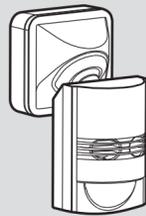




## DUAL-TECHNOLOGY PRESENCE DETECTOR PMUSW



## INSTRUCTION MANUAL

### TECHNICAL SPECIFICATIONS

Rated voltage	230V~±10% 50 / 60Hz
Load (L)	<b>For Lighting: μ</b> Incandescent Lamp : Max. 2000W AC Halogen Lamp : Max. 1000W LV Halogen Lamp : Max. 1000VA / 600W (traditional) Max. 1000VA / 900W (electronic) Fluorescent Lamp : Max. 900VA / 100uF 25 x (1 x 18W); 12 x (2 x 18W); 15 x (1 x 36W); 7 x (2 x 36W); 10 x (1 x 58W); 5 x (2 x 58W) Max. 1000VA / 600W (uncompensated) LED Lamp : Max. 500VA / 400W Energy Saving Lamp: Max. 600VA / 400W (include CFL and PL lamp)
Auto Off Time Adjustment	Adjustable from approx. 5sec to 30min, Test & √L
Lux Adjustment	Adjustable from approx. 10Lux to 1000Lux
ACC ON / OFF Switch	Select "ON" for activating or select "OFF" for deactivating air current compensation function
Triggering Method Selection	PIR + US , US, PIR, PIR / US
Detection Range (H=2m)	PIR: 180°, approx. 8m in frontward, approx. 6m in sideward. US: 180°, adjustable up to approx. 8m x 8m, it's an oval shape
Operating Temperature	0°C to +45°C
Environmental Protection	Class II, IP20

**CAUTION!**  
Installation and assembly of electrical equipment must be carried out by skilled person. Contact a qualified electrician in the event of fault or break down.

**CAUTION!**  
Switches complying with this standard are suitable for use at ambient temperature not normally exceeding 25°C, but occasionally reaching 35°C.  
A circuit breaker (250VAC, 10A) type C according to EN60898-1 shall be installed in the fixed wiring for protection.  
Do not mount on conductive surface.  
Do not open the enclosure frequently.  
Turn off power when change the light sources.  
Bulb burn of certain brands would cause high in-rush current which might damage the unit permanently.

## 1 PACKAGE CONTENTS

Pattern	Item	Quantity
	Detector	1
	Wood screw Φ4 x 25.4mm	2
	Plastic anchor	2
	Manual	1

Pattern	Item	Quantity
	Lens shield	1
	PMUSIR IR Remote controller (For optional purchase)	1

## 2 PRODUCT DESCRIPTION

### 2.1 Features

The dual-technology presence detector PMUSW integrates advanced PIR and Ultrasonic sensor technologies in one unit. With its knobs and IR remote controller, the time, ultrasonic sensor sensitivity, Lux, ACC (air current compensation) function and PIR/US triggering method can be selected as user desired to match different application requirements and energy saving for switching light on and off. It is suitable for indoor application which is ideal for using in hotel lobby, stairwell, classroom, storeroom, conference room, corridor, public lavatory, under-ground parking, etc.

Triggering mode application examples:

- PIR+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 or PIR/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.

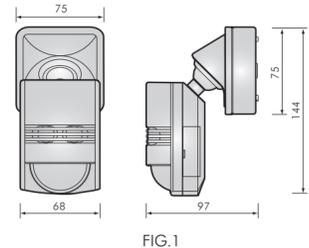
### 2.2 ON / OFF delay function

According to the changeable ambient light level, detector can postpone load's delay time of turning on and off to avoid load's unnecessarily turning on or off due to rapid ambient light change: **Ambient light level changes from bright to dark:** If the ambient light level keeps be lower than the preset Lux value for 10sec, the light will be automatically switched on after 10sec. (LED will be on 10sec for indication)

**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 ≥ 5min, the light will be automatically switched off after 5min.

Time setting < 5min, 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.

