

4.Characteristics

4-1 Detection Performance

Conditions for measuring: Ambient temperature=25°C(77°F) Operating voltage=5VDC

		Value	Conditions concerning the target
(Note 1) Detection Sensitivity		(Note 2) $\pm 0.22V \leq$	Supposing slight motion(Small movement) 1.The temperature difference between the target and the surroundings should be superior to 4°C.(7.2°F) 2.Movement speed: 0.5m/s 3.Target concept is human head (Size:Around 200×200mm) 4.Detection range is 3.5m.
Detection Area	Horizontal	$99^{\circ}(\pm 49.5^{\circ})$	Supposing walking(Big movement) 1.The temperature difference between the target and the surroundings should be superior to 4°C.(7.2°F) 2.Movement speed: 1.0m/s 3.Target concept is human body (Size:Around 700×250mm) 4.Detection range is 8.5m.
	Vertical	$99^{\circ}(\pm 49.5^{\circ})$	
	Detection zones	192	Supposing ultra slight motion (Tiny movement) 1.The temperature difference between the target and the surroundings should be superior to 4°C.(7.2°F) 2.Movement speed: 0.5m/s 3.Target concept is human hand (Size:Around 100×100mm) 4.Detection range is 2.5m.

Note 1:The detection range is depending on the target's speed and its temperature difference with the surroundings, detection can occur at a range superior to the value above.

Therefore, before using, please confirm the detection characteristics under the usage environment.

Note 2:The internal circuit threshold of the EKMC16 series corresponds to output offset voltage(Vos) $\pm 0.22V$.

The threshold of the EKMC46 series corresponds to half of this.

4-2 Maximum Rated Values

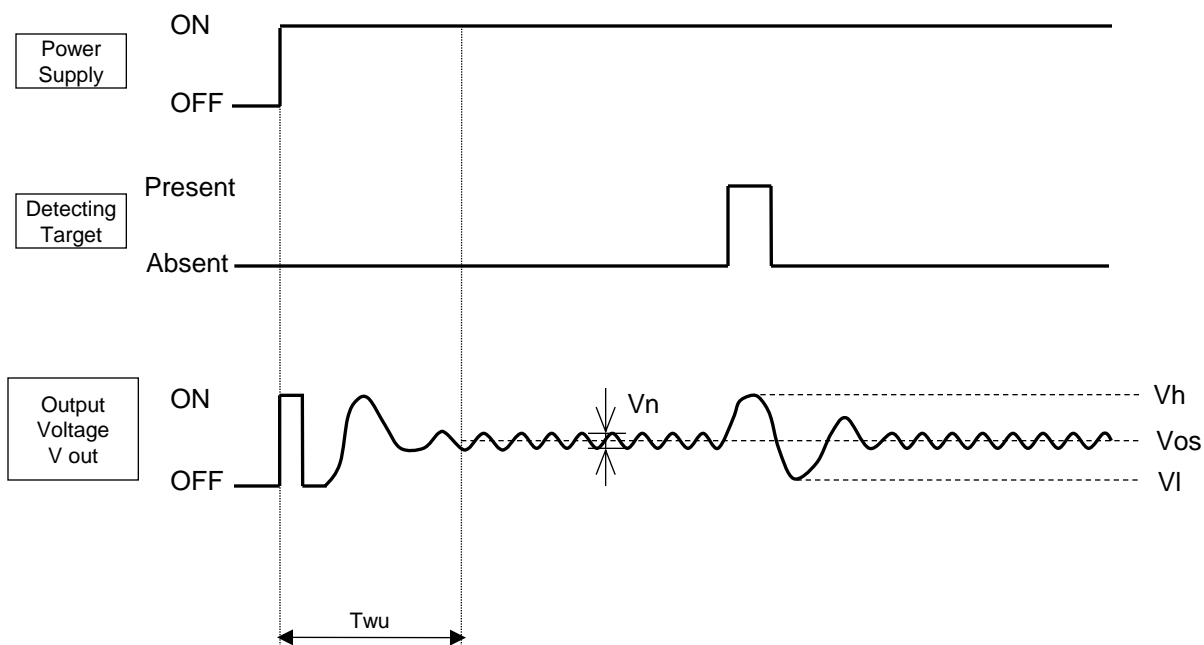
	Value	Unit
Power Supply Voltage	-0.3~7.0	VDC
Usable Ambient Temperature	-20~+60°C (-4~+140°F) Do not use in a freezing or condensation environment	
Storage Temperature	-20~+70°C (-4~+158°F)	

