

INSTRUCTION MANUAL

TECHNICAL SPECIFICATIONS

Rated Voltage	230V~±10% 50/60Hz
Load (L)	<p>For lighting (with jumper wire): Incandescent Lamp : Max. 2000W AC halogen Lamp : Max. 1000W LV halogen Lamp : Max. 1000VA Fluorescent Lamp : Max. 900VA / 100μF (compensated)</p> <p>Energy saving Lamp (include CFL and PL lamp): Max. 80VA or 4 x Max. 20VA lamps</p> <p>For HVAC (remove jumper wire): Max. 10A for ≤ 250VAC (cos φ=1) Max. 5A for ≤ 30VDC</p>
Auto off Time Adjustment	Adjustable from 5sec to 30min, Test & \sqrt{t}
Lux Adjustment	Adjustable from 10Lux to 1000Lux
ACC on / ACC off Switch	Select "ON" for activating or select "OFF" for deactivating air current compensation function
Triggering Method Selection	PIR + US, PIR only, US only, PIR or US
Detection Range (H=2.5m)	PIR: 360° circular, adjustable up to Φ8m US: 360°, adjustable up to 10m x 16m, it's an oval shape
Environmental Protection	Class II, IP20
Operating Temperature	0°C to +45°C

All procedures indicated in this manual must be carried out by a professional installer.

CAUTION

- Turn off power before proper installation of the unit.
- Bulb burn of certain brands would cause high in-rush current which might damage the unit permanently.
- Turn off power when change the light sources.
- Turn off power when change the knob setting.
- Before installation, the circuit breaker (250VAC, 10A) type C according to EN60898-1 shall be installed.

1 PACKAGE CONTENTS

Pattern				
Item	Sensor	Lens shield	Junction Box	Manual
Quantity	1	2	1	1

Pattern			
Item	Non-dropping screw Φ3 x 18mm	Screw Φ3 x 14mm	Wood Screw Φ4 x 25.4mm
Quantity	4	2	2

Pattern		
Item	Protection cap	IR remote controller (For optional purchase)
Quantity	1	1

2 PRODUCT DESCRIPTION

2.1 Features

The flush/surface mount single-load 360° PIR and ultrasonic occupancy sensor SAE-UE-MS-CU_WE integrates advanced PIR and ultrasonic (US) technologies in one unit. It is suitable for indoor application which is ideal for using in home, open-plan office, multi-stall public restroom, conference room, underground parking lots, classroom, library, etc. With its knobs and IR remote controller, the time, ultrasonic sensitivity, Lux, ACC (air current compensation) function and PIR/US triggering method can be adjusted as user desired to match different application requirements and energy saving for switching light on and off.

2.2 Dimension:

- SAE-UE-MS-CU_WE: Φ111.5 x 72mm (See FIG.1-A)

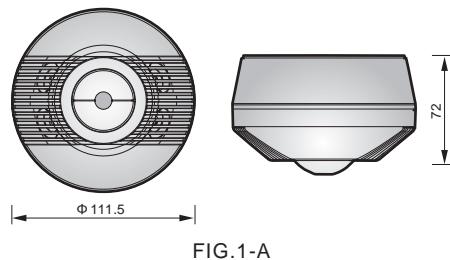


FIG.1-A

- Junction box: Φ111.5 x 35mm (See FIG.1-B)

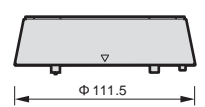


FIG.1-B

- Sensor unit: Φ111.5 x 90mm (See FIG.1-C)

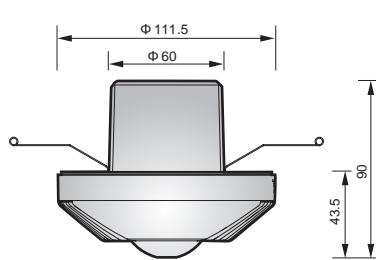


FIG.1-C

3 INSTALLATION AND WIRING

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

3.1 Select a proper location

The recommended installation height of the sensor is 2 - 3m, 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 8m x 10m with small movement (i.e. hand wave), and an oval shape of 10m x 16m with large movement (i.e. walk). The detection angle is 360° for both PIR and ultrasonic sensors (See FIG.2-A & FIG.2-B).

