Canada: Industry Canada Certification
Certification Number: To Be Provided

Operation is subject to the following two conditions:
(1) this device may not cause interference, and
(2) this device must accept any interference including interference that may cause undesired operation of the device.

USA: FCC Certification
FCC Identification Number: I5T-MW001

This device complies with part 15 of the FCC Rules.
Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) This device must accept any interference received, including interference that may cause undesired operation.

Any changes or modification not expressly approved by Senstar-Stellar Corporation could void that user's authority to operate the equipment.

FCC ID: I5T-MW001

CIAS

ERMO 482

Microwave barriers for external protection

Installation manual

Version 1.01

INDEX

CONTENTS

1) GENERAL DESCRIPTION

ERMO 482/... is a microwave system for external protection of the volumetric barrier type.
Volumetric barrier means the spatial protection obtained by using separate transmitter and receiver, placed opposite each other, in which one of the three dimensions is considerably greater than the other two.
This type of systemis able to reveal the presence of a body moving within the sensitive field set up between transmitter and receiver.
The shape and size of the sensitive field set up between transmitter and receiver in ERMO 482/... depend on the following factors:

a) Type of antenna used
b) Effective distance between transmitter and receiver
c) Level of sensitivity set up on the receiver
d) Presence of fixed parts within the sensitive field (land, walls, fencing, posts, etc.)
e) The type of obstacles, if any
f) Alignment of transmitter and receiver

- Two types of antenna are used:

- 10cm PARABOLIC
- 20cm PARABOLIC

The 10cm PARABOLIC antennae are suitable for the formation of rather wide but short range fields of protection.
The 20cm PARABOLIC antenna forms longer fields of protection, but less wide ranging. (FIG. 1. a-b)

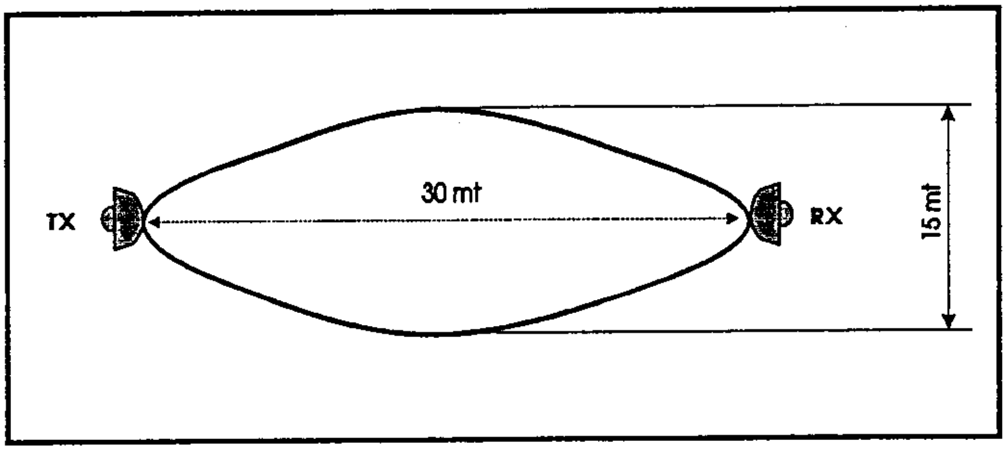


FIG. 1a - 10cm parabolic antenna

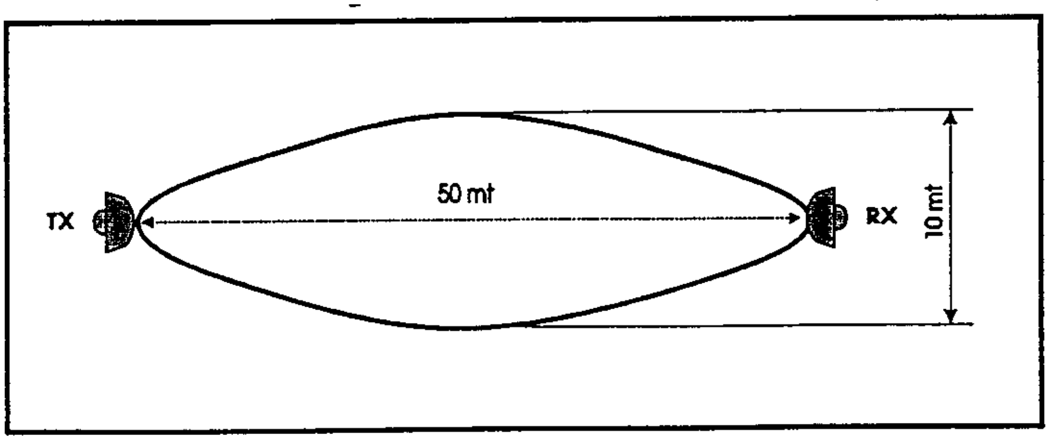


FIG. 1b - 20cm parabolic antenna

Figure 1 a-b - Maximum beam of the sensitive zones

- **The effective distance between transmitter and receiver**, depending on the type of antenna, determines the other two dimensions, due to the fact that the opening angle of the antennae used remains constant to the variation of the reciprocal distance between transmitter and receiver. (FIG. 2)

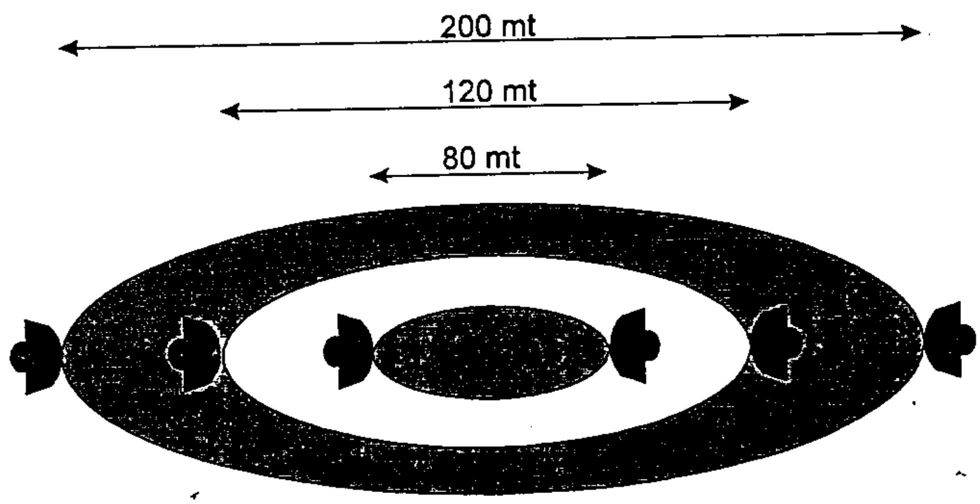


Figure 2 - Variation of the dimension of the sensitive zone on the variation of the distance

- **The level of sensitivity set up on the receiver,** according to a particular antenna, ensures that the microwave barriers can have a sensitivity to more or less intense disturbance signals. Bear in mind that the weaker signals come from more peripheral zones of the field, while the more intense signals come from central zones. Thus it is clear that the regulation of the sensitivity provokes a corresponding variation of the height and breadth of the field of protection. The length, on the other hand, is determined exclusively by the distance between transmitter and receiver (FIG. 3).

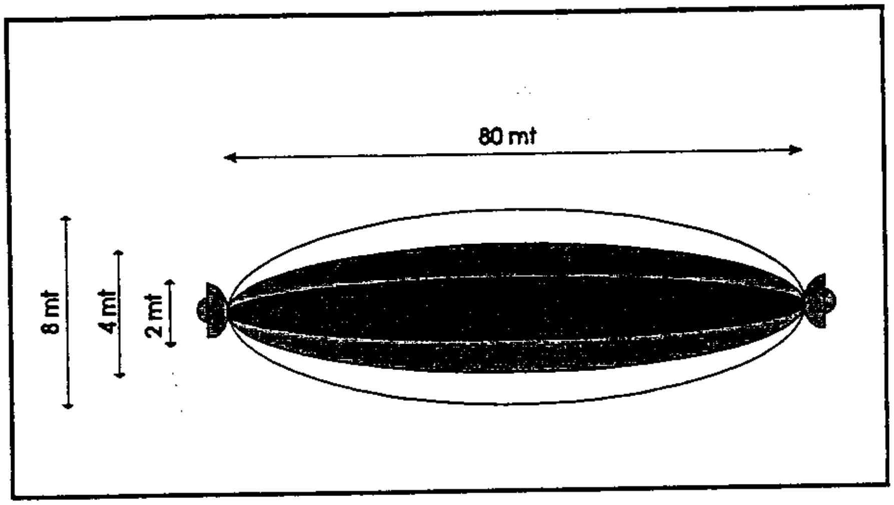


Figure 3 - Variation of the dimension of the sensitive zone on the variation of the sensitivity

- **The presence of fixed parts, within the sensitive field,** alters the dimensions of the protection field determined, in theory, by the distance between these and the level of sensitivity imposed on the receiver.
  These dimensions are valid only when the barrier is installed in a free space.
  In all the other cases the obstacles present will provoke distortions of the shape and alteration of the size of the protection field.

- **The nature of the obstacles,** eventually present, provokes either a reflection or an absorption, or a combination of both these phenomena in confrontation with the electromagnetic energy contained. Therefore, different alterations of the protection field occur depending on the nature of the obstacles. (FIG. 4)

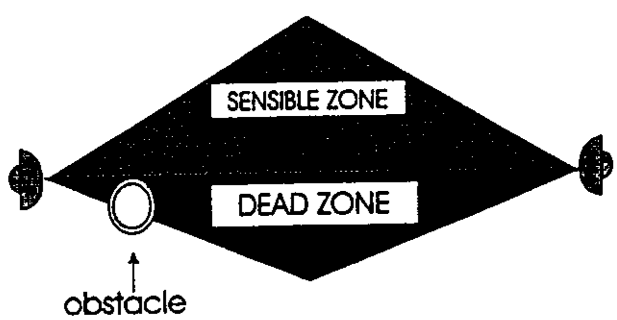


Figure 4 - Sensitive zone in the presence of an obstacle

- **An imperfect alignment between transmitter and receiver** provokes, a distortion of the shape of the protective field which is set up, as well as an obvious reduction of the signal received. This fact becomes clearly apparent when considering that the protection field is determined, in the first approximation, by the combination of the principal radiation lobes of the two antennae, which, if perfectly aligned, will establish a regular and symmetrical protection field in the two halves of the section, if badly aligned they will cause asymmetry and a more probable interception of obstacles (even though apparently outside the sensitive field). (FIG. 5)

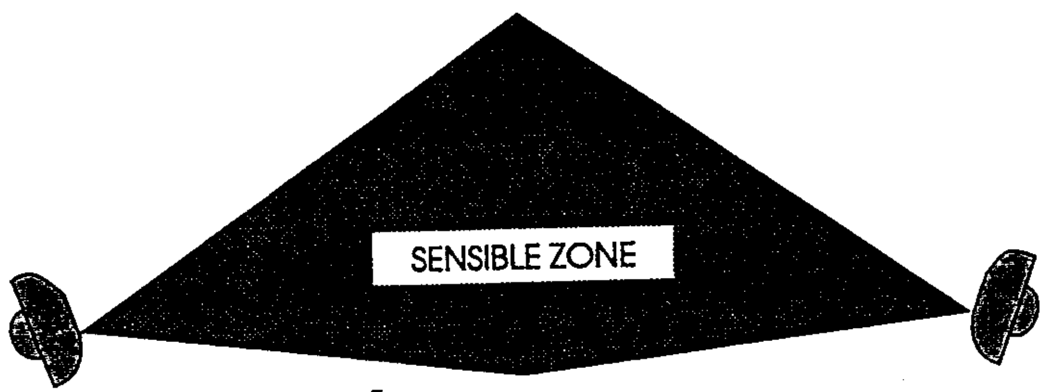


FIG. 5 - Sensible zone distorsion for bad alignement

Bearing these basic considerations in mind, we can state that the general form of the protection field takes the shape of two trunks of a cone opposed to each other at the base. The minimum bdimension of the field is the one of the antennae, while the maximum dimension is determined by all the other factors already examined.
The breadth of the signal received is the vectorial sum of the direct signal and all the reflected ones. (FIG. 6)

