

TAKEX

FLAME SENSOR

FS-5000E

Instruction Manual

We appreciate your purchase of a TAKEX flame sensor. This sensor will provide long and dependable service when properly installed. Please read this Instruction Manual carefully for correct and effective use.

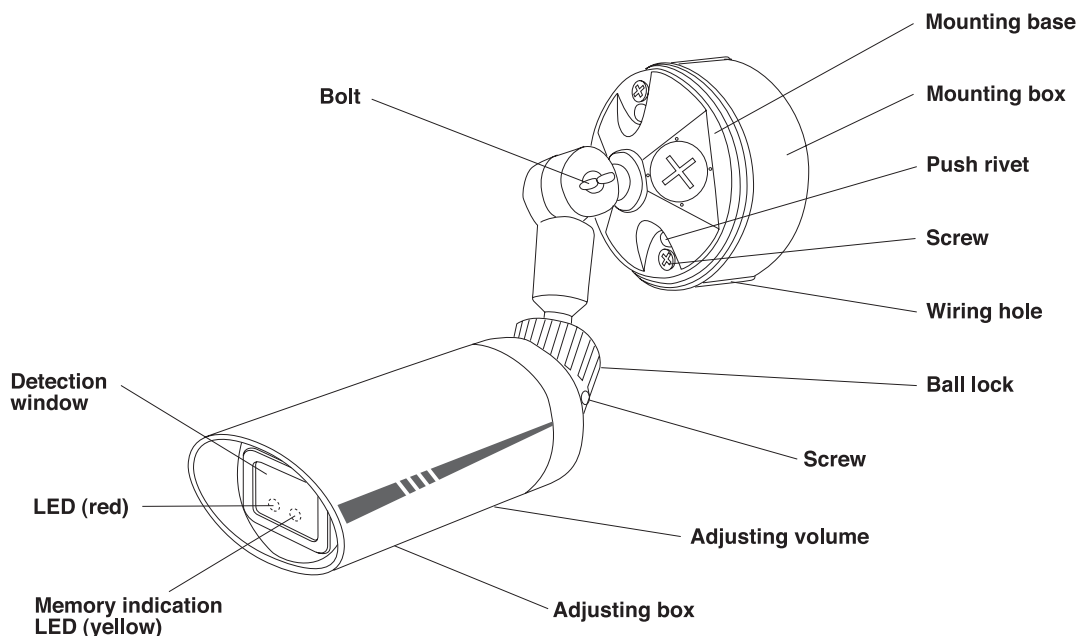
Please Note : This sensor is designed to detect flames and to initiate an alarm ; it is not a fire-preventing device.

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

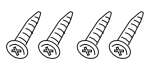
PRODUCT DESCRIPTION

Flame sensor FS-5000E immediately detects ultraviolet rays contained in flames and activates the external output. It can be installed either indoors or outdoors. By selecting the set up from the 8 levels that is suitable to the environment the sensor is installed, it will reduce the possibility of false detections of other kinds of ultraviolet rays. Also there are many convenient functions such as Output Time Set Up, Day/Night Time Discernment Function, Alarm Memory Function. It can be used widely as early detector of incendiary fire, smoking in prohibited areas etc.

1 PARTS DESCRIPTION



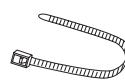
Accessories



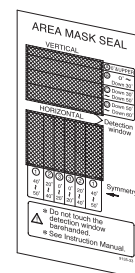
Tapping screw
6×30 (4 pcs.)



Tapping screw
4×8 (1 piece)



Combining band
(1 piece)



Area mask seal (1 piece)

2 ATTENTION

PRODUCT CLASSIFICATION

This sensor is designed to detect ultraviolet rays contained in flames, and to issue a signal. This unit is not a fire-preventing device. And this will not detect smoke, heat. PULNiX is not responsible for damage, injury or losses by fire, accident, calamity, Acts of God (including inductive surge by lightning), abuse, misuse, abnormal usage, faulty installation or improper maintenance.

OBJECTS TO BE DETECTED

This sensor detects ultraviolet rays in a very sensitive level. So it will possibly detect other objects than flames. Besides, this sensor does not detect the burning object which is not flaming.

