



MOTION SENSOR
(AREA REFLECTIVE TYPE)

MA MOTION
SENSOR Series

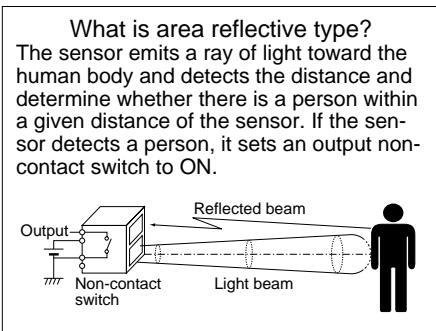
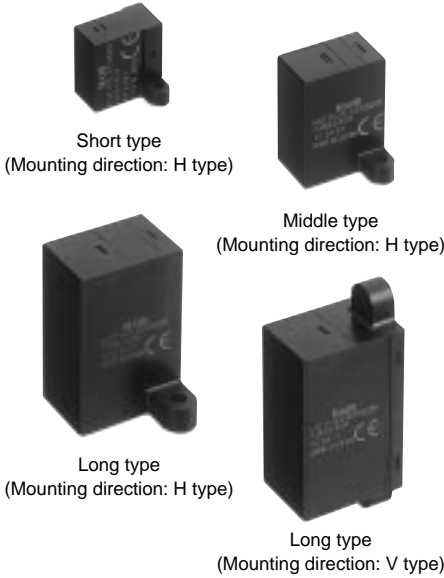
FEATURES

- 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.**
 - The DC 5V type (DC 4.5 to 6.5V)
 - 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**
 - Automatic lighting of wash basin units
 - Toilets
 - Automatic water flow from faucets
- Stores and financial instructions**
 - Automatic doors
 - Automatic lighting
 - Cash dispensing machines
 - Automatic teller machines
 - Visitor detecting sensors
- Amusement market**
 Automatic lighting for game display
- Medical field**
 Non-contact switch
- Others**
 - Automatic ticket gates
 - Seat-taking sensors
 - Golf cart collision prevention



ORDERING INFORMATION

AMB; MA Motion Sensor

Detection distance type (shape)

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

Triggering function

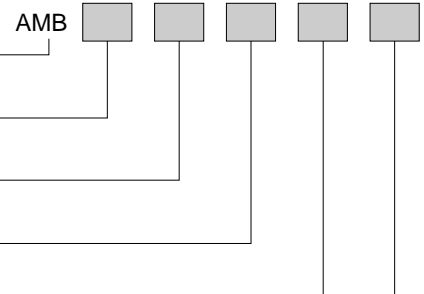
1: External triggering type 4: Built-in oscillation circuit type (Internal trigger)

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.	Detection distance																			
	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	
Short type	mm	—	—	5	6	7	8	9	10	—	—	—	—	—	—	—	—	—	—	—
	inch	—	—	1.969	2.362	2.756	3.150	3.543	3.937	—	—	—	—	—	—	—	—	—	—	—
Middle type	mm	20	30	40	50	60	70	80	—	—	—	—	—	—	—	—	—	—	—	—
	inch	7.874	11.811	15.748	19.685	23.622	27.559	31.496	—	—	—	—	—	—	—	—	—	—	—	—
Long type	mm	—	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
	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	78.74

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		
		6.5 to 27 V DC	10 cm 3.937 inch	AMB1409	AMB1109		
			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		
H type	Middle type	4.5 to 6.5 V DC	9 cm 3.543 inch	AMB140209	AMB110209	20 pcs.	200 pcs.
			10 cm 3.937 inch	AMB1402	AMB1102		
			20 cm 7.874 inch	AMB240902	AMB210902		
			30 cm 11.811 inch	AMB240903	AMB210903		
			40 cm 15.748 inch	AMB240904	AMB210904		
		6.5 to 27 V DC	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		
			20 cm 7.874 inch	AMB240202	AMB210202		
H type	Long type	4.5 to 6.5 V DC	30 cm 11.811 inch	AMB240203	AMB210203	20 pcs.	200 pcs.
			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		
			80 cm 31.496 inch	AMB2402	AMB2102		
			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.

