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See the stc 95 manual

1) GENERAL DESCRIPTION

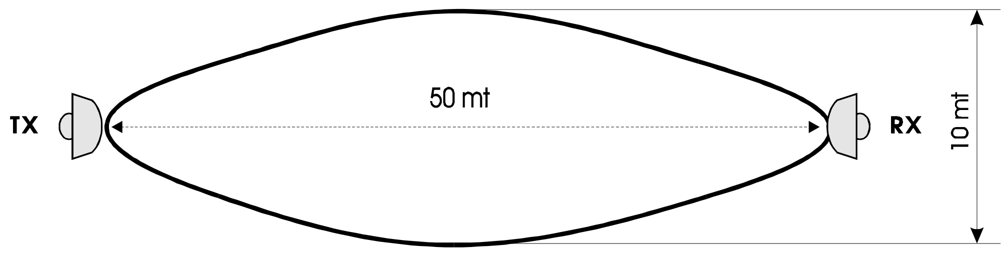
ERMO 482/... is a microwave system for external protection of the volumetric barrier type.
Volumetric barrier means the spatial protection obtained by using separate transmitter and receiver, placed opposite each other, in which one of the three dimensions is considerably greater than the other two.
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

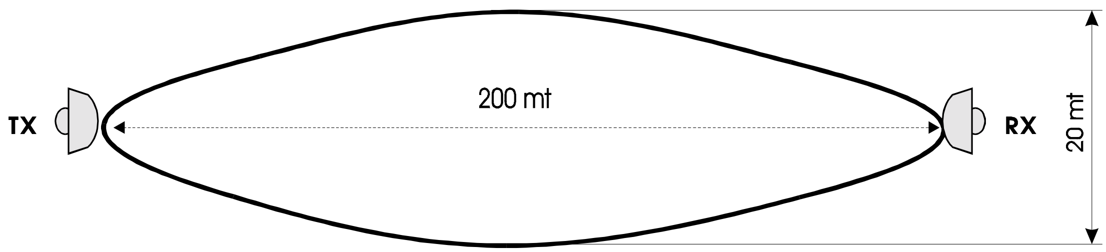
- Two types of antenna are used:

- 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)



Antenna parabolica 10 cm



Antenna parabolica 20 cm

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)

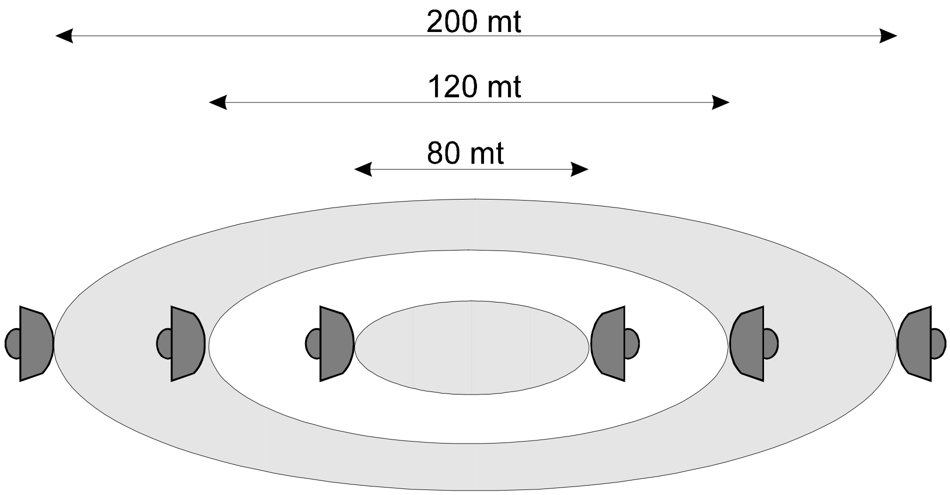


Figure 2 - Variation of the dimension of the sensitive zone on the variation of the distance

- **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 causes 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).

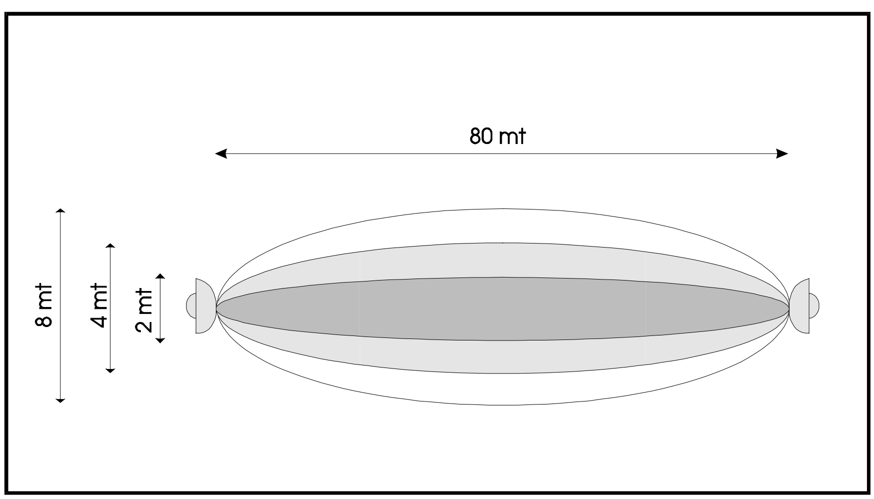


Figure 3 - Variation of the dimension of the sensitive zone on the variation of the sensitivity

- **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)

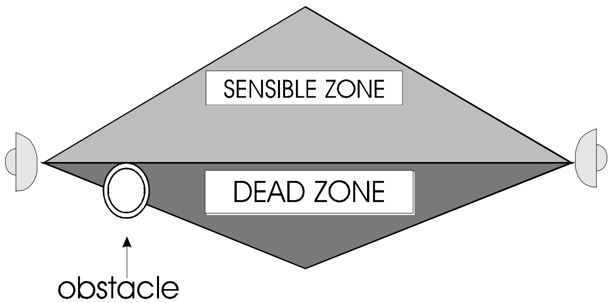


Figure 4 - Sensitive zone in the presence of an obstacle

- **An imperfect alignment between transmitter and receiver** causes, 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)

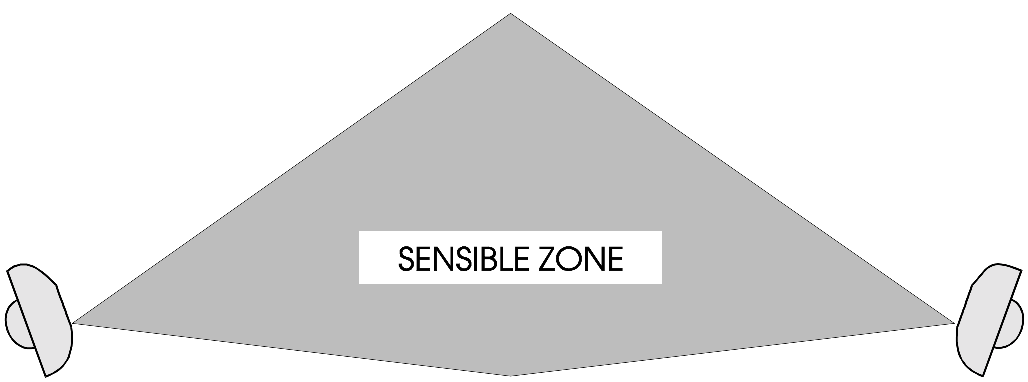


FIG. 5 - Sensible zone distorsion for bad alignement

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 dimension 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)

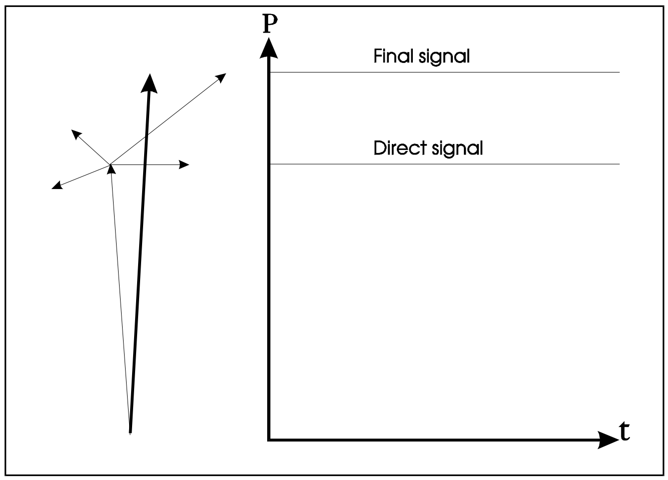


Figure 6 - Vectorial representation of the signal received

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)

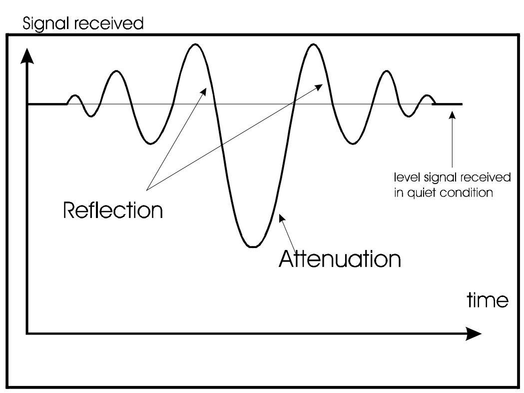


Figure 7 - Representation of the signal received during an intrusion

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.

