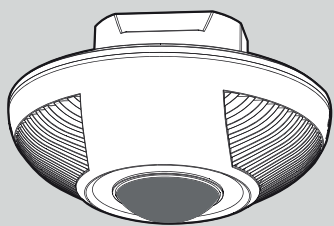


DUAL-TECH PRESENCE DETECTOR for KNX Home & Building Control System PD00H01KNX



INSTRUCTION MANUAL

TECHNICAL SPECIFICATIONS

Rated Voltage	21 - 30VDC (supply by KNX bus)
Current Consumption EIB / KNX	Operate : Approx. 40mA Standby : Approx. 30mA
Connection Type	Bus connection terminal: Φ0.8mm, single core
Output	4 Channels (Light control, Constant Light Control, Twilight switch, HVAC)
Settings	By ETS 5
Detection Range (Sensitivity Max.)	PIR: 360° circular, adjustable up to Φ8m US: 360°, adjustable up to 7m x 13m, it's an oval shape
Triggering Method Selection	PIR and US, PIR only, US only, PIR or US, set by ETS
Ultrasonic Sensor Frequency	32KHz
Sensitivity	PIR: Fixed in maximum US: Adjustable via ETS in 4 steps
Light Measuring	10 - 2000Lux
Operating Temperature	-20°C to +45°C
Environmental Protection	IP20
Material and Colour	Plastic, white
Standard and Safety	EN 60669-1 / EN IEC 60669-2-1 / EN IEC 63044-3 / EN IEC 63044-5-2 / EN 50491-2



Installation and assembly of electrical equipment must be carried out by qualified electricians. Contact a qualified electrician in the event of fault or break down.

CAUTION!

- Do not mount on conductive surface.
- Do not open the enclosure frequently.
- Circuit of PD00H01KNX is a low voltage circuit. Never connect it with standard 220V circuit or put it into a same Wiring Tube with the circuit.

1 PACKAGE CONTENTS

Pattern				
Item	Detector	Lens shield	Screw shield Φ3 x 14mm	Manual
Quantity	1	2	2	1

Optional accessories for surface mounting

Pattern			
Item	Junction box JB-46	Anti-dropping screw Φ3 x 18mm	Wood screw Φ4 x 25.4mm
Quantity	1	4	2

Optional accessories for flush mounting

Pattern	
Item	Power box cap SP-96
Quantity	1

2 PRODUCT DESCRIPTION

2.1 Features

The Dual-Technology presence detector PD00H01KNX integrates advanced PIR and Ultrasonic sensor technologies in one unit. The combination of these technologies helps to eliminate false triggering problems even in difficult applications. It is suitable for indoor application which is ideal for using in home, open-plan office, multi-stall public restroom, conference room, under-ground parking lots, classroom, library, etc. The control parameters time, ultrasonic sensor sensitivity, Lux and PIR/US triggering method of presence detector can be adjusted as user desired by ETS to match different application requirements.

- For use in KNX (EIB), TP (twisted pair) bus system in conjunction with other KNX components.
- Parameter and function settings via ETS 5 (Engineering Tool Software 5).
- Unique design of upgrading the firmware on-line for convenient operation.
- Status LEDs can be activated / deactivated.
- Automatic presence- and brightness-dependent control for lighting and HVAC.
- HVAC mode (0=automatic, 1=comfort, 2=standby, 3=economy, 4=building protection).
- Can be used as fully or semi-automatic, switchable.
- Switch or constant light control mode with standby function.
- Parallel switching of multiple presence detectors (Master / Slave or Master / Master).
- Detection and sending of current brightness level.
- Intelligent Central-OFF function.
- PIR & Ultrasonic sensors locking function.
- Manual influence via external KNX push buttons possible.
- Room correction factor setting for brightness measurement calibration.

Triggering mode application examples:

- PIR and US:**
If the precise detection is necessary, choose this triggering method which can reduce the false triggering problem. For example, a classroom, an open-plan office, etc..
- US only / PIR or US:**
When there is high level of minor motion or obstacle (furniture or partitions) existing in the monitored space, or it is a multi-stall space. For example, a multi-stall public restroom, an office with partitions, etc..
- PIR only:**
If the monitored space is free of obstacle or has high level of airflow or the detection area is needed to be well specified. For example, a small-scale office with air-conditioning, a small conference room, etc..

