USER MANUAL:

Microwave MES250/2

Dual Technology Outdoor Barrier

ALIGNMENT AND SETTING OF THE MICROWAVE

PREMISE

The following information on the microwave installation method is to be considered on an informative level only, as operating with dual technology brings about a marked improvement in performance. In fact, the microwave barrier sounds its alarm only in the case of intruder detection by both the infrared and microwave systems, in this way decreasing the possibility of false alarms.

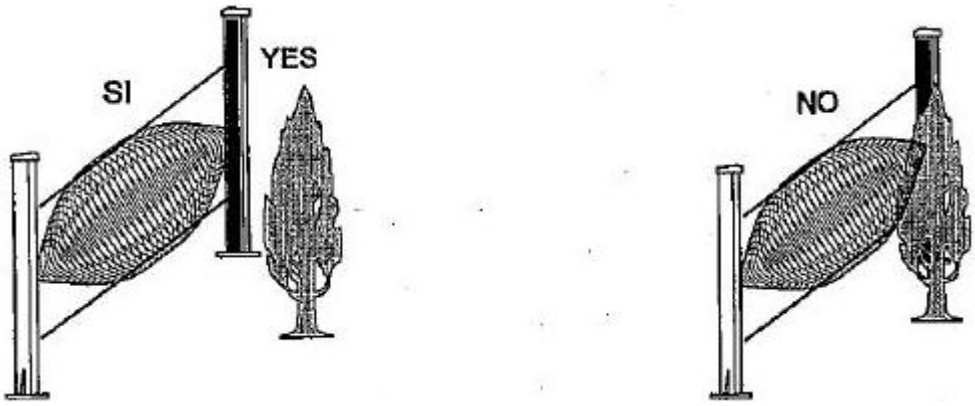
GENERAL FEATURES

The microwave barrier for outdoor per mitral protection consists of a transmitter and a receiver positioned opposite each other (see figure).
The device detects moving bodies within the sensitive area between the transmitter and receiver.
The sensitive field created depends on various factors which are to be discussed in the installation instructions which follow.
Briefly, the sensitive field depends, in most cases, on the following variables:

- distance between the transmitter and receiver
- height of the heads
- sensitivity level set on the receiver
- presence of obstacles or ground irregularities along the tract to be covered.
- Terrain type and obstacles
- Quantity of signal picked up by the receiver.

INSTALLATION INSTRUCTIONS

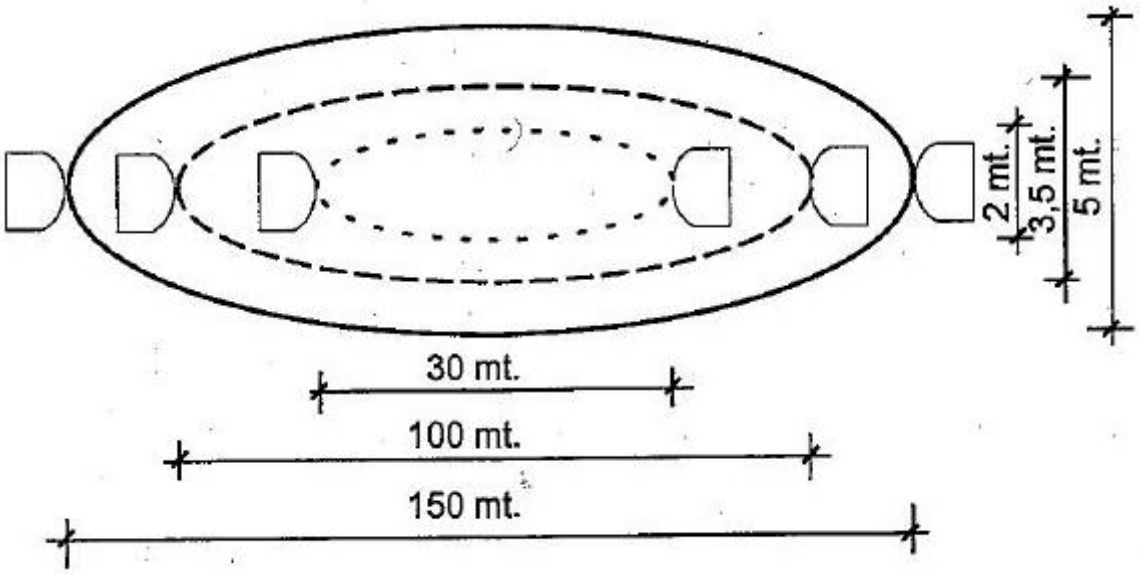
For correct installation the tract must be set in a sufficiently free and prepared area to optimize its protection (See note below).
The transmitter unit must be correctly orientated towards the receiver. Pay attention when laying the plinth on the ground and in the preparation of the base so that correct orientation is obtained. In general, the receiver and transmitter must be positioned on the same level to avoid problems inherent in varying sensitivity along the tract, as discussed in the following description.



