Panasonic
ideas for life

**MOTION SENSOR (AREA REFLECTIVE TYPE)**

# MA MOTION SENSOR Series

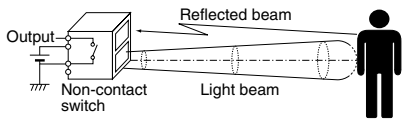
Short type
(Mounting direction: H type)

Middle type
(Mounting direction: H type)

Long type
(Mounting direction: H type)

Long type
(Mounting direction: V type)

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.




## 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

## ORDERING INFORMATION

AMB □ □ □ □ □

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)

| Detection distance \ Part No. | | 02 | 03 | 04 | 05 | 06 | 07 | 08 (Middle type does not need 08.) | 09 | 10 (Short type does not need 10.) | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 (Long type does not need 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 | 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 | | |
| | | | 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 | | |
| | | | 80 cm 31.496 inch | AMB2402 | AMB2102 | | |
| H type | Long type | 4.5 to 6.5 V DC | 30 cm 11.811 inch | AMB340903 | AMB310903 | 20 pcs. | 200 pcs. |
| | | | 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 | | | 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 | 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).

# 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 7.480 inch | 285 mm 11.220 inch | 380 mm 14.961 inch | 475 mm 18.701 inch | 570 mm 22.441 inch | 665 mm 26.181 inch | 760 mm 29.921 inch | with a standard reflection board |
| | | Typical | 200 mm 7.874 inch | 300 mm 11.811 inch | 400 mm 15.748 inch | 500 mm 19.685 inch | 600 mm 23.622 inch | 700 mm 27.559 inch | 800 mm 31.496 inch | |
| | | Maximum | 210 mm 8.268 inch | 315 mm 12.402 inch | 420 mm 16.535 inch | 525 mm 20.669 inch | 630 mm 24.803 inch | 735 mm 28.937 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 | 100 cm 39.37 inch | 110 cm 43.307 inch | |
| Rated detection distance | | Minimum | 285 mm 11.220 inch | 380 mm 14.961 inch | 475 mm 18.701 inch | 570 mm 22.441 inch | 665 mm 26.181 inch | 760 mm 29.921 inch | 855 mm 33.661 inch | 950 mm 37.402 inch | 1045 mm 41.142 inch | with a standard reflection board |
| | | Typical | 300 mm 11.811 inch | 400 mm 15.748 inch | 500 mm 19.685 inch | 600 mm 23.622 inch | 700 mm 27.559 inch | 800 mm 31.496 inch | 900 mm 34.433 inch | 1000 mm 39.37 inch | 1100 mm 43.307 inch | |
| | | Maximum | 315 mm 12.402 inch | 420 mm 16.535 inch | 525 mm 20.669 inch | 630 mm 24.803 inch | 735 mm 28.937 inch | 840 mm 33.071 inch | 945 mm 37.205 inch | 1050 mm 41.339 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 49.055 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 44.882 inch | 1235 mm 48.622 inch | 1330 mm 52.362 inch | 1425 mm 56.102 inch | 1520 mm 59.842 inch | 1615 mm 63.583 inch | 1710 mm 67.323 inch | 1805 mm 71.063 inch | 1900 mm 74.803 inch | with a standard reflection board |
| | | Typical | 1200 mm 47.244 inch | 1300 mm 51.181 inch | 1400 mm 55.118 inch | 1500 mm 59.055 inch | 1600 mm 62.992 inch | 1700 mm 66.929 inch | 1800 mm 70.866 inch | 1900 mm 74.803 inch | 2000 mm 78.74 inch | |
| | | Maximum | 1260 mm 49.606 inch | 1365 mm 53.740 inch | 1470 mm 57.874 inch | 1575 mm 62.008 inch | 1680 mm 66.142 inch | 1785 mm 70.275 inch | 1890 mm 74.409 inch | 1995 mm 78.543 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).