4-3 Electrical Characteristics

Conditions for Measuring: Ambient temperature=25°C(77°F)

Subject		Symbol	Min	Avg.	Max	Unit	Special mention
Operating Voltage		Vdd	3.0	—	5.5	VDC	—
Electrical Current Consumption		Iw	—	170	350	μA	Iout=0
Output Current		Iout	—	—	200	μA	—
Analog Output Saturated Voltage	High	Vh	1.9	—	—	V	—
	Low	VI	—	—	0.2	V	—
Output offset average voltage		Vos	1.0	1.1	1.2	V	Steady-state output voltage when not detecting.
Steady-state noise		Vn	—	80	150	mV	—
Circuit Stability Time (when voltage is applied)		Twu	—	—	30	s	—

4-4 Timing Chart



【Durations】

Twu:Circuit Stability Time=About 30s. (max.)

During this stage, the output's status is undefined (ON/OFF) and detection is therefore not guaranteed.

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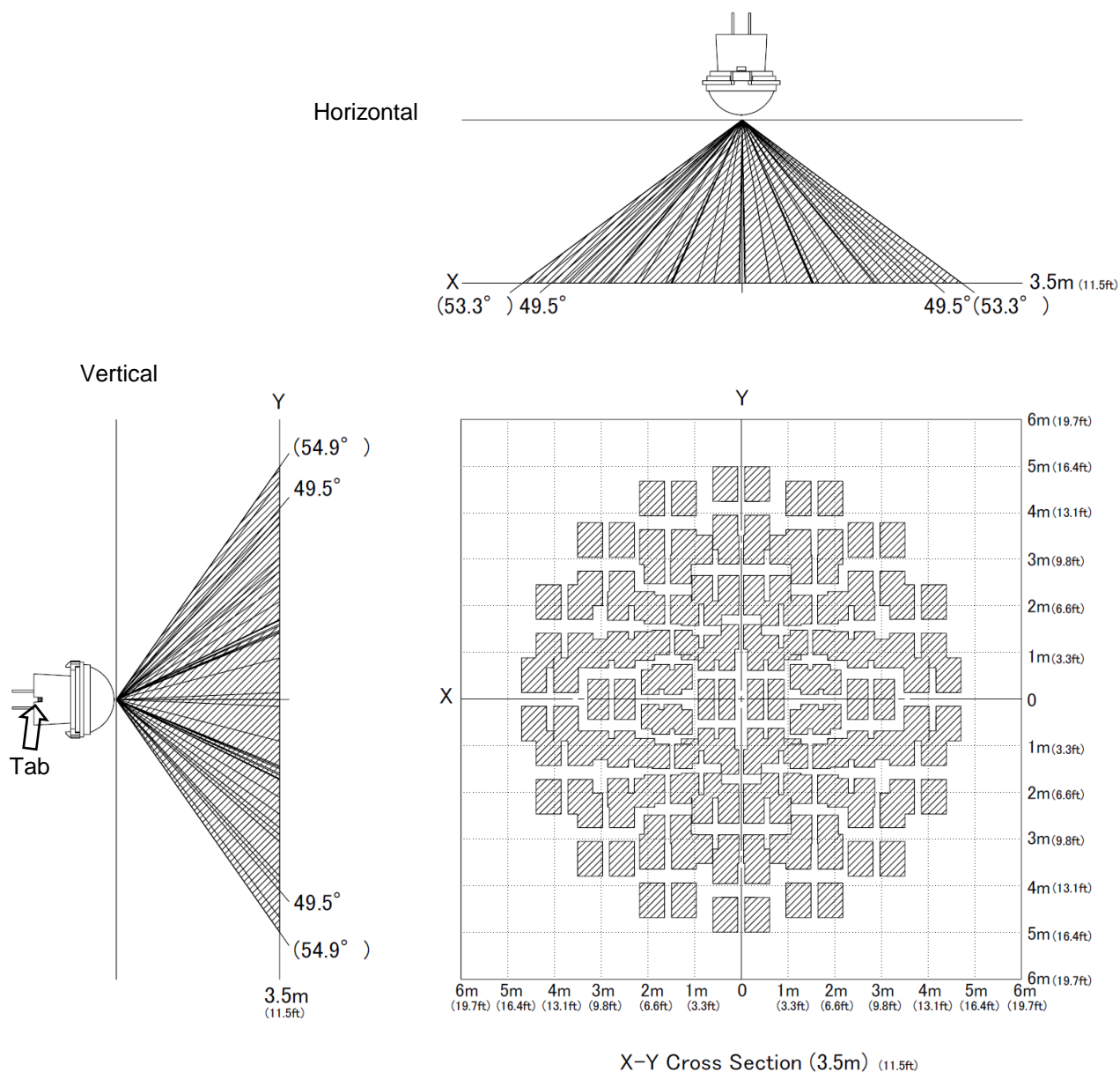
PIR MOTION SENSOR "PaPIRs" VZ series
PaPIRs+ model Ultra slight motion detection type
(170μA / Analog output)