Pay particular attention to the presence of artificial (doors, awnings, etc.) or natural (trees, bushes, etc.) moving parts which must be positioned outside the sensitive beam created by the microwave. As regards the lobe width, and thus the sensitive part of the microwave, refer to the following instructions.

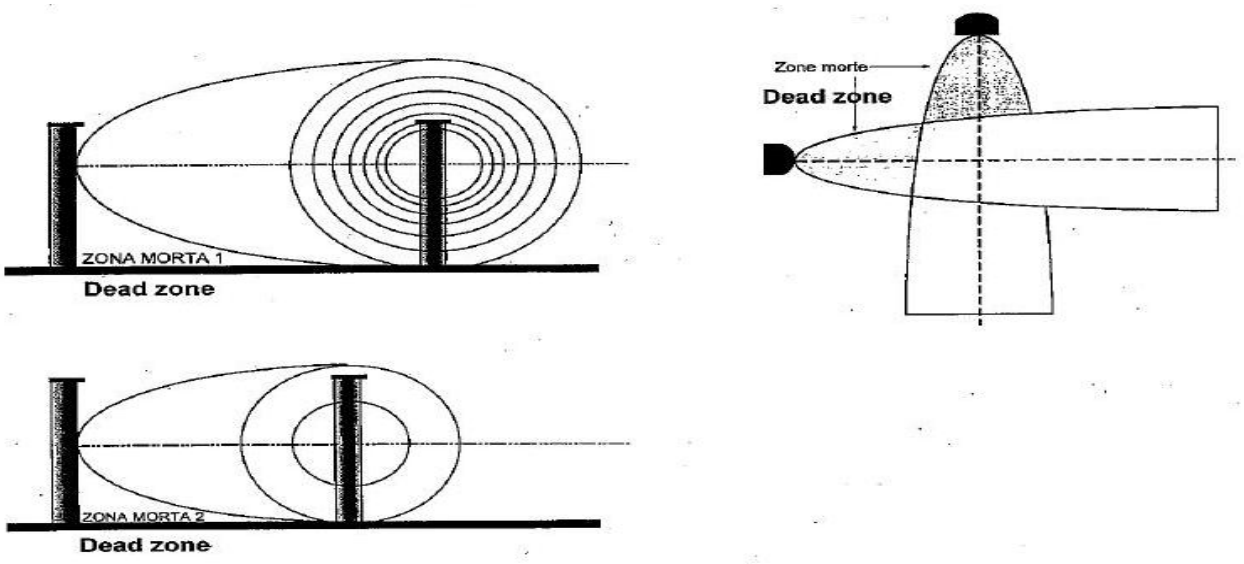
Distance between transmitter and receiver

The distance between the TX and RX determines the width of the lobe within which objects are individualized, setting off the general alarms on the receiver.
The size of the lobe in relation to the distance between the transmitter and receiver is shown in the figure below.