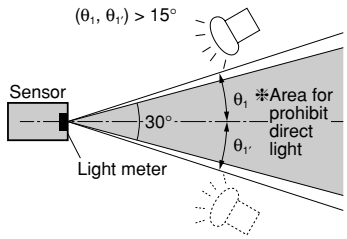
- For short type: 100 mm 3.937 inch square area, 90% reflection rate.
- For middle type: 200 mm 7.874 inch square area, 90% reflection rate.
- For long type: 500 mm 19.685 inch square area, 90% reflection rate.

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

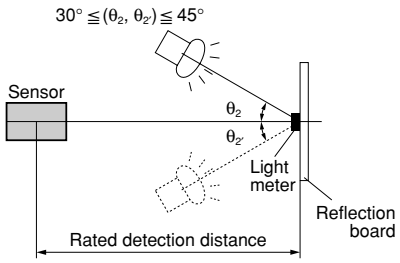
2. Distance deviation = $\frac{a-b}{a} \times 100$ (%)

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.

**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)

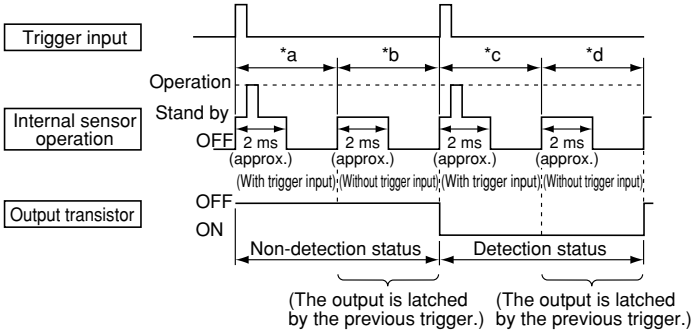
1) Built-in oscillation circuit type

| Items | | | Symbol | Short type | Middle type | Long type | Measured conditions |
|---|---|---|---|---|---|---|---|
| Rated operating voltage | | Minimum<br>Typical<br>Maximum | Vdd | DC 5V type: 4.5V Free-ranging power type: 6.5V<br>—<br>DC 5V type: 6.5V Free-ranging power type: 27V | | | |
| Average current consumption (Iout = 0 mA) | No detection | Minimum<br>Typical<br>Maximum | It | —<br>DC 5V type: 4.5mA Free-ranging power type: 5.6mA<br>DC 5V type: 6.2mA Free-ranging power type: 7.8mA | | | |
| | Detection | Minimum<br>Typical<br>Maximum | It | —<br>DC 5V type: 7.0mA Free-ranging power type: 9.1mA<br>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)

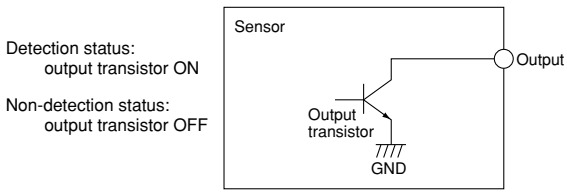
| Items | | | | Symbol | 10 cm type | 80 cm type | 200 cm type | Measured conditions |
|---|---|---|---|---|---|---|---|---|
| Rated operating voltage | | | Minimum<br>Typical<br>Maximum | Vdd | DC 5V type: 4.5V Free-ranging type: 6.5V<br>—<br>DC 5V type: 6.5V Free-ranging type: 27V | | | |
| Average current consumption | Without trigger input | Output OFF | Minimum<br>Typical<br>Maximum | Ib | —<br>DC 5V type: 0.1mA Free-ranging type: 1.0mA<br>DC 5V type: 0.3mA Free-ranging type: 1.8mA | | | Notes: 1.*b |
| | | Output ON | Minimum<br>Typical<br>Maximum | Id | —<br>DC 5V type: 0.5mA Free-ranging type: 1.4mA<br>DC 5V type: 3.4mA Free-ranging type: 4.5mA | | | Notes: 1.*d |
| | With trigger input | Output OFF | Minimum<br>Typical<br>Maximum | Ia | —<br>DC 5V type: 2.2mA Free-ranging type: 3.1mA<br>DC 5V type: 6.2mA Free-ranging type: 7.2mA | | | Notes: 1.*a |
| | | Output ON | Minimum<br>Typical<br>Maximum | Ic | —<br>DC 5V type: 2.4mA Free-ranging type: 3.3mA<br>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<br>Maximum | Tw | 20μs<br>1/2Tt | | | Half off the distance period |
| | Level | | Maximum<br>Minimum | $V_{TL}$<br>$V_{TH}$ | 0.8V<br>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.



