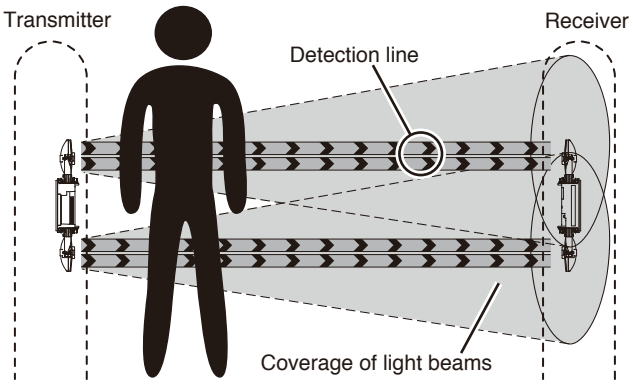
TAKEX PHOTOELECTRIC BEAM SENSOR

PXB- 50HF-KH: OUTDOOR 165ft (50m)
PXB-100HF-KH: OUTDOOR 330ft (100m)
PXB-200HF-KH: OUTDOOR 660ft (200m)

Instruction Manual

Thank you for purchasing this product.
Read this instruction manual before using the product to make sure that you use it correctly.

This device is an opposed type photoelectric beam sensor that consists of a photo transmitter that transmits infrared light, and a photo receiver for the transmitted light, as shown in the illustration on the right.
The infrared light transmitted from the transmitter expands in a cone shape, while the light beams enter the receiver.
The straight line that connects the transmitter with the receiver is the detection line.
If the detection line is obstructed (light is obstructed for more than 0.05 – 0.7 seconds), the receiver detects this break in the light beams, and outputs a signal.
In order to ensure that the detection line has sufficient margin of sensitivity, adjust the direction of the light beams before placing the system into operation. Providing sufficient margin of sensitivity reduces the occurrence of malfunction caused by dense fog, heavy rain, frost, snow, and other such weather conditions.



Main Features

(1) DOUBLE MODULATION

Double modulated beams are designed to distinguish the external lights.
It increases the reliability in the outdoor security system.

(2) WIDE BEAM

WIDE

The pitch between upper beam and lower one is widened more than old models.
False alarm by birds and falling leaves reduces drastically.

(3) QUAD HIGH POWER BEAM

4

The beam power is 100 times of the minimum requirement.
The beam distance is 10 times of the described specification.
This high power beam also realizes the reliability against the harsh conditions like fog, snow, heavy rain.

(4) LOW CURRENT CONSUMPTION

ECO

50% less than remaining models. The battery size may reduce, wiring diameter may lessen, installation cost may decrease.

(5) ECOLOGY

RoHS

RoHS adapted – Environment friendly. Free from Lead, Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyl, Polybrominated diphenyl ether.

(6) DUAL RING SIGHT

Enables better and clear view for easy beam alignment.

(7) TARGET COLOR

The vivid color of the internal structure can be recognized easily from the far end in the beam alignment procedure.
The color differs between a transmitter and a receiver which helps easy installation and checking.

(8) INCREASED ANGLE ADJUSTMENT ALLOWANCE

Vertically ±20° compared with previous version.
It may adapt to the slope installation flexibly.

(9) WIRELESS ALIGNMENT CHECKER

Enables easy and accurate beam alignment. (Sold separately)

(10) LIGHTNING PROTECTION

Minimize the damage by the induced thunder through wirings.
It may stand 10000V under normal mode, 15000V under common mode.

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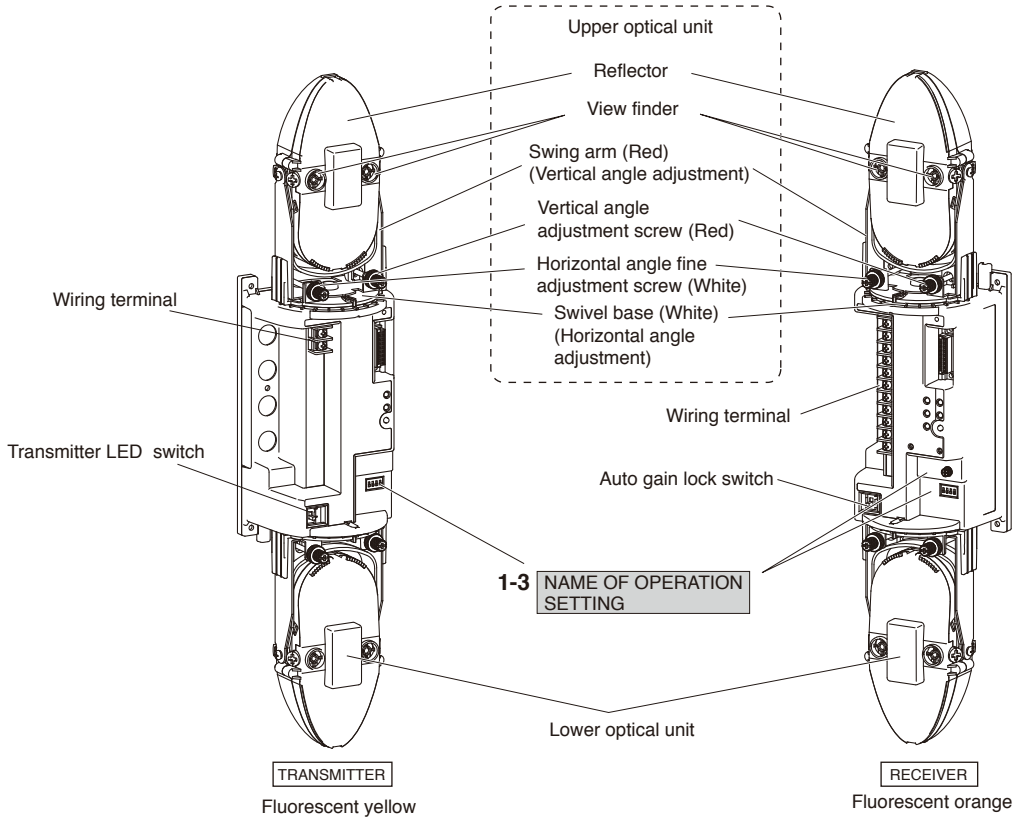
1 PRODUCT COMPONENTS

This section describes the contents of the product package and the names and functions of the parts that appear in this instruction manual.

1-1 PARTS DESCRIPTION

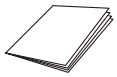
Check that the following transmitter, receiver, and accessories are included in the box when you first unpack the product.

Sensor body : 2 pcs (Transmitter: 1 pc, Receiver: 1 pc)



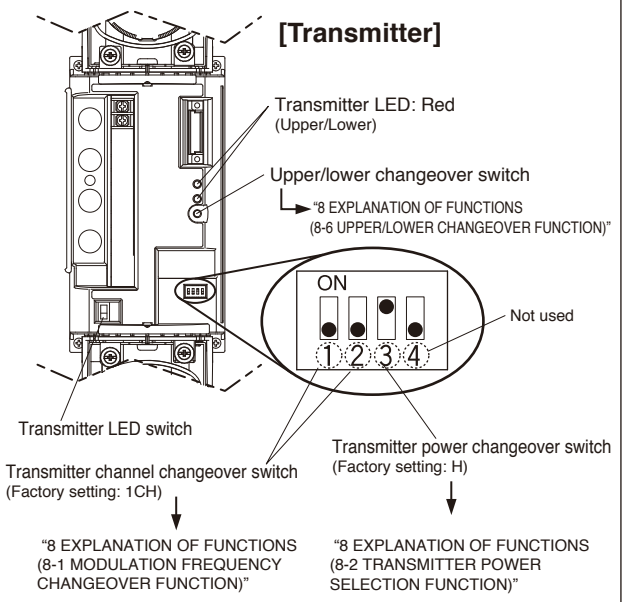
1-2 Accessories

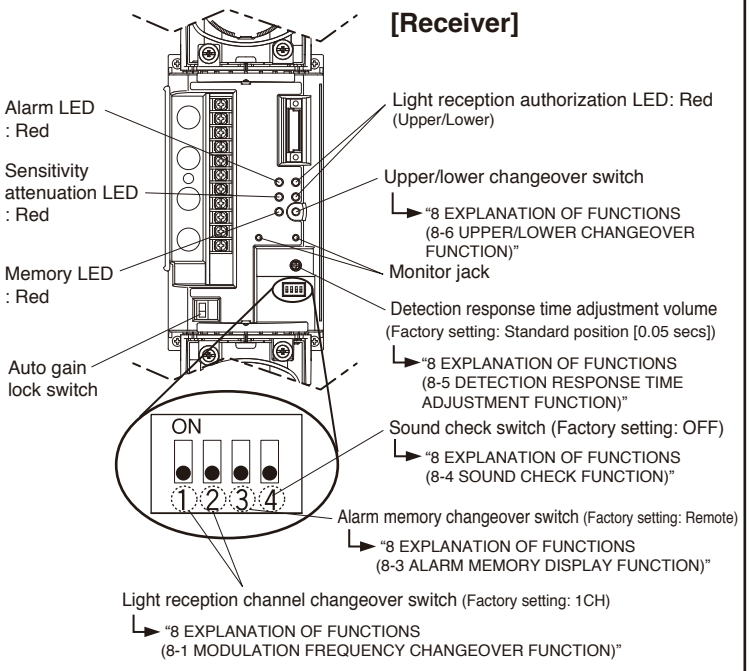
Panhead screw
(M3×12mm)
: 8 pcs



Instruction Manual
(This Manual)
: 1 pc

1-3 NAMES OF OPERATION SECTION





2 OPERATING PRECAUTIONS

- This manual describes the precautions to be observed for safe operation of this device by classifying them into the following categories. As these are important, be sure to read and strictly observe them.

(1) When using multi-level protection, use sensors of the same model for both upper and lower sensors, and set the same transmission power (H/L) for all of them.
(2) Using these sensors together with sensors from a different series (e.g. PB-HF-KH) may cause interference between the sensors.

Description of the Display

⚠	**Warning** Indicates information that if ignored and the device is handled incorrectly, may result in death or serious injury.
⚠	**Caution** Indicates information that if ignored and the device is handled incorrectly, may result in injury or damage to property alone.
⊘	This symbol indicates a prohibited action, with the specific action shown near the symbol. **Example:** ⊘ Do not disassemble
!	Indicates the useful information.

⚠ Warning

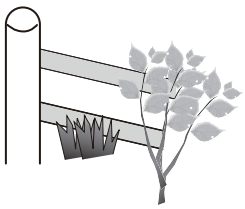
- Do not use the sensors powered with a voltage level other than the indicated power supply voltage specified (between 10 to 30V DC). Doing so may cause a fire or electrical shock.
- Do not connect a device that exceeds the capacity shown to the output contact of this device. Doing so may cause a fire or electrical shock.
- Do not touch the terminal section with wet hands. Doing so may cause an electrical shock.
- Do not disassemble or modify this device. Doing so may cause a fire, electrical shock, or malfunction of the device.
- If smoke or an abnormal odor or sound is found, leaving it unattended may cause a fire or electrical shock. Immediately turn off the power to the device and confirm that the abnormal state has been corrected, and then ask the place of purchase for repair.

