◢ OPTEX

BOUNDARY GARD ™
BX-100PLUS

Read instruction completely before beginning installation.

· Optex presents a new concept, BOUNDARYGARD™, which protects a building's exterior by detecting intruders before entry is attempted and can also provide a deterrent with its Audible Alarm Indicator before break-in occurs.

· BX-100PLUS is the Photoelectric detector which is designed with this concept. Maximum detection range between transmitter and receiver for BX-100 is 100 ft (30m).
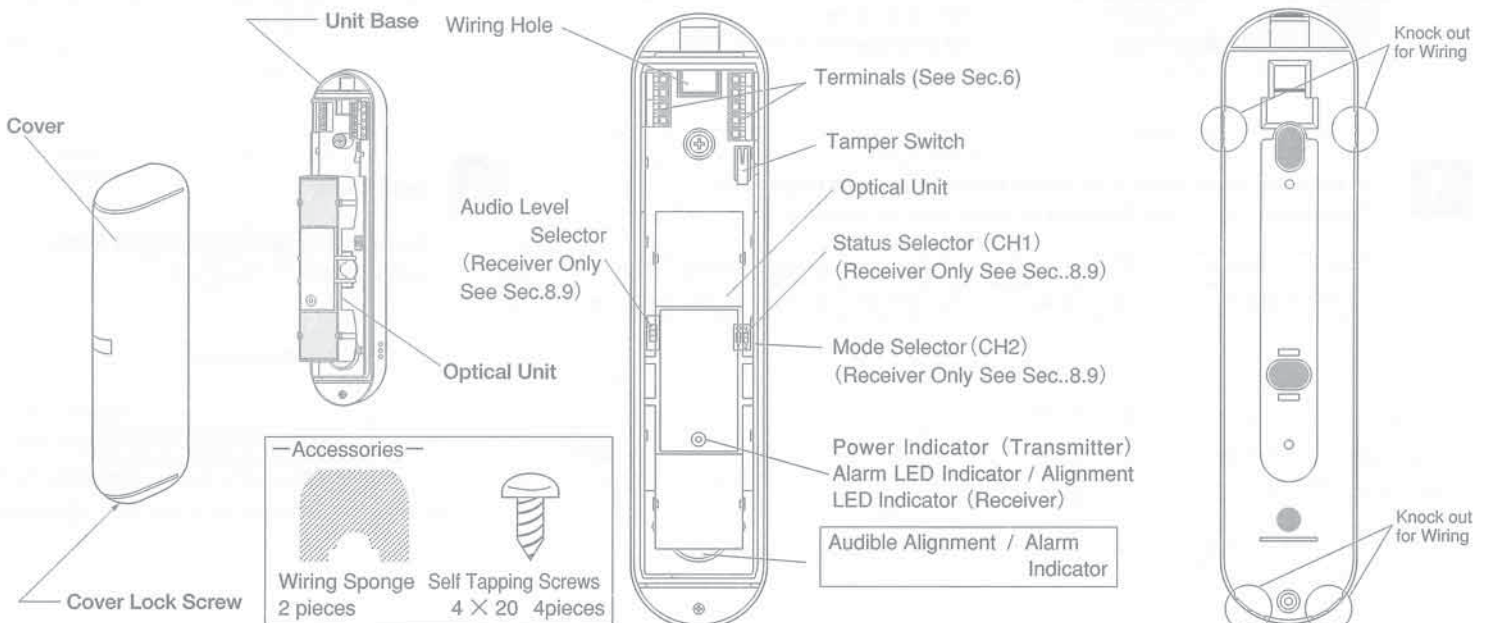
Features

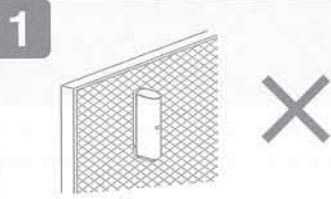|	
1. Compact & Slim design.	: Easily set-up on the wall.
2. Double Output Terminals (Individual N.O. & N.C. outputs)	
3. Audible Alarm Indicator.	: BX-100PLUS can sound an alarm by a buzzer built in the receiver when alarm is occurring.
4. Optical alignment by Audio & Visual.	: Easy optical alignment by Audible Alignment indicator built in the receiver & Alignment LED Indicator.
5. Tamper.	: N.C. output opens when cover is removed.
6. Option.	: White decorative cover (WC-1). White covers are to match the wall color.Hood is included which can be fixed to this cover for rain and frost proof.
	: Spacer (SP-1). To avoid beam interruption by obstructions
	: Metal Guard (MG-1). As the protector for the sensor unit not to be broken by vandalism on outdoor use.
7. Water Proof.	: IP rating : IP54

Safety-Related Precautions

Before installation, make sure to read this instruction manual carefully for safe and effective product operation.

⚠ Warning	⚠ Caution
This icon denotes a situation involving the risk of serious injury or even death, if the warning given is ignored.	This icon denotes a situation involvig the risk of serious injury or other property if the warning given is ignored.

