

**PASSIVE INFRARED and MICROWAVE
COMBINATION DETECTOR**

DX-40 , DX-60 , DX-40 PLUS , DX-60 PLUS

FEATURES

DX-40,DX-60,DX-40PLUS and DX-60PLUS

- Microwave Area Shaping Technology (Patent Pending)
- Multifocus Optics Design (Patented)
- Automatic TROUBLE Monitoring (Patent Pending)
- Microwave "Watchdog" Circuit
- QUAD Zone Logic
- Temperature Compensation Logic
- Hassle-free Microwave Adjustment
- Sealed Optics
- 3 LED Walk Test Indication

DX-40,DX-40PLUS Only

- LED On/Off Switch
- Small Animal Immunity

DX-40PLUS,DX-60PLUS Only

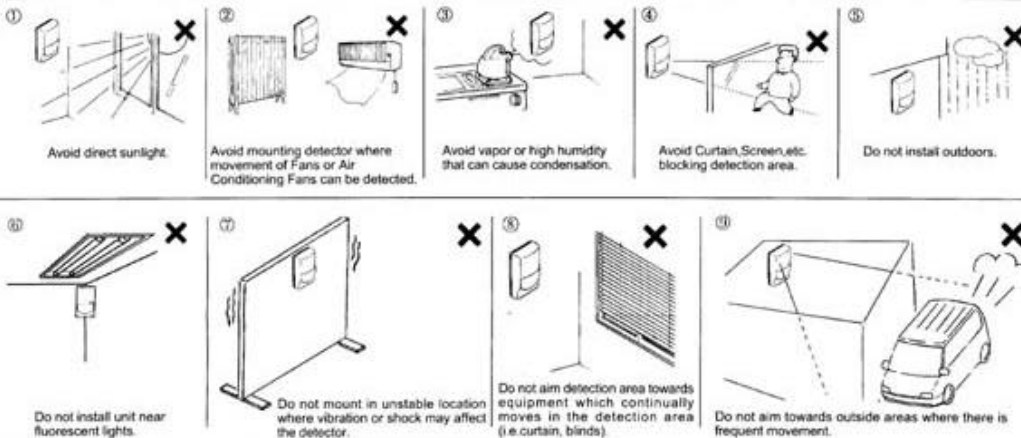
- Separate Relay Output for Automatic Trouble Monitoring
- Alarm Memory
- LED Remote Control Terminal

OPTIONAL BRACKET

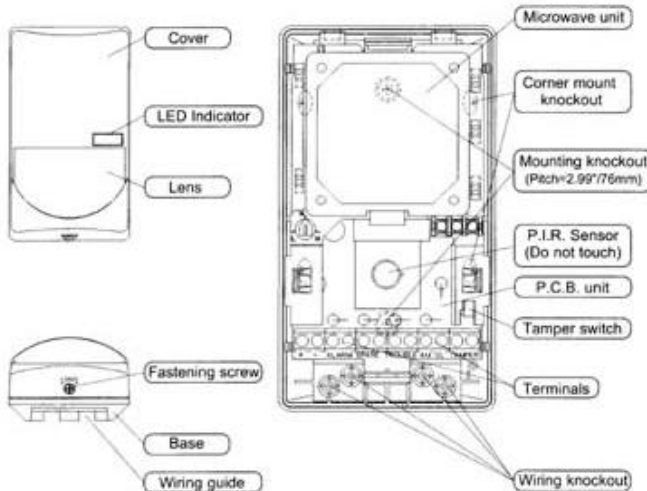
FA-1W : Wall Mount Bracket : adjustable $\pm 45^\circ$ (Horizontally), 0-20° (Vertically downwards)

FA-3 : Compact Wall & Ceiling Bracket : adjustable $\pm 45^\circ$ (Horizontally), 0-10° (Vertically downwards)