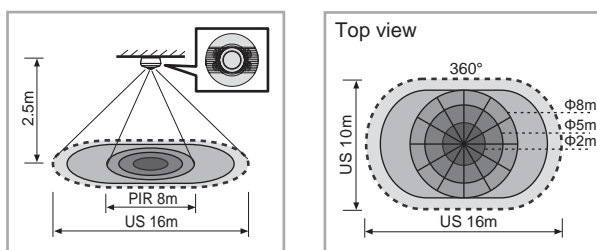


FIG.2-A

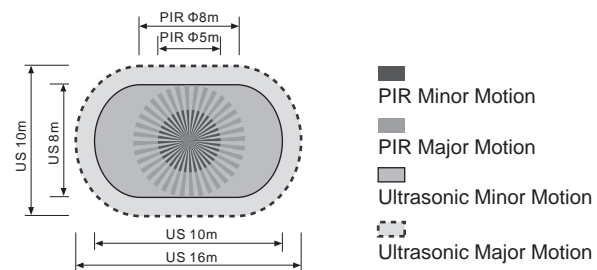


FIG.2-B

3.2 Wiring

CAUTION

D1: For lighting: Keep jumper wire connected.
For HVAC : Remove jumper wire and connect to power of HVAC.

D2: Load; L: Live supply; N: Neutral
For lighting control, sensor will be damaged in the case of wires connected in reverse in between D2 and N.

3.2.1 For lighting (With jumper wire on D1 & L terminals)
3.2.1.1 One sensor controls one load (See FIG.3).

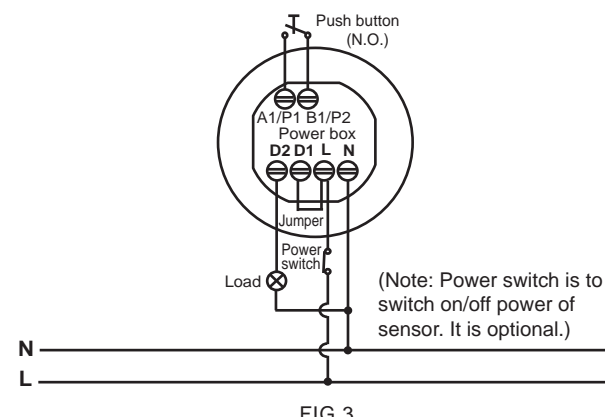


FIG.3

3.2.1.2 The operation of C-BUS signal controlling (See FIG.4, should set the slide switch refer to section 4.2.1.2 and FIG.20 & FIG.21 firstly).