2.2 Dimension

- PD00H01KNX Φ111.5 x 67mm (See FIG.1-A):

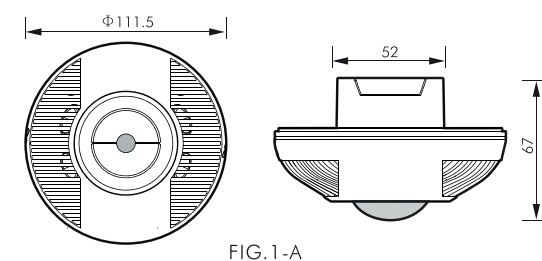


FIG.1-A

- SP-96: 62.5 x 50mm (See FIG.1-B)

Detector with power box cap SP-96 for flush mount (for optional purchase): Φ111.5 x 90mm (See FIG.1-C)

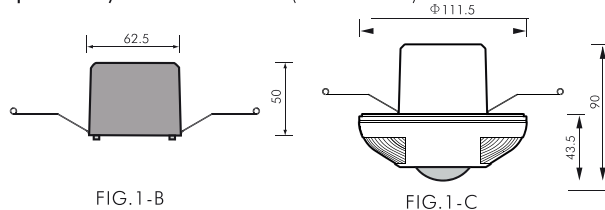


FIG.1-B

FIG.1-C

- JB-46: Φ111.5 x 35mm (See FIG.1-D)

Detector with junction box JB-46 for surface mount (for optional purchase): Φ111.5 x 72mm (See FIG.1-E)

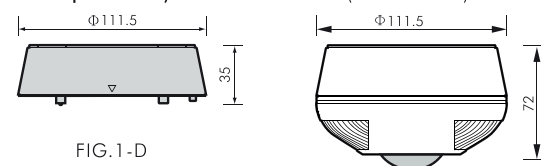


FIG.1-D

FIG.1-E

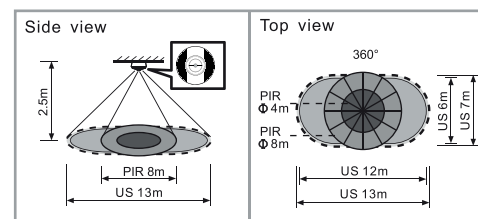
3 INSTALLATION AND WIRING



Please disconnect power completely and read the entire instruction manual carefully before installation.

3.1 Select a proper location

- 3.1.1 The recommended installation height of this detector is 2 - 4m, and 2.5m is the optimal mounting height. The detection range of PIR sensor can reach up to Φ8m, and ultrasonic sensor is an oval shape of 3.5m x 7m with small movement (i.e. hand wave), and an oval shape of 7m x 13m with large movement (i.e. walk). The detection angle is 360° for both PIR and ultrasonic sensors (See FIG.2).



- Ultrasonic Major Motion
- PIR Major Motion
- Ultrasonic Minor Motion
- PIR Minor Motion

Height	Walk across		Walk towards		Seated	
	US	PIR	US	PIR	US	PIR
2.0m	13x7m	Φ7m	13x7m	Φ3m	12x4m	Φ4m
2.5m	13x7m	Φ8m	13x7m	Φ3m	12x6m	Φ4m
3.0m	13x7m	Φ9m	13x7m	Φ3m	10x4m	Φ4m
3.5m	13x7m	Φ10m	13x7m	Φ3m	10x4m	Φ2m
4.0m	12x7m	Φ11m	12x7m	Φ3m	/	/

FIG.2

- 3.1.2 Location of dual-technology detector (See FIG.3-A & FIG.3-B).

- Dual-technology detector is capable of detecting occupant without directly seeing the moving person due to the high sensitivity of ultrasonic sensor.
- Ceiling mount will give an overall view of the entire room, and the detector should be mounted in the center of the room so that the detector can detect movement from anywhere of the monitored space.
- If you choose the PIR technology (PIR+US or PIR only) as triggering method, the detector should be located where the PIR sensor is able to see the occupant.
- In order to ensure good reliability of PIR sensor, an overlapping area is needed to be considered while installing several sensors in the same space.

