INTRODUCTION

1-1 BEFORE YOUR OPERATION

- Read this instruction manual carefully prior to installation.
- After reading, store this manual carefully in an easily accessible place for reference.
- This manual uses the following warning indications for correct use of the product, harm to you or other people and damage to your assets, which are described below. Be sure to understand the description before reading the rest of this manual.

⚠️ Warning
Failure to follow the instructions provided with this indication and improper handling may cause death or serious injury.

⚠️ Caution
Failure to follow the instructions provided with this indication and improper handling may cause injury and/or property damage.

⚠️ This symbol indicates prohibition. The specific prohibited action is provided in and/or around the figure.

⚠️ This symbol requires an action or gives an instruction.

 CONTENTS

1 INTRODUCTION ................................................. 1
   1-1 BEFORE YOUR OPERATION .................. 1
   1-2 PRECAUTIONS ................................. 2
   1-3 PARTS IDENTIFICATION ............... 2
2 PREPARATIONS .................................................. 2
   2-1 ORDERING DETECTOR BATTERIES........2
   2-2 CHECKING THE WIRELESS TRANSMITTER SIZE 2
3 INSTALLATION .................................................... 3
   3-1 WALL MOUNTING .................................... 3
   3-2 POLE MOUNTING ................................. 4
   3-3 MOUNTING IN THE BEAM TOWER ................ 5
   3-4 WIRING ................................................. 7
4 SETTING ............................................................ 8
   4-1 FUNCTION ................................................ 8
   4-2 4 CHANNEL BEAM FREQUENCY SELECTOR , 8
   4-3 OPTICAL ALIGNMENT ............................... 9
   4-4 BEAM INTERRUPTION ADJUSTMENT .......... 9
   4-5 ADJUSTING OUTPUT ................................ 10
5 OPERATION CHECK ............................................ 11
   5-1 LED INDICATION ..................................... 11
   5-2 OPERATION CHECK .............................. 11
   5-3 TROUBLE SHOOTING ........................... 11
6 SPECIFICATIONS ................................................ 12
   6-1 SPECIFICATIONS ...................................... 12
   6-2 DIMENSIONS & OPTION ........................... 12
1-2 PRECAUTIONS

Install the unit on a stable surface.

Install the pole in a location where sufficient stability can be ensured.

Do not install the unit in a location where trees, leaves, or other objects that may swing in the wind may block the beam.

Do not install the receiver in a location where it is exposed to direct sunlight.

Observe the prescribed transmitter-receiver distance (range) and installation height.

AX-100TFR
Detection range: 30 m (100 ft.)

AX-200TFR
Detection range: 60 m (200 ft.)

Installation Height
0.7 m - 1 m
(2.3 ft. - 3.3 ft.)

The pole size should be φ43 - 48 mm (φ1.69" - 1.89").

Do not allow the infrared beam from a different model to reach the receiver.

The pole size should be φ43 - 48 mm (φ1.69" - 1.89").

Do not install the unit more than 1 m (3.3 ft.) away from the wall or fence that are running parallel to the beam.

The cross (×) mark indicates prohibition.

1-3 PARTS IDENTIFICATION

Cover
Main unit
Back box
Chassis

Cover lock screw
Harness retainer plate
Back box lock screw

Accessories

M4×30 screws: 4
M3×8 screws: 6
Pole mounting bracket set
U-brackets: 2
Velcro tape: 2 sets

Removing the Back Box >>

Removing the Cover >>

2 PREPARATIONS

2-1 ORDERING DETECTOR BATTERIES

Specified batteries: Four LSH20 batteries manufactured by SAFT
For information about batteries, visit the following website and contact your local SAFT sales representative.

2-2 CHECKING THE WIRELESS TRANSMITTER SIZE

Use two wireless transmitters for each of receivers and transmitters. When wireless transmitters with two or more inputs are available, use one wireless transmitter for each of transmitters and receivers.

