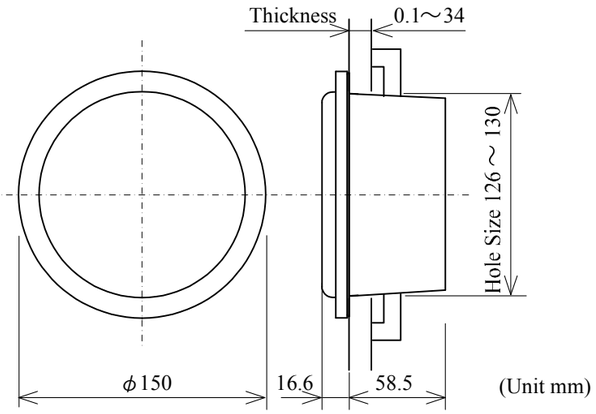
12. Technical Specifications

Model Name	HR85	
Detection Method	Active Infrared Reflection	
Installation Height	2.0 ～ 4.0m	
Mounting Height adjustment	2 ～ 3m / 2.5 ～ 4m (Dip Switch)	
Sensitivity adjustment	H / M / L / Snow (Dip Switch)	
Depth adjustment	Adjustable Angle	±10° (Area Adjusting Screw)
	Row	6R / 5R / 4R / 3R / 2R (Dip Switch)
Width adjustment	Adjustable Angle	±10° (1° Step)
	Adjustable Area 1	Wide / Narrow (Area Mask)
	Adjustable Area 2	Wideness (with Prism)
Self-Monitoring	ON / OFF (Dip Switch)	
1st Row Detection	Doorway / Normal (Dip Switch)	
Supply Voltage	AC/DC 12 ～ 24V ±10%	
Power Consumption	AC12V : 2.3VA Max DC12V : 120mA Max AC24V : 2.9VA Max DC24V : 60mA Max	
Output	Relay Contact 1a DC50V 0.1A（Resistance load）	
Output Holding Time	Approx. 0.5 seconds	
Presence Timer	2s / 10s / 60s / ∞ (Dip Switch) (Set to 2s / 10s / 60s : 6 rows set at the same time.) (Set to ∞: the period is infinity in case of the 1st, 2nd, 3rd Row, 2 seconds in case of the 4th, 5th, 6th Row.)	
Frequency	6 Frequencies (Dip Switch)	
LED Indicator	Power Indicator LED : <Power-ON> ON / <2nd Row Overlapped & Self-Monitoring> BLINK Operation Indicator LED : <Detection> ON / <2nd Row Overlapped & Self-Monitoring> BLINK Initialization Indicator LED : <During Initialization> ON / <Adjustment Mode> BLINK	
Operating Temperature	-20 ～ +60 ℃	
Weight	Approx. 310 g	

Please note that specifications are changed without notice.

13. External Dimensions



< Disclaimer > The manufacturer cannot be held responsible for below.
1. Misinterpretation of the installation instructions, miss connection, negligence, sensor modification and inappropriate installation.
2. Damage caused by inappropriate transportation.
3. Accidents or damages caused by fire, pollution, abnormal voltage, earthquake, thunderstorm, wind, floods and other acts of providence.
4. Losses of business profits, business interruptions, business information losses and other financial losses caused by using the sensor or malfunction of the sensor.
5. Amount of compensation beyond selling price in all cases.

HOTRON CO.,LTD.

Manufacturer
HOTRON CO.,LTD.
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MP-10169-A | '14. 03

HOTRON

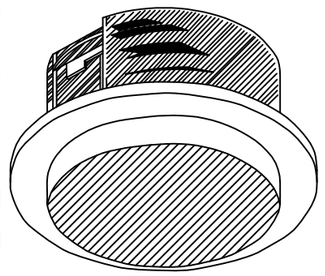
Motion & Presence Sensor

User Manual

HR85

<Ceiling Internal Mounting Type>

We would like to extend our thanks to you for purchasing this sensor.
Before install this sensor, please read the following instructions carefully.