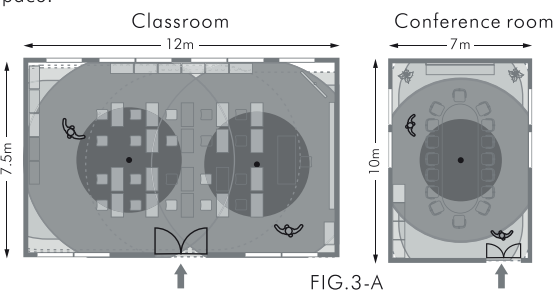


FIG.3-A

FIG.3-B

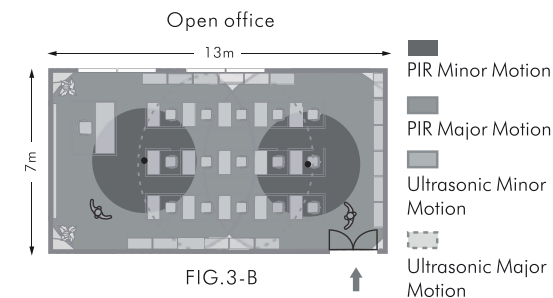


FIG.3-B

3.1.3 Examples of application

- 3.1.3.1 Ultrasonic sensor is less affected by humidity which is more suitable for using in the humid environment (See FIG.4-A).



FIG.4-A



FIG.4-B

FIG.4-C

FIG.4-D

- 3.1.3.3 Ultrasonic sensor is high sensitive in detecting small movement, such as a minor motion of typing, hand waving, door opening, etc. (See FIG.4-E & FIG.4-F & FIG.4-G):

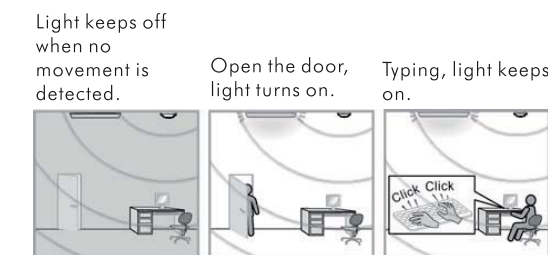


FIG.4-E

FIG.4-F

FIG.4-G

- 3.1.3.4 Since ultrasonic sensor is high sensitive to small motion and does not require a direct view between the sensor and the moving object, therefore, it is optimum for using in the spaces where frequently has less or small motion taken place, such as a conference room, an open plan office with partitions, a library, etc. (See FIG.4-H & FIG.4-I & FIG.4-J).

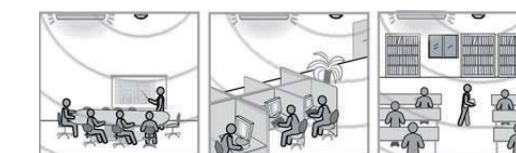


FIG.4-H

FIG.4-I

FIG.4-J

3.1.4 Helpful tips for installation

Since the detector is in response to temperature, airflow and wind change, please avoid the following conditions:

- Avoid aiming the detector toward the objects which may be swayed in the wind, such as curtain, tall plants, miniature garden, etc. (See FIG.5-A).
- Avoid aiming the detector toward the objects whose surfaces are highly reflective, such as mirror, monitor, etc. (See FIG.5-A).
- It is better to locate the detector at least 2m away from the glass gate or window for avoiding nuisance triggering because the shaking of glass could trigger the ultrasonic sensor (See FIG.5-D).
- It is better to locate the detector at least 2m away from the source of airflow such as doorway, vents and air conditioning, etc. (See FIG.5-B & FIG.5-C & FIG.5-E). If airflow causes the detector false triggering, please lower the ultrasonic sensitivity or select a more suitable location.
- The distance between two detectors must be at least 2m to avoid interference (See FIG.5-F).
- The direction of the ultrasonic sensor should aim to the main detection area to obtain the best coverage (See FIG.2).

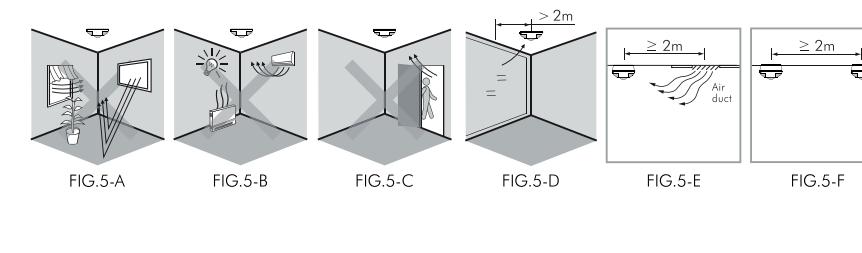


FIG.5-A

FIG.5-B

FIG.5-C

FIG.5-D

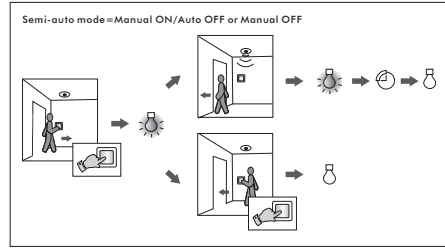
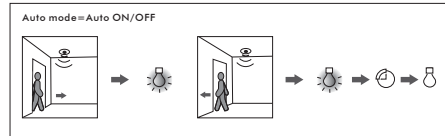
FIG.5-E

FIG.5-F

3.2 Function

3.2.1 Auto / Semi-auto mode

This function is enabled with ETS setting. Please refer to section 1 "Parameter setting" and 2 "Communication objects description" of part II for detailed information.