Possible cause of false alarm. Do not install the sensor nearby the followings.	Flames which can not be detected.
<ul style="list-style-type: none"> * Halogen lamp * Electric discharging lamp such like mercury lamp * Electric sterilizer lamp * Spark of welding * Electric spark (caused by motor, pantograph) * Sunlight * Electric discharge of thunderbolt * High electric field * All objects that give out ultraviolet rays 	<ul style="list-style-type: none"> * Flames through the glass or transparent resin * Lighting portion of cigarette * Burning charcoal or briquet * Electric stove * Burning object without flames

(Ultraviolet rays contained in discharge lights such as sparks at welding construction sites or from pantographs of trains, are very strong. Even though the sensor does not detect directly, it may detect the reflection.)

OTHERS

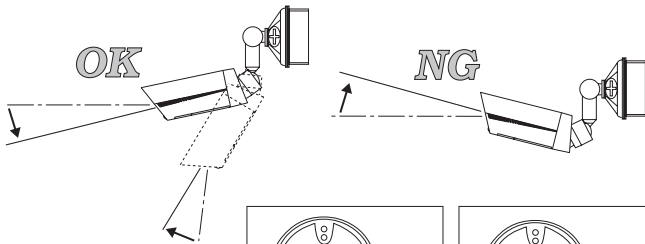
- * There is an operation mode function. It makes the sensor operate when it is darker than the set up. In this case, the sensor will not operate when it is brighter than the set up.
- * This sensor issues output for the detection time + set up.
- * In cases that the detection window is covered with frost or ice etc., the sensitivity will become very low and may not detect properly.
- * The sensitivity will decrease in cases of rain or snow in the detection area.
- * Do not touch the detection window barehanded. The oil of hands may cause low sensitivity. Wipe with soft cloth with alcohol in case it gets soiled. Also after installation keep wiping when necessary.
- * Do not pour water directly on the sensor. (It is rain resistant structured but not water resistant.)
- * The detection window is special glass. It is a fragile article.
- * The sensor may get damaged before detecting flames where there is an explosion.
- * Ultraviolet rays are invisible. It could be released from unexpected objects. Set up the sensitivity to "L" and detection timer to the next longer time when the sensor does not operate properly, such as raising an alarm while there is no flame, and there is none of the facts of the above-mentioned "possible cause of false alarm" nearby.



When a strong impact is given to the sensor, it may cause damage, malfunction or less performance. Do not handle in a rough manner.


3 DO'S AND DON'T'S

- * Keep the sensor angle downward than horizontal and upward than vertical when installed outdoors.



- * Keep the detection window straight and the adjusting part at the bottom.

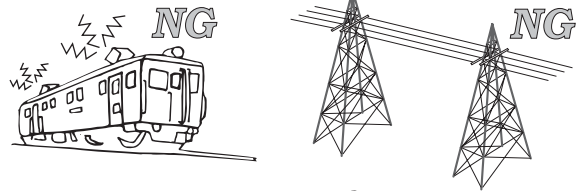
- * There are many other ultraviolet ray factors outdoors that may cause unexpected detection. Therefore, the detection timer is recommended to be set up longer than 6 secs. when installed outdoors.

INSTALLED OUTDOORS	DETECTION TIMER	1 sec. : not recommended 6 secs. or more : OK
	SENSITIVITY	H : not recommended L : OK

(The ex-factory's set up is 1 sec. in order to check the area and operation.)

- * Refer the detection area drawing when installing. Check the area adjustment while operating the sensor.
- * Do not install in following locations.

- Near railways. The sparks from the pantograph may cause false detection.
- Near high voltage power lines. The sparks from the pylon may cause false detection.



- Near weld construction sites. The sparks may cause false detection.



