

1 OVERVIEW

The "Zone passing/stationary detection type presence sensor" is installed on the ceiling and detects a standstill or a passage of the vehicle and the human body judging from its distance variations by measuring the distance up to the floor. This sensor is not influenced by wind and the car-body shape like ultrasound sensors. In addition, it is not influenced by the color and shades of the vehicle like diffuse reflective sensors. The setting can be performed by one point zone teaching. You can set up from a remove location by the optional remote control unit.



- Do not use the sensor for human body protection detection.
- When using the sensor for safety, secure the safety by the whole detection and the control system.

2 SPECIFICATION

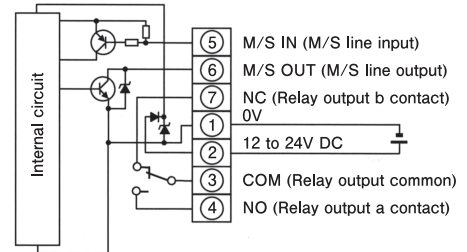
Model		DX-S300W
Installation height (From floor)		1 to 3m (※1)
Detection height (From floor)		Approx. 0.4m or more (※2)
Standard detection object		φ0.3m white drawing paper
Power supply		12 to 24V DC ±10% Ripple 10% or less
Power consumption		1.7W or less
Output mode		Relay output 1c Rating: 0.5A 30V DC or less Resistive load
Operating mode		Stationary mode/passage mode select operation
Timer function		No timer/ON OFF DELAY select Timer time: 3/9 s select
Response time		Stationary mode: 1.5 s or less Passage mode: 0.2 s or less
Mutual interference prevention		Master/Slave (Maximum 8 units including Master unit)
Light source (Wavelength)		Infrared LED (850nm)
Indicators		OPERATION/TEACH indicator: Yellowish green LED ERROR/SLAVE indicator: Orange LED ZONE indicator: Yellow LED
Switch (SW)		SET switch (Switching for the power on reset teaching) DELAY switch (Response time switching) ZONE switch (Operation mode switching)
Teaching method		Teaching by a remote control (The remote control is an optional) Or power on reset teaching
Teaching type		One point zone teaching
Material	Base	Acrylonitrile-butadiene-styrene
	Chassis	Acrylonitrile-butadiene-styrene
	Cover	Acrylic
Connection		M3 self-up terminal block
Weight		Approx. 200g
Accessories		Thread, Set washer, Dustproof sheet, Operation manual

- ※1 When the floor is asphalt, use the sensor at the height of 1 to 2.6m.
※2 The detection height of approx. 0.4 to 1m is automatically set by the automatic sensitivity correction function.

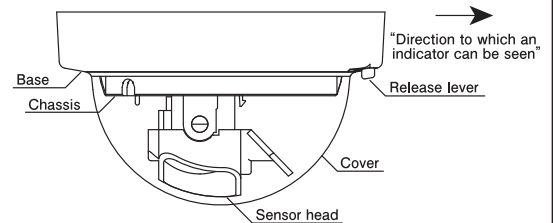
3 ENVIRONMENTAL SPECIFICATION

Environmental Specification	Ambient light	5,000 lx or less
	Ambient temperature	-20 to +55°C (In storage: -40 to +70°C) (No freezing)
	Ambient humidity	35 to 85% RH (No condensation)
	Protective structure	I P40
	Vibration	10 to 55Hz Double amplitude 1.5mm 3 directions Each 2 hours
	Shock	500 m/s ² 3 directions Each 3 times
	Dielectric withstanding	Batch of terminal - Between cases 1000V AC for 1 min. Relay output - Between power and internal circuit 500V AC for 1 min.
	Insulation resistance	500V DC mega 20MΩ or more

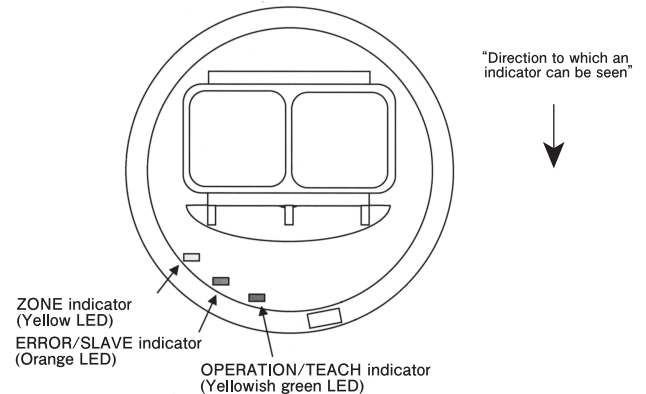
4 INPUT/OUTPUT CIRCUIT AND CONNECTION



5 DETAILS



6 INDICATORS



[OPERATION/TEACH indicator (Yellowish green LED)]

