TAKEX GLASS BREAK SENSOR

GS-2000E

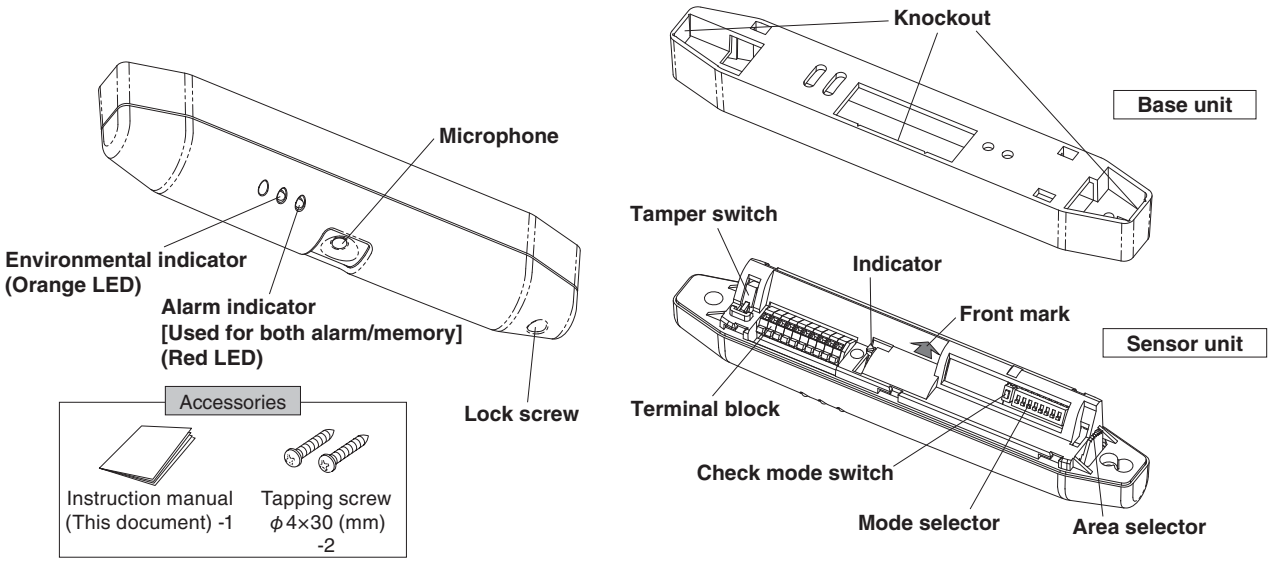
Instruction Manual

Thank you for purchasing our product.
Before using this product, please read this instruction manual to ensure correct operation.

1 PRODUCT DESCRIPTION

This product is a non-contact sensor that detects the breaking sound (ultrasonic bandwidth) generated when plate glass, used for a window or showcase, gets broken on impact, and will output an alarm. By adopting a circuit that detects two kinds of ultrasonic bands, the breaking sound of glass can be detected.
This sensor is a passive type, and can be installed together with multiple units in the same location. Its slim body is inconspicuous, allowing the unit to be used in various places. Ensure that this sensor is used for security in unmanned spaces only.

2 PARTS DESCRIPTION



3 PRECAUTIONS Be sure to observe

- The following precautions should be observed by categorizing the degree of hazard or damage that would occur due to improper use.

⚠Warning	Indicates situations that may result in death or serious injury.

⚠Caution	Indicates situations that may result in minor injury and/or damage to property, or delayed notification in the operating system due to malfunctions and/or alarm failure.

- We explain the precautions you should observe using the following symbols throughout the manual.

⃠ A prohibited action you must not do.	❗ An action you must perform, or description we would like you to understand.

⚠ Warning

⃠ Do not disassemble or remodel the unit. Failure to follow this may result in fire, electric shock, and/or malfunction.

❗ If the following errors or malfunctions occur, immediately cut the power supply and contact the dealer. Failure to follow this may result in fire, electric shock, and/or malfunction.
- Smoke, abnormal odor and/or sound are generated
- Liquid such as water and/or foreign materials has entered inside the unit
- Deformed and/or damaged parts have been discovered in the unit

⃠ Do not use the unit outside the specified range of power voltage. Failure to follow this may result in fire, electric shock, and/or malfunction.

⃠ Do not install the unit in a place and/or with a mounting method that cannot support its weight. Failure to follow this may result in injury or damage to property if the unit falls down.

❗ Install the unit on solid places, such as ceiling surfaces or walls with reinforced materials applied. When you install the unit on materials other than wood, such as plasterboard or concrete, use the anchors and mounting screws appropriate to the wall materials, and install the unit securely. Unstable installation may result in injury or damage to property if the unit falls down.

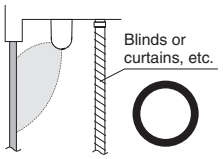
❗ Fix the sensor unit for operation using the lock screws. This prevents injury and/or damage to property if the unit falls down, and also prevents the unit from being scratched and/or tarnished.

