

DECLARATION OF CONFORMITY

Tecnoalarm srl declare under their sole responsibility that the product to which this declaration relates

EXPLORER BUS

is in conformity with all relevant essential requirements of the directive 1999/5/CE and in particular the health and safety provisions of the directive 73/23/CEE and the electromagnetic compatibility provisions of the directive 89/336/CEE.

In addition, the correct use of the radio spectrum is guaranteed to prevent from harmful interferences.

San Mauro Torinese, May 07th, 2008

Negro Giovanni



TECHNICAL SPECIFICATIONS

Type:	EXPLORER BUS
Description:	Outdoor microwave barrier
AC power supply	
Rated voltage:	18V ~
Max. consumption RX:	100mA~
Max. consumption TX:	160mA ~
DC power supply - battery	
Rated voltage:	13.8V
Operating voltage:	9V ...15V
Max. consumption RX:	45mA
Max. consumption TX:	80mA
Max. battery fitted:	12V , 2.1Ah
Max. current for battery recharge (TX and RX):	240mA
Power:	5mW
Frequency	
Operating frequency:	10.525GHz - imp. 50%
Channel 1:	5KHz
Channel 2:	6KHz
Channel 3:	7KHz
Channel 4:	8KHz
EXPLORER 600	
Max. range:	60m
EXPLORER 1200	
Max. range:	120m
EXPLORER 2200	
Max. range:	220m
Anti-opening and antidetachment tamper:	Micro-switch
Operating temperature:	-25°C...+55°C
Protection type:	IP65



EXPLORER BUS
Outdoor microwave barrier

18V ~
100mA~
160mA ~

13.8V
9V ...15V

45mA
80mA
12V , 2.1Ah
240mA
5mW

10.525GHz - imp. 50%
5KHz
6KHz
7KHz
8KHz

60m

120m

220m

Micro-switch
-25°C...+55°C
IP65

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EXPLORER BUS



Outdoor microwave barrier with RSC technology

1. DESCRIPTION

EXPLORER BUS is an outdoor microwave barrier mounted inside casing with aluminium diecast bottoms. The termoplastic covers guarantee high resistance to atmospheric agents.

It can be mounted on the ground using special mounting posts of 60mm diameter, or against the wall using arm mounting brackets.

It is composed of 2 separate modules: TX and RX. The modules can be powered by either alternated (18V) or continued voltage (13.8V), and are equipped with a 12V-2.1Ah battery and power supply with battery charger.

The receiver (RX) must be connected via special module for the control of devices connected via SENSOR BUS (SPEED PLUS series).

All the parameters of the barrier (receiver and transmitter) are programmable through control panel both on the spot and at distance.

The transmitter and receiver can be connected together permitting to manage beside the receiver functions, trouble and alarm signaling as well as programming of the transmitter.

The barrier is equipped with a circuit for the discrimination of the interferences apt to distinguish atmospheric disturbances or bird passage from an attempt at burglary. It offers complete immunity from fog.

2. INSTALLATION

The surface the barrier is mounted on has to be as even as possible. The best results are obtained on concrete, asphalt, solid soil and any other flat surface. A reliable output is obtained on lawn on condition that the grass is trimmed regularly and the blade length does not exceed 10cm in order to avoid excessive signal attenuation.

WARNING

Trees and bushes stirred by the wind as well as animals crossing the beams may cause false alarms.

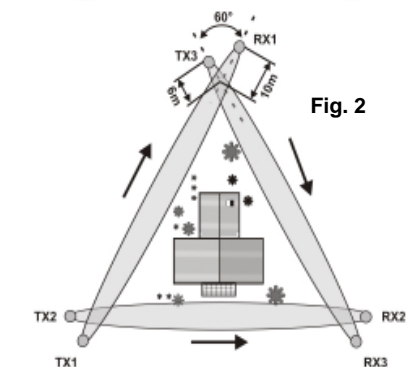
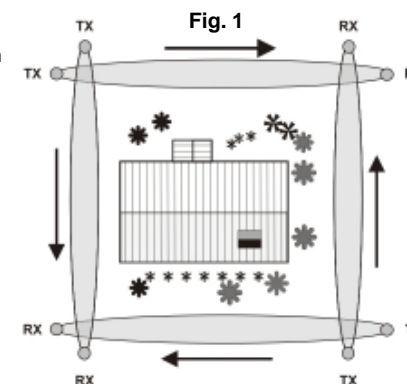
2.1 4-SIDES (SQUARE) PERIMETER PROTECTION

Every side of the square must be protected by a receiver (RX) and a transmitter (TX). For the protection of square perimeters the barriers must be installed in a way so that in every angle are placed either two transmitters or two receivers (fig. 1). This is to prevent interferences among the apparatus.