3.2.2 Test mode

Test mode is for checking the detection area. If movement is detected, the lighting switches on for 2 seconds and then off again. Please refer to "2.1 Test mode" of part II for detailed information.

3.2.3 Manual operation function

Switching / dimming mode selection via an external device.

3.2.4 Parallel switching (Master / Slave or Master / Master)

Can only be set by ETS software. Please refer to "1.1 Parallel switching" of part II for detailed information.

3.2.5 Ambient light appraisal

According to the changeable ambient light level, detector can postpone delay time of turning on and off load to avoid its unnecessary on or off switching due to rapid ambient light change:

- **Ambient light level changes from bright to dark:**
To avoid unnecessary switching ON/OFF load due to temporary ambient light value change caused via nature, e.g. a passing cloud, the detector has been designed with a 10sec delay for activating the light on and the detector will ignore any movement within the 10sec delay time, and the red LED will be continuous on as indication, but the detector has no reaction during the 10sec delay time.
- **Ambient light level changes from dark to bright:**
If the ambient light level continuously exceeds the switch off Lux value for 5min, there are different reactions according to the time setting value. Time setting ≥ 5 min, the light will be automatically switched off after 5min.
Time setting < 5 min, the light will be automatically switched off when the set time reached if no movement is detected during the 5min. But if there is movement detected within the 5min, the time will be reset upon detection and until 5min later, the light is switched off.

3.2.6 Standby function

Please refer to "4.1 Standby mode function" of part II for detailed information.

3.2.7 Constant light control

According to the changeable ambient light level, the load can dim to bright or dark automatically to match the Lux setting value (Lux setting value by ETS is measured the mixed light level of artificial light and the ambient light).

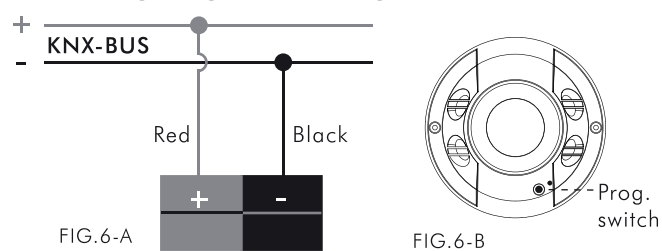
3.2.8 Central-OFF function

Please refer to "4.3 Central-OFF function" of part II for detailed information.

3.2.9 Presence simulation function

Please refer to "4.4 Presence simulation function" of part II for detailed information.

3.3 Wiring diagrams & Program switch



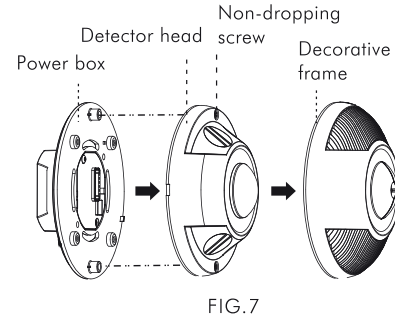
3.4 Installation Procedure

3.4.1 Flush mount with European standard junction box

NOTE

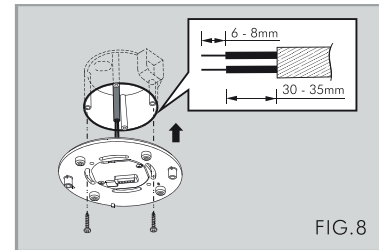
The direction of the ultrasonic sensor should aim to the main detection area to achieve the best detection coverage when detector is flush mounted with European standard junction box, and the fixing plate can be adjusted 45°.

3.4.1.1 Take off the decorative frame (See FIG. 7).



3.4.1.2 Pull out cables from European standard junction box (See FIG. 8), then strip off 6 - 8mm of cable sheathing for wiring, and refer to the wiring diagrams for correct cable connections (See FIG. 6).

