(e.g.)In case of PAS2-N8(when job indicator lights on)
When the supply voltage is 12V ,the current consumption of the emitter is : 0.7W ÷12V =0.058A=58mA

NPN output type

I/O circuit diagram

• Emitter

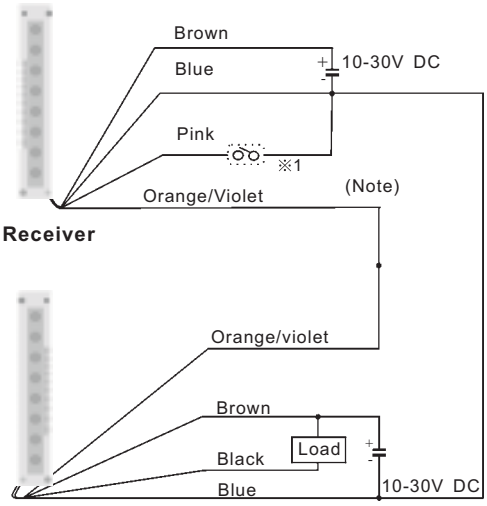


Notes : 1) Input (pink) is the job indicator input when No.4 of the operation mode switch on the emitter is set to the OFF side , and it is the test input when the switch is set to ON side .
2) In order to use the job indicator as a large operation indicator , connect the input (pink) of the emitter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

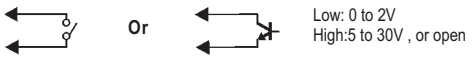
Symbols...D1:Reverse supply polarity protection diode
D2: Reverse current protection diode
ZD: Surge absorption zener diode
Tr: NPN output transistor
E: Job indicator

Wiring diagram

• Emitter



※1 Non-voltage contact or NPN open-collector transistor

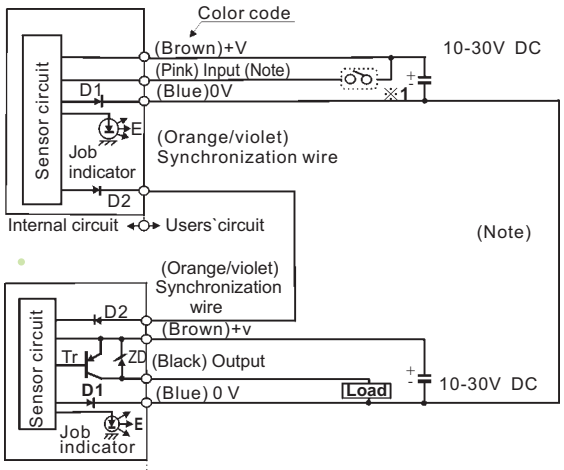


Note :Refer to PRECAUTIONS FOR PROPRE USE(p.7~) for job indicator operation or test input operation .

PNP output type

I/o circuit diagram

• Emitter



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 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 .
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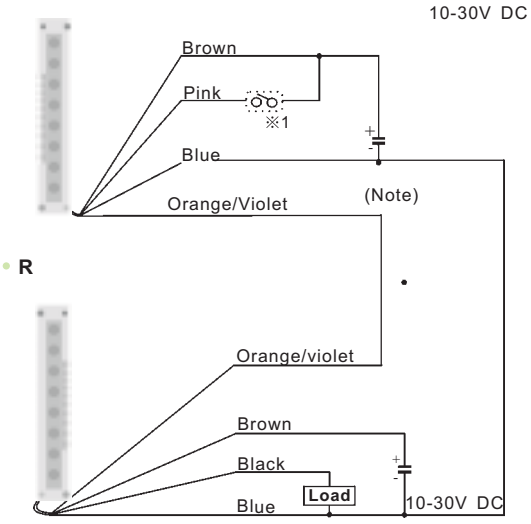
Symbols...D1:Reverse supply polarity protection diode
D2:Reverse current protection diode
ZD: Surge absorption zener diode
Tr: NPN output transistor
E: Job indicator

Wiring diagram

• Emitter



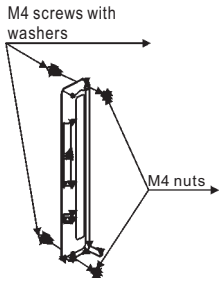
※1 Non-voltage contact or NPN open-collector transistor

Note :Refer to PRECAUTIONS FOR PROPRE USE(p.7~) for job indicator operation or test input operation .