⊘ This icon indicates actions to be avoided. Details of the actions to be avoided are written beside or near icon. (The icon on the left indicates that the product must not be dissembled)

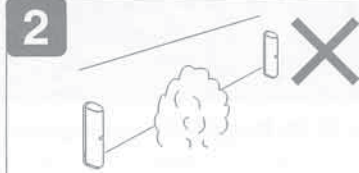| ⚠ Warning		⚠ Warning	
We can not assume responsibility for any damages and accidents using for any applications.		Never attempt to disassemble or modify the products.	
⚠ Warning		⚠ Caution	
Avoid the risk of connecting terminals to the units which require high power supply or current draw.		Avoid directly water supplied by buckets or hose. Water splashed on the unit increases the risk of fire or electric shock.	

1. PARTS IDENTIFICATION

Cover

Cover Lock Screw

Unit Base — Wiring Hole

Optical Unit

Audio Level Selector (Receiver Only See Sec.8.9)

—Accessories—

Wiring Sponge 2 pieces

Self Tapping Screws 4 × 20 4pieces

Terminals (See Sec.6)

Tamper Switch

Optical Unit

Status Selector (CH1) (Receiver Only See Sec..8.9)

Mode Selector (CH2) (Receiver Only See Sec..8.9)

Power Indicator (Transmitter) Alarm LED Indicator / Alignment LED Indicator (Receiver)

Audible Alignment / Alarm Indicator

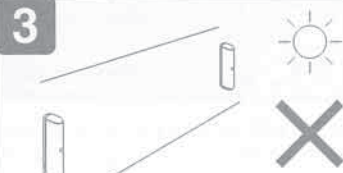Knock out for Wiring

Knock out for Wiring
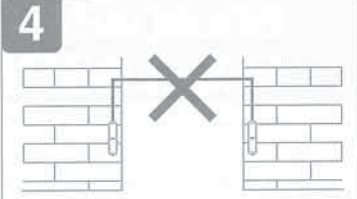
2. INSTALLATION NOTES

1

Mount unit on a solid surface only.

2

Avoid installing the unit where falling leaves or growth of branches will block the beam.

3

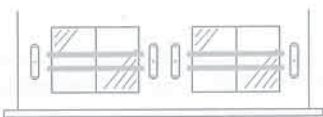Prevent direct sunlight from entering into internal optics.

4

Avoid aerial wiring.

5 Line Protection

Set up Receivers and Transmitters as drawing in the case 2 sets of BX-100 PLUS will be installed not to receive the other transmitter's beam.
Avoid to install 3 sets of BX-100PULS on the line.
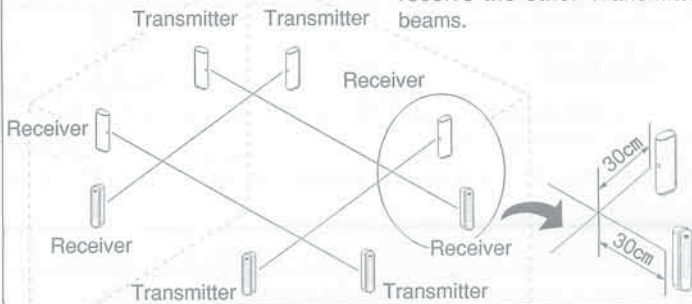
Transmitter A Receiver A ReceiverB TransmitterB

6 Beam Stacking

Set up Receivers and Transmitters as drawing. And it should be at intervals of 27″ (70cm)between upper sensor and lower one.
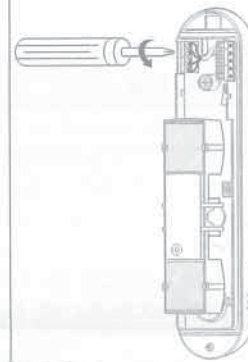
T   R R   T
T   R R   T

70cm
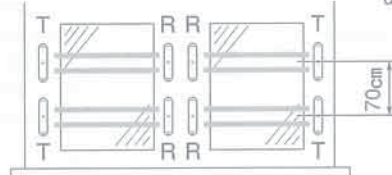
7 Perimeter Protection

Set up Receivers and Transmitters as drawing. And receivers should be at intervals of 12″ (30cm) not to receive the other Transmitter's beams.
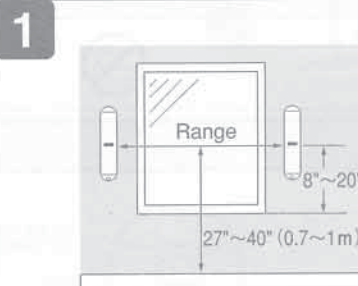
Transmitter Transmitter

Receiver

Receiver

Receiver

Receiver

Transmitter Transmitter

30cm
30cm

8

Keep appropriate space for access the terminals between the unit and the wall as drawing.

Wall

BX-100PLUS

3. INSTALLATION HINTS

1

Range

8"~20" (0.2~0.5m)

27"~40" (0.7~1m)

Detection range and installation height.
Detection range.
Maximum distance of between Receiver and Transmitter is 100 ft (30m).
The installation height should be at 27"~40" (0.7~1m) from ground and 8"~20" (0.2~0.5m).
Be sure to set up at same height.