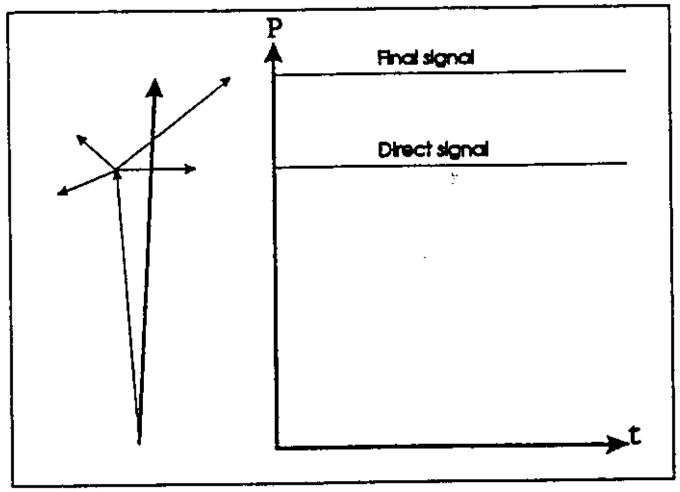


Figure 6 - Vectorial representation of the signal received

It is easy to see how the introduction of any object into the protected field, whether reflecting or absorbing electromagnetic energy, will provoke an alteration of the preceding condition, causing a variation in the breadth of the signal received in proportion to the size of the object introduced and its degree of penetration into the sensitive field.If the object introduced into the protection field is held in movement, it will provoke a continuous variation of the breadth of the signal received, thus bringing about a modulating frequency whose breadth is in proportion to the dimensions and position of the field and of the object introduced, and whose frequency is proportional to the speed of movement in the field of the object. (FIG. 7)

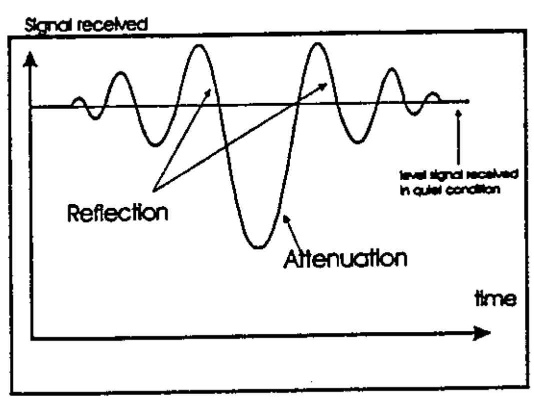


Figure 7 - Representation of the signal received during an intrusion

Electromagnetic energy is radiated from the transmitter in the form of impulses, so that in the presence of an object in movement within the protection field, as well as the breadth modulation of the peak of the signal received, we will find a phase modulation of the impulses detected.
As the frequency of the transmitted impulses of electromagnetic energy has 4 different values, it is possible to carry out on the receiver a check of the correspondence of the frequency received with a sample frequency within the receiver itself.
Thus, we determine a channeling which, as well as offering greater possibilities to elaborate the signal, makes the system much less vulnerable with regard to any attempt to neutralise it.

2) BLOCK DIAGRAM

The block diagram of the transmitter of **ERMO 482/...** is shown in Fig. 8.

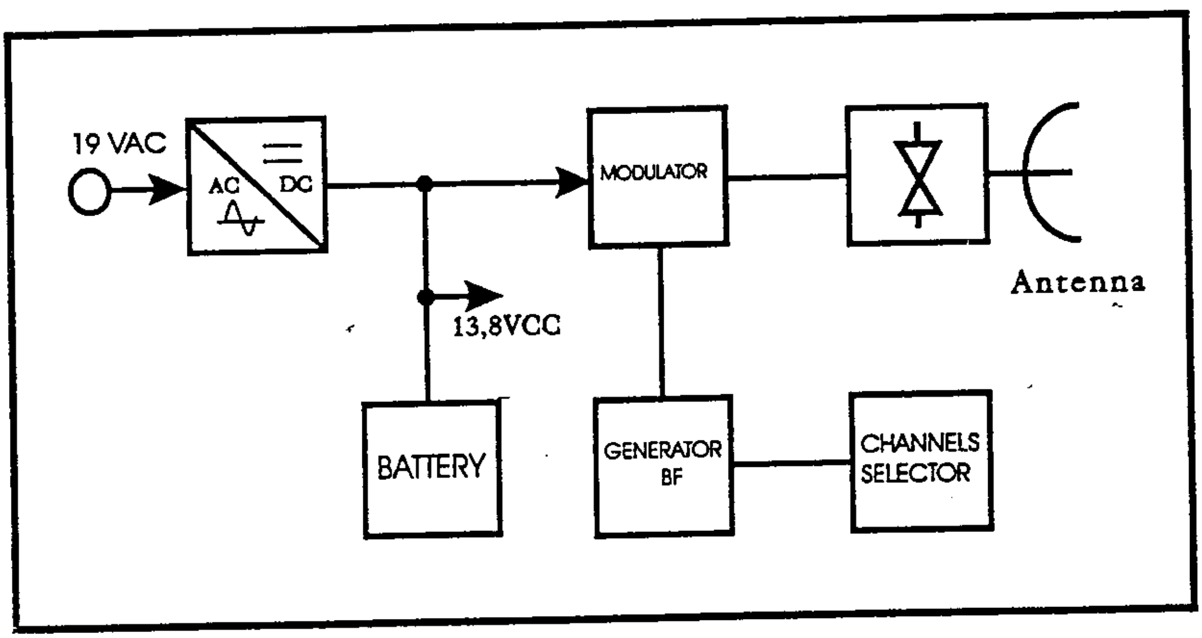


Figure 8 - Block diagram of the transmitter

The block diagram of the receiver of **ERMO 482/...** is shown in Fig. 9.

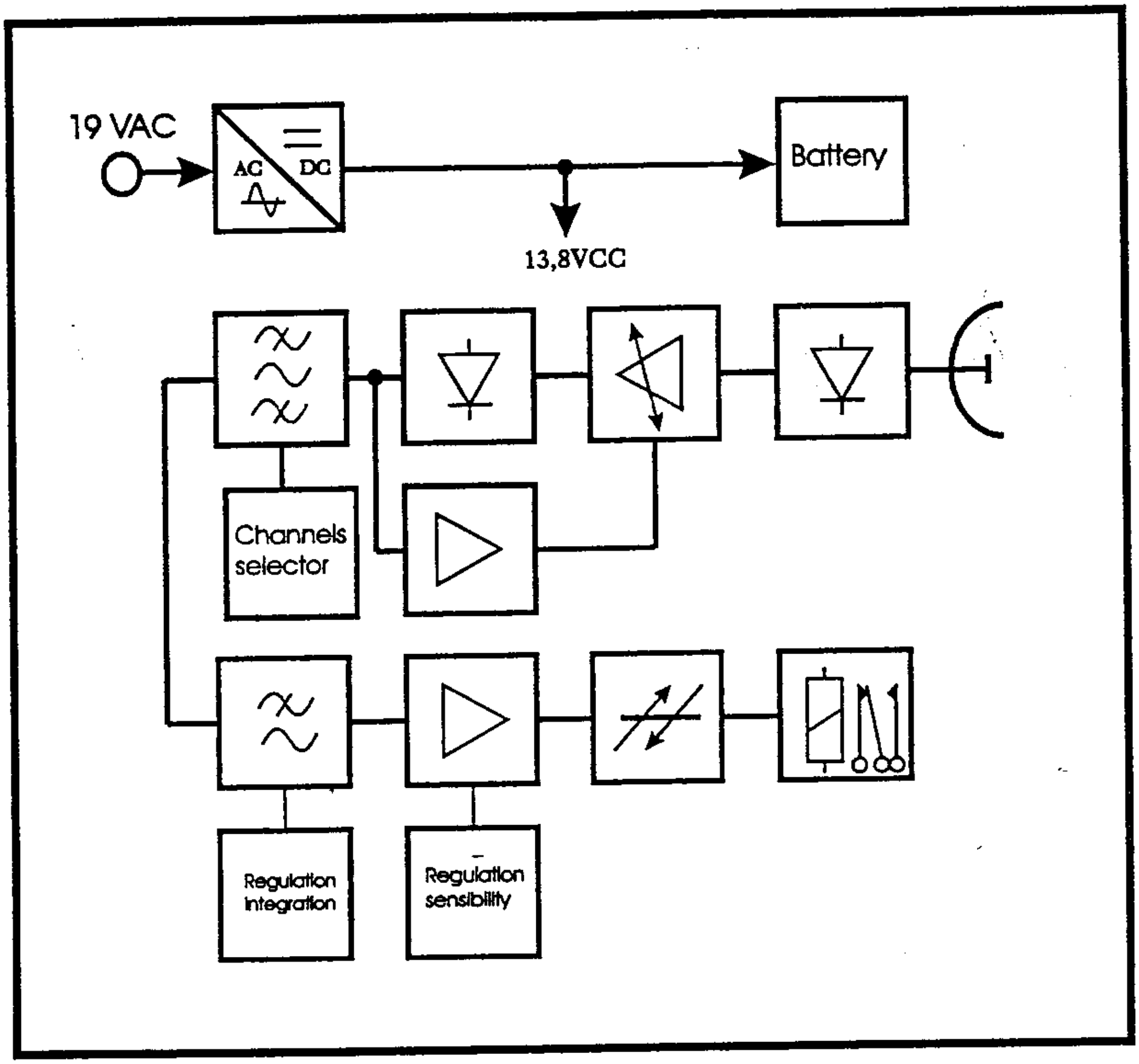


Figure 9 - Block diagram of the receiver

3) TECHNICAL SPECIFICATIONS

Table 1 shows the technical specifications of ERMO 482/...

	Min	Nom	Max	Note
Working frequence	9,5 GHz	9,9 GHz	9,95 GHz	
Maximum force	-	20 mW	-	
Modulation	-	-	-	on/off
Duty-cycle	-	50/50	-	
Number channels	-	-	4	
Range:				
ERMO 482/50	50 m	-	-	
ERMO 482/80	80 m	-	-	
ERMO 482/120	120 m	-	-	
ERMO 482/200	200 m	-	-	
Power supply tension ( ):	17 V	19 V	21 V	
Power supply tension ( ):	11,5 V	13,8 V	16 V	
Power supply current TX ( ):	-	155 mA	165 mA	
Power supply current RX in control ( ):	-	210 mA	220 mA	
Power supply current RX in alarm ( ):	-	130 mA	130 mA	
Power supply current TX ( ):	-	33 mA	40 mA	
Power supply current RX in control ( ):	-	65 mA	72 mA	
Power supply current RX in alarm ( ):	-	20 mA	25 mA	
Room for battery:	-	-	-	12Y/1,9Ah
Alarm outputs:				
Contact redome removal (TX)	-	-	30 VA	C-NC
Contact redome removal (RX)	-	-	30 VA	C-NC
Exchange intrusion alarm	-	-	30 VA	C-NC-NA
lighting signals:	-	-		
Presence green led net (TX)	-	-	-	ON
Presence green led net (RX)	-	-	-	ON
Recognition green led net	-	-	-	ON
State of green led NON alarm-	-	-	-	ON
Sensibility regulation	-	-	-	trimmer
Integration regulation	-	-	-	trimmer
Weight without battery (TX)	-	2910 g	-	
Weight without battery (RX)	-	2970 g	-	
Dimensions				
Diameter	-	-	305 mm	
Depth jaws included	-	-	280 mm	
Working temperature	-25 °C	-	+55 °C	
Performance level:	3°			
Level of wrapper protection:	IP55			

Table 1 - Technical specifications

Additive note for barriers ERMO 482 power supply and earthing:

- **The cable which carries the transformer power supply to the apparatus must be masked and the mask must be connected to the soul**
- **the metallic case must be connected to the soul, through a suitable earth terminal projected inside.**

4) COMPONENT PARTS OF THE SYSTEM

The ERMO 482/... package is made up of the following parts:

A) Transmitter
B) Receiver
C) Post clamps
D) Cavoflex ends
E) Transformers
F) Testing diagrams
G) Instruction manual

For ease of assembly, the dismantling and the eventual replacement, for assistance, with the various parts of the apparatus ERMO 482, there is an "exploded" illustration of a barrier head.