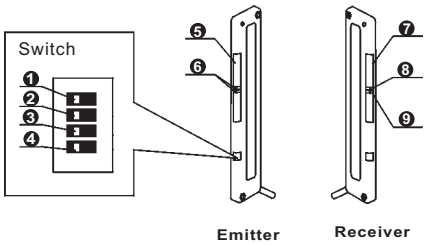
PRECAUTIONS FOR PROPER USE

Mounting

Use M4screws 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 .)



Functional description



		Description	Function	
Emitter	❶	Emission frequency selection switch	1 ■□ :Frequency A	1 □■ : Frequency B
	❷	Job indicator mode switch	2 ■□ : Lights up when the job indicator input is Low	2 □■ : Lights off when the job indicator input is at Low
	❸		3 ■□ : Lighting	3 □■ : Blinking
	❹	Test-run switch	4 ■□ : OFF	4 □■ : ON
	❺	Job indicator (Red LED)	Lights up , blinks , or lights off when the job indicator input is at Low . Lighting pattern is selected by operation mode switch .	
	❻	Power indicators (Green LED×2)	Light up when power is ON . Emission frequency a or b is indicated by the number of LEDs lighting up.	
Receiver	❼	Job indicator (Red LED)	Lights up , blinks , or lights off when the job indicator input is at Low . Lighting pattern is selected by operation mode switch .	
	❽	Stable incident beam indicator (Green LED)	Lights up when all beams are stably received . And blinks alternately with the operation indicator when an abnormal condition is found out by the test-run.	When an excess current flows through the output , the stable incident beam indicator and the operation indicatoron the receiver blink simultaneously due to the operation of the short-circuit protection circuit .
	❾	Operation indicator (Red LED)	Lights up when one or more beams are interrupted , and blinks alternately with the stable indicator when an abnormal condition is found out by the test-run.	

Job indicator operation selection

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

Job indicator mode switch	Job indicator operation	
	Job indicator input : Low	Job indicator input : High or open
1 2 3 4	Lights up	Lights off
1 2 3 4	Lights off	Lights up
1 2 3 4	Lights up	Blinks
1 2 3 4	Lights off	Blinks

Job indicator input signal condition

	Signal condition
Low	0 to 2v
High	5 to 30v , or open

To use job indicator as large operation indicator

When the job indicator input of the emitter is connected to the output of the receiver , the job indicators can be used as large operation indicators .

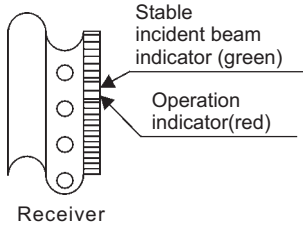
Job indicator mode switch	Light state	Dark state
1 2 3 4		
1 2 3 4		
1 2 3 4		
1 2 3 4		

Test-run function

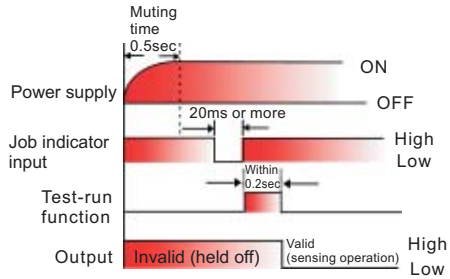
Set the test-run switch to ON before switching on the power supply .
Turn the external input ON (job indicator input Low) after supplying power . Then , the sensor starts emission and checks itself whether each beam channel is in the Light or Dark state .
If all beams are properly received , the sensor starts normal sensing operation .
If the sensor may fail or the sensing area is blocked by some object , the sensor is held in the Dark state (safeside) and the stable incident beam indicator and the operation indicator blink alternately .