The following figure shows the dimensions of the wireless transmitter installation space in the back box. Note that transmitters with dimensions greater than those are not applicable.

Note

• Be sure to monitor the alarm and low battery outputs.
• To monitor the tamper output, include a wireless transmitter supporting three or more inputs into the system.
3 INSTALLATION

3-1 WALL MOUNTING

1 Remove the chassis from the back box.

2 Fix the chassis to the wall.

3 Connect the cables from the back box to the wireless transmitters.

Caution
After mounting the chassis, wiggle the tamper bushing with your thumb and forefinger to ensure the tamper works properly.

Receiver-Wireless Transmitter Connection
Yellow/Yellow-white cable: For alarm
Green/Green-white cable: For low battery
Black/Black-white cable: For tamper

Transmitter-Wireless Transmitter Connection
Green/Green-white cable: For low battery
Black/Black-white cable: For tamper

Caution
• When N.O. wireless transmitters are used, see "Using the N.O. type transmitter" in sec. "3-4" to change the wiring.
• Use the specified batteries for the wireless transmitters.

4 Insert the specified batteries into the back box.

Warning
• Do not use batteries other than those specified. Specified batteries: Four LSH20 batteries manufactured by SAFT
• Do not mix batteries that have different levels of power remaining (i.e., new and used batteries). Not observing the above may result in an explosion, leakage of electrolyte, emission of toxic gases or other outcomes that may be harmful to people and property.

Caution
Remove all batteries prior to replacing with new ones. If this is not followed, the low battery indicator LED will not reset and continue to flicker.

5 Fix the wireless transmitters in the back box.

6 Run the cables so that they are not pinched between the chassis and back box.

7 Install the back box onto the chassis.

Tighten the back box lock screw.
3-2 POLE MOUNTING

-Single set

1. Remove the chassis from the back box.

2. Using a screwdriver or similar tool, break the knockout portion as shown.

3. Install three pole mounting brackets on the chassis.

4. Fix the chassis on the pole.

5. Take steps 3 through 6 refer to sec. "3-1" to install the wireless transmitters and batteries in the back box, and then install the back box on the chassis.

- Two detectors in opposing directions

1. Remove the chassis from the back box.

2. Using a screwdriver or similar tool, break the knockout portion as shown.

3. Install three pole mounting brackets on the chassis.

- Caution

After mounting the chassis, wiggle the tamper bushing with your thumb and forefinger to ensure the tamper works properly.

Knockout two locations pairing in a horizontal line.

Install the bracket in the knocked-out locations in step 2.

M3×8 screw (supplied) Pole mounting bracket (supplied)

M4×30 screw (supplied)

U-bracket (supplied)

Choose a different pair of knockouts.

Detectors 1

Detectors 2
4 Fix the chassis on the pole.

3-3 MOUNTING IN THE BEAM TOWER
Mounting inside optional beam tower.

1 Remove the cover from the detector.

2 Loosen the main unit fixing screw and remove the main unit from the back box.

3 Remove the harness retainer plate.

4 Open the wiring hole in the top of the main unit using pliers.

5 Remove the chassis from the back box.

---

Caution
After mounting the chassis, wiggle the tamper bushing with your thumb and forefinger to ensure the tamper works properly.

Refer to sec. “3-1” steps 3 through 6 to install the wireless transmitters and batteries in the back box, and then install the back box on the chassis.

Caution
Cables are connected between the back box and the main unit. Do not exert an excessive amount of force on the cables. Handle the main unit with care.

Loosen the main unit fixing screw.

Main unit

Harness retainer plate (sticker)

Tighten the back box lock screw.

Wiring hole

Loosen the back box lock screw.
6 Fix the chassis and main unit mounting bracket (optional) in the tower.

Caution
Tamper bushing (option: MP-4)

After completing the settings and operation check, insert the tamper bushing into each transmitter/receiver.