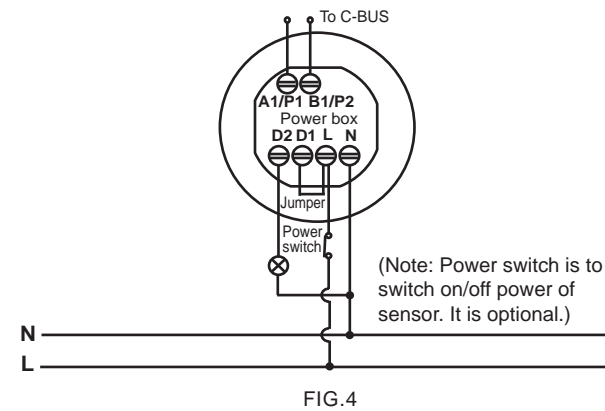


FIG.4

3.2.1.3 One sensor controls staircase timer (Set the time knob to \sqrt{t}) (See FIG.5).

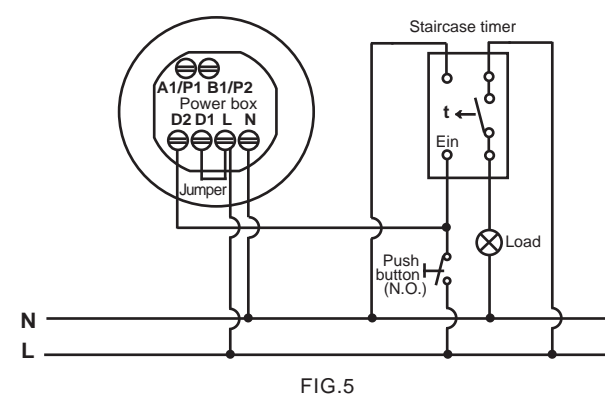


FIG.5

3.2.2 One sensor controls HVAC (Remove jumper wire on D1 & L terminals).

3.2.2.1 D1-D2 connect to AC power supply (See FIG.6-A).

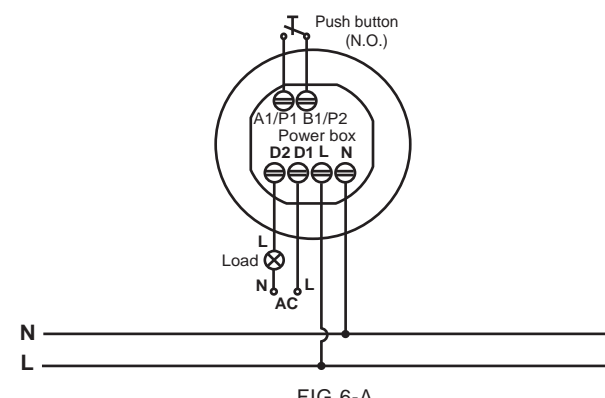


FIG.6-A

3.2.2.2 D1-D2 connect to DC power supply (See FIG.6-B).

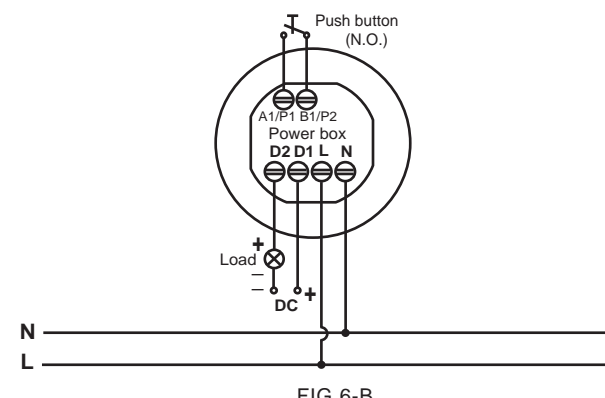


FIG.6-B

3.3 Installation procedure

3.3.1 Helpful tips for installation
Since the sensor is in response to temperature, airflow and wind change, please avoid the following conditions:

- Avoid aiming the sensor toward the objects which may be swayed in the wind, such as curtain, tall plants, miniature garden, etc (See FIG.7-A).
- Avoid aiming the sensor toward the objects whose surfaces are highly reflective, such as mirror, monitor, etc. (See FIG.7-A).
- The sensor must be located 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.7-D).
- The sensor must be located at least 2m away from the source of airflow such as doorway, vents and air conditioning, etc. (See FIG.7-B & FIG.7-C & FIG.7-E).
- The distance between two sensors must be at least 6m to avoid interference (See FIG.7-F).
- The direction of the ultrasonic sensor should aim to the main detection area to obtain the best coverage (See FIG.2-A).