### 2.3 Dimension: 144 x 75 x 97mm (See FIG.1)



## 3 INSTALLATION AND WIRING

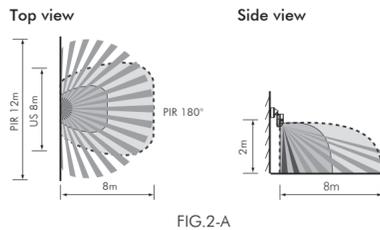
**!** Please disconnect power completely and read the entire instruction manual carefully before installation.

### 3.1 Select a proper location

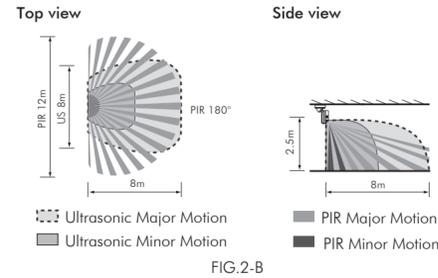
3.1.1 The recommended installation height of this detector is 2 - 3m, and 2m is the optimal mounting height. Install the detector at height of 2m or 2.5m, the detection range of PIR sensor can reach up to front approx. 8m, approx. 6m on both sides, and ultrasonic sensor is an oval shape of approx. 4m x 4m with small movement (i.e. hand wave), and an oval shape of approx. 8m x 8m with large movement (i.e. walk). The detection angle is 180° (See FIG.2-A & FIG.2-B).

#### PMUSW (Dual Technology):

##### Wall mount

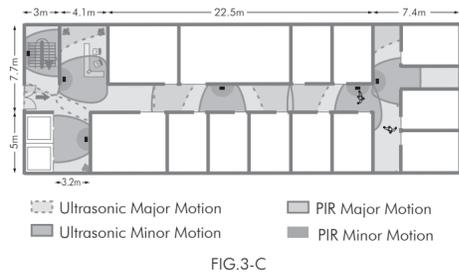
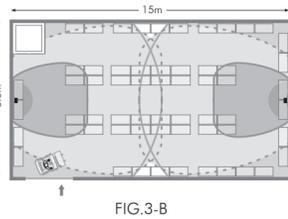
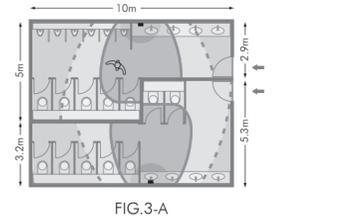


### Ceiling mount

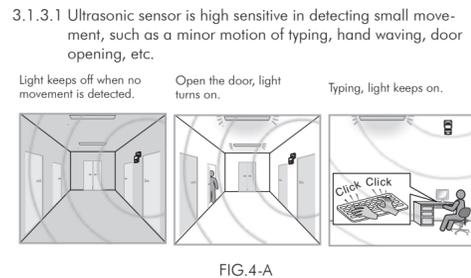


3.1.2 Location of dual-technology detector (See FIG.3-A & FIG.3-B & FIG.3-C).

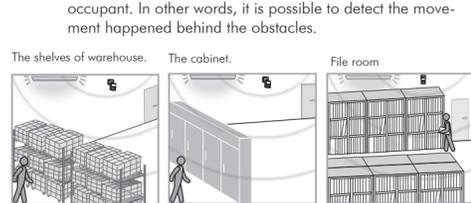
- Dual-technology detector is capable of detecting occupant without directly seeing the moving person due to the high sensitivity of ultrasonic sensor.
- If you choose the PIR technology (PIR+US or PIR only) as triggering method, the detector should be located where the PIR sensor is able to see the occupant.
- In order to ensure good reliability of PIR sensor, an overlapping area is needed to be considered while installing several sensors in a space.