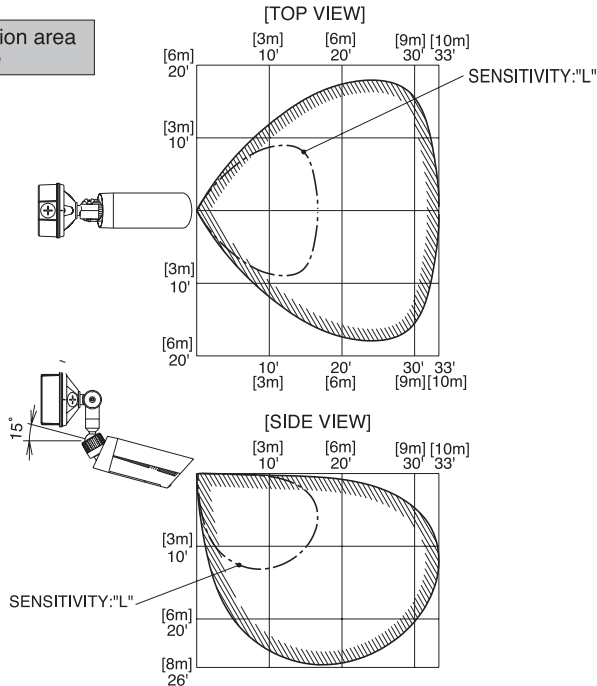
- Where spark or flame is usually used. (kitchen, incinerator etc.)
- Where severe shock or electric noise is caused.
- Where shield object (glass, transparent resin etc.) is in front.
- Where steam stagnates heavily. (bathroom etc.)
- Where temperature is under -20°C (-4°F) or over +50°C (+122°F).
- High location installation is recommended to prevent mischief. (over 2.5m)
- This product is for wall, ceiling, under eaves installation. Use the optional attachment for installation at unplane places.

4 DETECTION AREA

1. Detection Area

- *The upper detection area is limited to avoid sun ray influence and other remote unexpected detectable objects.
- *The detection distance depends on the size and time of flaming. The bigger and longer continued flame is prior to be detected. The smaller and shorter the flame continues, the detection area gets narrower.

Detection area picture

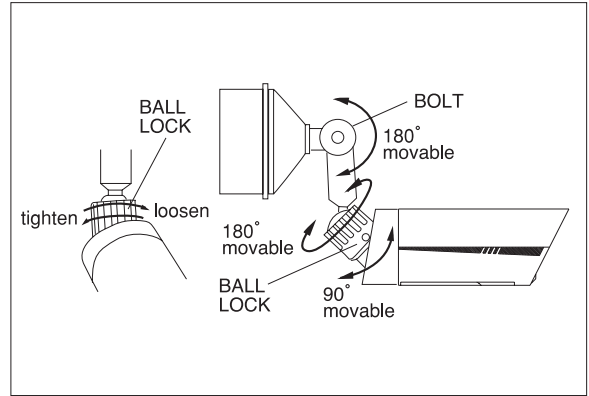


CONDITIONS

- * DETECTION OBJECT : GAS FLAME OF LIGHTER 2.75" (7cm)
- * SENSITIVITY : "H"
- * TIMER : 1sec.
- * ANGLE : DOWNWARD 15°

2. Area adjustment

- The area adjustment in wide angle allows the sensor to be installed in various locations.
- Loosen the bolt and ball lock and refer to "3. DO'S AND DON'T'S" when installing. Do not forget to tighten it when finished.



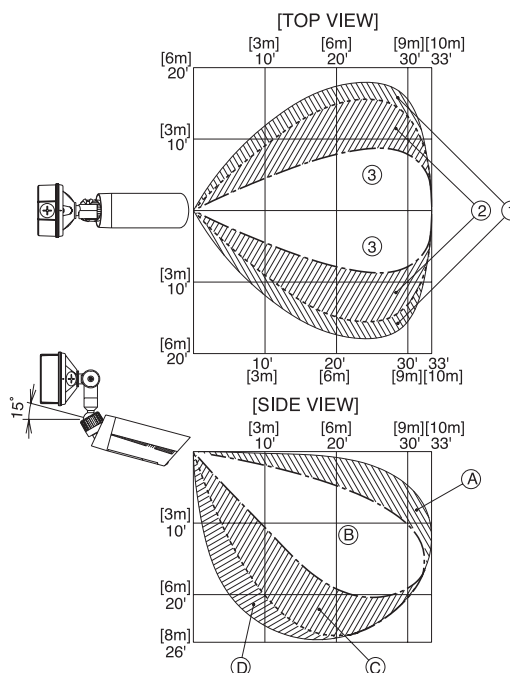
- Keep the detection area downwards to avoid sun ray influence and other remote unexpected detectable objects when installing outdoors.