Operating state	Display state
When detecting the floor	Light-OFF
When detecting a car	Light-ON
Under teaching	Blinking
When receiving the remote control	Light-OFF→Light-ON

[ERROR/SLAVE indicator (Orange LED)]

Operating state	Display state
Teaching error	Blinking
Slave operation	Light-ON

[ZONE indicator (Yellow LED)]

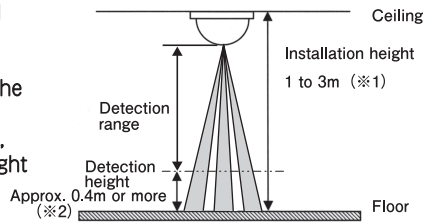
Operating state	Display state
Stationary mode	Light-OFF
Passage mode	Light-ON

7 INSTALLATION HEIGHT AND DETECTION HEIGHT

Install the sensor in a vertical position (within $\pm 3^\circ$) to the floor within the range of the installation height shown in the right drawing.

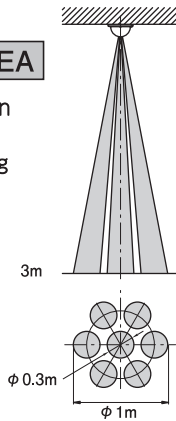
※1 When the floor is asphalt, use the sensor at the height of 1 to 2.6m.

※2 The detection height of approx. 0.4 to 1m is automatically set by the automatic sensitivity correction function.



8 DETECTION AREA

Take note that the detection area may not be consistent with this diagram depending on the shape of the vehicle or the person's dress and the access speed, or the difference of the color and material of the floor.



Installation height	Detection area
1m	$\phi 0.3\text{m}$
1.5m	$\phi 0.5\text{m}$
2m	$\phi 0.65\text{m}$
2.5m	$\phi 0.85\text{m}$
3m	$\phi 1\text{m}$

9 MOUNTING

[When installing to the raceway]

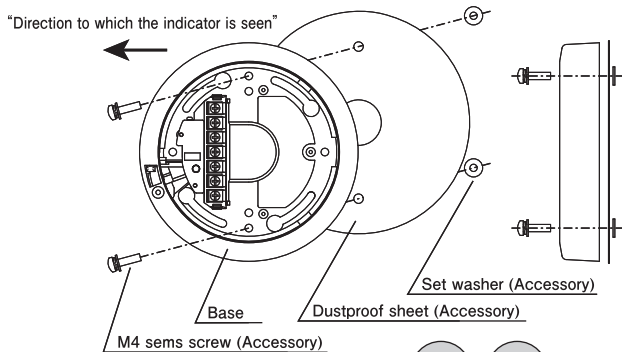
Install the sensor with tightening torque 0.8N·m to the raceway bracket DX-B4 (Option) or commercially available wall outlet box (Panasonic Electric Works-made DC3068BK, etc.). Do not install on the places where the surface is uneven. Also follow the instruction manual of the raceway bracket DX-B4 (Option).

[When installing on the ceiling]

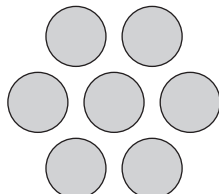
Install the sensor with tightening torque 0.8N·m to the ceiling bracket DX-B5 (Option). Do not install on the mount places where the surface is uneven. Also follow the instruction manual of the ceiling bracket DX-B5 (Option).

[When installing on the switch box]

Fix a dustproof sheet (Accessory) to the base with M4 screws (Accessory) and the set washers (Accessory). After confirming the direction to which the indicator is seen, install the sensor on the switch box with tightening torque 0.8N·m.

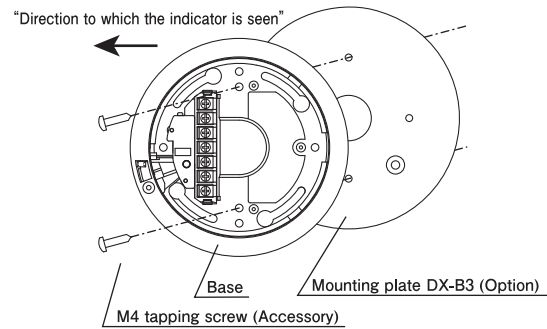


Detection area projected on the floor when mounted in the above direction.



