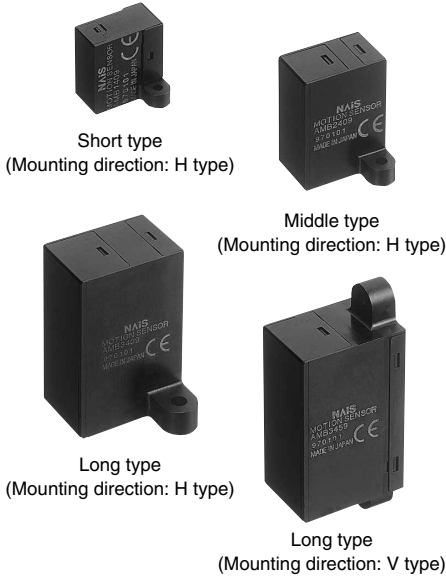


**Panasonic**  
ideas for life

MOTION SENSOR  
(AREA REFLECTIVE TYPE)

MA MOTION  
SENSOR Series



**FEATURES**

- **Certain detection unaffected by the reflectance of the object**  
The sensor can provide stable detection that is not affected by the condition (color or material of the clothing) or parts (skin, hair, etc.) of the object being monitored. (Reflectance 18% to 90%). Excellent performance even when the detection surface is dirty.
- **Only connecting DC power supply for operating**  
Built-in oscillation circuit type obviates the hitherto existing need for start signal input.
- **Use in adjacent positions is possible**  
These sensors can be located in adjacent positions, because the timing of the external trigger signals can be adjusted so that the beam frequency of each adjacent sensor will not interfere with the other.
- **Battery drive possible**  
By applying longer interval for the trigger signal, you can reduce the total power consumption.
- **Ultra compact size**  
Suitable for building in equipment as the size is ultra compact.
- **Can be used with a number of different supply voltages.**
  - 1) The DC 5V type (DC 4.5 to 6.5V)
  - 2) The free-ranging power type (DC 6.5 to 27V)

They support the DC power supplies of electronic products and equipment in general.

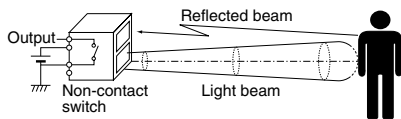
- **The open collector output system makes for easy load drive.**  
These sensors provide a continuous output during detection because the output system makes it easy to drive the load.  
They achieve an output performance of 30V, Built-in oscillation circuit type: 100 mA, External triggering type: 10 mA.
- **All models with Built-in oscillation circuit type meet CE mark standards.**  
Conforms with EMC directive for CE certification vital for use in Europe.

**APPLICATIONS**

- **Water-based product market**
  - 1) Automatic lighting of wash basin units
  - 2) Toilets
  - 3) Automatic water flow from faucets
- **Stores and financial instructions**
  - 1) Automatic doors
  - 2) Automatic lighting
  - 3) Cash dispensing machines
  - 4) Automatic teller machines
  - 5) Visitor detecting sensors
- **Amusement market**  
Automatic lighting for game display
- **Medical field**  
Non-contact switch
- **Others**
  - 1) Automatic ticket gates
  - 2) Seat-taking sensors
  - 3) Golf cart collision prevention

**What is area reflective type?**

The sensor emits a ray of light toward the human body and detects the distance and determine whether there is a person within a given distance of the sensor. If the sensor detects a person, it sets an output non-contact switch to ON.



**ORDERING INFORMATION**

AMB; MA Motion Sensor

Detection distance type (shape)

1: Short type 2: Middle type 3: Long type

Triggering function

1: External triggering type 4: Built-in oscillation circuit type (Internal trigger)

Classification by output method & mounting direction

0: Transistor/H type 5: Transistor/V type

Operating voltage

2: Free-ranging power type (DC6.5 to 27V) 9: The DC 5V type (DC 4.5 to 6.5V)

Part No.	AMB																			
	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	
Short type	cm	—	—	—	5	6	7	8	9	10	—	—	—	—	—	—	—	—	—	
	inch	—	—	—	1.969	2.362	2.756	3.150	3.543	3.937	—	—	—	—	—	—	—	—	—	
Middle type	cm	20	30	40	50	60	70	80	—	—	—	—	—	—	—	—	—	—	—	
	inch	7.874	11.811	15.748	19.685	23.622	27.559	31.496	—	—	—	—	—	—	—	—	—	—	—	
Long type	cm	—	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	
	inch	—	11.811	15.748	19.685	23.622	27.559	31.496	35.433	39.37	43.307	47.244	51.181	55.118	59.055	62.992	66.929	70.866	74.803	
																			200	
																			78.74	