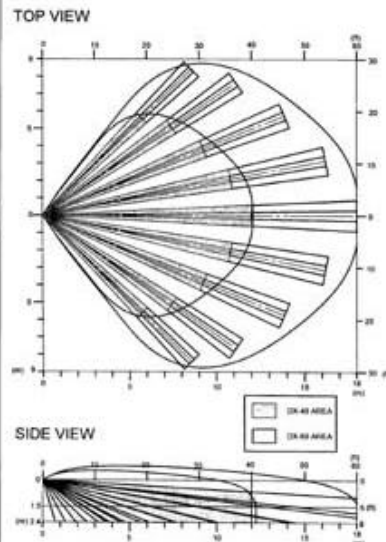
1.INSTALLATION HINTS



2.DESRIPTION AND OPERATION



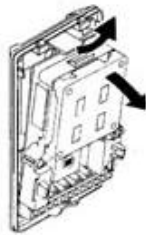
3.DETECTION AREA



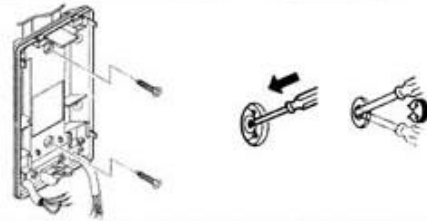
4. INSTALLATION



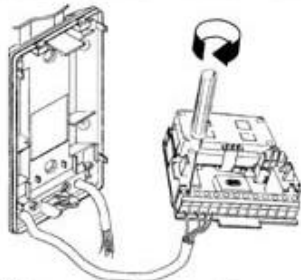
Loosen fastening screw and remove cover.



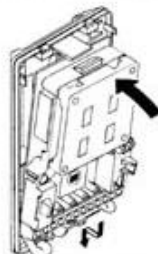
Release hook at top of unit. Remove P.C.B. unit from base.



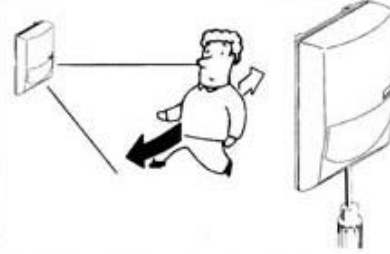
Lead in wires through knockouts along the wiring guide on the rear side of base. Mount base with supplied screws. When small animal immunity is required, refer to Section 6-E. When using a bracket, check matching knockout position before opening mounting hole.



Wire according to Section 5.



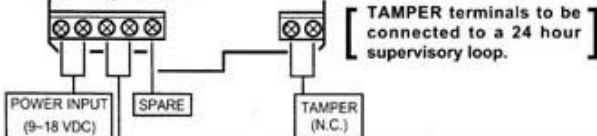
Fix P.C.B. unit into base. Supply power. Allow 30 sec to warm up.



Conduct walktest and make adjustments. (Section 6) Fit cover using fastening screw.

5. WIRING

DX-40, DX-60

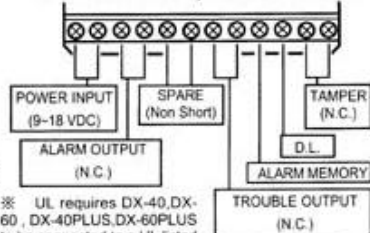


Power wires should not exceed the following lengths.

| WIRE SIZE | DX-40, DX-60 | | DX-40 PLUS, DX-60 PLUS | |
|------------------------------|---------------|---------------|------------------------|---------------|
| | 12V | 14V | 12V | 14V |
| AWG 22(0.33mm ²) | 160m (530ft) | 320m (1060ft) | 140m (460ft) | 280m (930ft) |
| AWG 20(0.52mm ²) | 250m (830ft) | 500m (1660ft) | 220m (730ft) | 440m (1460ft) |
| AWG 18(0.83mm ²) | 400m (1330ft) | 800m (2660ft) | 350m (1160ft) | 700m (2330ft) |

When using two or more units on one wire, the maximum length is obtained by dividing the maximum wire length listed above by the number of units used.

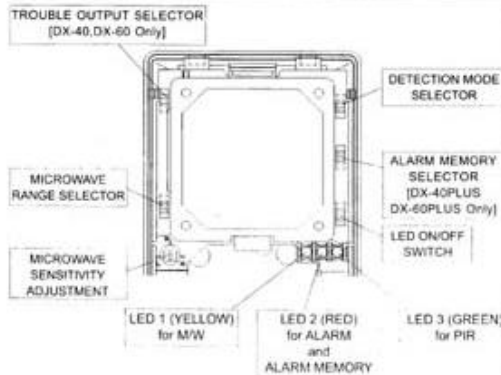
DX-40 PLUS, DX-60 PLUS



※ UL requires DX-40, DX-60, DX-40PLUS, DX-60PLUS to be connected to a UL listed power supply capable of providing a nominal input of 12VDC 35mA (max.) [DX-40, DX-60], 12VDC 40mA (max.) [DX-40PLUS, DX-60PLUS] and battery standby time of 4 hours.

※ The equipment shall be installed in accordance with the National Electrical Code, NFPA 70.