[When installing to the round switch box]

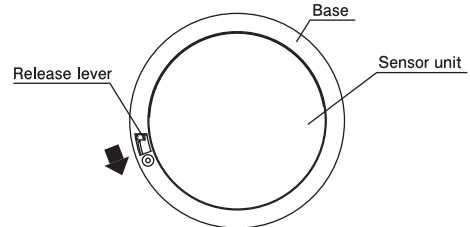
Install the mounting plate DX-B3 (Option) on the round switch box. After confirming the direction to which the indicator is seen, install the base to the mounting plate with tightening torque 0.8N·m. In this case, the dustproof sheet (Accessory) and the set washer (Accessory) are not required.



10 SENSOR UNIT

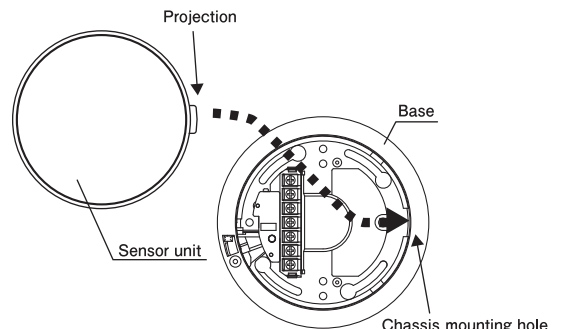
[How to remove the sensor unit from the base]

Slide the release lever to the direction of the arrow.



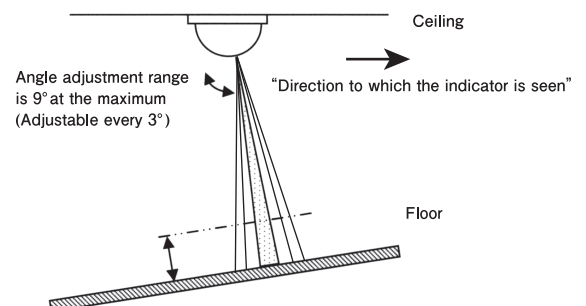
[How to mount the sensor unit to the base]

Fit the projection to the chassis mounting hole, and then snap down.

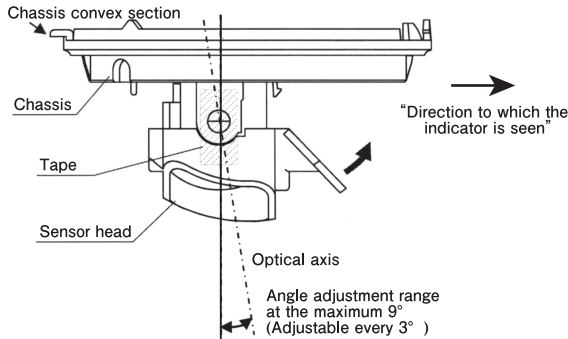


11 SENSOR HEAD ANGLE ADJUSTMENT

When the floor is inclined against the ceiling as indicated below, the angle of the sensor head can be adjusted.



1. Remove the sensor head from the base.
2. After confirming the direction (Direction to which the indicator is seen), mount the base on the ceiling.
3. Remove the cover from the chassis according to the 12 "Cover".
4. Peel off the tape fixing the sensor head.
5. The angle adjustment of the sensor head can be adjusted at 3 stages (Maximum 9°) every 3°. Adjust the sensor head angle so that the optical axis almost becomes perpendicular to the floor.

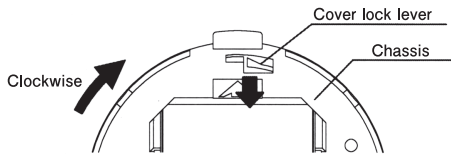


6. Mount the cover to the chassis.
7. Mount the sensor unit to the base.

12 COVER

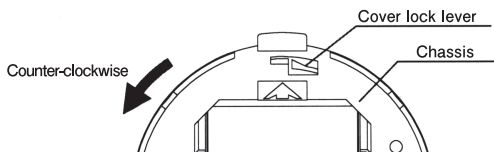
[How to remove the cover from the chassis]

While lightly pressing down the cover lock lever from the inside to the arrow direction, then turning the cover clockwise, and the cover is removed from the chassis.