3.4.1.3 Fit the power box into European standard junction box then screw them with two screws (See FIG. 8).

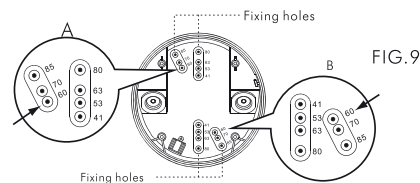


3.4.1.4 Assemble the detector with power box, then fix them with two screws (See FIG. 7).

3.4.1.5 Put on the decorative frame and restore the power supply.

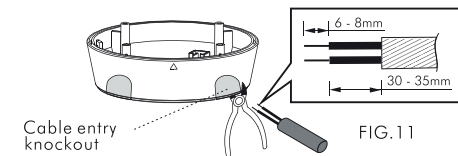
3.4.2 Surface mount

3.4.2.1 There are 7 pairs of fixing holes with various distances from 41mm to 85mm on the bottom cover of the combined junction box which can be selected for different mounting applications box JB-46 (See FIG. 9). Select two same figures on both ends for the corresponding fixing distance (See FIG. 10).

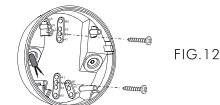


NO.	A	B	The distance between A and B
1	41	41	41mm
2	53	53	53mm
3	60	60	60mm
4	63	63	63mm
5	70	70	70mm
6	80	80	80mm
7	85	85	85mm

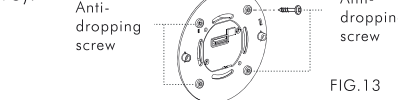
3.4.2.2 To feed power cables through the side of junction box, please use the cutting pliers to break the side cable entry knockouts, then insert cables into junction box and feed through it. Please strip off 6 - 8mm of cable sheathing for wiring (See FIG. 11).



3.4.2.3 Choose two proper knockouts to fix the junction box JB-46 on the surface of ceiling board with two wood screws (See FIG. 12).



3.4.2.4 Insert four anti-dropping screws to the corresponding screw holes on detector's fixing plate. Afterwards, those four screws will not drop off to provide convenient subsequent installation (See FIG. 13).

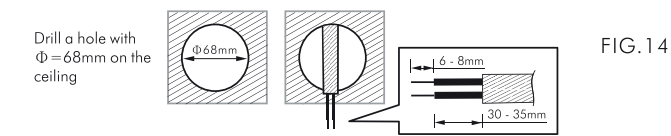


3.4.2.5 Refer FIG. 7 to assemble the detector head with the power box, and then refer to the wiring diagrams (See FIG. 6) for correct cable connections.

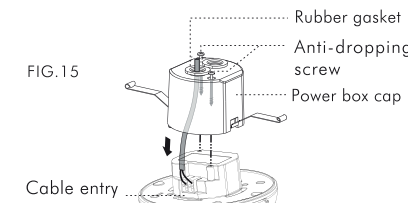
3.4.2.6 Put on the decorative frame and restore power supply.

3.4.3 Flush mount

3.4.3.1 To install detector, please drill a hole with diameter of 68mm on ceiling board and keep the power cable outside. Please strip off 6 - 8mm of cable sheathing for wiring (See FIG. 14).

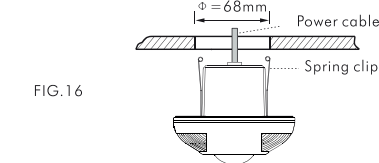


3.4.3.2 Break the two rubber gaskets on the power box cap with screwdriver, then put the power cable through them (See FIG. 15).



3.4.3.3 Refer to wiring diagrams for correct cable connections, then cover the power box cap back and screw it tightly.

3.4.3.4 Insert detector's two spring clips into the drilled hole, then push it upwards (See FIG. 16).



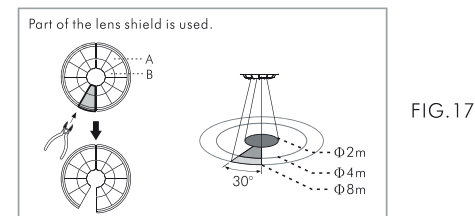
3.4.3.5 Switch on the power supply.