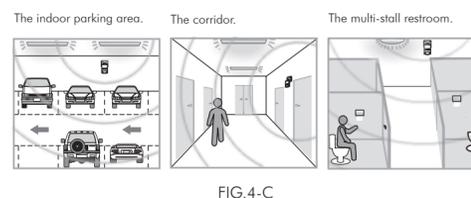
### 3.1.3 Examples of application



3.1.3.1 Ultrasonic sensor is high sensitive in detecting small movement, such as a minor motion of typing, hand waving, door opening, etc.

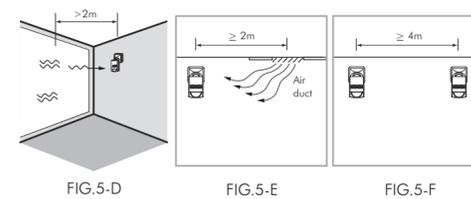
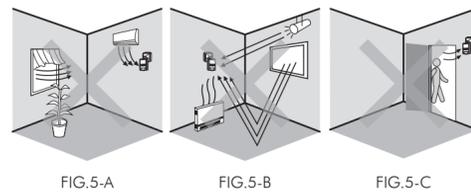


3.1.3.2 Ultrasonic sensor detects occupant based on the Doppler Effect and it does not need to "see" directly the movement of occupant. In other words, it is possible to detect the movement happened behind the obstacles.



### 3.1.4 Helpful tips for installation

- 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-A & FIG.5-B & FIG.5-C & FIG.5-E). If the airflow causes the detector false triggering, lower the US sensitivity, or select a more suitable location.
- 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).
- The distance between two detectors should be at least 4m 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-A & FIG.2-B & FIG.2-C & FIG.2-D).



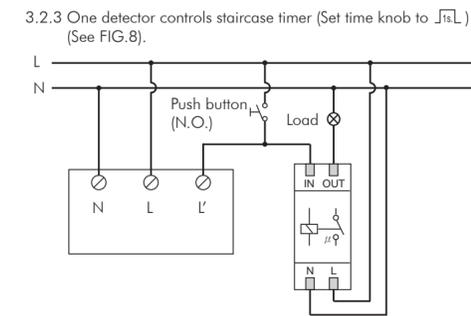
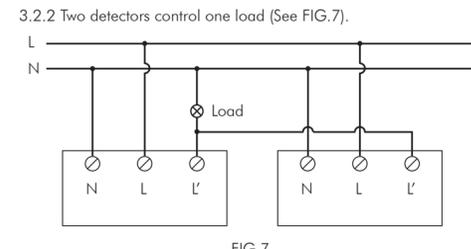
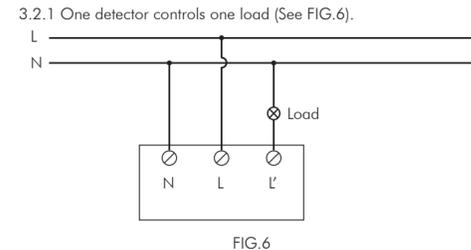
### NOTE

- 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 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.
  - Wire connections in reverse in between N and L will cause lower sensitivity of ultrasonic sensor.

### The Effects to PIR sensitivity:

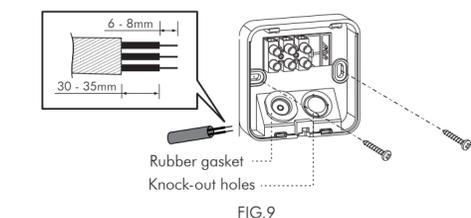
- The following conditions may cause lower sensitivity of PIR sensor:
  - On very foggy days, the sensitivity may be less due to moisture collecting on the lens.
  - On very hot days, the sensitivity will be lower as high ambient temperature can be close to body temperature.
  - On very cold days when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