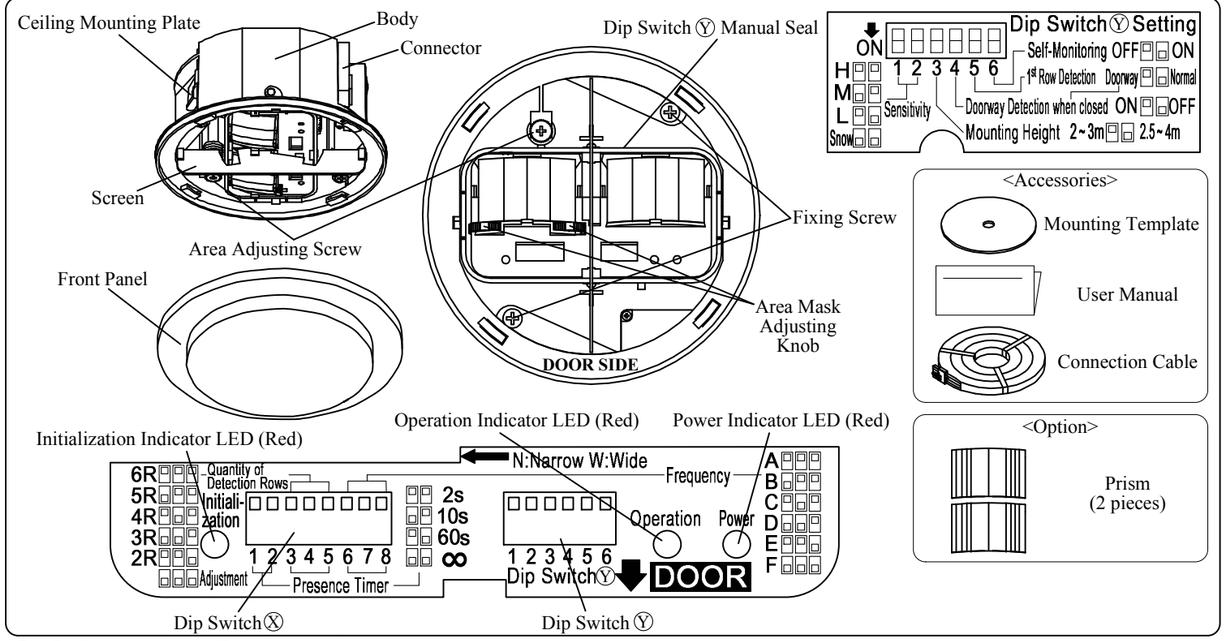
⚠WARNING Disregarding this symbol may result in serious injury or death.

⚠CAUTION Disregarding this symbol may result in injury or damage to equipment.

1. Features

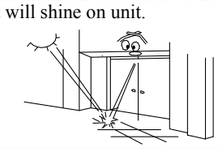
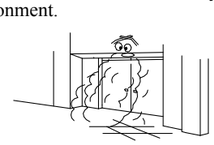
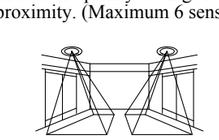
- The detection area is made up of 6 rows, each of which has 12 detection spots. This provides a very dense detection area of 72 detection spots.
- Using prisms makes it possible to detect wider area. (Mount less than 2.8m in case of using prisms.)
- Doorway detection can be set. Either doorway detecting mode or usual activation mode can be selected by Dip Switch.
  Under usual activation mode, detection area depth is enlarged.
- Angle activation area is adjustable by Area Adjusting Screw not by the way of click.
- The narrow/wide area can be adjusted by Area Mask.
- 6 frequency setting to avoid cross interference between sensors in close proximity.
- The sensor is microprocessor controlled, providing programmable Presence Timer. (2, 10, 60 seconds, ∞)
  If set to ∞, the period is infinity in case of the Inner 3 Row.
- AC/DC 12～24V is applied as Supply voltage.

2. Description

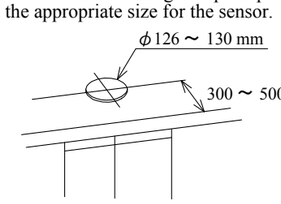
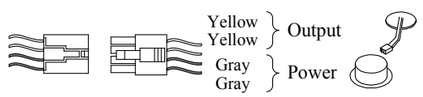
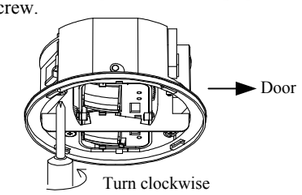
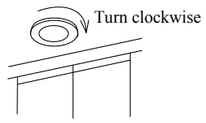


3. Mounting Precaution

⚠CAUTION Mount the sensor by following information below.