4 LENS SHIELD

4.1 Usage of lens shield for PIR sensor

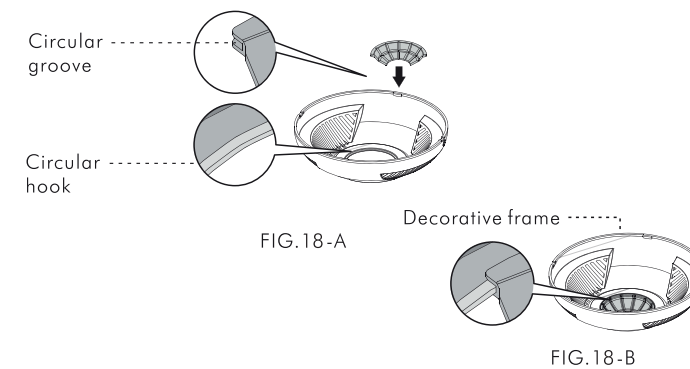
4.1.1 PD00H01KNX has provided 2 lens shields for masking the undesired detection area (See FIG. 17).

Used lens shield	Covered detection range
None	$\Phi 8$ m
Small segment	30° per piece
A+B	$\Phi 2$ m
A	$\Phi 4$ m



- The shadow part of the lens shields in the FIG. 17 are referring to the cut-off parts.
- The ultrasonic sensor is unaffected by the lens shield.

4.1.2 Fixing lens shield: There is a circular groove on the back of the decorative frame and the lens shield is designed with a circular hook. By coupling the hook into the groove, the lens shield is fixed (See FIG. 18-A & FIG. 18-B).



NOTE

- Do not attempt to open or repair the unit without qualified electrician while it is malfunctioned.
- The Effects to PIR sensitivity:
The following conditions may cause lower sensitivity of PIR sensor:
 - In very foggy days, the sensitivity may be less due to moisture collecting on the lens.
 - In very hot days, the sensitivity may be less since high ambient temperature is close to body temperature.
 - In very cold days when heavy clothing is dressed, especially the facial area is covered, very little heat will be emitted from the body causing the unit to be less sensitivity.
 - Cleaning: Wipe with dry cloth only. Soap or rough cloth may damage the detector lens.
- Factors may effect sensitivity of ultrasonic sensor:
The following conditions may cause lower sensitivity or false triggering of ultrasonic sensor:
 - Ultrasonic sensitivity will be affected by the materials such as carpet, sound absorbable cotton, curtain, etc. since they are sound wave absorber.
 - Low ambient temperature might slightly decrease ultrasonic sensitivity and also reduce the detection range.

5 TROUBLE SHOOTING

When PD00H01KNX works abnormally, check assumptive problems and suggested solutions in following table that will hopefully solve your problem.

Problem	Possible Cause	Suggested Solution
Lighting / HVAC device does not turn on	<ol style="list-style-type: none"> 1. Power does not turn on. 2. Incorrect wiring 3. Incorrect Lux setting. 4. Malfunctioned load. 5. Unable to detect movement. 	<ol style="list-style-type: none"> 1. Switch on the power. 2. Refer to wiring diagrams for correct connection. 3. Check if Lux is set to the correct value. 4. Replace the disabled load with a new one. 5. Check detection range setting.
Lighting device does not turn off	<ol style="list-style-type: none"> 1. Auto off delay time is set too long. 2. Detector is nuisance triggered. 3. Incorrect wiring. 	<ol style="list-style-type: none"> 1. Set auto off delay time to a shorter time and check if the load is switched off or not according to the preset off delay time. 2. Keep the objects which may cause nuisance triggering away from detection coverage to avoid activating detector while doing the test. 3. Refer to wiring diagrams (See FIG. 6).
Red LED does not turn on	<ol style="list-style-type: none"> 1. PIR sensor is not chosen as the triggering method (PIR only; PIR or US; PIR and US). 2. Exceed the valid detection range. 3. Not set to Test mode. 4. LED indicating function is set to "Disable". 	<ol style="list-style-type: none"> 1. Choose PIR sensor as the triggering method. 2. The movement should be within the valid detection range ($\Phi 8$m). 3. Set to test mode. 4. Set the LED indicating function to "Enable" via ETS software.
Green LED does not turn on	<ol style="list-style-type: none"> 1. Ultrasonic sensor is not chose as the triggering method (US only; PIR or US; PIR and US). 2. Exceed the valid detection range. 	<ol style="list-style-type: none"> 1. Choose ultrasonic sensor as the triggering method. 2. The movement should be within the valid detection range (7m x 13m).
Nuisance triggering	There are heat sources, airflow, highly reflective objects or any objects which may be swayed in the wind within the detection coverage.	Avoid aiming the detector toward any heat sources, such as air conditioning, electric fans, heaters or any highly reflective surfaces. Make sure there are no swaying objects within the detection coverage.