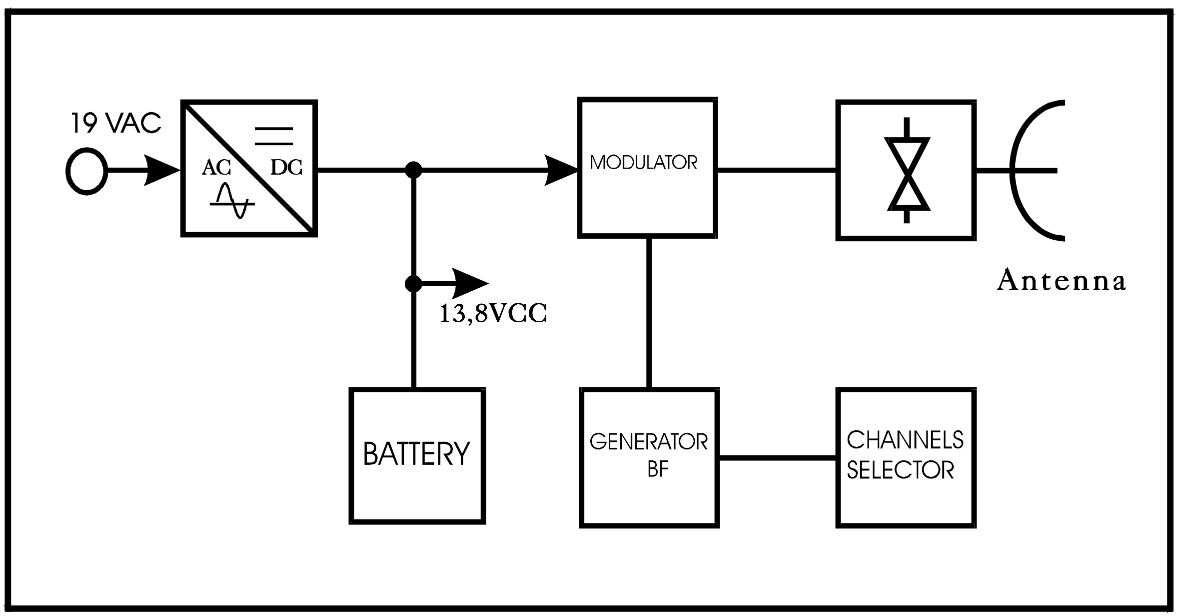


Figure 8 - Block diagram of the transmitter

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

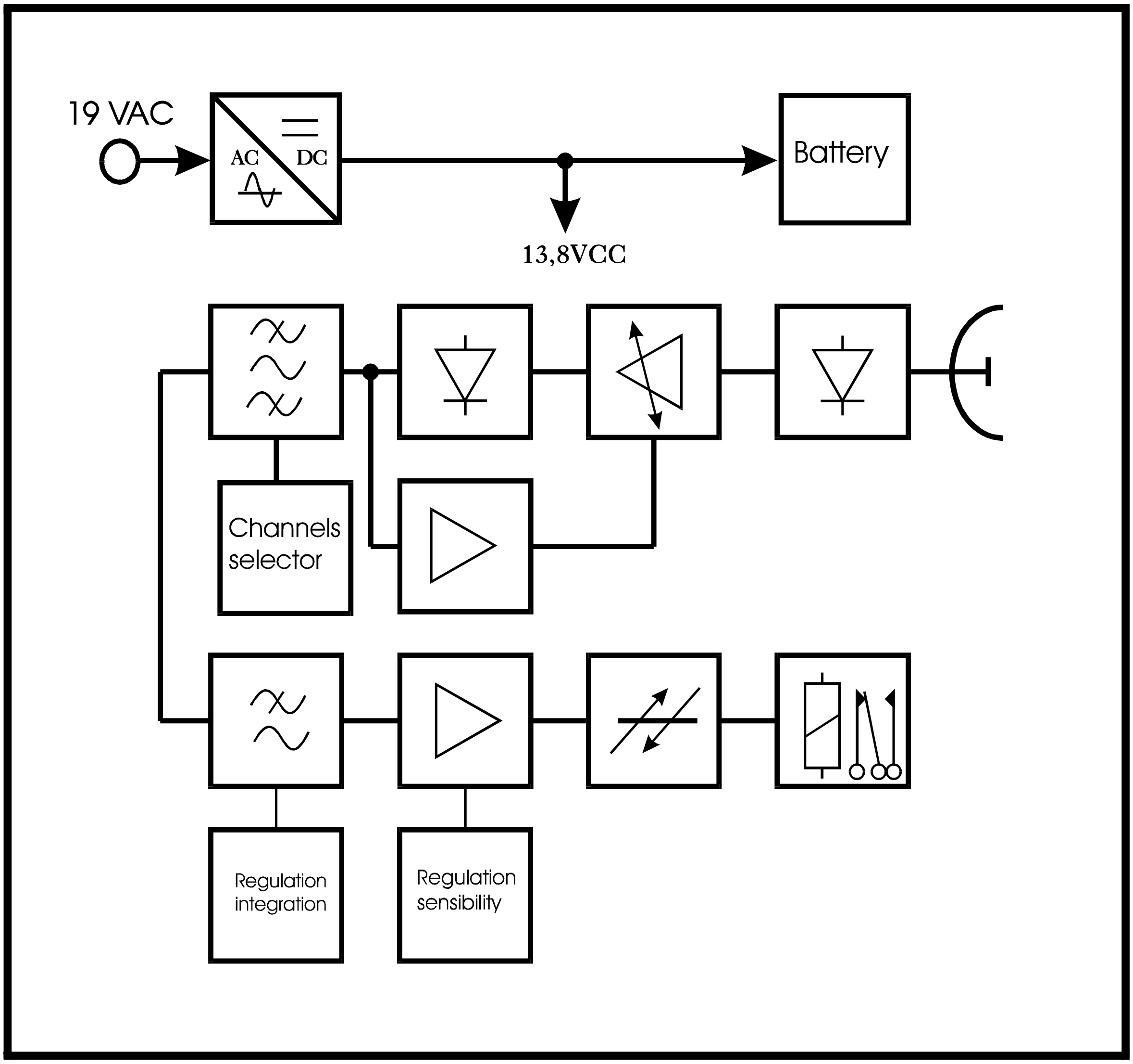


Figure 9 - Block diagram of the receiver

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

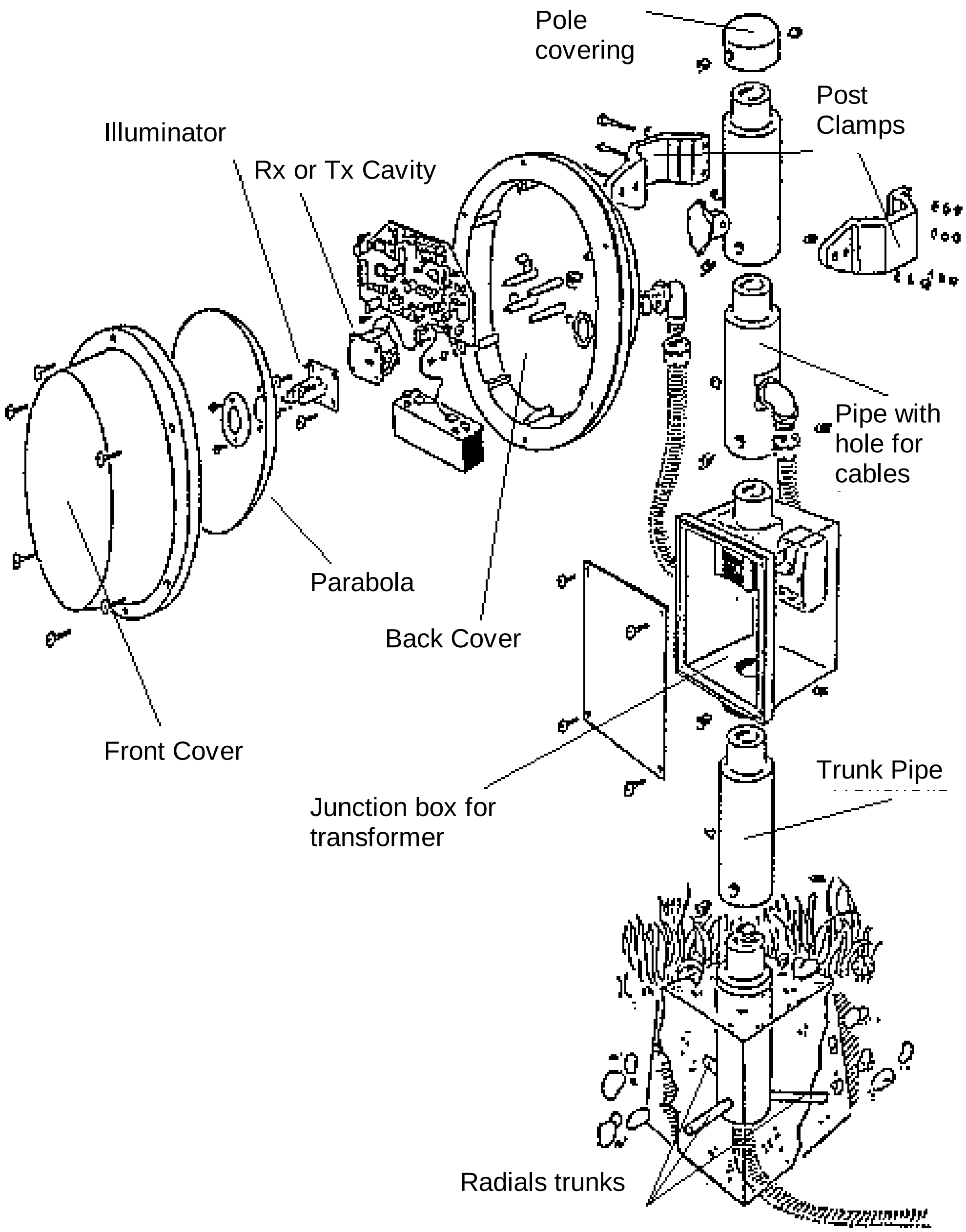
- the metallic case must be connected to the soul, through a suitable earth terminal projected inside.

