

TAKEX

MICROWAVE SENSOR

MW-50H

Instruction Manual

We appreciate your purchase of the TAKEX microwave sensor. This sensor will provide long and dependable service when properly installed. Please read this instruction manual carefully for correct and effective use.

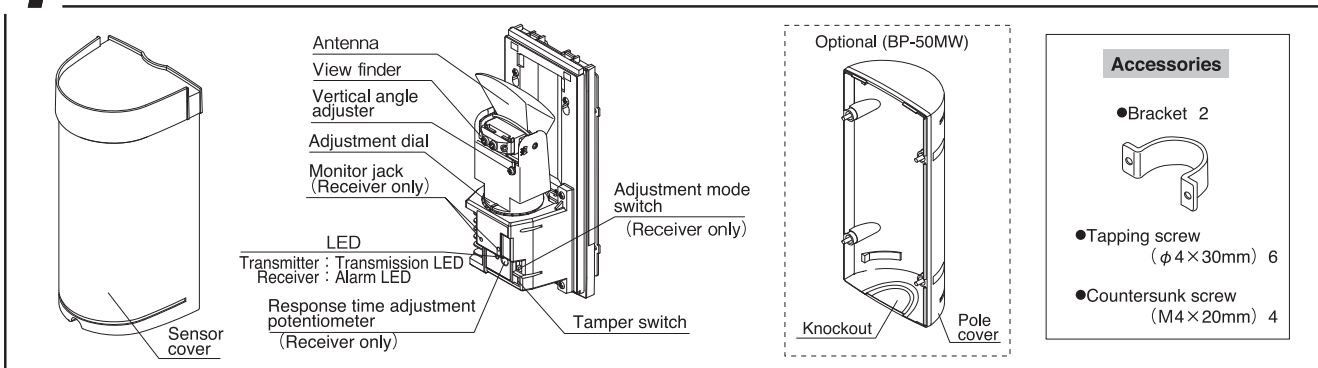
Please note : This sensor is designed to detect intrusion and to initiate an alarm; it is not a burglary or a crime preventing device.

TAKEX is not responsible for damage, injury or loss caused by accident, theft, Acts of God (including inductive by lightning surges), abuse, misuse, abnormal usage faulty installation or improper maintenance.

PRODUCT DESCRIPTION

This Product consists of a transmitter which sends 24GHz band of microwave and a receiver which receives the beam. It will initiate an alarm signal when the receiver detects a drop in the beam reception level due to interruption of objects interrupt between the transmitter and receiver. Compared to a photoelectric beam, the wavelength of microwaves is extremely long, which prevent the sensor from being affected by weather such as torrential rainfall, snowfall, fog or frost especially during cold winters. Stable detection performance is possible. Two types of frequencies, MW-50 (H) and MW-50 (L) are available.

1 PARTS DESCRIPTION



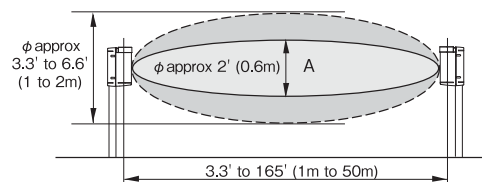
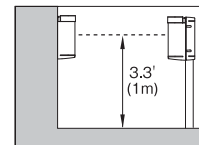
2 CAUTIONS ON INSTALLATION

1) DO'S AND DON'TS

- Do not install the unit at places where it may be blocked by obstacles such as trees.
- Do not install the unit on unsteady surfaces.
- Do not install the unit a street side or in parking lots where many cars may pass by. Installation must be at 5ft. (1.5m) away from the automobiles traffic.
- When installing the unit along the side of a building or fence, installation must be at least 3.3ft. (1.0m) away from said constructions.
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- Don't face the mirror unit to the sun directly during installing or replacing. It may become a cause of malfunction.
- Don't install other than correct direction. (at slant, at upside down)
- It is buried in snow etc.
- Freezing

2) Height of installation

Install the unit at a height of 3.3' (1m), ground to center of microwave sensor, to detect human being walking or running through the beam.



A core detection area is approximately ϕ 2' (0.6m) as indicated above as A, when the alignment is correctly adjusted. It is suggested to make at least 3.3' (1m) open space on either side of detection area to prevent false alarm.

* Please check the detection area by walking test.

Do not stack the sensors vertically.

3) Check the environment of the installation site

The microwaves are affected by electric waves reflected from buildings, fences, and or the ground. The beam reception level of the microwaves depends on how the unit is installed in the area, especially by the height of installation. Find the position

(height) of the sensor for transmitter and receiver respectively where the maximum signal reception level can be obtained before the final.



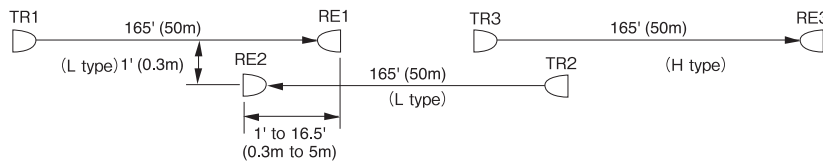
Note: Install the sensor at a proper height and position otherwise detection area could be widened over 6.6' (2m). This could cause the sensor to detect movements of cars or vegetations near the area and lead to frequent false alarms.

4) Installation example

When two or more sets are used, two frequencies (L and H types) should be used in order to avoid cross talk or interference. Refer to the following example.