⚠ Caution

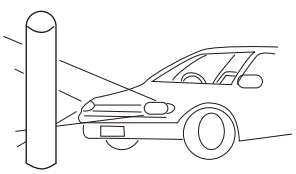
- Do not install this device in a location that cannot support its weight. Doing so may cause the device to fall and cause an injury or malfunction of the device.

2-1 EXAMPLE OF INCORRECT INSTALLATION

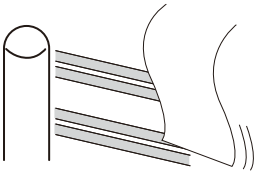
⊘ **DON'TS** Do not install as shown below. This will cause erroneous detection or detection failure.



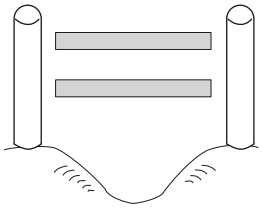
- Installation in locations shaded by trees etc.



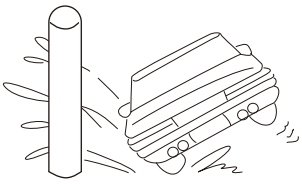
- Installation in location where strong light such as sunlight or light from vehicle headlights can directly enter the receiver



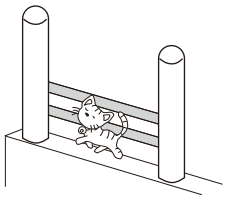
- Installation in areas where objects that move with the wind (the laundry etc) can obstruct the optical axis



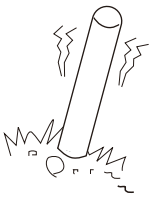
● Installation on uneven ground



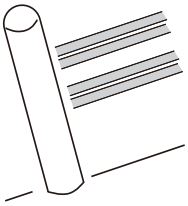
● Installation in locations where the unit may be splashed by dirty water or direct sea spray



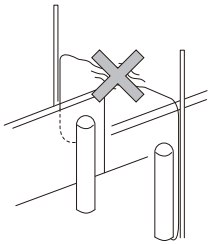
● Installation directly above a wall



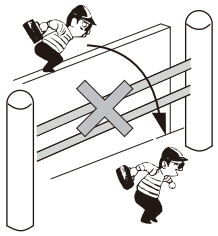
● Installation in an unstable, wobbling location



● Slanted installation



● Overhead wiring



● Installation close to a wall

● Using PXB-HF-KH together with other beam sensors or different protection distance beam sensors in stacking

Cautions when using the outdoor photoelectric beam sensor (Daily maintenance)

1. In areas where there are trees or weeds, the infrared may get obstructed by overgrown branches or leaves. As this may cause erroneous detection, be sure to trim down leaves and branches according to the growth of the plants. Furthermore, the infrared may get obstructed by swaying branches or leaves due to wind. Keep in mind the swaying of leaves and branches when trimming them.
2. Vine type plants may wrap around the photoelectric beam sensors causing erroneous detections. Therefore, be sure to prune such plants regularly.
3. Other natural phenomena such as insects or bird droppings may soil the sensors causing miss detection. Be sure to clean the sensors regularly.

3 PRECAUTIONS

In order to use these sensors correctly, thoroughly read this instruction manual and select the mounting position and protection distance.

3-1 PROTECTION DISTANCE AND RANGE OF LIGHT BEAM COVERAGE

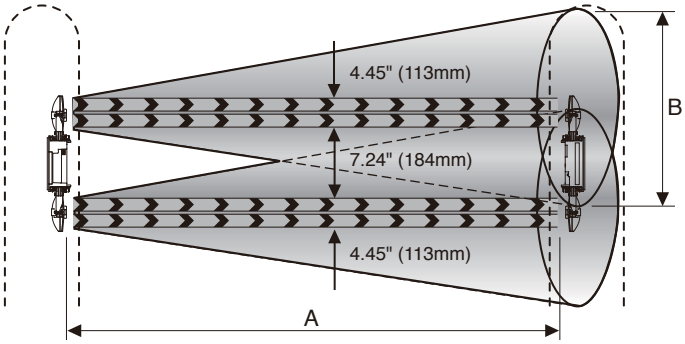
As the infrared light leaves the transmitter, it expands into conic shape light beams. The optical axis is in the center of the light beams. Arrange the reflector so that the device on the opposite side is in the center of the light beams.

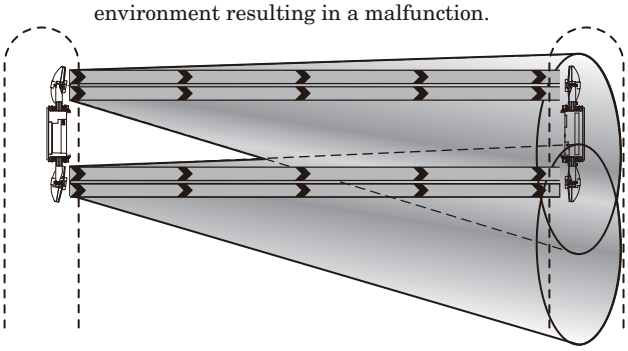
CORRECT

If the optical axis (center of the light beams) is aligned correctly, a detection line with sufficient margin of sensitivity is formed.

WRONG

If the optical axis is not aligned correctly, there will be insufficient margin of sensitivity even if the receiver is at the center of the light beams, making the system more susceptible to adverse effects of the environment resulting in a malfunction.

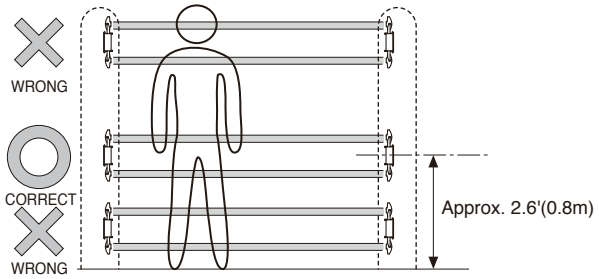




A: Protection Distance	B: Coverage of light beam
165ft (50m)	Approx. 4ft (1.2 m)
330ft (100m)	Approx. 8ft (2.4 m)
660ft (200m)	Approx. 16ft (5.0 m)

3-2 MOUNTING HEIGHT

As these sensors are designed to detect humans, install so that the center of the sensors are at a height of approximately 2.6ft (0.8m) from the ground when installing both on a wall and on a pole.



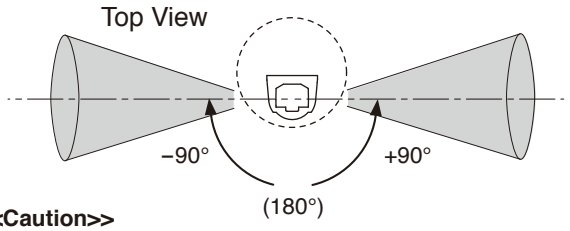
CORRECT

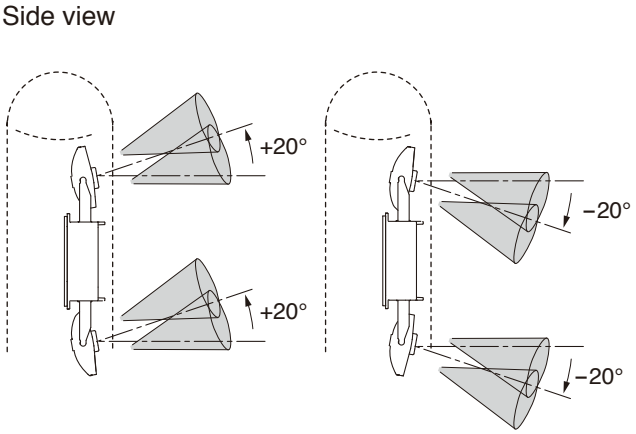
Installing so that the center of the sensor is approximately 2.6ft (0.8m) from the ground means that the protection line is at waist height for humans, enabling reliable detection.

WRONG

If the installation position is too high or too low, the protection line will be above shoulder height or below knee height, making it more difficult for reliable detection.

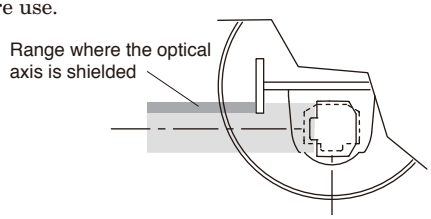
3-3 OPTICAL AXIS ADJUSTMENT RANGE





<<Caution>>

The optical axis may be shielded depending on the shape of the housing and mounting surface.
Check the optical axis range carefully and start installation before use.

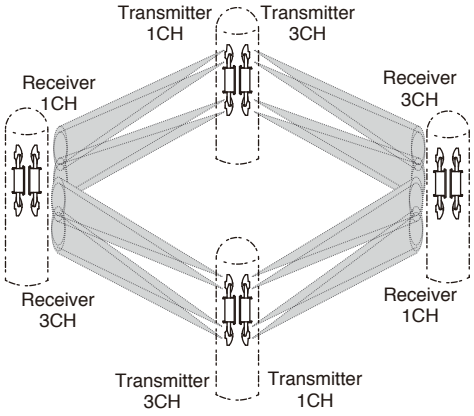


3-4 EXAMPLE OF PRACTICAL APPLICATION

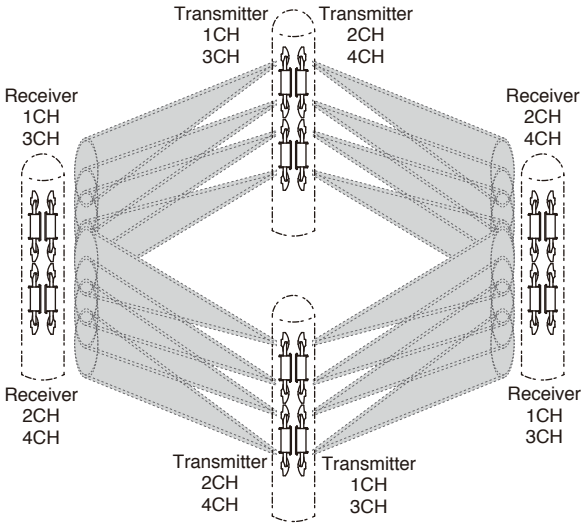
• In order to minimize the occurrence of malfunctions, refer to the protection diagram below for optimal operation.
Using the sensors incorrectly may cause malfunction. (Light beams are drawn in simplified form)

- When using multi-level protection or install straight line protection at multiple spans, use a sensor for which the modulation frequency can be switched. In addition, set an appropriate channel and install a transmitter and a receiver in appropriate locations, according to the following examples. If an inappropriate channel is set, it may cause malfunction.
- For the modulation frequency channels for upper and lower sensors when multi-level protection is used, set separate channels, such as “1” and “3”, or “2” and “4”.
- Mutual interference or wraparound of the photoelectric beams can be prevented by changing the channels. “8 EXPLANATION OF FUNCTIONS (8-2 MODULATION FREQUENCY CHANGEOVER FUNCTION)” Note: Set corresponding transmitters and receivers to the same channel.
- For the installation methods not described in the instruction manual (installation of straight line protection with 4-span or more, 3 level protection or more, or others), contact the place of purchase or TAKEX.