5) ACCESSORIES

In the picture of page 10 there are several parts of the accessories that can be supplied on request by quoting the relevant code number. Here we are:

A) 15cm Post
B) Post cover
C) Connector block
D) Connector block cover

6) INSTALLATION

When designing a volumetric barrier protection system, it is first necessary to carry out an inspection of the site to be protected, in order to note the real operating conditions. In fact it is necessary to determine:

6. 1) Number of lines to install
6. 2) Length of each line
6. 3) Land conditions
6. 4) Nature of terrain
6. 5) Presence of walls, fences, posts, trees, hedges, other obstacles
6. 6) Breadth of sensitive bands
6. 7) Breadth of the dead zones near the apparatus
6. 8) Height of the apparatus from the ground
6. 9) Supporting poles, their ground fixtures, connector boxes
6. 10) Connections to AC supply
6. 11) Connection of the battery to reserve supply
6. 12) Connections to the elaboration centre

6. 1) Number of lines to install

As the volumetric barrier protection has to be designed within a closed perimeter, as well as the obvious considerations of the subdivision of the perimeter into a certain number of lines which take into consideration the operating requirements within the system, we must remember that it is always best to install an even number of lines. This is due to the fact that the possible reciprocal interferences between adjacent lines are cancelled out if two apparatus with the same name are installed at the vertices of

the polygon obtained by the installation of the various lines: either two transmitters or two receivers.
Obviously, this can **always** only takes place when there is an **even** number of lines.
If it is not possible to install an even number of lines, careful considerations should be given to the possible interferences for the correct choice of the most suitable vertex for the positioning of the transmitter near the receiver.
The following illustrations show a number of typical cases, with the most appropriate solution. (FIG. 11)

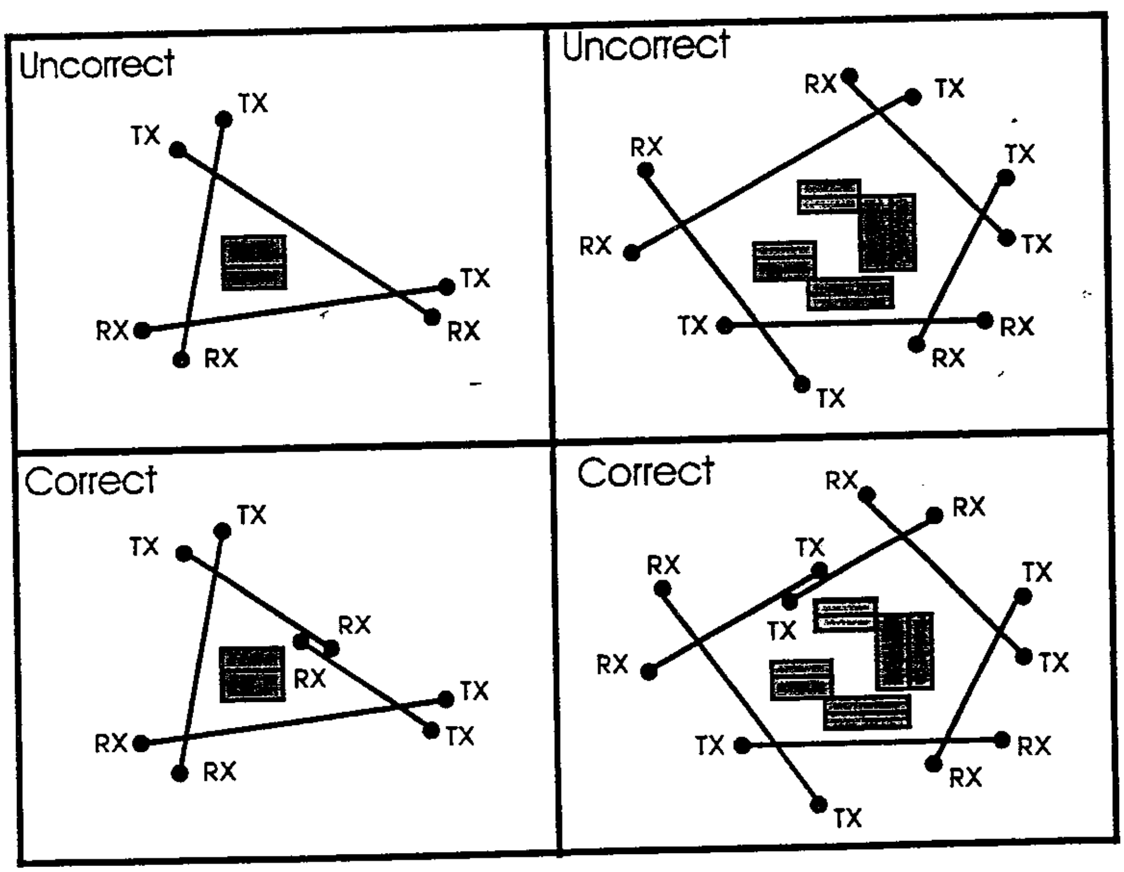


Figure 11 - Examples of correct solutions when using odd numbers of lines

6. 2) Length of each line

The identification of the length of each line makes it possible to purchase the appropriate equipment and CIAS supplies, in the same container, a range of four different capacities and dimensions of the sensitive field.

To better understand this subdivision, there follows a table illustrating the various models, showing the capacity and the type of antenna used. (TAB. 2)

	PARABOLA 10 cm	PARABOLA 20 cm
ERMO 482 / 50	50	-
ERMO 482 / 80	-	80
ERMO 482 / 120	-	120
ERMO 482 / 200	-	200

Table 2 - Capacity and antenna used for each model

6. 3) Land conditions

The soul is an enormous obstacle along the entire line, thus ables to exert a notable influence on the form of intrusion and the response to it.
To avoid shaded and hypersensitive zones, as much as possible, particular attention should be paid to the conditions of the land.

It should be:

a) Fixed

We advise not to install the apparatus where there are vehicle weighbridges, long grass (over 10 cm), ponds, streams and rivers, and all types of soul where conditions can change rapidly.
If this situation is not taken into consideration, there is the risk that the position of the soul could change rapidly, provoking false alarms. (FIG. 12)

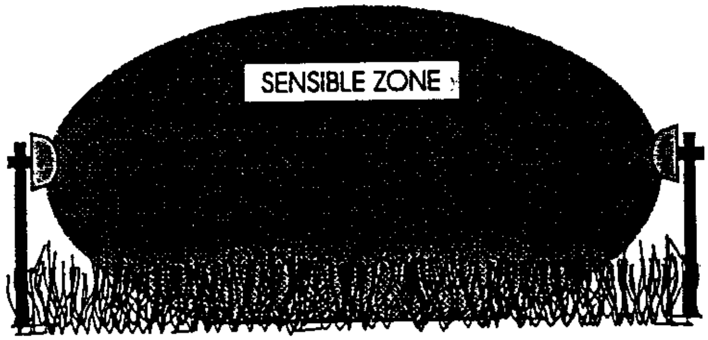


Figure 12 - Interference in the sensible zone of high grass

b) Stable

We advise not to install the apparatus where the soul can alter, in the course of the time, because of natural causes, such as sandy areas, or for man-made reasons, such as material deposits, where it is possible that the protection zone changes its standard conditions after the installation. If this is not taken into consideration, the alteration of the soul can lead to the creation of dead and hypersensitive zones with, in the first case, insensitive areas and, in the latter, false alarms. (FIG. 13)

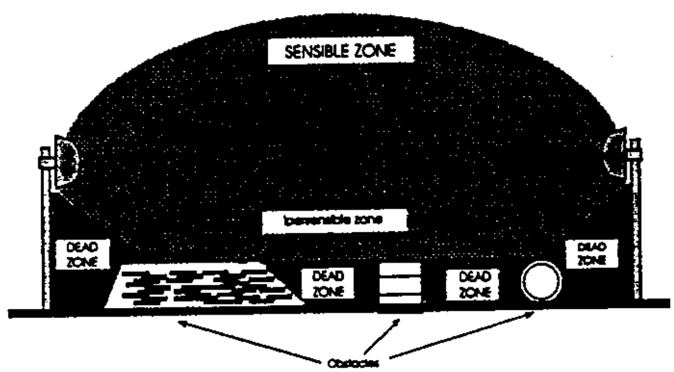


Figure 13 - Formation of dead and hypersensitive zones due to the presence of various obstacles

c) Smooth

Be sure that the installation takes place along lines with ondulation of less than ± 20 cm. If the soul is not perfectly flat, we must bear in mind that there will be zones of less sensitivity or even dead zones in the depressions, while on the ridges we will find greater sensitivity or even hypersensitivity, with the result, once again, of possible insensitive areas or false alarms. (FIG. 14)

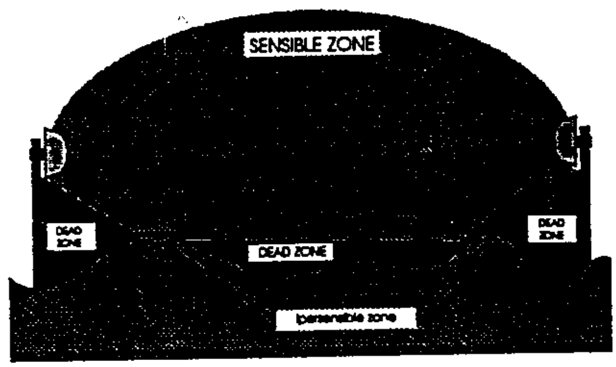


Figure 14 - Formation of dead and hypersensitive zones due to excessively ondulation ground

6. 4) Nature of the soul

Bearing tha above in mind, there follows a list of the various types of terrain suitable for the installation of the apparatus:

a) asphalt
b) concrete
c) beaten earth
d) gravel
e) lawn (with grass no higher than 10 cm)

The following table summarises the possibility of carrying out a good installation on various possible soils, also bearing in mind their conditions. (TAB. 3)

		LAND CONDITIONS					
		SMOOTH	FIXED	STABLE	INCLINED	WAVY <20cm	WAVY >20cm
TYPE OF TERRAIN	ASPHALT	SI	SI	SI	SI	SI	NO
	CEMENT	SI	SI	SI	SI	SI	NO
	GROUND	SI	SI	SI	SI	SI	NO
	GRAVEL	SI	SI	SI	SI	SI	NO
	GRASS	SI	SI	SI	SI	SI	NO
	METAL	NO	NO	NO	NO	NO	NO
	WATER	NO	NO	NO	NO	NO	NO
	SAND	NO	NO	NO	NO	NO	NO
	VEGETATION	NO	NO	NO	NO	NO	NO

Table 3 - Use of barriers in relation to the soil

6. 5) Presence of walls, fences, posts, trees, hedges and various obstacles

As we have already mentioned in the general description, any obstacle within the protection field brings about a distortion of the shape and the alteration of the dimensions.
It should be borne in mind that the obstacles in proximity of the protection field can also provoke distortions of the field itself and, in addition, when these elements are movable, there is the possibility of **false alarms**.
In general **walls**, positioned longitudinally to the line, do not cause great problems, as they are fixed and poor reflectors. But if they are partially transverse or project significantly into the protection field, bear in mind that dead zones will be created behind them and the signal received could be insufficient to guarantee reliable operation with regard to **false alarms**. (FIG. 15)