● Linear protection

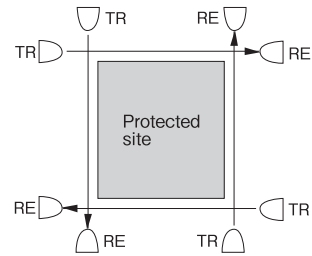
H type should be used for TR3 and RE3 when TR1 and RE1 are L type.



- Do not use different frequencies (H and L) in a detection line.
Use a pair of same frequency : TR(H) and RE(H) OR TR(L) and RE(L).
- Do not stack the sensors vertically.

● Perimeter protection

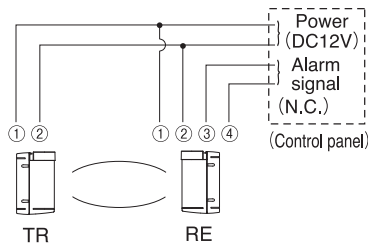
Do not install the transmitter and the receiver at a same corner. Microwave sensor with the same frequency can be used for this case.



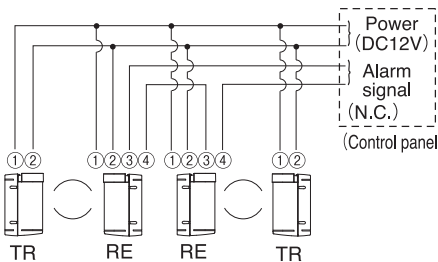
Wiring

The equipment must be powered from an LPS in accordance with EN60950-1 : 2001

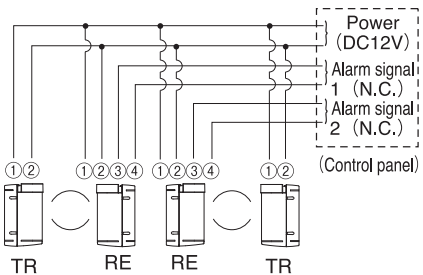
1) Basic connection



2) When two or more sets are connected to the same line.



3) When two or more sets are connected to separate lines.

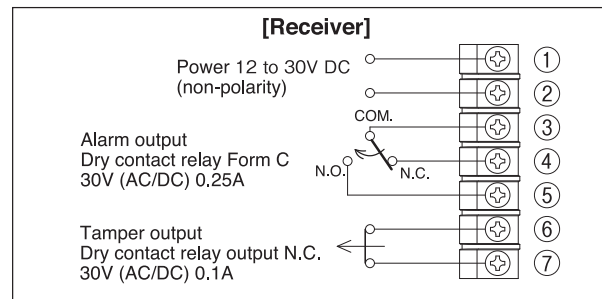
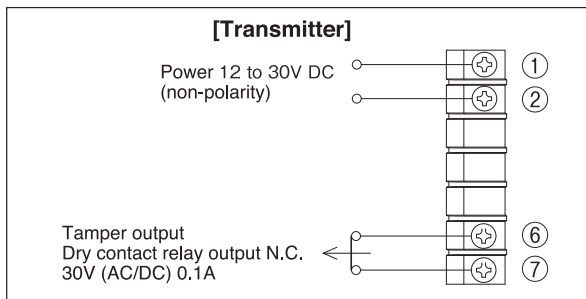


4) Wiring distance

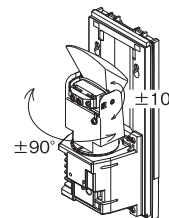
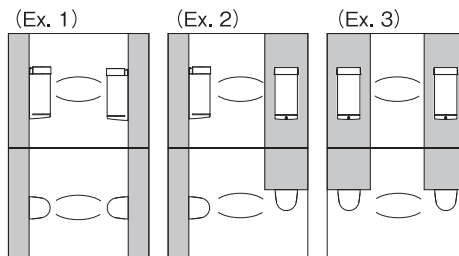
Size of wire used	Power voltage	
	12V DC	24V DC
AWG 20 (Dia. 0.8mm)	Up to 660ft. (200m)	Up to 5,300ft. (1,600m)
AWG 18 (Dia. 1.0mm)	Up to 1,000ft. (300m)	Up to 7,800ft. (2,400m)
AWG 17 (Dia. 1.1mm)	Up to 1,350ft. (400m)	Up to 9,500ft. (2,900m)
AWG 16 (Dia. 1.25mm)	Up to 1,800ft. (550m)	Up to 12,000ft. (3,800m)
AWG 15 (Dia. 1.4mm)	Up to 2,300ft. (700m)	Up to 16,500ft. (5,100m)
AWG 14 (Dia. 1.6mm)	Up to 2,950ft. (900m)	Up to 21,000ft. (6,400m)

- Note : 1) Max. wiring distance when two or more sets are connected is the above value divided by the number of sets.
2) The signal line can be wired to a distance of up to 6,000ft. (2,000m) with AWG 20 (dia.0.8mm) telephone wire.

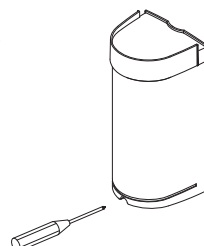
Terminal arrangement



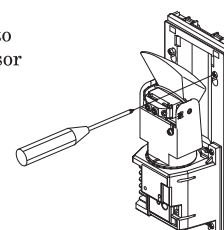
Mounting



- 1) Detach the sensor cover with a screw driver.