# MA Motion Sensor (AMB)

## DETECTION DISTANCE TYPE (distance limited)

Mounting direction	Type (shape)	Rated operating voltage	Rated detection distance	Part No.		Packing quantity						
				Built-in oscillation circuit type	External triggering type	Inner	Outer					
H type	Short type	4.5 to 6.5 V DC	5 cm 1.969 inch	AMB140905	AMB110905	20 pcs.	200 pcs.					
			6 cm 2.362 inch	AMB140906	AMB110906							
			7 cm 2.756 inch	AMB140907	AMB110907							
			8 cm 3.150 inch	AMB140908	AMB110908							
			9 cm 3.543 inch	AMB140909	AMB110909							
			10 cm 3.937 inch	AMB1409	AMB1109							
		6.5 to 27 V DC	5 cm 1.969 inch	AMB140205	AMB110205							
			6 cm 2.362 inch	AMB140206	AMB110206							
			7 cm 2.756 inch	AMB140207	AMB110207							
			8 cm 3.150 inch	AMB140208	AMB110208							
			9 cm 3.543 inch	AMB140209	AMB110209							
			10 cm 3.937 inch	AMB1402	AMB1102							
			H type	Middle type	4.5 to 6.5 V DC			20 cm 7.874 inch	AMB240902	AMB210902	20 pcs.	200 pcs.
								30 cm 11.811 inch	AMB240903	AMB210903		
40 cm 15.748 inch	AMB240904	AMB210904										
50 cm 19.685 inch	AMB240905	AMB210905										
60 cm 23.622 inch	AMB240906	AMB210906										
70 cm 27.559 inch	AMB240907	AMB210907										
80 cm 31.496 inch	AMB2409	AMB2109										
6.5 to 27 V DC	20 cm 7.874 inch	AMB240202				AMB210202						
	30 cm 11.811 inch	AMB240203			AMB210203							
	40 cm 15.748 inch	AMB240204			AMB210204							
	50 cm 19.685 inch	AMB240205			AMB210205							
	60 cm 23.622 inch	AMB240206			AMB210206							
	70 cm 27.559 inch	AMB240207			AMB210207							
H type	Long type	4.5 to 6.5 V DC			80 cm 31.496 inch	AMB2402	AMB2102	20 pcs.	200 pcs.			
			30 cm 11.811 inch	AMB340903	AMB310903							
			40 cm 15.748 inch	AMB340904	AMB310904							
			50 cm 19.685 inch	AMB340905	AMB310905							
			60 cm 23.622 inch	AMB340906	AMB310906							
			70 cm 27.559 inch	AMB340907	AMB310907							
			80 cm 31.496 inch	AMB340908	AMB310908							
			90 cm 35.433 inch	AMB340909	AMB310909							
			100 cm 39.370 inch	AMB340910	AMB310910							
			110 cm 43.307 inch	AMB340911	AMB310911							
			120 cm 47.244 inch	AMB340912	AMB310912							
			130 cm 51.181 inch	AMB340913	AMB310913							
			140 cm 55.118 inch	AMB340914	AMB310914							
			150 cm 59.055 inch	AMB340915	AMB310915							
			160 cm 62.992 inch	AMB340916	AMB310916							
			170 cm 66.929 inch	AMB340917	AMB310917							
			180 cm 70.866 inch	AMB340918	AMB310918							
			190 cm 74.803 inch	AMB340919	AMB310919							
200 cm 78.740 inch	AMB3409	AMB3109										
H type	Long type	6.5 to 27 V DC	30 cm 11.811 inch	AMB340203	AMB310203	20 pcs.	200 pcs.					
			40 cm 15.748 inch	AMB340204	AMB310204							
			50 cm 19.685 inch	AMB340205	AMB310205							
			60 cm 23.622 inch	AMB340206	AMB310206							
			70 cm 27.559 inch	AMB340207	AMB310207							
			80 cm 31.496 inch	AMB340208	AMB310208							
			90 cm 35.433 inch	AMB340209	AMB310209							
			100 cm 39.370 inch	AMB340210	AMB310210							
			110 cm 43.307 inch	AMB340211	AMB310211							
			120 cm 47.244 inch	AMB340212	AMB310212							
			130 cm 51.181 inch	AMB340213	AMB310213							
			140 cm 55.118 inch	AMB340214	AMB310214							
			150 cm 59.055 inch	AMB340215	AMB310215							
			160 cm 62.992 inch	AMB340216	AMB310216							
170 cm 66.929 inch	AMB340217	AMB310217										
180 cm 70.866 inch	AMB340218	AMB310218										

Note: If you plan to use multiple sensors side-by-side, or you wish to keep the current consumption small, inquire for details about external trigger type, which is suitable for such applications.