Setting test-run switch

OFF	ON
	



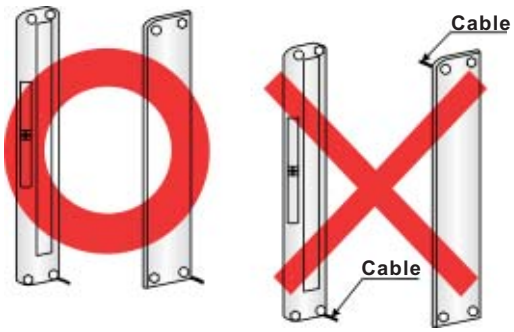
Time chart



Note : The test-run function can be used o
nly once after switching on the power supply .

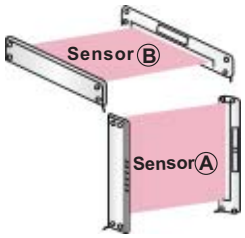
Orientation

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



Interference prevention function

By setting different emission frequencies , two units of PAS2 can be mounted close together , as shown in the figure on the below . The emission frequency can be checked by the number of power indicator lighting up on the emission .



	Frequency selection switch	Power indicator (Emitter)
Sensor Ⓐ (FREQ .A)	Frequency A 	 One LED light up
Sensor Ⓑ (FREQ .B)	Frequency B 	 Two LEDS light up

Wiring

- Make sure to carry out the wiring in the power supply off condition .
- Verify that the supply 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 sensor , connect the frame ground .(F .G .)terminal of the equipment to an actual ground .
- Do not run the wires together with high-voltage lines or power line or put them in the same raceway . This can cause malfunction due to induction .

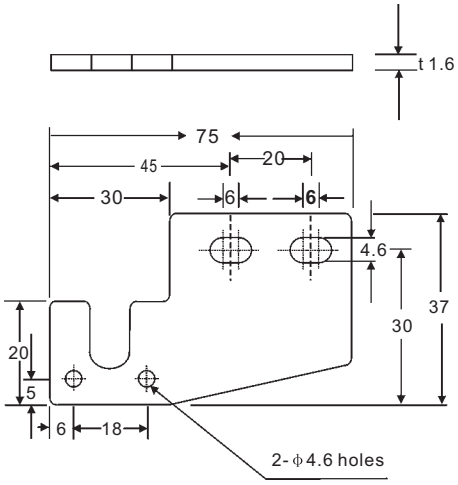
Others

- Do not use during the initial transient time (500 ms)after the power supply is switched on .
- 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 .
- 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 .

- This sensor is not for 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 sensor conforming to safety standards are available.
  For details , please contact our office.

DIMENSIONS(Unit : mm)

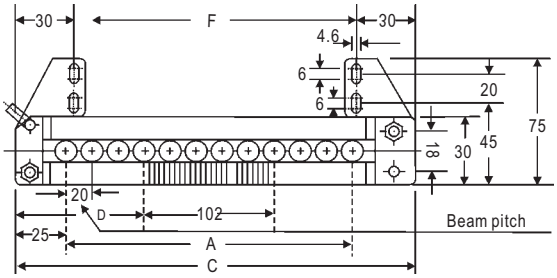
Sensor mounting bracket

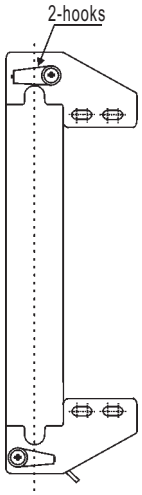


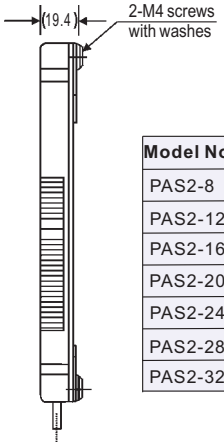
Material : Cold rolled carbon steel (SPCC)
(Uni-chrome plated)

Four bracket set
Eight M4 (length 18mm) screws with washers (four screws with washers are used), eight nuts , Four hooks , four spacers and four M4 (length 15 mm) screws with washers are attached .
M4 (length 15 mm) screws with washers are not used for PAS2.