6. FUNCTIONS



6 - A. LED ON/OFF

Switch On or Off by adjusting the pin switch. LED will turn on under following status even if the pin switch is positioned to Off.

- 1) During warm-up period (approx. 30 seconds)
- 2) Alarm Memory indication
- 3) To indicate TROUBLE status (refer Section 6-C)



* D.L. terminal / LED remote control terminal (DX-40 PLUS, DX-60 PLUS Only)
LED can be enabled or disabled remotely from control panel by D.L. terminal. Place jumper pin switch in OFF position.

| | |
|--------------|---|
| LED Enabled | Connect D.L. terminal to common ground (with detector). |
| LED Disabled | No ground to D.L. terminal (open circuit). |

6 - B. MICRO WAVE ADJUSTMENT

Adjust microwave detection area by RANGE SELECTOR & SENSITIVITY ADJUSTMENT.

- 1) Select RANGE SELECTOR according to the room size
 DX-40,DX-40PLUS LONG 10 - 12m (33ft-40ft) DX-60,DX-60PLUS LONG 12 - 18m (40ft-60ft)
 SHORT 5 - 9m (17ft-30ft) SHORT 6 - 12m (20ft-40ft)

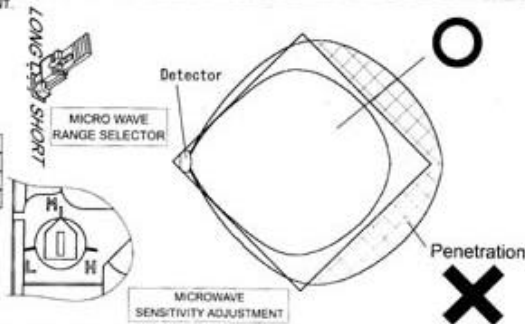
- 2) Position SENSITIVITY ADJUSTMENT to L firstly, then, along with walk testing, turn to H gradually until you get detection at the longest distance for the required detection range.

Guidance of SELECTOR and ADJUSTMENT position

| RANGE SELECTOR | Short | Short | Short | Long | Long | Long |
|------------------|--------------------------|----------|-----------|-----------|-----------|-----------|
| SENS. ADJUSTMENT | L | M | H | L | M | H |
| Detection | DX-40,DX-40PLUS 5m(17ft) | 7m(23ft) | 9m(30ft) | 10m(33ft) | 11m(37ft) | 12m(40ft) |
| Range | DX-60,DX-60PLUS 6m(20ft) | 8m(26ft) | 12m(40ft) | 12m(40ft) | 15m(50ft) | 18m(60ft) |

The chart shows any example of adjustments which may differ depending upon the size and shape of the installation site. For good adjustment, conduct walk test according to above 2).

IMPORTANT
 If Microwave detection range is set too wide, it may detect movements outside of the detection area, resulting in false alarms.
Do not adjust sensitivity too high.



6 - C. AUTOMATIC TROUBLE MONITORING

DX-40,DX-60 series features automatic trouble monitoring which generate trouble signal when detection ability of PIR or Microwave is compromised.

1) . PIR detection failure

- Function
 When something is blocking the PIR detection ability very near the detector (up to approx. 20 cm), i.e. by paper, this function will generate a TROUBLE signal. It requires the area to be blocked for approx. 30 seconds or less.
- Reset of TROUBLE Output
 Remove blocking material and conduct a walk test. If PIR detects properly, TROUBLE output will reset.
- Caution
 Do not switch power down the detector during a TROUBLE status. (It will reset TROUBLE output even if blocking material remains.) Cannot detect blocking away from the detector (up to approx. 20 cm) In order for this feature to activate, an object must be placed within 20cm of the detector which will reflect microwave. After this occurs, the detector counts any PIR detection's for up to 30 seconds, and if there are no PIR detection's, the unit will generate a trouble signal. If there is nothing to reflect microwave within 20cm of the detector, the trouble signal will not be sent, even if the PIR is blocked (i.e. Spray).

2) . Microwave detection failure (Self-Check)

- Function
 This function monitors signal wave shape of PIR and microwave's human detection, and inspect microwave's failure. Analysis requires an average of 10 to 20 minutes.

6 - D. DETECTION MODE

Select STD(Standard) or SP(Special) position according to environment conditions.

STD : Select this position usually. Signals are analyzed twice. High reliability and sharp detection are available in this mode.

SP : For bad environments with moving objects in the detection area (i.e. pets or animals).