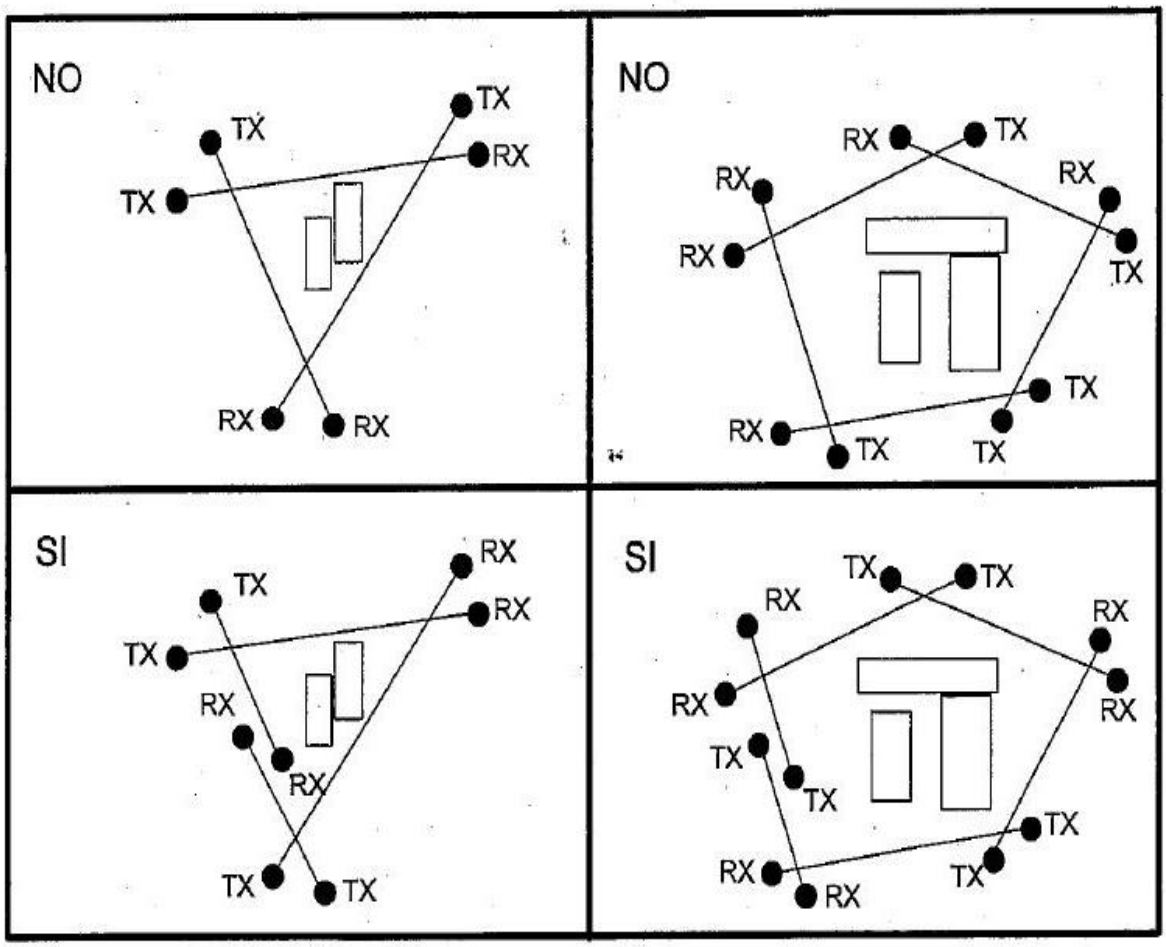


Height of the heads

The height always determines the width of the lobe. If the TX or RX heads are positioned at a certain distance from the ground, this increases or decreases the height of the lobe.
A parameter to keep in mind when positioning the microwave in the column is the blind zone (insensitive) next to the receiver and transmitter (see figure).
The higher the microwave, the greater the blind zone.
The lower the microwave, the smaller the blind zone next to the heads (see figure).



In order to avoid the blind zones, overlap configurations are formed at the angles of protection.
The minimum overlap for sufficient coverage must be at least 4-5 m. (depending of the sensitivity set).
The overlap depends on the height at which the microwave is positioned (see figure).
When installing the device, it is advisable to do so with an equal number of microwaves (TX and RX) in order to close the perimeter completely (see figure).
It is preferable to install only transmitters or only receivers at the points of overlap.
Two microwaves that overlap do not need to have the same transmission channel.
MES250/2 can have 4 different transmission channels.

