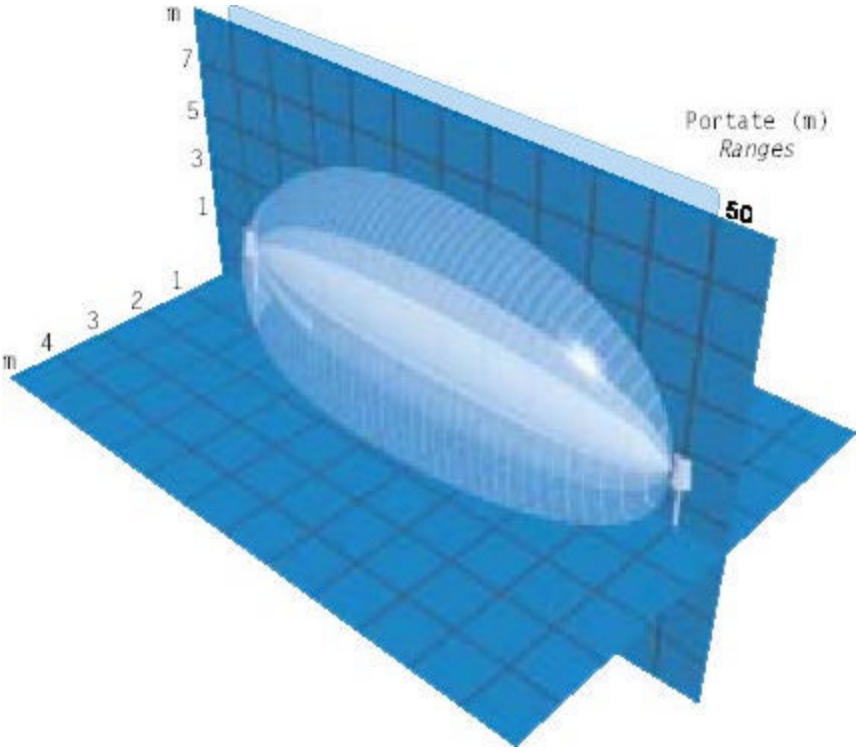
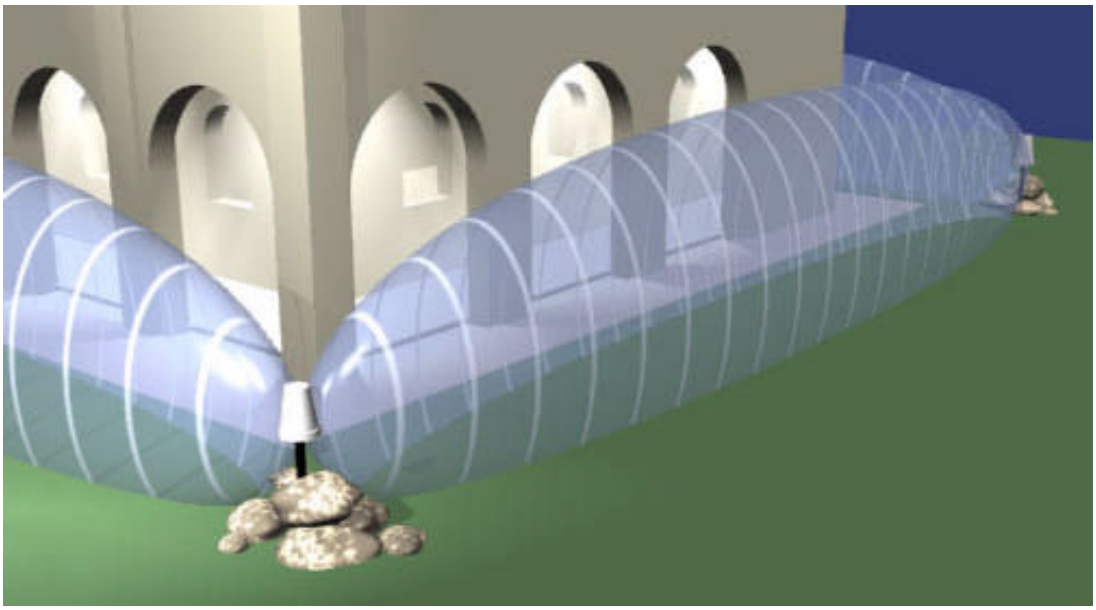
1. DESCRIPTION