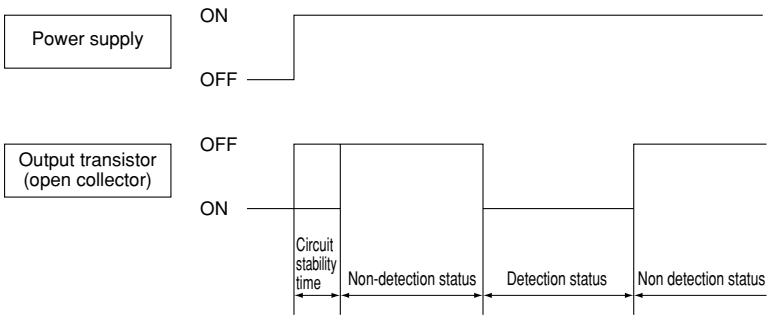

Notes: 2. A high level is established in the open state due to pull-up by the internal circuit. (Refer to the connector wiring diagram.)

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.



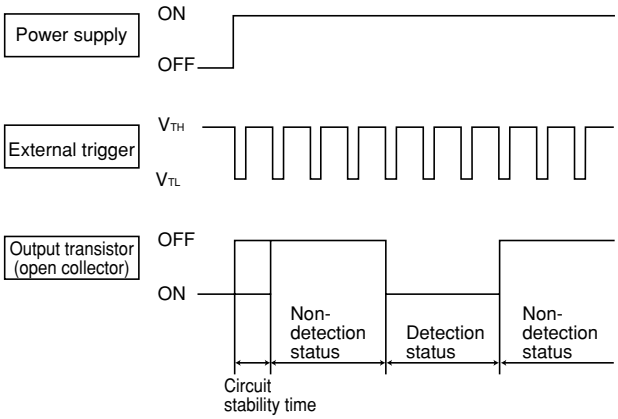
# TIMING CHART

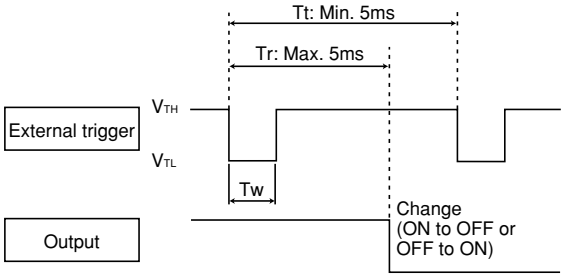
1) Built-in oscillation circuit type




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



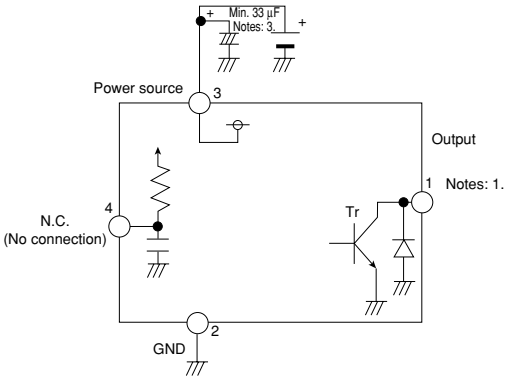

Notes: 1. Circuit stability time : Max. 12 ms
2. During the time taken for the circuit to stabilize after the power is turned on, the ON/OFF status of the output transistor is not determined by whether the sensor is in the detection status or non-detection status.