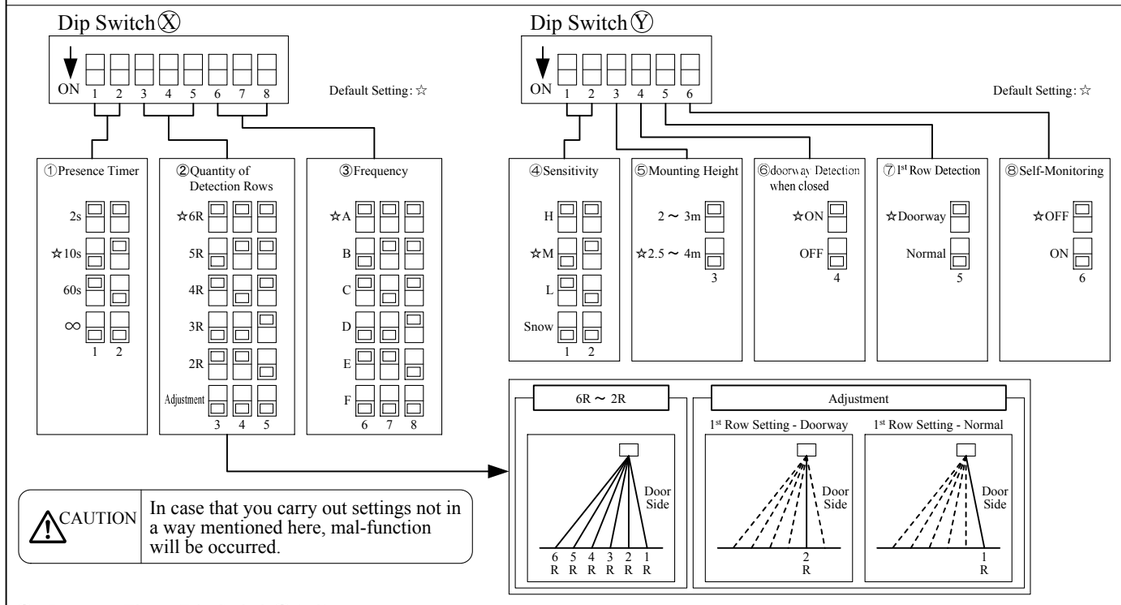
1. Mount between 2.0～4.0m. Mount less than 2.8m in case of using Prisms. 	*2.* Do not leave any objects which may move in the Detection Area. 	*3.* Do not mount where rain or snow can fall directly on unit.
4. Do not mount in an area where reflection of sunlight will shine on unit. 	*5.* Do not mount in humid or steamy environment. 	*6.* Use different frequency settings for sensors in close proximity. (Maximum 6 sensors) 

4. Mounting & Wiring Information

⚠WARNING Drilling may cause electric shock. Be careful of hidden wires inside the ceiling.		
1. Cut out the Mounting Template provided into the appropriate size for the sensor. 	2. Connect wires Connector of the Unit ⇐ Wiring Cable  Gray codes used for Power, yellow codes used for Output. Both do not have polarity of electrode.	3. Mount the body into the ceiling by Fixing Screw. 
4. Dip Switch Settings and adjustments. 5. Dip Switch Settings 6. Adjusting the detection area 7. Sensitivity Settings (Pre-caution on Power-ON)	5. Please see 8. Verification of Operation to confirm operations. ⚠CAUTION If there is the wiring inside the ceiling, install the body more than 1m away the wiring.	6. Attach the Front Panel to the body. 

5. Dip Switch Settings

Please read followings and understand the functions well to do the proper settings.



⚠CAUTION In case that you carry out settings not in a way mentioned here, mal-function will be occurred.

① Presence Timer (Dip Switch Ⓧ 1 · 2)
The sensor will detect a stationary object only for the time set by the Presence Timer. (2s, 10s, 60 seconds, ∞)
If set to ∞, the period is infinity in case of the 1st, 2nd, 3rd Row, 2 seconds in case of the 4th, 5th, 6th Row.

② Quantity of Detection Rows (Dip Switch Ⓧ 3 · 4 · 5)
Pattern Depth is adjustable by selecting 2R / 3R / 4R / 5R / 6R (all rows).
If set to <adjustment>, mode is special for adjusting and the inner row only is valid. (please see 6.2)

③ Frequency (Dip Switch Ⓧ 6 · 7 · 8)
When more than two sensors are installed in close proximity to each other, select different frequencies for each sensor from A to F to prevent interference.
If you used our H/MH/ML/L 4 frequency changed model, please be noted H coincides with A and MH with B and ML with C and L with D.