2 Alignment angle

Horizontally 184°
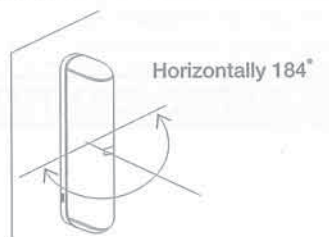
3 In the case, when there is no space to set up at same height with Transmitter, set up the Receiver in sweet area as drawing.

Detection Range	17 (5)	33 (10)	50 (15)	66 (20)	82 (25)	100 (30)	ft (m)
SWEET AREA	12 (30)	16 (40)	20 (50)	20 (50)	20 (50)	20 (50)	inch (cm)

5m   10m   15m   20m   25m   30m

SWEET AREA
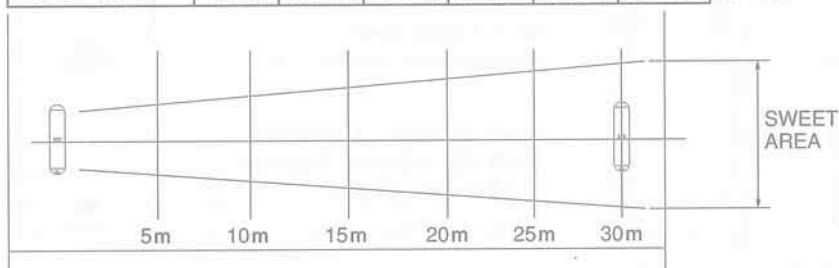
4 Front set up

Be sure to set up at same height on the vertical wall.

Front set up

4. INSTALLATION METHOD

1

Loosen the cover lock screw and remove the front cover.

2

Pull out the wire through the wiring hole on the Unit Base and connect to the terminal (See Sec.6).

3

Wiring Sponge

Be sure to close the wiring hole with sponge for rain, dust and insect protection after wiring.

4

Attach the Unit Base to the wall with the screw. See Sec.5 before setting up in the case you use optional parts,white decorative cover or Spacer.
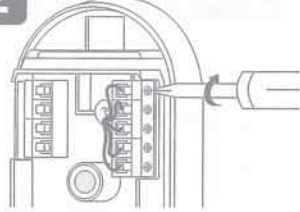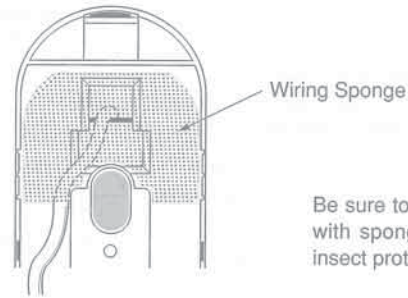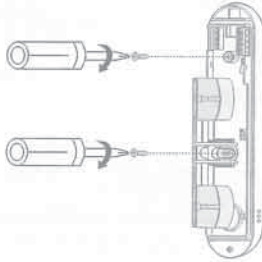
5

After checking optical alignment and operation check (See Sec.8) replace the cover, and fasten the cover lock screw tightly.

5. INSTALLATION METHOD OF WHITE DECORATIVE COVER (WC-1) & SPACER (SP-1)

White decorative cover, WC-1 are optional parts.

HOOD

WC-1
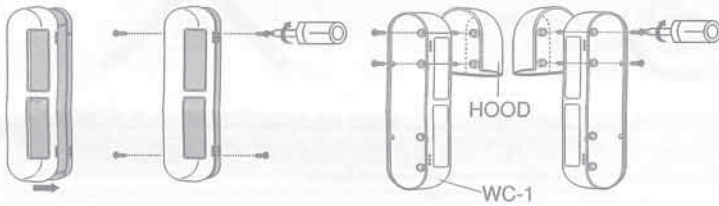
· White Decorative Cover, WC-1 is optional.
  Place the WC-1 on the cover of the BX-100 and tighten the provided four (4) screws through the top and bottom holes located on both sides of the unit.

· The hood which included in the package can reduce the factor of false and mis-alarm caused by rain, frost, or snow.
· Attach the hood to WC-1 with the screw as drawing.
· Then, attach WC-1 with hood to unit base as above.

Spacer, SP-1 is optional.
SP-1 allows the units to make space between the units and wall to avoid interruption by obstructions. (2 spacers can be used per unit)

UP

UP

DOWN
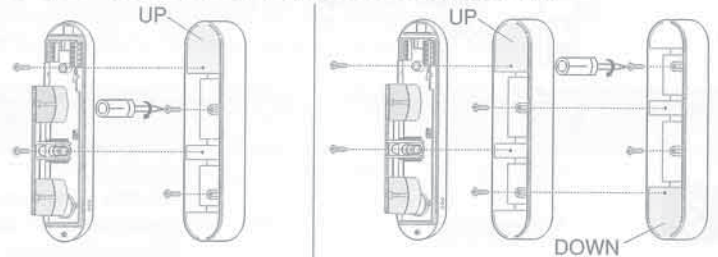
1 piece of SP-1 (50mm)
After mounting SP-1 on the wall, install the BX-100PLUS (See Sec. 4) as drawing

2 pieces of SP-1 (100mm)
After mounting SP-1 on the wall, pile up one more SP-1. Then install the BX-100PLUS (See Sec. 4) as drawing

6. TERMINAL

Receiver

Power input
10.5~28VDC

Alarm Output N.O

Audio Control Input
(See Sec.9)

Tamper N.C.