### 3.2 Wiring (for lighting)

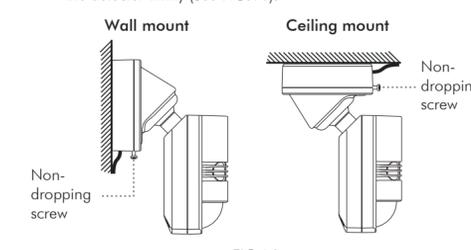


### 3.3 Installation procedure

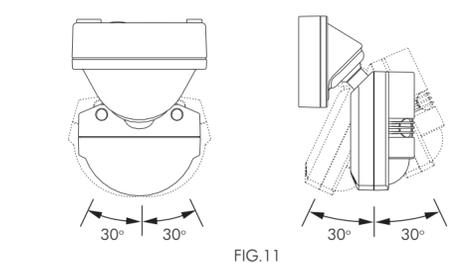
- PMUSW can be mounted either on the wall or ceiling.
- 3.3.1 Please be noted to strip off 6-8mm of cable sheathing by tool (See FIG.9).
- 3.3.2 Put the electric cable through the rubber gasket and fit the bottom case on the wall firmly by two screws (See FIG.9).



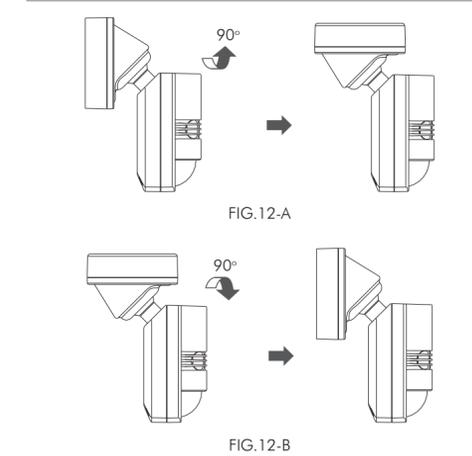
- 3.3.3 Refer to the wiring diagram (See FIG.6 & FIG.7 & FIG.8) to insert the power cables into the corresponding terminals.
- 3.3.4 Screw the front cover of power box on the bottom case, then fix the detector firmly (See FIG.10).



- 3.3.5 The detector head is adjustable 30° sidewards and downwards (See FIG.11) respectively. Please refer to 4.4 adjustment of detector head to get the desired detection field.



**NOTE**  
To avoid damaging the product, please pay attention to the rotating direction of detector head while installing.  
● Changing from wall mount to ceiling mount, please rotate the detector head 90° clockwise before installing (See FIG.12-A).  
● Changing from ceiling mount to wall mount, please rotate the detector head 90° anti-clockwise before installing (See FIG.12-B).



## 4 OPERATION AND FUNCTION

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

Knob (Ex-factory setting)	Function	Knob setting
ACC ON/OFF	Reduce the false trigger problem caused by airflow.	ON : Activate the ACC function. OFF : Deactivate the ACC function. Remark: Under ACC ON status, the detection coverage of ultrasonic sensor will be reduced.
Meter +/-	Set the sensitivity of ultrasonic sensor	"-" = Min. (Approx. an oval shape of 1m x 2m). "+" = Max. (Approx. an oval shape of 8m x 8m).
PIR+US / US / PIR	Select triggering method	PIR+US: Load will turn on when both PIR and ultrasonic sensors are triggered. After the load is on, either PIR or ultrasonic sensor detects movement, the load keeps on. US : Load will turn on only when ultrasonic sensor is triggered. PIR : Load will turn on only when PIR sensor is triggered. PIR/US : Load will turn on when either PIR or ultrasonic sensor is triggered.

Knob (Ex-factory setting)	Function	Knob setting
	Set delay off time	Range: Approx. 5sec to 30min. Test : Test mode (Load and red and / or green LED will be 2sec on, 2sec off). Lux setting is invalid. : Short impulse mode for staircase timer switch control (Load and red and / or green LED will be 1sec on, 9sec off).
	Set the light value for switching on load	Range: Approx. 10Lux to 1000Lux User can set the knob according to their requirement for application. The marked values are for reference only.