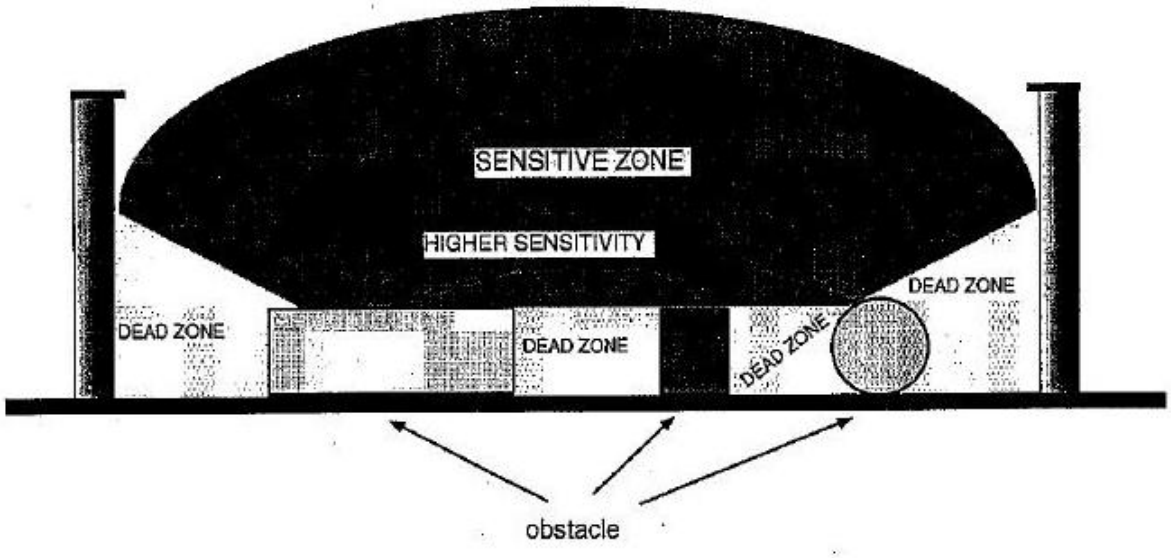


Sensitivity set on the receiver

Using the regulation trimmer on the receiver, it is possible to adjust the microwave to be more or less sensitive in order to detect bigger or smaller objects which enter the microwave's field of protection.
A microwave set at a very high sensitivity has a wider lobe than one with a less sensisitive setting.
An object entering the extremities of the sensitive zone activates a less signal percentage variation than the variation provoked by the same object at the centre of the microwave lobe. This phenomenon is shown in figure below.