Medusa 02 is a CIAS microwave barrier product, thanks to the adopted planar technology the barrier operates with an asymmetric sensitive beam. The particular design is suitable for the integration in various environment types (villas, terraces, small industrial sites, etc.).

Medusa 02 is composed by one POWER SUPPLY board and one or more RF units (as will be described in the following pages).





2) STC 95 TEST INSTRUMENT FOR MEDUSA 02 TUNING AND ALIGNMENT

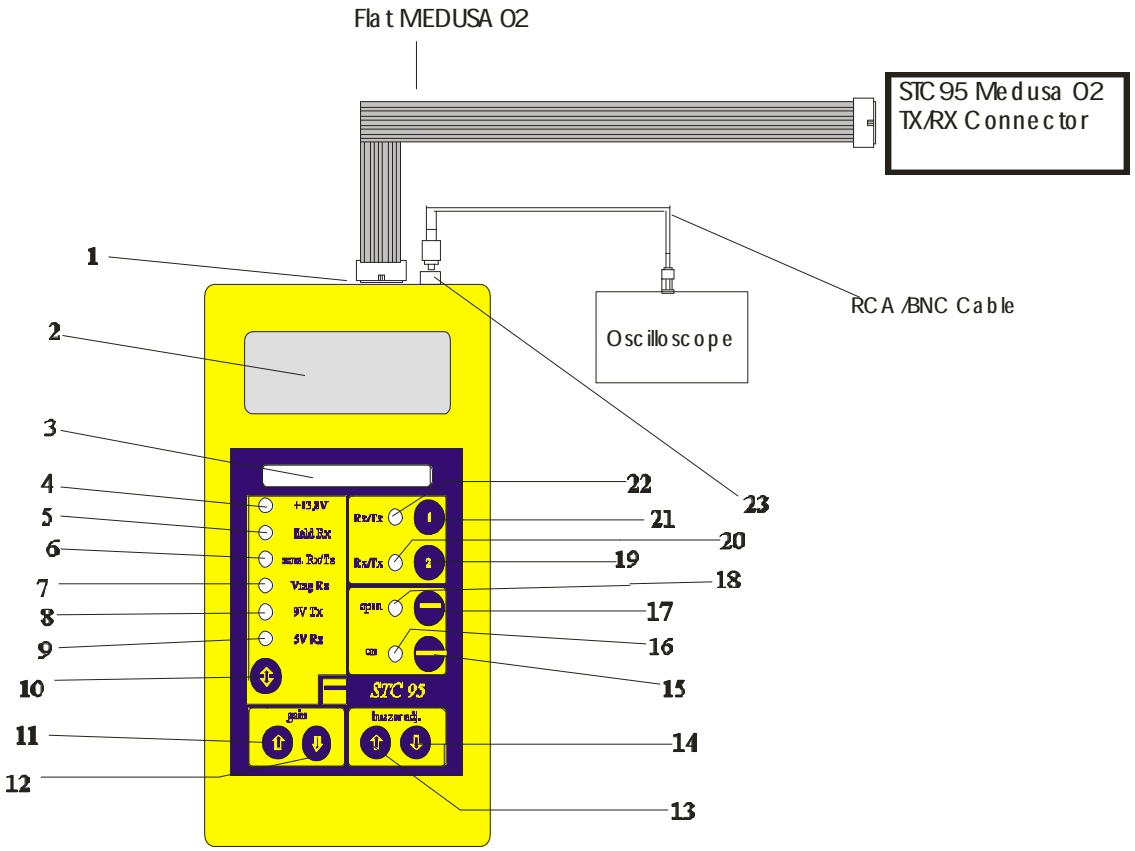


Fig 1

1	3M connector	13	Increasing threshold Buzzer activation button.
2	LCD Display	14	Decreasing threshold Buzzer activation button.
3	LED strip	15	Buzzer activation / deactivation button.
4	Power supply LED test 13,8 VDC	16	Buzzer activation LED
5	Received field LED test	17	Open / closed Loop button
6	Check Sens.RX/RF TX LED	18	Open loop LED indication
7	AGC LED check	19	Activation / deactivation tests button TX/RX 2
8	Power supply LED test TX 9 VDC	20	Test indication LED RX/TX 2
9	Power supply LED test RX 5 VDC	21	Activation / deactivation tests button TX/RX 1
10	Tests selection button	22	Test indication LED RX/TX 1
11	Manual increasing gain button	23	RCA for scope connection with supplied cable
12	Manual decreasing gain button		

3. ALIGNMENT AND ADJUSTMENT OF MEDUSA 02

To align and adjust the MEDUSA 02 barrier proceed as follows:

3.1 Operations on the Transmitter

- Unscrew the 4 countersunk screws fitted under the base to lift the cap.