⃠ Do not connect devices with a capacity exceeding that indicated by the output contacts on the unit. This may result in electric shock, fire, and/or malfunction.

⃠ Do not touch the terminals with wet hands. Failure to follow this may result in electric shock.

⚠ Caution

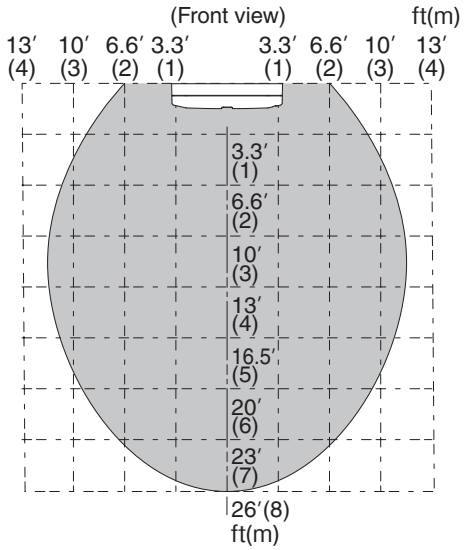
- Do not apply impact to the unit.
  Applying strong impact to the unit may result in deteriorated performance, and/or damage to the unit.
- The unit may not operate properly near devices that generate a strong electric or magnetic field. Also, the devices near the unit may not operate properly due to the magnetic field or magnetism generated by the unit. Make sure to check it before operation.
- Make sure to perform a sufficient operation check on the whole system before operation.
- This unit is for indoor use only. Do not use the unit in environments subject to water and/or high humidity. Failure to follow this may result in malfunction if water enters the unit.
- Do not install the unit at places subject to oil smoke, steam, humidity, and/or dust. Failure to follow this could result in fire, electric shock, and/or malfunction due to the transmission of electricity through oil, water, and/or dust. Also, it could result in housing deterioration, and/or substrate corrosion, due to oil.
- Ask specialists to have any electrical work done, if required.
  Failure to follow this may result in fire, and/or electric shock.
- Securely conduct installation work, according to the instruction manual. Also, make sure to use the supplied accessories and specified parts. Failure to follow this may result in fire, and/or electric shock, as well as injury or damage to property if the unit falls down.
- Do not perform aerial wiring for power supply cables and signal wires. Failure to follow this may result in electric shock, fire, and/or malfunction.
- This unit detects the breaking sound generated when plate glass is broken on impact. It cannot detect broken glass damaged by a force other than impact, such as deformation of buildings structures.
- Install the sensor at a place where the glass surface to be guarded can be seen directly.

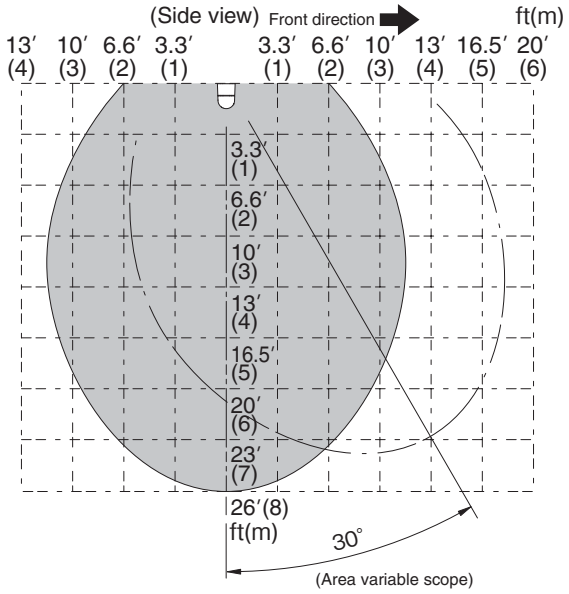


- Reliable detection is difficult in places with adverse sound reflection and/or resonance from ceilings, walls, floors, etc. Perform a sufficient operation check before installation.
- Do not install the unit within three meters from the following noise sources.
  - Large ventilation fan
  - Air conditioner outlet
  - Printer equipment
  - Bell type device
  - Mailbox

  Refrain from using the unit at other places subject to metallic sound and/or noise.
- Do not install the unit where there are ultrasonic-generating devices, such as cleaners, humidifiers, sensors, or repelling devices for cats or mice. Failure to follow this may result in malfunction.
- Do not operate the unit under manned conditions, with someone in a room.
  Ensure that this sensor is used for security in unmanned spaces only.
  Failure to follow this may result in malfunction.
- Do not use the unit in order to protect poorly maintained windows that could vibrate due to wind or external sound. Failure to follow this may result in malfunction.
- Do not install the unit in a place subject to strong vibration and/or electrical noise. Failure to follow this may result in malfunction.