[How to mount the cover to the chassis]

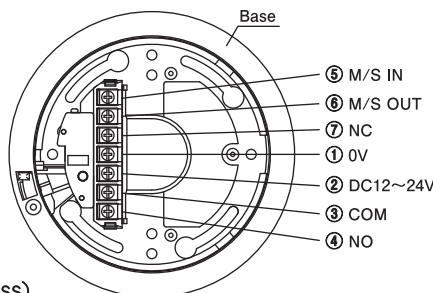
Fit the cover into the chassis, turn it counter-clockwise until the cover lock lever clicks.



13 WIRING

The tightening torque of the terminal is 0.6 N·m.

When extending the wire, use wires with diameter of $\phi 0.9\text{mm}$ or more, and when using it in 24V DC, the length of the connection should be 120m or less (When or less 12V DC, it becomes 40m or less).

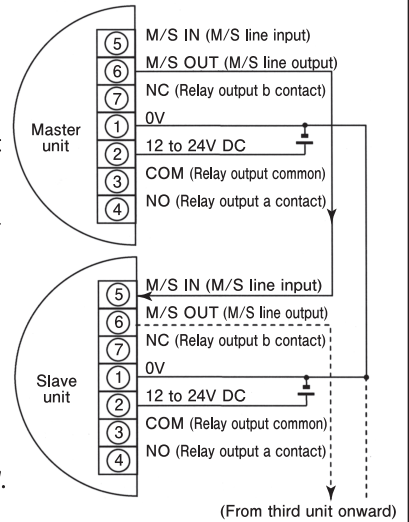


14 ANTI INTERFERENCE SETTING

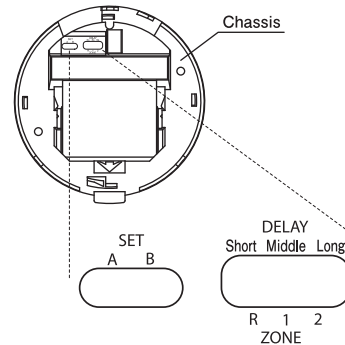
When installing two or more sensors adjacently (2.0m or less for DX-S400; 2.5m or less for DX-S300W), connect as shown below to prevent interference. You can connect up to eight units including the master unit. You do not have to perform any setup for the main unit.

The SLAVE indicator (orange LED) on the slave unit will turn on. Be careful not to use DX-S400 and DX-S400L or DX-S300W together.

Do not mix different models like DX-S400 or DX-S400L in a loop consists of DX-S300W.



15 USER INTERFACE



SET switch: Set the power-on reset teaching ON or OFF. When the power-on reset teaching is ON, the memory is reset and teaching is started every time when the power is resupplied.

- A** Power on reset teaching OFF (factory set)
 - When switched from B to A, teaching is performed.
 - When the unit is powered initially, teaching is performed.
- B** Power on reset teaching ON

(Note) Switching of the SET switch cannot be done by the remote controller

(Note) "Power on reset teaching: ON" implements teaching also in the unintended power ON/OFF such as outage.

DELAY switch: Set the output timer. The DELAY switch functions as the ON/OFF DELAY in the stationary mode and as the OFF DELAY in the passage mode. (※)

- Short** Timer disabled
- Middle** 3 sec. (※)
- Long** 9 sec. (Factory set) (※)

(※) The DELAY switch functions as the ON/OFF DELAY in the stationary mode and as the OFF DELAY in the passage mode.

(Note) Switching of the DELAY switch cannot be done by the remote controller.

(Note) When changed the setting, be sure to perform teaching again.

ZONE switch: Select the operation mode.

R Setting by the remote controller.

- **Stationary mode:** After setting the ZONE switch to "R", direct the remote controller to the sensor. If the TEACH indicator (Yellowish green LED) is off, press the "3" button of the remote controller until TEACH indicator LED turns on. If the TEACH indicator is on, press the "3" button of the remote controller until TEACH indicator turns off and on again.

The ZONE indicator (Yellow LED) turns off and the operation mode is set to the stationary mode. Continue to perform teaching.

- **Passage mode:** After setting the ZONE switch to "R", direct the remote controller to the sensor. If the TEACH indicator (Yellowish green LED) is off, press the "4" button of the remote controller until TEACH indicator LED turns on. If the TEACH indicator is on, press the "4" button of the remote controller until the TEACH indicator turns off and on again.