3. Area masking

There are many ultraviolet ray factors outdoors that may cause unexpected detection. In case there are objects that cause unexpected detection in the area and is not avoidable by adjustment, use the accessorized "area mask" to cover the area.

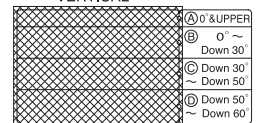
- *There are 6 horizontal masks and 4 vertical masks. The 2 types can also be used combined.
- *Stick it on from the edge of the detection window holding the ear. Tear the ear after sticking on.
- *After sticking on, check the operation of the sensor.
- *Wear gloves and do not touch the detection window barehanded. When accidentally touched, wipe with soft cloth with alcohol.

Masked detection area

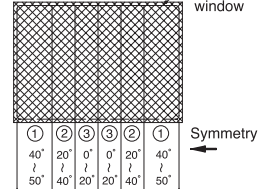


AREA MASK SEAL

VERTICAL



HORIZONTAL



- * Do not touch the detection window barehanded.
- * See Instruction Manual.

AREA MASK SEAL

CONDITIONS

- * DETECTION OBJECT : GAS FLAME OF LIGHTER 2.75" (7cm)
- * SENSITIVITY : "H"
- * TIMER : 1sec.
- * ANGLE : DOWNWARD 15°

5 OPERATION AND FUNCTION

(1) Operation

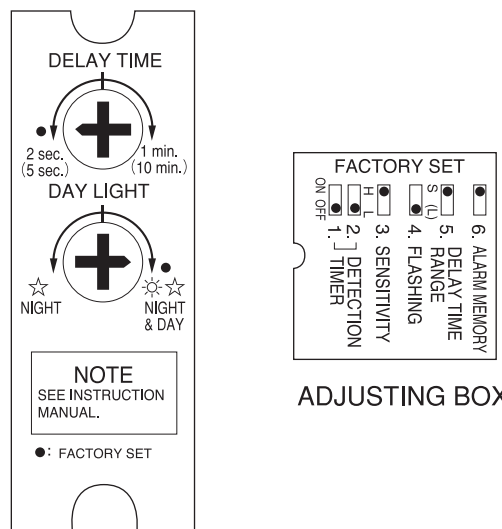
The red LED will light and start output when the sensor detects flame (ultraviolet ray) for the set up time (1 sec., 6 sec., 15 sec., 30 sec.) and moreover when the environment is darker than the [operation mode] set up.

In cases it still keeps flaming, it will continue the above LED lighting and output. After the flame goes out, the LED lighting and output (off delay) will stop according to the [delay time range] (2 sec. ~ 10min.).

(2) Mode Setting

The following settings and functions are selectable for detection and output. Use the dip switch in the adjusting box and adjusting volume which is on the bottom of the sensor.

- The adjusting volume can be turned by coins.
Do not turn strongly, it may cause damage.



ADJUSTING VOLUME

ADJUSTING BOX

① Detection Function

This product detects ultraviolet ray included in flames and outputs an alarm. Outdoor installation would cause much more false detection than indoor installation, for there are many other ultraviolet ray factors and few shielding objects. The 8 selectable sensitivity levels combined by 2 sensitivity set ups and 4 detection timer set ups are made to prevent false detection at such uncertain conditions outdoors. Select the set up that most suits the environment and purpose.

When the sensor does not operate properly, set up the sensitivity to "L" and detection timer to the next longer time.

Detection timer

This function set ups the min. flaming time to detect. It outputs an alarm when the flame continues to flame more than the set up time. It will not output an alarm when the flame goes out before the set up time.

The following 4 levels are selectable.

ADJUSTING BOX DETECTION TIMER	DETECTION TIME (outputs when flames for more than the below time)	PURPOSE/EXAMPLE
OFF ● OFF 1 2	1 sec.	Flame of lighter/match detection at non-smoking areas. [beginning set up]
OFF ● ON 1 2	6 secs.	Fire detection
ON ● OFF 1 2	15 secs.	In case of uncertain operation on the above two.
ON ● ON 1 2	30 secs.	Fire detection at uncertain environment.

- * The alarm may delay when the strength of ultraviolet ray is weak.
- * Intermittent ultraviolet ray will not be detected.
- * Timer set up 6 secs. or more is recommended for outdoor installation.