- Terminate the a.c. wires (19 Vac) onto terminals 1 and 2 of MS3 on the POWER SUPPLY circuit (fig.2).
- Check that the green LED indicating presence of mains lights up.
- The wire with the fastons must be connected to terminal strip MS2, the black one to terminal 1 (GND) and the red one to terminal 2 (+13.8 V)
- Connect the fastons to the battery paying attention to the polarity (red lead on battery positive, and black lead onto battery

ATTENTION: Polarity reversals on the battery blows fuse F3 on the power supply circuit. In this case place the fastons properly and substitute the blown fuse (1A R).

- Check that module RF TX is connected to connector TX1 on the POWER SUPPLY circuit (fig. 2).
- Preset one of the 4 channels available (1/2/3/4) through the channel selector present on module RF TX (Fig, 3).
- The red LED on the RF Tx module is the sole light indication and is distinguished by the term “FAULTY” (fig.3). The LED lights up when the RF or BF oscillator is not working properly.
- Use instrument STC 95 to check if the Transmitter is working properly.

(The designation of the LEDs and keys is shown in fig. 1)

3.1.1 – Insert the connector of the STC 95 onto the STC 95 connector of the POWER SUPPLY circuit (fig. 2) and proceed as follows :

3.1.2 – Check that LED ***“Rx/Tx 1”*** (22) on STC 95 is ON. If it is OFF, then press key ***“1”*** (21) to turn it ON.

N.B. Key *“1”* (21) is used to select the tests with STC 95 of Rx1 or Tx1
Key *“2”* (19) is used to select the tests with STC 95 of Rx2 or Tx2