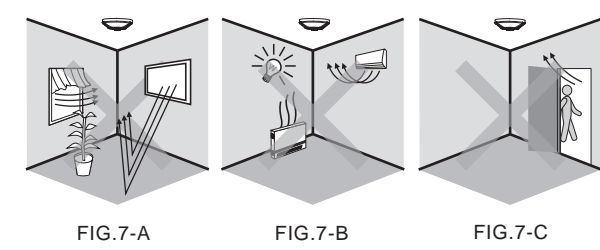


FIG.7-A

FIG.7-B

FIG.7-C

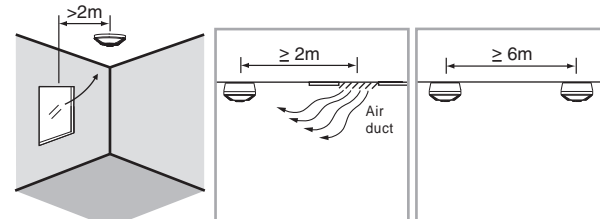


FIG.7-D

FIG.7-E

FIG.7-F

3.3.2 Flush mount

NOTE
When sensor is flush mounted with spring clip, protection cap of terminals must be used.

3.3.2.1 To install sensor, 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.8).

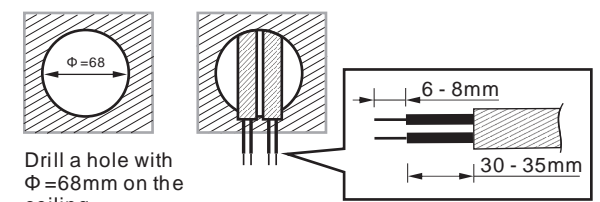


FIG.8

3.3.2.2 Open the knockout of protection cap with screwdriver if the user wants to use the two tubes, then fix the tubes and put the power cable through them (See FIG.9).

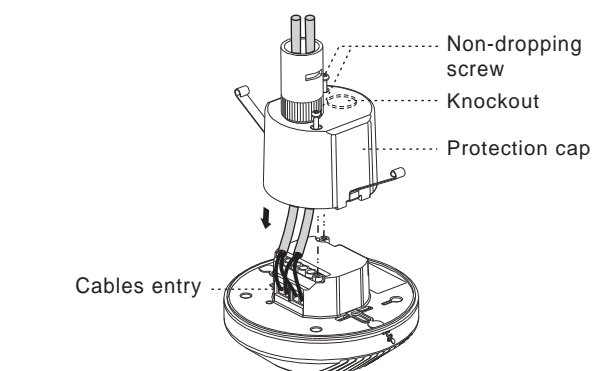


FIG.9

3.3.2.3 Refer to wiring diagrams for correct cable connections, then cover the protection cap back and screw it tightly.
3.3.2.4 Insert sensor's two spring clips into the drilled hole, then push it upwards (See FIG.10).

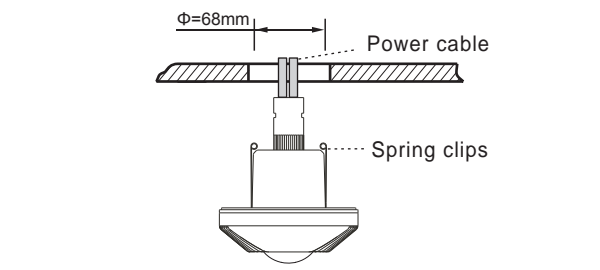


FIG.10

3.3.2.5 Switch on the power supply.

3.3.3 Flush mount with European standard junction box

NOTE

- No need of using the protection cap of terminals and spring clip when sensor is flush mounted with European standard junction box.
- The direction of the ultrasonic sensor should aim to the main detection area to achieve the best detection coverage when sensor is flush mounted with European standard junction box, and the fixing plate can be adjusted 45°.