Sensitivity

This function set ups the size of flame (the strength of ultraviolet ray) to detect.

ADJUSTING BOX SENSITIVITY	SENSITIVITY
H ● 3	H : 100% [beginning set up]
L ● 3	L : 50%

- * The detective distance for "L" is half of that for "H", when detecting same flame.
- * When there is uncertain operation at "H", change the sensitivity to "L".
- * For outdoor use, "L" is recommended.

② Output function

Delay time (Operation time adjustment)

The output time for the following is off delay of detection time + set up time.

There are following selections.

OUTPUT	ADJUSTING BOX DELAY TIME RANGE	ADJUSTING VOLUME DELAY TIME	OPERATION TIME (adjustment limit)
* dry contact relay Form C	(S) ● (short) 5	(2 sec.) ● (1 min.)	approx. 2 secs. ~approx. 1 min. [beginning set up] : approx. 2 secs.]
* LED	(L) ● (long) 5	(5 sec.) ● (10 min.)	approx. 5 secs. ~approx. 10 min.

Day light (Operation mode)

The following output will cause only when the circumference is darker than the set up. (day / night time discernment function)
Set up according to purpose.

OUTPUT	ADJUSTING VOLUME DAY LIGHT	OUTPUT CONDITIONS (circumference brightness)
* dry contact relay Form C	NIGHT	Output only night time
* LED		Output both day/night time [beginning set up]

- * For subtle set up, adjust the volume when the circumference is the requested light level.
- * Even setting up for night time mode, it may not output when the circumference is bright for lightings etc. In that case, turn the volume to the right until it outputs.
- * The "output only night time" function is convenient to detect only night time for locations that have other ultraviolet ray factors at day time.

Flashing

The following two output types are selectable.

OUTPUT	ADJUSTING BOX FLASHING	OUTPUT TYPE
* dry contact relay Form C	ON 4	Repetition of interval flashing (0.5 sec. output, 0.3 sec. stop)
* LED	OFF 4	Continuance output [beginning set up]

Lighting to threaten and notice incendiarism.

Alarm Memory Function

Enables identification of individual sensors in multiple sensor configuration. After rasing an alarm, the memory indication LED (yellow) blinks for 3 minutes and then lights for 47 minutes.

When an alarm is caused again during the lighting, it will light for another 47 minutes. <re-trigger operation>

OUTPUT	ADJUSTING BOX ALARM MEMORY	MEMORY
* memory LED (yellow)	ON 6	Indicates [beginning set up]
	OFF 6	Does not indicate

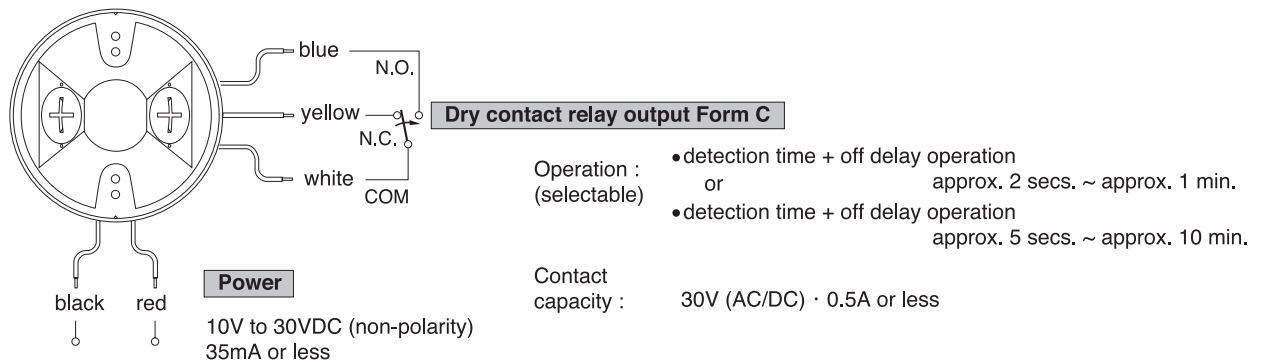
- * In case of request of resetting during blinking and lighting, turn the power off and on again. (power on reset operation)