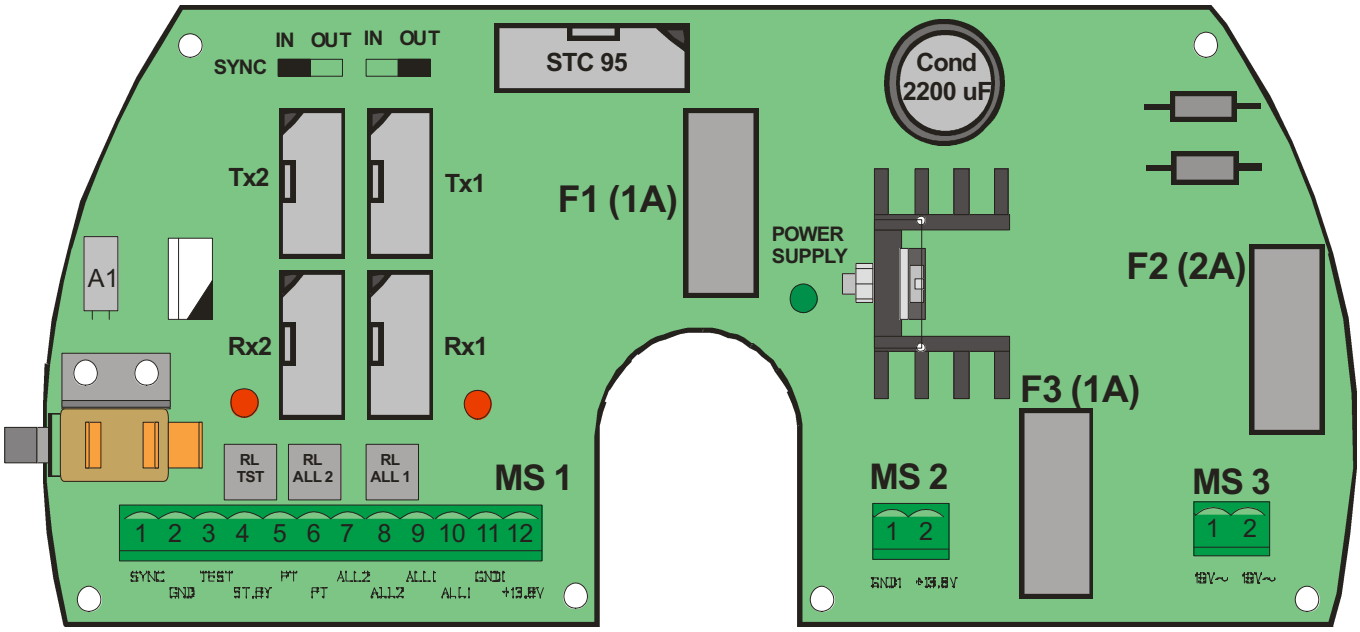


Fig. 2

Connectors

MS1	
1	IN/OUT Synchronism
2	Ground signal (GND)
3	Test
4	Stand-by
5	Tamper
6	Tamper
7	Alarm 2
8	Alarm 2
9	Alarm 1
10	Alarm 1
11	Ground (GND 1)
12	+13.8 V

MS2	
1	Ground (GND1)
2	+13.8 V

MS3	
1	19 Vac
2	19 Vac

3.1.3 – Press key ***"⇳"*** (10) to select the test (fig.1) till the power supply voltage test indicating LED ***"+13,8V"*** (4) lights up. The voltage read on the display (2) must be 13.8 Vdc ±10%.

3.1.4. – Press key ***"⇳"*** (10) several times till LED ***"9VTx"*** (8) lights up. The voltage read on the display (2) must be 9 Vdc ±10%.

3.2 Operations on the Receiver

- Unscrew the 4 countersunk screws fitted under the base to lift the cap.
- Terminate the a.c. wires (19 Vac) onto terminals 1 and 3 of MS3 on the POWER SUPPLY circuit (fig.2).
- Check that the green LED, on the POWER SUPPLY circuit (fig.2), indicating presence of mains lights up.
- Connect the fastons to the battery paying attention to the polarity (red lead on battery positive, and black lead onto battery negative) .

ATTENTION: Polarity reversals on the battery blows fuse F3 on the power supply circuit. In this case place the fastons properly and substitute the blown fuse (1A R).

- Check that module RF RX is connected to connector RX1 on the POWER SUPPLY circuit (fig. 2).
- Preset the same channel set on the corresponding module TX through the channel selector present on module RF RX (Fig, 3).
- Two LEDs are present on the RF RX module termed “CHANNEL PRESENCE” and “ALARM”. The first lights up when the channels preset on the TX and on the RX are identical, the second one lights up when the barrier is alarmed.
- Use instrument STC 95 to check proper operation.