Assembly dimensions
Mounting drawing with the receiver

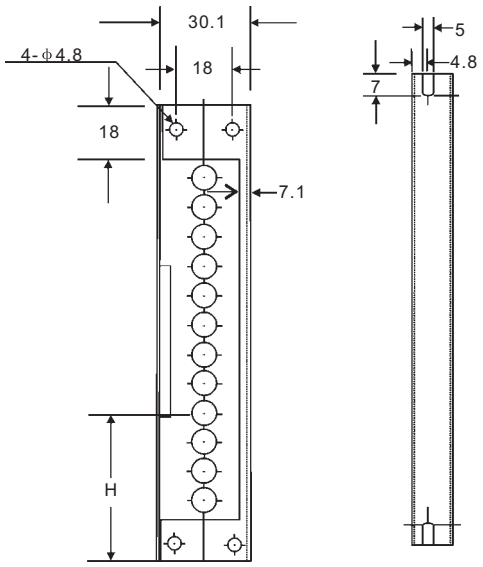




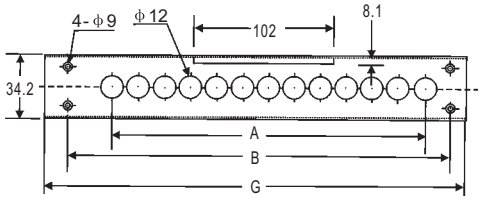


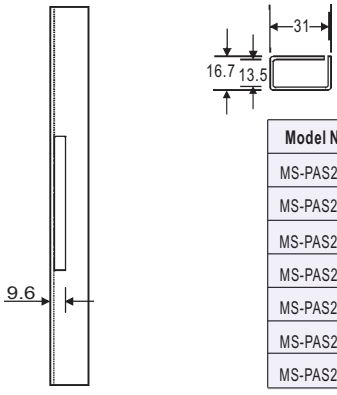
Model No	A	C	D	F
PAS2-8	140	190	44	130
PAS2-12	220	270	84	210
PAS2-16	300	350	124	290
PAS2-20	380	430	164	370
PAS2-24	460	510	204	450
PAS2-28	540	590	244	530
PAS2-32	620	670	284	610

Sensor protection bracket



Note :The sensor protection bracket can be used for both the emitter and the receiver .
Material : Cold rolled carbon steel (SPCC)
(Chrome plated)