The ZONE indicator turns on and operation mode is set to the passage mode. Continue to perform teaching.

- 1 Stationary mode (factory set)
- 2 Passage mode

(Note) When changed the setting, be sure to perform teaching again.

16 SETTING

- Passage mode (Motion detection)
Setting example (Power on reset teaching: OFF, DELAY switch: No timer, Operation mode: Passage mode)
 - It requires approx. 15 seconds for teaching. Since it requires to exactly detect the floor not to go into between the sensor and the floor during teaching.
 - The output becomes ON during teaching.

[When performing the initial setting and teaching]

- ① Set the ZONE switch to "2".
- ② Set the DELAY switch to "Short".
- ③ After the SET switch is set to "A". The TEACH indicator (Yellowish green LED) blinks and starts teaching when turning on the power.
- ④ When the teaching is completed, The TEACH indicator turns off.

[When performing re-teaching such case as after cleaning]

- ① When turning on the power after adjusting the SET switch to "B", the TEACH indicator starts blinking.
- ② After the TEACH indicator turns off, turn the power off.
- ③ Turn the SET switch from "B" to "A", then turning on the power. The TEACH indicator blinks and starts teaching.
- ④ When the teaching is completed, The TEACH indicator turns off.

[When performing re-teaching by a remote controller]

- ① Direct the remote controller to the sensor so that the multiple sensors will not react simultaneously. If the TEACH indicator (Yellowish green LED) is off, press the "1" button of the remote controller until the TEACH indicator turns on. If the TEACH indicator is on, press the "1" button of the remote controller until the TEACH indicator turns off and on again. (Approx. 1 sec.)
- ② When release the button, the TEACH indicator blinks and the unit starts teaching.
- ③ When the teaching is completed, the TEACH indicator turns off.

- Stationary mode (Human presence detection)
Setting example (Power on reset teaching: OFF, DELAY switch: 9 sec., ZONE: Stationary mode)

- It requires approx.15 seconds for teaching. Since it requires to exactly detect the floor, not to go into between the sensor and the floor during teaching.
- The output becomes ON during teaching.

[When performing the initial setting and teaching]

- ① Confirm that each switch (SET, DELAY, ZONE) is set as the "Setting example". The TEACH indicator (Yellowish green LED) blinks and starts teaching when turning on the power.
- ② When the teaching is completed, TEACH indicator turns off.

[When performing re-teaching such case as after cleaning]

- ① When turning on the power after adjusting the SET switch to "B", the TEACH indicator starts blinking.
- ② After the TEACH indicator turn the power off.
- ③ Then turn on the power. The SET switch from "B" to "A". The TEACH indicator blinks and starts teaching.
- ④ When the teaching is completed, TEACH indicator turns off.

[When performing re-teaching by a remote controller]

- ① Direct the remote controller to the sensor so that the multiple sensors will not react simultaneously. If the TEACH indicator (Yellowish green LED) is off, press the "1" button of the remote controller until the TEACH indicator turns on. If the TEACH indicator is on, press the "1" button of the remote controller until TEACH indicator turns off and on again. (Approx. 1 sec.)
- ② When release the button, the TEACH indicator blinks and the unit starts teaching.
- ③ When the teaching is completed, the TEACH indicator turns off.

17 ON/OFF DELAY SETTING

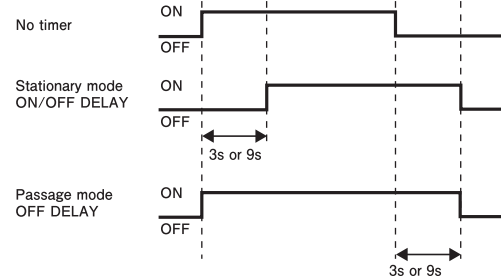
The DELAY switch is set at "Long" initially.

In the stationary mode the timer is set at 9 seconds both for the ON DELAY and the OFF DELAY.

In the passage mode the timer is set at 9 seconds only for the OFF DELAY.