4 DETECTION AREA

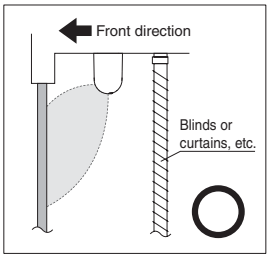




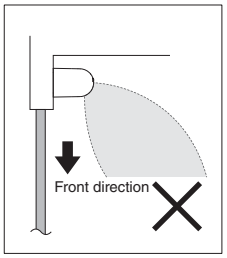
- The detection areas in the figure indicate the status when the sensitivity is set to “High” in the environment without any walls that reflect ultrasonic waves around the unit.
- Install the sensor, and adjust the detection area in order to cover the whole glass surface to be protected within the detection area.
- The size of glass surfaces to be protected should not exceed five square-meter.
- Confirm the position of the mounted sensor and glass surface to be protected, and determine the appropriate angle to set the area selector. (Refer to “6. Detection Area Adjustment”)

5 INSTALLATION

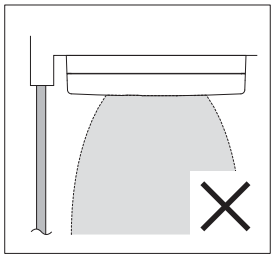
■Sensor mounting position



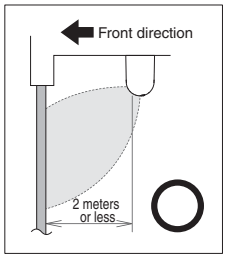
Mount the sensor between the glass and the blind or curtain.



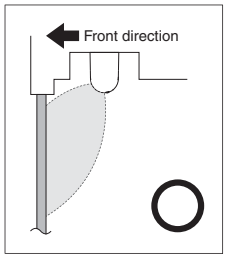
Mount the sensor on a ceiling surface or a side wall surface. Do not mount it on the glass side wall, as the protection area is not set to the glass surface.



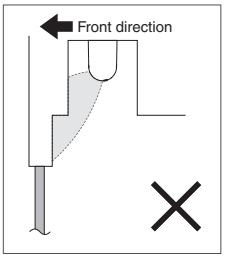
Mount the front of the sensor (indicated by 'Front mark') facing the glass surface.



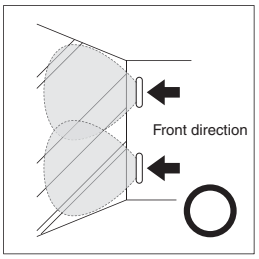
Mount the sensor max. two meters from the glass surface.



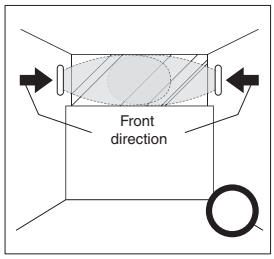
In a curtain box, mount the sensor so that the operation area is not blocked.



Do not mount the sensor in a curtain box that is too deep, to avoid masking the protection area.

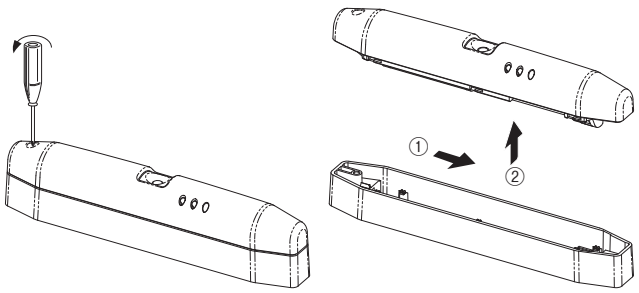


If the sensor mounted on a high ceiling cannot cover the whole glass surface, add additional sensors to a wall surface also.



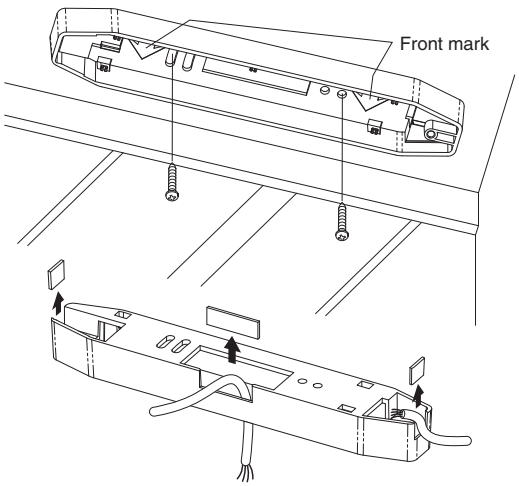
When protecting a long, horizontal glass surface, you can mount two sensors facing each other on the wall surfaces at both ends.

1. Loosen the lock screw, and slide the sensor unit to remove the base unit.

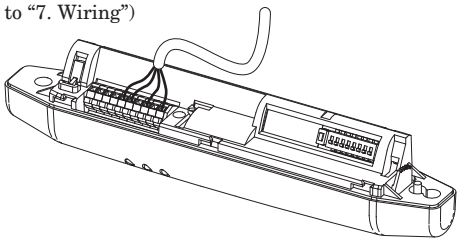


2. Face the 'Front mark' of the base unit toward the protected glass surface, and mount using the attached screws.

*For open wiring, before mounting the base unit, break the knockout on the base unit, and pass the wire through the opening.