MA Motion Sensor (AMB)

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		Short type*Remark 1						Measured conditions
				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 1.969 inch	60 mm 3.362 inch	70 mm 2.756 inch	80 mm 3.150 inch	90 mm 3.543 inch	100 mm 3.937 inch			
	Maximum	55 mm 2.165 inch	66 mm 2.598 inch	77 mm 3.031 inch	88 mm 3.465 inch	99 mm 3.898 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	
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 200 mm	11.220 inch 300 mm	14.961 inch 400 mm	18.701 inch 500 mm	22.441 inch 600 mm	26.181 inch 700 mm	29.921 inch 800 mm		
	Maximum	7.874 inch 210 mm 8.268 inch	11.811 inch 315 mm 12.402 inch	15.748 inch 420 mm 16.535 inch	19.685 inch 525 mm 20.669 inch	23.622 inch 630 mm 24.803 inch	27.559 inch 735 mm 28.937 inch	31.496 inch 840 mm 33.071 inch		
Measuring tolerance		Typical	3%			5%		10%	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 below.	
	Brightness of reflection surface	Maximum	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	
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 300 mm	14.961 inch 400 mm	18.701 inch 500 mm	22.441 inch 600 mm	26.181 inch 700 mm	29.921 inch 800 mm	33.661 inch 900 mm	37.402 inch 1000 mm	41.142 inch 1100 mm	
	Maximum	11.811 inch 315 mm 12.402 inch	15.748 inch 420 mm 16.535 inch	19.685 inch 525 mm 20.669 inch	23.622 inch 630 mm 24.803 inch	27.559 inch 735 mm 28.937 inch	31.496 inch 840 mm 33.071 inch	35.433 inch 945 mm 37.205 inch	39.37 inch 1050 mm 41.339 inch	43.307 inch 1155 mm 45.472 inch	
Measuring tolerance		Typical	3%				5%				Reflection rate: 90 to 18%
Usable ambient brightness (Resistance to ambient light)*Remark	Brightness of sensor surface	Maximum	30,000 lx							See the drawing below.	
	Brightness of reflection surface	Maximum	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	
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 1200 mm	48.622 inch 1300 mm	52.362 inch 1400 mm	56.102 inch 1500 mm	59.842 inch 1600 mm	63.583 inch 1700 mm	67.323 inch 1800 mm	71.063 inch 1900 mm	74.803 inch 2000 mm	
	Maximum	47.244 inch 1260 mm 49.606 inch	51.181 inch 1365 mm 53.740 inch	55.118 inch 1470 mm 57.874 inch	59.055 inch 1575 mm 62.008 inch	62.992 inch 1680 mm 66.142 inch	66.929 inch 1785 mm 70.275 inch	70.866 inch 1890 mm 74.409 inch	74.803 inch 1995 mm 78.543 inch	78.74 inch 2100 mm 82.677 inch	
Measuring tolerance		Typical	5%	10%			15%				Reflection rate: 90 to 18%
Usable ambient brightness (Resistance to ambient light)*Remark	Brightness of sensor surface	Maximum	30,000 lx							See the drawing below.	
	Brightness of reflection surface	Maximum	30,000 lx								

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

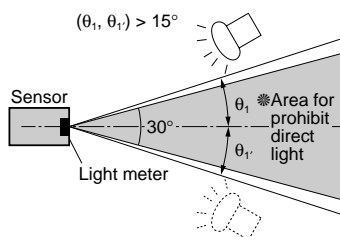
- For short type: 100 mm 3.937 inch square area, 90% reflection rate.
- For middle type: 200 mm 7.874 inch square area, 90% reflection rate.
- For long type: 500 mm 19.685 inch square area, 90% reflection rate.

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

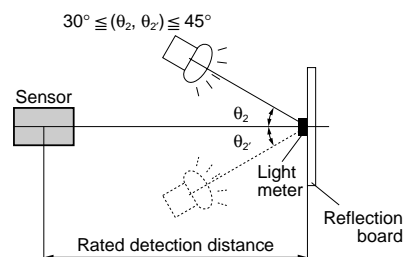
2. Distance deviation = $\frac{a-b}{a} \times 100$ (%)

- 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.