④ Sensitivity (Dip Switch Ⓨ 1 · 2)
Normal position is <M>. If the Door operates even though no person is in the detection area, please set to <L> (Sensitivity will be lower).
When there is an influence by snow or insects, set to <Snow>.

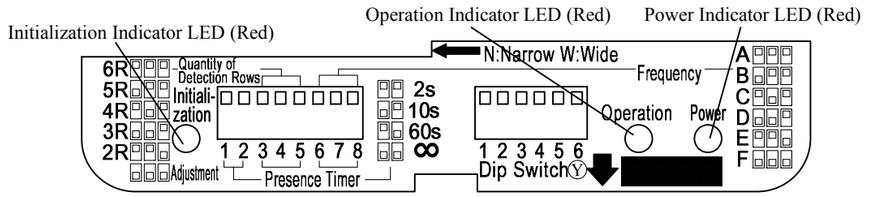
⑤ Mounting Height (Dip Switch Ⓨ 3)
Adjust the mounting height 2 ～ 3 m or 2.5 ～ 4 m.

⑥ Doorway Detection when closed (Dip Switch Ⓨ 4)
Doorway Detecting mode when 1st Row Setting (Dip Switch Ⓨ 5) is set to <Doorway>.
ON : Detects Doorway when the Door is closed. Normal position is <ON>
OFF : Not detect Doorway when the door is closed. Combined with other security systems, <OFF> is useful.

⑦ 1st Row Setting (Dip Switch Ⓨ 5)
Doorway : Detects Doorway realizing the Door movement. Normal position is <Doorway>.
Normal : Detects as an usual Activation Row. In this case, adjust the detection area of the 1st Row away from the door.

⑧ Self-Monitoring (Dip Switch Ⓨ 6)
Self diagnostic function can be selected.

10. Indicator Function



Initialization Indicator LED

	Initialization Indicator
During	ON
After	OFF
Adjusting Mode	Blink

Operation Indicator / Power Indicator LED

	Operation Indicator	Power Indicator
Pre-Power ON	OFF	OFF
Power ON	OFF	ON
Detecting	ON	ON
2nd Row Overlapped	Both Blink	
Self-Monitoring	Alternate Blink	

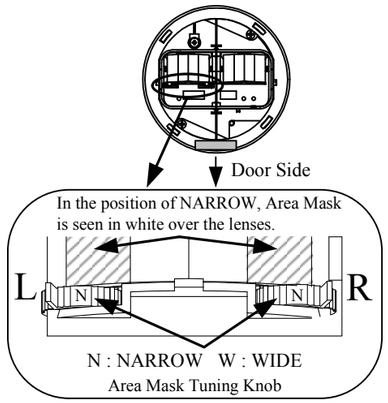
11. Trouble Shooting

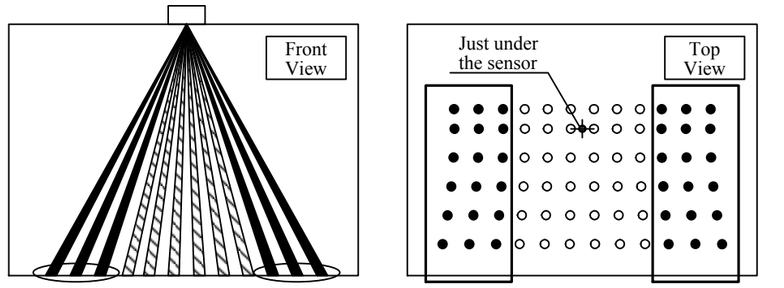
Problem	Cause	Solution
Door does not operate.	Sensor Connector.	Tighten connector or reconnect.
	Power Supply Voltage.	Apply proper voltage to the sensor.
Door operates intermittently.	Sensor is very dusty or covered with raindrops etc.	Clean the sensor. (Do not use thinner or alcohol to clean sensor.)
	Sensitivity is too low.	Increase sensitivity by adjusting <Dip Switch Ⓨ 1 · 2>.
	Detection area incorrect.	Adjust Dip Switch and Area Mask.
Door operates when no-one is present.	Moving objects in the detection area.	Adjust detection area or move away the moving object.
	Detection area too far from the Door, detecting people passing by.	Adjust Dip Switch and Area Mask.
	Sensitivity is too high.	Decrease sensitivity by adjusting <Dip Switch Ⓨ 1 · 2>.
	Another sensor is installed near by.	Ensure different frequency setting for each other.
	The condition of Detection Area is varying. *Dust / Dirty *Spread out / Remove a mat *Snow (footprints)	Detection State may continue during the time setting for presence detection (the Door remains open) and becomes normal afterward. Set the presence detection time shorter, re-set the power supply.