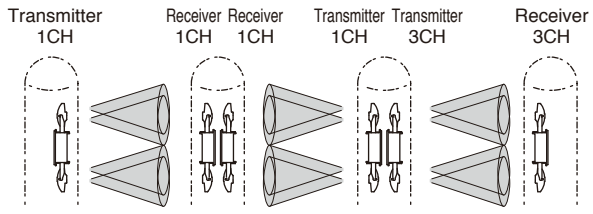
● External Perimeter Protection



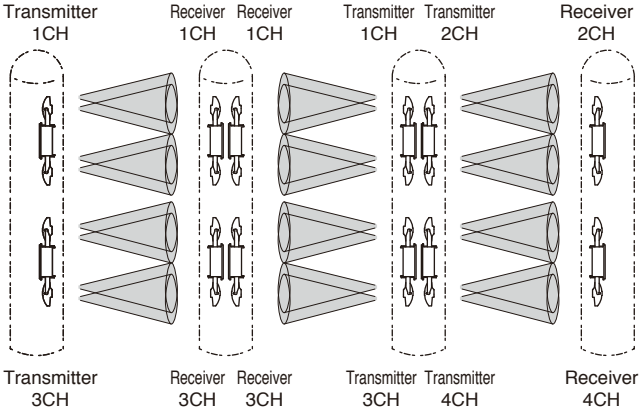
● 2 Level External Perimeter Protection



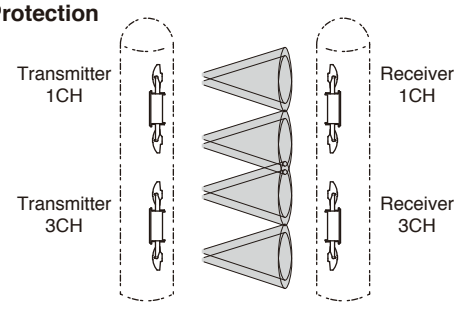
● Straight Line Protection



● 2 Level Straight Line Protection



● 2 Level Protection

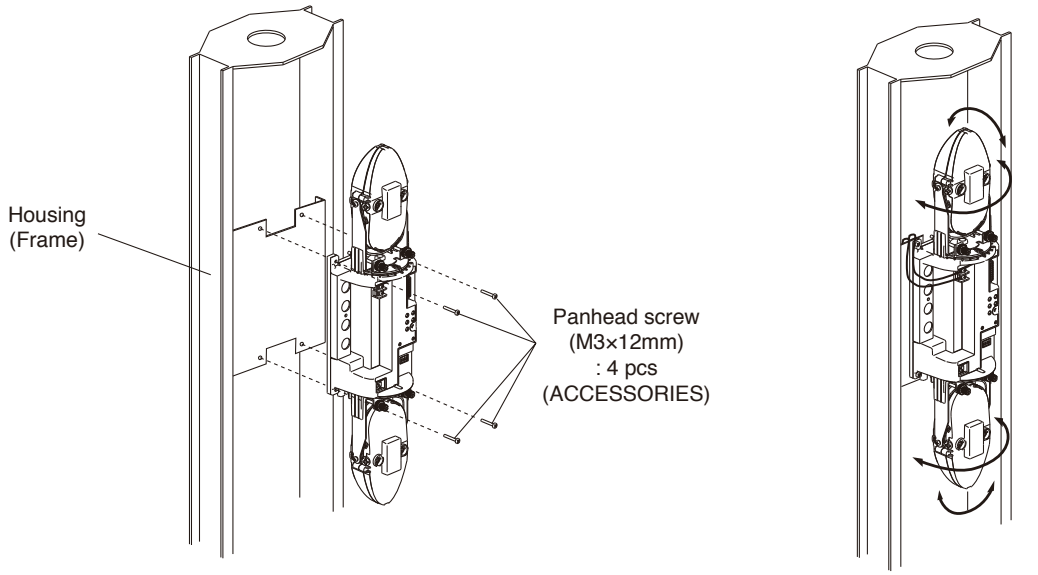


• Consult with TAKEX distributor or TAKEX regional office about the frequency selection for installations not mentioned in this instruction manual. Inappropreate choice of frequency may cause malfunction.

4 INSTALLATION METHOD

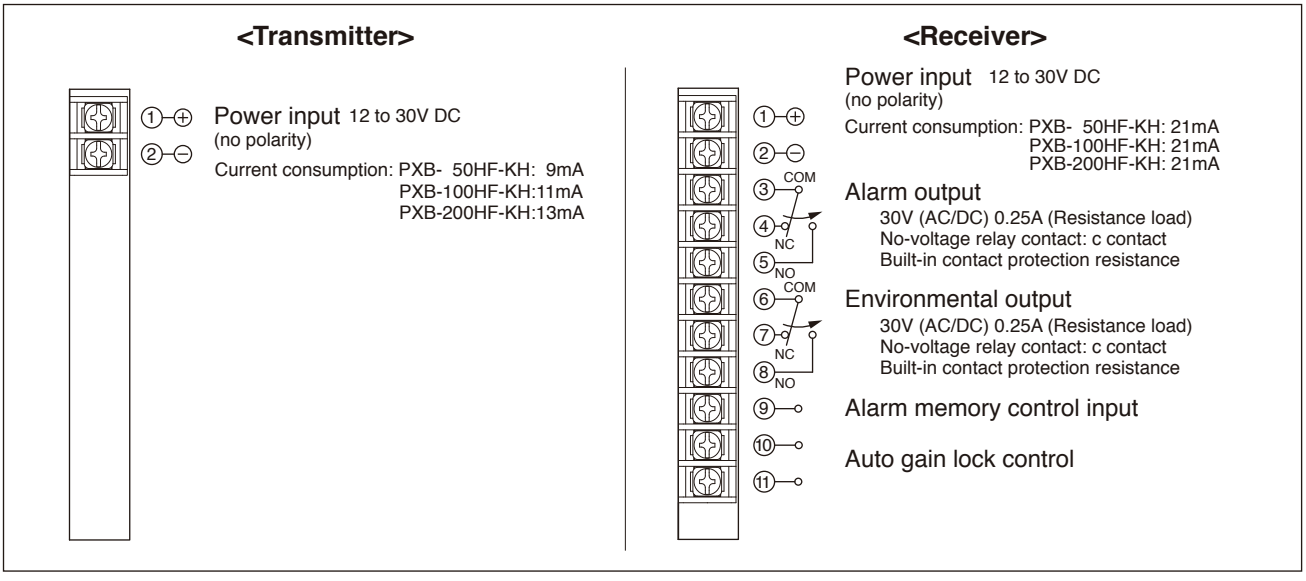
4-1 INSTALLATION INTO HOUSING

- Read the instruction manual for your housing carefully, and install the product into the housing correctly.
- Wiring is required based on the sensor installation.
  Refer to "6 WIRING METHOD" for wiring and connection.
- Refer to "9 EXPLANATION OF FUNCTIONS" for switching channels and transmitting beam power.



5 WIRING METHOD

5-1 POSITION AND RATING OF TERMINALS



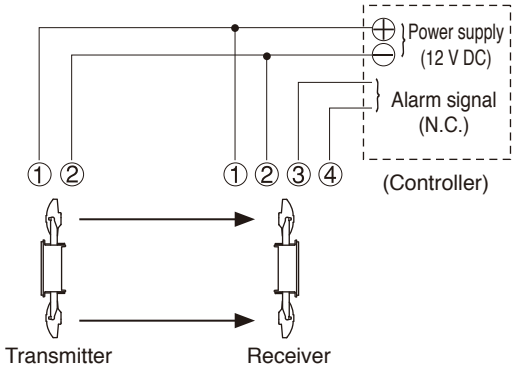
5-2 WIRING DISTANCE BETWEEN SENSOR AND POWER SUPPLY

Part No. / Supply voltage / Size of electrical cable used	PXB-50HF-KH		PXB-100HF-KH		PXB-200HF-KH	
	12V DC	24V DC	12V DC	24V DC	12V DC	24V DC
AWG 20 (Dia,0 . 8 mm)	Up to 2,500ft. (750m)	Up to 17,000ft. (5,200m)	Up to 2,300ft. (700m)	Up to 16,000ft. (4,880m)	Up to 2,200ft. (670m)	Up to 15,000ft. (4,570m)
AWG 18 (Dia,1 . 0 mm)	Up to 3,800ft. (1,160m)	Up to 27,500ft. (8,380m)	Up to 3,700ft. (1,130m)	Up to 25,000ft. (7,500m)	Up to 3,500ft. (1,070m)	Up to 24,000ft. (7,320m)
AWG 17 (Dia,1 . 1 mm)	Up to 4,800ft. (1,460m)	Up to 33,000ft. (10,000m)	Up to 4,500ft. (1,370m)	Up to 31,000ft. (9,500m)	Up to 4,200ft. (1,280m)	Up to 29,500ft. (8,990m)
AWG 16 (Dia,1.25 mm)	Up to 6,200ft. (1,890m)	Up to 43,000ft. (13,100m)	Up to 5,800ft. (1,770m)	Up to 40,000ft. (12,000m)	Up to 5,300ft. (1,600m)	Up to 38,000ft. (11,600m)
AWG 15 (Dia,1 . 4 mm)	Up to 7,800ft. (2,380m)	Up to 53,000ft. (16,000m)	Up to 7,300ft. (2,350m)	Up to 51,000ft. (15,500m)	Up to 6,800ft. (2,070m)	Up to 47,000ft. (14,300m)
AWG 14 (Dia,1 . 6 mm)	Up to 10,000ft. (3,000m)	Up to 71,000ft. (21,600m)	Up to 9,500ft. (2,900m)	Up to 66,000ft. (20,000m)	Up to 8,900ft. (2,710m)	Up to 62,000ft. (18,900m)

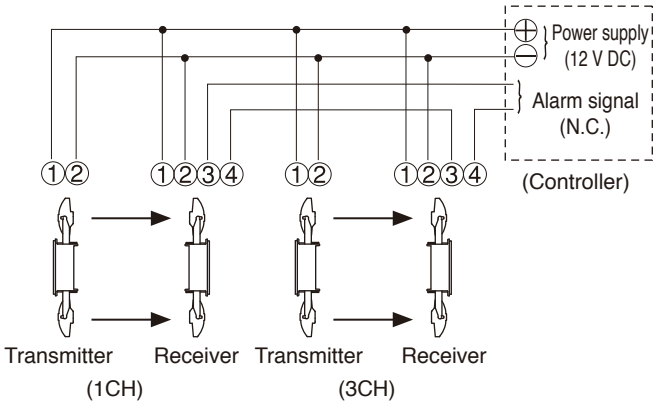
- When 2 or more units are connected, the wiring distance is calculated as follows: [Above value/number of units]

5-3 WIRING DISTRIBUTION DIAGRAM (WIRING DIAGRAM)