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) Testing sheet diagrams
F) 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 trunk pipes
B) Pole covering
C) Junction box
D) Transformers

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 the ground
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)

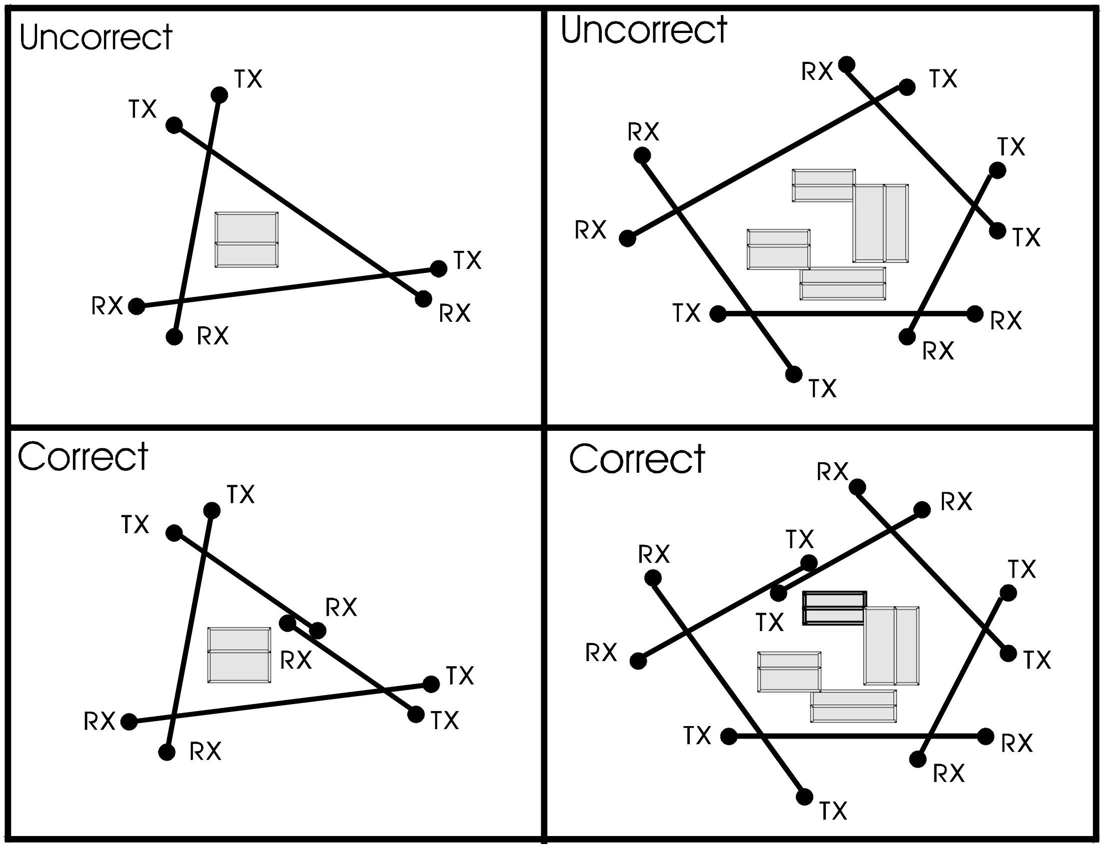


Figure 11 - Examples of correct solutions

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 soil 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 soil could change rapidly, provoking false alarms. (FIG. 12)

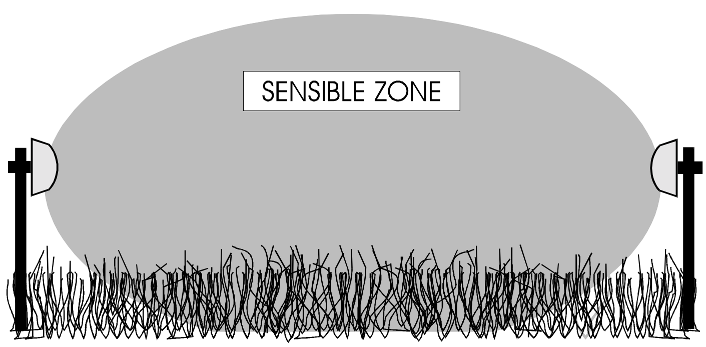


Figure 12 - Interference in the sensible zone of high grass

b) Stable

We advise not to install the apparatus where the soil 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 soil 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)

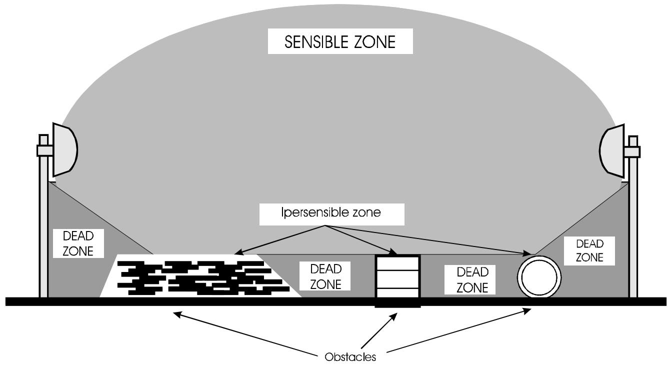


Figure 13 - Formation of dead and hypersensitive zones due to the presence of various obstacles

c) Smooth

Be sure that the installation takes place along lines with ondulation of less than ± 20 cm. If the soil 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)

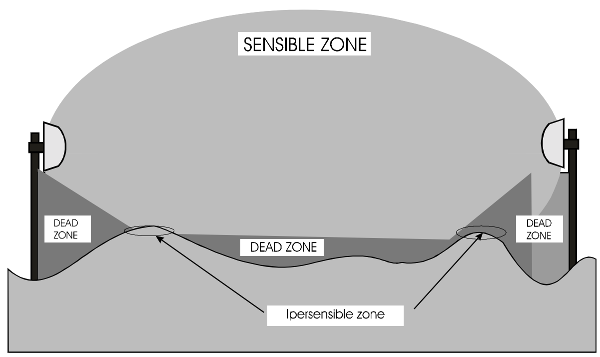


Figure 14 - Formation of dead and hypersensitive zones due to excessively ondulation ground

6. 4) Nature of the soil

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 cause 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)

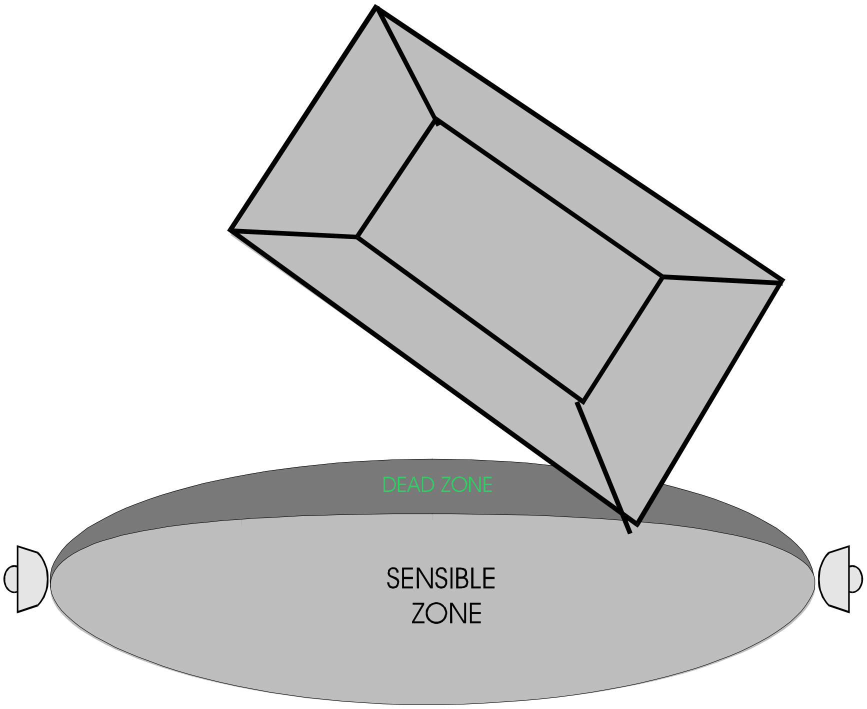


Figure 15 **-** Formation of dead zone due to the projection of a wall into the sensitive zone

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).