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

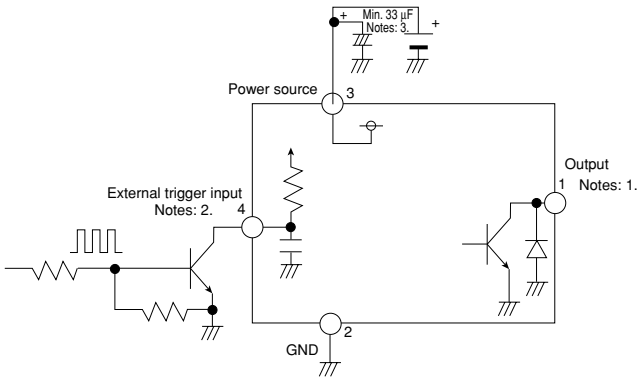
# HOW TO USE

### 1. Wiring diagram of connector

Built-in oscillation circuit type




External triggering type



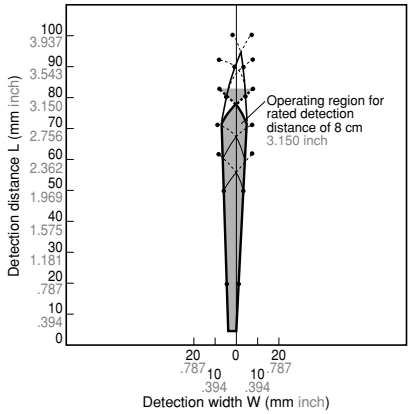

Notes: 1. The output transistor has an open collector structure.
Detection status: Output transistor ON (connected to GND)
Non-detection status: Output transistor OFF (open state)
2. The status of the external trigger input is as follows:
Open at the high level
GND (less than 0.8V) at the low level
Under 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**

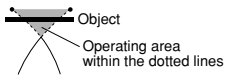
• How to interpret the graph

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




Operating area within the dotted lines

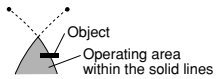
Objects that enter the entire area are detected.



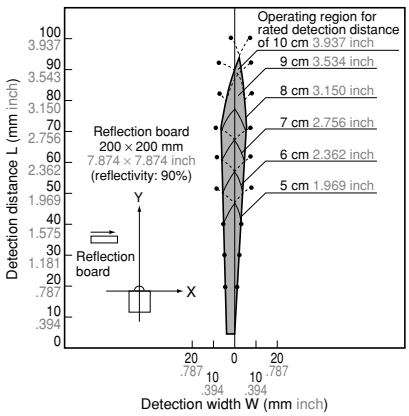

Note: If only part of the object is in the detection area, it is not detected.

Operating area within the solid lines

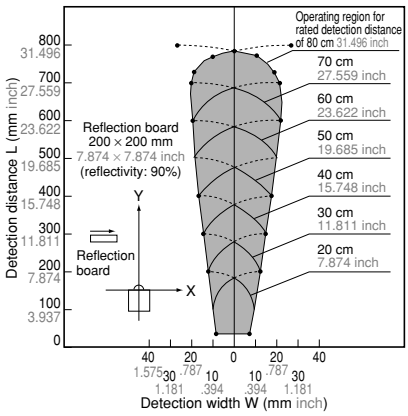
Objects that even partially enter the area are detected.