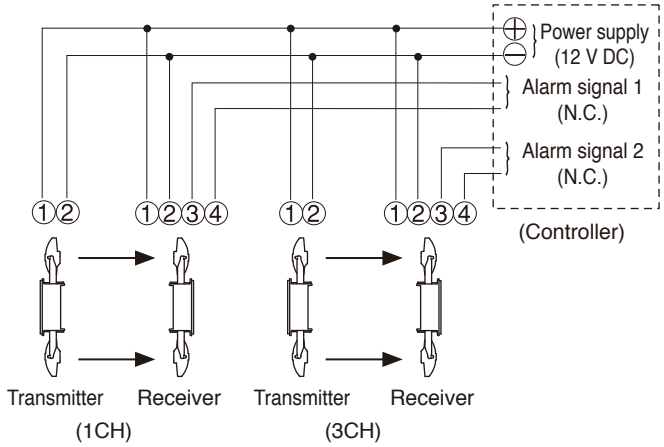
● **Basic connections**



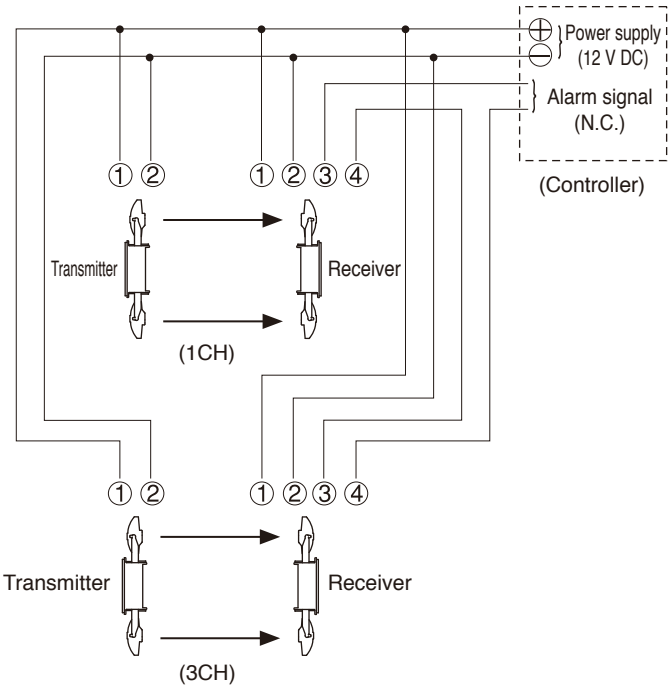
● **When multiple sensor units are connected to the same circuit**



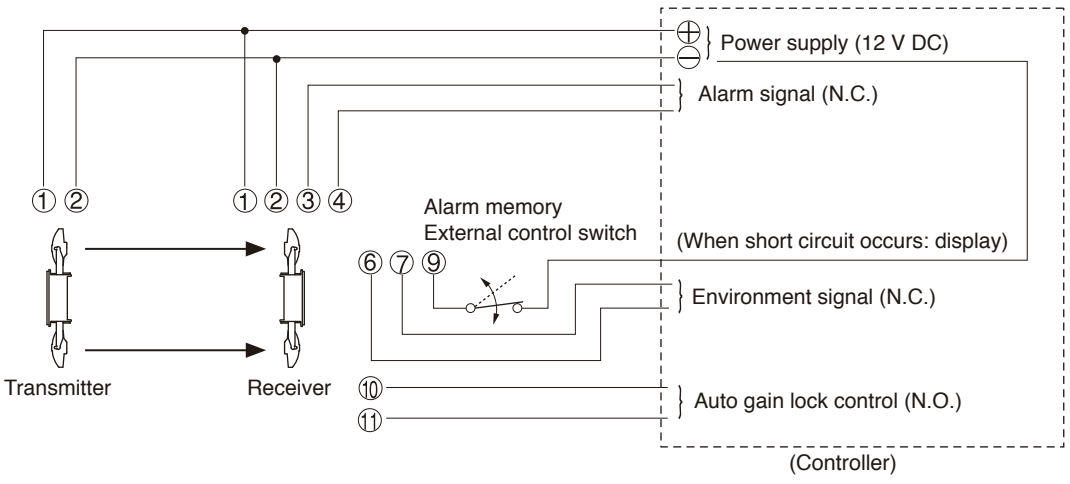
● **When multiple sensor units are connected to separate circuits**



● **Basic connections for 2 level protection**



● **For environmental output, tamper output, and alarm memory display in the remote mode**



[Precautions for Installation]

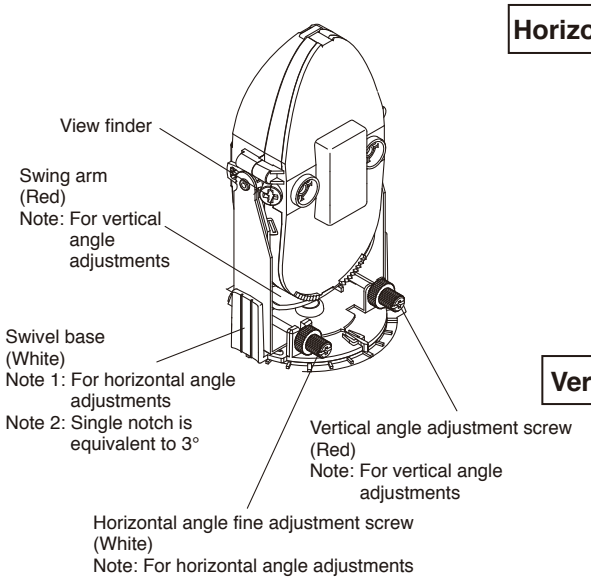
(1) Signal output for the upper and lower levels of the receiver cannot be output separately.
(2) For outdoor wiring installation, carry out pipe laying work whenever possible.
(3) Never use overhead wiring.

6 OPTICAL AXIS ADJUSTMENT

By aligning the optical axis correctly, a protection line with sufficient margin of sensitivity can be created, reducing the occurrence of malfunction. Always adjust the optical axis on both upper and lower levels.

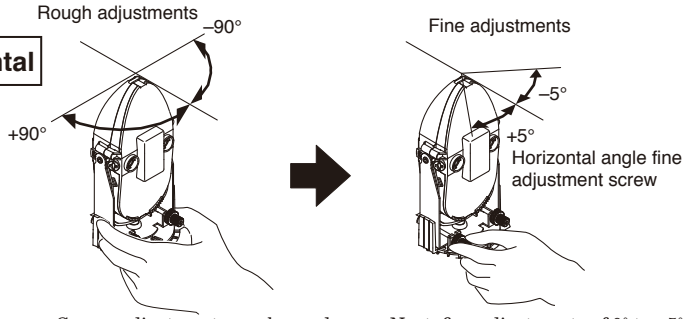
6-1 NAMES AND FUNCTIONS OF OPTICAL AXIS ADJUSTMENT PARTS

●Names of the Optical Unit



●Reflector Section Horizontal/Vertical Angle Adjustment Method

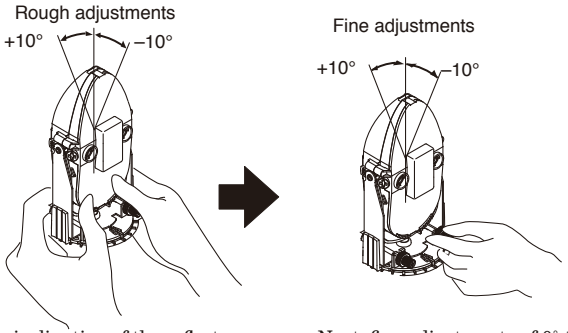
Horizontal



Coarse adjustments can be made by moving the swivel base within the range of 0˚ to ±90˚.

Next, fine adjustments of 0˚ to ±5˚ can be made using the horizontal angle adjustment screw.

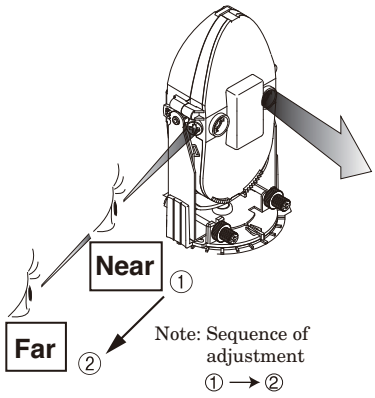
Vertical



The inclination of the reflector can be switched between -10˚ and +10˚ by pushing it forwards or backwards.

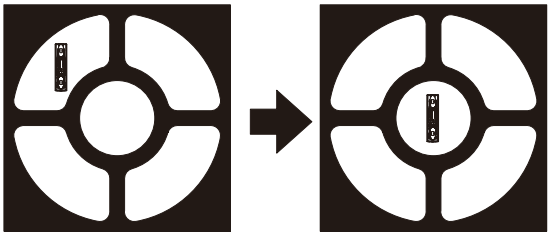
Next, fine adjustments of 0˚ to ±10˚ can be made using the vertical angle adjustment screw.

●Double Ring Alignment Mechanism Visible from the view finder



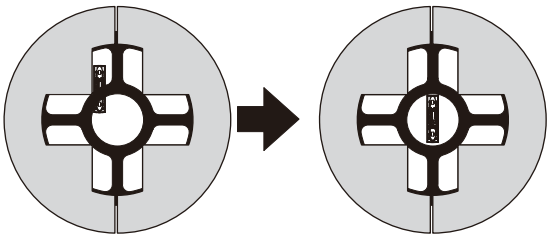
Near

When the view finder is looked closely, view appears as the diagram on the right. Adjust the angle so that the target color appears in the center of the ring.



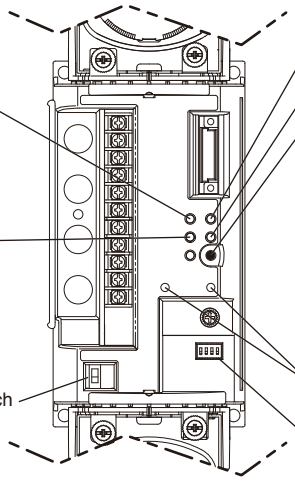
Far (The accuracy high)

When the view finder is looked from a distance, the view appears as the diagram on the right. Adjust the angle so that the target color appears in the center of the ring.



●Names of the Operation Section

Note: This section describes the name and function of each part used during optical axis adjustment.



Alarm LED
Note: Only available on the receiver
• Lights up when an alarm is output.

Sensitivity attenuation LED
Note: Only available on the receiver
• Lights up when the sensitivity is insufficient.

Transmitter:
• Transmitter LED switch
Receiver:
• Auto gain lock switch

Upper transmission/reception authorization LED
Lower transmission/reception authorization LED
} The corresponding LED lights up when the light transmission/reception is authorized. (The upper and lower can be switched by he upper/lower changeover switch.)