**DETECTION DISTANCE TYPE** (distance limited) (cont.)

Mounting direction	Type (shape)	Rated operating voltage	Rated detection distance	Part No.		Packing quantity	
				Built-in oscillation circuit type	External triggering type	Inner	Outer
H type	200 cm type	6.5 to 27 V DC	190 cm 74.803 inch	AMB340219	AMB310219	20 pcs.	200 pcs.
			200 cm 78.740 inch	AMB3402	AMB3102		
V type	Long type	4.5 to 6.5 V DC	30 cm 11.811 inch	AMB345903	AMB315903	20 pcs.	200 pcs.
			40 cm 15.748 inch	AMB345904	AMB315904		
			50 cm 19.685 inch	AMB345905	AMB315905		
			60 cm 23.622 inch	AMB345906	AMB315906		
			70 cm 27.559 inch	AMB345907	AMB315907		
			80 cm 31.496 inch	AMB345908	AMB315908		
			90 cm 35.433 inch	AMB345909	AMB315909		
			100 cm 39.370 inch	AMB345910	AMB315910		
			110 cm 43.307 inch	AMB345911	AMB315911		
			120 cm 47.244 inch	AMB345912	AMB315912		
			130 cm 51.181 inch	AMB345913	AMB315913		
			140 cm 55.118 inch	AMB345914	AMB315914		
			150 cm 59.055 inch	AMB345915	AMB315915		
			160 cm 62.992 inch	AMB345916	AMB315916		
			170 cm 66.929 inch	AMB345917	AMB315917		
			180 cm 70.866 inch	AMB345918	AMB315918		
190 cm 74.803 inch	AMB345919	AMB315919					
200 cm 78.740 inch	AMB3459	AMB3159					
V type	Long type	6.5 to 27 V DC	30 cm 11.811 inch	AMB345203	AMB315203	20 pcs.	200 pcs.
			40 cm 15.748 inch	AMB345204	AMB315204		
			50 cm 19.685 inch	AMB345205	AMB315205		
			60 cm 23.622 inch	AMB345206	AMB315206		
			70 cm 27.559 inch	AMB345207	AMB315207		
			80 cm 31.496 inch	AMB345208	AMB315208		
			90 cm 35.433 inch	AMB345209	AMB315209		
			100 cm 39.370 inch	AMB345210	AMB315210		
			110 cm 43.307 inch	AMB345211	AMB315211		
			120 cm 47.244 inch	AMB345212	AMB315212		
			130 cm 51.181 inch	AMB345213	AMB315213		
			140 cm 55.118 inch	AMB345214	AMB315214		
			150 cm 59.055 inch	AMB345215	AMB315215		
			160 cm 62.992 inch	AMB345216	AMB315216		
			170 cm 66.929 inch	AMB345217	AMB315217		
			180 cm 70.866 inch	AMB345218	AMB315218		
190 cm 74.803 inch	AMB345219	AMB315219					
200 cm 78.740 inch	AMB3452	AMB3152					

Note: If you plan to use multiple sensors side-by-side, or you wish to keep the current consumption small, inquire for details about external trigger type, which is suitable for such applications.

**PERFORMANCE**

**1. Detection performance** (Measuring conditions: ambient temp.: 25°C 77°F; operating voltage: 5 V DC)

Items		Detection distance						Measured conditions	
		Short type*Remark 1							
		5 cm 1.969 inch	6 cm 2.362 inch	7 cm 2.756 inch	8 cm 3.150 inch	9 cm 3.543 inch	10 cm 3.937 inch		
Rated detection distance	Minimum	45 mm 1.772 inch	54 mm 2.126 inch	63 mm 2.480 inch	72 mm 2.835 inch	81 mm 3.189 inch	90 mm 3.543 inch	with a standard reflection board	
	Typical	50 mm	60 mm	70 mm	80 mm	90 mm	100 mm		
	Maximum	1.969 inch 55 mm 2.165 inch	3.362 inch 66 mm 2.598 inch	2.756 inch 77 mm 3.031 inch	3.150 inch 88 mm 3.465 inch	3.543 inch 99 mm 3.898 inch	3.937 inch 110 mm 4.331 inch		
Measuring tolerance		Typical		10%	15%	20%	25%	Reflection rate: 90 to 18%	
Usable ambient brightness (Resistance to ambient light)*Remark 2	Brightness of sensor surface	Maximum						30,000 lx	See the drawing on the next page.
	Brightness of reflection surface	Maximum							

Remarks: 1. After receipt of order, average rated detection distance to 15 cm 5.906 inch is possible. Please inquire.  
 2. Install so that light from direct light sources does not enter the sensor (within 30° of the sensor light beam).

# MA Motion Sensor (AMB)

Items		Detection distance		Middle type*Remark 1					Measured conditions
		20 cm 7.874 inch	30 cm 11.811 inch	40 cm 15.748 inch	50 cm 19.685 inch	60 cm 23.622 inch	70 cm 27.559 inch	80 cm 31.496 inch	
Rated detection distance	Minimum	190 mm	285 mm	380 mm	475 mm	570 mm	665 mm	760 mm	with a standard reflection board
	Typical	7.480 inch	11.220 inch	14.961 inch	18.701 inch	22.441 inch	26.181 inch	29.921 inch	
	Maximum	200 mm	300 mm	400 mm	500 mm	600 mm	700 mm	800 mm	
Measuring tolerance	Typical	3%			5%		10%		Reflection rate: 90 to 18%
	Maximum	30,000 lx							
Usable ambient brightness (Resistance to ambient light)*Remark 2	Brightness of sensor surface	30,000 lx							See the drawing below.
	Brightness of reflection surface	30,000 lx							

Remarks: 1. After receipt of order, average rated detection distance to 15 cm 5.906 inch is possible. Please inquire.  
2. Install so that light from direct light sources does not enter the sensor (within 30° of the sensor light beam).