#### 4.2 Usage of lens shield

4.2.1 PMUSW has provided a lens shield for masking the undesired detection area of PIR sensor. The lens shield has 3 layers with 4 small units each, and 50° of detection angle can be covered by each unit.

For example, to install the detector at the height of 2 - 2.5m, the detection range can reach up to approx. 3m diameter if the complete lens shields has been used, and up to approx. 6m diameter if layer C has been cut, as well, if layer B has been cut or no lens shield is used, the detection range is a sector with front approx. 8m and both sides approx. 7m. (The detection angle of ultrasonic sensor can not be changed by using lens shield).

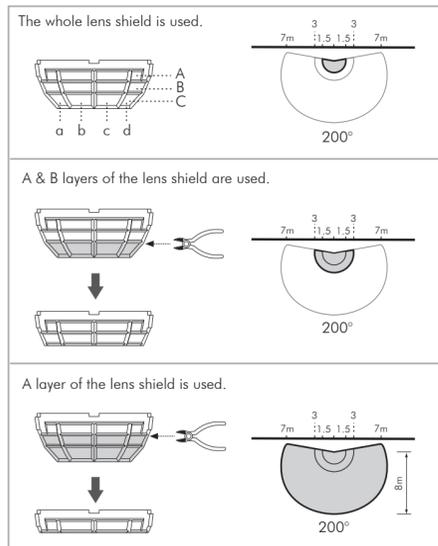


FIG. 13-A

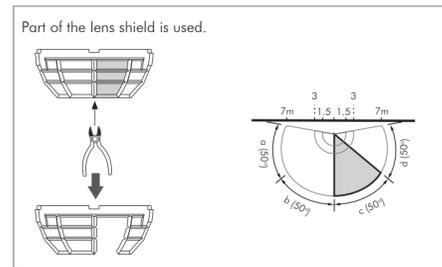


FIG. 13-B

- The shadow part of the lens shields in the FIG. 13-A & FIG. 13-B is needed to be cut off.

#### 4.2.2 To fit the shield

Firstly eliminate the corresponding part of shield and insert the two block points into the grooves beside of the lens, then insert the borderline which has a small slot into the grooves outside of the lens, make sure shield is firmly affixed (See FIG. 14).

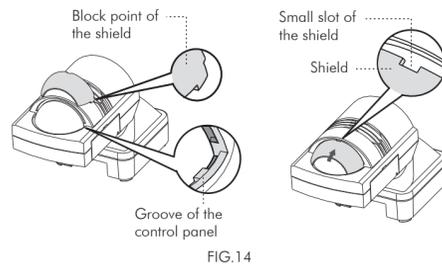


FIG. 14

#### 4.2.3 To detach the shield

Prod the shield outwards slightly, a small slot shows on the top of the lens, prize up the layer at the slot with a screw-driver to peel the shield off (See FIG. 15).

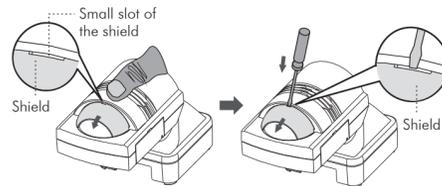


FIG. 15

#### 4.3 Walk test

**NOTE**  
It takes approx. 60sec for detector to warm up with load on after power is initially supplied or resupplied after power failure, then the detector enters into normal operation to carry out a walk test. During which, red and green LEDs will be permanently on for 60sec if no IR setting value is stored in detector. Reverse, the red and green LEDs will flash for 60sec if any setting value has been stored in the detector.

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. 60sec for detector to warm up with load and LEDs on for 60sec, afterwards they will turn off.

Step 2: To walk within the desired detection coverage of detector (Refer to FIG. 23-A & FIG. 23-B).

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 detector either by knobs or IR remote controller and conduct the walk test until the detector's detection coverage meets your demand.