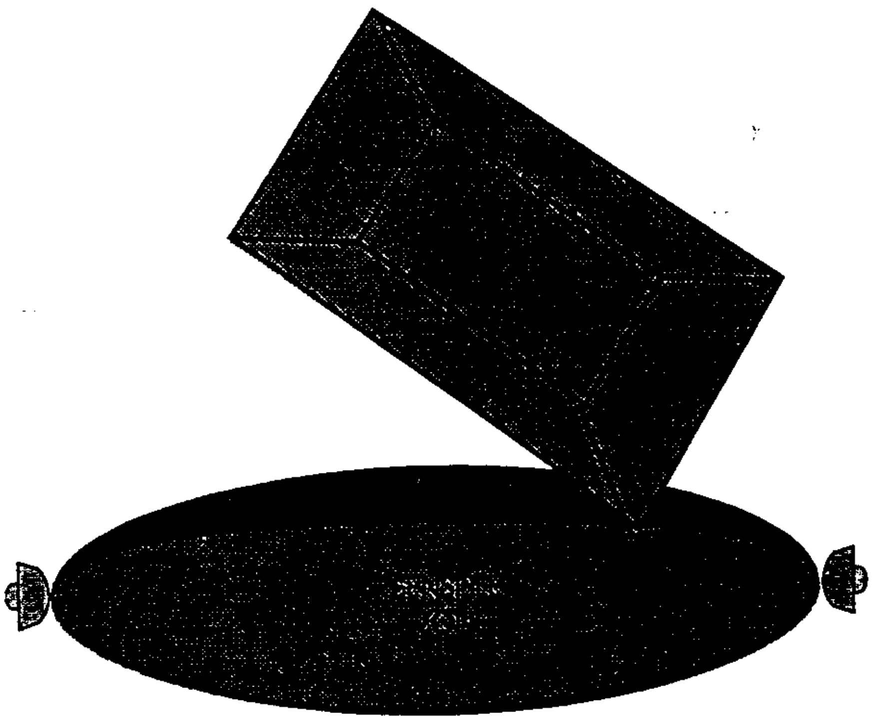


Figure 15 - Formation of dead zone due to the projection of a wall into the sensitive zone

Fences, as they are generally made of metal and therefore highly reflective, can provoke different problems.
First of all, we should be sure that the fence is well fixed, so that it does not move in the wind. In case of longitudinal fences, this type of movement could create troubles of high order.
If the fence in question is transverse, it is absolutely essential that it is perfectly immobile. It should be composed of mesh or bars with a maximum space of **3 cm** from one to the other; **on the contrary, we could have false alarms.**
Metal fences behind the apparatus can also provoke distortions in the sensitive band, especially if the mesh is fine (less than 3 cm), and they can cause sudden movement with the possibility of **false alarms** (FIG. 16).

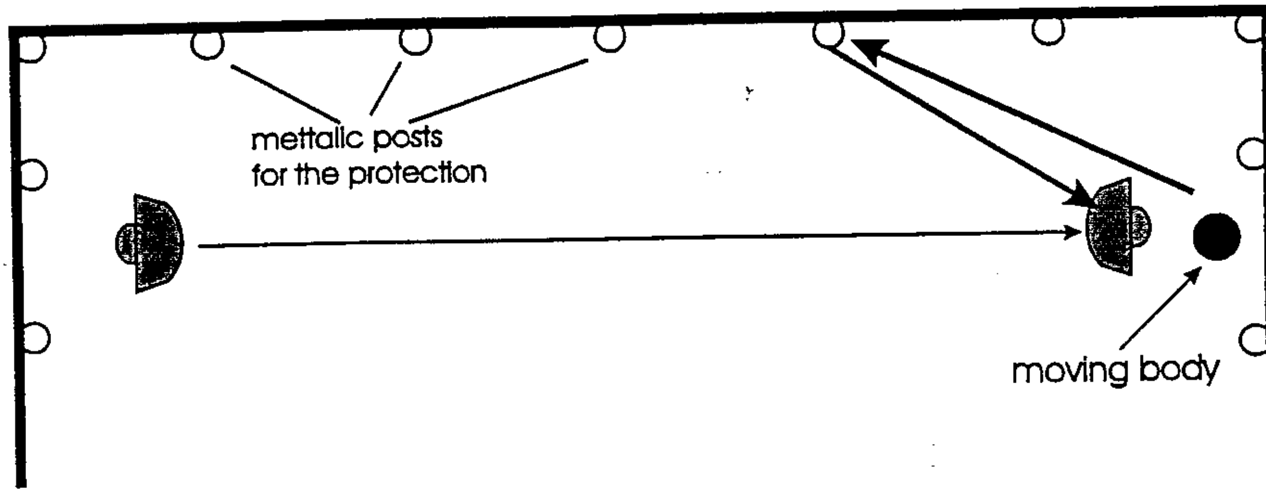


Figure 16 - Possible interference due to the presence of metal fence post

Along the line of the protection field, the presence of tubes, posts or similar is tolerated (lighting standards, for example), provided that their dimensions are not excessive in proportion to the band of protection.
In such a case a sizeable dead zone would be created and if this zone was very large in relation to the band of protection, the operation would be unreliable, with the possibility of false alarms. (FIG. 17)

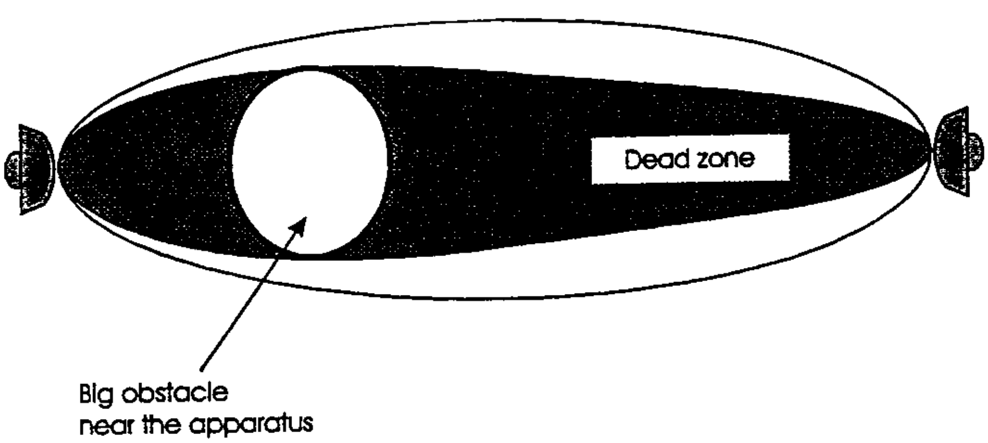


Figure 17 - Example of unreliable working caused by the presence of an excessively large obstacle

Trees, hedges and bushes in general require very careful attention, both near and within tha bands of protection.
These obstacles are variable in dimension and position, and in fact they can be affected by growth and wind movement.
We, therefore, advise very strongly not to place the protection bands in proximity of these obstacles. They are tolerable only if thei growth is limited by methodical maintenance and their movement is checked by suitable containment barriers. (Fig. 18)
Various obstacles may be present along the protection lines, and in the case it is necessary to take the same precautions as in the previous cases.

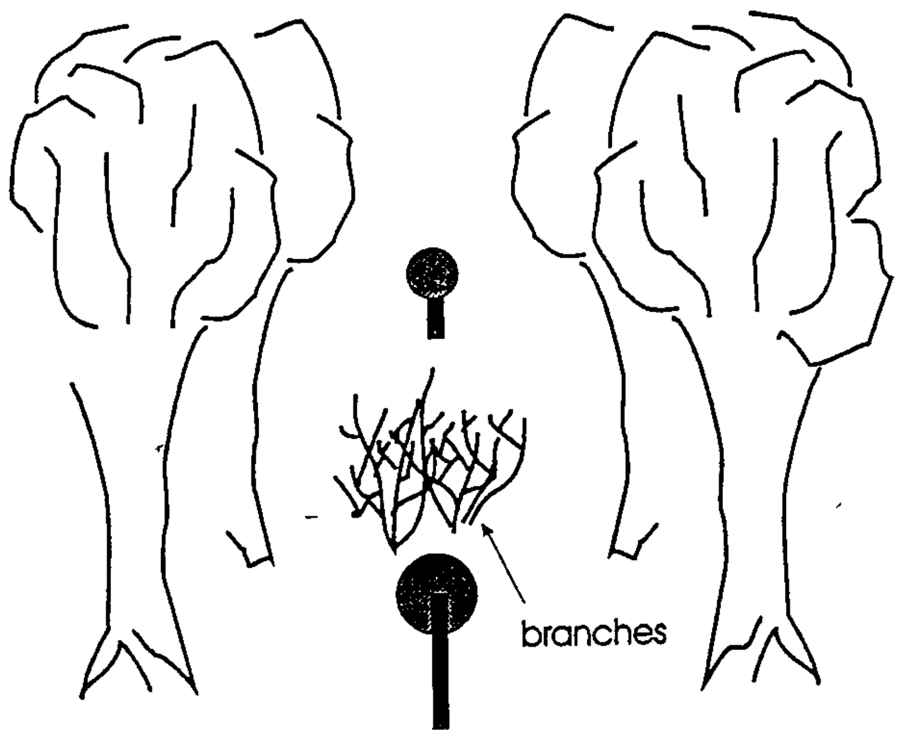


Figure 18 - Interference of shrubs and branches of trees in the sensitive zone

6. 6) Breadth of the sensitive bands

As we have already seen, the breadth of the sensitive bands depends on the type of antenna used, the distance between transmitter and receiver and on the sensitivity regulation.The following pictures supply the diameter at the halfway point of the sensitive bands, depending on the length, for both maximum and minimum sensitivity of the various models. (fig. 19/20)

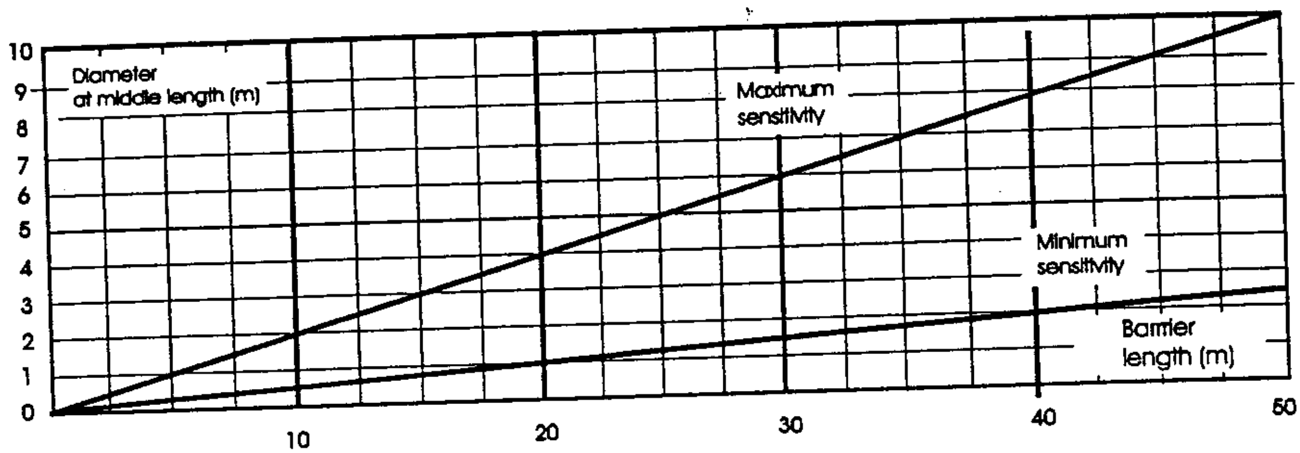


Figure 19 - Diameter of the sensitive zone at the halfway point depending on the length of the line for ERMO 482/50

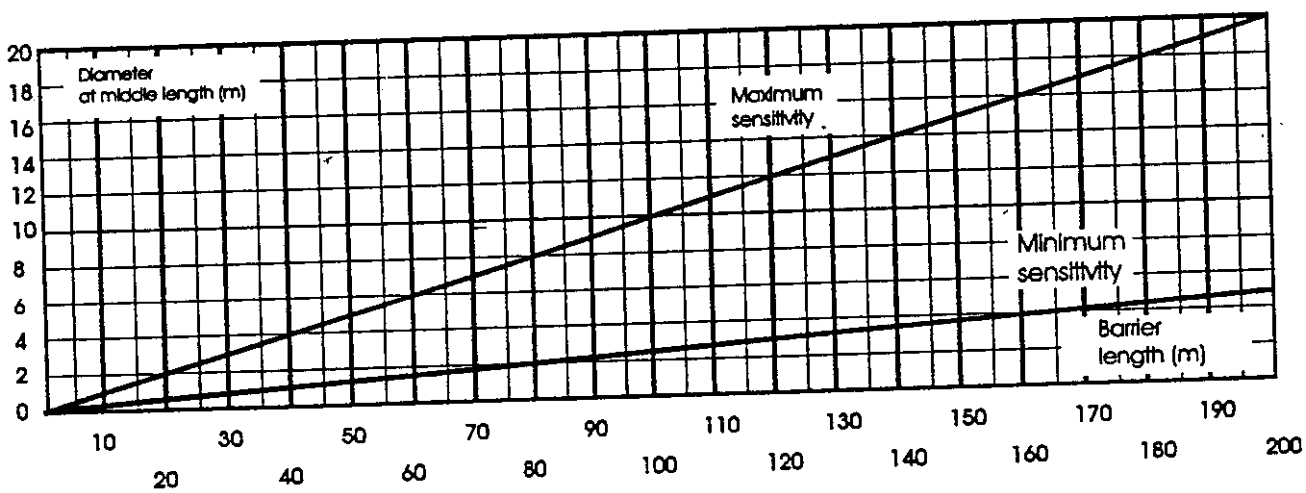


Figure 20 - Diameter of the sensitive zone at the halfway point depending on the length of the line for ERMO 482/80 - 120 - 200

6. 7) Length of the dead zones in proximity of the apparatus

The length of the dead zones in proximity of the apparatus depends on the distance of the apparatus from the ground, the sensitivity set up on the receiver and the type of antenna used.