Rev.

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4-5 Detection Area(Reference)

1) Supposing slight motion



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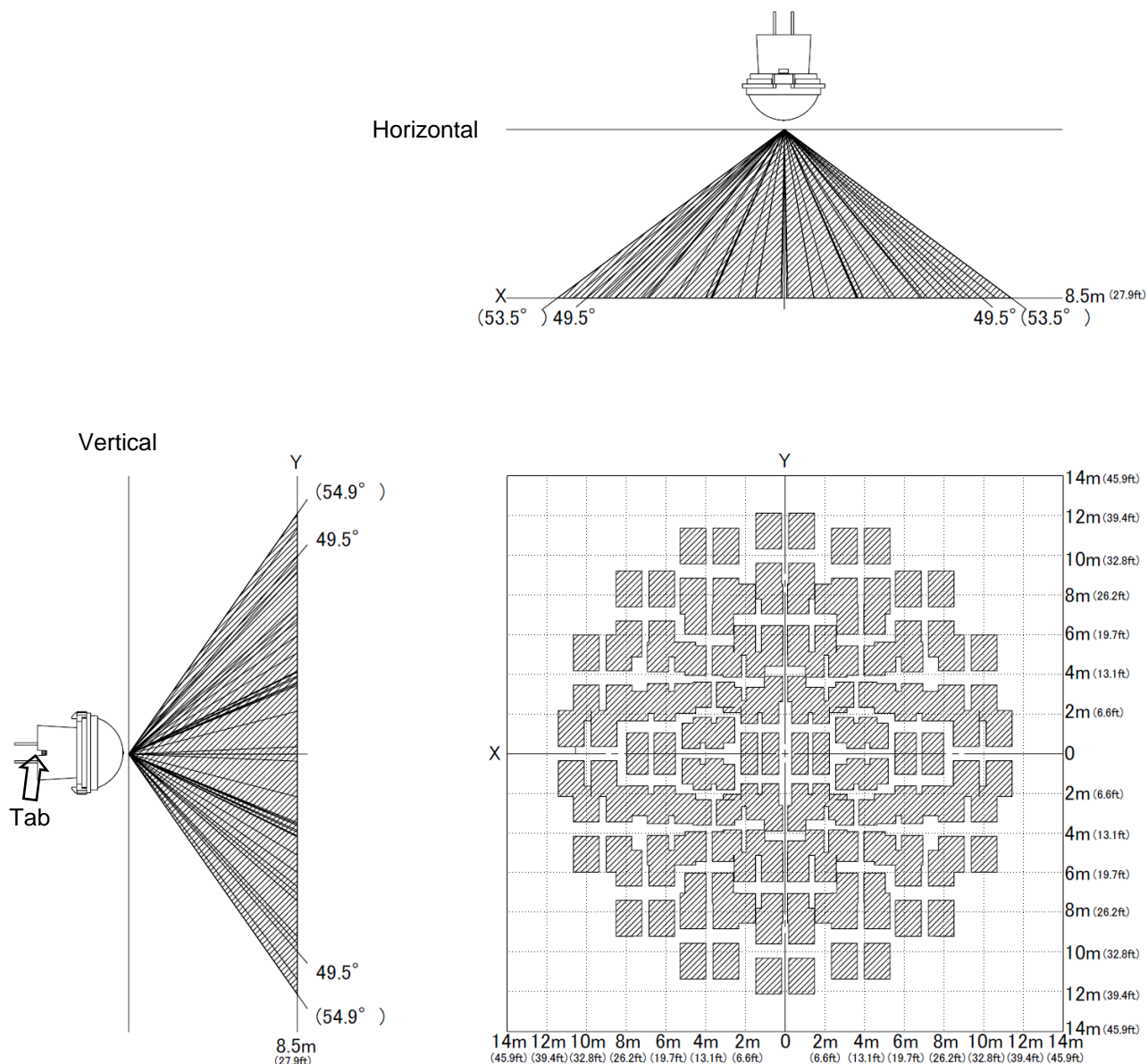
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2) Supposing walking