#### Walk type for PIR sensor

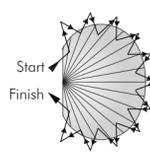


FIG. 16-A

#### Walk type for ultrasonic sensor

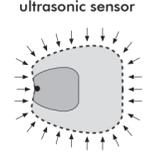
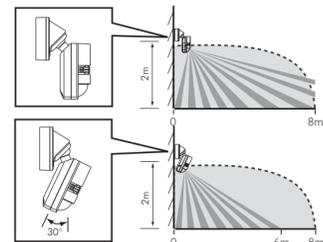


FIG. 16-B

#### 4.4 Adjustment of detector head

The detector head can be adjusted 30° upward and downward. When the detector head is adjusted 30° downward, the PIR detection range can be up to 6m, and 8m by US detection (See FIG. 17), and it is not recommended to adjust the detector head 30° upward, because after that it will affect the detection range and it may cause false trigger by light.

#### Wall mount



#### Ceiling mount

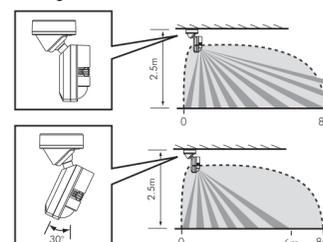


FIG. 17

## 5 TROUBLE SHOOTING

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

Problem	Possible cause	Suggested solution
Lighting device does not turn on	1. Power does not switch on.	1. Switch on the power.
	2. Incorrect wiring.	2. Refer to wiring diagrams (See FIG. 6 - FIG. 8) and check if the load is malfunctioned.
	3. The ambient light level is too high.	3. Set Lux value to be above the ambient light level then trigger the detector, and check if the load is switched on or not.
	4. Malfunctioned load.	4. Replace the disabled load with a new one.
Lighting device does not turn off	1. Auto off delay time is set too long.	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. Detector is nuisance triggered.	2. Keep the objects which may cause nuisance triggering away from detection coverage to avoid activating detector while doing the test.
	3. Incorrect wiring.	3. Refer to wiring diagrams (See FIG. 6 - FIG. 8).
Red LED does not turn on	1. PIR sensor is not chose as the triggering method (PIR only; PIR/US; PIR+US).	1. Choose PIR sensor as the triggering method.
	2. Exceed the valid detection range.	2. The movement should be in the valid detection range.
Green LED does not turn on	1. Ultrasonic sensor is not chose as the triggering method (US only; PIR/US; PIR+US).	1. Choose ultrasonic sensor as the triggering method.
	2. Exceed the valid detection range.	2. The movement should be in the valid detection range.
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 to any heat sources, such as air conditioning, electric fans, heaters or any highly reflective surfaces. Make sure no swaying object is within the detection coverage.

#### NOTE

- Do not attempt to open or repair the unit without qualified electrician while it is malfunctioned.
- Cleaning: Wipe with dry cloth only. Soap or rough cloth may damage the detector lens.

## 6 OPTIONAL ACCESSORY

6.1 It is recommended to purchase our high quality IR remote controller PMUSIR for easy, convenient and safe programming on PMUSW (See FIG. 18).