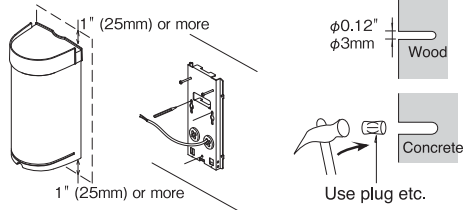
- 2) Detach the mounting plate to loosen 2 screws that fix sensor body to the mounting plate.



3) Wall mount

① Make holes in the wall.

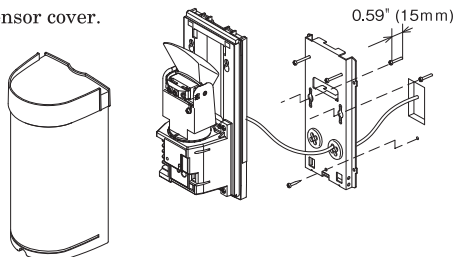
- Place the mounting plate the wall as a template for drilling and mark the screw holes. (Allow a space of 1" (25mm) above and below the plate. This will provide easy detachment of the cover after installation.)



- Pre-drill in wall.
Concrete wall : Refer to specifications of the securing plug used.
Wooden wall : 0.12" (3mm) diameter.

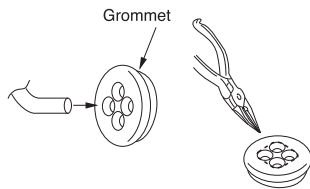
② Install the sensor.

- Insert tapping screws to 0.59" (15mm) under the screw head.
- Install the mounting plate on the wall after pulling the wire through it.
- Connect terminals.
- Attach sensor cover.



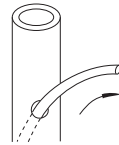
* The grommet is compatible with a wire of $\phi 0.12"$ ($\phi 3\text{mm}$) to $\phi 0.24"$ ($\phi 6\text{mm}$) outer diameter.

When a wire of more than $\phi 0.24"$ ($\phi 6\text{mm}$) outer dia. is used, cut off the dotted line portion as illustrated using pliers or the like. Then use caulking to prevent insects from entering into unit.



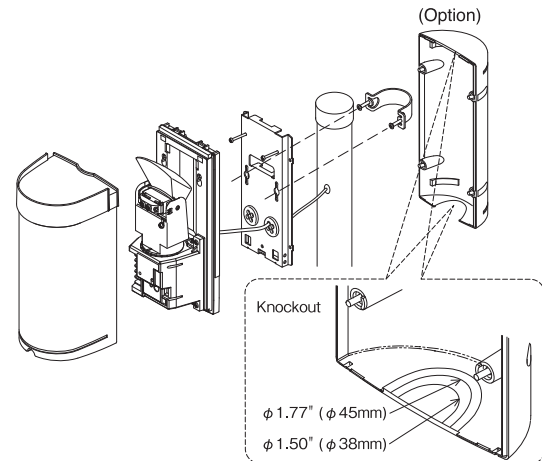
4) Pole mount

① Make a wiring hole in the pole. Pull the wire through wire.



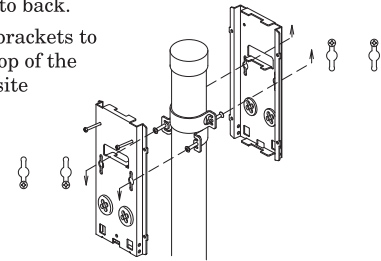
② Install sensor on the pole.

- Attach the U brackets to pole and fix the mounting plate with screws.
- Fix the sensor the body to the mounting plate.
- Connect the terminals.
- Attach the sensor and pole covers.
(Break the knockouts on the cover and pole cover to adapt to pole's diameter and configuration.)



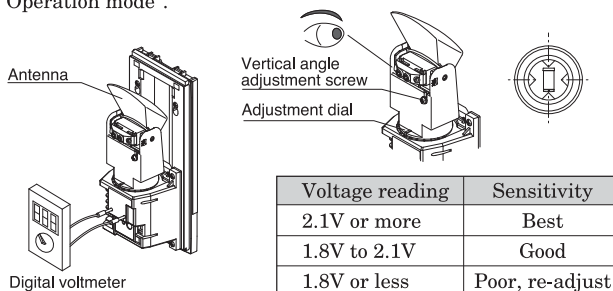
5) Pole mounting back to back.

- Attach the two U brackets to the poles, one on top of the other, facing opposite directions.
(See illustration.)



3 SET-UP OF FUNCTIONS AND ALIGNMENT

- Supply power with covers off.
- Look through the view finder on the transmitter unit and move it until the receiver unit is visible.
Repeat the procedure on the receiver unit.
- Set the adjustment mode switch on the receiver to "adjustment mode".
Connect the digital volt meter to the monitor jack and check the monitor output voltage (beam reception level).
When the output voltage is low, adjust the installation height of the transmitter and receiver so that the output voltage will reach the highest level. (Make sure that the angle of the antenna does not change.)
Note: Install the sensor at a proper height and position otherwise detection area could be widened over 6.6' (2m).
This could cause the sensor to detect movements of cars or vegetations near the area and lead to frequent false alarms.
- After adjustment, make sure that the adjustment switch is set to "Operation mode".



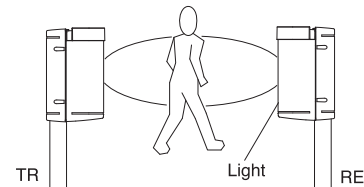
③ After adjustment, set the adjustment mode switch to "Operation mode".