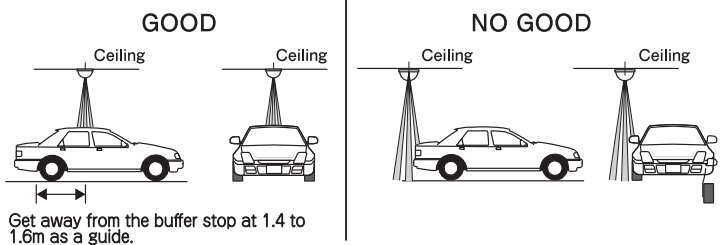
The delay timer also can be set at 3 sec. or zero according to the environment, by the DELAY switch.

- Stationary mode response time = Response time 1.5 sec. or less+ Output ON/OFF DELAY
- Passage mode response time = Response time 0.2 sec. or less+ Output OFF DELAY

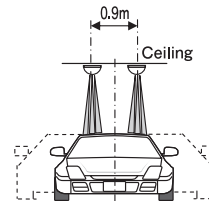


18 CAUTIONS IN INSTALLATION

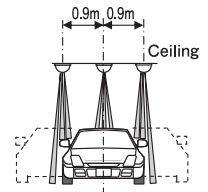
Example 1 Install the sensor directly above at the center of the ceiling of the vehicle. Use 1 unit of the sensor.



Example 2 When the passageway width exceeds 2.5m, or the sensor cannot be installed directly above at the center of the vehicle, use 2 sensor units.



Example 3 When the passageway width exceeds 3.4m use 3 sensor units.



(Reference) Passageway width and sensor unit number

Sensor unit number	1 unit	2 units	3 units	4 units
Passageway width	to 2.5m	2.6 to 3.4m	3.5 to 4.3m	4.4 to 5.2m

- Install the sensor directly above at the center of the vehicle as indicated in Example 1. If there are the buffer stops, get away from the buffer stop at 1.4 to 1.6m as a guide. When the passageway width is wide, install the multiple sensors at the interval of 0.9m between the sensors as indicated in Example 2 and Example 3, and install the sensors so that all 7-optical axes cover the ceiling of the vehicle in either of the seats of a car is detected through the windshield or a sunroof, or when all 7-optical axes does not cover the vehicle, the output may be turned OFF. When installing multiple sensors, connect the sensors as shown in 14 ANTI INTERFERENCE SETTING.
- Install the sensor avoiding the places where pools are formed due to rains or snow.
- When installing the sensor on the raceway, use the raceway bracket DX-B4 (Option) or commercially available wall outlet box (Panasonic Electric Works-made DC306BK, etc.). Also, do not install on the places where the surface is uneven by using hangers and hanging rings.
- When install the sensor on the ceiling, use the ceiling mount bracket DX-B5 (Option). Also, do not install on the places where the surface is uneven.
- Do not install the sensor on the movable part or to places where floor moves.
- Since the sensor has no waterproof structure, do not install it to places where exposed to rains or snow. Also, care is needed so that water will not run through electric wires.
- Keep the sensor out of sunlight and a strong light beam such as a fluorescent lamp, an incandescent lamp, within the operating range.
- This sensor is for indoor use only. Do not install it outdoors.

19 ABOUT THE TEACHING ERROR

When errors occur in teaching, the ERROR indicator (Orange LED) blinks.

The causes are the followings.

- ① The floor cannot be detected
- ② The installation height is 3m or more from the floor
- ③ The installation height is 1m or less from the floor

Check the installation conditions and perform teaching again.