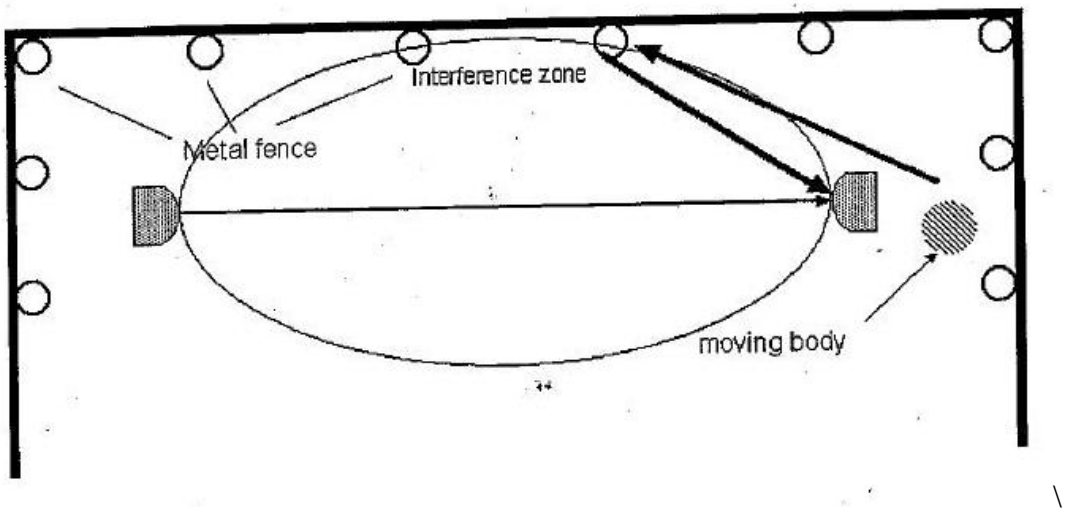
Obstacles along the tract

Any type of fixed obstacle present along the working axis of the microwave lobe changes the microwave's sensitive zone, creating blind zones (no possibility of detecting intruders) or zones with reduced or increased sensitivity (see figure).
All this depends on the objects present and the calibration of the microwave. Special attention must be paid to the terrain type. Grassy areas, for example, must be frequently mown to avoid long grass, blown by the wind or other elements, creating a variation in the signal received above the programmed sensitivity and thus cause false alarms (see figure).

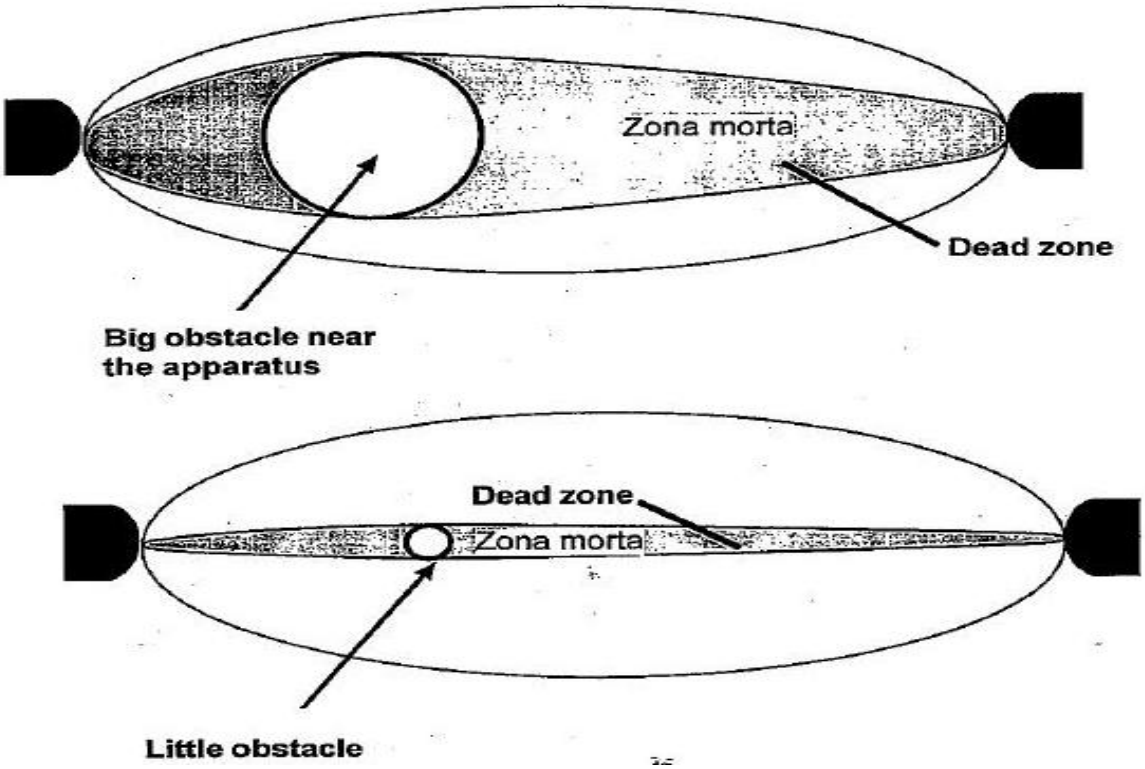


Obstacle type

Other than the size of the obstacles, the type of material must also be taken into consideration. There are some materials which reflect or absorb the signal thus affecting the sensitivity and the obscurement zone of the signal.
Pay attention to the position, with respect to the central axis of the tract, of any metal fencing which may interfere with the normal functioning of the microwave (see figure).