MA Motion Sensor (AMB)

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		It = 100 mA
	Leakage current	Maximum	Il	3μA		V = 30V

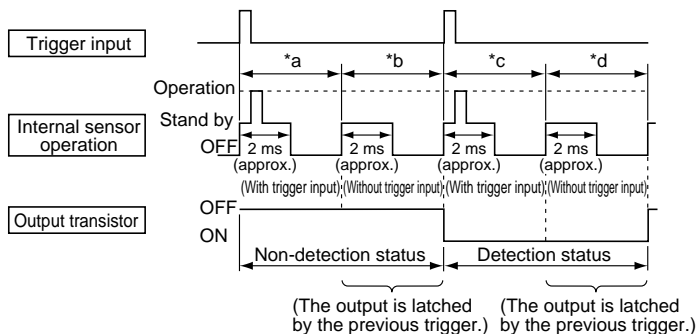
2) External triggering type (trigger conditions: trigger pulse width = 20μs and trigger synchronization = 5ms)

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	Ib	— 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	Id	— 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	Ia	— 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	Ic	— 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	Tt	5ms/cycle			
External trigger	Pulse width	Minimum Maximum	Tw	20μs 1/2Tt		Half off the distance period	
	Level	Minimum Maximum	VTL VTH	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	Il	3μA		V = 30 mA	

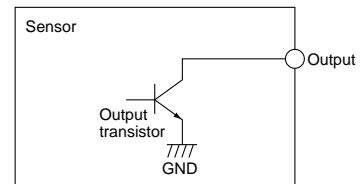
Notes: 1. The ratio between the 4 operating modes (*a to *d) depends on the external trigger period and detector time, and the current consumption corresponds with this varying ratio.

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.



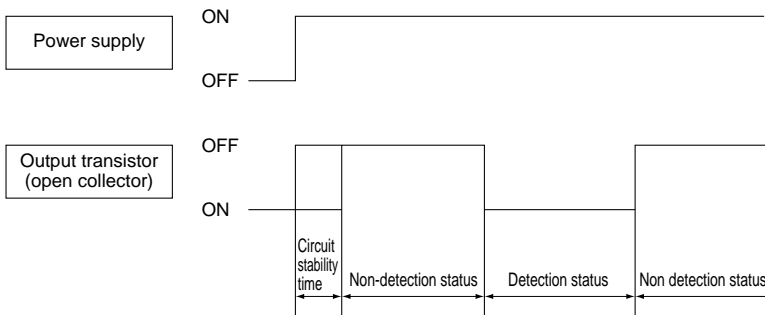
Detection status:
output transistor ON
Non-detection status:
output transistor OFF



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.)