3.3.3.1 Take off the decorative frame (See FIG.11).

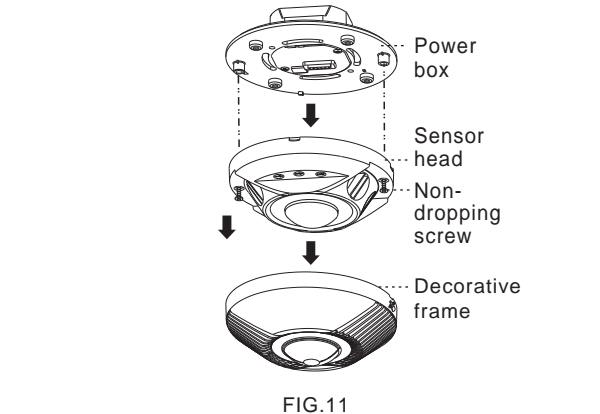


FIG.11

3.3.3.2 Pull out cables from European standard junction box (See FIG.12), then strip off 6 - 8mm of cable sheathing for wiring, and refer to the wiring diagrams for correct cable connections (See FIG.3 - FIG.6-A & B).

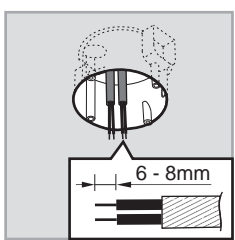


FIG.12

3.3.3.3 Fit the power box into European standard junction box then fix them with two screws (See FIG.13).

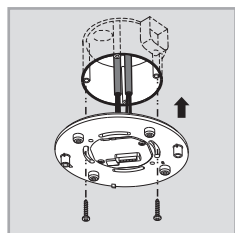


FIG.13

3.3.3.4 Assemble the sensor with power box, then fix them with two screws (See FIG.11).

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

3.3.4 Surface mount

NOTE

No need of using the protection cap of terminals and spring clips when sensor is surface mounted.

3.3.4.1 There are 7 pairs of knockouts with various distances from 41mm to 85mm on the bottom cover of the combined junction box which can be selected for different mounting applications (See FIG.14). To select two same figures on both ends for the corresponding fixing distance (See FIG.15).

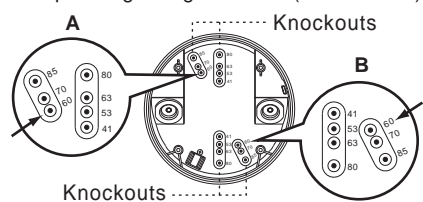


FIG.14

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

FIG.15

3.3.4.2 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.16).

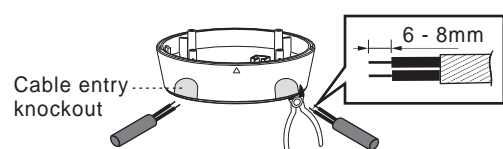


FIG.16

3.3.4.3 Choose two proper knockouts to fix the junction box on the surface of ceiling board with two wood screws (See FIG.17).

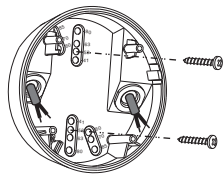


FIG.17

3.3.4.4 Insert four non-dropping screws to the corresponding screw holes on sensor's fixing plate. Afterwards, those four screws will not drop off to provide convenient subsequent installations (See FIG.18).

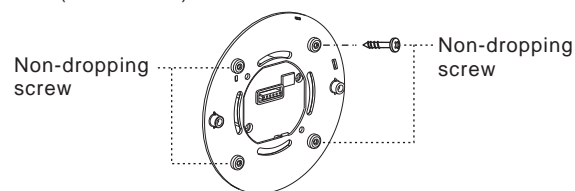


FIG.18

3.3.4.5 Refer the FIG.11 to assemble the sensor head with the power box, and then refer to the wiring diagrams (See FIG.3 - FIG.6-A & B) for correct cable connections.