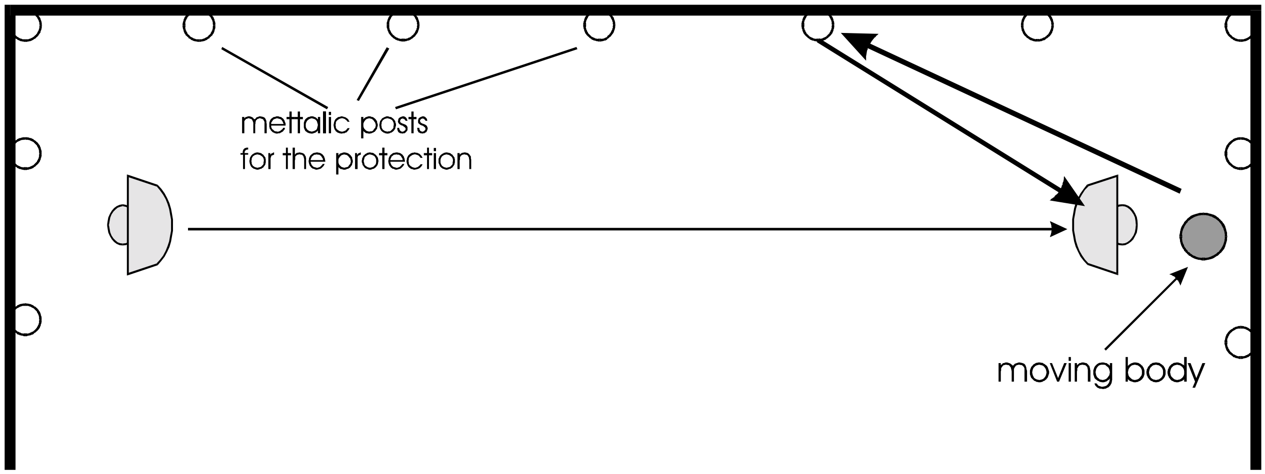


Figure 16 - Possible interference due to the presence of metal fence post

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)

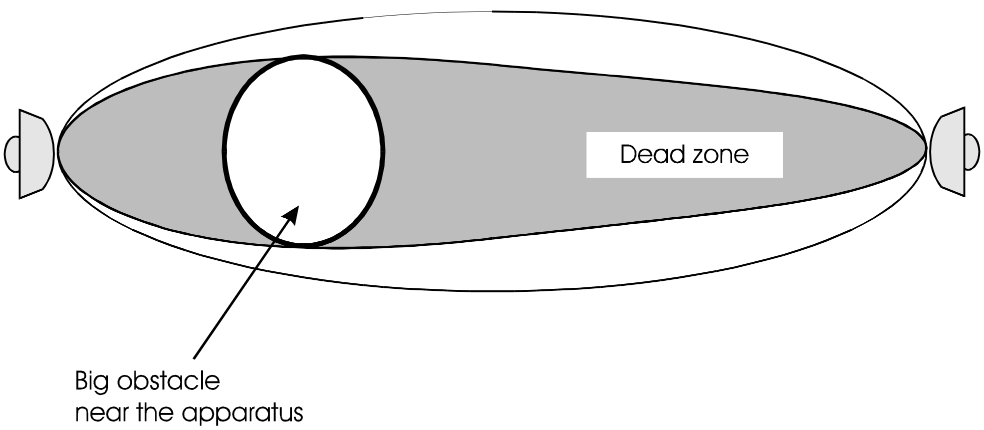


Figure 17 - Example of unreliable working caused by the presence of an excessively large obstacle

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.

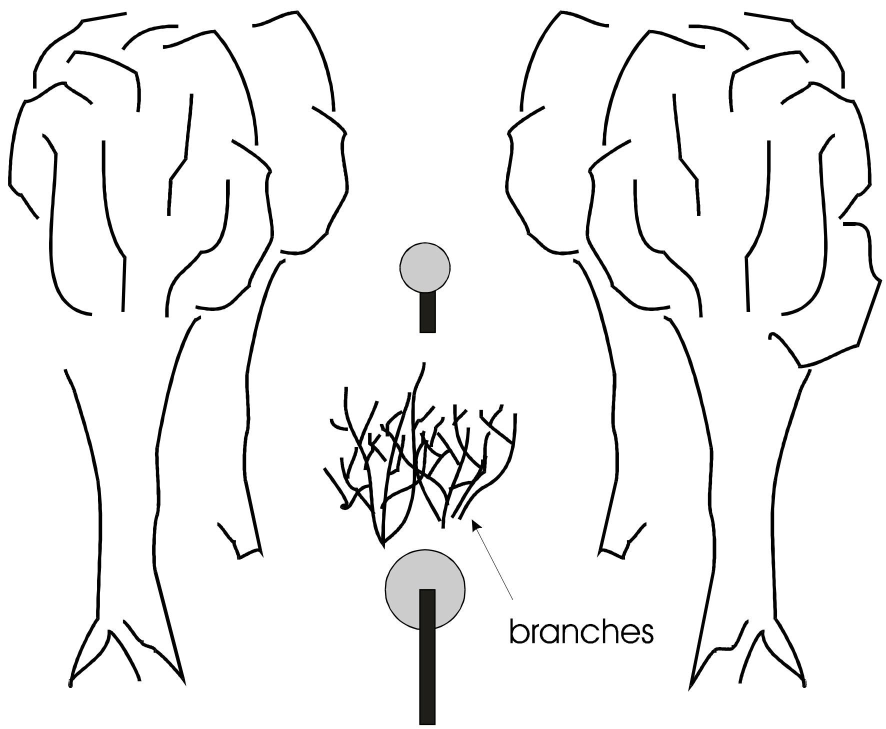


Figure 18 - Interference of shrubs and branches of trees in the sensitive zone

6. 6) Breadth of the sensitive beam

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)

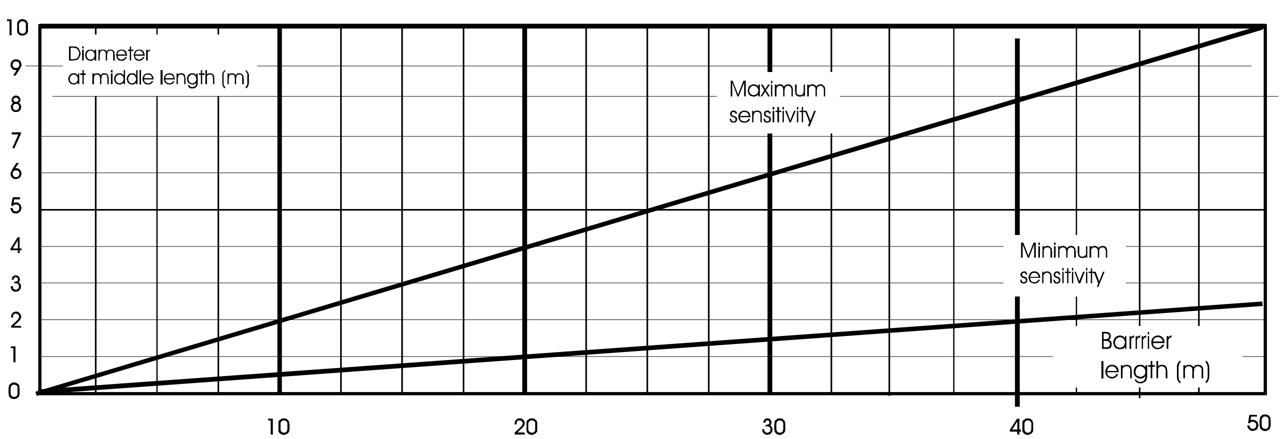


Figure 19 - Diameter of the sensitive zone at the halfway point depending on the length of the line for ERMO 482/50

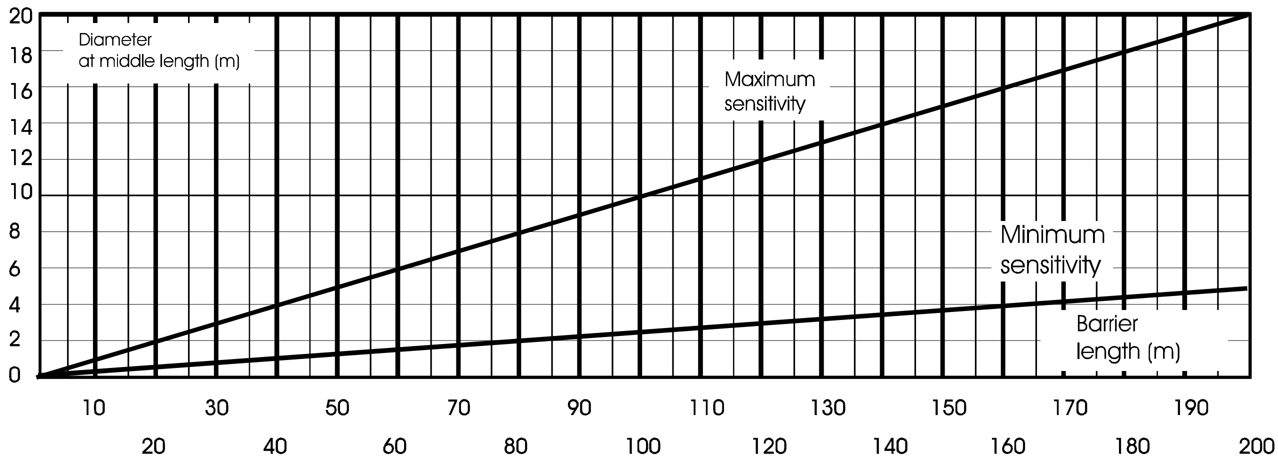


Figure 20 - Diameter of the sensitive zone at the halfway point depending on the length of the line for ERMO 482/80 - 120 - 200

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)