X-Y Cross Section (8.5m) (27.9ft)

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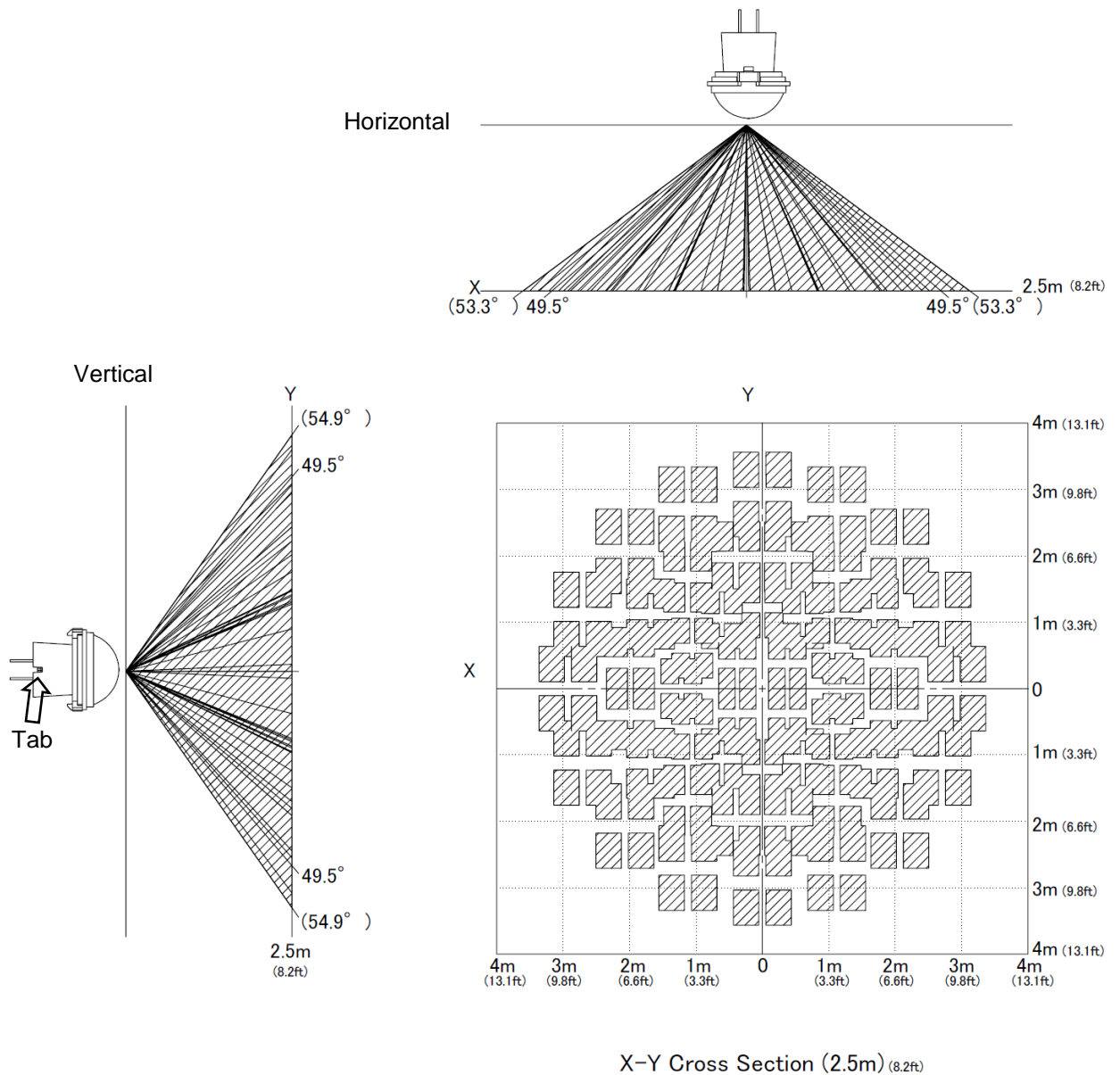
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3) Supposing ultra slight motion