6 WIRING

(1) Attention

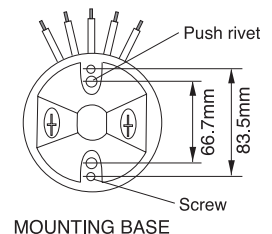
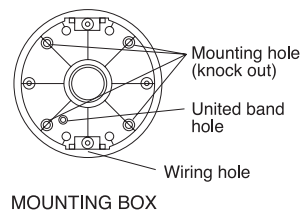
- * Turn off power when installing. Hot line work will cause electric shock and damage.
- * The wiring is lead wiring. Follow the prepare procedure.
- * The wiring lead is contained in the mounting base. Take off the screw, mounting base, mounting box when installing.

(2) Wiring Connection



7 INSTALLATION

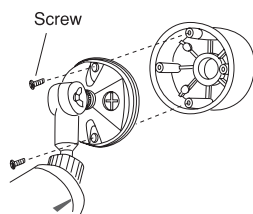
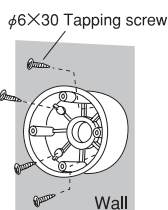
- [1] Select the most suitable installation place and way according to the purpose.
(Refer to "3. DO'S AND DON'T'S", "4. DETECTION AREA".)
- [2] Take off the 2 screws, mounting base, mounting box.
(Wiring leads are contained in the mounting base.)
- [3] Wire and instal the sensor.
(Refer to "6. WIRNG" and the following)
- [4] Set up temporary and confirm the area and operation.



The following wiring and installation can be done. Follow the procedures.

EXPOSED WIRING

- (1) Fix to the surface
 - ① Make a hole through the 4 mounting holes (knock outs) by a driver etc.
 - ② Fix the mounting box by the 4 $\phi 6 \times 30$ tapping screws to the surface.
- (2) Take off the lid of the wiring hole on the bottom of the mounting box and pass the wiring through. (Conduit tube wiring is possible for the wiring hole is conduit tube screw G16.)
- (3) Follow the "6. (2) Wiring connection" for wiring.
- (4) To avoid direct pressure to the knot, combine the wiring by the accessory Combining Band and fix it to the inside of the box by $\phi 4 \times 8$ tapping screw.
- (5) Fix the mounting base tightly to the mounting box by the 2 screws.



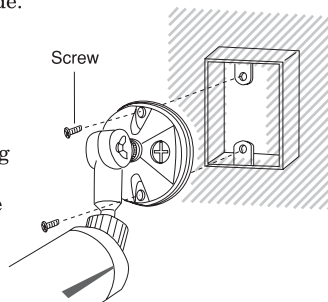
BUILT IN WIRING

- (1) Preparation (not necessary for following case)

[The mounting base fits 83.5mm and 66.7mm type built in switch box. Though, it needs adjustment for the following case.]

 - ◎ 66.7mm type (beginning set up : 83.5mm)
 - Push out the 2 push rivets from the back side of the mounting base and put them into the 2 holes on the outside.

- (2) Follow the "6. (2) Wiring connection" for wiring.
- (3) Fix the mounting base tightly to the attachment box by the 2 screws.
- (4) Give rain proof treatment such as calking to the top and side of the mounting base. (It may not stick according to the surface condition.)



* Use optional equipments for other installation.

8 OPERATION CHECK

Check operation after wiring and installation.

(1) Detection area

* Set up for area check.

- Detection timer 1 sec.
- Sensitivity H
- Delay time 2 sec.
- Day light Night & Day

(same as beginning set up)

* Set up the area angle referring to the "4. 1. Detection area" picture.

* Put power on.

* Turn on a lighter more than 1 sec. within the detection area. Check the angle and size of area by LED and connected machines and tools.

* In case it includes unnecessary areas, adjust by changing angle or masking the area.

(2) Operation

* Decide the real set up according to the purpose and environment.

* Activate the sensor again and check the LED and connected machines and tools.