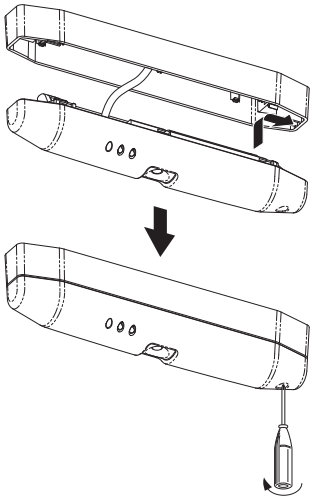


3. Connect the wires to the terminal block on the sensor unit. As an extra terminal is reserved for interconnected wiring, make sure to connect only one electric cable to one pole on the terminal block.
(Refer to "7. Wiring")



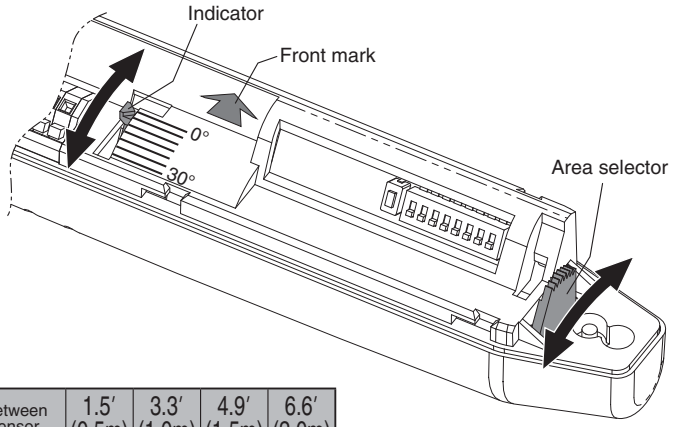
4. Use the area selector so that the detection area faces the glass surface.
(Refer to "4. Detection Area")
(Refer to "6. Detection Area Adjustment")

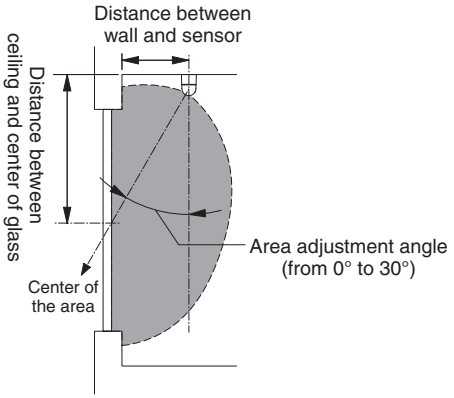
5. Mount the sensor unit to the base unit by aligning the direction of the 'Front mark' on each, then tighten the lock screw to secure in place.



6 DETECTION AREA ADJUSTMENT

The angle of detection area can be adjusted up to 30° toward the direction of the 'Front mark' in 5° increments. Adjust the angle to cover the desired area.
Move the area selector inside of the sensor unit, and set the detection area based on the glass surface to be protected. Whilst checking the indicator position.



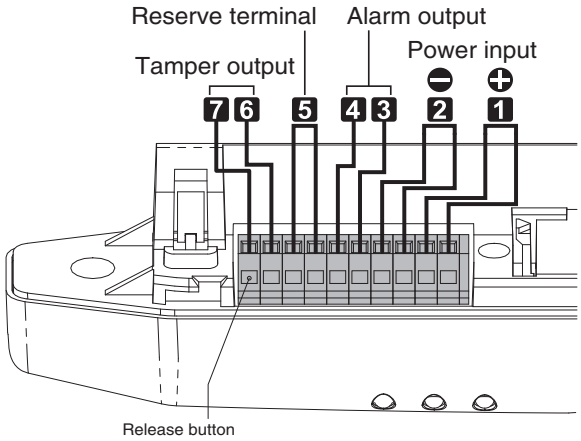


Distance between wall and sensor		1.5′ (0.5m)	3.3′ (1.0m)	4.9′ (1.5m)	6.6′ (2.0m)
Distance between the ceiling and center of glass	3.3′(1m)	30°	30°	30°	30°
	6.6′(2m)	15°	30°	30°	30°
	10′(3m)	10°	20°	25°	30°
	13′(4m)	5°	15°	20°	25°
	16.5′(5m)	5°	5°	15°	20°

*The detection area has a spread. Set the area so that the center of the detection area is roughly to the center of the window.

7 WIRING

■Terminal configuration



1 2 Power input ⊕ ⊖ — DC 9 V to 28 V, 25 mA or less (no polarity)

3 4 Alarm output
Contact method : Dry solid-state contact (N.O./N.C. selectable)
Contact operation : One-shot (approximately two seconds)
Contact rating : DC 30 V (AC 24 V)/0.25 A (resistive load) (built-in contact protection resistance 3.3 Ω)

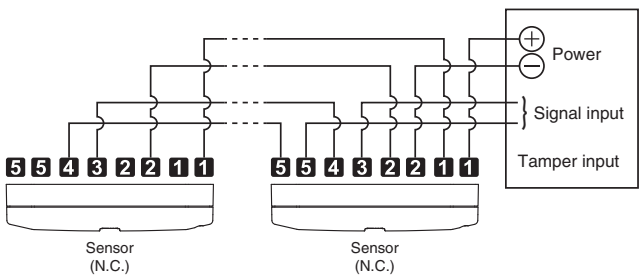
5 Reserve terminal — *Use for interconnected wiring.