Alarm Output N.C.

Transmitter

Power input
10.5~28VDC

Tamper N.C.
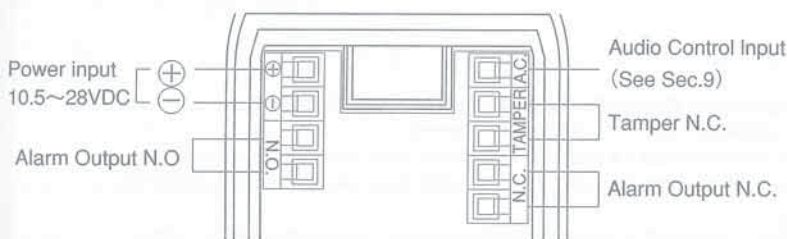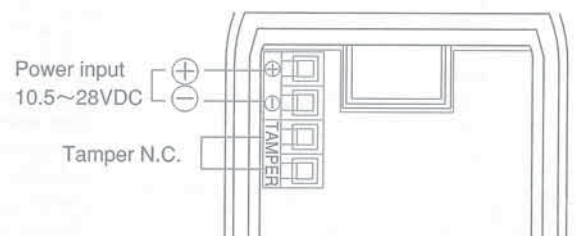
Wiring Distance

Power wires should not be exceed following length.

When using two or more units on the wire, the maximum length is obtained by dividing the wire length listed below by the number of units used.

Wire Size	Power Supply 12VDC	24VDC
AWG22 (0.33mm²)	495 (150)	1640 (500)
AWG20 (0.52mm²)	820 (250)	2955 (900)
AWG18 (0.83mm²)	1315 (400)	4595 (1400)
AWG16 (1.31mm²)	1970 (600)	6565 (2000)

ft (m)

7. WIRING

Refer to the drawing

2 Set in the Line

Power unit should be parallel connected.
Alarm output should be series connected when system is N.C.
Alarm output should be parallel connected when system is N.O.

Transmitter   Receiver   Receiver   Transmitter

Alarm Input

Control Panel
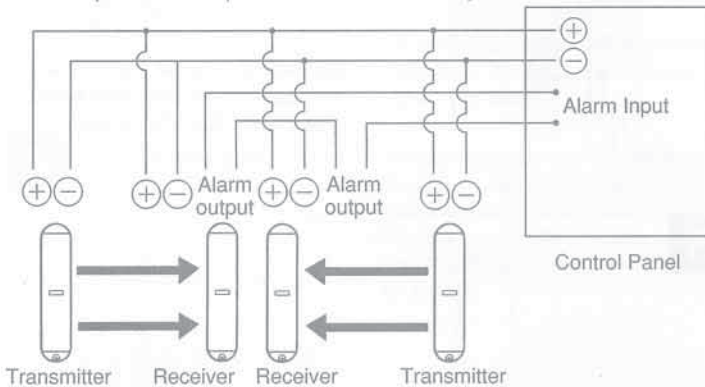
Connecting the peripheral devices

Control Panel

Alarm Input

POWER SUPPLY

Transmitter   Receiver   Silen

N. C. N. O.

8. OPTICAL ALIGNMENT

Beams should be aligned perfectly to get reliable porformance following method. The alignment should be done on condition that the cover of both Transmitter and Receiver are removed.

1 Mode Selector (CH2)

DIP SW 1.STATUS 2.MODE

ON
OFF
1 2
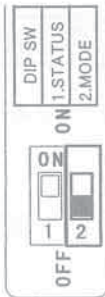
Select CH2 OFF to select Alignment Mode. This setting allows to check the Alignment Status by Audible Alignment Indicator and Alignment LED Indicator.

2

Turn the optical unit with your hand as drawing.Both optical unit of Transmitter and Receiver should be faced each other up to indicate beep sound and flickering of LED.

The optical unit should be adjusted not to touch the miller's surface of it as drawing indicates. Avoid breaking the beams with your hand.

3 Receiver

Audio Level Selector

Alignment LED Indicator

Audible Alignment Indicator
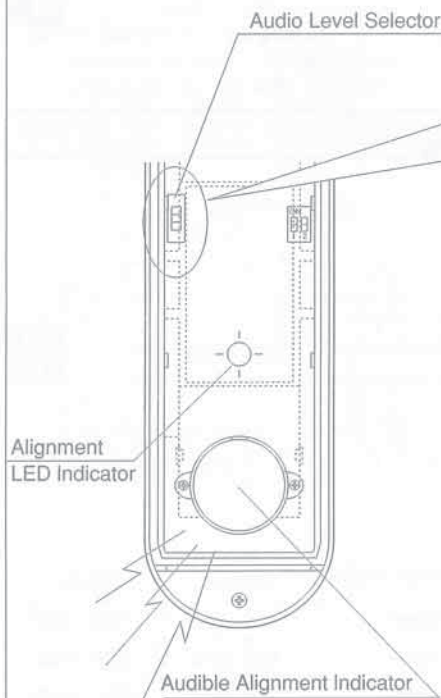
Adjust finally using Audible Alignment Indicator and Alignment LED Indicator.