9 TROUBLE SHOOTING

TROUBLE	CHECK	CORRECTIVE ACTION
Completely inactive	<ul style="list-style-type: none"> ● No power supply (Broken or improper wiring) ● Low voltage ● Interrupting object in front of detection area (Including glass) ● Improper detection area set up (Including detection distance) ● Improper operation mode set up ● Improper detection timer set up 	<ul style="list-style-type: none"> → ● Correct supply or replace broken wiring → ● Correct supply or replace broken wiring → ● Remove the interrupting object → ● Re-adjust the detection area set up (Refer to "4. DETECTION AREA") → ● Re-adjust the operation mode (Refer to "5. OPERATION AND FUNCTION") → ● Re-adjust the detection timer set up
Sometimes inactive	<ul style="list-style-type: none"> ● Improper detection area set up (Including detection distance) ● Improper operation mode set up ● Detection window soiled ● Improper detection timer, sensitivity set up 	<ul style="list-style-type: none"> → ● Re-adjust the detection area set up (Refer to "4. DETECTION AREA") → ● Re-adjust the operation mode (Refer to "5. OPERATION AND FUNCTION") → ● Wipe with soft dry cloth → ● Re-adjust the detection timer, sensitivity set up
Activate without flame	<ul style="list-style-type: none"> ● Unstable power supply ● Large electrical noise source such as radio station or wireless station nearby ● Unexpected ultraviolet ray nearby (Refer to "2. ATTENTION", 3. DO'S AND DON'T'S") ● Sparking object such as welding construction site, railway pantograph nearby 	<ul style="list-style-type: none"> → ● Correct supply → ● Relocate the sensor → ● Remove the object / Relocate the sensor / Adjust the angle / Mask the area by seal / Set up sensitivity to "L" / Set up detection timer to the next longer time. (Refer to "5. OPERATION AND FUNCTION") → ● Relocate the sensor / Adjust the angle / Mask the area by seal / Set up sensitivity to "L" / Set up detection timer to the next longer time. (Refer to "5. OPERATION AND FUNCTION")
The LED lights but the connected device inactivates	<ul style="list-style-type: none"> ● Poor contact output connection or broken wire ● Improper output connection ● Improper connected units 	<ul style="list-style-type: none"> → ● Check the wiring or connection → ● Check the output terminal by tester etc. → ● Check the connected units

USUAL CHECK

◎ Follow the following for maintenance.

- Detection window → Wipe with soft cloth with alcohol
- Other parts → Wipe with soft cloth with synthetic cleanser

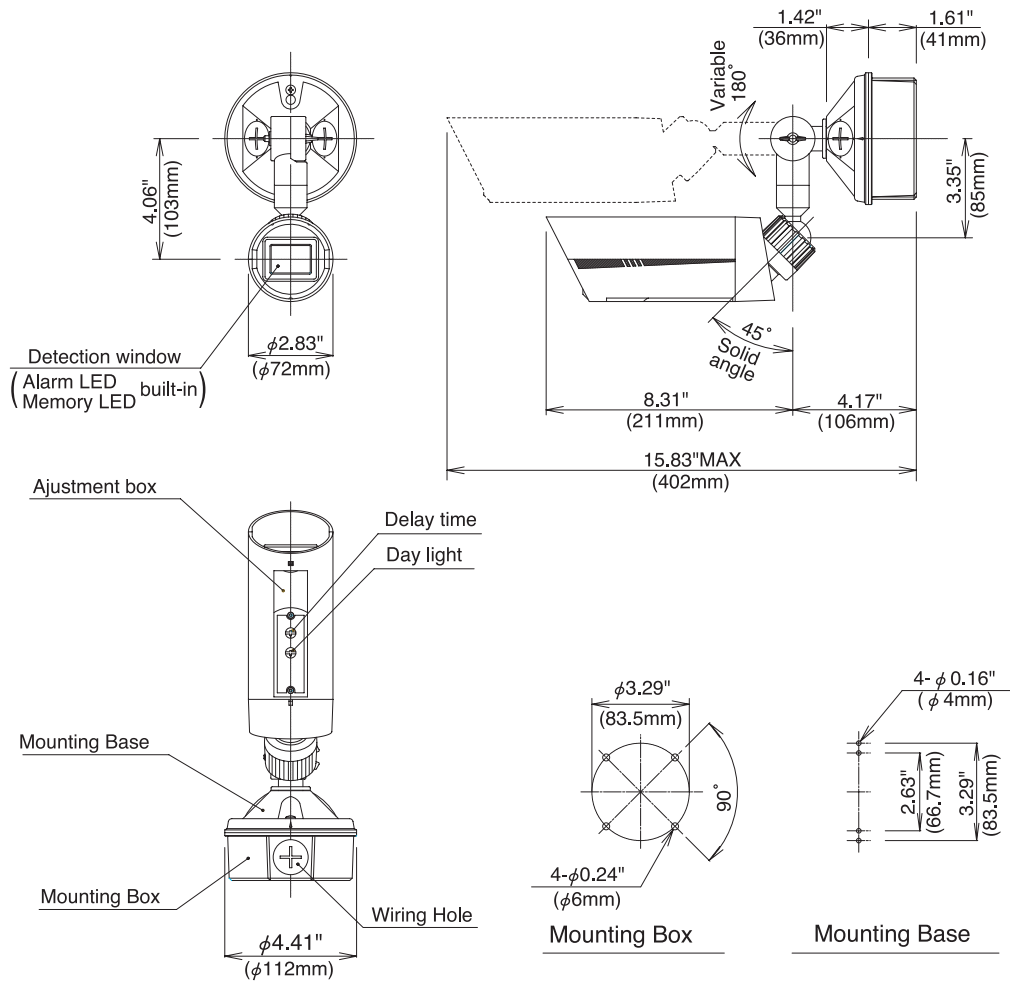
* Do not use alkaline cleanser.