Upper/lower changeover switch

Transmitter
Each time the switch is pressed, the optical unit that transmits the light switches.
Transmit from both upper and lower → Only transmit from upper → Only transmit from lower → No transmission

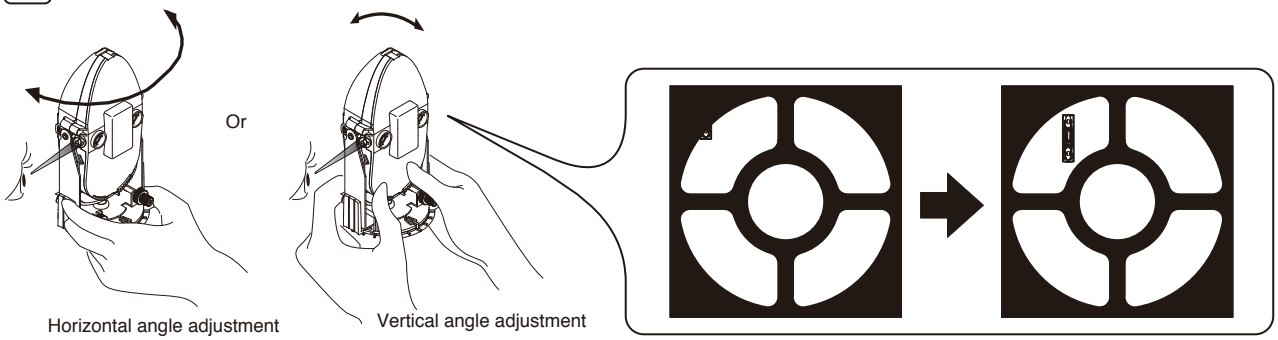
Receiver
Each time the switch is pressed, the optical unit that receives the light is switched.
Received on both upper/lower → Only received on upper → Only received on lower

Monitor jack Note: Only available on the receiver
• The monitor output voltage can be checked by using a commercially available tester.

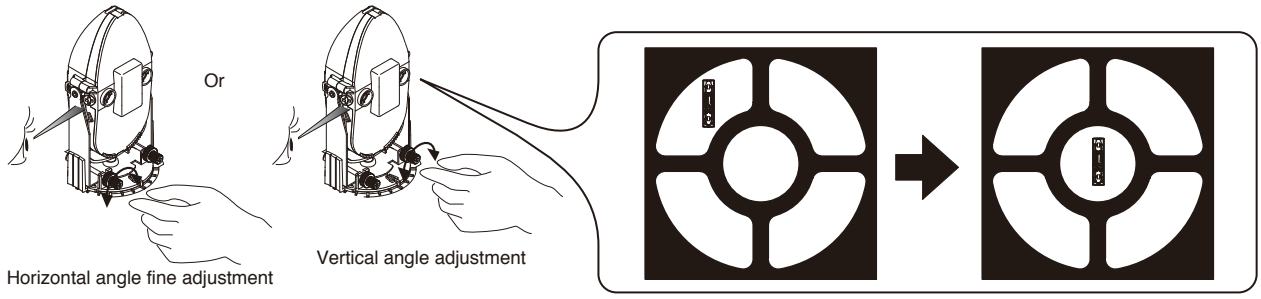
Sound check switch Note: Only available on the receiver
• Light reception level can be checked by the sound tone.
In the walk test mode, the beep sound is generated according to the alarm output.

6-2 OPTICAL AXIS ADJUSTMENT USING THE ALIGNMENT MECHANISM

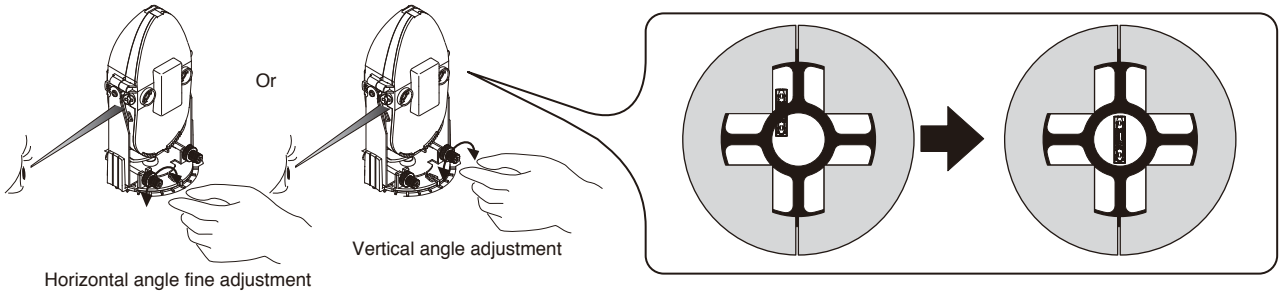
1 Move the swivel base and swing arm so that the opposite device is roughly aligned with the view finder.



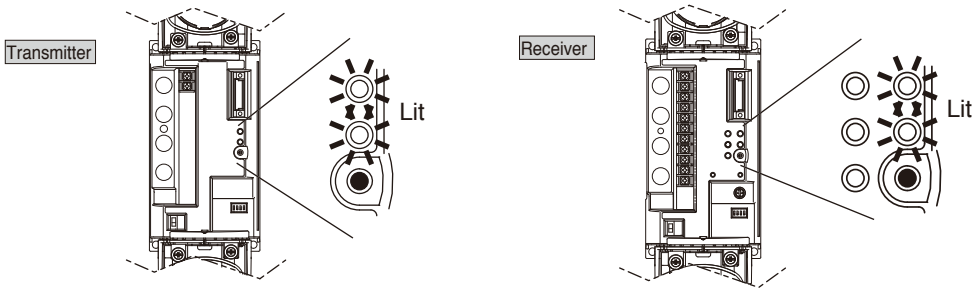
2 Look closely through the view finder, and adjust the position so that the sensor of the opposite device is visible at the center of the ring using the horizontal and vertical angle fine adjustment screws.



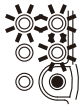
3 Look through the view finder from a distance, and readjust so that the sensor of the opposite device is visible at the center of the ring using the horizontal and vertical angle fine adjustment screws.



4 Turn on the power to the transmitter and receiver, check that the LEDs of both the transmitter and receiver are lit.



● If the LED of the receiver indicates as follows, take an appropriate measure according to the following description.

		Description of the Display	Remedy
Receiver		(1) The light enters the receiver, but the light reception level is insufficient (The optical axis is misaligned)	(1) Go to step **5** and fine adjust the optical axis
		(1) Different channels are set for the transmitter and receiver (2) The photoelectric beams are interfered	(1) Set the same channel for the transmitter and receiver (2) Change to a channel that is not influenced by other factors
		(1) The light does not enter the receiver at all (The optical axis is not adjusted correctly)	Go back to step **1** and adjust the optical axis again

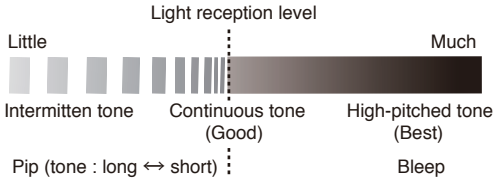
5 To improve accuracy of optical axis
Perform the procedure of "Optical Axis Adjustment Using the Sound Check", "Optical Axis Fine Adjustment Using the Monitor Output Voltage", or "Optical Axis Fine Adjustment Using the Alignment Wireless Checker".

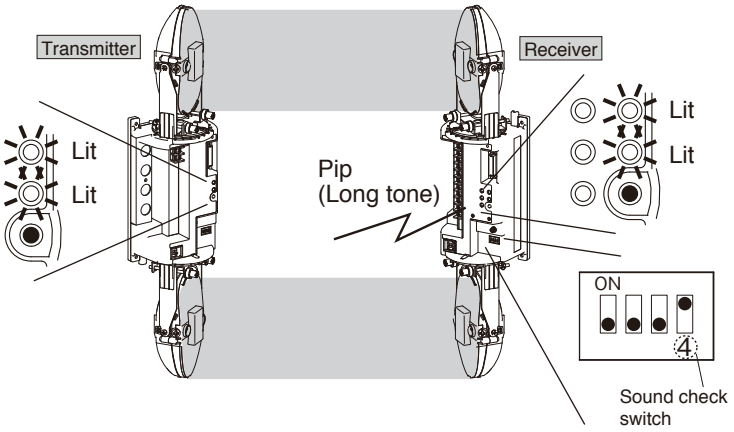
Optical Axis Fine Adjustment Using the Sound Check

- The sound check function indicates the light reception level by using high and low pitch tones.
- The sound check function is only installed on the receiver.

<<Caution>>
First, check only the transmission on the upper level and reception on the upper level , and then check only the transmission on the lower level and reception on the lower level.
(When the light can be received on both the upper and lower levels, the beep sound at the total light reception level of the upper and lower levels are generated.)

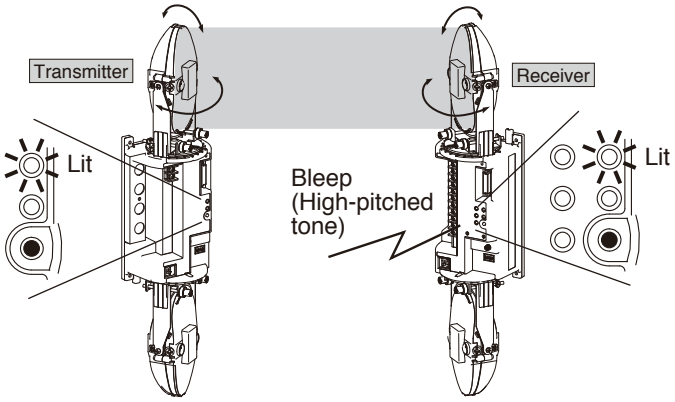
1. Turn the sound check switch on the receiver to the ON position.
   When the optical axis is roughly aligned, the beep sound can be heard.
   The optical axis is greatly misaligned if no sound can be heard.





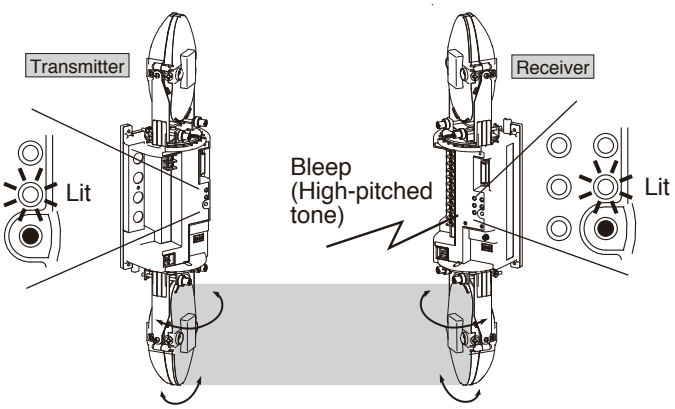
2. Fine adjust the upper level optical axis.

(1) Press the upper/lower changeover switch on the transmitter to select [Only transmit from upper].
(2) Press the upper/lower changeover switch on the receiver to select [Reception authorization on upper only].
(3) Turn the adjustment screw to fine adjust until the tone reaches the highest pitch.
(Adjust both the transmitter and receiver.)