① Adjust the beam alignment of Receiver until alignment status achieves Good level in Audible Alignment Indicator and Alignment LED Indicator as the following chart.
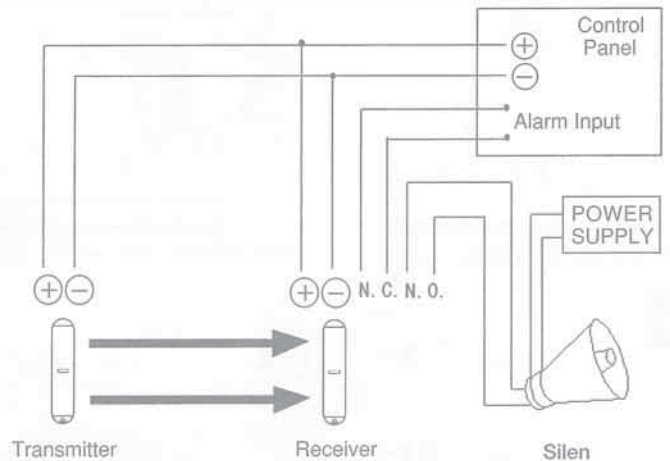Audio Level Selector can set 3 volume level during Alignment Mode as follows.

VOLUME SELECT MAX / MIN / OFF
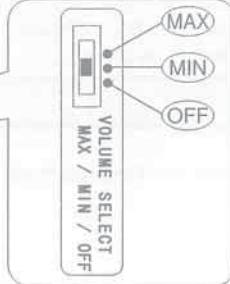
MAX — Select MAX when big beep sound is required. (ex. Alignment of Transmitter)

MIN — Select MIN when small beep sound is required. (ex. Alignment of Receiver)

OFF — Select OFF when beep sound is not required.

② Adjust the beam alignment of Transmitter by alignment status until it achieves excellent in Audible Alignment Indicator and Alignment LED Indicator as drawing.
Optical Alignment is accomplished if it Indicates Good level after checking alignment status.
If Audible Alignment Indicator and Alignment LED Indicator do not indicate Good, realign by checking ①,②.
Should adjust the beam alignment of Receivers until alignment status achieves Excel level, Audible Alignment Indicator indicates long beeps, for reliable operation.

Alignment Level	POOR	GOOD	EXCEL
Alignment LED Indicator	Flickering Slow — — — ➤ Fast	Continuously on ➤	
Audible Alignment Indicator	Pulsed tone Slow — — — — ➤ Fast		Continuous tone ➤

Alignment status does not achieve good level when adjusted by using suggested method.

In the case Audible Alignment Indicator do not indicate the pulsed sound and Alignment LED Indicator do not indicate light in spite of adjusting.

Check if Receiver and Transmitter are at the same height. → N.G. → Adjust at same height.

↓ O.K

Adjust the alignment up and down as follows.
Note : it is effective when the Receiver and Transmitter was Side set up only.
Be sure to set up at same height on the vertical wall.

Side set up   Front set up
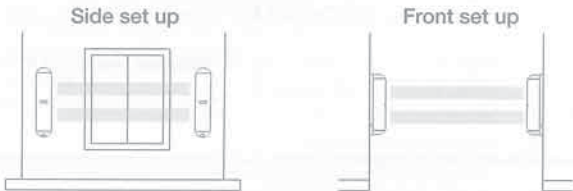
Adjustment of the alignment vertically.

The hole of base unit is large to be used for vertical adjustment.
Loosen the lock screw and shift the unit base right and left, adjust the beam alignment vertically.
However it is effective when the Receiver and Transmitter was Side set up only.
Attach the unit at same height and mount flat surface.

±2°

---

4 Mode Selector (CH2)

DIP SW 1.STATUS 2.MODE

ON / OFF 1 2

Alarm Mode
↕
Alignment Mode

Select CH2 ON to select Alarm Mode after optical alignment when Audible Alignment Indicator indicates beep sound and Alignment LED Indicator is flickering.
This setting allows Audible Alignment Indicator to switch to Audible Alarm Indicator.
If Mode Selector is not selected to Alarm Mode, the beep sound of buzzer would not stop.
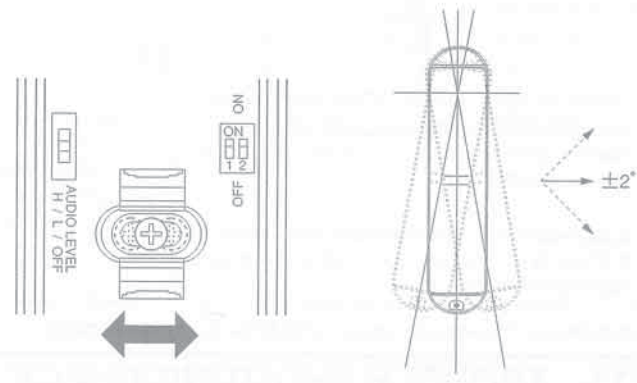
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9. AUDIBLE ALARM INDICATOR FUNCTION

Audible Alarm Indicator is the function which warns against intruders with the beep sound (70dB) when they block the beams.
This function can be controlled by program output of Control Panel.
Audible Alarm Indication Function is not intended to replace the required audible sounding devices of a UL Certified Burglar Alarm System.