Items		Detection distance		Long type							Measured conditions
		30 cm 11.811 inch	40 cm 15.748 inch	50 cm 19.685 inch	60 cm 23.622 inch	70 cm 27.559 inch	80 cm 31.496 inch	90 cm 35.433 inch	100 cm 39.37 inch	110 cm 43.307 inch	
Rated detection distance	Minimum	285 mm	380 mm	475 mm	570 mm	665 mm	760 mm	855 mm	950 mm	1045 mm	with a standard reflection board
	Typical	11.220 inch	14.961 inch	18.701 inch	22.441 inch	26.181 inch	29.921 inch	33.661 inch	37.402 inch	41.142 inch	
	Maximum	300 mm	400 mm	500 mm	600 mm	700 mm	800 mm	900 mm	1000 mm	1100 mm	
Measuring tolerance	Typical	3%					5%				Reflection rate: 90 to 18%
	Maximum	30,000 lx									
Usable ambient brightness (Resistance to ambient light)*Remark	Brightness of sensor surface	30,000 lx									See the drawing below.
	Brightness of reflection surface	30,000 lx									

Remark: Install so that light from direct light sources does not enter the sensor (within 30° of the sensor light beam).

Items		Detection distance		Long type							Measured conditions
		120 cm 47.244 inch	130 cm 51.181 inch	140 cm 55.118 inch	150 cm 59.055 inch	160 cm 62.992 inch	170 cm 66.929 inch	180 cm 70.866 inch	190 cm 74.803 inch	200 cm 78.74 inch	
Rated detection distance	Minimum	1140 mm	1235 mm	1330 mm	1425 mm	1520 mm	1615 mm	1710 mm	1805 mm	1900 mm	with a standard reflection board
	Typical	44.882 inch	48.622 inch	52.362 inch	56.102 inch	59.842 inch	63.583 inch	67.323 inch	71.063 inch	74.803 inch	
	Maximum	1200 mm	1300 mm	1400 mm	1500 mm	1600 mm	1700 mm	1800 mm	1900 mm	2000 mm	
Measuring tolerance	Typical	5%	10%				15%				Reflection rate: 90 to 18%
	Maximum	30,000 lx									
Usable ambient brightness (Resistance to ambient light)*Remark	Brightness of sensor surface	30,000 lx									See the drawing below.
	Brightness of reflection surface	30,000 lx									

Remark: Install so that light from direct light sources does not enter the sensor (within 30° of the sensor light beam).

- For short type: 100 mm 3.937 inch square area, 90% reflection rate.
- For middle type: 200 mm 7.874 inch square area, 90% reflection rate.
- For long type: 500 mm 19.685 inch square area, 90% reflection rate.

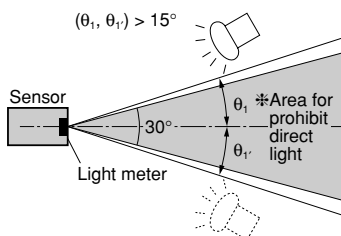
Notes: 1. Detecting an object within the maximum preset detection distance.

$$2. \text{Distance deviation} = \frac{a-b}{a} \times 100 (\%)$$

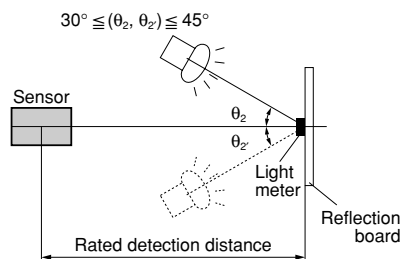
a: detection distance of standard detection target with reflectance of 90%.

b: detection distance of standard detection target with reflectance of 18%.

## [Brightness of sensor surface]



## [Brightness of reflection surface]



Note: Light from direct light sources (sunlight, strobe light, inverter illumination, reflected light from glass or mirrors etc.) that enters the sensor from within the prohibited range can cause the sensor to operate erroneously.

## 2. Absolute maximum rating (Measuring condition: ambient temp.: 25°C 77°F)

Items	Type	Built-in oscillation circuit type		External triggering type	
		DC 5 V type	Free power supply type	DC 5 V type	Free power supply type
Power supply voltage		-0.3 to 8 V DC	-0.3 to 30 V DC	-0.3 to 8 V DC	-0.3 to 30 V DC
Output dielectric strength		30 V		30 V	
Output flow current		100 mA		10 mA	
Usable ambient temperature		-25 to +75°C +5 to +131°F (No freezing)		-25 to +75°C +5 to +131°F (No freezing)	
Storage temperature		-30 to +85°C -4 to +176°F		-30 to +85°C -4 to +176°F	