6 7 Tamper output
Contact method : Dry contact (N.C.)
Contact operation : Continuous output when the sensor unit is detached (until the sensor unit is mounted)
Contact rating : DC 30 V/0.1 A (resistive load)

●Usable electric cables
Single wire : φ0.4mm ～ φ1.2mm
0.2mm² ～ 1.0mm²
AWG24 ～ AWG16

- **1 2 5** can be interconnected. The terminals of same number are connected inside.
- The terminal block is a screw-less type. To remove an electric cable, push the release button on the terminal block, and pull out the cable.
- When you strip insulation of the cables to be connected on the terminal block, refer to the strip gauge provided on the label of the sensor unit.

■Basic connection
[connection example when using multiple units]



■Maximum allowable wiring distance
[between the sensor and power equipment]

●When using single wires

	(when DC 12 V is supplied)	(when DC 24 V is supplied)
φ0.03″(φ0.65mm)	Up to 3,000ft(900m)	Up to 15,000ft(4,600m)
φ0.04″(φ0.9mm)	Up to 5,600ft(1,700m)	Up to 29,000ft(8,800m)
φ0.05″(φ1.2mm)	Up to 10,000ft(3,100m)	Up to 52,000ft(15,700m)

*When connecting two or more units to the same cable, the maximum distance is the above value divided by the number of units.
*Signal wires can be connected in a distance of up to 3,300ft(1,000 m) when telephone wires of φ0.03″(φ0.65 mm) are used.

8 FUNCTION

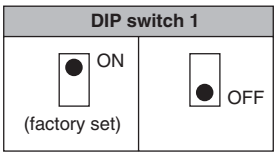
■Mode selector

Use the mode selector inside the sensor unit to perform various settings.

Alarm indicator setting (DIP Switch 1)

Set the alarm indicator (red) status.

ON ：Light up when the sensor activates the alarm
OFF：Always off
*Even if this is set to OFF, the indicator lights up in check mode, and when the malfunction occurs.

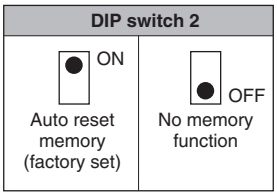


Memory display setting (DIP Switch 2)

Set the memory display status.

ON ： When the sensor activates the alarm, the alarm indicator blinks for three minutes, and lights up for 47 minutes. (If the sensor activates the alarm again whilst the memory display is lit, the memory display will light up for a further 47 minutes.)

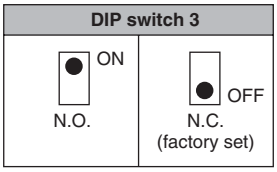
OFF： Memory OFF



Alarm contact setting (DIP Switch 3)

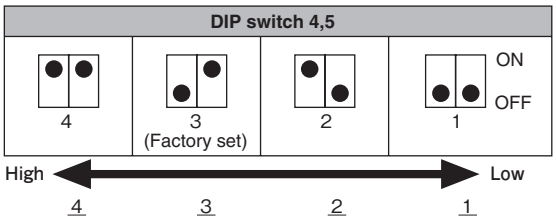
Set the alarm contact to N.O. /N.C.

ON ：N.O.
OFF：N.C.



Sensitivity setting (Dip Switch4,5)

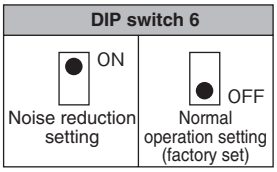
Change detection sensitivity.



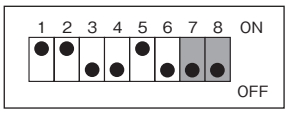
Noise reduction setting (DIP Switch 6)

Reduce environmental noise.
*When this setting is ON, the detection distance could be shortened. Make sure to check sensitivity before operation. (Refer to “9. Operation Check”)

ON ：Noise reduction setting
Set to ON when there are many environmental noises.
OFF：Normal operation setting



Factory set



*Make sure to keep DIP switches 7 and 8 OFF during operation.

■Function description

SELF-DIAGNOSIS FUNCTION

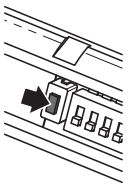
This function monitors whether any damage or disconnection occurs in the sensor circuits or not.
If any damage or disconnection occurs inside the unit, a warning is given using the alarm output and alarm indicator.
If you reset the sensor power during a warning, monitoring temporarily stops, but it restarts when the warming-up operation finishes.
If a warning is given, immediately check operation of the sensor.

TAMPER FUNCTION

This function monitors whether the sensor unit is mounted properly or not, and also gives a warning against action related to the main body removal. If the sensor unit is removed, or mounted improperly, the tamper output is generated for warning. When the sensor unit is remounted properly, the function is restored. If a warning is given, immediately check operation of the sensor.