• The switch selection is not recognized with the tamper bushing inserted. Remove the tamper bushing before selecting a function using the switch.
• After completing the settings, be sure to insert the tamper bushing to check that all LEDs are OFF. Without the tamper bushing, the LEDs are kept ON, which consumes more battery power.
• Monitor Jack Output become disable when tamper bushing inserted.
• When inserting the tamper bushing, the beam alignment test point will be disabled. Please complete the alignment procedure before inserting tamper bushing.

How to remove the tamper bushing >>

Insert a flat-blade screwdriver, and twist it lightly to remove the tamper bushing.

7 Refer to sec. “3-1” steps 3 through 6 to install the wireless transmitters and batteries in the back box, and then install the back box on the chassis. Install the main unit on the main unit mounting bracket.

8 After completing the settings and operation check, insert the tamper bushing into each transmitter/receiver.

Caution

After mounting the chassis, wiggle the tamper bushing with your thumb and forefinger to ensure the tamper works properly.

Main unit mounting bracket (option: MP-4)

Tighten the screws.

250 mm (9.8 inch) or less

250 mm (9.8 inch) or less
### 3-4 WIRING

#### -Using the N.C. type transmitter

This product is provided with wiring based on the assumption that N.C. wireless transmitters are used. Connect the cables from the back box (Yellow/Yellow-white, Green/Green-white, and Black/Black-white) to the respective terminals on the wireless transmitters.

**NOTE>>**
- To monitor the tamper output, include a wireless transmitter supporting three or more inputs into the system.
- When you want to use the D.Q. output, share the terminal with the alarm, low battery, or tamper output. For information about wiring, see the wiring diagram in “Setting the D.Q. output” in “4-5”.

#### -Using the N.O. type transmitter

When N.O. wireless transmitters are used, change the wiring and switch settings from initial setting.

---

**Receivers**

**Back box**

**Transmitter**

**AX-100/200TFR**

**AX-100/200TFR (BE)**

---

**NOTE>>**
- To monitor the tamper output, include a wireless transmitter supporting three or more inputs into the system.
- When you want to use the D.Q. output, share the terminal with the alarm, low battery, or tamper output. For information about wiring, see the wiring diagram in “Setting the D.Q. output” in “4-5”.

---

**Transmitter**

**AX-100/200TFR**

**AX-100/200TFR (BE)**

---

**NOTICE**

- Using the N.C. type transmitter
- Using the N.O. type transmitter

---

**When N.O. wireless transmitters are used, change the wiring and switch settings from initial setting.**
4 SETTING

4-1 FUNCTION

(All of the following switch settings are factory default.)

Monitor jack (Receiver only)
Receiver:
 alarm indicator LED
Transmitter:
 power LED
low battery LED
Vertical alignment dial
Horizontal alignment dial
View finder

3: Battery saving timer switch
4: Intermittent output function switch
5: N.C./N.O. selection switch

a) Double stacked protection

Since Receiver B may receive the infrared beam from Transmitter A, select their frequencies as shown in the figure above.

(b) Long distance protection

Since Receiver C may receive the infrared beam from Transmitter A, select their frequencies as shown in the figure above.

c) Double stacked long distance protection

More than double stacked application is not possible.

d) Perimeter protection

e) Perimeter protection in a two-stack configuration

4-2 4 CHANNEL BEAM FREQUENCY SELECTOR

The 4 channel beam frequency selector can be used to avoid unwanted crosstalk that can occur when using multiple photo beams for long distance or beam stacking applications.

• To select between 4 separate beam frequencies, use the switch provided.
• Make sure the receiver and transmitter that are facing each other are set to the same channel.
• More than double stacked application is not possible.

Note>>
Always switch the frequencies TWO channels apart when stacking units on top of one another. (See following example.) The upper unit is set on channel 1 while the lower is on channel 3, channels 2 and 4 could have also been used.