3.2.1 – Insert the connector of the STC 95 onto the STC 95 test connector of the POWER SUPPLY circuit (fig. 2) and proceed as follows :

3.2.2 – Check that LED ***”Rx/Tx1”*** (22) on STC 95 is ON. If it is OFF, then press key ***“1”*** (21) to turn it ON.

N.B. Key *“1”* (21) is used to select the tests with STC 95 of Rx1 or Tx1
Key *“2”* (19) is used to select the tests with STC 95 of Rx2 or Tx2

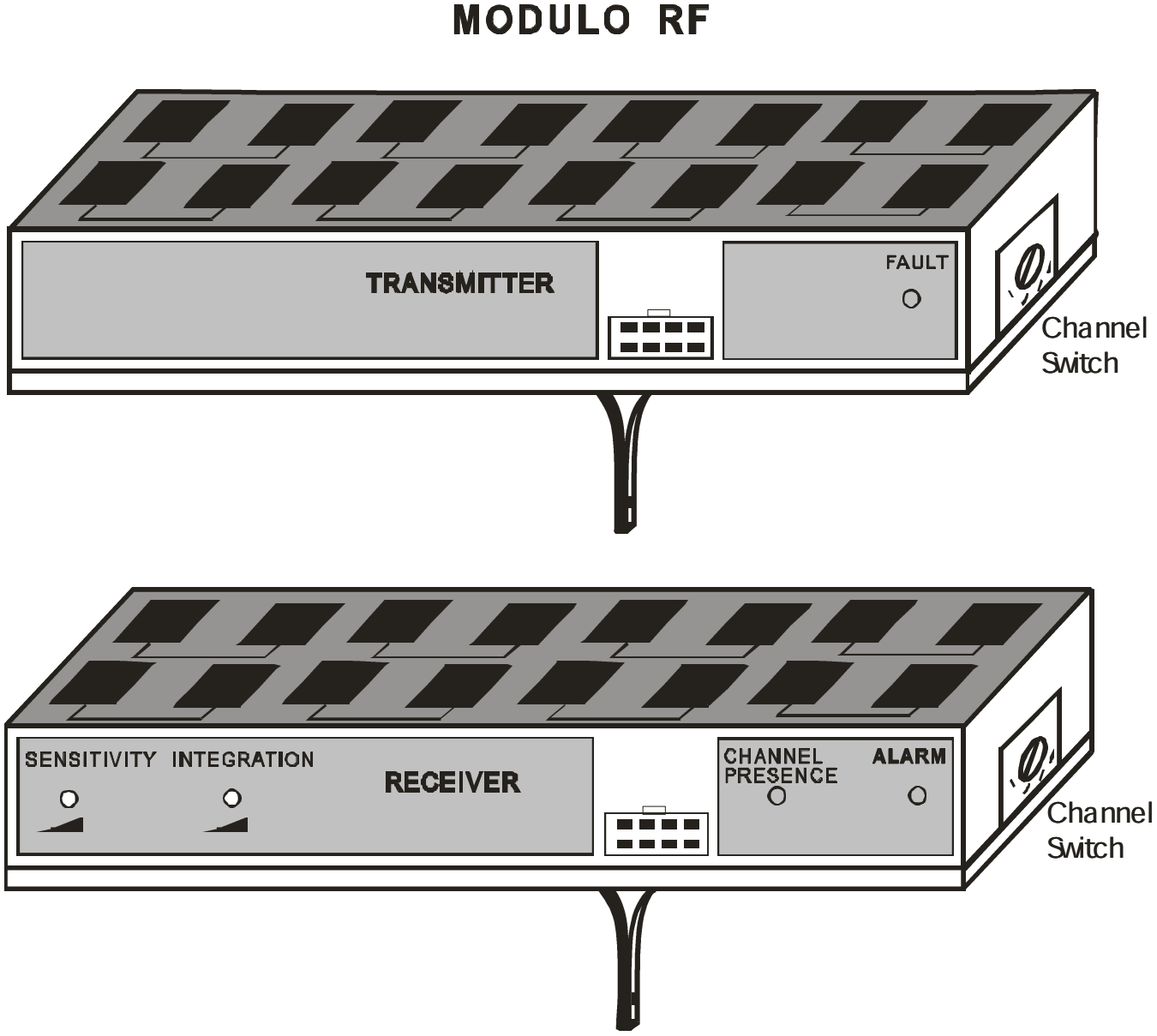


Fig. 3

3.2.3 – Press the test selection key ***"⇳"*** (10) till the battery voltage test LED ***"+13,8V"*** (4) lights up. The voltage read on display (2) must be 13.8 Vdc + 10%. If the equipment sight pointing has been properly carried out the "CHANNEL PRESENCE" LED (acknowledging the channel) should light up on the RF RX module (fig. 3). In order to optimise the link proceed to electronically point in the following manner:

3.2.4 – Check that LED ***"on"*** (16) is OFF. Should it be ON press key ***"Buzzer"*** (15) to turn it OFF. In this manner the buzzer inside the STC 95 will be de-activated.

3.2.5 – Check that LED ***"Open"*** (18) is ON. Should it be OFF press key ***"Loop"*** (17) to switch it ON. In this manner the "LOOP" will be opened.

3.2.6 - Press key ***"⇳"*** (10) till LED ***"field Rx"*** (5) switches ON.
Check that a 6 Vdc (approx.) voltage is read on the display and that the mid LED is glowing on the LED bar (3). Should the voltage value differ and should the glowing LEDs be the end ones, then press either key ***"⇑ gain"*** (11) or key ***"⇓ gain"*** (12) till the previously described condition arises (i.e., the LED in the middle of the bar lights up, and a 6 Vdc value is read on the display).

3.2.7- After having loosened the fastening screws on the mast, turn the RFRX module on the horizontal surface till obtaining the maximum reading on the display (2).

3.2.8 - Repeat the pointing operation on the horizontal adjustment of the RFTX module.

3.2.9 - After having obtained the best pointing, lock the horizontal movement of the RFTX and RFRX modules