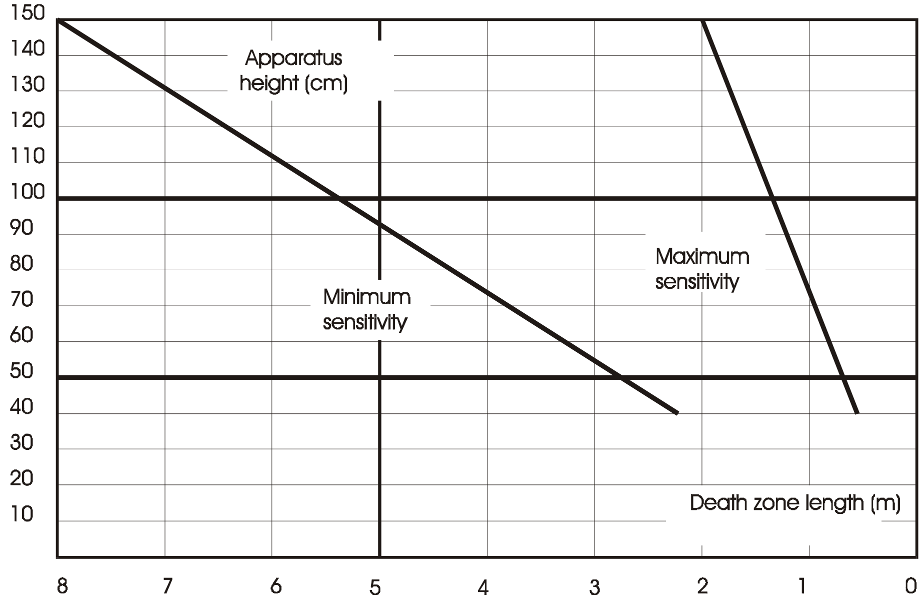


Figure 21 - Length of the dead zone near the apparatus depending on the height from the ground for ERMO 482/50

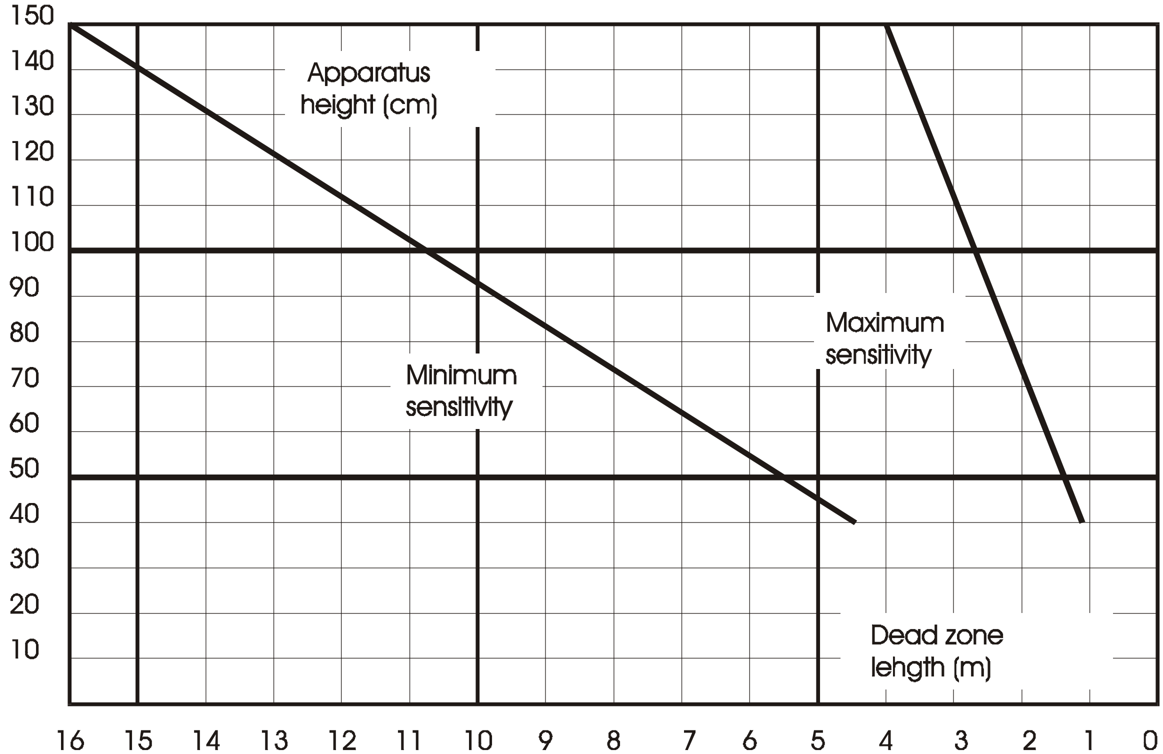


Figure 22 - Length of the dead zone near the apparatus depending on the height from the ground for ERMO 482/80 - 120 - 200

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

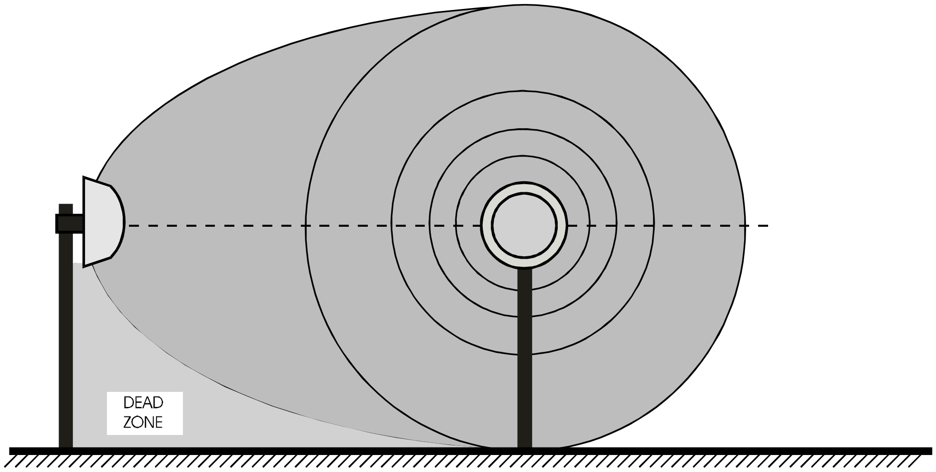


Figure 22a - Overlapping of two sensitive bands in an intersection

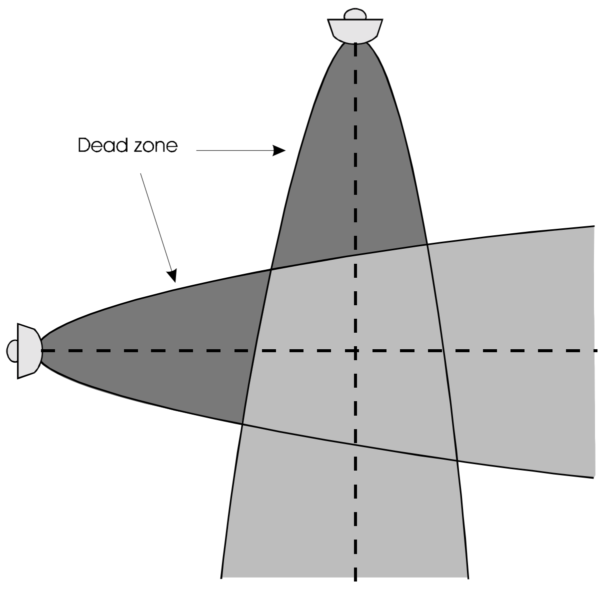


Figure 22b - Overlapping of two sensitive bands in an intersection

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

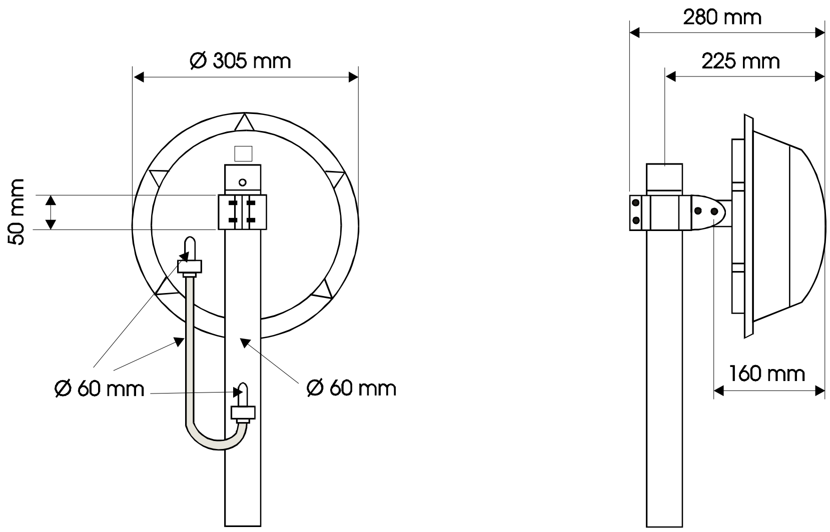


Figure 23

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 pipes in 15 cm length, which can be used to build poles of the desired length, as well as available covers for poles.
The best solution is shown in picture at pag. 10.
The poles can be fixed to the ground by inserting them into holes which are then filled with concrete.
The junction 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 junction box at the pole made of trunkings. This junction 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)