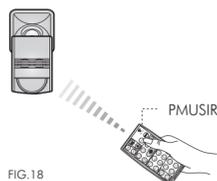


FIG. 18

6.2 Push button function:

Button	Function
	<b>To set load I (CH1) on for 8hrs</b> <ul style="list-style-type: none"> <li>By pressing "ON" button, the load of detector will be turned on for 8hrs.</li> <li>Load will be turned off after 8hrs and return to auto mode. Or press "ON" button again to exit this "8hrs on mode" during this period, detector will return to auto mode.</li> <li>Load I (CH1) can be lead to off mode by pressing "OFF" button under on mode.</li> </ul>
	<b>To set load I (CH1) off for 8hrs</b> <ul style="list-style-type: none"> <li>By pressing "OFF" button, the load connected to detector will be turned off for 8hrs.</li> <li>Detector will return to auto mode after 8hrs. Or press "OFF" button again to exit this "8hrs off mode" during this period, detector will return to auto mode. Or switching off power supply of presence detector for 5sec and re-supply it again to lead detector to auto mode.</li> <li>Load I (CH1) can be lead to on mode by pressing "ON" button under off mode.</li> </ul>
	<b>Unlock PMUSIR buttons</b> <ul style="list-style-type: none"> <li>By pressing "LE" button, PMUSIR buttons will be unlocked. Thereafter, IR remote controller can be used to set presence detector.</li> <li>The default channel is CH1 (Load I) after unlocking PMUSIR.</li> <li>When operating PMUSIR to detector under unlock mode, detector will lock automatically 5min after the last operating if "LE" button is not pressed.</li> </ul>
	<b>To lock PMUSIR buttons</b> By pressing "Lock" button, PMUSIR buttons will be locked and no key function is workable (except "LE" & "Reset").
	<b>Test mode</b> <ul style="list-style-type: none"> <li>By pressing "TEST" button to enter into Test mode, it is confirmed by detector's LED flashing for 2sec. Walking through the detection coverage, both load I (CH1) and detector's LED turn on 2sec once detector is triggered (Reaction is regardless of Lux value).</li> <li>Load II (CH2) has no reaction in test mode.</li> </ul>
	<b>To reset settings on presence detector</b> By pressing "RESET" button aiming to the detector, all settings on presence detector will go back to potentiometers' settings, and all MEMO data will be deleted.
	<b>To adjust Lux value</b> By pressing corresponding button, the selected light level threshold is set to presence detector for switching on the connected load. Load II (CH2) is independent of Lux value.

Button	Function
	<b>To read-in the actual ambient light level</b> Actual ambient light level can be read-in as threshold for switching the connected load, if the provided Lux values do not match user's requirement. The steps are as below: Press "Eye" button till detector's red LED flashing to enter into learning mode, learning time is 10sec. Then the actual ambient light level is read-in confirmed by both load and LED turn on for 5sec to indicate PMUSIR learning successfully and then turn off. Afterwards, it returns to Auto mode. <b>Note:</b> If the ambient light level is out of the range of 10 - 1000Lux, detector will learn for 10sec, then LED flashes quickly for 5sec to indicate PMUSIR learning is failed, and the alternative of 10Lux or 1000Lux value will be stored depending on under 10Lux or above 1000Lux value.
	<b>The previous setting values can be stored and duplicated to other detector</b> <ol style="list-style-type: none"> <li>Set the desired Lux and time values on one detector by using IR remote controller.</li> <li>Then by pressing "MEMO" button for approx. 3sec aiming to above detector, the Lux and time settings of this detector will be saved into this IR remote controller by detector's LED flashing.</li> <li>By pressing "MEMO" button again for approx. 1sec aiming to a new detector, the saved settings can be duplicated to the new detector.</li> <li>Transfer the settings to detectors desired by repeating above last step. If no data is saved in IR remote controller, detector has no reaction after press "MEMO" button.</li> <li>Battery removed for more than 5sec or "MEMO" button is pressed, all the data in IR remote controller will be deleted.</li> </ol>
	<b>Select load for time setting</b> By pressing "Time1" to set the delay off time value of load I (CH1), and "Time2" to set the delay off time value of load II (CH2). "Time1" is invalid if the detector has only one load.
	<b>Time setting for Time / Time1 or Time2</b> By pressing "Time" to select the load desired to set the delay off time value. Either "Time1" or "Time2" is pressed, LED flashes 2sec, and then press the corresponding time value button to set it, which is confirmed by detector's LED flashing for 2sec.
	<b>Short impulse mode</b> <ul style="list-style-type: none"> <li>Press "Short impulse mode" button to enter into short impulse mode, both LED and load are controlled by Lux under this mode.</li> <li>If the triggering method is "PIR+US": Both PIR and ultrasonic sensors are triggered, the load and LEDs will be on for 1sec, and then off. The next triggering should be 9sec interval.</li> <li>If the triggering method is "PIR/US": Either PIR or ultrasonic sensor is triggered, the corresponding LED and load will be on for 1sec, and then off. The next triggering should be 9sec interval.</li> <li>If the triggering method is "PIR only": Only PIR sensor is triggered, the red LED and load will be on for 1sec, and then off. The next triggering should be 9sec interval.</li> <li>If the triggering method is "US only": Only ultrasonic sensor is triggered, the green LED and load will be on for 1sec, and then off. The next triggering should be 9sec interval.</li> <li>Load II (CH2) has no reaction in short impulse mode.</li> </ul>