3.2.10 – Unlock the vertical movement of the RFRX module and direct it towards the top.
Slowly move it towards the bottom till obtaining the maximum reading on display (2) and on the LED bar (3) by proceeding as per the horizontal adjustment.

3.2.11- Repeat the vertical movement on the RFTX module. After having obtained the maximum reading, lock the vertical movement on modules RFTX and RFRX.

3.2.12 - Press key ***"Loop"*** (17) and check that Loop Closure LED ***"Open"*** (18) turns OFF. Check that after a recovery period of approx. 2 mins. the value read on display (2) reaches approx. 6 Vdc, and that the LED at the centre of the bar lights up.

3.2.13 - Press key ***"⇳"*** (10) till LED ***"VRag Rx"*** (7) lights up. Check that a voltage value within 2.5 and 6Vdc is read on the display. This AGR voltage value is directly proportional to the distance between the transmitting and receiving heads, and is inversely proportional to the received RF signal.
The pointing operation of modules RFRX and RFTX must be such as to make this voltage value the lowest possible. The values nearest to 6 V do not guarantee steady operation.

3.2.14 – Press key ***"⇳"*** (10) till the Sensitivity Measurement LED ***"sens Rx/Tx"*** (6) lights up. Operate on the "SENSITIVITY" trimmer present in module RF RX (fig. 3) till a value within 0 and 9 Vdc is read on the display. Note that the value of 0 Vdc corresponds to the maximum sensitivity, and that value 9 Vdc corresponds to the minimum sensitivity.

3.2.15. –Adjust the "INTEGRATION" trimmer on module RFRX (fig. 3) till obtaining the required integration.
N.B. A "high" integration guarantees a better immunity to interference caused by the movement of small animals, fences, hedges etc., but determines a lower sensitivity for quick movements. Therefore, it is suggested to adopt high integration levels when the barrier cannot be crossed quickly (e.g., when installed near the static barriers to protect).