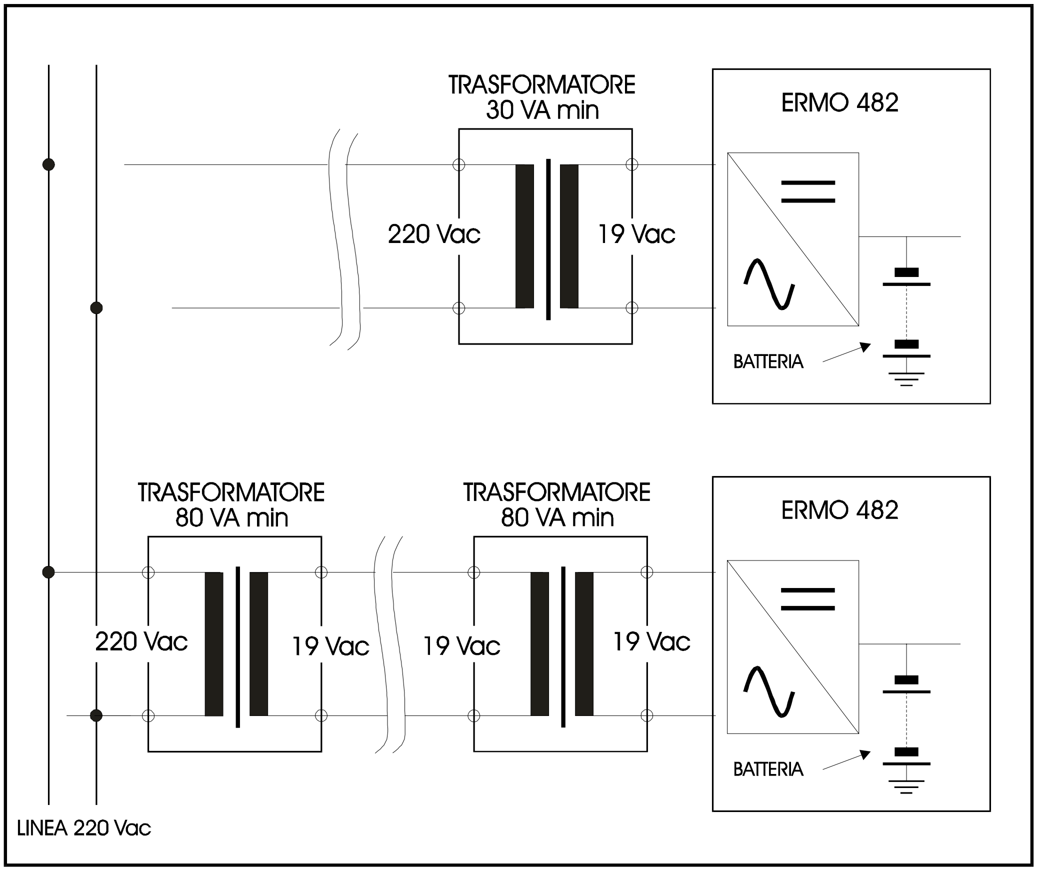


Figure 24 - Two correct ways to supply the apparatus

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 control panel

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).

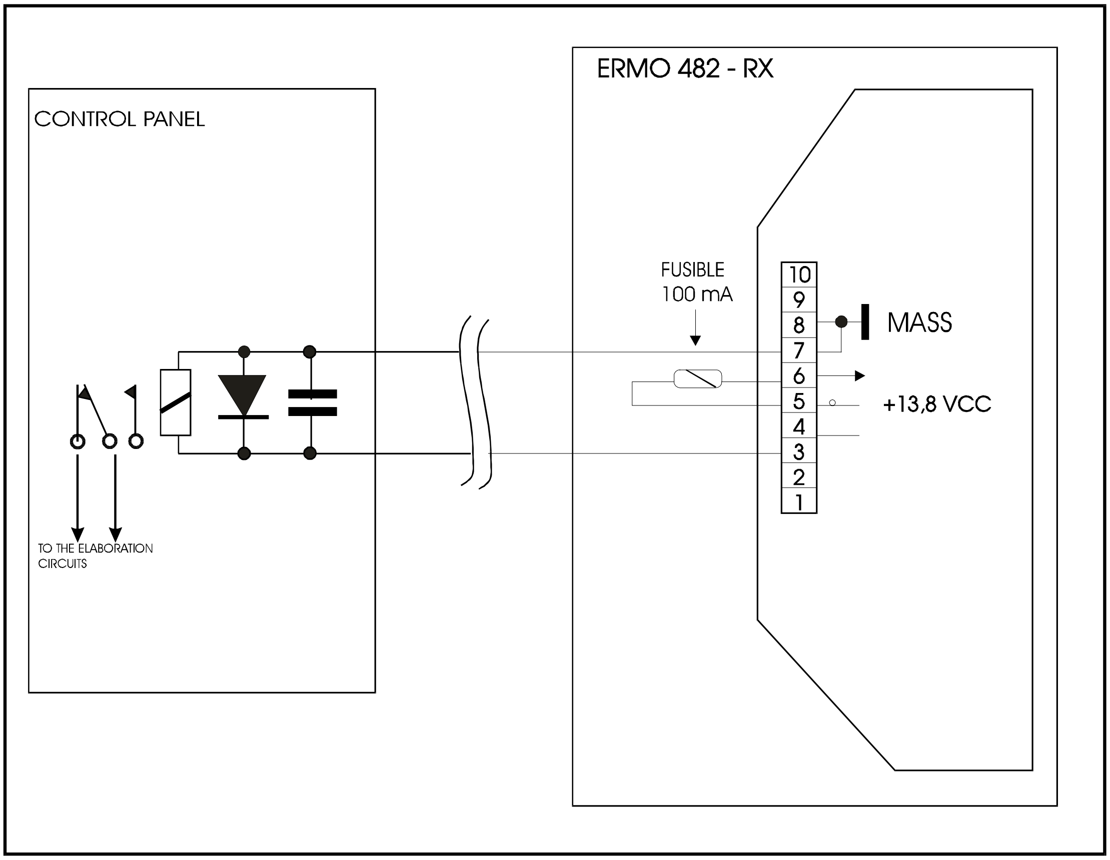


Figure 25 - Protection of the line from cuts and short circuit by uncoupling relay; this connection is particularly immune from disturbances that can be picked up by the line

STC 95 INSTRUMENT

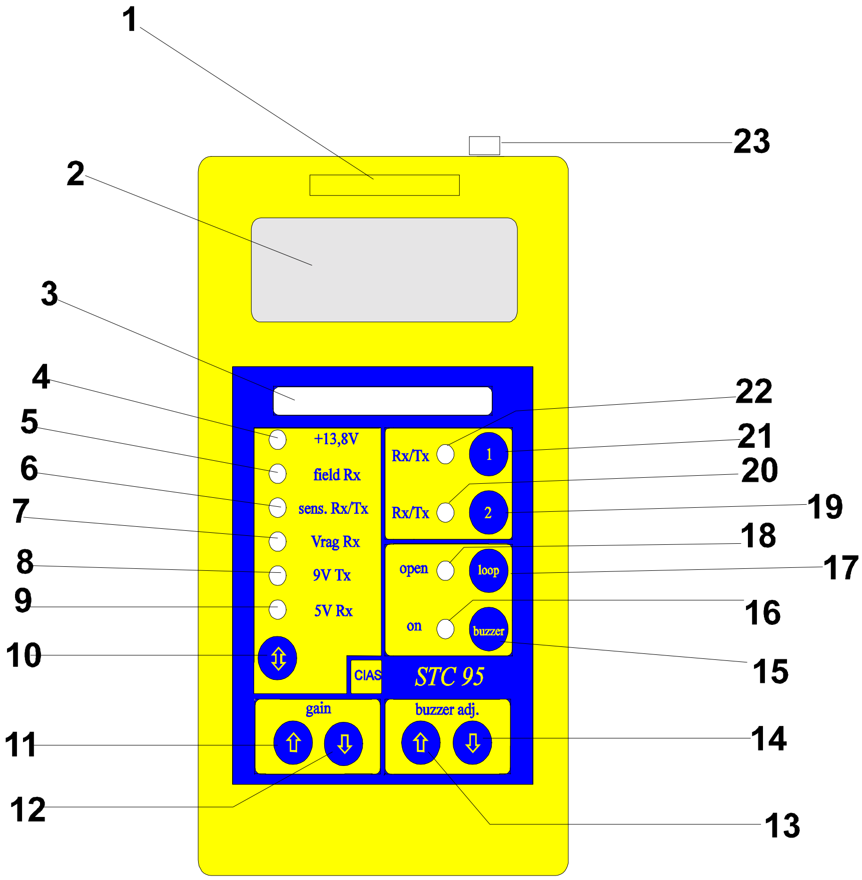


Figure - 26 -

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

Version)
8. 9 VDC supply LED
on/off

Version)