Status Selector (CH1)
Select CH1 ON or OFF refer to following chart.

DIP SW 1.STATUS 2.MODE

ON / OFF 1 2

Alarm : Closed/Low
↕
Alarm : Open/High
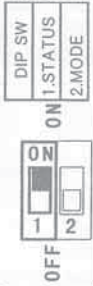
○Set the Audible Alarm Indicator to indicate beep sound only when they block the beams.
This function can be controlled by program outputs of Control Panel.
Select CH1 ON or OFF refer to following chart.

Detector Setting / CP's Status	Alarm : Closed / Low	Alarm : Open / High
Arming	Closed / 0-1VDC	Open / 5-18VDC
Disarming	Open / 5-18VDC	Closed / 0-1DVC

Audio Level Selector

MAX
MIN
OFF

VOLUME SELECT MAX / MIN / OFF
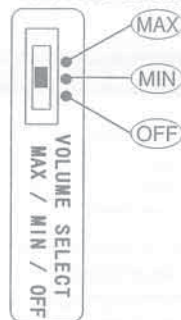
Select the Audio Level Selector MAX or MIN when the Audible Alarm Indicator is used. The volume is always MAX not to concern the setting is MAX or MIN.
Select OFF when the function is not used.

＜Wiring for setting the Audible Alarm Indicator only when the status of control panel is arming.＞

Non-Voltage type
The switch is acquired when there is not PGM output at control panel.

○In the case there is no Non-Voltage type output on the Control Panel.

○In the case there is Non-Voltage type output on the Control Panel.

Optional Switch
(Control Panel)
Negative type output
Audio control Input
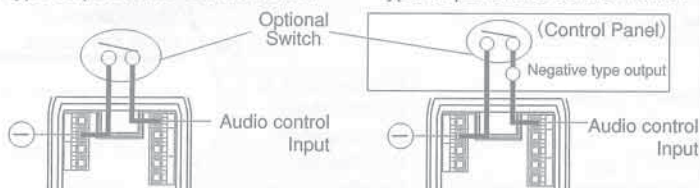
Voltage type
The switch is acquired when there is PGM output at control panel.
Connect BX-100PLUS to control panel as drawing.

⊕ ⊖ PGM output
(Control Panel)
Audio control Input
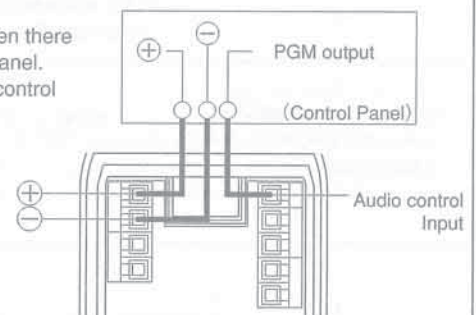
In the case Audio Control output is not connected, select the Status Selector (CH1) as follows.
Select CH1 OFF when Audible Alarm Indicator is acquired.   Select CH1 ON when Audible Alarm Indicator is not acquired.

10. CONFIRMATION OF ACTION

Be sure to confirm after Installing.

Alarm LED Indicator

Select the Mode Selector (CH2) ON to select Alarm Mode for conducting a walk test. (See Sec 9). Check that Alarm LED Indicator of the Receiver is OFF.

If the Alarm LED Indicator is ON even though the beams are not blocked, re-adjust the optical alignment (See Sec. 8).
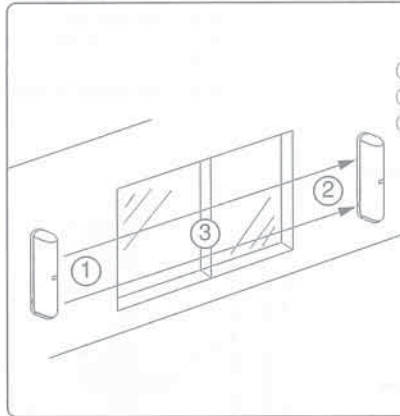
After replacing the cover of both transmitter and receiver, conduct a walk test from at least the following three points.
① In front of Transmitter.
② In front of Receiver.
③ At the middle point of between Receiver and Transmitter.

Installation is accomplished after checking the Audible Alarm Indicator indicates beep sound when the beams are blocked.

If the Audible Alarm Indicator does not indicate beep sound even though the beams are blocked, re-adjust the optical alignment (See Sec. 8) or refer to the following "TROUBLE SHOOTING CHECK SHEET" (See Sec 11) and follow them.

After a walk test, select the Audio Level Selector OFF when beep sound is not required.

Walk test and cleaning the covers should be conducted annually.

11. TROUBLE SHOOTING CHECK SHEET

When defective conditions are encountered, proceed with the following.
If you have any questions on these procedures, call Technical Support.

1. "No Action" on the transmitter or receiver after power has been applied.

Check to see that power cables are properly connected and polarity is correct.
— YES → Check to see that input power is within 10.5-28VDC.
— YES → Call Technical Support.