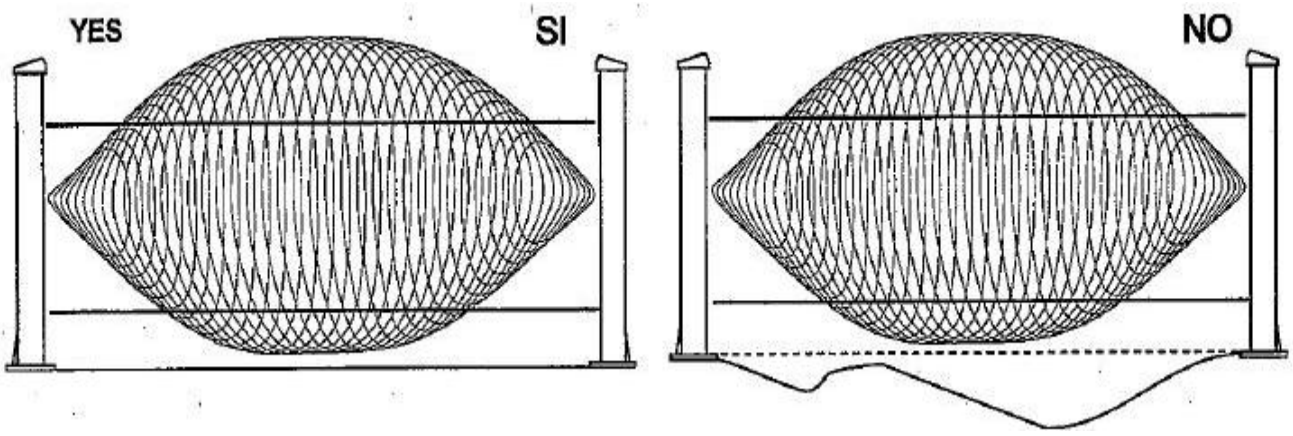


In order to avoid that such reflections or movement of the metal mesh activate false alarms, position the receiver and transmitter units so that they result sufficiently far away from the maximum lobe created by the microwave. Refer to the instructions maintaining a few metres of margin.
Check that there are no rain water gutters with plastic pipes (those in copper, in theory, do not create disturbances) in the microwave's sensitive area.
A fence with posts which are not very close together may be placed transversally to the microwave lobe, as long as **it makes absolutely no vibrations.**
Small metal posts along the microwave line may also be tolerated, taking into account that they will, anyway, generate zones of insensitivity, to a degree comparable to the area of the obstacle. Clearly the obstacle must be of such dimensions to cover a minimum percentage of the detection zone. Carry out tests to evaluate the feasibility of the installation (see figure).



Ground type and irregularities

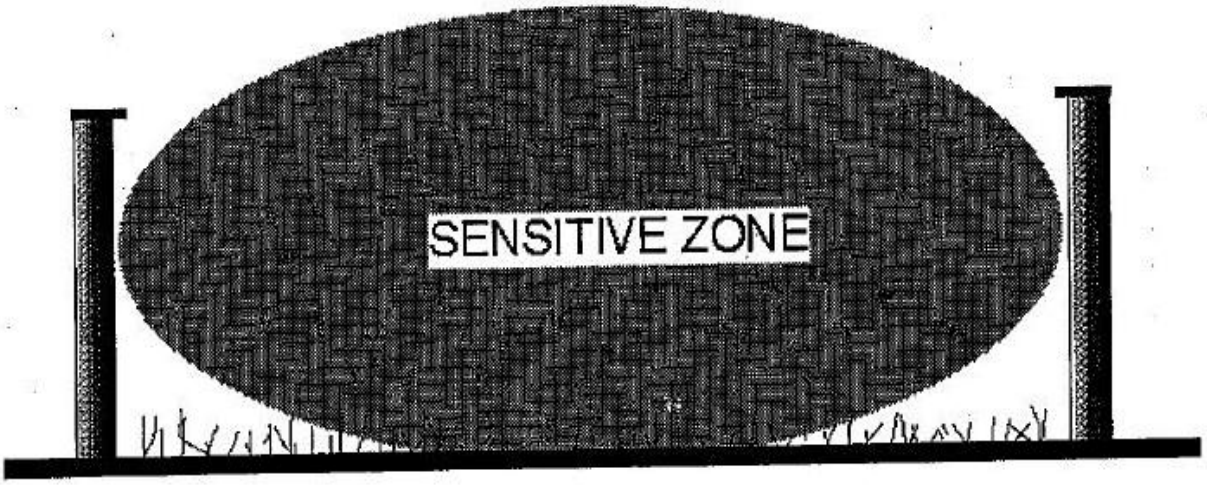
An essential feature for adequate protection of the site is that the transmitter and receiver are opposite each other in a linear and regular way.
Linear ground means that the TX and RX are positioned on the same plane, without irregularities due to steps or separation walls which change the plane and consequently create a "shadow zone".