2.2 3-SIDES (TRIANGLE) PERIMETER PROTECTION

In triangle installations with three barriers, in one angle you are forced to place a receiver (RX) and a

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transmitter (TX) next to each other (fig. 2).

Doing this, bear in mind the following precautions:

- RX1 must be installed at least 10 meters behind TX3 referring to the point of intersection of the two beams.
- TX3 must be installed at 6 meters distance from the point of intersection of the beams.
- The angle formed by RX1 and TX3 must not be wider than 60°.

2.3 POSITIONING

In order to guarantee total coverage where the two beams cross each other, the point of intersection must coincide with the point of adherence on the ground.

The mounting posts must be installed as shown in figure 3 with the following distances:

- EXPLORER BUS 600 - distance A = A1 = 3m
- EXPLORER BUS 1200 - distance A = A1 = 4m
- EXPLORER BUS 2200 - distance A = A1 = 5m

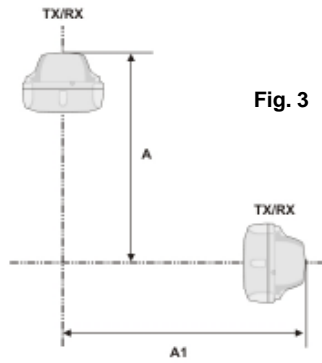


Fig. 3

2.4 PROTECTION OF PERIMETERS EXCEEDING THE MAXIMUM RANGE

If one side of the perimeter is longer than the maximum range of the barrier, it is necessary to place several barriers side by side (fig. 4).

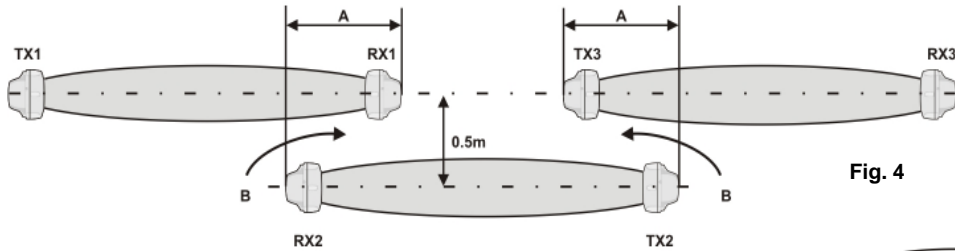


Fig. 4

Doing this, the distance between the barriers must not exceed 50cm in order to prevent a possible intruder from passing through the corridors (B) without being captured (fig. 4).

The distance (A) between the receivers RX1 and RX2 or the transmitters TX2 and TX3 depends on the type of barrier:

- EXPLORER BUS 600 - distance A = 6m
- EXPLORER BUS 1200 - distance A = 8m
- EXPLORER BUS 2200 - distance A = 10m

2.5 MOUNTING HEIGHT

The mounting height (H) depends on the type of barrier (fig. 5):

- EXPLORER BUS 600 - height H = 65cm
- EXPLORER BUS 1200 - height H = 90cm
- EXPLORER BUS 2200 - height H = 115cm

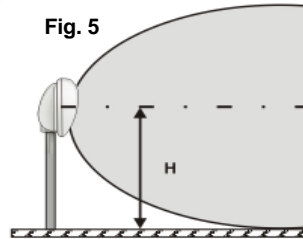


Fig. 5

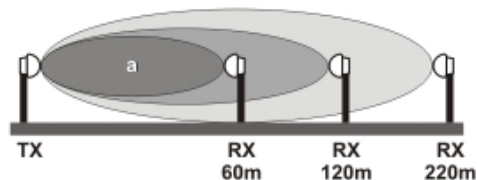
2.6 COVERAGE (BEAM WIDTH)

The distance between the two apparatus (transmitter and receiver) determines the beam width (fig. 6).