3.2.16 – Press key ***"Buzzer"*** (15) till the buzzer enabling LED ***"on"*** (16) lights up. When there are no movements in the protection field check that the buzzer is mute. If otherwise, press key ***" ⇓ Buzzer adj."*** (14) till it turns OFF. If when activating the function the buzzer is already mute press key ***" ⇑ Buzzer adj."*** (13) till an intermittent operation is obtained, afterwards slightly press key (14) till it switches OFF.

3.2.17. – Carry out the crossing trials to check for the presence of an intermittent sound and then, following the presence of an alarm, for a continuous buzz. The activation of an alarm indication lights up, on the RX POWER SUPPLY circuit, the red LED that is situated on the right of the Rx1 connector and opens the alarm relay contact (terminals 9 and 10 of MS1) (fig. 2).

3.2.18 - The STC 95 is provided with an RCA output (fig. 1) which, through the wire supplied, allows to check the wave form of the received signal.
An oscilloscope (any of the types present on the market) is utilised for this check.
A good connection between the transmitting head and the receiving head produces the waveform illustrated in fig. 4.

A bad connection produces the waveform illustrated in fig. (5).
Note the noise at the tip of the square wave.

This means that the signal is not good. Therefore, repeat the pointing operations till the waveform shown in fig. 4 is obtained.
All the data concerning the tests made on the plant must be reported on the test sheets supplied for each barrier. This will make the servicing operations easier to carry out.

3.2.19 – Place the cap back again and regularly fasten it with the screws provided in order to obtain good water proofing.

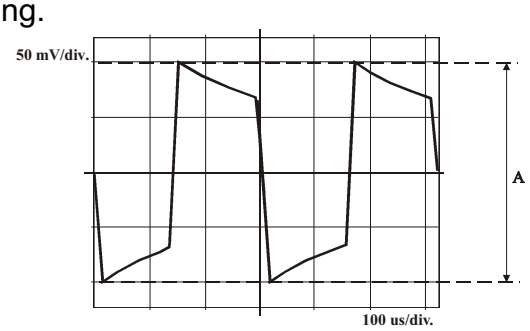


Figura 4 - Correct Waveform
A = 200 mVpp (± 10%)

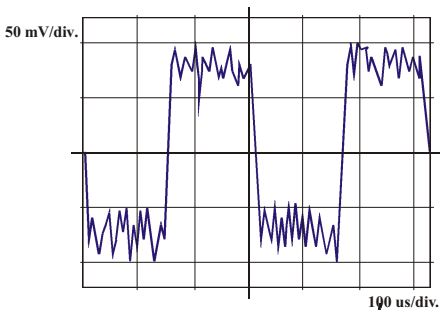


Figura 5 - Uncorrect Waveform (High Noise)

4. ALIGNMENT AND ADJUSTMENT OF MEDUSA 02 WITH TWO RF MODULES

The MEDUSA 02 barrier can contain two RFTX modules or two RFRX modules inside the transmitting and receiving heads.
The alignment and testing operations are as those described in the previous chapter except for the additional RF TX and RFRX modules which must be connected (through the specific flat cable) to connectors Tx2 and Rx2, respectively.
Moreover, to be able to use instrument STC 95 set the measurements on the second Rx/Tx 2 section. This is obtained by pressing key ***"2"*** (19) on STC 95 and by then checking that LED ***"Rx/Tx2"*** (20) switches ON and that LED ***"Rx/Tx1"*** (22) turns OFF.

4.1 RFTX module synchronizing

The two RFTX modules must be synchronised to the same channel (the relevant receivers as well) to prevent them from interfering with each other. Moreover, strap SYNC on the RFRX 1 Transmitter module must be set to the "OUT" position and that on the RFTX 2 module to the "IN" position.
In these conditions the RFTX 1 module supplies the sync. signal to the RFTX 2 module thereby guaranteeing a simultaneous emission of microwaves from the two not mutually interfering modules.