Button	Function
	<b>ACC on / off control function</b> <ul style="list-style-type: none"> <li>Pressing "ACC ON" button to activate the air current compensation function which is confirmed by the green LED keeping on for 5sec.</li> <li>Pressing "ACC OFF" button to deactivate the air current compensation function which is confirmed by the green LED flashing for 5sec.</li> </ul>
	<b>PIR or Ultrasonic mode</b> By Pressing "PIR/US" button, the detector is set to activate its load on when either PIR sensor or ultrasonic sensor is triggered by movement. When PIR is triggered, the red LED will flash; when ultrasonic sensor is triggered, the green LED will flash. To exit this mode by selecting other mode.
	<b>PIR &amp; Ultrasonic mode</b> By pressing "PIR+US" button, the detector is set to activate its load on when both PIR sensor and ultrasonic sensor detect the movement, and both red and green LEDs will flash. To exit this mode by selecting other mode.
	<b>PIR only function</b> By pressing "PIR only" button, the detector is set to activate its load on only when the PIR sensor of it detects the movement, and the red LED will flash to confirm the successful setting of this mode. To exit this mode by selecting other mode.
	<b>Ultrasonic only function</b> By pressing "US only" button, the detector is set to activate its load on only when the ultrasonic sensor of it detects the movement, and the green LED will flash to confirm the successful setting of this mode. To exit this mode by selecting other mode.
	<b>Sensitivity adjustment of Ultrasonic sensor</b> <ul style="list-style-type: none"> <li>By pressing "Sensitivity adjustment" button to set the sensitivity of ultrasonic sensor. Each time the user presses the button, the sensitivity of ultrasonic sensor would increase or decrease 10% with indication of green LED flashing.</li> <li>By pressing "Sensitivity adjustment" button to increase the sensitivity of ultrasonic sensor.</li> <li>By pressing "Sensitivity adjustment" button to decrease the sensitivity of ultrasonic sensor.</li> <li>When the sensitivity of ultrasonic sensor is at its highest or lowest level which is confirmed by green LED keeping on for approx. 2sec.</li> </ul>

#### 6.3 Trouble shooting of PMUSIR

When remote controller PMUSIR works abnormally, please check assumptive problems and suggested solutions in following chart that hopefully solve your problem.

Problem	Possible cause	Suggested solution
Detector fails to receive signal	1. Exceed the transmission range.	1. Operate within transmission range, and ensure PMUSIR aims directly to the detector.
	2. Low battery power.	2. Replace a new battery. 3. Check the trouble of detector, then refer the TROUBLE SHOOTING of detector manual for repairing.
No signal	1. Low battery power.	1. Replace battery.
	2. Press two or more buttons once.	2. Press one button once.
Fail to transmit signal	In locked mode.	Unlock PMUSIR.

Due to our policy of continuous improvement we reserve the right to change specification without prior notice. Errors and omissions excepted. These instructions have been carefully checked prior to publication. However, no responsibility can be accepted by E-Matic for any misinterpretation of these instructions.

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