



PDM Detector Application Guide

There are four different PDM detector types offered by Vanderbilt:

1. PIR only (Passive InfraRed)
2. PIR only with Anti-Mask
3. PIR and Microwave (Dual Detectors)
4. PIR and Microwave with Anti-Mask

The PIR detectors identify IR heat signatures within the detectors given range. This heat signature movement is monitored and subsequently triggers the alarm output. The PIR detectors are particularly sensitive to movements perpendicular to the detection zones.

Content

PDM Microwave	2
Vanderbilt PDM Product Range	3
Pros and Cons	3
Do's and Don'ts	4
PDM Q&A	4

PDM Microwave

The microwave detector transmits a 9 or 10GHz electromagnetic wave and the receiver measures the frequency of the reflected waves. The PDM compares the signal that was transmitted against the reflected signal that is received. The movement of an intruder results in a change in the reflected signal frequency, caused by the Doppler effect. The microwave detection is more sensitive to motion directly towards or away from the detector. PIR or infrared detection is more sensitive to movement perpendicular to the detector.

Dual detector operation is based on both microwave and PIR. Both technologies need to be active to cause an alarm, which minimises the likelihood of a false alarm.

The antimask function ensures that any tampering near the detector can be detected reliably. The PDM is available at different operational frequencies based on the national regulations for Short Range Devices:

Frequency	Countries
9.35GHz	EU member states: ES, FI, FR, GB, IT, SE Non-EU member states*: AD, AU, UA, US
10.525GHz	EU member states: AT, CZ, DE, EE, FR, GB, HU, IE, LU, SK Non-EU member states*: AD, TR
10.587GHz	EU member states: AT, CZ, DE, EE, FI, SE, SK Non-EU member states*: AU, TR, UA, US

* List of non-EU member states is not complete. Please contact <http://www.service.vanderbiltindustries.com> for country-specific inquiries.

Vanderbilt PDM Product Range

V54530-F105-A100	PDM-I12T PIR AM detector
V54530-F106-A100	PDM-I18 PIR detector
V54530-F107-A100	PDM-I18T PIR AM detector
V54530-F114-A100	PDM-I12 PIR detector
V54530-F115-A100	PDM-E-I12 E-Bus PIR detector
V54530-F116-A100	PDM-E-I18T E-Bus PIR AM detector
V54531-F113-A100	PDM-IXA12 DUAL detector 10.525GHz
V54531-F114-A100	PDM-IXE12 DUAL detector 10.587GHz
V54531-F115-A100	PDM-IXD12T Dual AM detector 9.35GHz
V54531-F116-A100	PDM-IXA12T Dual AM detector 10.525GHz
V54531-F117-A100	PDM-IXE12T Dual AM detector 10.587GHz
V54531-F118-A100	PDM-IXD18 DUAL detector 9.35GHz
V54531-F119-A100	PDM-IXA18 DUAL detector 10.525GHz
V54531-F120-A100	PDM-IXE18 DUAL detector 10.587GHz
V54531-F121-A100	PDM-IXD18T Dual AM detector 9.35GHz
V54531-F122-A100	PDM-IXA18T Dual AM detector 10.525GHz
V54531-F123-A100	PDM-IXE18T Dual AM detector 10.587GHz
V54531-F124-A100	PDM-IXD12 DUAL detector 9.35GHz
V54531-F130-A100	PDM-E-IXD12 E-Bus Dual detector
V54531-F131-A100	PDM-E-IXD18T E-Bus Dual AM detector
V54530-F115-A100	PDM-E-I12 E-Bus PIR detector
V54530-F116-A100	PDM-E-I18T E-Bus PIR AM detector
V54531-F130-A100	PDM-E-IXD12 E-Bus Dual detector
V54531-F131-A100	PDM-E-IXD18T E-Bus Dual AM detector

Pros and Cons

Advantages of Microwave detectors

- Insensitive to temperature fluctuations, air turbulence and audible noises
- Standard installation
- Masking protection, only T version – G3
-

Disadvantages of Microwave detectors

- Reflections from metallic objects, (aluminium foil, and other electrically conductive metals such as copper, can reflect and absorb the radio waves and consequently interfere with the received signal).
- Magnetic materials absorb microwave signals significantly. The more magnetic material in the environment, the more microwaves are absorbed.
- PDMs operate at country specific licenced frequency.
- Requires careful planning for locating PDM's.

Do's and Don'ts

Do Not

1. Install either version of the PDM outdoors.
2. Install the microwave version onto metal surfaces.
3. Install either version in direct or reflected sunlight including conservatories.
4. Install the PIR in direct hot or cold draughts.
5. Install the PIR near heat sources or air conditioning outlets.
6. Install the PIR on windows or uninsulated walls.
7. Install the PIR above heaters or radiators.
8. Aim either version at areas that are subject to rapid changes in temperature and/or changes in air humidity.
9. Install either version where it may be subject to vibration.
10. Install the microwave PDM within 30cm of any metal object.
11. Install the microwave PDM near sources of moving water (e.g. Drainpipes), or pools of water
12. Aim the microwave PDM at metal objects that might reflect or absorb microwave energy.
13. Use the 18m detector for a small area coverage. (Small area coverage 4m² to 100m², for areas >100m², use 18m detector)

Do

1. Observe the correct mounting height.
2. Observe the correct distance in relation to moving objects (fans/blowers, doors, etc.) and fluorescent lamps (at least 0.5 m)
3. Mount the product only on solid walls, free from vibration or movement.
4. Mount the detector at the recommended height from a height of 2.0 to 2.6m, if necessary, the detector can be mounted up to a maximum of 3.0 m, at a 2° angle of inclination. For further clarification, please refer to the appropriate installation sheet.

PDM Q&A

Q1. Can the microwave detector be installed on a metal surface without effecting the performance of the detector and/or introducing an unwanted mask condition?

A1. No, a metal surface will affect the microwave performance, it is recommended to use a non-microwave PDM version.

Q2. Using a microwave detector, would a vending machine (example) produce enough interference to cause a mask condition if the machine is within the detection pattern? Would any electrical equipment effect the detector?

A2. All devices that are large metal objects with mechanical moving parts that are electrically operated have the capacity to interfere with the microwave detectors. It is recommended to use a non-microwave PDM version.

Q3. What is the microwave detection pattern compared with the PIR detection pattern?

A3. The pattern is detailed as the shaded area in fig 1 & 2 of the microwave detector installation sheet.

Q4. Does the microwave pattern cover a small distance behind the detector?

A4. Yes. 30cm at least.

Q5. What is the impact on the stability of the detector if the microwave detection pattern penetrates wood, brick, glass, etc?

A5.: The power of microwave signal is potentially too low to penetrate brick work, but the microwave can sense movement outside of the protected area and this may contribute towards false alarms.

Q6. What impact on the microwave detector does large moving metal objects within the microwave detection area have on the detector? Consider all known issues, (white goods, cars, post trollies, etc).

A6: During normal operation, large metal objects moving within the microwave detection area may cause the device to enter a masked state. Once the object is removed from the microwave detection area, the device will automatically revert to the normal, unmasked state unless configured for Latch mode.

Q7. What impact does large metal objects have on the microwave detection capability during power up and self-test sequence?

A7. If a large metal object is within the microwave detection area during these sequences, the background level will be established as the norm, when the large metal object is removed from the microwave detection area the detection base line changes, which could cause the detector to enter a mask state. The mask state can only be cleared by power cycling the detector, with the microwave detection area being clear from all large metal objects.