After rechecking, there is still a problem, please contact us or your dealer.

3. Area Mask

Detection Area can be adjusted using Area Mask.





Please turn Area Mask to stop in “click”.

7. Sensitivity Settings (Pre-caution on Power-ON)

⚠CAUTION	Before applying power, please check the wiring again and follow instructions below.

1 After installation of the sensor, please check sensitivity Dip Switch set to <M>
(Dip SwitchⓎ 1・2. Default is <M>.)

2 Please adjust the Mounting Height.
(Dip SwitchⓎ 3. Default is <2.5 ～ 4m>.)

⚠CAUTION	When the actual Mounting Height is 2.5 ～ 3m, either setting <2 ～ 3m> or <2.5 ～ 4m> can be selected. In this case, Default <2.5 ～ 4m> is recommended.

3 Sensitivity is adjusted automatically. Before applying power, please check no objects (stepladder, tools etc.) are left in the detection area.
After applying power, do not enter into the detection area within 10 seconds.
(If there is a person inside the detection area within the detection seconds, setting sensitivity cannot be made properly.)

Do not enter into the detection area within 10 seconds

Power ON → 10 seconds → Presence Detection

⚠CAUTION	If there is a moving object in the detection area after Power-ON, the sensor will not be in Presence Detection mode. After removing of the person or object, the sensor will be in Presence Detection mode in 7 seconds.
⚠CAUTION	When set to ∞, please be noted there would be a case the door remains open if the surface of the detection floor changed suddenly. In that case, please turn off the power and try again.
⚠CAUTION	While carrying out followings, please turn off the power. If you carry out followings when the power is ON, the door will remain open for the period of Presence detection time you set. And also the Initialization will start again. ・In case of alteration of Detection Area, or re-adjustment of Sensitivity. ・In case of laying or removing a cloth/resin mat in the Detection Area.

8. Verification of Operation

1. If mounting and various settings are completed, the power and confirm the performance of detection area.
2. If the door does not operate normally, turn off the power and re-set the detection area.
3. If the door does not function normally after the above procedure, adjust Dip Switch.
4. When adjusting the detection area or sensitivity by Dip Switch, turn off the power first.
When re-setting, turn on the power according to <7. Sensitivity Settings (Precaution on Power-ON)>.

How to set sensitivity :

(1) When the sensor does not detect a person in the detection area, adjust <Dip SwitchⓎ 1・2> (H) side.
(Sensitivity increases)

(2) When the sensor detects a person even if no one exists in the detection area, adjust <Dip SwitchⓎ 1・2> (L) side.
(Sensitivity decreases)

9. Self-Monitoring

Self-Monitoring means the sensor is equipped with microprocessor control function and continuously monitors itself.
When Self-Monitoring determines that the sensor has malfunctioned, Operation Indicator LED and Power Indicator LED will blink alternately with the door remained open. In this case, please replace the sensor immediately.
ON / OFF of Self-Monitoring can be set with Dip Switch.

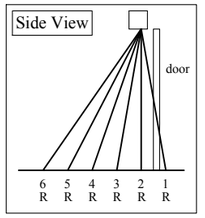
⚠CAUTION	If the floor of Detection Area is specular surface, Self-Monitoring may function. In that case, set Self-Monitoring <OFF> with Dip Switch.

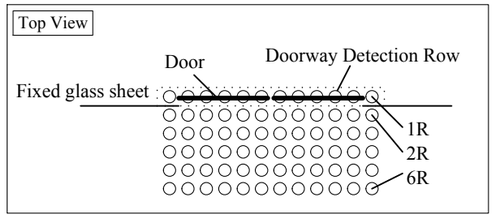
5.1 1st Row Detection (Doorway Detection Mode)

When the 1st Row is used for the detection of doorway, please set Dip Switch as follows.

Dip SwitchⓎ 5 1st Row Detection
Doorway

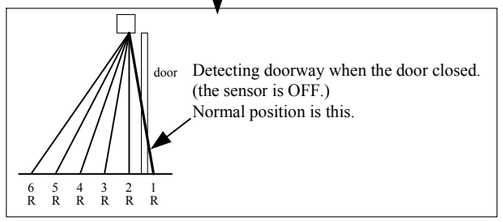
Even after setting 1st Row to <Doorway>, if the door still closes, set the detection area as follows not to detect the door.