6. 8) Height of the apparatus from the ground

Bearing in mind the previous considerations and on the arrangement of the system, it is necessary to install the apparatus at the right height from the ground.
In average conditions of the system and of taring the height should be 85 cm. (The measurement is calculated from the ground to the centre of the apparatus). The following pictures give a complete idea of the situation for the two types of antenna used. (FIG. 21-22)

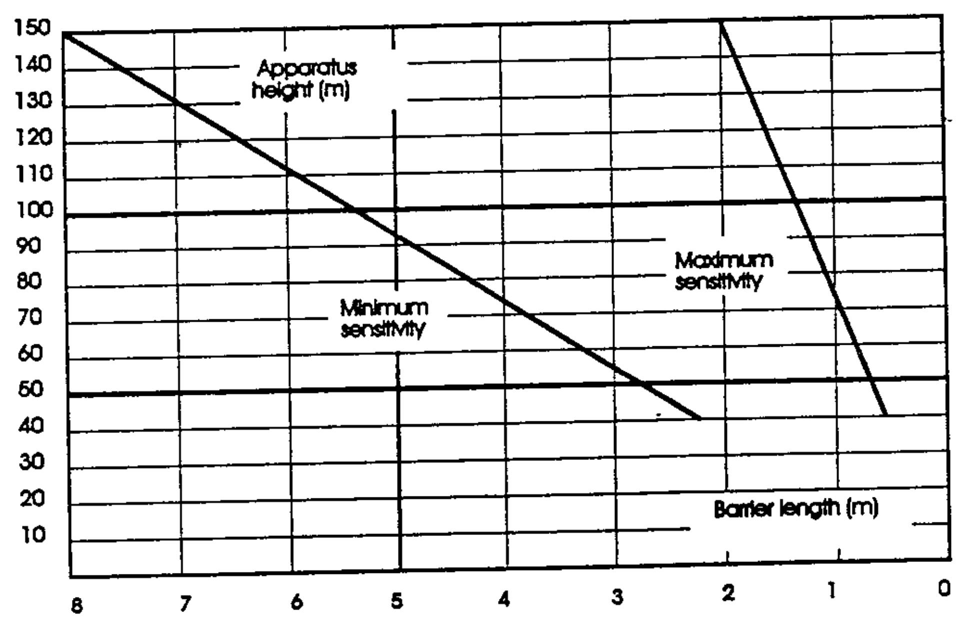


Figure 21 - Length of the dead zone near the apparatus depending on the height from the ground for ERMO 482/50

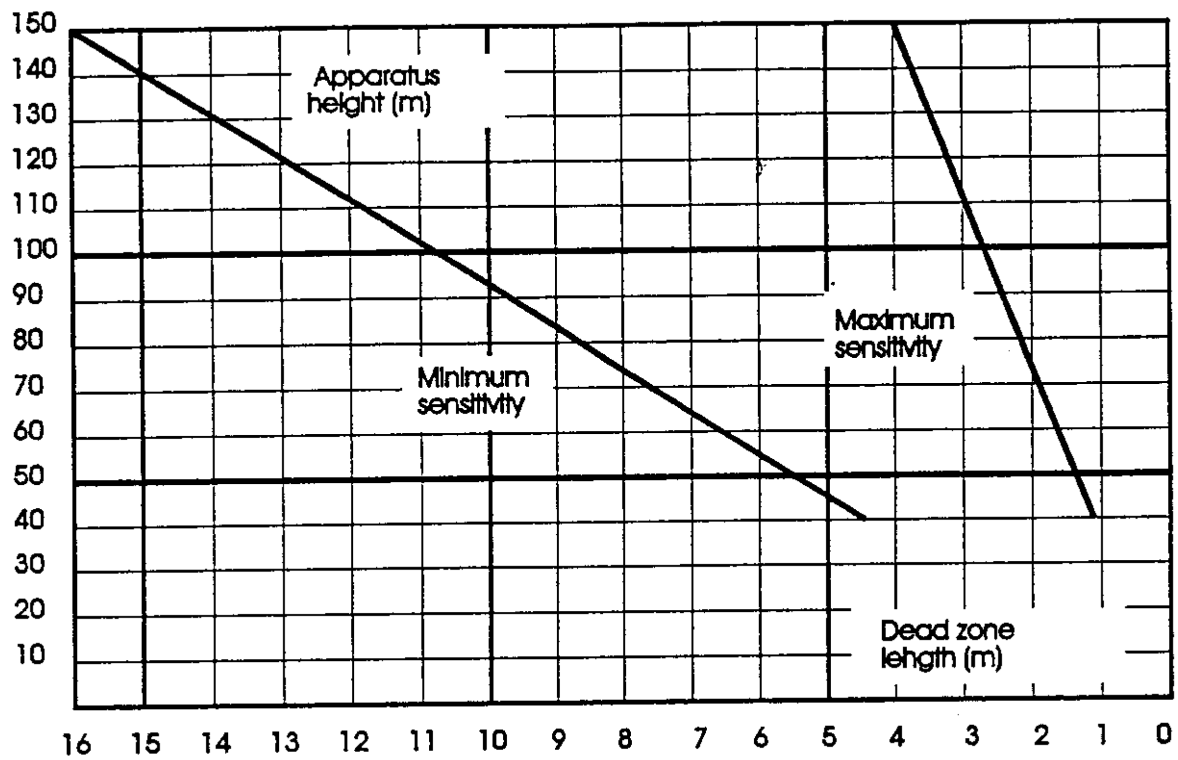


Figure 22 - Length of the dead zone near the apparatus depending on the height from the ground for ERMO 482/80 - 120 - 200

The following illustrations show the dead zones near the intersection of the two lines. (FIG. 22a - 22b)

6. 9) Supporting poles, ground fixtures, connector boxes

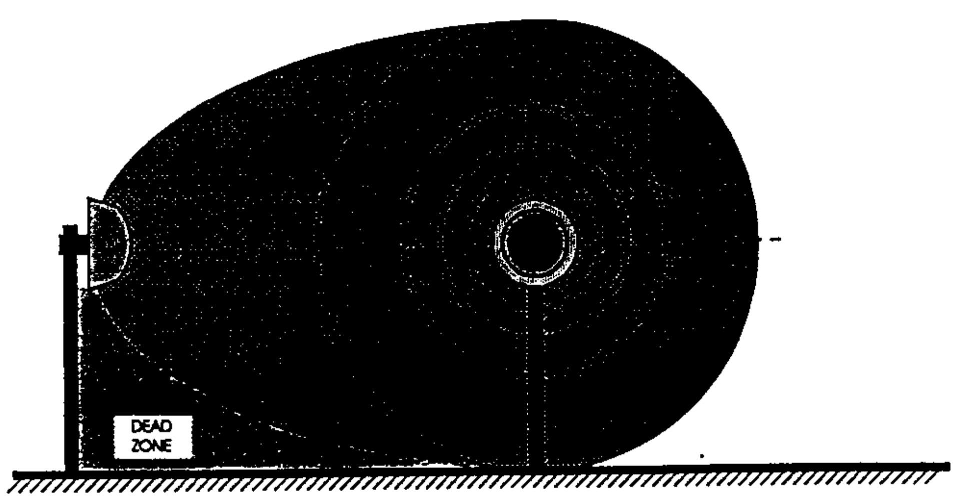


Figure 22a - Overlapping of two sensitive bands in an intersection

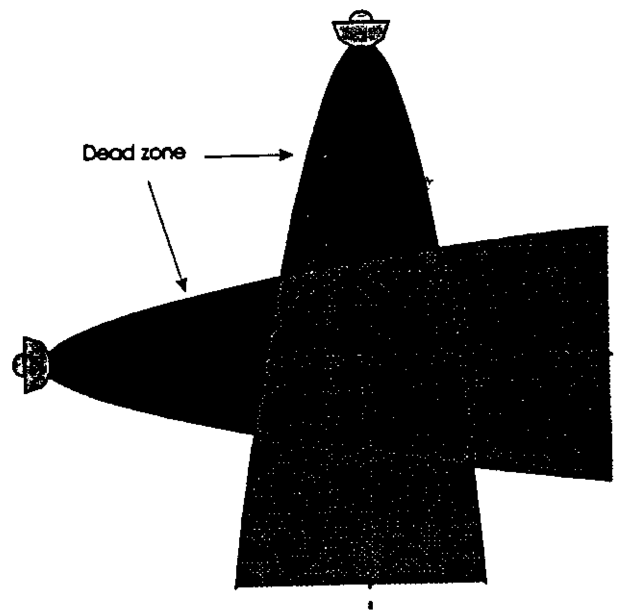


Figure 22b - Overlapping of two sensitive bands in an intersection

The following illustration shows the maximum dimensions of each ERMO 482/... head and its support post. (FIG. 23)

The external diameter of the support posts should be 60 mm. Poles of this diameter are

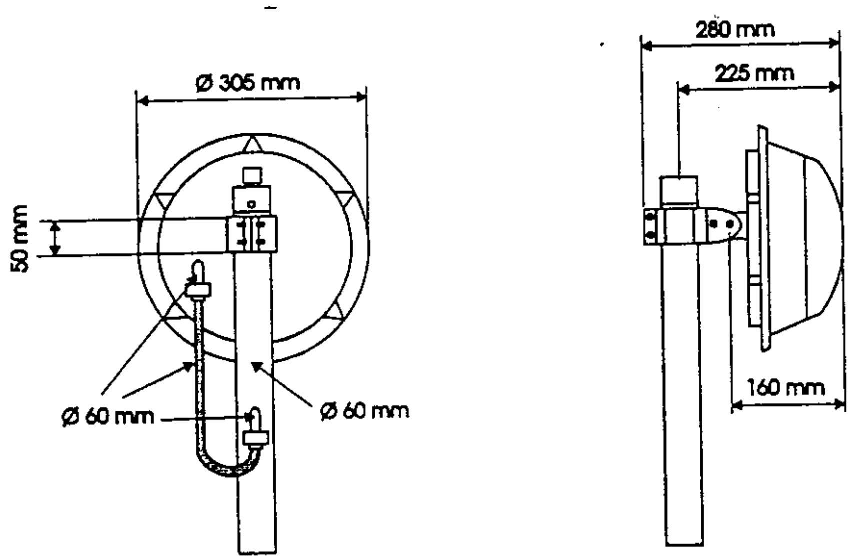


Figure 23

easy to find as they correspond to the external dimensions of two inch gas common pipes.
As already seen in the section on accessories, CIAS is able to supply aluminium trunking in 15 cm length, which can be used to build posts of the desired length, as well as available covers for posts.
The best solution is shown in picture 10.
The posts can be fixed to the ground by inserting them into holes which are then filled with concrete.
The connector boxes contain the AC supply transformer, with the overall dimensions of: 85 * 70 * 70 mm.
For corrent AC supply, this transformer should be placed immediately near the head it supplies. Picture 10 shows an excellent solution using a coaxial aluminium connector box at the post made of trunkings. This connector box (supplied by CIAS as an accessory) can house a bipolar switch and a 12V-5,7 Ah battery as well as the transformer.