4 OPERATION CHECK

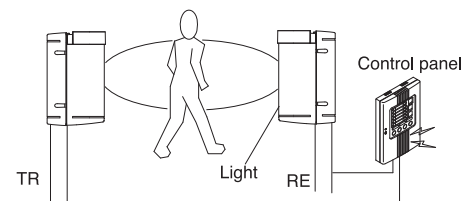
After the installation and angle adjustment are finished, test operation by performing a walking test through walk testing the sensor.
Two methods may be used.

Note: When cover is attached, the sensor is switched to be in an operation mode automatically.

1) Check by alarm LED only.



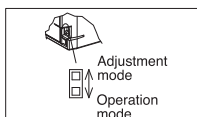
2) Check by both the alarm LED and control panel



5 FUNCTIONS DESCRIPTION

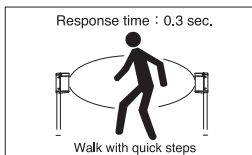
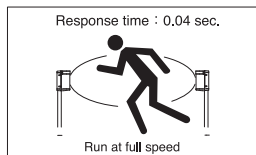
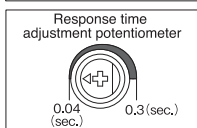
1. Adjustment mode switch

With this switch, a speedy check of the beam reception level is possible.
When aligning the beam, turn the switch to the "Adjustment mode".
(Factory set : Operation mode)



2. Response time adjustment volume

(Factory set : 0.04)



6 TROUBLESHOOTING

Solve possible problems according to the following table.
If normal operations cannot be restored by this means, contact either the dealer from whom you bought the unit or TAKEX.

Symptoms	Possible causes	Remedies
Transmitter LED does not light	1. No power supply 2. Bad wiring connection or broken wire, short	1. Turn on the power 2. Check wire
Receiver LED does not light when the beam is broken	1. No power supply 2. Bad wiring connection 3. Microwave is reflected off another object and sent into the receiver	1. Turn on the power 2. Check wire 3. Remove the object causing the reflection, or change the place for installation
Receiver LED continues to light (the does not stop)	1. No power supply to the transmitter 2. Angle adjustment of transmitter and receiver is not appropriate. 3. Obstacles between transmitter and receiver	1. Turn on the power on the transmitter 2. Readjust angle 3. Remove obstacles.
Intermittent alarm	1. Bad wiring connection 2. Change of supply voltage 3. Shading objects between the transmitter and receiver 4. A large electric noise source such as power machine is located near the transmitter and receiver 5. Installation height, installation site or angle adjustment is inappropriate	1. Check again 2. Stabilize supply voltage 3. Remove object the causing the shade 4. Change the place of installation 5. Readjust

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.)
- Periodically (approximately weekly) confirm operation.

9 SPECIAL NOTES

FCC

(1)FCC Regulation Statement : This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures : -Reorient or relocate the receiving antenna. -Increase the separation between the equipment and receiver. -Connect the equipment into an outlet on a circuit different from that to which the receiver is connected. -Consult the dealer or an experienced radio/TV technician for help.

WARNING : Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

(2)RF Exposure Warning Statement : This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure compliance. This transmitter must be at least 20 cm from the user and must not be co-located or operating in conjunction with any other antenna or transmitter.
The information in this guide may change without notice. The manufacturer assumes no responsibility for any errors that may appear in this guide.

Limited Warranty :

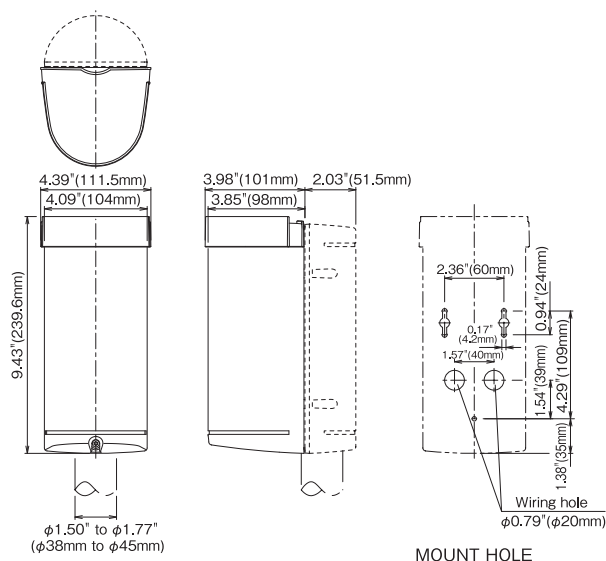
TAKEKX products are warranted to be free from defects in material and workmanship for 12 months from original date of shipment. Our warranty does not cover damage or failure caused by natural disasters, abuse, misuse, abnormal usage, faulty installation, improper maintenance or any repairs other than those provided by TAKEKX. All implied warranties with respect to TAKEKX, 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, TAKEKX 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.