NO → Correct terminal connection and/or polarity.

NO → Remove power wires from Power supply's output terminals. Does the power now satisfy the requirements?

There is a possibility that the power line has been cut.

Power cables may be too long for the gauge being used. This will cause the voltage to drop. Use heavier cable or use additional power supplies closer to the farthest units. If you are unsure of the proper wire gauge, call Technical Support.

YES → The power line is short circuited or grounded. Repair as required.

NO → The power supply may be faulty, repair is required, or call power supply manufacturer.

2. Alarm signal is being generated or the Audible Alarm Indicator does not stop even though beams are not blocked

Go to page 1, trouble shooting procedure, number 1.

NO → Check to see that power cables are properly connected.

YES → Is Mode Selector(CH2) selected ON, which means Alarm Mode?

NO → Select Mode Selector(CH2)ON, which means Alarm Mode

YES → Mode Selector(CH2)OFF, which means Alignment Mode. Is the buzzer or the Audible Alignment Indicator beeping? Is the Alignment LED Indicator on the receiver ON?

YES → Remove the alarm circuit wire from the receiver, then check the alarm output relay with volt meter.
— Output is in alarm condition. → Call Technical Supprot.
— Output is in the normal condition. → Check the alarm circuit wires for shorts, opens or grounds. Also, check the control panel for proper function.

NO → Re-align the beams using the Audible Alignment Indicator and the Aignment LED Indicator. Is the buzzer of the Audible Alignment Indicator beeping? Is the Alignment LED Indicator on the receiver ON?

YES → Does the unit work properly?
— YES → Completed.

NO → Is the Power indicator on the transmitter ON?
— YES → Double check to see that there are no objects that may be blocking the beams.
— OK → Remove the obstructions, or move the beams.
— NG → Call Technical Supprot.

NO → Go to page 1, see trouble shooting procedure, number 1.

3 . "No Action" on alarm zone even though the beams are blocked.

The Alarm LED Indicator ON but control panel does not recognize the alarm signal. → Remove the alarm circuit wires from the receiver. Check the action of the alarm output relay.

— YES → When the power for the transmitter is removed, the alarm output relay activates.

— NO → Call Technical Support.

— YES → Is the control panel zone's "Loop Response Time" set to within 1 second.

— NO → Re-pwiring of the alarm circuit wire is required. Replace or repair as necessary.

— YES → The control panel may be malfunctioning, call the control panel manufacturer.

— NO → Re-program the Zone's "Loop Response Time" accordingly.

When the receiver's cover is removed and the beams are blocked, the Alarm LED Indicator does not turn ON. → When the power for the Transmitter is shut down, the relay goes into an alarm condition.

— YES → The beams may not be blocked completely by your intended target.

— YES → Adjust the installation height to block the beams completely.

— NO → Are there any other photoelectric beams near the installation site?

— YES → Remove power from all other transmitters and conduct walk test. Does the unit work properly?

— YES → The unit may be affected by other beams. Change the layout of the beams or call Technical Support.

— NO → Remove the alarm circuit wire from the receiver, place your volt meter on resistance and measure the alarm output relay. Does the relay open when power is removed?

— YES → The unit may be affected by electrical noise. May need to use shielded wire and/or metallic conduit. Call Technical Support if you are unsure of the proper shielding techniques.

— NO → Call Technical Support.

Although the Alarm LED Indicator is ON, the Audible Alarm Indicator is not sound. → Does the Audio Level Selector for buzzer select MAX or MIN?

— NO → Select the Audio Level Selector MAX or MIN.(See Sec.8)

— YES → Call Technical Support.

4 . False activation

Is the buzzer of the Audible Alignment Indicator beeping? Is the Alignment LED Indication on the receiver ON?

— YES →

There are plants, trees or debris that may block the beam during windy conditions. → Cut off branches, mow grass or secure debris to avoid unnecessary activation. Or move the beams.

The unit may be detecting a large bird. → Change the mounting place to avoid breaking beams for birds.

The units may be detecting small animals(dog,cat,etc...) → Change the mounting place or height to avoid breaking beams for small animals.

The receiver is facing directly at the rising or setting sun. → Move the beams to avoid the rising or setting sun. Or switch transmitter and receiver locations. Call Tecnical Support.

There are cars that may block the beam. → Keep out the cars blocking beams, or move the beams.

Bad wiring or corroded splices. → Chack for shorts, open grounds and high resistance values on the alarm circuit wires only, then repair as required. Or, if everything looks to be OK, call Technical Support for further assistance.

The covers are very dirty or dusty. → Clean covers both inside and outside using a dry soft cloth or mild soap and water only. Do not use any oil or alcohol based solvents to clean the covers; doing so will cloud or etch the cover and reduce its efficiency.

— NO → Re-align the beams using the Audible Alignment Indicator and the Alignment LED Indicator.

Change the footing, pole or structure to insure a stable mounting surface.

— NO → Are the beams mounted on a stable footing with little movement of the mounting structure?

— YES → (to false activation causes)

Important
The majority of false activation can be attributed to poor beam alignment. Should adjust the beam alignment until alignment status achieves "Good" level.