Any obstacles, metal partitions, tunnels or other structure placed inside the area of coverage may distort the form and diameter of the beam.

TYPE		EXPLORER BUS 600	EXPLORER BUS 1200	EXPLORER BUS 2200
a	min	50cm	100cm	150cm
	max	120cm	250cm	300cm
b	min	50cm	100cm	150cm
	max	150cm	300cm	400cm

Vertical diagram



Horizontal diagram

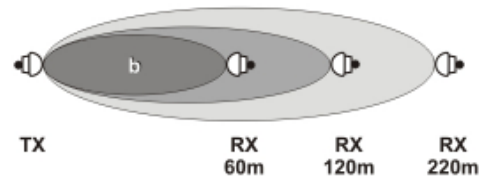


Fig. 6

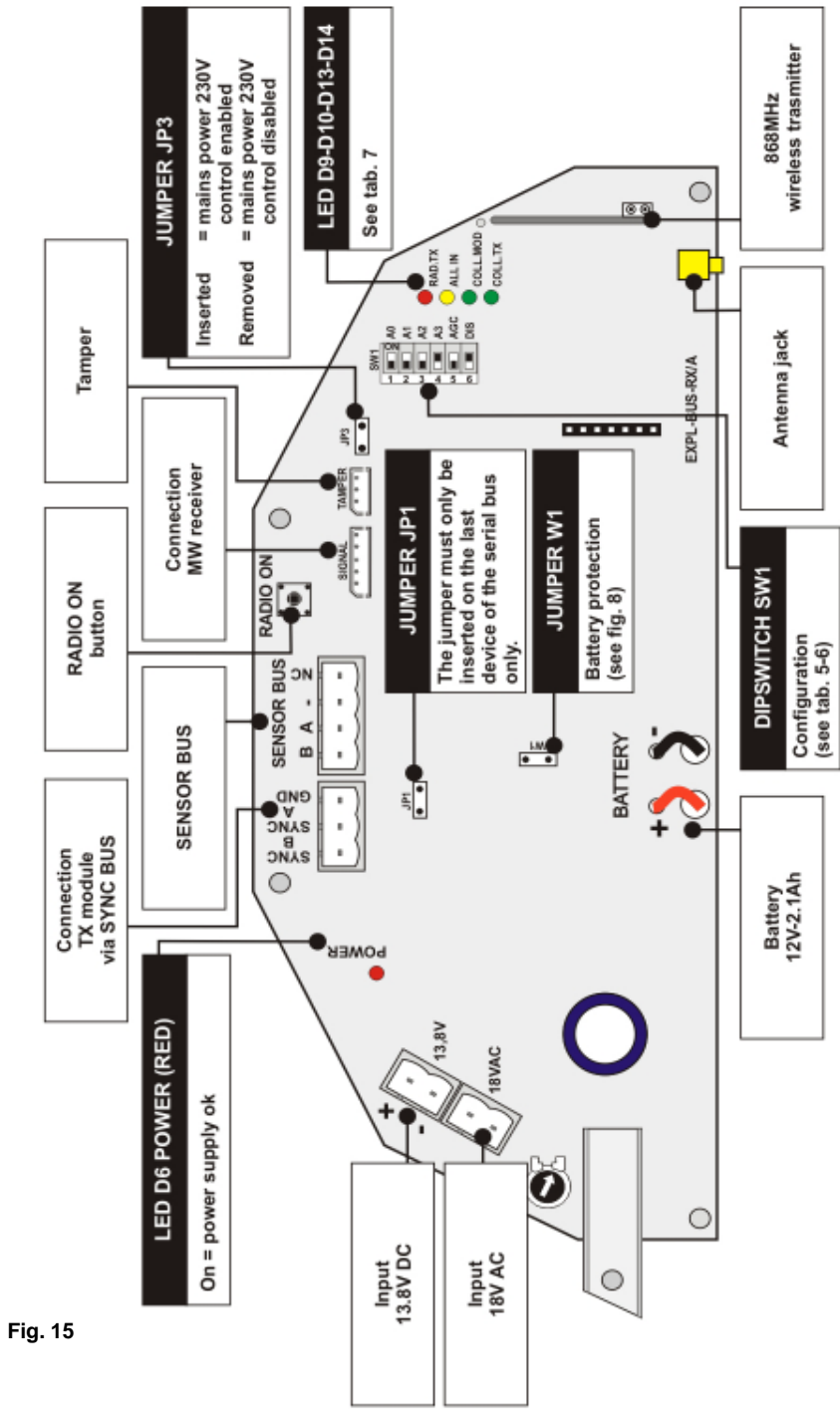


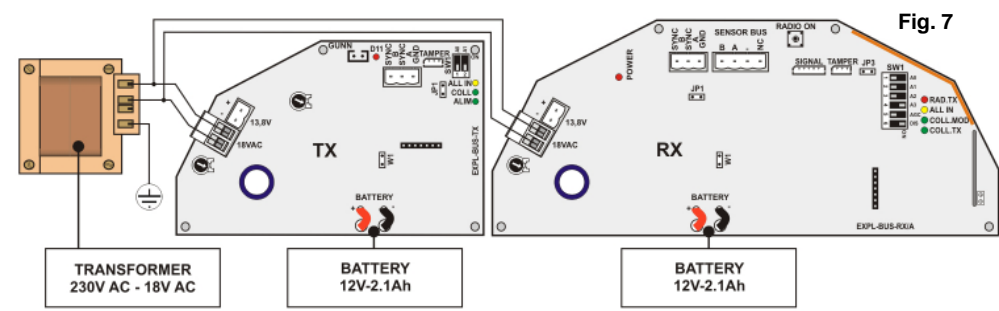
Fig. 15

3. POWER SUPPLY

EXPLORER BUS can be powered with alternated (18V AC) or continued (13.8V DC) voltage.

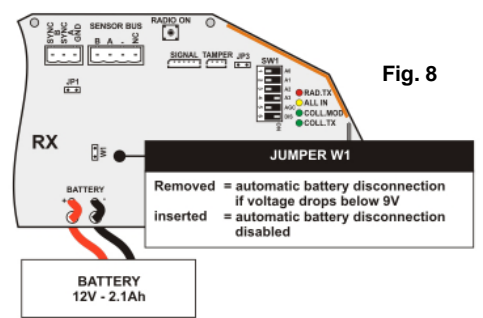
3.1 ALTERNATED (18V AC) POWER SUPPLY VOLTAGE