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

20. Module measurements

(Medusa PLUS TX/RX

9. 5 VDC supply LED on/off

10. Measurement selection LED

11. Manual gain increase

12. Manual gain decrease

21. TX/RX measurements (ermo 482-583-medusa base-medusa)

22. TX/RX measurements on (ermo 482-583-medusa base-medusa)

23. RCA connector

CONNECTING STC 95 TO CIAS BARRIERS

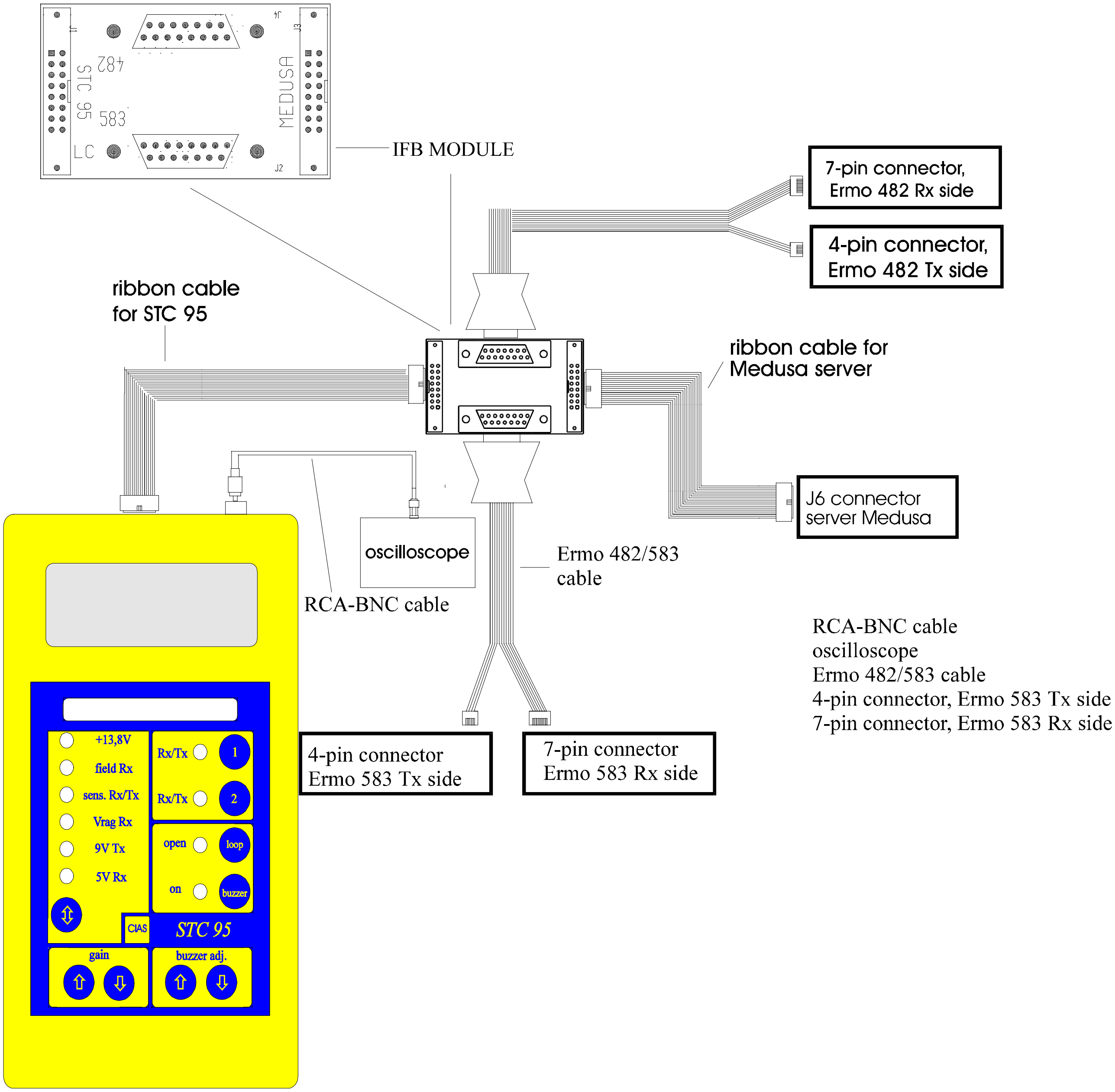


Figure - 27 -

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 9VDC+/-10%.

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

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

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 æ10%.

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 æ10%.

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

Any oscillations greater than æ500 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 (> æ 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 (æ300 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 æ1 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.

7. ALIGNEMENT AND CALIBRATION MEDUSA BASE

In order to make the alignment and the calibration of the barrier MEDUSA BASE it is necessary to proceed in the following way:

7.1 - Go to the transmitter
- Remove the radome unscrewing the allen screws
- Connect the AC power supply (19 VAC) to the terminals 1 and 3 of J7 (fig. 31)
- Check that the green led lights for net presence
- Connect the faston to the battery, observing the correct polarity (red wire to battery positive, black wire to battery negative)

WARNING: If polarity is accedentally inverted, the transmitter circuit fuse F3 (2A) will blow . If the connactions are then corrected and the blown fuse replaced, the transmitter will operate normally.

- Verify that the module RF TX is connected to the connector TX1 J1 of the BASE SERVER TX (fig. 31).
- Set one of the 4 available frequencies (1/2/3/4) by switching ON the channels selector on the module RF TX (fig. 31).
- On the module RF TX, the only switched indication is the red led, which corresponds to the writing “GUASTO” (fig. 31). The led is switched on in case of non-working of the oscillator RF.
- Check that the transmitter operates using the STC 95.

7.1.1 - Insert the connector of the STC 95 into the connector J6 of the circuit BASE SERVER TX (fig. 33) and proceed as follows:

7.1.2 - Verify that the led 22 (fig. 29) is switched on. If it is switched off, press the button 21 (fig. 29) to switch it on.

7.1.3 - Press button 10 (fig. 29) as many times as are necessary to make the led 4 light up. The voltage displayed (2) must be 13.8 VDC +/- 10%.

7.1.4 - Press the button 10 until led 8 lights up. The voltage displayed (2) must be 9 VDC +/- 10%.

7.1.5 - Press the button 10 until led 6 lights up. The voltage displayed (2) must be 5 VDC +/- 10%.

7.2 - Disconnect the instrument STC 95 from the circuit BASE SERVER TX and go to the receiver:

- Remove the radome unscrewing the allen screws
- Connect the AC power supply (24 VAC) to the terminals 1 and 3 of J7 (fig. 34)
- Check that the green led is switched on and the red led of intrusion alarm on the circuit BASE SERVER RX (fig. 34)
- Connect the fastons to the battery.

WARNING: if polarity is accidentally inverted, either on the transmitter or on the receiver, we have the interruption of the F3 (2A) fuse on the circuits base server TX and/or RX. If the connections are then corrected and the blown fuse replaced, the barrier will operate normally.

- Check that the module RF RX is connected to the connector RX1 J3 of the circuit Base Server RX (fig. 34).
- Consider the same channel on the TX by operating on the channels selector on the module RF RX (fig. 32).
- On the module RF RX there are two leds with the writing “CHANNEL” and “ALARM”. The first one is switched on when the channels on TX and RX are the same, the second one is switched on when the barrier is not in allarm (fig. 32).
- Check the correct working through the STC 95.

7.2.1 - Insert the connector STC 95 into the “MEASUREMENT CONNECTOR” J6 of the circuit base server RX (fig. 34) and proceed as follows:

7.2.2 - Check that leds (22) (fig. 29) is swithed on, if it is switched off press the button 21 to switch it on (fig. 29).

7.2.3 - Press button (10) to light up led (4) (fig. 29). The voltage on the display (2) must be 13.8 Vdc +/- 10%. If the previous aiming of the apparatus has been done correctly, we must see on the module RF RX (fig. 32) the lighting up of the leds “CHANNEL” and “ALARM” which indicate the channel recognition and the non-allarm indication. In order to optimize the link we must make the electronic aiming in the following way:

7.2.4 - Check that led (16) is switched off. If it is switched on press button (17) to switch it on, so that we have the “LOOP” opening (fig. 26).

7.2.5 - Check that led (18) is switched on. If it is switched off press button (17) to switch it on, so that we have the “LOOP” opening (fig. 26).

7.2.6 - Press button (10) in order to obtain led (5) lightning.
Check that on the display we can see a tension of about 6 Vdc and on led (3) bar the central led is switched on. If the value is different and the switched led is near the limits, press either the button (11) or the button (12) until we will have the previous condition described (lighting of bar central led and indications of about 6 Vdc on the display).

7.2.7 - After slackening the screws holding the receiver to the pole, rotate the module RF RX in the horizontal plane until the maximum reading in obtained on the display (2).

7.2.8 - Repeat the tuning operation with the horizontal regulation of the module RF TX.

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

7.2.10 - Slacken the vertical adjustement 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 led array (3) in the same way as for horizontal adjustement.

8. ALIGNMENT AND CALIBRATION MEDUSA PLUS

The barrier MEDUSA PLUS is different from the MEDUSA BASE as in the transmitter and receiver heads there are respectively two modules RF TX and two modules RF RX.
Also the circuits BASE SERVER TX and BASE SERVER RX are different from the barrier MEDUSA BASE:

To make the alignement and calibration of the barrier MEDUSA PLUS it is necessary to proceed as it follows:

8.1 - Go to the transmitter
- Remove the radome and unscrew the allen screws
- Connect the AC (24 VAC) to the terminals 1 and 3 of J7 (fig. 30)
- Check that the green led is switched on
- Connect the fastons to the battery by respecting the polarities (red wire to battery positive, black wire to battery negative).

WARNING: the accidental inversion of polarity on the battery, either on the transmitter or the receiver, provokes the fuse F3 (2A) interruption on the circuits base server TX and/or RX. If the connections are then corrected and the blown fuse replaced, the barrier will work normally.

- Check that the module RF TX 1 is connected to the connector TX1, J1 of the circuit BASE SERVER TX PLUS (fig. 34).

- Check that the module RF TX 2 is connected to the connector TX 2 J2 of the circuit BASE SERVER TX PLUS (fig. 34).
- Set one of the 4 available frequencies (1/2/3/4) by using the channels selector on the module RF TX1.
- Set a different channel among the available ones (1/2/3/4) by using tha channels selector on the module RF TX 2.
- On the module RF TX, the only lighting indication is the red led, which corresponds to the writing "GUASTO" (fig. 31). The led lights for non-working of the oscillator RF.
- Check the correct working of the transmitter through the instrument STC 95.