12. SPECIFICATIONS

Model	BX-100PLUS
Range	Outdoor 100ft.(30m) Indoor 200ft.(60m)
Maximum Arrival Distance	1000ft.(300m)
Detection Method	Simultaneous interruption of 2 infrared beams
Beam Characteristics	Pulsed Infrared
Interruption Period	50msec
Power Input	10.5 - 28VDC
Curreny Draw	55mA(Stand by)/ 75mA (Max)
Alarrn Period	2±1 sec (Delay)
Relay Output	2 relay outputs N.O.and N.C. 28VDC 0.2A(Max)each
Beeping Period	15 sec
Volume of Audible Alarm Indicator	70dB(at1 meter distance)
Tamper	N.C. opens when cover is removed 28VDC 0.2A(Max)
Operating Temperature	-30˚F~+131˚F(-35℃~+55℃)
Environmental Humidity	95 % (Max)
Alignment Angle	±92 Horizontal
Mounting	Wall(indoor / outdoor)
Weight	14.1oz(400g)
IP rating	IP54
Accessoriest	Self Tapping Screws x4 Wlring Sponges x2
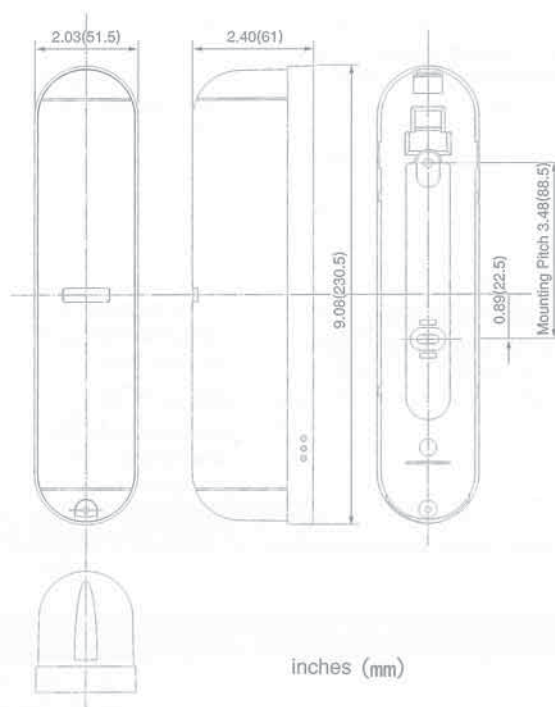
N219

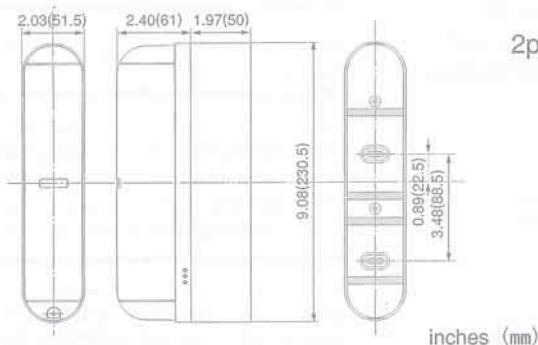Specification and design are subject to change without prior notice.

13. DIMENSIONS

inches (mm)

WC-1
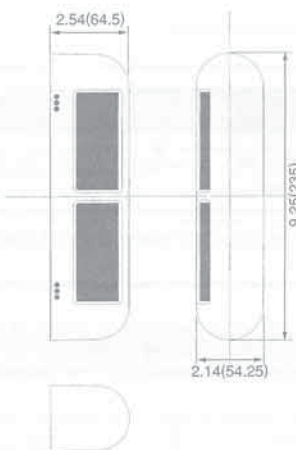
WC-1&HOOD
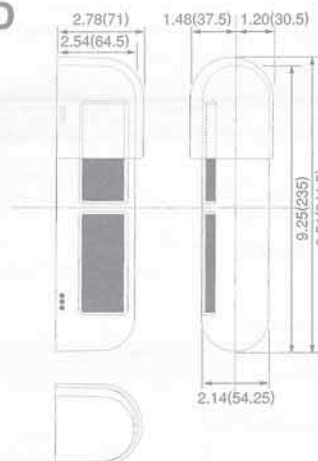
SP-1

1piece

2pieces

inches (mm)

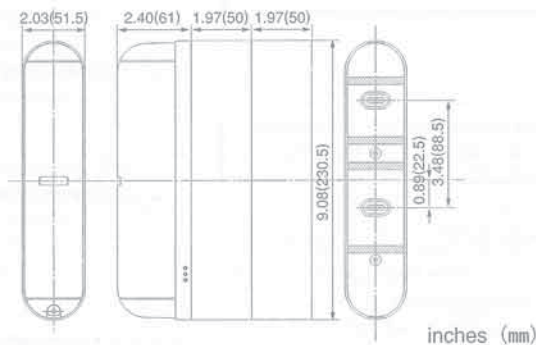inches (mm)

NOTE

This unit is designed to detect an intruder and activate an alarm control panel.
Being only a part of complete system, we can not accept responsibility for any damages or other consequences resulting from an intrusion.