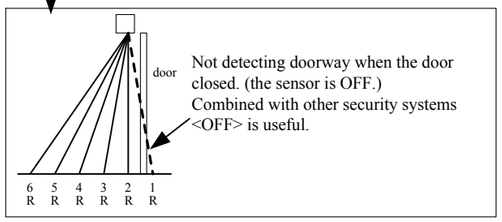


Dip SwitchⓎ 4 Doorway Detection when closed
ON OFF

Doorway detection function can be selected as follows.



Detecting doorway when the door closed. (the sensor is OFF.)
Normal position is this.

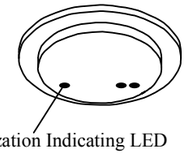


Not detecting doorway when the door closed. (the sensor is OFF.)
Combined with other security systems <OFF> is useful.

Initialization

Initialization of a sensor (door learning process) is necessary for doorway detection. This process is made every time of Power-ON, it is completed after the sensor has learned the movement of persons 2 or 3 times. The state of Initialization process is confirmed with Initialization Indicating LED.

Under Initialization : Initialization Indicating LED flashes. Not detecting doorway.
After Initialization : Initialization Indicating LED does not flash. Detecting doorway.



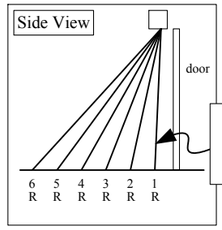
The 2nd ～ 6th Row except Doorway Row are not necessary for the Initialization process above, and they operate in the same manner of usual reflection sensors.

⚠CAUTION	If only the detection of Doorway Row occurs, and has judged malfunction of the door, re-start the initialization process. Initialization Indicating LED starts flashing when initialization.

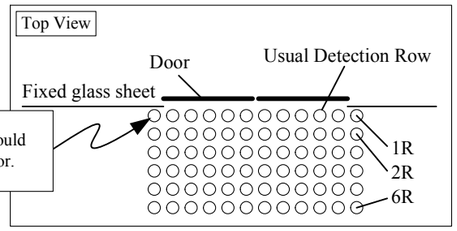
5.2 1st Row Detection (Usual Mode)

When the 1st Row is used as the usual detection, and activation area (detection depth area) is to be enlarged, please set detection area as follows.

Dip SwitchⓎ 5 1st Row Detection
Normal



The 1st Row detection area should not be overlapped with the door.



Initialization process is not necessary in this case. Initialization Indicating LED does not flash even after Power-ON.

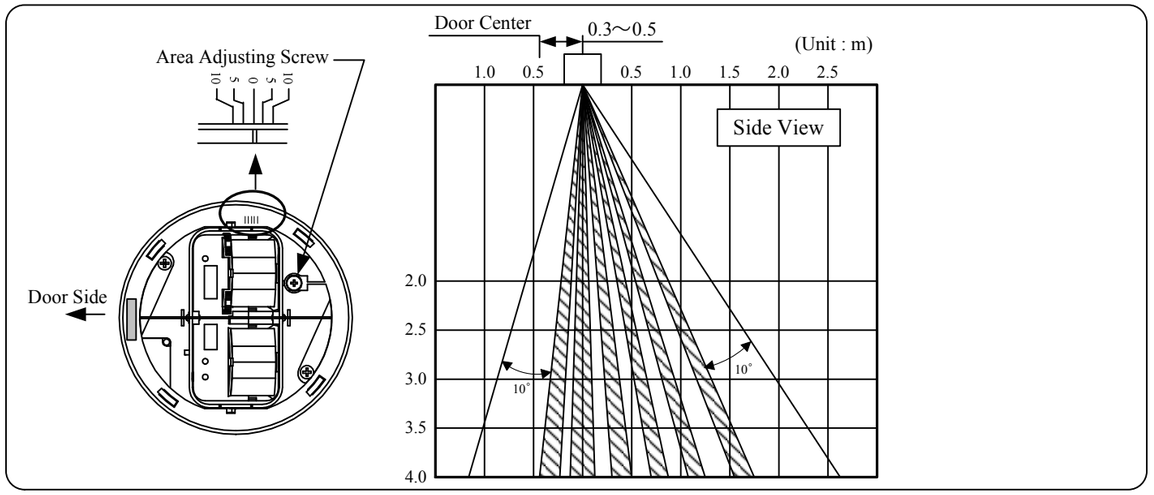
6. Adjusting the detection area

Adjust the detection area according to the following diagrams.