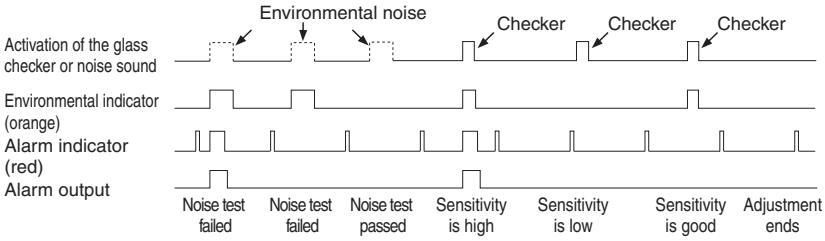
CHECK MODE FUNCTION

This function is used to check the installation environment and the sensitivity.
The surrounding environment where the sensor is installed can be confirmed. If there are sound sources or noise that may cause a false alarm in an installation environment, it notifies by the environmental indicator lighting up.
When the ‘Check mode switch’ is pressed, it switches over to ‘Check mode’ for five minutes. It enables checking of the detection area.
(Refer to “9. Operation Check”)
If the sensor does not detect anything for approximately five minutes, “Operation mode” is set automatically. Note that “Check mode” is extended by approximately five minutes for every detection (indicator lights up). To activate “Check mode” again, press the check mode switch.



■Check mode

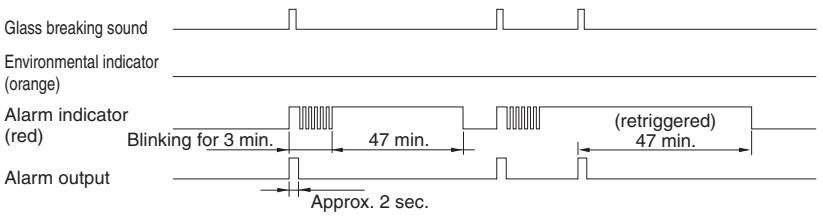
This mode is used to check the installation environment, and the sensitivity. Press the check mode switch to activate “Check mode” for approximately five minutes. While in this mode, the alarm indicator (red) blinks at short intervals. In this mode, both the environmental indicator (orange) and alarm indicator (red) can be operated. Even if the alarm is set off, the memory function will not activate. “Check mode” is extended by approximately five minutes for every detection (alarm indicator lights up).



■Operation mode

This is normal detection mode. After check mode finishes, it is automatically switched to operation mode.
If the sensor activates the alarm, the alarm indicator (red) activates the memory display for 50 minutes (auto reset after blinking for three minutes, and being lit up for 47 minutes). Note that the environmental indicator (orange) does not operate.

*When the memory display setting is set to ON.



9 OPERATION CHECK

In order to ensure reliable operation, use “Glass checker EG-2000” (sold separately), and check operation and sensitivity according to the following description. *Follow the instruction manual of the glass checker.

ENVIRONMENT CHECK

Check whether the sensor installation environment is appropriate or not.

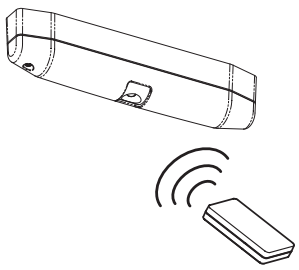
If there is a possibility of sound and/or noise in the same space as the glass to be protected, generate actual sound and/or noise as a test, and check that the environment indicator does not light up. Refer to “8. Function”
If the environmental indicator lights up by sound or noise, change the installation location, or decrease the sensor sensitivity by increasing the number of the sensor units to be installed and by reducing the detection area per unit.

SENSITIVITY CHECK

Check the extension of the detection area, and the most appropriate sensitivity while checking that the environmental indicator on the sensor unit lights up.
Set the sensitivity setting inside the EG-2000 to “L” side, and use the checker.

(1) Turn on the sensor power. Press the check mode switch to activate “Check mode” for approximately five minutes, and the alarm indicator blinks. “Check mode” is extended by approximately five minutes for every detection operation (alarm indicator lights up). Refer to “8. Function”

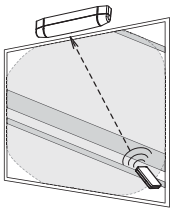
(2) First, press the send button on the glass checker to activate near the sensor unit. Check that both the alarm indicator (red) and environmental indicator (orange) light up.



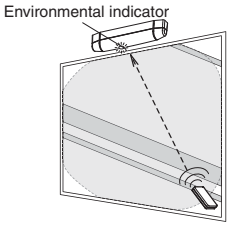
(3) Activate the glass checker by pointing its transmission section toward the sensor unit from the glass surface to be protected, and check the sensitivity. Check it from all the positions of the glass surface to be protected.

Note: Reliable use of the glass checker is difficult under the influence of adverse reflection from ceilings, walls, and/or floors. If this is the case, move the glass checker position slightly to the left or right, and check again. If only the environmental indicator on the sensor unit lights up, the sensitivity is normal.