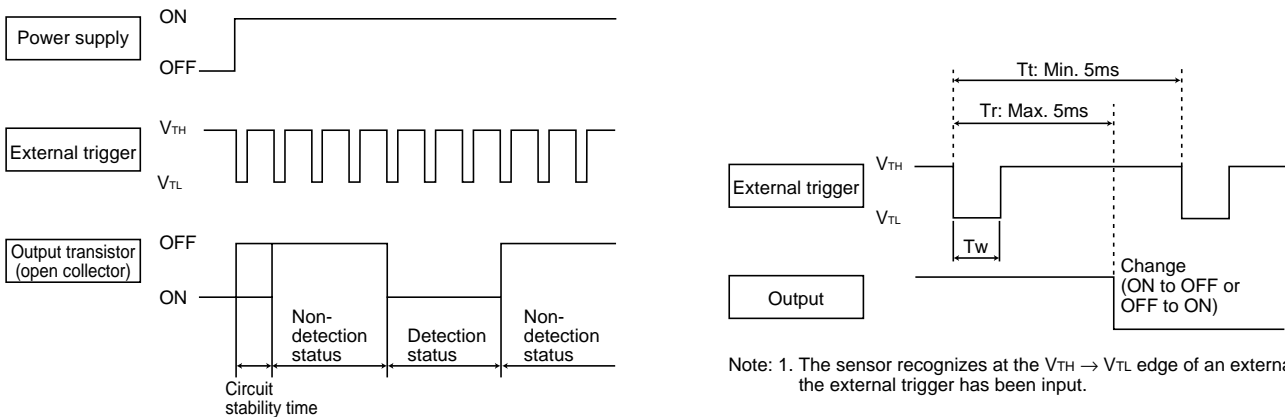
TIMING CHART

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

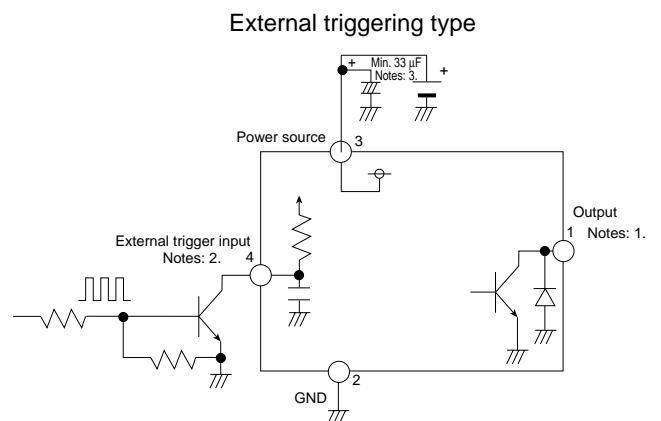
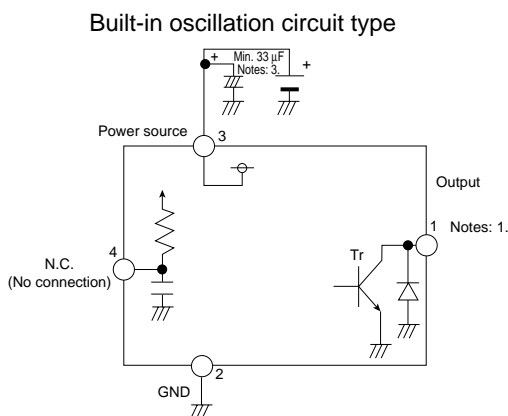


- Note: 1. The sensor recognizes at the $V_{TH} \rightarrow V_{TL}$ edge of an external trigger that the external trigger has been input.

- 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



- 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.

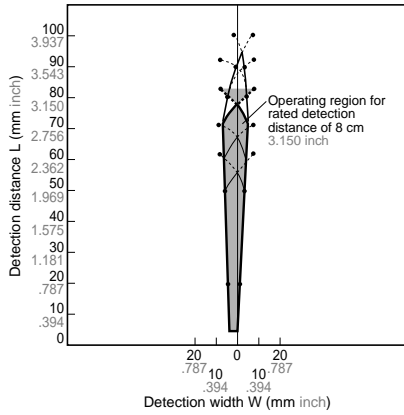
MA Motion Sensor (AMB)

REFERENCE DATA

Operating region characteristics

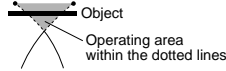
- How to interpret the graph

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



Operating area within the dotted lines

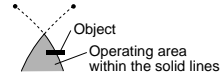
Objects that enter the entire area are detected.



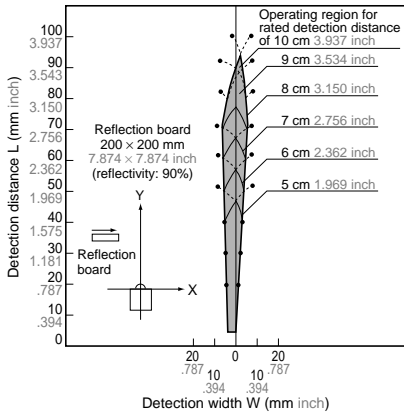
Note: If only part of the object is in the detection area, it is not detected.

Operating area within the solid lines

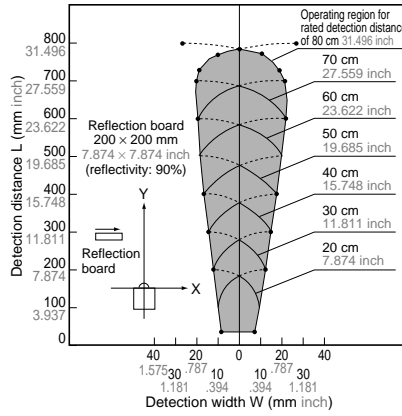
Objects that even partially enter the area are detected.



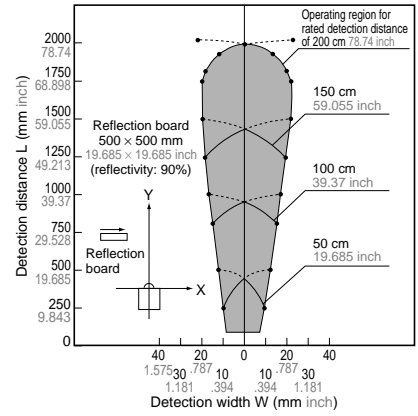
(1) Short type (AMB14□□□□□)



(2) Middle type (AMB24□□□□□)