◎ Check operation once a week. Also check operation when the surrounding is changed.

10 SPECIFICATIONS

PRODUCT NAME	FLAME SENSOR	
MODEL NO.	FS-5000E	
DETECTION SYSTEM	Ultraviolet rays detection (Detected wave length <185 to 260nm>)	
DETECTION AREA	Distance	33ft. (10m) [2.75" (7cm) flame]
	Angle	Vertical : approx. 75° (upward :15°) Horizontal : approx. 100° (downward :60°)
	Adjustment range	Vertical : downward 90° (horizontal-vertical) Horizontal : 180°
SENSITIVITY ADJUSTMENT	Sensitivity	H (100%), L (50%) [selectable by switch]
	Detection timer	1sec., 6sec., 15sec., 30sec. [selectable by switch]
POWER SUPPLY	10V to 30VDC (non-polarity)	
POWER CONSUMPTION	35mA or less	
ALARM OUTPUT	<input type="radio"/> Dry contact relay Form C (alarm : open/close) Contact capacity : 30V (AC/DC) 0.5A or less (resistance load) Operation time : The following are selectable * Detection time + off delay operation approx. 2 sec. - 1 min. * Detection time + off delay operation approx. 5 sec. - 10 min. Output operation : The following are selectable * Same time as above continuous output * Same time as above flashing output Operation mode (day/night time discernment function) : 5 lux (night time operation) - ∞ lux (day time operation) adjustment volume	
ALARM MEMORY	The memory indication LED blinks for 3 minutes and then lights for 47 minutes and automatically resets.	
LED	<input type="radio"/> Operation LED (red) : synchronous dry contact relay <input type="radio"/> Memory indication LED (yellow) : blinks for 3 minutes and then lights	
WIRING	Lead wiring power supply : 2 / dry contact : 3	
AMBIENT TEMP. RANGE	-4° F to +122° F (-20°C to +50°C)	
INSTALLATION	Indoor, Outdoor	
WEIGHT	approx. 19.3 oz (550g)	
APPEARANCE	Sensor part : PC resin (white) Adjustment, mounting part : AES resin (white)	
ACCESSORIES	* Tapping screw $\phi 6 \times 30$ (SUS) : 4 pcs * Tapping screw $\phi 4 \times 8$ (SUS) : 1 piece * Band : 1 piece * Area mask seal : 1 piece	
OPTIONAL	Pole attachment (for the end) : BP-01 Pole attachment (for the middle) : BP-02 Vise : BV-03	

11 EXTERNAL DIMENSIONS



CAUTION

- * Follow the voltage of the indicated power supply. Incorrect voltage may cause fire, electric shock etc.
- * Do not connect equipment that exceed the indicated output capacity. It may cause fire.
- * Do not install in locations that do not endure the weight of this product. It may drop and cause accident.
- * Do not decompose, modify this product. It may cause fire, electric shock etc.



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 Acts of God, 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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