Regular ground has no bumps or ditches which would reduce or increase the microwave sensitivity set during the calibration phase (see figure). Ditches in the ground provoke "shadow" or less sensitive zones where an object may pass without being detected.
The microwave tends to be influenced by the type of ground on which it is installed.
To avoid unpleasant surprises it is worth making some considerations before installation.
The choice of ground must be the following:

Stability

The ground must not have movable parts near the sensitive zone, any grassy areas must be frequently mown (maximum height less than 10 cm, see figure 11), there should not be any flowing water, especially longitudinally, ground where structural features may be changed. The installation of a microwave without problems must be on the following types of ground.



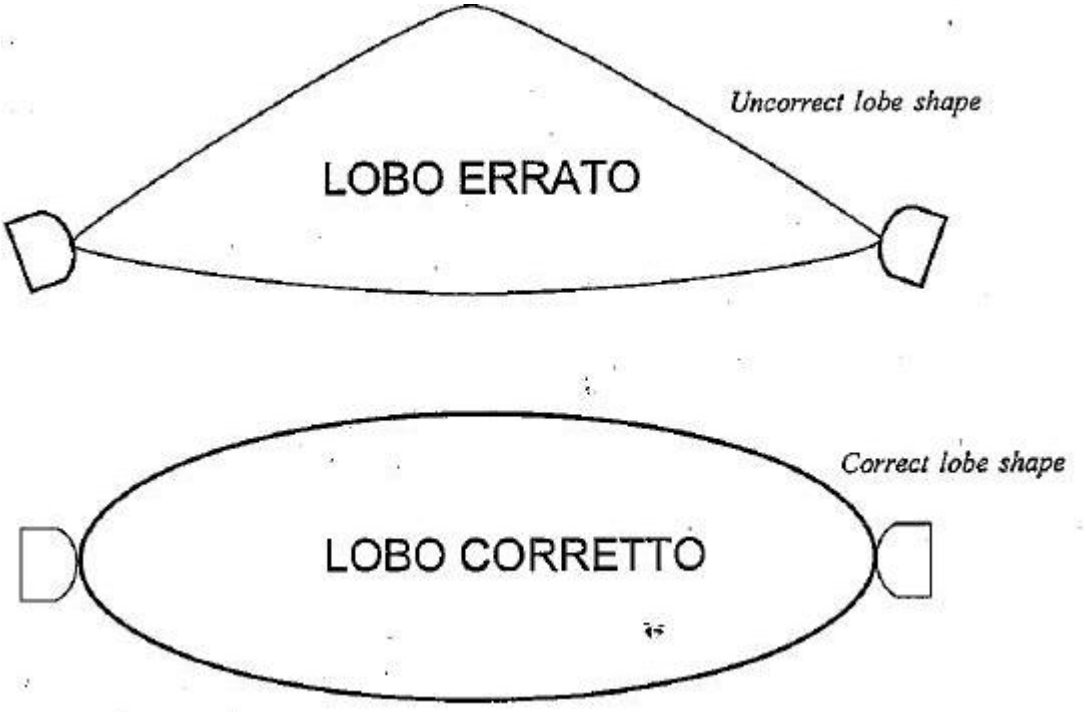
- Asphalt
- Cement
- Clay
- Gravel
- Grass (mown)