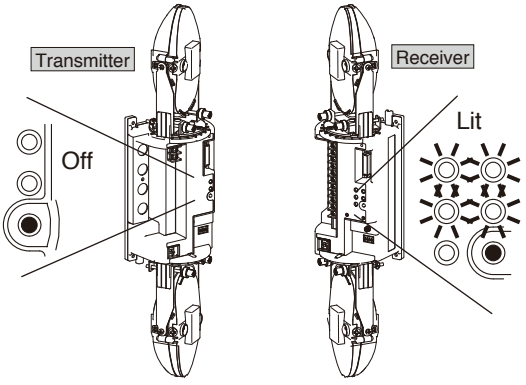
3. Fine adjust the lower level optical axis.

(1) Press the upper/lower changeover switch on the transmitter to select [Only transmit from lower].
(2) Press the upper/lower changeover switch on the receiver to select [Reception authorization on lower only].
(3) Turn the adjustment screw to fine adjust until the tone reaches the highest pitch.
(Adjust both the transmitter and receiver.)



4. Check if the light from another transmitter enters the receiver.

(1) Press the upper/lower changeover switch on the transmitter to select [No transmission].
(2) Press the upper/lower changeover switch on the receiver to select [Reception authorized for both upper and lower].
(3) Check that the alarm LED lights up when the receiver outputs an alarm signal, and that the sensitivity attenuation LED also lights up.



- If no alarm is activated or the sensitivity attenuation LED is not lit

When using multi-level protection, there may be some effects of other photoelectric beam sensors. In such case, readjust the other photoelectric beam sensors to reduce the effects to the minimum possible.
In addition, check that an appropriate channel is set.

Optical Axis Fine Adjustment Using the Monitor Output Voltage

● Accurate adjustments of the optical axis can be achieved by checking the light reception level value using the voltage of the monitor output.

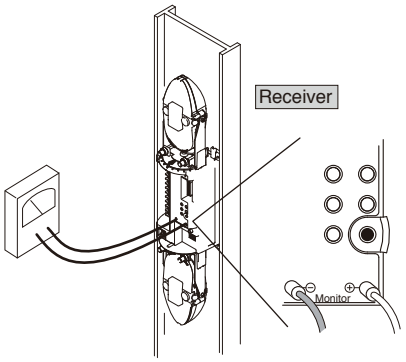
<<Caution>>

First, check only the transmission on the upper level and reception on the upper level , and then check only the transmission on the lower level and reception on the lower level.

(The values are not displayed correctly when the light can be received for both the upper and lower levels.)

See the following table for the monitor output voltage.

Monitor Output Voltage	Light Sensitivity
More than 2.5 V DC	Best
2.3 to 2.5V DC	Good
Less than 2.3V DC	Poor, re-adjust



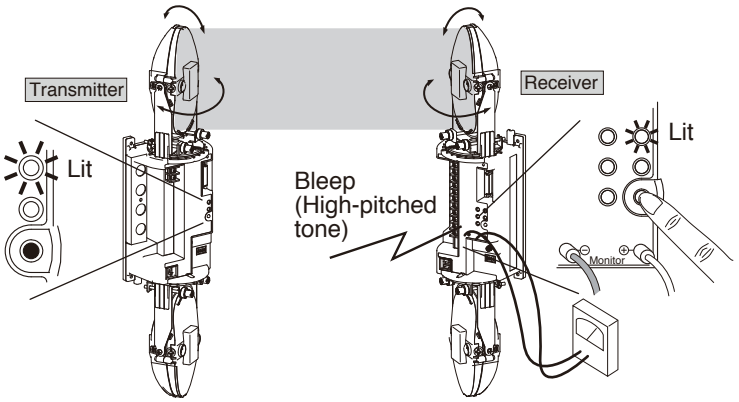
1. Insert a commercially available tester into the monitor jack on the receiver.

<<Caution>>

The monitor jack is polarized.
Check the polarity of the tester pin before inserting it.
Use a tester with an internal resistance of over 100 kΩ.

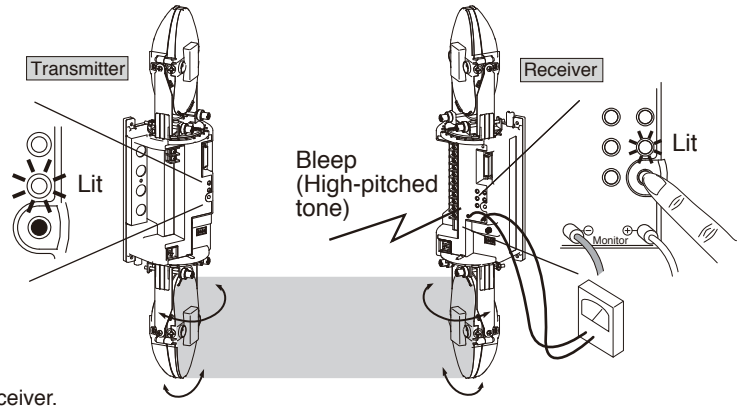
2. Fine adjust the upper level optical axis.

(1) Press the upper/lower changeover switch on the transmitter to select [Only transmit from upper].
(2) Press the upper/lower changeover switch on the receiver to select [Reception authorization on upper only].
(3) Turn the adjustment screw to fine adjust until the monitor output voltage reaches the highest value.
(Adjust both the transmitter and receiver.)



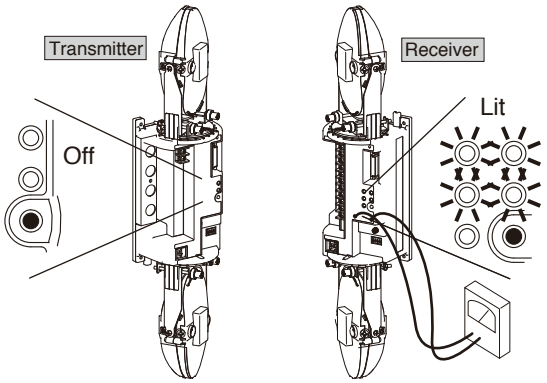
3. Fine adjust the lower level optical axis.

(1) Press the upper/lower changeover switch on the transmitter to select [Only transmit from lower].
(2) Press the upper/lower changeover switch on the receiver to select [Reception authorization on lower only].
(3) Turn the adjustment screw to fine adjust until the monitor output voltage reaches the highest value.
(Adjust both the transmitter and receiver.)



4. Check if the light from another transmitter enters the receiver.

(1) Press the upper/lower changeover switch on the transmitter to select [No transmission].
(2) Press the upper/lower changeover switch on the receiver to select [Reception authorized for both upper and lower].
(3) Check that the alarm LED lights up when the receiver outputs an alarm signal, and that the sensitivity attenuation LED also lights up. Also check the monitor output voltage.



● If no alarm is activated or the sensitivity attenuation LED is not lit

When using multi-level protection, the monitor output voltage may become close to “1 V” due to effects of other photoelectric beam sensors. In such case, readjust the other photoelectric beam sensors to reduce the effects to the minimum possible.
In addition, check that an appropriate channel is set.

Optical Axis Fine Adjustment Using the Alignment Wireless Checker: ER-02 (Sold Separately)

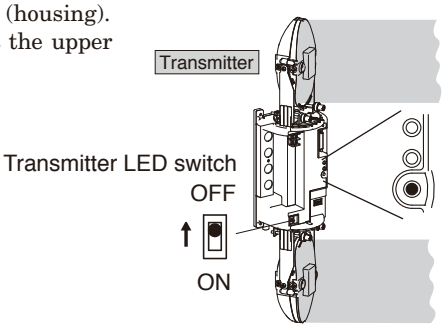
● Accurate adjustments of the optical axis can be achieved by checking the light reception level value using the voltage of the monitor output.
● As the light reception level value can also be checked using the voltage on the transmitter, more accurate adjustments of the optical axis can be achieved.
Using the alignment wireless checker enables easy and accurate beam alignment.
Providing sufficient margin of sensitivity increases resistance to the dense fog, snow, and heavy rain, which makes it possible to construct a highly reliable intrusion alarm system.

Note: For detailed operation procedure of the alignment wireless checker, refer to the instruction manual for the alignment wireless checker ER-02.

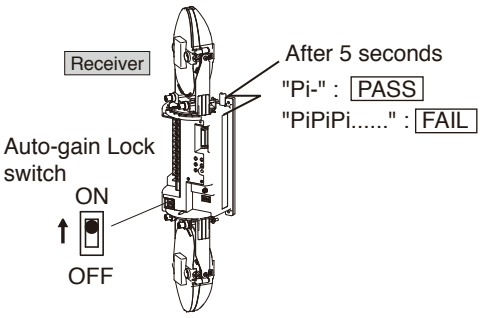
7 OPERATION CHECK

Be sure to perform an operation check after the optical axis adjustment.

1 Set Transmitter LED switch of the transmitter to [OFF] and mount the cover (housing). When Transmitter LED switch is set to [OFF], the LED light turns off, but the upper and lower beams are transmitted.



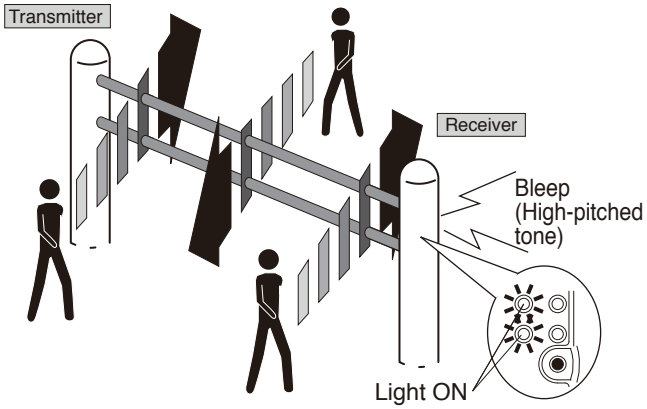
2 After the optical adjustment is completed, set Auto Gain Lock switch to [ON] under the light beam reception condition, and wait for approximately 5 seconds.
During this period, do not shield the optical axis.
A one-time short beep sound [Pi-] shows that the auto gain lock is completed correctly.
(After the auto gain lock, the upper and lower LEDs light off.)
Set Reception authorization LED switch of the receiver to [OFF].



- After the auto gain lock is completed correctly, the walk test mode is activated for 5 minutes regardless of whether the cover is mounted or not. During the walk test mode, the beep sound is generated when the alarm LED lights on by the alarm output. After approximately 5 minutes has elapsed, the walk test mode ends. Even if Auto Gain Lock switch is not set to [ON], set Reception authorization LED switch to [OFF] activate the walk test mode for 5 minutes.
- How to set Auto Gain Lock by remote control.
  The units has terminals for Auto Gain Lock by remote control.
  1. Attached the housing cover of receiver side.
     *Set the Auto Gain Lock switch "OFF" and set the Auto Gain Lock terminal "Open"
  2. Change the Auto Gain Lock terminal to "Close", and wait for 5 sec.
     If a "beep" tone sounds once after 5 sec. the Auto Gain Lock is completed.
     *Don't block the optical axis while 5 sec for initialize.

<<Caution>>

① The intermittent beep sound like "PiPiPi....." shows that the beam reception volume is not enough. In this case, the LED on the side of the insufficient reception volume blinks. Set Auto Gain Lock switch to [OFF], and adjust the optical axis again.
In the multi-level protection, when the light enters from
② other units than the opposing transmitter, turn off the power of the other transmitter to stop transmitting the light beam, then set Auto Gain Lock switch to [ON].