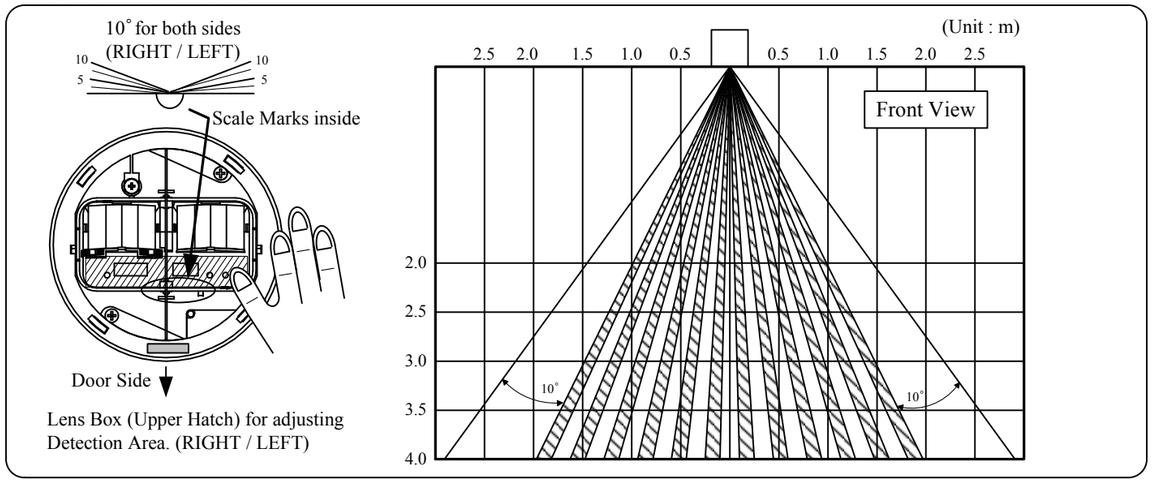
⚠CAUTION	The illustrated detection areas represent the actual position of the infrared beams. The actual detection area observed will vary depending on the sensor installation environment, objects been detected and sensor settings. Please confirm the detection area and sensitivity after installation without fail.
⚠CAUTION	Do not touch the surface of the lens while adjusting. If the lens becomes dirty, wipe the lens clean by using neutral detergent.

1. Detection Area Pattern

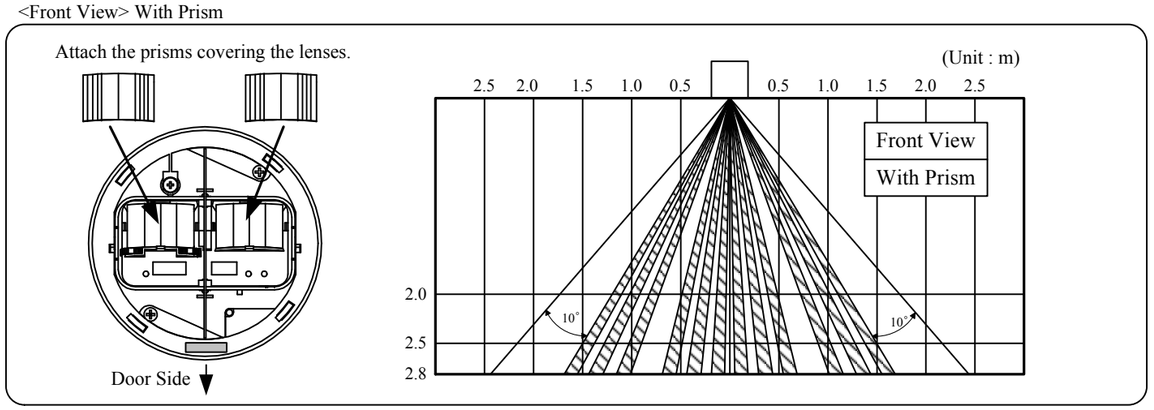
<Side View>



<Front View> Without Prism

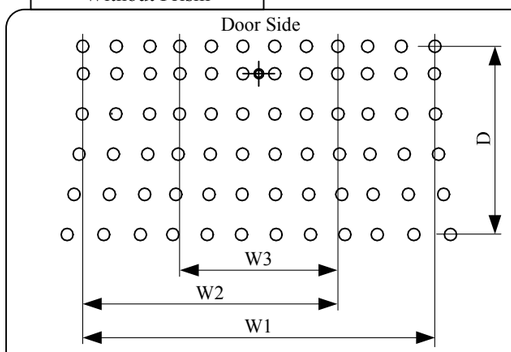


<Front View> With Prism



<Top View>

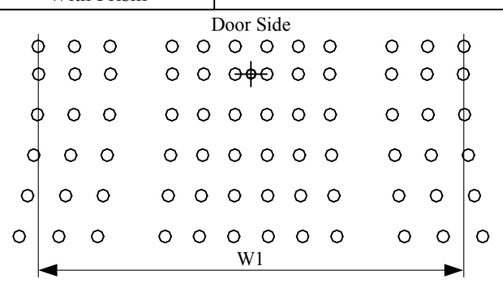
Without Prism



(Unit : mm)