3.3.4.6 Put on the decorative frame and restore power supply.

4 OPERATION AND FUNCTION

4.1 Setting of Lux, Time, US sensitivity, ACC and PIR/US knobs

Knob (Ex-factory setting)	Function	Knob setting
Lux	Set the light value for switching on load	Range: 10Lux to 1000Lux User can set the knob according to their requirement for application. The marked values are for reference only.
Time	Set delay off time	Range: 5sec to 30min Test: Test mode (Load and red and/or green LED will 2sec on, 2sec off). Test: Short impulse mode for staircase timer switch control (Load and red and/or green LED will 1sec on, 9sec off).
US sensitivity	Set the sensitivity of ultrasonic sensor	- = Min. (approx. an oval shape of 2x4m). + = Max. (approx. an oval shape of 10x16m).
ACC	Protect the sensor from the interference of the airflow and wind	ON: Activate the ACC function. OFF: Deactivate the ACC function. Remark: Under ACC ON status, the detection coverage of ultrasonic sensor will be reduced 1 - 2m.
PIR only / US only / PIR+US	Select triggering method	PIR/US: Load will turn on when either PIR or ultrasonic sensor is triggered. PIR+US: Load will turn on when both PIR and ultrasonic sensors are triggered, and after the load is on, either PIR or ultrasonic sensor detects movement, the load keeps on. PIR only: Load will turn on only when PIR is triggered. US only: Load will turn on only when ultrasonic sensor is triggered.

4.2 Other functions

4.2.1 Function of A1/P1 B1/P2 terminal

4.2.1.1 Connect terminal A1/P1 B1/P2 with push button (N.O. type) to manually control the load's on / off (See FIG.3). When the load is off, press the push button to manually control the load on. The load keeps on if the movement is detected constantly. The load can be automatically switched off if no movement is detected and the delay time has expired, or by pressing the push button again. When the load is off, the movement cannot trigger the load on, and the sensor will return to the previous mode until detecting the last movement and the delay time has expired.

4.2.1.2 Before ex-factory, the slide switch is set as below (See FIG.19, push button mode). User can change to the C-BUS mode with the following steps: 1st: open the knockout with "-" type screwdriver (See FIG.20). 2nd: move the slide switch to the position as shown in FIG.21 with the "-" type screwdriver.

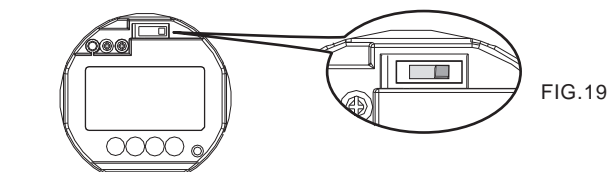


FIG.19

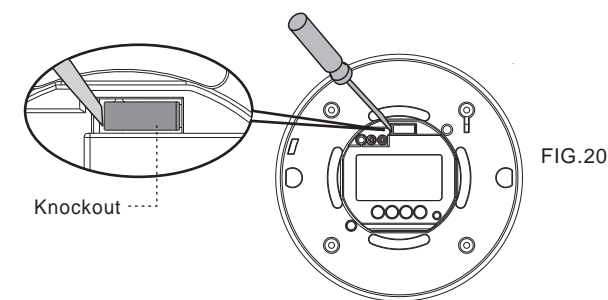


FIG.20

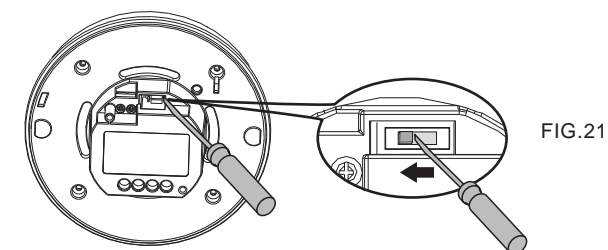


FIG.21

4.2.1.3 The C-BUS signal is for controlling the C-BUS system's load on (See FIG.21).

4.2.2 Advance switching off function

To enhance energy savings, the sensor is able to turn off the controlled load prior to the set delay off time if it detected the passing through occupant. When the load is off, once the sensor is triggered, the load will on. If no movement is detected again during 30sec to 3min, the load will only keep on for total 3min, and then off, even the time setting value is more than 3min.