Note: The cable which carries the barrier supply from the transformers to the battery heads must be masked, and the mask must be connected to the ground.

6. 10) Connections of the apparatus to the AC supply

The apparatus work with AC supply at a maximum voltage of 20 V. eff. The connection between head and transformer should be inferior to 1.5 mmq.
The conductors which connect the transformer to the 220 Vcc must have a section of 2.5 mmq.
If the AC current is low tension (20 V eff.), insulation transformers should be used, 20 V: 20 V of at least 80 VA. (fig. 24)

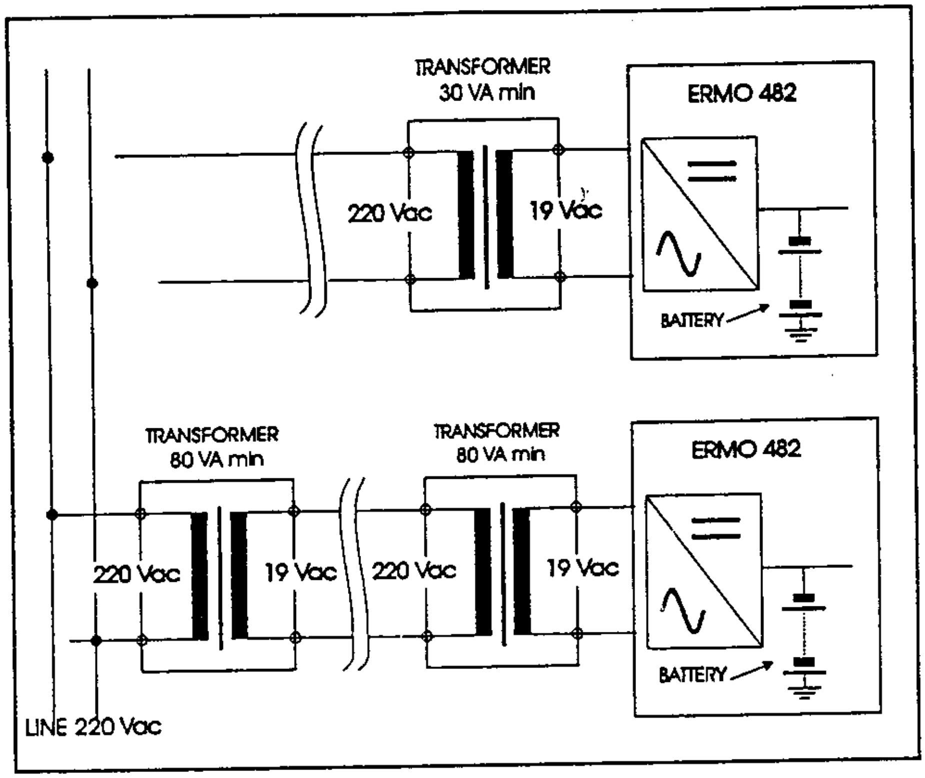


Figure 24 - Two correct ways to supply the apparatus

Connection between apparatus and transformer is similar to the previous one, the connection to the 20 V grid should be carried out by bearing in mind its length and the possibility that each single head of the apparatus may require a maximum current of 1A. In any case, the section should be no less than 1.5 mmq.

6. 11) Connection of the battery for reserve supply

Within each head of the apparatus, there is a space for the housing of a rechargeable lead battery of 12 Vcc - 1,9 Ah. The battery is charged by the supplier inside each head and it is connected to it by a red and black plate with connecting clip fitted within each single head.
This battery, when there is no grid power, gives apparatus autonomy of over 12 hours.
if greater autonomy is necessary, a reserve supply group should be installed in the immediate vicinity of each head.
The connection of these groups is carried out at the terminals of the apparatus marked with the symbols of mass and + 13,8 Vcc.
The size of these groups should bear in mind that the DC absorption of each single head is 70 mA approx.

6. 12) Connection of the apparatus to the elaboration centre

The transmitter head consists of a normally closed contact free from potentials, for protection during the container opening.
The connections of these outputs to the elaboration centre should be made with screend cable with asection of no less than 0.5 mmq. Because of long cables circuits in external environment, troubles can be induced on the cables themselves and so they can be conduced to the elaboration control panel These troubles can overtake, in case we use balanced lines, very high values, able to provoke false alarms. Therefore we advise not to use balanced lines.
If it is necessary to protect the alarm line from cutting and short-circuit we advise to adopt the following table (FIG. 25).

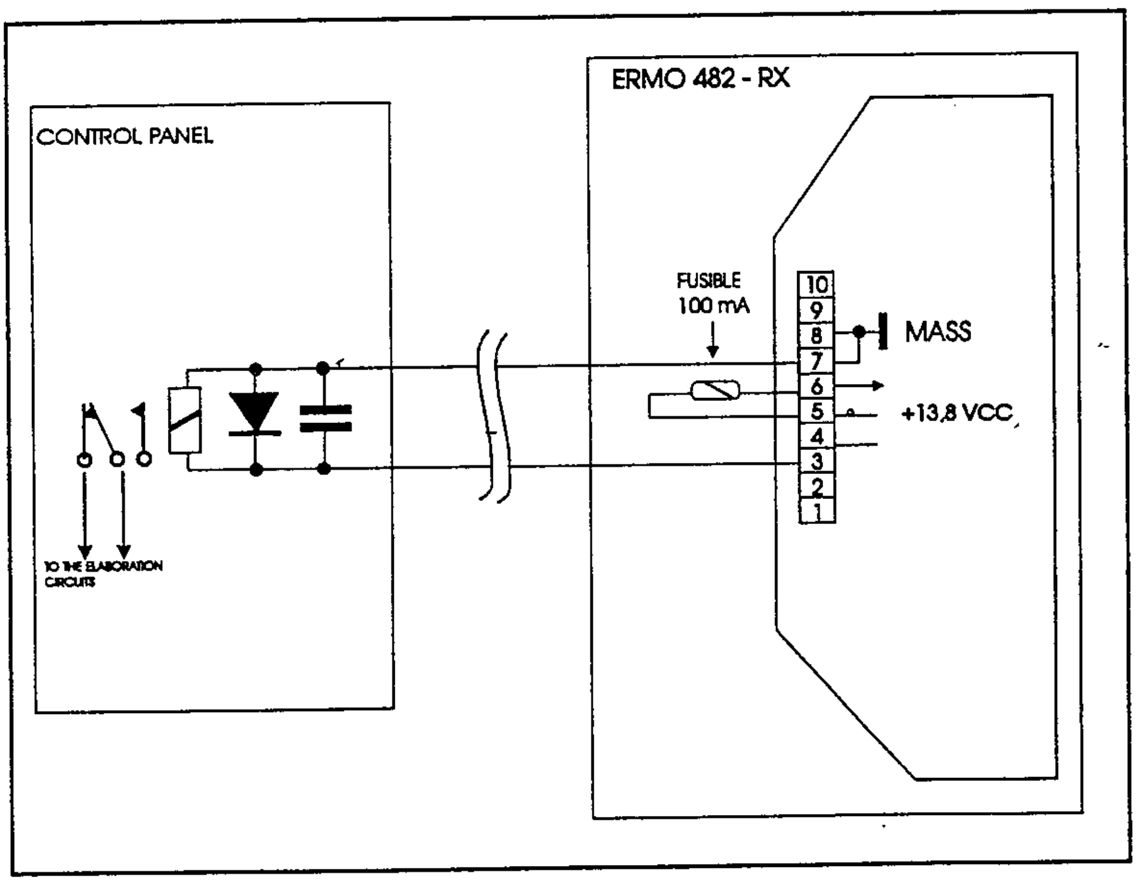


Figure 25 - Protection of the line from cuts and short circuit by uncoupling relay; this connection is particularly immune from disturbances that can be picked up by the line.

STC 95 INSTRUMENT

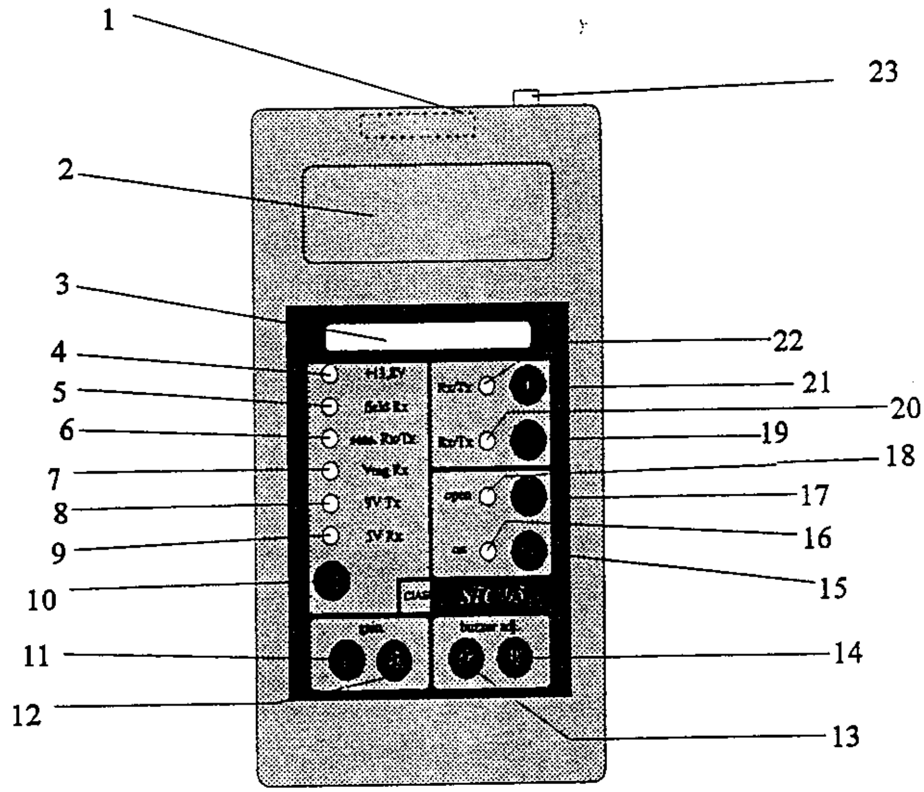
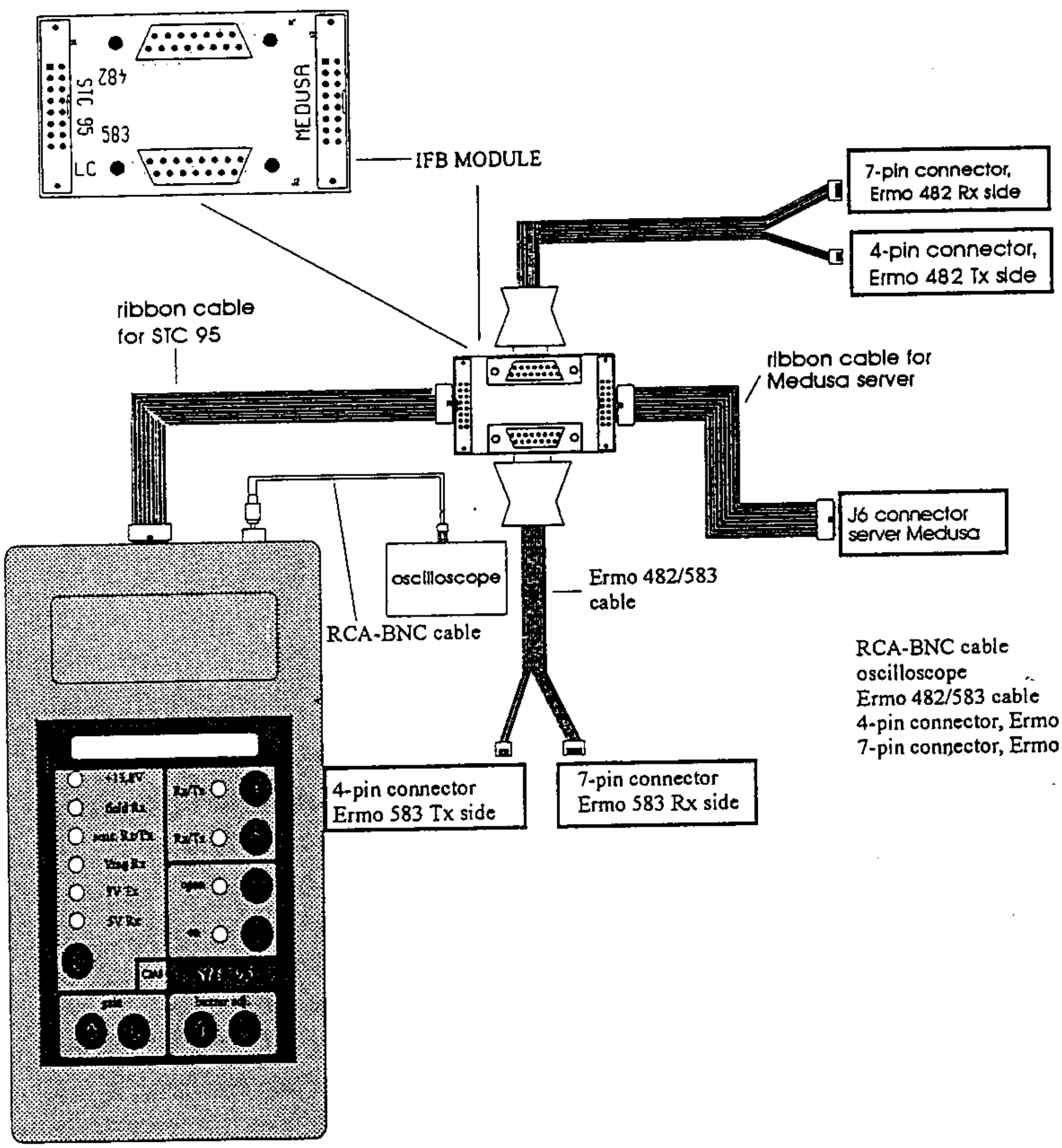