<u>The installation of a microwave on the following types of ground is unadvisable or not immune to false alarms.</u>

- Grass (unknown)
- Thick vegetation
- Water
- Sand
- Metal

Signal quantity received

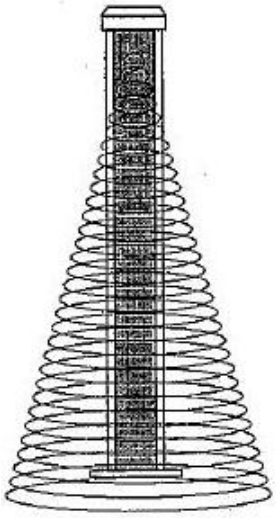
During the installation phase it is necessary to take great care in the alignment of the transmitter and receiver.
An inadequate alignment means, other than a decrease in the signal received (a microwave installed at 100m which is badly aligned would result as if it was installed at a much greater distance), an alteration in the microwave's sensitive zone (lobe).
A correctly aligned microwave tract results in a lobe which is symmetrical to its axis and regular in shape (see figure below).



A lobe's asymmetry may be due to may things, for example; alignment, the presence of obstacles or the presence of reflecting elements along the tract.

ASSEMBLY AND CALIBRATION OF DOPPLER ANTI-CRAWLING DEVICE (OPTIONAL)

In linear installations where barriers are not overlapped, it is possible to protect the first few meters from each column with a special microwave "Strip Line" device mounted inside the column. With such a device the first two to three meters are covered, enough to signal crawling under the beam. This system also requires infrared consent to generate the dual-technology alarm. Conversely, in the case of disqualification of the system, it will behave in t as the microwave, generating its own autonomous alarm.



ASSEMBLY

- Install the MW Doppler at the desired height and proceed to its wiring.
- Connect the three wires of the MW Doppler to the TX:
  Terminal 1 BLUE wire
  Terminal 2 RED wire
  Terminal 3 BLACK wire
- Repeat the same procedure on the RX card, connecting the termnals As follows:
  37 BLU
  38 BLACK
  39 RED
- Connect, if necessary, the TX and RX interface cards as previously described on P. 10.
- By means of the potentiometer placed directly above the fixing nut it is possible to calibrate the microwave taking into consideration that the lobe must reach as far as the point at which the microwave may also be activated by crawling.
- Make sure that during calibration nobody moves in front of the transmitter column. The LED on the Doppler interface card indicates detection of an intruder.

TIMING CALIBRATION OF THE TWO TECHNOLOGIES

In the bottom left hand corner of the RX interface card there are two trimmers: P1 and P2. Both trimmers are used to regulate the times of the temporary windows their own technologies. This means that if the microwave timer is set at 30 seconds, an alarm triggered by the microwave will be transformed into a general alarm **only** if, within 30 seconds, the infrared device also generates an alarm. Similarly, if the timer of the infrared device is set at 20 seconds, an alarm provoked by the infrared device will be transformed into a general alarm **only** if, within 30 seconds, the microwave also generates an alarm.

CLOSING THE COLUMNS

Close the columns, taking care that the guiding gaskets of the Perspex are in place and correctly inserted into the extrusions as any Perspex movement could cause false alarms. Make sure that the Perspex is always clean, especially at the lower part of the columns.

CAUTION: It is recommended that the hole at the bottom of the column is closed in order to avoid the entrance of insects which could jeopardize the operation of the appliance.

MES 250/2 GENERAL TECHNICAL FEATURES

MICROWAVE

Frequency USA:	10525.5MHz to 10529.5MHz
Scope:	150 m
Sheaf diameter:	From 1 to 6 m
Power supply:	13.8 V DC

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

FCC Information to Users @ FCC 15.105

For Class B Unintentional Radiators:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of more of the following measures:

- Reorient or relocate the receiving antenna;
- Increase the separation between the equipment and receiver;
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected;
- Consult the dealer or an experienced radio/TV technician for help.

Warning to Users @ FCC 15.21

Warning: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.