3 Obstruct the sensor beams near the sensor or the center of the detection line and check that an alarm can be output correctly.

If the sound check switch is set to ON, after the auto gain lock has been completed normally, the walk test mode is activated for 5 minutes. The beep sound is generated in synchronization with the alarm output.
The alarm LED lights up according to the alarm output.

If no alarm is output

Turn off the power to the transmitter and check that an alarm is output.

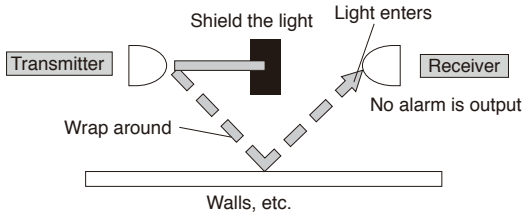
An alarm is output

- The sensor beams are not obstructed → Change the height or location of the sensor so that the light on the detection line can be obstructed completely.
- Light entrance due to wrap around of the beams (Due to light entrance caused by reflection) → Readjust the optical axis, and move the direction of the optical axis away from the reflection surface within the allowable range. (Perform this for both the transmitter and receiver)
- Spill-over light entrance → Change over a channel or synchronized timing.

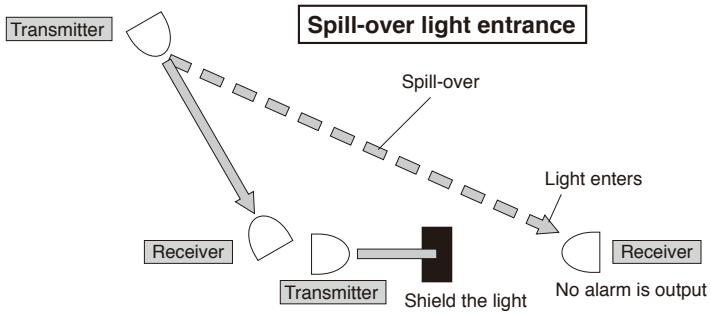
No alarm is output

* It results from the same channel and the same synchronized timing settings.

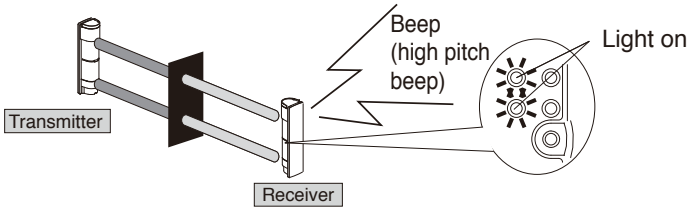
Light entrance due to beam wraparound



Spill-over light entrance



4 In using the environmental output, confirm that the environmental output is generated when the optical axes in both the upper and lower sections are shielded for 20 seconds or more.



8 EXPLANATION OF FUNCTIONS

● This section describes the detailed information of the functions that appear in this instruction manual. Set each function according to the description below.

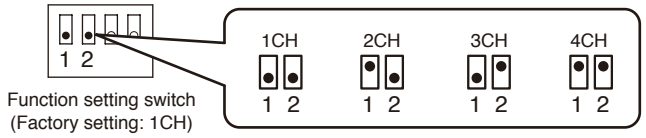
This device features the functions that must be set for operating the device, as well as those that are necessary for adjustment procedures. Perform setting and adjustment by checking the following table.

Whether to set on transmitter or receiver	Setting item	Setting
Both transmitter and receiver	Channel	☐ 1CH ☐ 2CH ☐ 3CH ☐ 4CH
Transmitter only	Transmission power	☐ H ☐ L
Receiver only	Alarm memory	☐ Timer ☐ Remote
	Sound check	☐ ON ☐ OFF
	Response time	☐ 0.05 secs (Standard) ☐ 0.3 secs ☐ 0.7 secs ☐ Other

8-1 MODULATION FREQUENCY CHANGEOVER FUNCTION

Note: Installed on the transmitter and the receiver

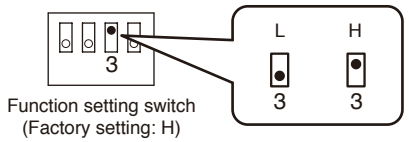
●Changing the channel changes the modulation frequency, which can prevent mutual interference or wraparound of the photoelectric beams. Set corresponding transmitters and receivers to the same channel.



8-2 TRANSMISSION POWER SELECTION FUNCTION

Note: Only installed on the transmitter

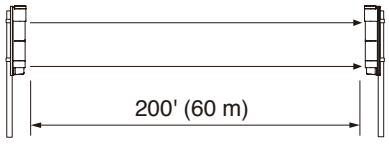
●This function switches the transmission power relative to the protection distance.
Interference or spill-over transmission of photoelectric beams can be prevented by setting an appropriate transmission power.



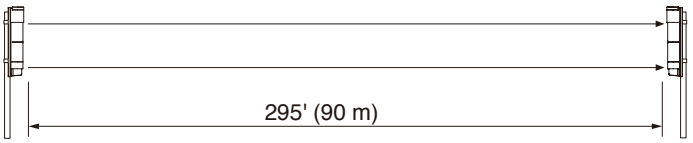
Model \ Power	L	H
PXB- 50HF-KH	Within 83ft (25 m)	Over 25m but within 165ft (50 m)
PXB-100HF-KH	Within 250ft (75 m)	Over 75m but within 330ft (100 m)
PXB-200HF-KH	Within 500ft (150 m)	Over 150m but within 660ft (200 m)

<<E.g.>>

● When PXB-100HF-KH is set at a distance of 200ft (60 m), set to L



● When PXB-100HF-KH is set at a distance of 295ft (90 m), set to H

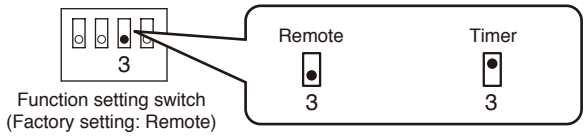


8-3 ALARM MEMORY DISPLAY FUNCTION

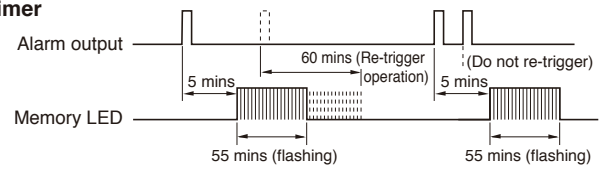
Note: Only installed on the receiver

● When multiple sensors are used, this function allows you to check which sensor was activated by flashing or lighting of the memory LED.
Note: In order to activate a beep sound in synchronization with the alarm output, set the sound check setting to [ON] in the remote mode.

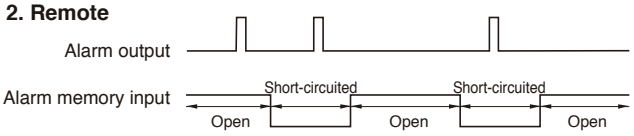
● If you do not wish to use the memory display function, select remote, and open terminal (9) (alarm memory input) on the receiver.



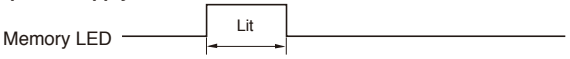
1. Timer



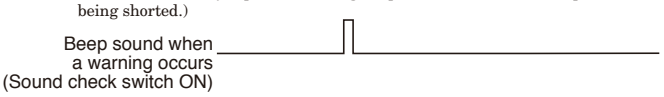
2. Remote



● **Open/Short circuit between the alarm memory terminal and power supply terminal**



You can check whether an alarm has been output while the alarm memory input is open by shorting the alarm memory input to light the memory LED.
(The alarm memory input does not light up if there is an alarm output when it is being shorted.)

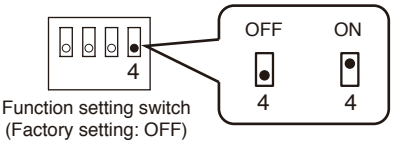


If an alarm is output while the memory LED is lit, the beep sound is generated.

8-4 SOUND CHECK FUNCTION

Note: Only installed on the receiver

● You can be notified of the light reception status or current alarm operation on the receiver by the sound of alarms.



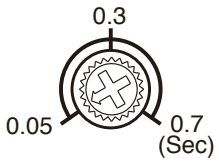
Function setting switch
(Factory setting: OFF)

Item	Operation (status)	Other settings
Light reception level	Light reception level can be checked by the sound tone. (The tone pitch becomes higher as the light reception level increases.)	While the receiver cover is removed.
Walk test mode	The beep sound is generated according to the alarm output. (Activated for approximately 5 minutes after auto gain lock)	
Alarm memory display	If an alarm is output while the memory LED is lit, the beep sound is generated.	Set the alarm memory display function to the remote mode.

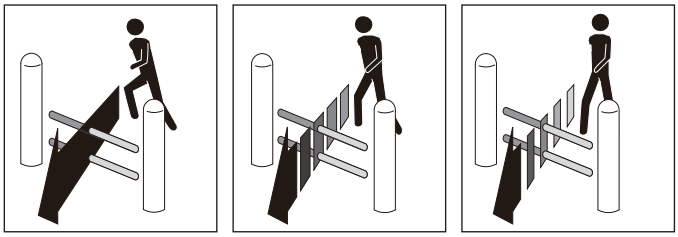
8-5 RESPONSE TIME ADJUSTMENT FUNCTION

Note: Only installed on the receiver

● The detectable interruption time can be adjusted
(Refer to the diagram below to adjust the response time)



Response time adjustment volume
(Factory setting: 0.05)



<<Caution>>

(1) If the interruption time is shorter than the response time, the obstructing object is not detected.

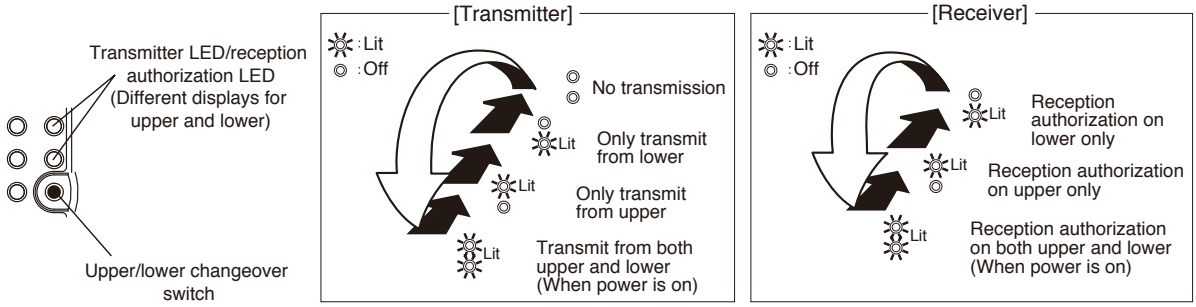
(2) In areas where there are large objects that could be blown and obstruct the optical axis (e.g., birds, a lot of paper, and cardboard), set the response time slightly slower by taking the installation condition into consideration. (However, if the response time is too slow, the units may not detect an intruder.)