Figure -26-

1. 3M connector
2. LCD display
3. LED display
4. 13.8VDC supply LED
5. detected field LED
6. TX/RX sens. meas. LED
7. Rag meas. LED
8. 9 VDC supply LED
9. 5 VDC supply LED
10. Measurement selection
11. Manual gain increase
12. Manual gain decrease
13. Buzzer threshold increase
14. Buzzer threshold decrease
15. Buzzer enable/disable
16. Buzzer on LED
17. Loop open/close
18. Loop open LED
19. Measurement on/off (Medusa PLUS TX/RX Version)
20. Module measurements on/off (Medusa PLUS TX/RX Version)
21. TX/RX measurements on/off (ermo 482-583-medusa base-medusa)
22. TX/RX measurements on LED (ermo 482-583-medusa base-medusa)
23. RCA connector

CONNECTING STC 95 TO CIAS BARRIERS



RCA-BNC cable
oscilloscope
Ermo 482/583 cable
4-pin connector, Ermo 583 Tx side
7-pin connector, Ermo 583 Rx side

Figura 27 -

7. ALIGNMENT AND CALIBRATION

The STC 95 was developed by CIAS for aligning and calibrating its intruder sensor barriers, making it an ideal tool for installers.
The unit is shown in figure 26 on page 28, together with its function specifications. Figure 27 shows the interconnections between the STC 95 and CIAS barriers.

To set up and test ERMO 482 barriers, proceed as follows:

7.1 - go to the transmitter
- remove the radome unscrewing the allen screws
- connect the AC power supply (19 VAC) to terminals 7-8 (fig. 28)
- check that the "MAINS" led lights (fig. 28)
- connect the faston connectors to the battery, observing the correct polarity (red wire to battery positive, black wire to battery negative)

WARNING: if polarity is accidentally inverted, the transmitter circuit fuse will blow (fig. 28) If the connections are then corrected and the blown fuse (2A) replaced, the transmitter will operate normally.

- set one of the 4 available frequencies (F1, F2, F3, F4) by switching ON the corresponding dip-switch (the others must all be OFF) (fig. 28)
- check that the transmitter operates using the STC 95 (fig. 26).

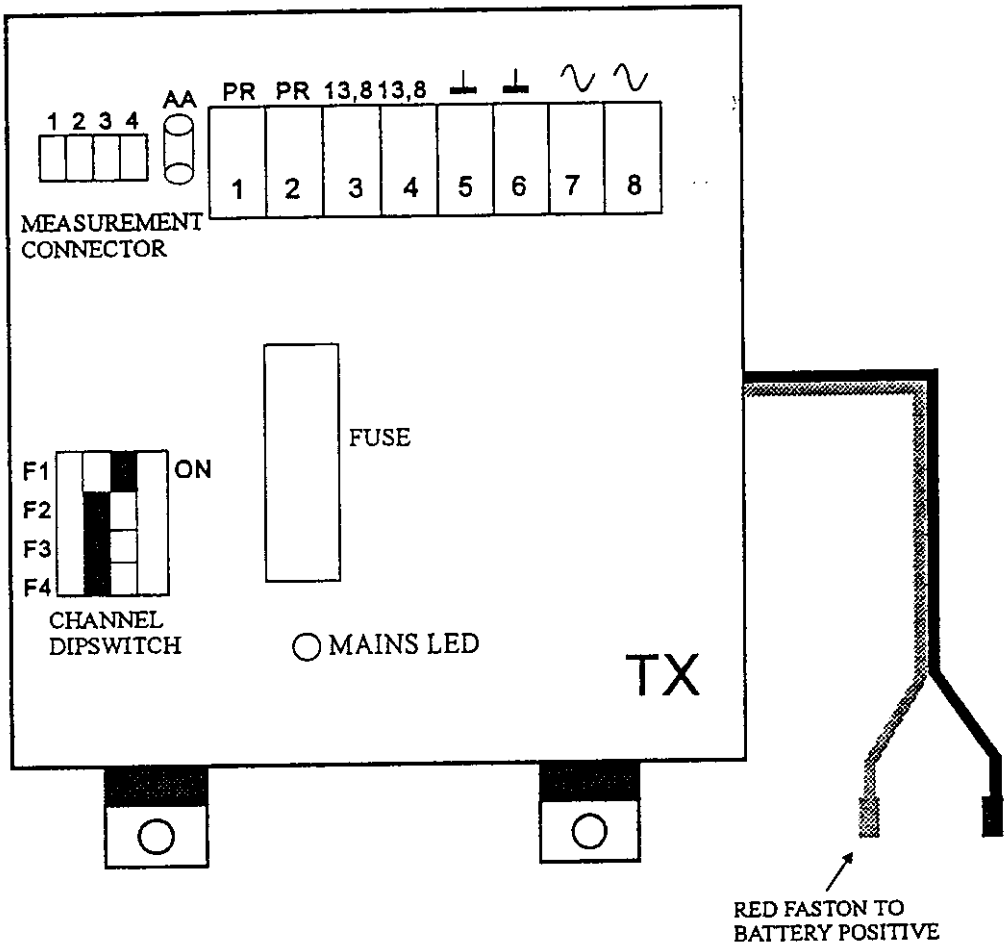
7.1.1 - connect the STC 95 to the ERMO 482 barrier as shown in fig. 27.
- plug the 4-pin connector (fig. 28) into the "MEASUREMENT CONNECTOR" on the TRANSMITTER CIRCUIT" and proceed as follows:

7.1.2 - check that led 22 (fig. 26) lights. If not, press button 21 (fig. 26) to turn it on

7.1.3 - press button 10 (fig. 26) as many times as are necessary to make led 4 light up (fig. 26). The voltage displayed must be 13.8 VDC +/- 10%

7.1.4 - press button 10 until led 8 lights up. Voltage displayed (2) must be 9 VDC +/- 10%.

7.1.5 - press button 10 until led 6 lights up. Voltage displayed (2) must be 5 VDC +/- 10%.

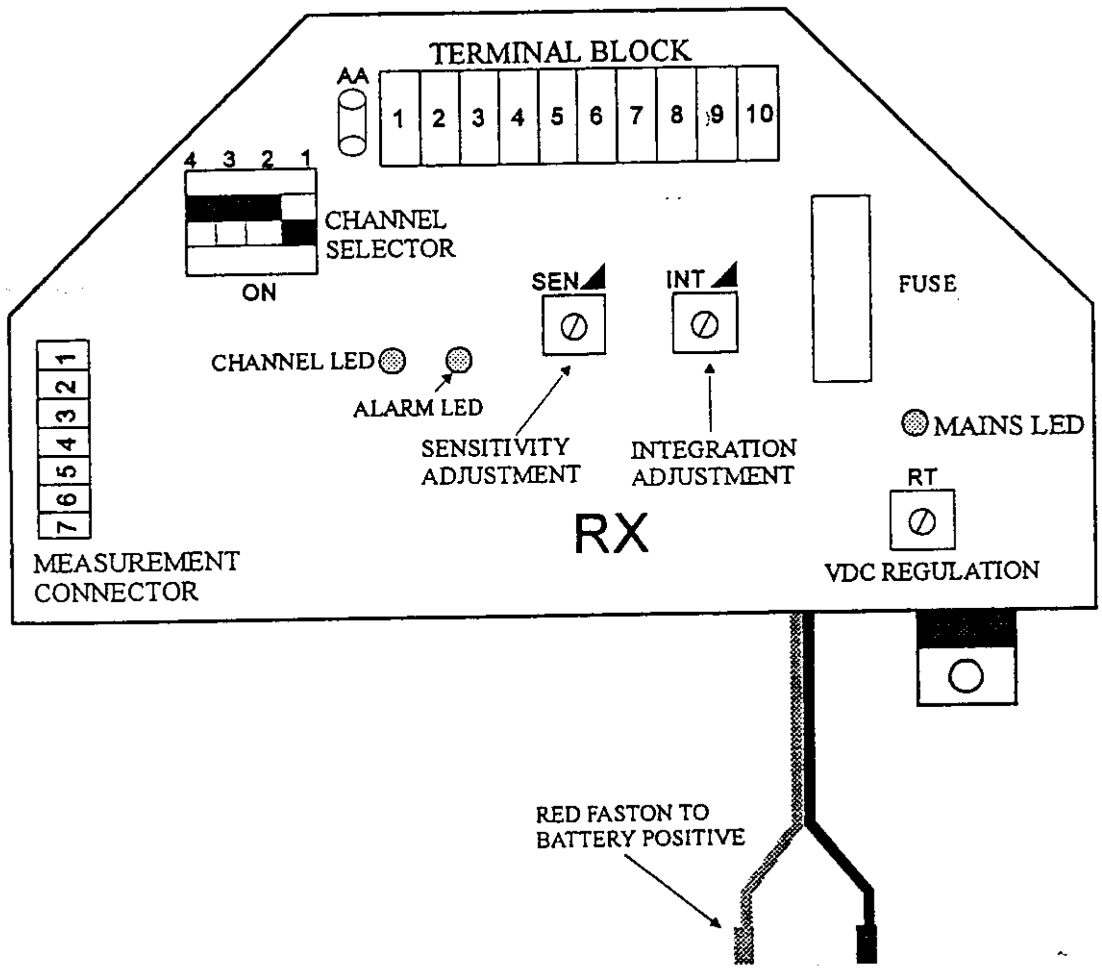


MEASUREMENT CONNECTOR	
PIN	
1	+9 VDC
2	+4,5 VDC SIGNAL
3	GROUND
4	+13,8 VDC

TERMINAL BLOCK	
PIN	FUNCTION
1	TAMPER
2	TAMPER
3	+13,8 VDC BATTERY +VE
4	+13,8 VDC BATTERY -VE
5	GROUND
6	GROUND
7	19 VAC INPUT
8	19 VAC INPUT

Figure 28 - Transmitter circuit

AA: BULB FOR ANTIREMOVAL. IT MUST BE ALWAYS TURNED UPSTAIRS. THE HEAD REMOVAL PROVOKES ALARM FOR SABOTAGE.