20 CAUTION OF OPERATION

- Perform teaching when the floor is dry.
- The malfunction may occur depending on the situation in places where the floor gets wet or pools formed due to rains and snow as a few lights are reflected back by the mirror-like surface. According to the situation, change the installation position of the sensor, lower the installation height, adjust the sensor so that it becomes vertical to the floor, select the threshold value "Not available" on the opposite side, etc. Have a discussion for installment of the multiple unit sensors since the detection may become unstable in the deep shade color vehicle such as black when selecting the threshold value "Not available" on the opposite side. In order to select and confirm the threshold value on the opposite side, the optional remote control DX-RC is necessary.
- Be sure to use the power within the rated range.
- Limit the current of the power supply in accordance with the size of the sensor cable.
(The number of connectable sensors to a power unit is 8 to 16 units.)
- The wiring mistake causes burns and breakage. Check the connection before turning on the power.
- Be sure to route the sensor wires separate from any power transmission or high voltage line. Use a same conduit or duct with high-voltage or power lines will cause malfunction or damage by induction.
- Avoid to turn on and off the power consecutively.
- Clean the cover by a soft and dry cloth periodically. A stain or dirt stuck on the cover deteriorates the performance. Do not use organic solvent including alcohol and thinner.
- To use the sensor in an environment containing a corrosive gas or exposed to a splash of chemical or oil, or a place exposed to vibration or shock may cause false operation.
- The special vehicles such as a convertible may not be able to be detected.
- In the passage mode, the output may turn ON/OFF due to dips and bumps of the detection object. Also, when detecting the passage of the vehicle, the output may turn ON/OFF due to the glass surface.
- When selecting ON for the Shiny floor effects reduction (SFER), even if there is an object exceeding the detection height, when light shielded by all 7-optical axes, the output turns OFF.
- When selecting OFF for the SFER, even if there is no object exceeding the detection height, when light shielded by either of 7-optical axes, the output turns ON.
- The output turns ON when turning on the power. When the power on reset teaching is OFF, the output relay turns on for approx. 11 seconds. When the power on reset teaching is ON, the output relay turns on for approx. 30 seconds.
- When getting far away by approx. 0.4m or more from the distance automatically set by the teaching due to movement of an object located at within the detection area, the output state varies according to the selection of the SFER.
In selecting "ON" : Output turns OFF.
In selecting "OFF" : Output turns ON.
When shipping out the product, OFF for the SFER has been selected.
- Since the teaching and the selection function for the SFER by the remote control are always valid, the adjacent multiple sensors may react simultaneously, thus, operate it directing to the sensor which you would like to set the remote control as much as possible.
- When the inverter illumination has been installed near the sensor, the sensitivity of the remote control lowers, and the setting by the remote control may not be done unless getting near the sensor.

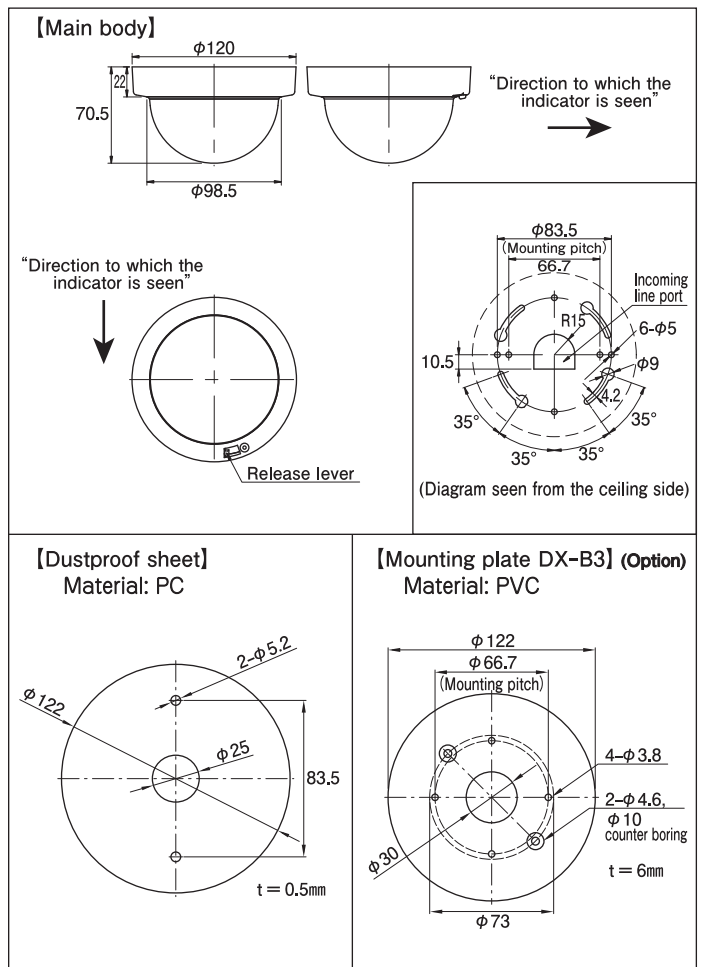
21 REMOTE CONTROL

A remote controller DX-RC is available as an option.

Refer to the operation manual of the remote controller DX-RC
Switching of the SET switch and the DELAY switch cannot be done from the remote controller.