4.2 – The sync. signal outputting from module RFTX1 (when the relevant SYNC strap has been set to the "OUT" position) is also present on terminal 1.
If having to synchronise other transmitter modules inside other heads (to prevent interferences) connect a shielded wire to a twisted pair between terminals 1 and 2 of MS1 associated to a Tx POWER SUPPLY UNIT termed "Master" and to a second Tx POWER SUPPLY UNIT termed "Slave".
The first Tx POWER SUPPLY unit must be set in the manner described above. The second one instead must have both SYNC straps set to the IN position.

NB. The length of the sync. cable must not exceed 10 meters.
Should a longer link be necessary, install a sync. distribution circuit in the two heads. The implementation of the sync. distribution circuit is described in the relevant handbook (SYNC 01).

5. MEDUSA 02 BARRIER MAINTENANCE

When failures occur on the MEDUSA 02 barrier proceed as follows:

5.1 - Remove the cap from the Receiver, insert the STC 95 instrument's connector as indicated in points 3.2.1 , 3.2.2.

5.2 - Check that the "CHANNEL PRESENCE" LED on the RF RX module is ON. Obviously this test must be made with the field free from any moving obstacles.

5.3 - Press key ***"⇳"*** (10) on the STC 95 so as to light up LED ***"+13,8V"*** (4). Check that the 13.8Vdc voltage is within the + 10% range. To this concern, remember that if the transformer is not within a water-tight holder the links might corrode hence disconnect with subsequent irreversible damage to the transformer.
Should this occur, replace the transformer making sure that the holder is hermetically sealed.
If, instead, the values read are higher this will mean that power supply has failed.
In this case substitute the POWER SUPPLY board.

5.4 - Press key ***"⇳"*** (10) on the STC 95 till LED ***"field Rx"*** (5) lights up (fig.1).
Check that the voltage read on the display is 6 Vdc + 10%.
This reading is highly stable when carried out in a motionless protection field.
Any oscillations above + 500 mV indicate signal instability that might be due to the reflection of the microwave on the obstacles present in the area to protect, or to wrong installation heights above ground, or to faulty barrier.
Occasional abrupt oscillations (> 1V) might be due to a faulty transmitter. In this case, replace the transmitter kit.
Slight oscillations are certainly due to interferences in the protection field (tree branches, grass swept by the wind, etc.). In this case get rid of the cause of interference.
If the value read on the "FIELD RX" differs from the one given (> + 1V) then the Receiver is faulty and the RX kit will have to be replaced.

5.5 – Press key ***"⇳"*** (10) till LED ***"VRag Rx"*** (7) lights up and till a voltage within 2.5/6 Vdc is readon the display. This AGR value is directly proportional to the distance between the Transmitter and the Receiver heads.

Ascertain that the AGR sets to the values within 2.5/6 Vdc. If the value read on the display (2) reaches values above 6.0 Vdc this will mean that the signal inputting the Receiver is very low hence the link is unreliable.

This fact might entail two types of problems. The first concerns the failure of the Receiver, and the second the failure of the Transmitter. To find out the event that has arisen proceed testing the Transmitter as instructed in chapter 3 (points 3.1, 3.1.1, 3.1.2, 3.1.3, 3.1.4).

After having tested the Transmitter and ascertained that it is operating properly, start replacing the Receiver kit.

Note that the AGR voltage test carried out during servicing indicates not only a failure but also an eventual variation of the environmental conditions within the protection field.

In fact, the comparison between the value reported on the test sheets and that read during the servicing phase will give an immediate indication on the operating state of the barrier.

Specifically, if the value read during the servicing phase differs slightly from that reported on the sheet (+ 300 mVdc), then the radio frequency signal inputting the Receiver is still good and attests that the barrier is operating properly.

To better understand the purpose of the AGC voltage test remember that it is closely connected to the quality of the radio frequency signal inputting the Receiver.