7 SPECIFICATION

Type	Microwave sensor
Model	MW-50H
Protection distance	3.3ft.(1m) to 165ft.(50m)
Max. arrival distance	Approx. 330ft. (100m)
Microwave	24.17GHz
Detection system	Microwave
Response time	0.04sec. to 0.3sec. (Variable using POT)
Alarm signal	Dry contact relay output 1C N.O. / N.C. COM. Contact action : Interruption time output Contact capacity : 30V (AC/DC) 0.25A or less
Supply voltage	12 to 30V DC
Power consumption	100mA • Transmitter : 50mA • Receiver : 50mA
Tamper signal	Dry contact output N.C. Contact capacity : 30V (AC/DC) 0.1A
Alarm LED (Receiver)	Red LED Lighting at alarm
Transmission LED (Transmitter)	Green LED Lighting at signal transmission
Functions	Monitor output, Adjustment mode switch
Weight	Transmitter 28.0oz (800g) Receiver 29.8oz (850g)
Appearance	Resin (Wine red)

8 EXTERNAL DIMENSIONS

Unit: inch (mm)



MOUNT HOLE

TAKEKX TAKENAKA ENGINEERING CO., LTD.

In Japan

Takenaka Engineering Co., Ltd.
83-1, Gojo-sotokan, Higashino,
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Tel : 81-75-501-6651
Fax : 81-75-593-3816
http : // www. takex-eng. co. jp /

In the U.S.

Takek America Inc.
151, San Zeno WAY
Sunnyvale, CA 94086, USA
Tel : 408-747-0100
Fax : 408-734-1100
http : // www. takex. com

In Australia

Takek America Inc.
4/15 Howleys Road, Notting Hill,
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Fax : +61 (03) 9543-2342

In the U.K.

Takek Europe Ltd.
Aviary Court, Wade Road,
Basingstoke, Hampshire, RG24 8PE, U.K.
Tel : (+44) 01256-475555
Fax : (+44) 01256-466268
http : // www. takex. com

No.05-224

TAKEX MICROWAVE SENSOR

MW-100AH

Instruction Manual

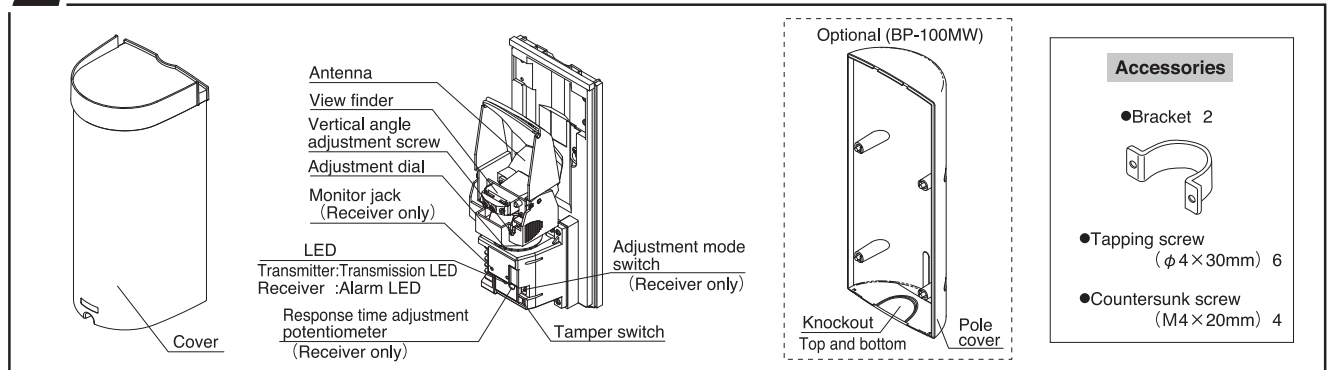
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2 PARTS DESCRIPTION



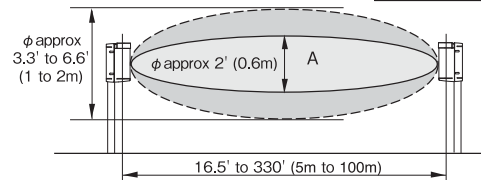
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- When installing the unit along the side of a building or fence, installation must be at least 3.3ft. (1m) away from said constructions.
- Don't install this unit in location where it is exposed to direct sunlight or halogen light. It may become a cause of malfunction.
- Don't face the mirror unit to the sun directly during installing or replacing. It may become a cause of malfunction.
- Don't install other than correct direction. (at slant, at upside down)
- It is buried in snow etc.
- Freezing
- Don't operate less than 3.3' (1m) detection distance between transmitter and receiver even for operation checking.

2) Height of installation

Install the unit at a height of 3.3' (1m), ground to center of microwave sensor, to detect human being walking or running through the beam.

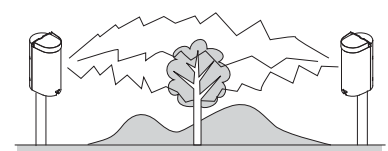


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- Please check the detection area by walking test.
- Do not stack the sensors vertically.

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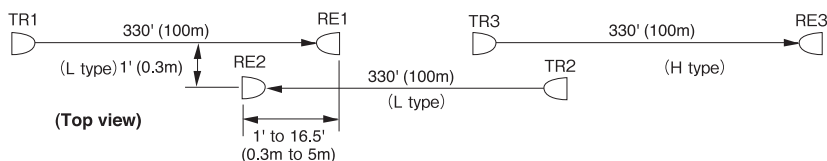
4 INSTALLATION

Installation example

When two or more sets are used, two frequencies (L and H types) should be used in order to avoid cross talk or interference. Refer to the following example.

● Linear protection (long distance)

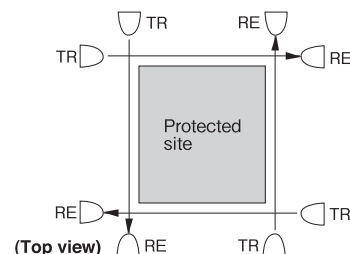
H type should be used for TR3 and RE3 when TR1 and RE1 are L type.