8.1.1 - Insert the connector of the STC 95 on the connector J6 of the circuit BASE SERVER TX PLUS (fig. 34) and proceed as follows:

8.1.2 - Check that the led 22 (fig. 29) is switched on. If it is switched off press the button 21 (fig. 29) to switch it on.

8.1.3 - Press the button (10) until the led (29) as many times as it is necessary to switch on the led (4). The voltage on the display (2) must be 13.8 Vdc +/- 10%

8.1.4 - Press the button (10) until the led (8) is switched on. The voltage on the display (2) must be 9 Vdc +/- 10%.

8.1.5 - Press the button (10) until the led (6) is switched on. The voltage on the display (2) must be 5 Vdc +/- 10%.

8.2 - Disconnect the instrument STC 95 from the circuit BASE SERVER TX PLUS and go to the receiver:

- Remove the radome and unscrew the allen screws
- Connect the AC power supply (24 VAC) to the terminals 1 and 3 of J7 (fig. 35)

- Check that the green led lights and the two red leds of intrusion alarm RX 1 and RX2 on the circuit BASE SERVER RX PLUS (fig. 35).
- Connect the fastons to the battery.

Warning: The accidental inversion of polarity on the battery provokes the F3 (2A) interruption. If the connections are then corrected and the blown fuse replaced, the barrier will work normally.

- Check that the modules RF RX 1 and RF RX 2 are connected respectively to the connectors RX1 J3 and RX2 J4 of the circuit BASE SERVER PLUS (fig. 35).
- Set the same channels of the TX head by using the channels selectors on the modules RF RX 1 and RF RX 2 (fig. 38).
- On the modules RF RX there are two leds with the writing “PRESENZA CANALE” and “ALLARME”. The first one is switched on when the channels of the TX and RX are the same, the second one is switched on when the barrier doesn’t indicate any alarm (fig. 32).
- Check the correct working through the instrument STC 95.

8.2.1 - Insert the connector of the STC 95 in the “CONNETTORE DI MISURA” J6 of the circuit BASE SERVER RX PLUS (fig. 35) and proceed as follows:

8.2.2 - Check that the led (22) (fig. 29) is switched on, if it is switched off press the button 21 to switch it on. (fig, 29).

In this way the instrument STC 95 can take the mesures, the tuning and the calibration of the barrier of the module RF RX 1.

8.2.3 - Press the button (10) until switching the led (4) on (fig. 29). The voltage on the display (2) must be 13.8 Vdc +/- 10%. If the previous tuning of the apparatus has been done in a correct way we can check it on the module RF RX1.

The led “PRESENZA CANALE” and “ALLARME” lighting linked to the channel recognition and to the non-alarm indication. In order to optimize the connection, we go on with the electronic tuning in the following way:

8.2.4 - Check that the led (16) is switched off. If it is switched on press the button (15) to switch it off, so that we have the “LOOP” opening (fig. 26).

8.2.5 - Check the button (18) is switched on. If it is switched off press the button (17) to switch it on, so that we have the “LOOP” opening (fig. 26).

8.2.6 - Press the button (10) until the led (5) lighting.

Check that on the display we can read a tension of about 6 Vdc and on the led (3) bar the central led is switched on. (fig. 29). If the tension value is different and the switched led is near the limits press eithr the button (11) or the button (12) till there will be the previous condition described (central led lighting of the bar and indications of about 6 Vdc on the display).

8.2.7 - After slackening the screws holding the receiver on the pole, rotate the receiver in the horizontal plane until the maximum reading is obtained on the display (2).

8.2.8 - Repeat the tuning operation with the transmitter head horizontal adjustement.

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

8.2.10 - Slacken the vertical adjustement lock on the receiver 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 adjustement.

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

8.2.12 - Press button (17) and check led (8) switching off. Check that after 2 minutes, the value on the display (2) is about 6 Vdc and that the central led of the bar lights.

8.2.13 - Press the button (10) to obtain the led (7) lighting and check on the display that the tension is between 2.5 and 6.5 Vdc. This RAG value is directly proportional to the distance between transmitter and receiver head.

8.2.14 - Press the button (10) to obtain the led (6) lighting. Use the trimmer “SENSIBILITA” which is on the module RF RX PLUS (fig. 38) till You read on the display a value between 0 and 9 Vdc. We must take into consideration the minimum sensitivity.

8.2.15 - Regulate the trimmer “INTEGRAZIONE” on the module RF RX PLUS (fig. 38) to obtain the integration desired.

8.2.16 - Press the button (15) to obtain the led (6) lighting which corresponds to the buzzer qualification (fig. 38). If there is not any movement in the protection field, check that the buzzer is silent. If it isn’t silent press the button (14) to obtain its silence. If with the function activation the buzzer is already silent operate on the button (13) to obtain its intermittent intervention, so operate slowly on the button (14) to obtain its silence.

8.2.17 - Make the crossing proufs by cheking before its buzzer intermittent and then the sound which indicates the effective taking over of the barrier crossing.

In addition check that without any movement in the protected field the buzzer doesn’t work. If it works, also in a discontinuous way, it means that the field is troubled. Because of big targets crossing over we can have also the turning off of the LED.

CANALE (fig. 38); in this way we indicate that we have had the radio frequency signal interruption.

8.2.18 - The STC 95 has an output RCA (fig. 26) which through a wire we give, (fig. 27) lets to check the wave form of the received signal.

This chek-in needs an oscilloscope (every kind present in the market).

A good connection between the transmitter head and the receiver one shows a wave form as the one indicated in fig. 31.

A connection shows a wave form as indicated in fig. 32.

We can observe as on the square wave spires is there is a trouble.

This means trhat the signal received is not good. In this case repeat the tuning operations to obtain the wave form of fig. 32.

8.2.19 - Press the button 21, check that the led 22 switches off (fig. 29) and the led 20 switches on (fig. 29). In this way the instrument STC 95 is set in order to make the measurement, the tuning and the calibration of the barrier linked to the module RF RX 2.

8.2.20 - Repeat all the operations of the paragraphes from 8.2.3 to 8.2.18 by using the barrier linked to the module RF RX 2 and RF TX 2.

All the data linked to the mesures done in the apparatus must be written on the slaves inserted in each barrier This will make the assistance operations be easier.

8.2.21 - Press the button 21, chack that the led 22 is sawitched off (fig. 29) and that the led 20 is switched on (fig. 29). In this way the instrument STC 95 can make the measurement, the tuning and the calibration of the barrier linked to the module RF RX 2.

9. MAINTENANCE MEDUSA BASE BARIER

In case of bad working on the MEDUSA BASE it is necessary to proceed in the following way:

9.1 - Go to the receiver, and after taking away the cover, introduce the STC 95 connector, as it is indicated in the paragraphs 7.2.1/7.2.2.

9.2 - Verify that the led "PRESENZA CANALE" and "ALLARME" included in the module RF RX are lighting, obviously this control must be done with the protection field free from obstacles in movement.

9.3 - Press the button (10) of STC 95 in order to obtain the led (4) lighting (fig. 30).
Verify that the tension of 13.8 Vcc is included in +/- 10%.

For this reason it is important to remember that the transformer is not included in airtight box; so that water can provoke some phenomena of connections corrosion with the following detachment of them, and possible irreversible damages of the transformer.
In this case proceed with the transformer replacement, by assuring that the box guaratees the airtight closure.

If, on the contrary, the values read are higher it means that the power supply is broken or that the installer has modified trimmer tension.
Make the control of tension taring by proceeding as follows:

Detach the fastons from the battery and link them to the tag of an electronic voltmeter of precision 20Vcc bottom scale. Use the trimmer RF on the basic circuit SERVER RX till reading a tension of 13.8 Vcc.
If we can’t take the tension back to this value it means that the controller can’t be repaired.
In this case the problem is solved with the regulation, remember to blok the trimmer with a paint drop fast drying up.

9.4 - Pressing the STC 95 button (10) to obtain the led (5) lighting (fig.1).
Verify that the tension read on the display is 6 Vcc +/- 10%.

In absence of moving objects in the protection field this reading is very sure.
Eventual oscillations superior to +/- 500 mA indicate system instability which can mean either moving obstacles interferences in the protection field or barier bad working.
Occasional oscillations of big entity (> 1V) can mean transmitter bad working, in this case we must proceed with the chanhe of transmitter kit.
Oscillations of live entity surely indicate interference in th protection field (tree foliage, grass waving by in the wind, etc.) in this case tha cause of disturbance should be removed.

If the reading in “FIELD” is different from the one shown (> +/- 1V), it means that the receiver has broken down and therefore the RX should be replaced.

9.5 - 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 occured, 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 readind 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 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 undestand 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.

10) MEDUSA PLUS MAINTENANCE

If there are some problems in MEDUSA PLUS procced as it is indicated in chapter (9) by making observations on modules RFTX!-RFTX2-RF RX1-RF RX2 present on the heads.

11) USE OF THE ASSISTANCE KITS AND THEIR FUNCTION

The assistance kits consist of basic circuit SERVER TX and by the module RF TX for the transmitter head and by basic circuit SERVER RX and by the module RF RX for the receiving head.

If we must intervene on the mEDUSA mod. PLUS remember that in the transmitting head there are two modules RF TX and a basic circuit SERVER PLUS TX and in the receiving head there are two modules RF RX and a basic circuit SERVER RX.