Note>>
• Do not attempt to install this product with any other photoelectric detector. It may cause the detector to fail or not respond to movements.
• In case that you install the battery operated photoelectric detector with Optex hard-wired photoelectric detector at the same site, ensure that the hard-wired transmitter cannot affect any other battery operated receivers for avoiding cross talk between photoelectric detector.

Warning
• Do not attempt to install this product with any other photoelectric detector. It may cause the detector to fail or not respond to movements.
• In case that you install the battery operated photoelectric detector with Optex hard-wired photoelectric detector at the same site, ensure that the hard-wired transmitter cannot affect any other battery operated receivers for avoiding cross talk between photoelectric detector.

The cross (x) mark indicates prohibition.
3 Adjust the horizontal and vertical angles while checking the light receiving status by Alarm indicator LED on the pairing receiver.

<table>
<thead>
<tr>
<th>Adjustment level</th>
<th>Light interrupted</th>
<th>Light received</th>
</tr>
</thead>
<tbody>
<tr>
<td>Realign</td>
<td>ON (Red)</td>
<td>0 V</td>
</tr>
<tr>
<td>Fair</td>
<td>Slow flicker</td>
<td>1.0 V</td>
</tr>
<tr>
<td>Good</td>
<td></td>
<td>2.0 V</td>
</tr>
<tr>
<td>Excellent</td>
<td></td>
<td>2.5 V</td>
</tr>
</tbody>
</table>

Caution
The Alarm indicator LED is a supporting tool for easy alignment. Be sure to perform fine alignment to ensure the maximum output level through the monitor jack.

4 Connect a tester to the monitor jack on the receiver.

5 Set the voltmeter range to 5 to 10 VDC. After checking the receiving level of optical axis by using the alarm indicator, make sure to make fine alignment for both transmitter and receiver with voltmeter until it reaches maximum monitor output over “good” level.

4-4 BEAM INTERRUPTION ADJUSTMENT

Initial setting is at 50 ms for normal work. According to the speed of a supposed target you select one specific setting out of 4 steps. Set the beam interruption adjustment switches of the Receiver according to the speed of the human object to detect.
4-5 ADJUSTING OUTPUT

- Setting the intermittent output function

When wireless configuration is being used, which is unable to determine whether the alarm output continues, setting the intermittent output function to the “ON” position, turns on the intermittent alarm output. This configures the wireless transmitter to send alarms at a specific time intervals.

<table>
<thead>
<tr>
<th>Receiver</th>
<th>Transmitter</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td></td>
</tr>
<tr>
<td>OFF</td>
<td></td>
</tr>
</tbody>
</table>

Intermittent Output Times
- Alarm output: 1 output/1 minute
- D.Q. output: 1 output/1 minute
- Low battery output: 1 output/5 minutes

- Setting the battery saving timer

Alarm output activation are limited by a timer 2 minutes. Even if there are continuous alarm events, the alarm output operates only once in the timer period.

<table>
<thead>
<tr>
<th>Receiver</th>
<th>Transmitter</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td></td>
</tr>
<tr>
<td>OFF</td>
<td></td>
</tr>
</tbody>
</table>

- Alarm output: 1 output/2 minute
- D.Q. output: 1 output/2 minute
- Low battery output: 1 output/15 minutes

⚠️ Caution
Remove all batteries prior to replacing with new ones. If this is not followed, the low battery indicator LED will not reset and continue to flicker.

- Setting the D.Q. output (environmental disqualification)

D.Q. will send a trouble signal when the beam strength is below acceptable levels, for more than 20 seconds, due to rain, snow, or heavy fog.

⚠️ Caution
This circuit sets N.O. for a low battery output, whereas N.C. for an alarm. Be sure to use N.O. ready wireless transmitter for this configuration. Turn “OFF” both battery saving timer and intermittent output function switches when applying this wiring example.