If alternated power supply voltage is used, connect a 12V-2.1Ah battery inside both apparatus, the receiver and transmitter, of the barrier (fig. 7).

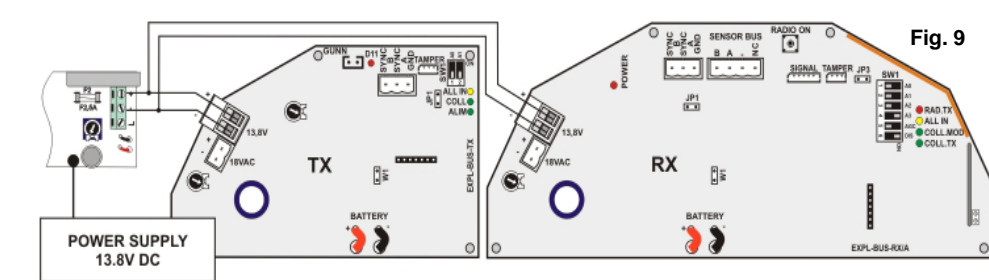


3.1.1 AUTOMATIC BATTERY DISCONNECTION

If alternated power supply voltage (18V AC) is missing, the barrier is powered by the batteries placed inside the apparatus. If power failure is persisting for a long time, the battery provides power supply until voltage has declined to 9V, then it is automatically disconnected in order to protect it against definitive and irreversible discharge. To enable the battery protection circuit, remove the jumper W1. The battery is automatically reconnected on restore of alternated power supply voltage.