## 3. Electrical characteristics (Measuring conditions: ambient temp.: 25°C 77°F; operating voltage =5 V DC)

### 1) Built-in oscillation circuit type

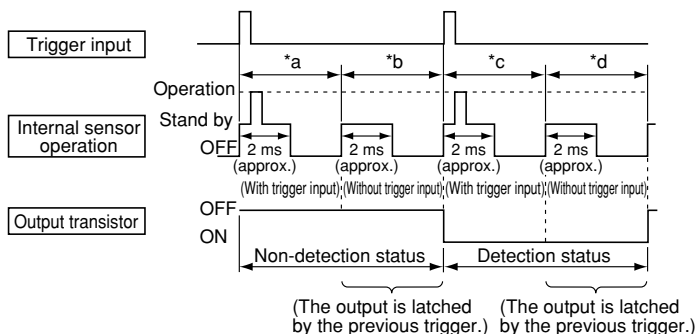
Items		Symbol	Short type	Middle type	Long type	Measured conditions
Rated operating voltage		Minimum Typical Maximum	Vdd	DC 5V type: 4.5V Free-ranging power type: 6.5V — DC 5V type: 6.5V Free-ranging power type: 27V		
Average current consumption (Iout = 0 mA)	No detection	Minimum Typical Maximum	It	— DC 5V type: 4.5mA Free-ranging power type: 5.6mA DC 5V type: 6.2mA Free-ranging power type: 7.8mA		
	Detection	Minimum Typical Maximum	It	— DC 5V type: 7.0mA Free-ranging power type: 9.1mA DC 5V type: 11.2mA Free-ranging power type: 14.2mA		
Measuring cycle		Minimum	T	8ms/cycle		
Output characteristics	Remain voltage	Maximum	Vr	1 V DC		I <sub>t</sub> = 100 mA
	Leakage current	Maximum	I <sub>l</sub>	3μA		V = 30V

### 2) External triggering type (trigger conditions: trigger pulse width = 20μs and trigger synchronization = 5ms)

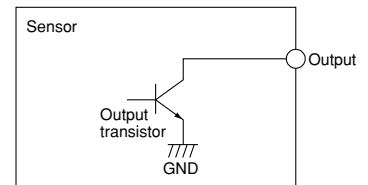
Items		Symbol	10 cm type	80 cm type	200 cm type	Measured conditions	
Rated operating voltage		Minimum Typical Maximum	Vdd	DC 5V type: 4.5V Free-ranging type: 6.5V — DC 5V type: 6.5V Free-ranging type: 27V			
Average current consumption	Without trigger input	Output OFF	Minimum Typical Maximum	I <sub>b</sub>	— DC 5V type: 0.1mA Free-ranging type: 1.0mA DC 5V type: 0.3mA Free-ranging type: 1.8mA		Notes: 1.*b
		Output ON	Minimum Typical Maximum	I <sub>d</sub>	— DC 5V type: 0.5mA Free-ranging type: 1.4mA DC 5V type: 3.4mA Free-ranging type: 4.5mA		Notes: 1.*d
	With trigger input	Output OFF	Minimum Typical Maximum	I <sub>a</sub>	— DC 5V type: 2.2mA Free-ranging type: 3.1mA DC 5V type: 6.2mA Free-ranging type: 7.2mA		Notes: 1.*a
		Output ON	Minimum Typical Maximum	I <sub>c</sub>	— DC 5V type: 2.4mA Free-ranging type: 3.3mA DC 5V type: 11.2mA Free-ranging type: 9.3mA		Notes: 1.*c
Measuring cycle (Trigger interval)		Minimum	T <sub>t</sub>	5ms/cycle			
External trigger	Pulse width	Minimum Maximum	T <sub>w</sub>	20μs 1/2T <sub>t</sub>		Half off the distance period	
	Level	Maximum Minimum	V <sub>TL</sub> V <sub>TH</sub>	0.8V 3V		Notes: 2	
Response performance: time from trigger pulse fall to detection output		Maximum	Tr	5ms			
Output characteristics	Remain voltage	Maximum	Vr	1 V DC		I = 10 mA	
	Leakage current	Maximum	I <sub>l</sub>	3μA		V = 30 mA	

Notes: 1. The ratio between the 4 operating modes (\*a to \*d) depends on the external trigger period and detector time, and the current consumption corresponds with this varying ratio.

Notes: 3. The output transistor is open collector. The output transistor is turned ON by the sensor detection status and turned OFF by its non-detection status.



Detection status:  
output transistor ON  
Non-detection status:  
output transistor OFF

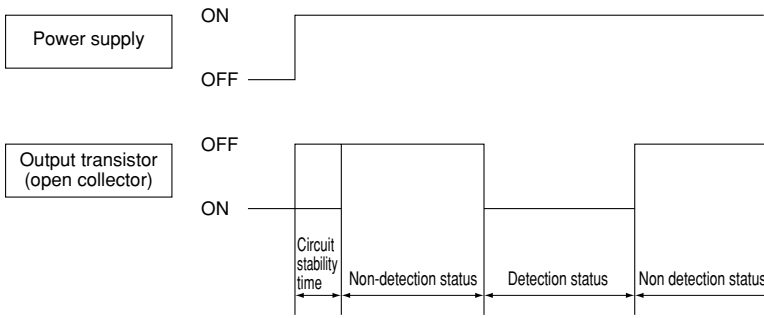


Notes: 2. A high level is established in the open state due to pull-up by the internal circuit. (Refer to the connector wiring diagram.)