Operating Time Chart

- Reception level
- Adverse weather level
- Alarm output level
- D.Q. output

Wiring example when Using N.C. Transmitters

a) Sharing the D.Q. output with the alarm output

Sender

Client

Other

Return

- Turn OFF switch No. 3 & 4.
- Turn ON switch No. 5.

b) Canceling the alarm output in adverse weather conditions

Sender

Client

Other

Return

- Add a short-circuit wire AWG 22 to 26 Length of about 80 mm (3 inches)
- Exchange the connections

Remove all batteries prior to replacing with new ones. If this is not followed, the low battery indicator LED will not reset and continue to flicker.
### 5-1 LED INDICATION

<table>
<thead>
<tr>
<th>DETECTOR STATUS</th>
<th>LED Indications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power ON</td>
<td>The power LED turns ON.</td>
</tr>
<tr>
<td>Detection (beam interruption)</td>
<td>The alarm LED turns ON.</td>
</tr>
<tr>
<td>Low battery power</td>
<td>The low battery LED flickers.</td>
</tr>
</tbody>
</table>

### 5-2 OPERATION CHECK

After installation is complete, be sure to check the operation.

1. See “Setting the battery saving timer” in “4-5” to turn OFF the battery saving mode.

2. Make sure that the alarm indicator is off. If it is illuminated even when the beams are not blocked, make optical alignment again.

3. Check that the low battery indicators on both transmitter and receiver are OFF. If the LED is flickering, the battery power is low. Replace with the new batteries.

4. Conduct a walk test to check that the alarm indicator LED on the receiver turns ON as the walker interrupts the beams.

   Be sure to conduct a walk test at the following three points:

   A. In front of the transmitter
   B. In front of the receiver
   C. At the mid point between the transmitter and receiver

   The detector is installed properly when the alarm indicator LED turns ON in the tests at all the three points.

### 5-3 TROUBLE SHOOTING

If the alarm indicator LED is OFF or flickering even though the beam is being interrupted, do the following:

1. Align the optical axis again.

2. In a multi-detector configuration, the receiver may be receiving the infrared beam from an unrelated transmitter. See sec. “4-2” and check the 4 channel beam frequency selector setting.

3. The beam from the transmitter may reach the receiver by reflecting off the floor or wall of a building. Good reflectors of visible light are also good reflectors of infrared beams. Remove the reflective objects around the detector or install the detector in a different place and then align the optical axis again.

---

**Caution**

For battery power savings, perform the operation check before checking the following items.

1. When installing on a wall or pole, make sure the cover is properly attached to main unit.
2. When installing in a beam tower, make sure the tamper bushing is properly attached to main unit. (See page 6 “Caution”.)
## 6-1 SPECIFICATIONS

<table>
<thead>
<tr>
<th>Model</th>
<th>AX-100TFR</th>
<th>AX-200TFR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Range</strong></td>
<td>30 m (100 ft.)</td>
<td>60 m (200 ft.)</td>
</tr>
<tr>
<td><strong>Maximum arrival distance</strong></td>
<td>265 m (870 ft.)</td>
<td>530 m (1740 ft.)</td>
</tr>
<tr>
<td><strong>Detection method</strong></td>
<td>Infrared beam interruption detection</td>
<td></td>
</tr>
<tr>
<td><strong>Beam frequency selection</strong></td>
<td>4 channel</td>
<td></td>
</tr>
<tr>
<td><strong>Interruption period</strong></td>
<td>Variable between 50, 100, 250, 500 msec (4 steps)</td>
<td></td>
</tr>
<tr>
<td><strong>Power Source</strong></td>
<td>3.6 V 13.0 Ah: LSH20 lithium batteries manufactured by SAFT (not installed)</td>
<td></td>
</tr>
<tr>
<td><strong>Current draw</strong></td>
<td>850 µA T: 300 µA + R: 320 µA (at 25°C, 3.6 VDC)</td>
<td></td>
</tr>
</tbody>
</table>