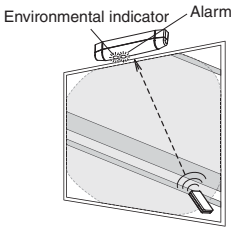
(4) If you activate the checker from the glass surface most distant to the sensor unit, and only the environmental indicator lights up, the sensitivity is normal. If the environmental indicator does not light up, the sensitivity is too low. On the contrary, if it lights up and the alarm indicator also lights up, the sensitivity is too high. If there are positions where the sensitivity is not appropriate, check the operation area again, or adjust the sensor sensitivity.



[Environmental indicator : OFF
Alarm indicator : OFF]
↓
Sensitivity is too low
↓
Increase the sensitivity setting



[Environmental indicator : Light up
Alarm indicator : OFF]
↓
Sensitivity is normal



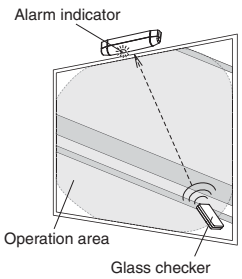
[Environmental indicator : Light up
Alarm indicator : Light up]
↓
Sensitivity is too high
↓
Decrease the sensitivity setting

(5) If detection operation has not been performed for approximately five minutes after the sensitivity check finishes, the mode automatically switches to “Operation mode”. Check that the alarm indicator is not blinking before operation.

ALARM OPERATION CHECK

Check operation of the installed sensor unit.
Use this function only for the daily operation check of the sensor, or during inspection.
Set the output switch inside the EG-2000 to “H” side, and use the checker.

Activate the glass checker by pointing its transmission section toward the sensor unit from the sensor’s operation area, by pressing the send button.
If the alarm indicator lights up, and a device connected to the alarm output activates, the alarm operation of the sensor is normal.



10 TROUBLESHOOTING

Follow the table below, and inspect the unit. If normal operation cannot be restored after inspection, contact your dealer or Takex.

Status	Cause	Countermeasure
The unit does not operate at all	(1) The power is not turned on (including disconnection), or the power voltage is too low (2) There are materials blocking the front of the sensor (3) The sensitivity setting is too low	(1) Check the power cable, and set the appropriate power voltage (2) Remove the blocking materials (3) Set the appropriate sensitivity (Refer to “8. Function Description”)
The unit remains in check mode, not switching to operation mode	(1) There are noise sources (bells, ultrasonic sensors, printers, or devices that generate metallic sound) near the unit	(1) Remove items causing malfunction, or keep them apart from the unit (three meters or more)
The unit sometimes does not operate	(1) The sensitivity setting is too low (2) The distance between the unit and glass surface to be detected is inappropriate	(1) Set the appropriate sensitivity (Refer to “8. Function Description”) (2) Set the detection distance within the rated value
The unit suddenly operates when nothing has occurred	(1) The power voltage becomes unstable (2) There are noise sources (bells, ultrasonic sensors, printers, or devices that generate metallic sound) near the unit (3) There are sources that generate electric noise near the unit (4) The sensitivity setting is too high	(1) Set the appropriate power voltage (2) Remove items causing malfunction, or keep them apart from the unit (three meters or more) (3) Change the installation place, or remove items causing malfunction (4) Set the appropriate sensitivity (Refer to “8. Function Description”)
The alarm indicator lights up, but connecting devices do not operate	(1) Connection failure occurs on alarm signal, and wiring is disconnected or short-circuited (2) The alarm contact output is generated (3) The alarm output setting is inappropriate (4) Connected devices do not operate properly	(1) Fix connection failure, disconnection/short circuit (2) Check the output terminal section using testers (3) Change the alarm output setting (4) Check connected devices