# MA Motion Sensor (AMB)

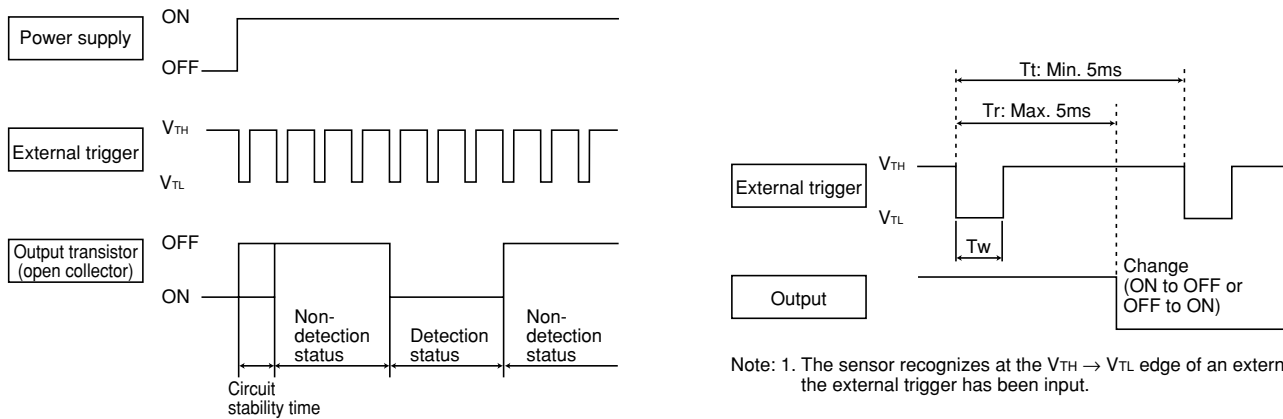
## TIMING CHART

### 1) Built-in oscillation circuit type



- Notes: 1. Circuit stability time : Max. 12 ms  
 2. During the time taken for the circuit to stabilize after the power is turned on, the ON/OFF status of the output transistor is not determined by whether the sensor is in the detection status or non-detection status.

### 2) External triggering type



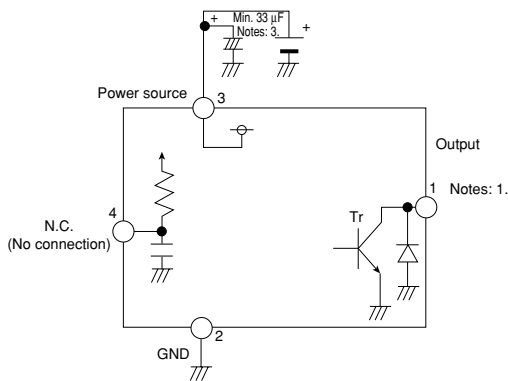
- Note: 1. The sensor recognizes at the  $V_{TH} \rightarrow V_{TL}$  edge of an external trigger that the external trigger has been input.

- Notes: 1. Circuit stability time : Max. 12 ms  
 2. During the time taken for the circuit to stabilize after the power is turned on, the ON/OFF status of the output transistor is not determined by whether the sensor is in the detection status or non-detection status.

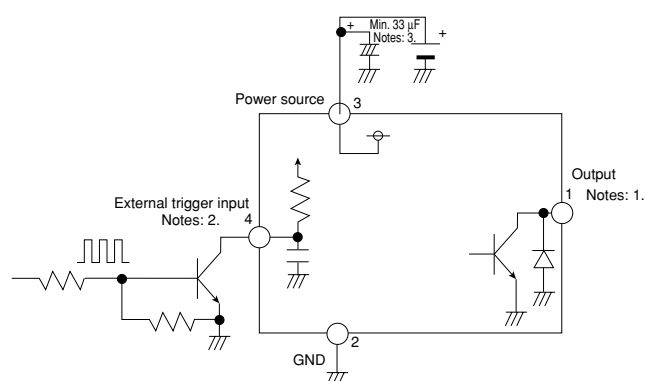
## HOW TO USE

### 1. Wiring diagram of connector

#### Built-in oscillation circuit type



#### External triggering type



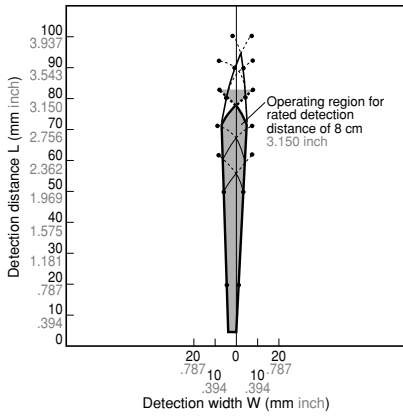
- Notes: 1. The output transistor has an open collector structure.  
 Detection status: Output transistor ON (connected to GND)  
 Non-detection status: Output transistor OFF (open state)  
 2. The status of the external trigger input is as follows:  
 Open at the high level  
 GND (less than 0.8V) at the low level  
 Under no circumstances must a high-level voltage be applied.  
 3. In the case of the external trigger type, to maintain the power supply noise performance, be certain to connect a capacitor (33µF or more) to the sensor power supply input terminal in order to stabilize the power supply voltage.