* **Battery life**
  - Transmitter: 5 years
  - Receiver: 5 years

### Output

<table>
<thead>
<tr>
<th>Model</th>
<th>AX-100TFR</th>
<th>AX-200TFR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Alarm output</strong></td>
<td>Form C-Solid State Switch: 3.6 VDC, 0.01 A</td>
<td></td>
</tr>
<tr>
<td><strong>Alarm period</strong></td>
<td>2 sec (±1) nominal</td>
<td></td>
</tr>
<tr>
<td><strong>D.Q. output</strong></td>
<td>Form A/B-Solid State Switch: 3.6 VDC, 0.01 A</td>
<td></td>
</tr>
<tr>
<td><strong>Low battery output</strong></td>
<td>Form A/B-Solid State Switch: 3.6 VDC, 0.01 A (Transmitter &amp; Receiver)</td>
<td></td>
</tr>
<tr>
<td><strong>Tamper output for Front cover</strong></td>
<td>Form C: 3.6 VDC, 0.01 A activates when cover removed. (Receiver only)</td>
<td></td>
</tr>
<tr>
<td><strong>Tamper output for Back box</strong></td>
<td>Form C: 3.6 VDC, 0.01 A activates when either back box or chassis is removed from the installment.</td>
<td></td>
</tr>
</tbody>
</table>

### Indicator

<table>
<thead>
<tr>
<th>Model</th>
<th>AX-100TFR</th>
<th>AX-200TFR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Alarm Indicator (Receiver)</strong></td>
<td>(1) Light on - IR Beam not received.</td>
<td></td>
</tr>
<tr>
<td><strong>Power (Transmitter)</strong></td>
<td>Power ON: ON, Power OFF: OFF</td>
<td></td>
</tr>
<tr>
<td><strong>Low battery</strong></td>
<td>Voltage Reduction: flicker</td>
<td></td>
</tr>
</tbody>
</table>

### Operating temperature

<table>
<thead>
<tr>
<th>Model</th>
<th>AX-100TFR</th>
<th>AX-200TFR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operating ambient humidity</strong></td>
<td>95% (Max.)</td>
<td></td>
</tr>
</tbody>
</table>

### Alignment angle

<table>
<thead>
<tr>
<th>Model</th>
<th>AX-100TFR</th>
<th>AX-200TFR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>±90° Horizontal, ±5° Vertical</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Mounting

<table>
<thead>
<tr>
<th>Model</th>
<th>AX-100TFR</th>
<th>AX-200TFR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Indoor/Outdoor, Wall/Pole/Tower mounting</strong> (Optional main unit mounting brackets are required, when the units mount in the tower.)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Weight

<table>
<thead>
<tr>
<th>Model</th>
<th>AX-100TFR</th>
<th>AX-200TFR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Weight</strong></td>
<td>1600 g (56.5 oz.) (Total weight of transmitter + receiver, excluding accessories)</td>
<td></td>
</tr>
</tbody>
</table>

### International protection

<table>
<thead>
<tr>
<th>Model</th>
<th>AX-100TFR</th>
<th>AX-200TFR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IP55</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Specifications and design are subject to change without prior notice.

** The value is based on the condition that it is used within the ambient temperature range of 20 to 25°C.

** The transmitter is also equipped with AX100/200 TFR (BE).

## 6-2 DIMENSIONS & OPTION

### Dimensions

<table>
<thead>
<tr>
<th>Model</th>
<th>AX-100TFR</th>
<th>AX-200TFR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main unit mounting bracket set (for tower mounting)</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Option

<table>
<thead>
<tr>
<th>Model</th>
<th>AX-100TFR</th>
<th>AX-200TFR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MP-4: Main unit mounting bracket</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Tamper Bushing

Without the tamper busing, the LEDs are kept ON, which consumes more battery power.

### NOTE

These units are designed to detect an intruder and activate an alarm control panel. Being only a part of a complete system, we cannot accept responsibility for any damages or other consequences resulting from an intrusion.

These products conform to the EMC Directive 2004/108/EC.