Remote control button	Function
1	Teaching
2	Unassigned
3	Stationary mode select (Note) Valid only the ZONE switch is set at "R".
4	Passage mode select (Note) Valid only the ZONE switch is set at "R".
5	Shiny floor effect reduction (SFER) Press the button when you would like to confirm whether ON or OFF for the SFER has been selected. ON : The TEACH indicator (Yellowish green LED) blinks 9 times. OFF : The TEACH indicator (Yellowish green LED) blinks 2 times.
6	Selection for the Shiny floor effect reduction (SFER) Continue to press the button 4 times when you would like to select either ON or OFF of the SFER. Each time pressing the button 4 times continuously, it switches to ("ON" → "OFF" → "ON") alternately. (Note) After having selected the SFER, be sure to perform teaching again.
7	Unassigned
8	Unassigned

22 DIMENSIONS (Unit : mm)



23 WARRANTY

Takenaka Electronic Industrial Co., Ltd. (Takenaka) guarantees the quality of the product described in this manual, based on Takenaka Quality Standard. Please contact the agent or sales office where you bought the product if you find any defects.

1 《Warranty period》

The warranty period of this product is one year after the invoice date. This warranty does not apply to consumable parts such as batteries or relays. Regarding a product of another manufacturer sold by Takenaka, the warranty conforms to the quality standard of the manufacturer.

2 《Scope of warranty》

If any defect is found during the warranty period, Takenaka will repair or replace the product without charge.

The following cases are not covered by the warranty even within the warranty period. Please note that the warranty period is not extended after a repair or replacement.

- ① If the product is used inappropriately or used under inappropriate conditions that are not described in the instruction manual or specifications.
- ② If the defect is caused by improper maintenance, including a failure to replace consumable or periodical parts as described in the instruction manual or specifications.
- ③ If the defect is not directly caused by the warranted product.
- ④ If the products is modified or repaired by persons not authorized by Takenaka.
- ⑤ If the defect is caused by rough handling, dropping, or collision after the product is delivered.
- ⑥ If the defect could not be predicted from a technical viewpoint at the time Takenaka made the agreement for, manufactured, or installed the product.
- ⑦ If the defect is caused by a natural disaster such as a fire, flood, earthquake, lightning (including a lightning surge) and so on, or an accident such as an abnormal voltage that Takenaka is not responsible for.

The warranty provided here is only for the Takenaka product and does not cover any secondary damage caused by problems related to the product.

3 《Target of Warranty》

- (1) When combining the Takenaka product with a product made by another manufacturer, confirm any related laws, rules, regulations, standards, and so on. It is the customer's responsibility to confirm the suitability of the product for the system or device it is to be combined with.
- (2) This product is designed and manufactured for industrial use. This warranty does not cover the application of the product to:
 - ① Equipment for nuclear facilities including nuclear power stations or nuclear control facilities, incineration systems, railway vehicles, aircraft or automobiles and their related facilities, medical equipment, entertainment equipment, safety devices, equipment regulated by administrative bodies or specific industries.
 - ② Equipment that may create serious danger or adversely affect human life or property.
 - ③ Public utilities for electricity, town gas or water supply, or equipment that requires consistent reliability, such as 24-hour continuous operation.
 - ④ Usage outdoors or usage in conditions or environments that are not prescribed in the instruction manuals.
 - ⑤ Usage or equipment that requires considerable care or attention to safety, similar to the cases in ① to ④.

This warranty may cover these applications if Takenaka is notified about the application of the product before sale and the customer approves the compatibility and the specification of the product by written agreement and/or by providing the required safety measures.

24 DISCLAIMER

This product is designed for industrial applications to detect the presence, absence, or passage of a variety of objects. It has no functions to prevent disasters, accidents, death or injuries. Takenaka will assume no responsibility for damages or losses resulting from accidents or disasters caused by a failure of the product, incomplete wiring or installation, or any act that does not follow the instruction manual.

We will assume no responsibility for damages or losses caused by:

- Earthquakes, lightning (including lightning surges), fires that we are not responsible for, acts or incidents caused by third parties, intentional or accidental misuse, or usage under other abnormal conditions.
- Any secondary damage caused by the usage, faulty operation, or malfunction of the product like suspended operation or malfunction of a connected device or system, damage to a device, loss of profit, interruption of business, corruption or loss of memory contents, cost of restoration, etc.
- Misuse, failure related to maintenance, installation or deinstallation, or failure to follow the contents of the instruction manual.
- Any malfunction (including false alarm or lost alarm) caused by the combination with a connected device or software over that we have no control.

The responsibility of Takenaka is limited to the extent of repair or replacement of the product. The expenses we are liable for will not exceed the original product cost.