Signals are analyzed 4 times for enhanced reliability. When walk testing, detection can be a little slower than STD mode.



6 - E. SPECIAL INSTRUCTIONS FOR SMALL ANIMAL IMMUNITY [DX-40 ,DX-40 PLUS Only]

1. Small animal immunity is most effective on animals less than 16 inches high.
2. Installation instructions
 - a. Set detection mode jumper in the SP(special) position.
 - b. Mount between 7 and 8 ft.(for maximum immunity mount as close to 8ft. as possible).
 - c. Do not angle detector towards the ground or use the angle bracket. Mount flat on the wall or in the corner.
 - d. For best small animal immunity, limit the detectors field of view to 40 ft. maximum in any direction.
 - e. For rodents, if any shelves within 15 ft. of the detector have a height that comes within 2.5 ft below the detector, small animal immunity will be reduced. Please select a mounting location which will avoid this situation.
 - f. For larger animals (16 inches in height or less at normal room temperatures) if animals jump up on desks, shelves, or other furniture small animal immunity will be reduced. Adjust detection area to avoid such obstacles.

Microwave "Watchdog" Circuit

When microwave operation fails, the detector automatically switches to back-up mode. In this mode, the PIR operates independently in order to avoid missing alarms during microwave failure. Detection mode (refer to section 6-D) turns into SP (Special) mode for enhanced reliability.

3) TROUBLE Output Indication

When TROUBLE status occurs, the following output will operate continually until the trouble is restored, i.e. blocking material of PIR is removed.

- LED Operation
 PIR Detection Failure : Yellow and Green LED's flicker.
 Microwave Detection Failure : Red and Yellow LED's flicker.

• Relay Output Terminals

DX-40,DX-60

TROUBLE signals will output through the ALARM output terminals.

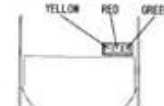


| SELECTOR POSITION | ALARM OUTPUT TERMINAL |
|-------------------|---------------------------------|
| ON | Output ON |
| OFF | No Output (LED Indication only) |

NOTE: When Alarm Output (ON) is selected and the detector goes into a trouble condition, the Alarm Output will open and remain in the open position. When the relay output is latched because of this type of trouble condition, the PIR only mode will not work. If PIR only mode is required, select Alarm Output (OFF) and trouble will be indicated by LED only.

DX-40PLUS,DX-60PLUS

TROUBLE signals will output through TROUBLE output terminals. Yellow and Green LED's flickers in turn.



6 - F. ALARM MEMORY

Compatible Control Panel is required for Alarm Memory. [DX-40 PLUS,DX-60 PLUS Only]

Select "POSITIVE" or "NEGATIVE" control. Connect A.M. terminal to Control Panel's Control Voltage Signal terminal (System Arming Status Voltage Output).



| Position | Negative | Positive |
|-----------------|-------------------|-------------------|
| System armed | 0-1VDC (grounded) | OPEN or +5-18VDC |
| System disarmed | OPEN or +5-18VDC | 0-1VDC (grounded) |

"grounded" = A.M. terminal is electrically connected with power supply terminal (ground).

OPERATION OF ALARM MEMORY

When the unit triggered during armed period, then the system is disarmed, Red LED will remain lit to confirm that it reported an alarm.

- Alarm Memory will operate even when LED is switched OFF.
- Alarm Memory will not operate while system is disarmed.
- After Alarm Memory latches, Alarm Output and Red LED operate normally during armed period.

RESET

Alarm Memory resets automatically when system is re-armed.

7. TROUBLE SHOOTING AND MAINTENANCE

INSTALLATION

| | | |
|------------------------------------|--|---|
| No Operation. | Power is not supplied. Incorrect wiring. Low power supply. | Supply power Correct wiring Supply power between 9 to 18VDC |
| Unit is constantly in warm-up mode | Low power supply. | Supply power between 9 to 18VDC |