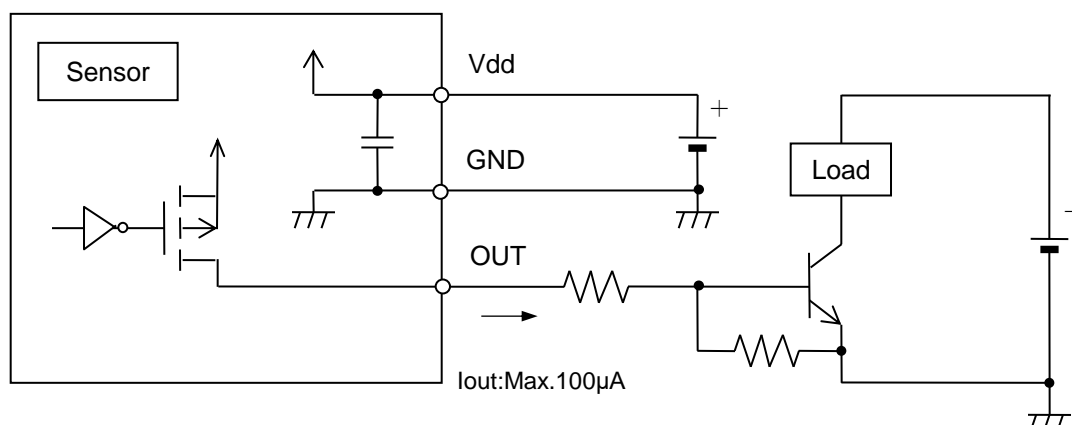


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4-6 Wiring Diagram

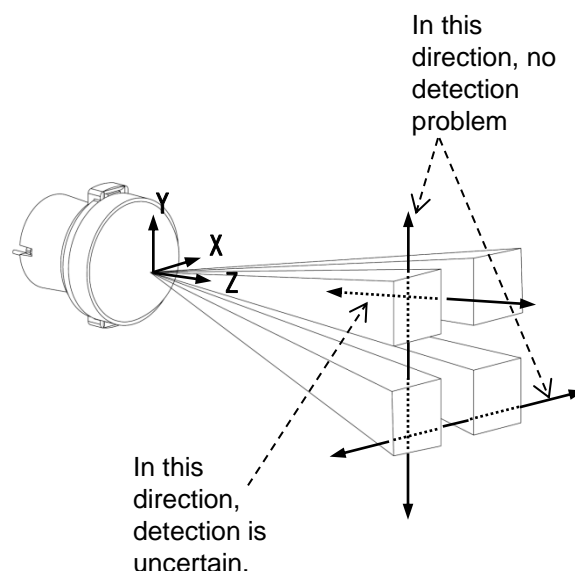


4-7 Mounting Directions

1) Direction

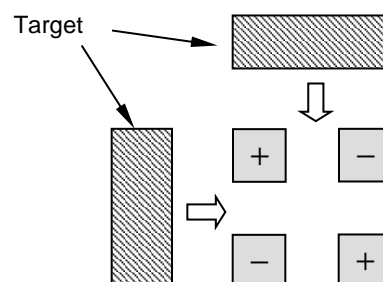
As detailed on the diagram, please install the sensor so that the expected trespassing direction corresponds to the axis X or axis Y.

In some cases, going back and forth towards the sensor (parallel movement to the axis Z), may not be detected.



2) Detection Area

As shown on the diagram, the detection zone is polarized. If a target enters the detection zones + and - at the same time, the signals are respectively cancelled and detection could become impossible at maximum detection range. (Please refer to the detection area diagram in 4-5 for details)



5. Safety Precautions

Head the following precautions to prevent injury or accidents.

- 1) Do not use these sensors under any circumstance 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.
- 2) Our company is committed to making products of the highest quality and reliability. Nevertheless, all electrical components are subject to natural deterioration, and durability of a product will depend on the operating environment and conditions of use. Continued use after such deterioration could lead to overheating, smoke or fire. Always use the product in conjunction with proper fire-prevention, safety and maintenance measures to avoid accidents, reduction in product life expectancy or break-down.
- 3) Before connecting, check the pin layout by referring to the connector wiring diagram, specifications diagram, etc., to verify that the connector is connected properly.
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.
- 4) Do not use any motion sensor which has been disassembled or remodeled.
- 5) Failure modes of sensors include short-circuiting, open-circuiting and temperature rises. If this sensor is to be used in equipment where safety is a prime consideration, examine the possible effects of these failures on the equipment concerned, and ensure safety by providing protection circuits or protection devices.
Example :
 - Safety equipments and devices
 - Traffic signals
 - Burglar and disaster prevention