## REFERENCE DATA

### Operating region characteristics

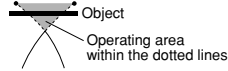
- How to interpret the graph

Example: Operating area of the Short Type with rated detection distance of 8 cm 3.150 inch.



Operating area within the dotted lines

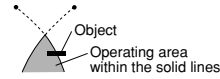
Objects that enter the entire area are detected.



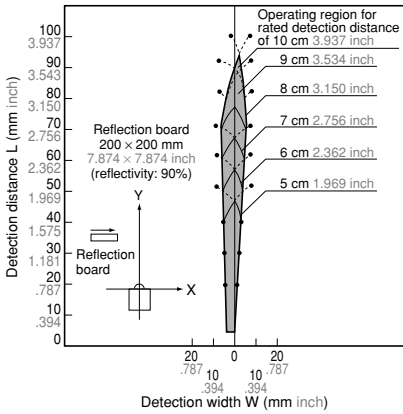
Note: If only part of the object is in the detection area, it is not detected.

Operating area within the solid lines

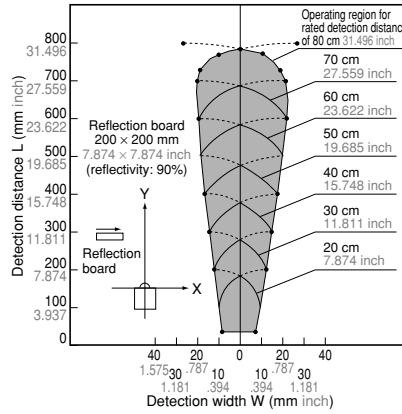
Objects that even partially enter the area are detected.



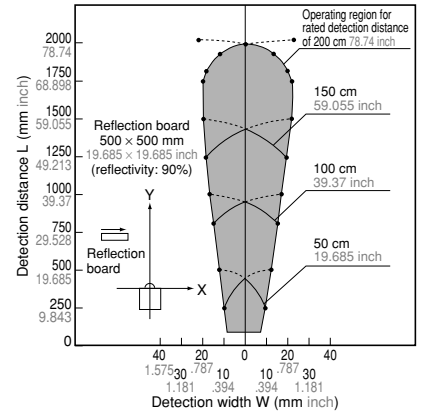
(1) Short type (AMB14□□□□□)



(2) Middle type (AMB24□□□□□)



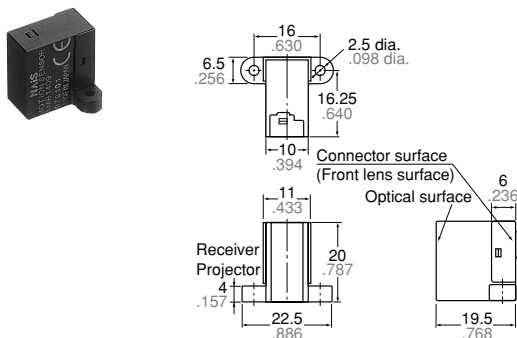
(3) Long type (AMB34□□□□□)



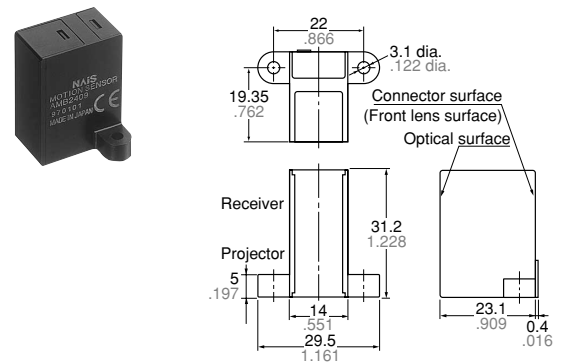
## DIMENSIONS (Common to the Built-in oscillation circuit type and External triggering type)

mm inch

1) Short type (H) (10 cm 3.937 inch)



2) Middle type (H) (80 cm 31.496 inch)

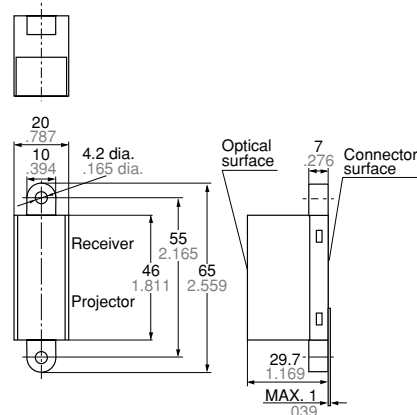
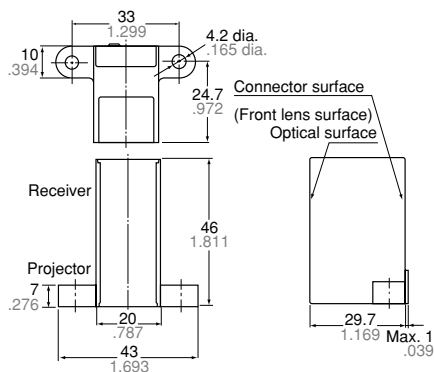