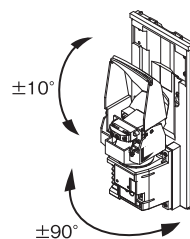
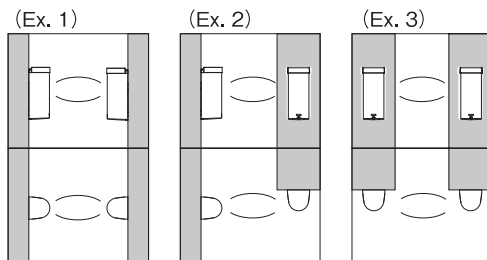
- Do not use different frequencies (H and L) in a detection line.
Use a pair of same frequency : TR(H) and RE(H) OR TR(L) and RE(L).
- Do not stack the sensors vertically.

● Perimeter protection

Do not install the transmitter and the receiver at a same corner. Microwave sensor with the same frequency can be used for this case.

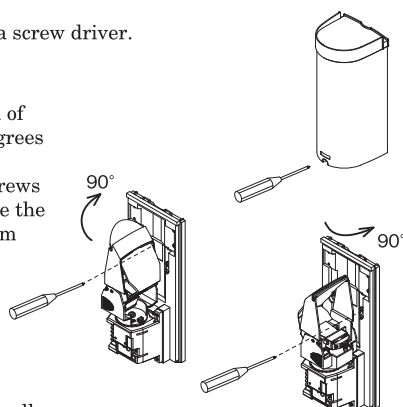


Mounting



1) Detach cover with a screw driver.

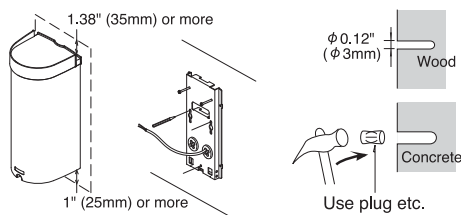
2) Turn the antenna of each unit by 90 degrees right or left. Then loosen the screws (2 places) to remove the mounting plate from the body.



3) Wall mount

① Make holes in the wall.

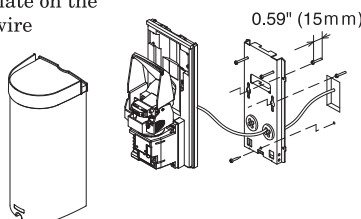
- Place the mounting plate the wall as a template for drilling and mark the screw holes. (Allow a space of 1" (25mm) above and below the plate. This will provide easy detachment of the cover after installation.)



- Pre-drill in wall.
Concrete wall : Refer to specifications of the securing plug used.
Wooden wall : 0.12" (3mm) diameter.

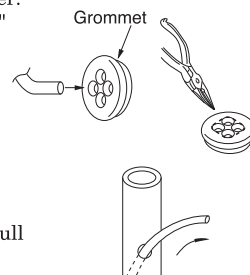
② Install the sensor.

- Insert tapping screws to 0.59" (15mm) under the screw head.
- Install the mounting plate on the wall after pulling the wire through it.
- Connect terminals.
- Attach cover.



* The grommet is compatible with a wire of $\phi 0.12"$ ($\phi 3\text{mm}$) to $\phi 0.24"$ ($\phi 6\text{mm}$) outer diameter.

When a wire of more than $\phi 0.24"$ ($\phi 6\text{mm}$) outer dia. is used, cut off the dotted line portion as illustrated using pliers or the like. Then use caulking to prevent insects from entering into unit.

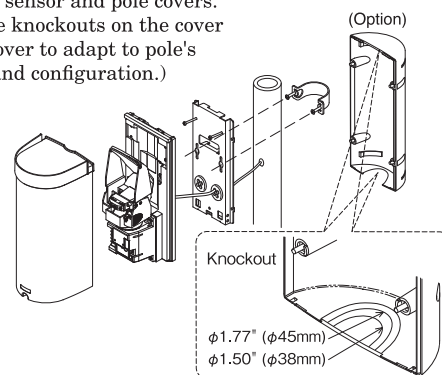


4) Pole mount

① Make a wiring hole in the pole. Pull through wire.

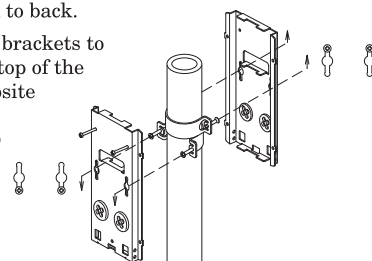
② Install sensor on the pole.

- Attach the U brackets to pole and fix the mounting plate with screws.
- Fix the sensor the body to the mounting plate.
- Connect the terminals.
- Attach the sensor and pole covers.
(Break the knockouts on the cover and pole cover to adapt to pole's diameter and configuration.)