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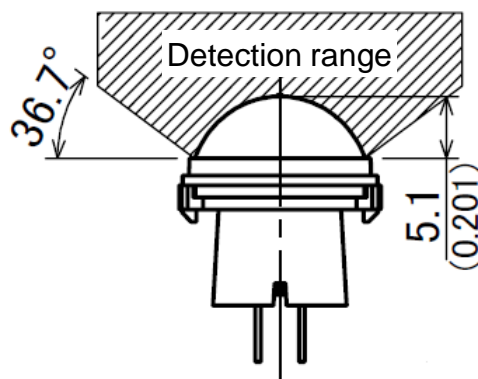
TITLE	SPECIFICATION	PAGE 9 / 12
<p data-bbox="244 219 564 253"><u>6.Operating Precautions</u></p> <p data-bbox="280 300 517 333">6-1 Basic Principles</p> <p data-bbox="296 365 1461 492">PaPIRs is a pyroelectric infrared sensor that detects variations in infrared rays. However, it may not detect in the following cases: lack of movement, no temperature change in the heat source. Besides, it could also detect the presence of heat sources other than a human body. Efficiency and reliability of the system may vary depending on actual operating conditions:</p> <ol style="list-style-type: none"> <li data-bbox="288 524 1043 557">1) Detecting heat sources other than the human body, such as: <ol style="list-style-type: none"> <li data-bbox="319 589 836 622">a) small animals entering the detection area <li data-bbox="319 622 1484 683">b) When a heat source for example sun light, incandescent lamp, car headlights etc, or strong light beam hit the sensor regardless inside or outside the detection area. <li data-bbox="319 683 1430 745">c) Sudden temperature change inside or around the detection area caused by hot or cold wind from HVAC, or vapor from the humidifier, etc. <li data-bbox="288 779 751 813">2) Difficulty in sensing the heat source <ol style="list-style-type: none"> <li data-bbox="319 844 1433 907">a) Glass, acrylic or similar materials standing between the target and the sensor may not allow a correct transmission of infrared rays, <li data-bbox="319 907 1305 969">b) Non-movement or quick movements of the heat source inside the detection area. (Please refer to 4-1 for details about movement speed.) <li data-bbox="288 1003 707 1037">3) Expansion of the detection area <p data-bbox="319 1068 1453 1131">In case of considerable difference in the ambient temperature and the human body temperature, detection area may be wider apart from the configured detection area.</p> <li data-bbox="288 1164 667 1198">4) Malfunction / Detection error <p data-bbox="319 1229 1469 1323">Unnecessary detection signal might be outputted, on rare occasions, come from sudden outbreak output due to the nature of pyro-electric element. When the application does not accept such condition strictly, please implement the countermeasure by introducing pulse count circuit etc.</p> <p data-bbox="280 1355 836 1388">6-2 Optimal Operating Environment Conditions</p> <ol style="list-style-type: none"> <li data-bbox="288 1420 1110 1453">1) Temperature : Please refer to the maximum rated values of 4-2. <li data-bbox="288 1453 1281 1487">2) Humidity Degree : 15~85% Rh (Avoid condensation or freezing of this product) <li data-bbox="288 1487 635 1520">3) Pressure : 86~106kPa <li data-bbox="288 1520 1161 1554">4) Overheating, oscillations, shocks can cause the sensor to malfunction. <li data-bbox="288 1554 1398 1637">5) This sensor is not waterproof or dustproof. Avoid use in environments subject to excessive moisture, condensation, frost, containing salt air or dust. <li data-bbox="288 1637 900 1671">6) Avoid use in environments with corrosive gases. 		