8-6 UPPER/LOWER CHANGEOVER FUNCTION

Note: Installed on the transmitter and the receiver

● This function allows you to switch the optical unit to transmit/receive the light by pressing the upper/lower changeover switch.

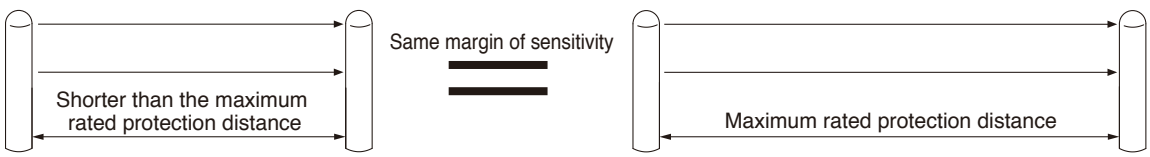
Note: The sensors switch as shown in the diagram below when the upper/lower changeover switch is pressed.



8-7 AUTO GAIN LOCK FUNCTION

Note: Only installed on the receiver

● The margin of sensitivity on this device is set so that an appropriate sensitivity can be obtained when the optical axis is aligned while the device is installed in the maximum protection distance. However, if the actual distance is shorter than the maximum rated protection distance, excessive margin of sensitivity is secured, which could make the device more susceptible to adverse effects of the reflection from the ground or walls. The auto gain lock function helps to adjust to an appropriate margin of sensitivity and fix the setting in the same manner as when the device is installed in the maximum rated protection distance, regardless of the actual installation distance (below the maximum rated protection distance). (However, it is always required that the optical axis is correctly aligned.)



Auto gain lock pass/fail criteria

When the receiver cover is attached, the display appears and the beep sound is generated in approximately 5 seconds according to the pass/fail result.
For detailed information, refer to the table on the right.

Note: The beep sound is generated regardless of the setting of the sound check switch.

: Off : Lit : Flashing

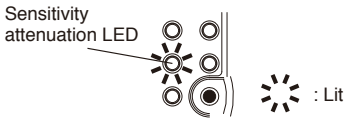
Beep sound	Light reception authorization LED	Result	Cause	Remedy
Beep (high pitch beep) (1 sec)	Off for both upper and lower	Pass	———	———
Beep-beep-beep (high pitch beep) (Intermittent sound for 20 seconds)	Light reception level for the upper beam is insufficient Light reception level for the lower beam is insufficient Light reception level for both the upper and lower beams is insufficient	Fail	(1) Light was being obstructed when the receiver cover was attached. (2) Light reception level is low due to misalignment of the optical axis. Note: The sensitivity attenuation LED is also lit	(1) Remove the item that is obstructing the light beams, re-attach the receiver cover, and check the beep sound. (2) Also, remove the cover from the transmitter, check the actual protection distance and transmission power before adjusting the optical axis again.

8-8 TRANSMITTER LED SWITCH

● The transmitter LED can be turned off.

8-9 LIGHT SENSITIVITY SIGNAL FUNCTION

Note: Only installed on the receiver



● The LED lights up when the light reception level is considered to be insufficient in order to notify the operator of that an inspection is necessary.

8-10 PROGRAMMABLE AGC FUNCTION

Note: Only installed on the receiver

● During adverse environmental conditions such as dense fog or heavy rain, this function temporarily increases the sensitivity of the receiver.
Note: The margin of sensitivity is maintained even if there is a sudden worsening in weather conditions.

8-11 EXTERNAL ENVIRONMENT DIAGNOSTIC FUNCTION

Note: Only installed on the receiver

● The light reception level falls below the specified level under adverse environmental conditions such as dense fog or heavy rain. This function issues an environmental output if such conditions are maintained.
Note: The environmental output continues until the light reception level for both the upper and lower beams recovers to the specified level (for 5 seconds at the shortest).

8-12 ALIGNMENT WIRELESS CHECKER CONNECTION FUNCTION

Note: Installed on the transmitter and the receiver

● Using the alignment wireless checker that is sold separately enables easy and accurate optical axis adjustment.
Providing sufficient margin of sensitivity increases the resistance to the dense fog, snow, and heavy rain, which makes it possible to construct a highly reliable intrusion alert system.

9 TROUBLESHOOTING

・Check the device by referring to the table below. If you cannot restore the device to a normal condition after the check, contact the place of purchase or TAKEX.

Status	Cause	Remedy
Transmitter LED does not light (cover is open)	(1) Power is not on (2) Poor wiring or breaking of wire, short (3) Transmitter is set to [Do not transmit]	(1) Connect the power source (2) Check again (3) Press the upper/lower changeover switch
Alarm LED does not light even if the photoelectric beam is obstructed	(1) Power is not on (2) Poor wiring or breaking of wire, short (3) Photoelectric beam is reflected by some object and entering the receiver (4) Four levels are not obstructed simultaneously (5) Sensor beam is obstructed for less time than the detection response time setting in the receiver	(1) Connect the power source (2) Check again (3) Remove the reflecting object, or change the installation location or optical axis direction (4) Obstruct four levels simultaneously (5) Shorten the detection response time
Alarm LED does not go out (Alarm output does not stop)	(1) Optical axis (alignment) is not aligned correctly (2) There is an obstruction between the transmitter and receiver (3) Transmitter/receiver cover or reflection section is dirty (4) Frequency channel settings on the transmitter and receiver do not match	(1) Perform angle adjustment again and set the gain lock (2) Remove the object (3) Clean using a soft cloth (4) Readjust the frequency channels so they are the same
Continually activated	(1) Poor wiring connection (2) Change of supply voltage (3) Obstruction between transmitter and receiver (objects such as branches that move with the wind) (4) The wiring of the transmitter/receiver is located nearby a power line (5) Unstable sensor installation (6) Transmitter/receiver cover or reflection section is dirty (7) Improper alignment of optical axis (8) A large bird or cat may obstruct the beams (9) Transmission power switch is set to L, which does not keep enough margin of sensitivity	(1) Check again (2) Stabilize the supply voltage (3) Remove the object (4) Change the wiring route (5) Fix in a stable location (6) Clean using a soft cloth (7) Perform optical axis adjustment again, set the gain lock and secure the margin of sensitivity (8) Set the response time to be slightly longer (however, this is not possible if there is a possibility that an intruder could run through at top speed) (9) Set the transmission power switch to H, remove the receiver cover and set the gain lock again

Daily Inspections

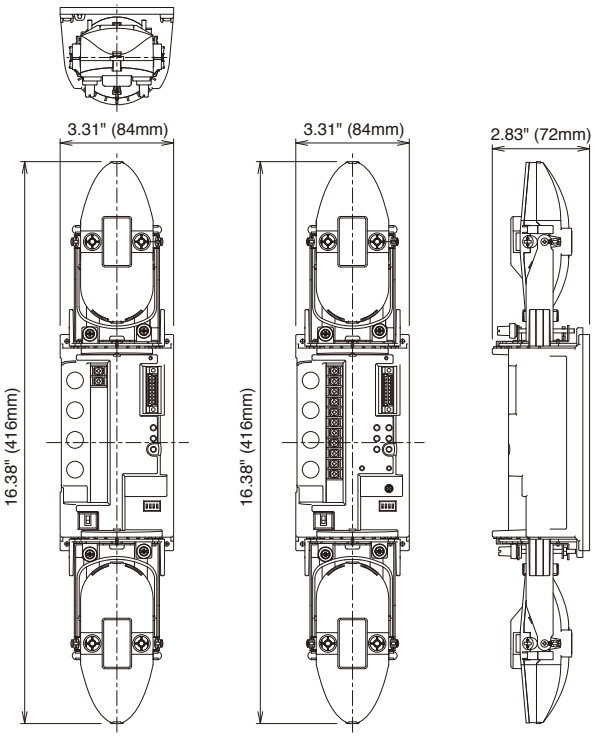
● To clean the device, use a soft, wet cloth and then wipe off any water drops.
If the device is particularly dirty, dip the soft cloth in water that includes a weak neutral detergent. Wipe the device gently with the cloth, then wipe off any detergent that remains. Do not use substances such as thinner or benzene. (The plastic parts may deform, discolor or change their properties.)

● Perform operation checks on a regular weekly basis.

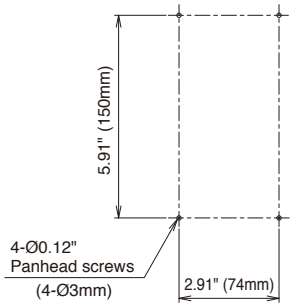
10 SPECIFICATIONS

Model	PXB-50HF-KH	PXB-100HF-KH	PXB-200HF-KH
Detection system	Near infrared pulsed beam interruption system (TR-RE 4 beam simultaneous interruption)		
Infrared beam	Double modulation pulsed beam by LED		
Protection distance	Outdoor 165' (50 m) or less	Outdoor 330' (100 m) or less	Outdoor 660' (200 m) or less
Max. arrival distance	1650' (500 m)	3300' (1000 m)	6600' (2000 m)
Response time	0.05 sec. to 0.7 sec. (Variable at pot)		
Power supply	12 to 30V DC (Non-polarity)		
Current consumption	30 mA or less	32 mA or less	34 mA or less
Alarm output	Dry contact relay output form C Contact action : Interruption time (Min.2sec.) Contact capacity : 30V (AC/DC) 0.25A (resistive load) Protective resistor		
Environmental output	Dry contact relay output form C Action : Activated when weather condition gets worse Contact capacity : 30V (AC/DC) 0.25A (resistive load) Protective resistorv		
Alarm LED	Red LED (Receiver) ON : when an alarm is initiated		
Attenuation LED	Red LED (Receiver) ON : when beam is attenuated		
Ambient temperature range	–31°F to+151°F (–35°C to+66°C)		
Beam adjustment	Horizontal: ±90°, Vertical: ± 20°		
Functions	Modulated beam frequency selection,Tone indicator, Environmental module, Beam power selection,Transmitting power adjutment, Alarm memory indication, Programmed AGC, Auto-gain lock function, Monitorjack, Response time adjustment, Upper/Lower beam switch, Wireless checker		
Mounting positions	Outdoor, Indoor		
Wiring	Terminals		
Weight	Transmitter : 12.6 oz (360g) Receiver : 15.8 oz (450g)		
Appearance	Optical unit : Resin Body : Resin		

11 EXTERNAL DIMENSIONS Unit: inch (mm)



Transmitter Receiver



Reference installation drawing

■Options : Alignment wireless checker : ER-02

Limited Warranty :

TAKEX products are warranted to be free from defects in material and workmanship for 12 months from original date of shipment. Our warranty does not cover damage or failure caused by natural disasters, abuse, misuse, abnormal usage, faulty installation, improper maintenance or any repairs other than those provided by TAKEX. All implied warranties with respect to TAKEX, including implied warranties for merchantability and implied warranties for fitness, are limited in duration to 12 months from original date of shipment. During the Warranty Period, TAKEX will repair or replace, at its sole option,free of charge, any defective parts returned prepaid. Please provide the model number of the products, original date of shipment and nature of difficulty being experienced. There will be charges rendered for product repairs made after our Warranty Period has expired.

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