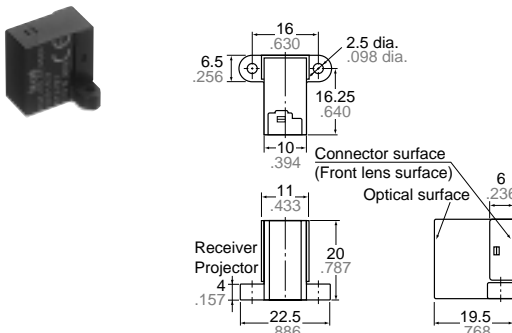
(3) Long type (AMB34□□□□□)



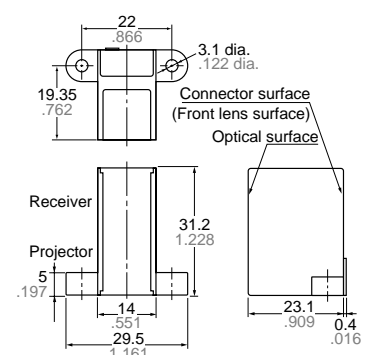
DIMENSIONS (Common to the Built-in oscillation circuit type and External triggering type)

mm inch

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



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

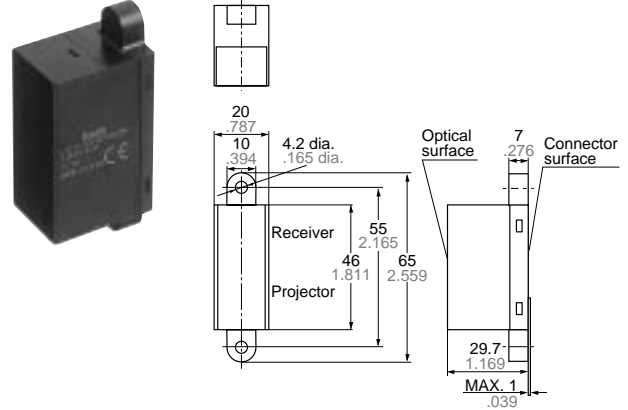
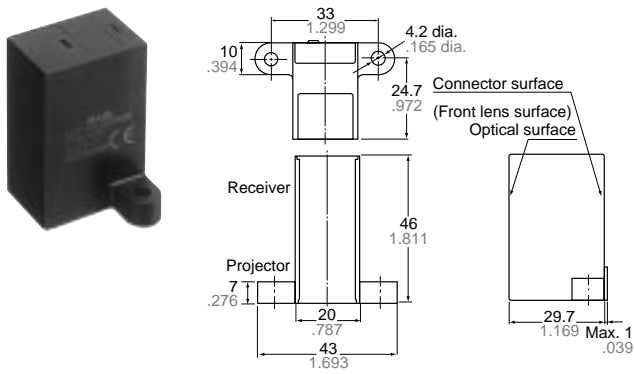


MA Motion Sensor (AMB)

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

Long type (V) (200 cm 78.74 inch)

mm inch



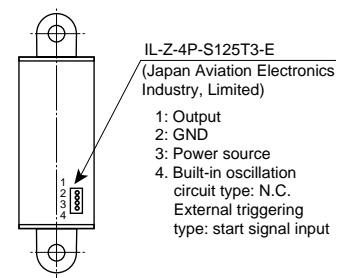
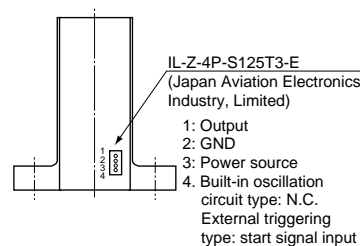
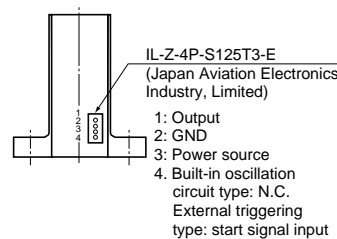
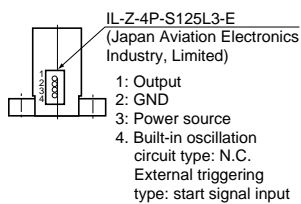
WIRING DIAGRAM (Connector surface view)

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)