Catalog No. EKMC260981□K	Name PIR MOTION SENSOR “PaPIRs” VZ series PaPIRs+ model Ultra slight motion detection type (170μA / Analog output)	Rev. 1.0
<div> <div>Panasonic Corporation</div> <div>(DKC-D09-D01,24,1st)</div> </div>		

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<p>6-3 Handling Cautions</p> <ol style="list-style-type: none"> 1) Do not solder with a soldering iron above 350°C (662°F) , or for more than 3 seconds. This sensor should be hand soldered. 2) To maintain stability of the product, always mount on a printed circuit board. 3) Do not use liquids to wash the sensor. If washing fluid gets through the lens, it can reduce performance. 4) Do not use a sensor after it fell on the ground. 5) The sensor may be damaged by ± 200 volts of static electricity. Avoid direct hand contact with the pins and be very careful when operating the product. 6) When wiring the product, always use shielded cables and minimize the wiring length to prevent noise disturbances. 7) The inner circuit board could be destroyed by a voltage surge. Use of surge absorption elements is highly recommended. Surge resistance : below the power supply voltage value indicated in the maximum rated values section. 8) Please use a stabilized power supply. Power supply noise can cause operating errors. Noise resistance : $\pm 20V$ or less (Square waves with a width of 50ns or 1μs) To reduce the effect of power supply noise, install a capacitor on the sensor's power supply pin. 9) Operating errors can be caused by noise from static electricity, lightning, cell phone, amateur radio, broadcasting offices etc... 10) Detection performance can be reduced by dirt on the lens, please be careful. 11) The lens is made of soft materials (Polyethylene). Please avoid adding weight or impacts that might change its shape, causing operating errors or reduced performance. 12) Operating "temperatures" and "humidity level" are suggested to prolong usage. However, they do not guarantee durability or environmental resistance. Generally, high temperatures or high humidity levels will accelerate the deterioration of electrical components. Please consider both the planned usage and environment to determine the expected reliability and length of life of the product. 13) Do not attempt to clean this product with any detergent or solvent, such as benzene or alcohol, as these can cause shape or color alterations. 14) Avoid storage in high, low temperature or liquid environments. As well, avoid storage in environments containing corrosive gas, dust, salty air etc. It could cause performance deterioration and the sensor's main part or the metallic connectors could be damaged. 15) Storage conditions Temperature: +5 ~ +40°C (+41 ~ +104°F) Humidity: 30 ~ 75% Please use within 1 year after products delivery. 		
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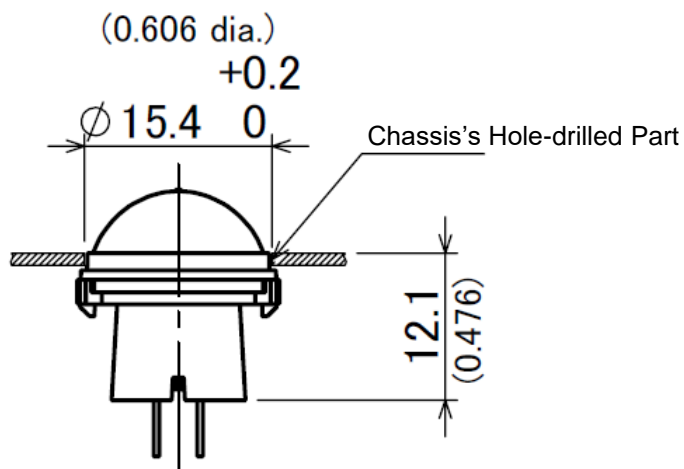
7. When Designing Your Product