H	W1	W2	W3	D
2200	2100	1550	1000	1100
2500	2400	1750	1100	1250
3000	2850	2100	1300	1500
4000	3800	2800	1730	2000

With Prism



(Unit : mm)

H	W1
2200	2560
2500	2920
2800	3270
More than 2800	Prism does not work

Depth "D" is unchanged
When using prisms : Mounting height is MAX 2.8m
Detection by Area Mask is prohibited

2. Adjusting Detection Area

Adjust the 2nd Row when Doorway detection function is ON.

① Set Dip Switch Ⓨ5 to <Doorway>

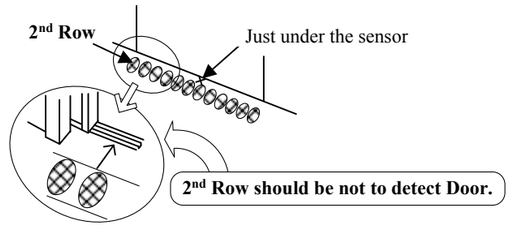
② Set Dip Switch Ⓧ3・4・5 to <Adjustment>

Adjustment 3 4 5

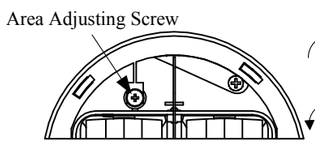
In this setting, only 2nd Row is valid.
Initialization indicating LED blinks.

③ Referring to the Area Adjusting Estimation List below, fix the approximate angle by Area Adjusting Screw.

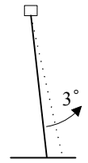
④ Adjust 2nd Row not to overlap with the Doorway with the door opened. (See the figure on the right)
Detection Area should be adjusted looking at Indicator LED by using a beam finder or reflection sheet.



⑤ Turn Area Adjusting Screw as below.



A 360° roll of the Screw adjusts Depth Angle 3°.



Moving distance by 360° roll of the Screw

Mounting height	2000mm	3000mm	4000mm
Moving distance on the floor	100mm	150mm	200mm

⑥ After finishing setting of 2nd Row, adjust Dip Switch Ⓧ3・4・5 as necessary. Re-set Power-ON after confirming no one is in the detection area. When Open/Close the door, if hunting occurs or caution Indicator LED regarding the 2nd Row overlapping with the door blink (Both Power Indicating LED and Operation Indicating LED blink at the same time), adjust the detection area away from the door by Area Adjusting Screw.

Area Adjusting Estimation List

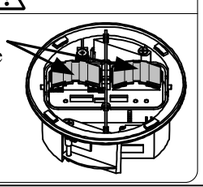
Distance between Door Center and Sensor / Mounting Height	300mm	400mm	500mm
2000mm	6°	9°	10°
3000mm	3°	5°	7°
4000mm	2°	3°	5°

⚠CAUTION	After adjusting Detection Area, be sure to Re-set Power-ON, and carry out Initializing and Automatic Sensitivity Adjustment again.
⚠CAUTION	When selection <Normal> of 1st Row Setting, the 1st Row detects in an usual activation mode. Please adjust the 1st Row not to detect the Door.

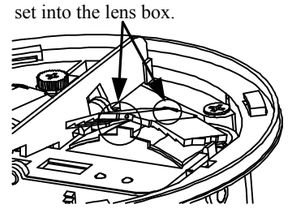
☆How to attach prisms (as an option)

⚠CAUTION

Each of the 2 prisms are attached.



Both sides of the prism lens are set into the lens box.



⚠CAUTION	Mounting height is less than 2.8m in case of using prisms.
⚠CAUTION	Setting Area Mask <Wide> in case of using prisms.
⚠CAUTION	Check whether the prisms are set firmly after fixing them.
⚠CAUTION	If the prisms become dirty, wipe them clean by using neutral detergent. Do not use thinner or alcohol.