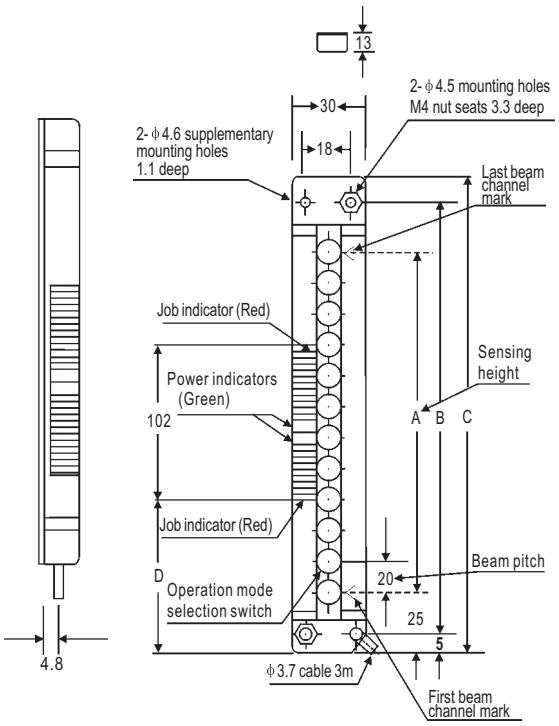




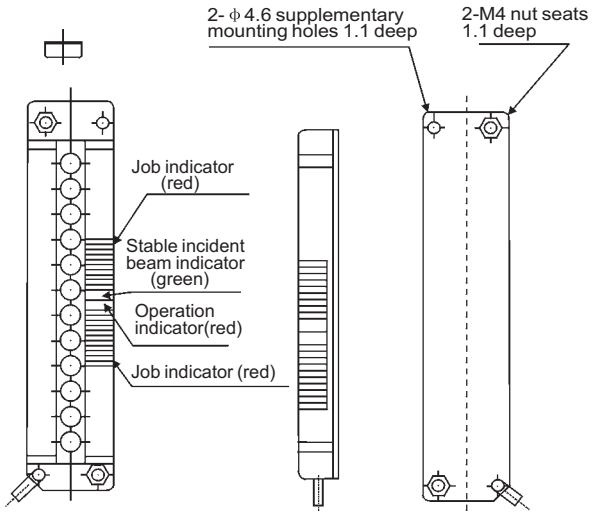
Model NO.	A	B	G	H
MS-PAS2-8	140	180	194	46
MS-PAS2-12	220	260	274	86
MS-PAS2-16	300	340	354	126
MS-PAS2-20	380	420	434	166
MS-PAS2-24	460	500	514	206
MS-PAS2-28	540	580	594	246
MS-PAS2-32	620	660	674	286

Two bracket set
Four M4 (length 20mm) screws with washers , and four nuts are attached .

Emitter

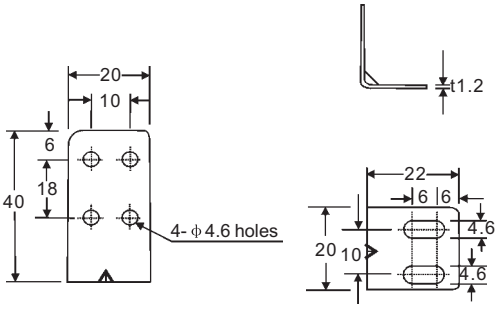


Receiver



Model No	A	B	C	D
PAS2-8	140	180	190	44
PAS2-12	220	260	270	84
PAS2-16	300	340	350	124
PAS2-20	380	420	430	164
PAS2-24	460	500	510	204
PAS2-28	540	580	590	244
PAS2-32	620	660	670	284

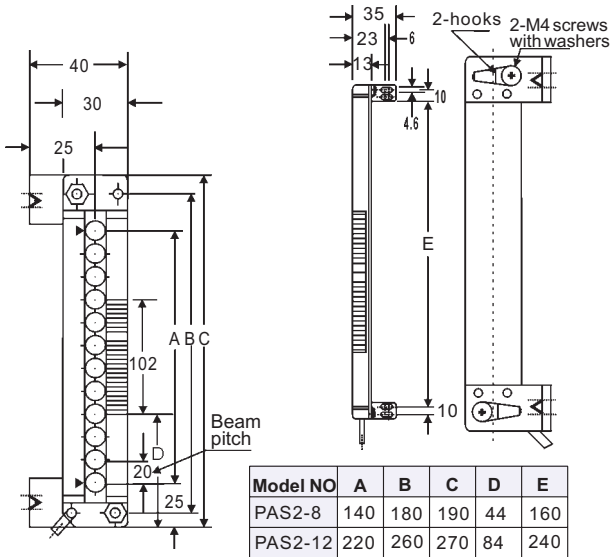
Sensor mounting bracket



Material : cold rolled carbon steel (spcc)
(Uni-chrome plated)

Four bracket set
Eight M4 (length 18mm)screws with washers
(Four screws with washers are used),
eight nuts , four hooks and four M4 (length 15mm)
screws with washers are attached .
M4 (length 15 mm)screws with washers are not
used for PAS2.

Assembly dimensions
Mounting drawing with the receiver



Model NO	A	B	C	D	E
PAS2-8	140	180	190	44	160
PAS2-12	220	260	270	84	240
PAS2-16	300	340	350	124	320
PAS2-20	380	420	430	164	400
PAS2-24	460	500	510	204	480
PAS2-28	540	580	590	244	560
PAS2-32	620	660	670	284	640