To ensure that the sensor's detection capability corresponds to the specification, please install the sensor in such a way that the rounded top of the lens protrudes at least 5.1mm above the chassis (enclosure), see picture below.

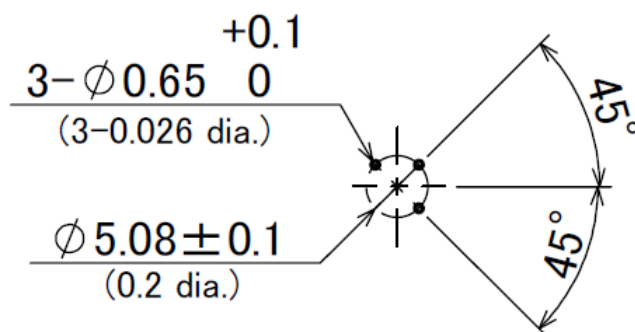
Furthermore the hole in the chassis (enclosure) needs to take the sensor's conical shape into consideration.



Recommended Hole Drilling Diameter



Recommended PCB Pattern Diagram



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<p data-bbox="248 230 464 264"><u>8.Special Notice</u></p> <p data-bbox="248 322 1441 383">As improvements are continually being made, the specifications or design of this product are subject to change without notice.</p> <p data-bbox="248 418 1461 512">Please strictly follow the “Safety Precautions” and “Operating Precautions” on the specifications sheet. Normal functioning cannot be expected if used in environments or conditions other than those specified above.</p> <p data-bbox="248 546 1203 607">We are deeply committed to providing the highest quality control for this product. Nevertheless:</p> <ol data-bbox="248 674 1469 1088" style="list-style-type: none"> 1) For issues not addressed above, we invite you to share your suggestions, or details about your company’s usage conditions, installation, specifications, needs of end users, and applications for this sensor. 2) To reduce the risk of harm caused by product failure to human life or assets, this product should always be used in conjunction with other safety measures, such as protective circuitry, double layered circuit boards, etc., and used within the guaranteed performance, efficiency or special characteristics values stated in the specification sheet. 3) This product is warranted for a period of one year, from date of delivery, applicable only if the product is used in accordance with the precautions mentioned above and the specifications sheet. We will replace or repair at the delivery location any malfunctioning or defective part or entire product if such defect or malfunction is caused by us. <p data-bbox="248 1153 1128 1184">However, the above warranty shall be void in the following circumstances:</p> <ol data-bbox="288 1218 1270 1408" style="list-style-type: none"> a) Damage caused to something else than the product itself. b) Damage or loss resulting during transportation, storage or handling after the date of supply. c) Phenomenon unforeseeable in the state of the technology as of the supply date. d) Damage caused by natural or unnatural events such as fire, earthquake, flood, or conflicts beyond our control. 		
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