# MA Motion Sensor (AMB)

3) Long type (H) (200 cm 78.74 inch)

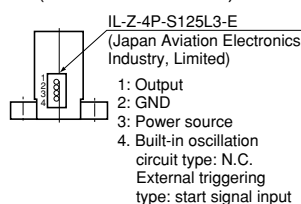
Long type (V) (200 cm 78.74 inch)

mm inch

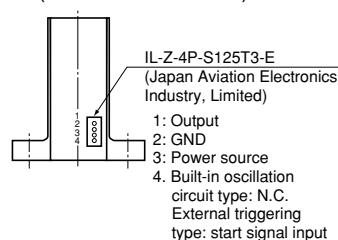


## WIRING DIAGRAM (Connector surface view)

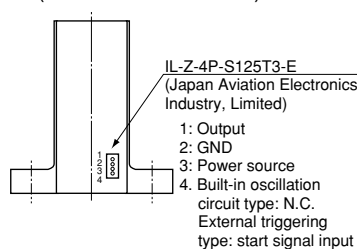
1) Short type (H)  
(10 cm 3.937 inch)



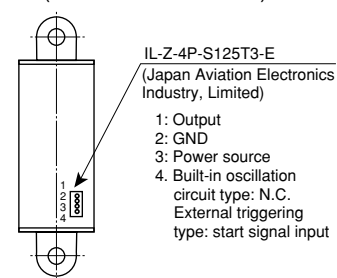
2) Middle type (H)  
(80 cm 31.496 inch)



3) Long type (H)  
(200 cm 78.740 inch)



4) Long type (V)  
(200 cm 78.740 inch)

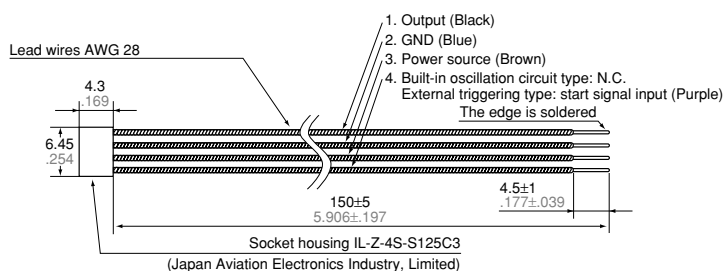


(Notes) Purchase the following connections:

1. Socket housing IL-Z-4S-S125C3(Japan Aviation Electronic Industry, Ltd.)
2. Lead wire (with metal connector at one end)

## OPTIONAL

1. Connector with cable  
AMB9001



Note: Mistaken cable assembly can cause damage to the internal circuits, so please check the power cord before switching ON. (Particular care must be taken as to avoid reverse connection of the power.)

## NOTES

### 1. Environment

- 1) Avoid using the sensor in environments containing excessive amounts of steam, dust, corrosive gas, or where organic solvents are present.
- 2) When the sensor is used in noisy environments, connect a capacitor (minimum 33  $\mu$ F) across its power input terminals.

### 2. Wiring

- 1) Check all wiring before applying power. Incorrect wiring may damage the internal circuit (in particular, check that the connection to the power supply is not reversed.)
- 2) Avoid excessive removing and replacing of the connector.

### 3. Detector surface (Optical surface)

- 1) Keep the detector surface clean. Excessive dust or dirt on the detector surface will deteriorate the sensing performance.
- 2) Do not allow condensation or freezing to occur on the surface of the sensor. If

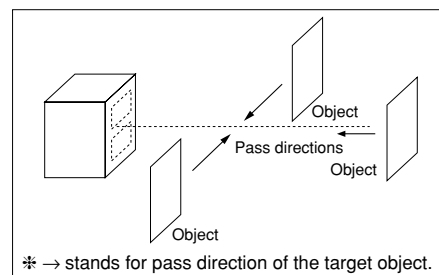
- condensation or freezing does occur at low temperatures, the sensor may not detect objects correctly.
- 3) This product is designed to detect the existence of human body. The sensor will not detect objects consisting of a low reflective material (e.g., an object coated with black rubber, etc.) or of a highly reflective material (e.g., mirror, glass, coated paper, etc.)
- 4) The front surface of the lens and case are made of polycarbonate resin and can withstand water, alcohol, oils, salts and weak acids. Other fluids such as alkalines, aromatic hydrocarbons and halogenated hydrocarbons may melt or swell the lens and case, please do not have such fluids touch the lens and case.
- 5) If you use the sensor with a cover or filter connected to the front of the sensor, the sensor may detect the cover itself, the detection distance can change, and unstable operation can result.
- 6) When using multiple sensors in paral-

lel, leave a space of at least 5 cm 1.969 inch between adjacent sensors, and confirm that they do not interfere with each other before use.

7) To protect the inner circuit, wiring should be max. 3 m 9.843 ft..

### 4. Recommended installation procedure

Install the photoelectric sensor so that it is orientated correctly in relation to the pass directions of the target objects as shown in the figure below.



For the general precautions, refer to the Notes for Motion Sensors on next page.