TROUBLE SHOOTING

| | | | |
|--|--|--------------------------------|---|
| Yellow LED does not light. (MW does not operate.) | Check LED On/Off Switch and turn. | Check if it detects near from. | Increase Sensitivity (section 6-B). |
| Green LED does not light. (PIR does not operate.) | | Check if it detects near from. | Check if there are blocking materials in the detection area. For example, furniture's, Poles, High Plants, Partition etc.) |
| | | | Remove blocking materials and conduct walk test again. |
| Yellow LED lights even if no person in detection area (MW detects) | Strong RFI nearby. Moving fan or motor of air-conditioning vents etc. Detection outside through wall. (Persons in the next room, Water pipe in the wall etc.) Movements of animals, curtains etc. | | Switch electrical equipment off. Adjust the detection range (section 6-B) and reduce sensitivity. Remove them from the detection area. |
| Green LED lights even if no person in detection area (PIR detects) | Wind direct hits detector. Strong light hits detector. (sunlight, car head light etc.) Rapid temperature changes in detection area (heating, air conditioning, incandescent lamp etc.), moving animals, or curtains etc. | | Avoid them from hitting detectors directly. Possibly, better to avoid it from the detection area. Remove such objects from detection area. |
| Red & Yellow LED flicker. | Failure of microwave unit | | Replace with new unit |
| Green & Yellow LED flicker. | Blocking materials in front of detector | | Remove blocking materials. |
| No output although Green & Yellow (or Red & Yellow) LED flicker. | Trouble Output Switch is OFF. Incorrect wiring Relay is broken. | | Turn it ON. Correct wiring Replace with new unit |
| No output although Red LED lights. | Incorrect wiring Relay is broken. | | Correct wiring Replace with new unit |
| Red LED continues to light | Incorrect wiring of Alarm Memory Improper Control Voltage from control panel | | Correct wiring Check control voltage. |

CONDUCT WALK TEST AT LEAST ONCE A YEAR.

8. SPECIFICATIONS

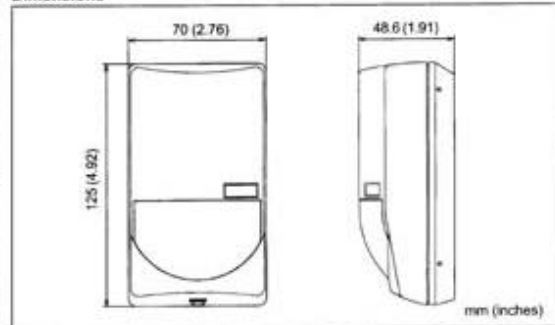
DX-40,DX-60

| Detection method | Passive Infrared and Micro Wave | |
|------------------------|--|--|
| | DX-40 | DX-60 |
| Model | DX-40 | DX-60 |
| Coverage | 40ft x 40ft (12m x 12m)@5° wide | 60ft x 60ft (18m x 18m)@5° wide |
| Detection zones | 82 zones(PIR) | |
| Mounting Height | 5 - 8ft(1.5 - 2.4m) | 6 - 8ft(1.8 - 2.4m) |
| Sensitivity | 3.6°F (2°C) at 2ft / sec (0.6m / sec), 40ft (12m) | 3.6°F (2°C) at 2ft / sec (0.6m / sec), 60ft (18m) |
| Detectable speed | 1 - 5ft / sec (0.3 - 1.5m / sec) | |
| Alarm period | Approx. 2 sec | |
| Alarm output | N.C., 28VDC 0.2A max. | |
| Tamper switch | N.C. Open when cover is removed. | |
| Warm up period | Approx. 30 sec | |
| LED indicator | Flicker during warm-up. RED : ALARM , ALARM MEMORY and TROUBLE indicator YELLOW : MW and TROUBLE indicator GREEN : P.I.R. and TROUBLE indicator | |
| Power input | 9 - 18VDC | |
| Current draw | 12mA (normal) , 35mA (max.) at 12VDC | |
| RF interference | NO Alarm 30V / m | |
| Operating temperature | 14°F - 122°F (-10°C - +50°C) | |
| Environmental humidity | 95% max. | |
| Microwave Frequency | 10.525GHz | |
| Weight | 5.3oz (150g) | |

DX-40 PLUS,DX-60 PLUS

| | |
|---------------------|--------------------------------------|
| Current draw | 17mA (normal) , 40mA (max.) at 12VDC |
| D.L. terminal | See Section 6-A |
| Alarm Memory | See Section 6-F |
| Trouble Output | N.C., 28VDC 0.2A max. |
| Microwave Frequency | 10.525GHz |

Dimensions



FCC Notice : This equipment has been tested and found to comply with the limits for a field disturbance sensor, pursuant to Part 15 of the FCC Rules. The user is cautioned that changes or modifications not expressly approved by OPTEX could void the user's authority to operate this equipment.

* Specifications and design are subject to change without prior notice.

NOTE

This unit is designed to detect movement of an intruder and activate an alarm control panel. Being only a part of a complete system, we cannot accept responsibility for any damages or other consequences resulting from an intrusion.



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