4.2.3 Usage of lens shield for PIR sensor

4.2.3.1 SAE-UE-MS-CU_WE has provided 2 lens shields for masking the undesired detection area of PIR sensor. One lens shield has 2 layers with 6 small units each, and 30° of detection angle can be covered by each unit. For example, to install the sensor at the height of 2.5m, the detection range can reach to 2m diameter if the complete lens shield has been used; and up to 6m diameter if only the A layer of lens shield has been used (See FIG.22-A).

4.2.3.2 After user choosing the desired detection area, the needless lens shield should be removed (See FIG.22-B).

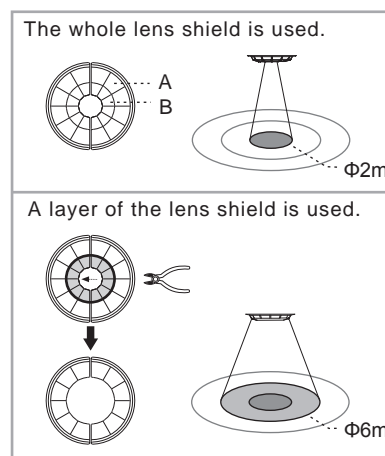


FIG.22-A

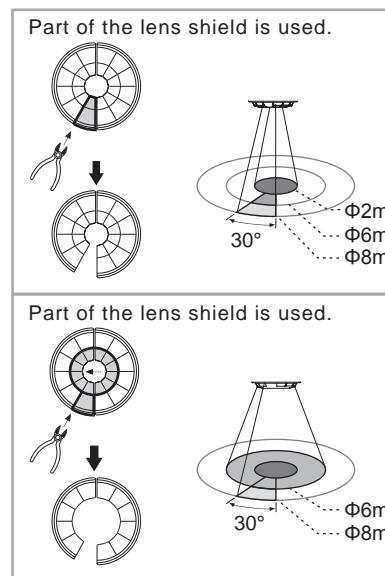


FIG.22-B

● The shadow part in the FIG.22-A, 22-B is needed to be cut off, the ultrasonic sensor is unaffected by the lens shield.

4.2.3.3 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.23-A & FIG.23-B).

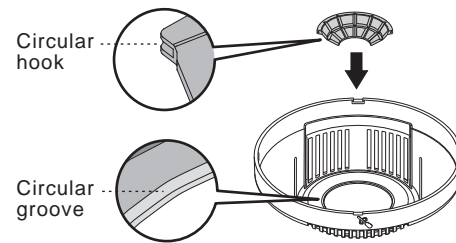


FIG.23-A

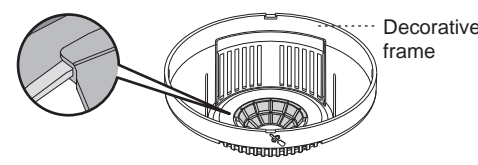


FIG.23-B

4.3 Walk test (uncontrolled by Lux)

NOTE

- It takes approx. 30sec for sensor to warm up with load on after power is initially supplied or re-supplied after power failure, then the sensor enters into normal operation to carry out a walk test. During which, red and green LEDs will permanent on for 30sec if no IR setting value is stored in sensor. Reversely, the red and green LEDs will flash for 30sec if any IR setting value has been stored in the sensor.
- Re-supplied after power failure, sensor works according to the previous settings.

The purpose of conducting the walk test is to check whether the triggering method (PIR, ultrasonic) is set correctly or not and to adjust the detection coverage. Procedures of conducting the Walk Test (Lux controller is disabled):

- 4.3.1 Set the time knob to "Test" position.
 - 4.3.2 Adjust the position of meter knob for matching the sensitivity of ultrasonic sensor as you desired. The detection coverage of PIR sensor can be adjusted by using the lens shield.
 - 4.3.3 Set the ACC knob to OFF position.
 - 4.3.4 Select the desired trigger method (i.e. PIR+US, PIR only, US only or PIR/US).
- Step 1: Switch on the power supply and it takes approx. 30sec for sensor to warm up with load and LED on for 30sec, afterwards they will turn off.
- Step 2: To walk within the desired detection coverage of sensor.
- Step 3: When its PIR sensor is triggered by movement, the red LED turns on for 2sec, then turns off; when its Ultrasonic sensor is triggered by movement, the green LED turns on for 2sec then turns off. When choosing PIR+US as triggering method, both red and green LEDs will turn on for 2sec then turn off if both sensors have been triggered by movement.
- 4.3.5 To repeat above mentioned procedures to adjust the settings of sensors either by knobs or IR remote controller and conduct the walk test until the sensor's detection coverage meets your demand.