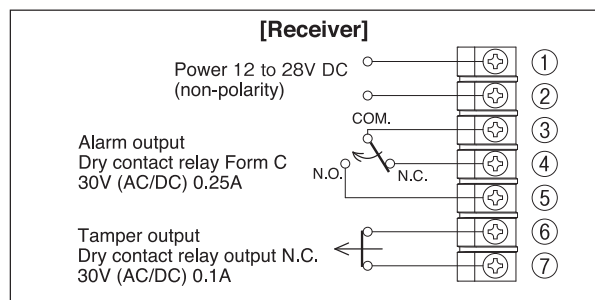
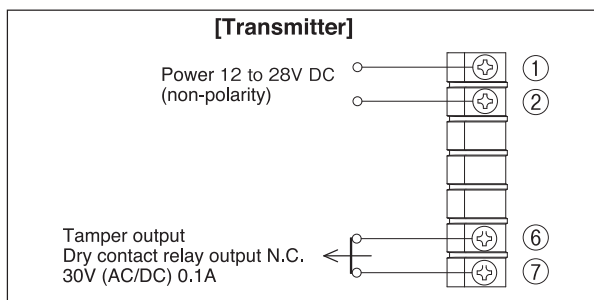
5) Pole mounting back to back.

- Attach the two U brackets to the poles, one on top of the other, facing opposite directions.
(See illustration.)



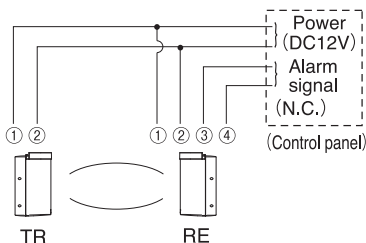
5 WIRING

Terminal arrangement

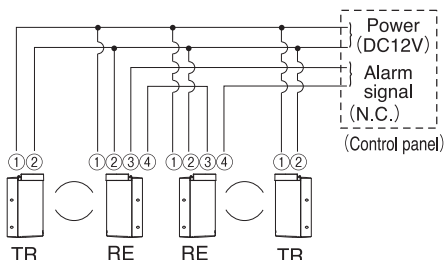


Wiring The equipment must be powered from an LPS in accordance with EN60950-1 : 2001

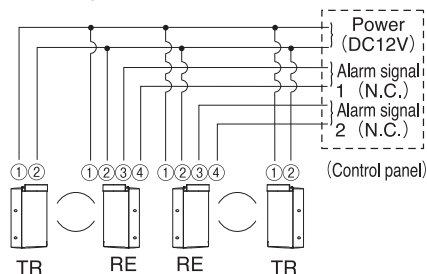
1) Basic connection



2) When two or more sets are connected to the same line.



3) When two or more sets are connected to separate lines.



4) Wiring distance

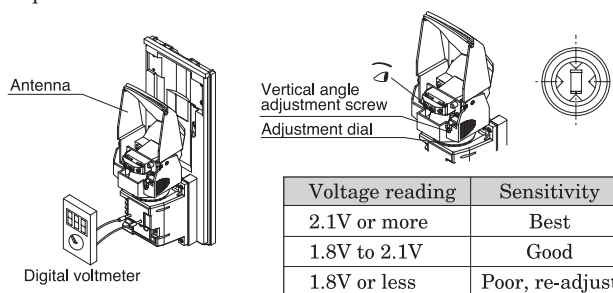
Size of wire used	Power voltage	
	12V DC	24V DC
AWG 20 (Dia. 0.8mm)	Up to 660ft. (200m)	Up to 5,300ft. (1,600m)
AWG 18 (Dia. 1.0mm)	Up to 1,000ft. (300m)	Up to 7,800ft. (2,400m)
AWG 17 (Dia. 1.1mm)	Up to 1,350ft. (400m)	Up to 9,500ft. (2,900m)
AWG 16 (Dia. 1.25mm)	Up to 1,800ft. (550m)	Up to 12,500ft. (3,800m)
AWG 15 (Dia. 1.4mm)	Up to 2,300ft. (700m)	Up to 17,000ft. (5,100m)
AWG 14 (Dia. 1.6mm)	Up to 2,950ft. (900m)	Up to 21,000ft. (6,400m)

Note : 1) Max. wiring distance, when two or more sets are connected, is the above value divided by the number of sets.

2) The signal line can be wired to a distance of up to 6,000ft. (2,000m) with AWG 20 (dia.0.8mm) telephone wire.

6 SET-UP OF FUNCTIONS AND BEAM ALIGNMENT

- Supply power with covers off.
- Look through the view finder on the transmitter unit and move it until the receiver unit is visible.
Repeat the procedure on the receiver unit.
- Set the adjustment mode switch on the receiver to "adjustment mode". Connect the digital volt meter to the monitor jack and check the monitor output voltage (beam reception level).
When the output voltage is low, adjust the installation height of the transmitter and receiver so that the output voltage will reach the highest level. (Make sure that the angle of the antenna does not change.)
- After adjustment, make sure that the adjustment switch is set to "Operation mode".



After adjustment, set the adjustment mode switch to "Operation mode".

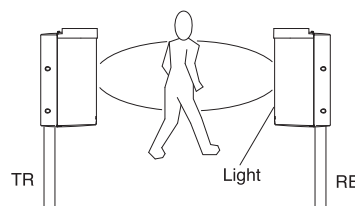
Note: Install the sensor at a proper height and position otherwise detection area could be widened over 6.6' (2m).
This could cause the sensor to detect movements of cars or vegetations near the area and lead to frequent false alarms.

7 OPERATION CHECK

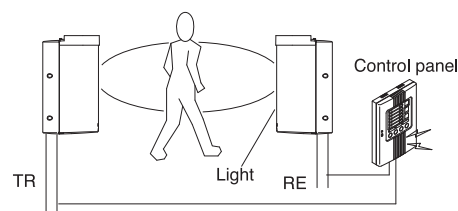
After the installation and angle adjustment are finished, test operation by performing a walking test through walk testing the sensor.
Two methods may be used.