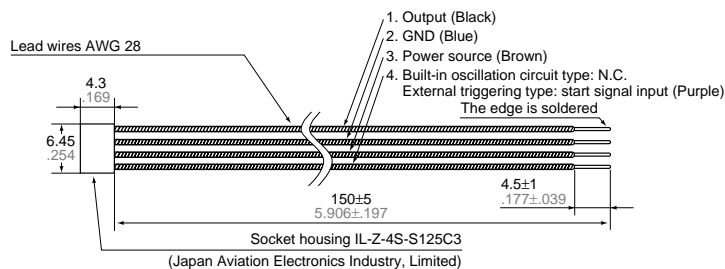


(Notes) Purchase the following connections:

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



mm inch

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 μ 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)

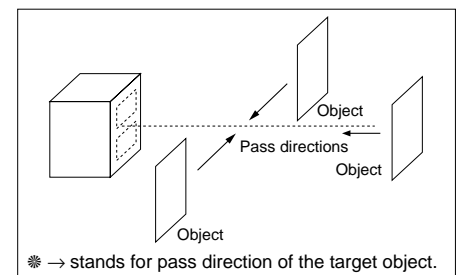
- 1) Keep the detector surface clean. Excessive dust or dirt on the detector surface will deteriorate the sensing performance.
- 2) Do not allow condensation or freezing to occur on the surface of the sensor. If

- 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 parallel, 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.



MA Motion Sensor (AMB)

NOTES FOR MOTION SENSOR

1. Ambient operating conditions

1) Temperature: Refer to the absolute maximum ratings for the temperature of each individual sensor.

2) Humidity: 15% to 85% RH (No freezing nor condensation at low temperature)

3) Atmospheric pressure: 86 to 106 kPa

4) The operating temperature and humidity ranges are the ranges in which the sensor can be continuously operated. They are not the guaranteed environmental withstanding values.

In general, degradation of electronic devices accelerates when they are operated under conditions of high temperature or high humidity. Before use, confirm the reliability of the sensors under the expected operating conditions.

5) The sensors do not have a water-proof or dust-proof construction.

Depending on the ambient operating conditions, some means of providing protection from water and dust and preventing the formation of ice and condensation must be provided prior to using the sensors. If a sensor is used with a cover installed, the initial detection performance specifications may not be able to be met. Confirm the operation under the actual operating conditions.

6) Take care to avoid exposing the sensors to heat, vibration or impact since malfunctioning may result.

2. Concerning external surge voltages

Since the internal circuitry may be destroyed if an external surge voltages is supplied, provide an element which will absorb the surges. The levels of the voltage surges which the sensor can withstand is given below.

MA motion sensors: 500 V ($\pm 1.2 \times 50\mu\text{s}$ unipolar full-wave voltage)

MP motion sensors: Within the supply voltage given in the absolute maximum ratings.

3. Concerning power supply-superimposed noise

1) Use a regulated power supply as the power supply. Otherwise, power supply-superimposed noise may cause the sensors to malfunction. The levels of noise which the sensor can withstand is given below.

MA motion sensors: ± 200 V (50ms, 1 μs wide square waves)

MP motion sensors: ± 20 V (50ms, 1 μs wide square waves)

2) To maintain the power supply noise performance, be certain to connect a capacitor (33 μF or more) to the sensor power supply input terminal in order to stabilize the power supply voltage.

4. Drop damage

If the sensor is dropped, damage can occur resulting in incorrect operation. If dropped, be sure to do a visual check of the exterior for noticeable damage and check the operation characteristics for faulty operation.

5. Concerning the circuit sides

Since the circuit sides given in this catalog are not protected in terms of circuit design, check out the performance and reliability of the circuits prior to using the sensors.

SAFETY PRECAUTIONS

Head the following precautions to prevent injury or accidents.

- Do not use these sensors under any circumstances in which the range of their ratings, environment conditions or other specifications are exceeded. Using the sensors in any way which causes their specifications to be exceeded may generate abnormally high levels of heat, emit smoke, etc., resulting in damage to the circuitry and possibly causing an accident.

- Before connecting a connector, check the pin layout by referring to the connector wiring diagram, specifications diagram, etc., and make sure that the connector is connected properly. Take note that mistakes made in connection may cause unforeseen problems in operation, generate abnormally high levels of heat, emit smoke, etc., resulting in damage to the circuitry.

- Do not use any motion sensor which has been disassembled or remodeled.
- Protection circuit recommended
The possible failure mode is either open or short of the output transistor. An excess heat is the cause for short mode failure. For any important and serious application in terms of safety, add protection circuit or any other protection method.