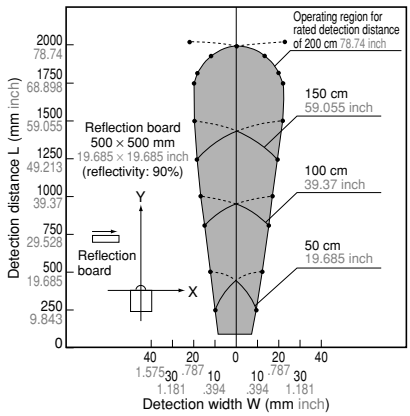

**(1) Short type (AMB14□□□□□)**




**(2) Middle type (AMB24□□□□□)**



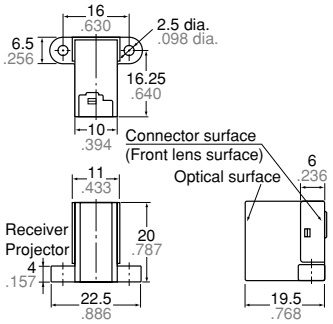

**(3) Long type (AMB34□□□□□)**



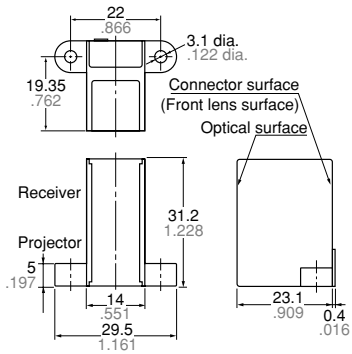

# DIMENSIONS (Common to the Built-in oscillation circuit type and External triggering type)

mm inch

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

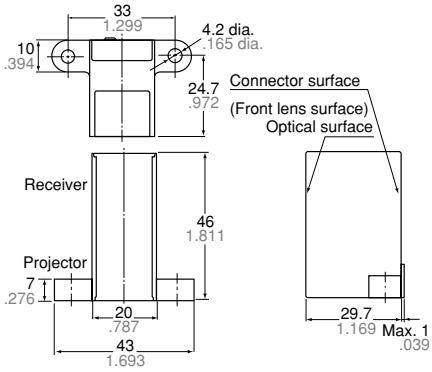



2) Middle type (H) (80 cm 31.496 inch)



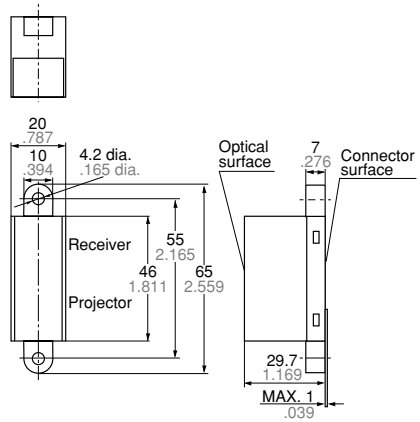
# MA Motion Sensor (AMB)

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



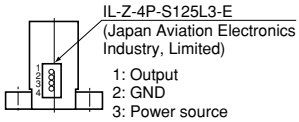

Long type (V) (200 cm 78.74 inch)

mm inch

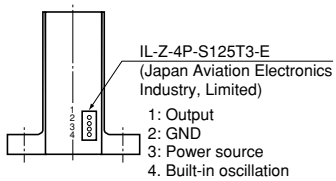



## WIRING DIAGRAM (Connector surface view)

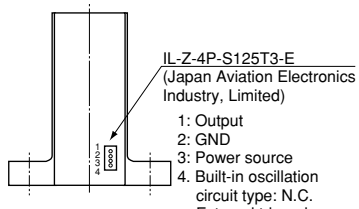
1) Short type (H)
(10 cm 3.937 inch)



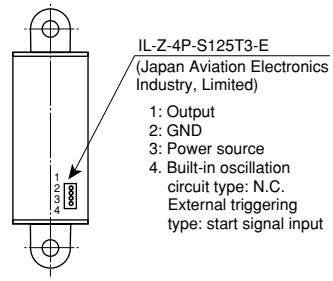

2) Middle type (H)
(80 cm 31.496 inch)




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




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

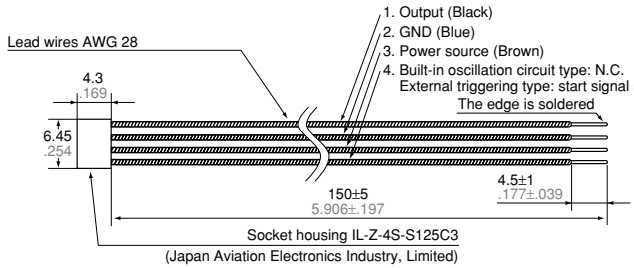



(Notes) Purchase the follwing connections:
1. Socket housing IL-Z-4S-S125C3(Japan Aviation Electronic Industry, Ltd.)
2. Lead wire (with metal connector at one end)

## 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 μF) 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.

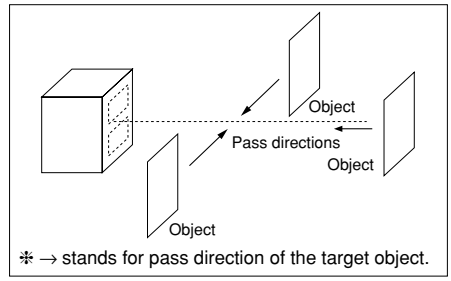
5) If you use the sensor with a cover or filter connected to the front of the sensor, the sensor may detect the cover itself, the detection distance can change, and unstable operation can result.

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.




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