5 TROUBLE SHOOTING

When SAE-UE-MS-CU_WE works abnormally, please check assumptive problems and suggested solutions in following table that will hopefully to solve your problems.

Problem	Possible cause	Suggested solution
Lighting device does not turn on	1. Power does not switch on. 2. Incorrect wiring. 3. The ambient light level is too high. 4. Malfunctioned load.	1. Switch on the power. 2. Refer to wiring diagrams (See FIG.3 - FIG.6-A & B) and check if the load is malfunctioned. 3. Set Lux value above the ambient light level then trigger the sensor and check if the load is switched on or not. 4. Replace the disabled load with a new one.
Lighting device does not turn off	1. Auto off delay time is set too long. 2. Sensor is nuisance triggered. 3. Incorrect wiring.	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 away from detection coverage to avoid activating sensor while doing the test. 3. Refer to wiring diagrams (See FIG.3 - FIG.6-A & B).
Red LED does not turn on	1. PIR sensor is not chose as the triggering method (PIR only; PIR/US; PIR+US). 2. Exceed the valid detection range.	1. Choose PIR sensor as the triggering method. 2. The movement should be in the valid detection range (Φ8m).
Green LED does not turn on	1. Ultrasonic sensor is not chose as the triggering method (US only; PIR/US; PIR+US). 2. Exceed the valid detection range. 3. Wires connection in reverse in between N and L.	1. Choose ultrasonic sensor as the triggering method. 2. The movement should be in the valid detection range (10m x 16m). 3. Refer to wiring diagrams (See FIG.3 - FIG.6-A & B)
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 sensor 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.

NOTE

Do not attempt to open or repair the unit without qualified electrician while it is malfunctioned.

The effects to ultrasonic sensitivity:

- The following conditions may cause lower sensitivity or false triggering of ultrasonic sensor:
 - Set ACC knob to ON: The airflow will cause false trigger to ultrasonic sensor. To reduce the possibility of false trigger, the dual technology sensor SAE-UE-MS-CU_WE is designed with air current compensation (ACC) function which is able to reduce the sensitivity of ultrasonic sensor approx. 10% - 40% varied with the strength of airflow.
 - 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.

The effects to PIR sensitivity:

- The following conditions may cause lower sensitivity of PIR sensor:
 - On very foggy days, the sensitivity may be less due to moisture collecting on the lens.
 - On very hot days, the sensitivity will be lower as high ambient temperature can be close to body temperature.
 - On very cold days when wearing heavy clothing, and especially if the facial area is covered, maybe appear less sensitive.
- Cleaning: Wipe with dry cloth only. Soap or rough cloth may damage the sensor lens.

6 OPTIONAL ACCESSORY

SAE-UE-MS-CU_WE can be programmed by IR remote controller (It is for optional purchase).

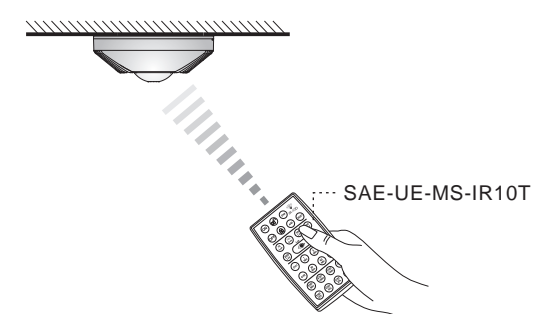


FIG.24