Note: When cover is attached, the sensor is switched to be in an operation mode automatically.

1) Check by alarm LED only.



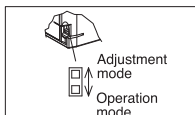
2) Check by both the alarm LED and control panel



8 FUNCTIONS DESCRIPTION

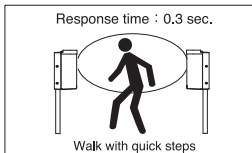
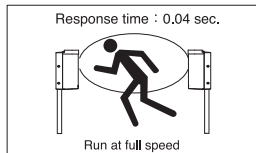
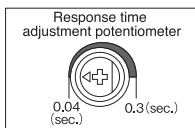
1. Adjustment mode switch

With this switch, a speedy check of the beam reception level is possible. When aligning the beam, turn the switch to the "Adjustment mode". (Factory set : Operation mode)



2. Response time adjustment volume

(Factory set : 0.04)



9 TROUBLESHOOTING

Solve possible problems according to the following table. If normal operations cannot be restored by this means, contact either the dealer from whom you bought the unit or TAKEX.

Symptoms	Possible causes	Remedies
Transmitter LED does not light	1. No power supply 2. Bad wiring connection or broken wire, short	1. Turn on the power 2. Check wire
Receiver LED does not light when the beam is broken	1. No power supply 2. Bad wiring connection 3. Microwave is reflected off another object and sent into the receiver	1. Turn on the power 2. Check wire 3. Remove the object causing the reflection, or change the place for installation
Receiver LED continues to light (the does not stop)	1. No power supply to the transmitter 2. Angle adjustment of transmitter and receiver is not appropriate. 3. Obstacles between transmitter and receiver	1. Turn on the power on the transmitter 2. Readjust angle 3. Remove obstacles.
Intermittent alarm	1. Bad wiring connection 2. Change of supply voltage 3. Shading objects between the transmitter and receiver 4. A large electric noise source such as power machine is located near the transmitter and receiver 5. Installation height, installation site or angle adjustment is inappropriate	1. Check again 2. Stabilize supply voltage 3. Remove object the causing the shade 4. Change the place of installation 5. Readjust

DAILY INSPECTIONS

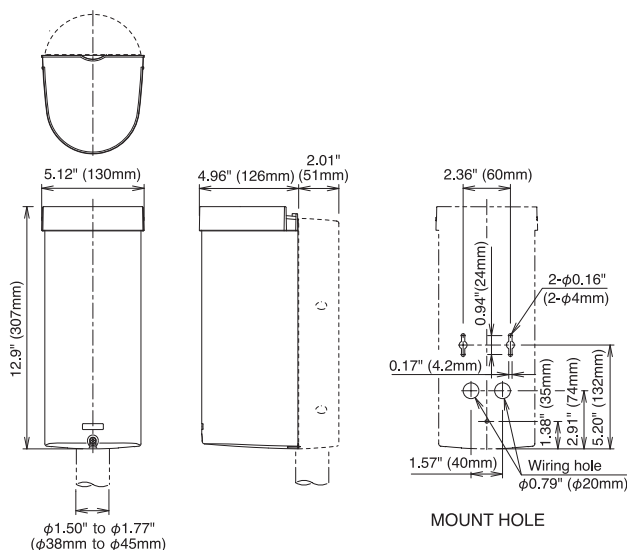
- To clean the device, use a soft, wet cloth and then wipe off any water drops. If the device is particularly dirty, dip the soft cloth in water that includes a weak neutral detergent. Wipe the device gently with the cloth, then wipe off any detergent that remains.
- Do not use substances such as thinner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

10 SPECIFICATION

Type	Microwave sensor
Model	MW-100AH
Protection distance	16.5ft. (5m) to 330ft. (100m)
Max. arrival distance	Approx. 660ft. (200m)
Microwave	24.17GHz
Detection system	Microwave
Response time	0.04sec. to 0.3sec. (Variable using POT)
Alarm signal	Dry contact relay output 1C N.O. / N.C. COM. Contact action : Interruption time output Contact capacity : 30V (AC/DC) 0.25A or less
Supply voltage	12 to 28V DC
Power consumption	100mA ● Transmitter : 40mA ● Receiver : 60mA
Tamper signal	Dry contact output N.C. Contact capacity : 30V (AC/DC) 0.1A
Alarm LED (Receiver)	Red LED Lighting at alarm
Transmission LED (Transmitter)	Green LED Lighting at signal transmission
Functions	Monitor output, Adjustment mode switch
Weight	Transmitter 36.8oz (1,050g) Receiver 38.5oz (1,100g)
Appearance	Resin (Wine red)

11 EXTERNAL DIMENSIONS

Unit: inch (mm)



12 SPECIAL NOTES

FCC

(1)FCC Regulation Statement : This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures : -Reorient or relocate the receiving antenna. -Increase the separation between the equipment and receiver. -Connect the equipment into an outlet on a circuit different from that to which the receiver is connected. -Consult the dealer or an experienced radio/TV technician for help.

WARNING : Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

(2)RF Exposure Warning Statement : This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure compliance. This transmitter must be at least 20 cm from the user and must not be co-located or operating in conjunction with any other antenna or transmitter. The information in this guide may change without notice. The manufacturer assumes no responsibility for any errors that may appear in this guide.

Limited Warranty :

TAKEK 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 TAKEK. All implied warranties with respect to TAKEK, 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, TAKEK 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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