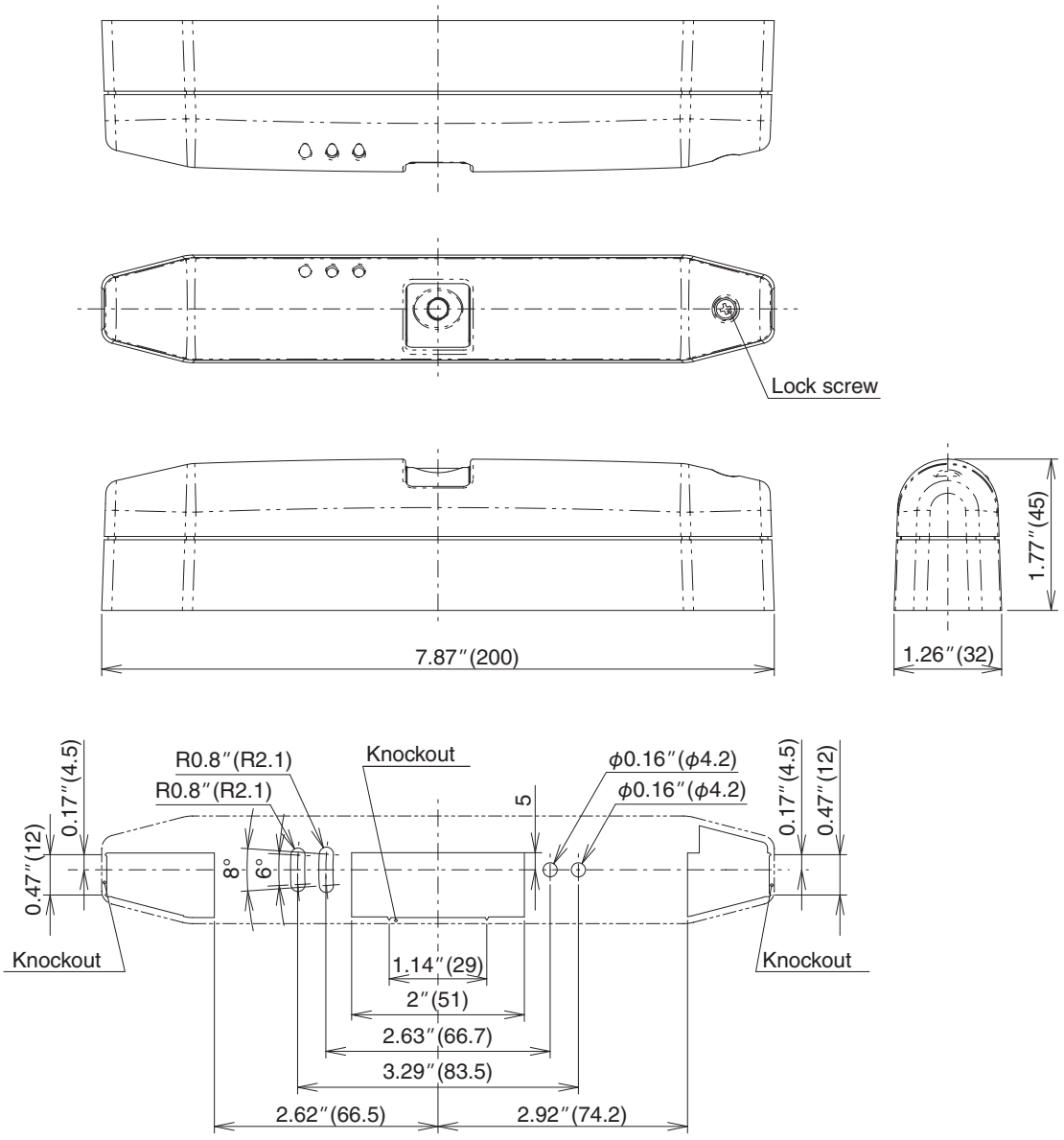
Daily inspection

- For maintenance, after wiping the unit with a moistened soft cloth, dry it off.
  If the unit is very dirty, gently wipe using a soft cloth immersed in diluted neutral detergent, wiping off any detergent residue thoroughly afterwards.
  Do not use thinner or benzine. (Failure to do so may result in the deformation of discoloration or deterioration of plastic parts)
- Periodically check operation, approximately once a week.
  In addition, make sure to check operation when desks or partitions have been moved due to layout change in the room to be protected.

11 SPECIFICATIONS

Product name	GLASS BREAK SENSOR
Model number	GS-2000E
Detection method	Ultrasonic Detection
Operation area	Distance direction : 26′(8 m) Extension direction : 23′(7 m)
Area adjustment scope	Vertical direction : 30° (by 5° pitch) Horizontal direction : ±4° (by using base mounting hole)
Power supply voltage	DC 9 V to 28 V (no polarity)
Consumption current	25mA or less
Alarm output	Contact method : Dry solid-state contact (N.O. /N.C. selectable) Contact operation : One-shot (approximately 2 sec) Contact rating : DC 30 V (AC 24 V)/0.25 A (resistive load) (built-in contact protection resistance 3.3 Ω)
Tamper output	Contact method : Dry contact (N.C.) Contact operation : Continuous output when the sensor unit is detached (until the sensor unit is mounted) Contact rating : DC 30 V/0.1 A (resistive load)
Alarm indicator	Red LED In check mode : Blinks (approx. every 2 sec) When the alarm is set off : Lights up (for approx. 2 sec) In memory operation : Auto resets after blinking for 3 min, and being lit up for 47 min When the alarm for abnormalities is set off : Lights up (continuously) (Available to set only the alarm and memory display to ON/OFF using the mode selector)
Environmental indicator	Orange LED When environmental error occurs : Lights up (in check mode) When checking the sensitivity : Lights up (in check mode)
Auxiliary functions	Check mode function, Noise reduction function, Self-diagnosis function, Tamper function
Ambient operating temperature	14°F to 122°F(–10°C to +50°C)(No condensation)
Installation place	Indoor : Ceiling and wall surfaces
Wiring connection	Terminals
Weight	Approx. 4.2oz(120g)
Appearance	Resin

12 EXTERNAL DIMENSIONS (Unit : mm)



■Option: Glass checker EG-2000

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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