MEASUREMENT CONNECTOR	
PIN	FUNCTION
1	SENSITIVITY
2	ALARM
3	THRESHOLD
4	200 mVpp
5	+13,8 Vcc
6	GROUND
7	RAG VOLTAGE

TERMINAL BLOCK		
PIN	FUNCTION	
1	TAMPER	
2	TAMPER	
3	C	ALARM RELAY
4	NO	(In monitoring
5	NC	conditions)
6	+13,8 VDC BATTERY POSITIVE	
7	GROUND	
8	GROUND	
9	19 VAC INPUT	
10	19 VAC INPUT	

Figura 29 - Receiver circuit

AA: BULB FOR ANTIREMOVAL. IT MUST BE ALWAYS TURNED UPSTAIRS. THE HEAD REMOVAL PROVOKES ALARM FOR SABOTAGE.

7.2 - go to the receiver:

- remove the radome unscrewing the allen screws
- connect the AC power supply (19 VAC) to terminals 7-8 (fig. 29)
- check that the "MAINS" led lights
- connect the faston connectors to the battery, observing the correct polarity (red wire to battery positive, black wire to battery negative)

WARNING: if polarity is accidentally inverted, the receiver circuit fuse will blow (fig. 29) If the connections are then corrected and the blown fuse (2A) replaced, the receiver will operate normally.

- set one of the 4 available frequencies (F1, F2, F3, F4) by switching ON the corresponding dip-switch (the others must all be OFF) (fig. 29)
- check that the receiver operates using the STC 95 (fig. 26).

7.2.1 - connect the STC 95 to the ERMO 482 barrier as shown in fig. 27.

7.2.2 - check that led 22 (fig. 26) lights. If not, press button 21 (fig. 26) to turn it on. Plug the 7-pin connector into "MEASUREMENT CONNECTOR" socket on the receiver circuit board (fig. 29) and proceed as follows:

7.2.3 - press button 10 (fig. 26) as many times as are necessary to make led 4 light up (fig. 26).
The voltage displayed must be 13.8 VDC +/- 10%.
If the units have already been aligned by eye, check that the leds "CHA" and "ALA" light up, indicating channel recognition and non-alarm status (fig. 29).
To optimise connection, proceed with electronic tune-up as follows:

7.2.4 - Check that led 16 is off. If it is lit, press button 15 to turn it off. This disables the STC 95 internal buzzer (fig. 26).

7.2.5 - Check that led 18 is lit. If it is off, press button 17 to turn it on. This opens the LOOP (fig. 26).

7.2.6 - press button 10 until led 5 lights up. Voltage displayed (2) must be 6 VDC +/- 10%, and the central led (3) in the led array must be on (fig. 26). If the displayed voltage is different and one of the leds near the end of the array is lit, press button 11 or 12 until these conditions are corrected (centre led lit and 6VDC displayed).

7.2.7 - After slackening the screws holding the receiver to the pole, rotate the receiver in the horizontal plane until the maximum reading is obtained on the display (2). The led array will light from the centre led towards the right. If the last led on the right stays on, press button 12 until the centre led lights, and continue adjusting the receiver head in the horizontal plane until the maximum reading is obtained on the display (2).

7.2.8 - Repeat the tuning operation with the transmitter head horizontal adjustment.

7.2.9 - Once optimal tuning is obtained, lock horizontal movement of the two heads (RX and TX).

7.2.10 - Slacken the vertical adjustment lock on the receiver (RX) head, and point it upwards. Shift it slowly downwards until the maximum reading is obtained on the display (2) and the led array (3) in the same way as for horizontal adjustment.

7.2.11 - Repeat the vertical adjustment on the TX head. Once optimal readings are obtained, lock the vertical movement on both heads (TX and RX).

7.2.12 - Press button 17 and check that led 18 goes off. Check that after a maximum recovery time of two minutes, the value shown on the display (2) reaches 6 VDC, and that the centre led in the array lights.

7.2.13 - Press button 10 until led 7 lights up; check that display shows voltage of between 2.5 and 6.5 VDC. This RAG value is directly proportional to the distance between transmitter and receiver heads. Press button 10 until leds (6) light.

7.2.14 - Adjust "SEN" trimmer on receiver head (fig. 29) until displayed value lies between 0 and 9 VDC. 0V corresponds to maximum and 9V to minimum sensitivity.

7.2.15 - Adjust "INT" trimmer, next to "SEN" trimmer (fig. 29), until the desired integration level is obtained.

7.2.16 - Press button 15 until led 16 lights. This indicates that the buzzer is enabled (fig. 26). Make sure that the buzzer remains silent during the absence of movement in the protected field. If the buzzer sounds, press button 14 until it is mute.

If the buzzer is already mute when this function is switched on, press button 13 until the buzzer sounds intermittently, then press button slightly until it is mute again.

7.2.17 - Run the barrier crossing tests, checking first the intermittent buzzer alarm and then the continuous buzzing indicating that the barrier has been crossed.

Check that the buzzer does not sound when there is no movement in the field. If this occurs, even intermittently, the field is disturbed.

If the barrier is crossed by very large targets, the CHANNEL LED (fig. 29) may also go out. This indicates that the RF signal has been interrupted.

Barrier set up must suit specific user requirements. However, it should be borne in mind that excessive sensitivity will tend to cause the alarm to go off under not strictly alarm conditions. Each individual case will require a compromise in parameters. Furthermore, it should be remembered that the sensor's perception of barrier crossing speed is affected by the integration adjustment, while the perception of the mass crossing the barrier is affected by the sensitivity adjustment.

7.2.18 - The STC 95 features an RCA socket (23) (fig. 26). This can be connected via a suitable cable to an oscilloscope (any type currently on the market), for analysis of the received signal wave-form. The wave-form should be of the type shown in figure 30 if the transmitter and receiver heads are properly aligned.

Poor alignment will lead to a received signal wave-form like that in figure 31, where noise can be seen at the tips of the square wave. This means that the received signal is not of good quality. In this case, the alignment tuning operations should be repeated until the wave-form is like that in figure 30.

All data on the measurements taken on the installation should be written in the test cards provided with each barrier. This will make any assistance operations much easier.

7.2.19 - Refit the radomes to the receiver and transmitter heads. Tighten down the mounting screws to ensure water-tightness.
A bad connection produces a waveform like the one shown in fig. 31. Note the presence of noise on the cusps of the square wave. This means that the signal received is not good. In this case repeat the aiming operations until the waveform in figure 30 is achieved.

All data relating to measurements carried out on the system should be written on the test cards which are supplied with every barrier. This will make assistance operations extremely easy.
Replace the radomes and fix them evenly with the appropriate screws in order to achieve good water-tightness.

8. MAINTENANCE

When breakdowns occur at a barrier, it is necessary to proceed as follows:

8.1 - Go to the receiver and, after removing the radome, plug in the connector of instrument STC 95 as described in points 7.2.1/7.2.2.

8.2 - Check that the "CAN" and "ALL" leds (fig. 29) are lit; obviously this check must be carried out with no moving obstacles in the protection field.

8.3 - Press key F10 on the STC 95 in order to light led 4 (fig. 26).
Check that the 13.8 DC voltage is within ±10%.
If the voltage is lower, it means the power supply unit is not operating correctly, or the AC power supply is missing; the latter possibility is also shown by the "GRID" led going out (fig. 29). In this case, check that there is a voltage across the primary winding of the transformer (220 V) and its efficiency.
In connection with this, it should be remembered that if the transformer is not closed inside a sealed case, water may corrode the connections, and these may consequently disconnect and possibly cause irreversible damage to the transformer.
In this case, replace the transformer and make sure its container is hermetically sealed.If, on the other hand, the readings are higher, it means that the power supply unit is faulty, or that the installer has adjusted the voltage regulation trimmer.
Check the voltage calibration by proceeding as follows:
Disconnect the battery fastons and connect them to the prods of a precision electronic voltmeter set to the 20 V DC scale. If the reading is not 13.8 V DC adjust the RT trimmer until the reading reaches 13.8 V DC.
If it is not possible to set the voltage to that value, it means the regulator is unrepairable.

In this case, it is necessary to replace the printed circuit. If the problem can be solved by adjustment, remember to block the trimmer in position with a drop of fast-drying paint.

8.4 - Press key 10 on the STC 95 until led 5 comes on (fig. 26).

Check that the voltage read in the "FIELD" RX function is 6 V DC ±10%.

When there are no moving objects in the protection field, this reading is very stable.

Any oscillations greater than ±500 mA show system instability which may either mean interference due to moving objects in the protection field or barrier malfunction.
Occasional large oscillations (> 1V) may mean transmitter malfunction; in this case, the transmitter kit should be replaced.

Small oscillations are almost certainly due to interference in the protection field (tree foliage, grass waving in the wind, etc.); in this case the cause of the disturbance should be removed.

If the reading in "FIELD" is different from the one shown (> ± 1V), it means the receiver has broken down and therefore the RX kit should be replaced.

8.5 - Press key 10 until led 7 comes on, and check that the voltage reading on the display is between 2.5 and 6.5 V DC. This RAG value is directly proportional to the distance between the transmitter and receiver heads.

Check that the RAG has a value of between 2.5 and 6.5 V DC. If the reading on the display (2) reaches values of greater than 6.5 V DC, it means that the signal arriving at the receiver is very low, and therefore the connection is highly precarious.

This fact may be the result of two classes of problems, the first regards receiver breakdown, and the second regards transmitter breakdown. In order to find out which event has occurred, it is necessary to carry out measurements on the transmitter as shown in the next chapter (points 7.1.3/7.1.4/7.1.5).

If, after carrying out measurements on the transmitter, it has been shown to be operating correctly, the receiver kit should be replaced as shown in the "USE OF ASSISTANCE KITS AND THEIR FUNCTION" chapter.

It is important to notice that the RAG measurement taken during assistance is not only useful for revealing the breakdown but also shows any change in the environmental conditions of the protection field.

In fact, if the installer has calibrated the system correctly, filled in the test cards which accompany each barrier, and written the RAG reading after the electronic aiming among the data on the card, comparison between the value shown on the test card and the one read during assistance gives an immediate indication of the barrier operating state.

More precisely, if the reading during assistance is only slightly different from the one shown on the card (±300 mV DC), the radio-frequency signal which arrives at the receiver is good and ensures correct barrier operation.

In order to understand the meaning of the RAG measurement better, it is important to remember that it is strictly connected with the quantity of the radio-frequency signal which arrives at the receiver.

It can therefore easily be understood that a drop in this signal (which is equivalent to an increase in the RAG value) compromises microwave barrier operation.

The signal received can be most efficiently checked by observing the waveform at the receiving head as described in point 7.2.18.

Check that the 13.8 V DC, 9 V DC and 4.5 V DC voltages at the transmitting head are correct within ±1 V DC. If one of the two or both are higher or lower, it means that the transmitting head has broken down. Replace with the TX assistance kit.

9. USE OF THE ASSISTANCE KITS AND THEIR FUNCTION

The assistance kits consist of the processing circuit part and the microwave part; more precisely, the transmitter kit (TX KIT) consists of a printed circuit and the microwave detector cavity.

One important fact to bear in mind is that the assistance kit is always calibrated for maximum performance, i.e. 200 metre range.

This is in order to make the task of the person called upon to provide the assistance easier since it avoids having to have four different kits according to the ranges. In this way, the installer no longer has the expense of buying complete barriers for the assistance, and the operation is also made simpler and quicker.

Replacing the circuit and cavity parts both on the transmitter and receiver does not alter the orientation of the barrier and therefore it is not necessary to carry out aiming operations again.