3.2 CONTINUED (13.8V DC) POWER SUPPLY VOLTAGE



If continued power supply voltage is used, connect a battery with appropriate capacity inside the power supply casing. A perimeter protection composed of 4 barriers, for instance, may be powered by a 13.8V DC-3A power supply equipped with a battery of min. 12V-17Ah capacity.

WARNING
 The battery protection circuit is not available, as the jumper W1 must compulsorily be inserted.

4. TAMPER PROTECTION

Both apparatus of the barrier are equipped with a micro tamper switch against opening. Upon opening of the casings the tamper switch snaps open causing the alarm release. In addition, the barrier is equipped with a position change detector with internal mercury ampulla. In case of shifting or rotation of the barrier, the contact of the detector is opened and the alarm is released.

WARNING
 For the correct functioning of the position change detector it is essential to install the mounting post in a perfectly upright position. It is recommended to use a spirit-level for installation.

5. CONNECTION

For the connection of the receiver to the control panel and the transmitter with the receiver it is recommended to use a twisted cable by Tecnoalarm. The twisted cables are the only to guarantee a good quality of the signal even over long distances. The transmitter and the receiver are connected via dedicated low speed serial bus (SYNC BUS) (fig.10).

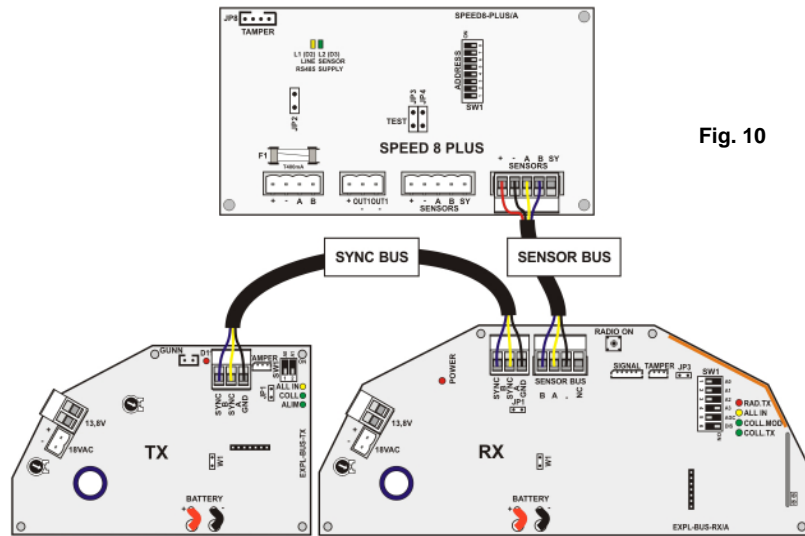


Fig. 10

WARNING

The connection between the transmitter and receiver via SYNC BUS is optional. If they are not connected together, it is not possible to monitor the tamper and fault signaling and the status of power supply of the transmitter module (TX) through control panel. On closing of the tamper switches of the receiver and transmitter all LED on the electronic boards are disabled (LED signaling is disabled) and the wireless transmitter of the microwave receiver is immediately deactivated.

6. PROGRAMMING

Programming can be made at distance by PC with the Tecnoalarm programming software or on the spot through console.

SENSITIVITY

Defines the size of the objects to be detected.

Settings:

- Very sensitive 25% of the optimal signal
- Sensitive 37.5% of the optimal signal
- Normal 50% of the optimal signal
- Hard 62.5% of the optimal signal
- Very hard 72% of the optimal signal

RESPONSE TIME

Defines the period of time the intrusion has to last before an alarm is released.

Settings: 100, 300, 500, 600 milliseconds.

TX CHANNEL

Defines the channel or modulation frequency to be used.

Settings:

- Channel 1 - 5KHz
- Channel 2 - 6KHz
- Channel 3 - 7KHz
- Channel 4 - 8KHz

FAULT SIGNALING

Permits enabling of fault signaling.

SUPERVISION

Permits to ignore alarm signaling of the transmitter if this is not connected to the receiver.

ANTIMASKING

9. RECEIVER

The receiver (RX) has to be connected to the control panel via special input extension module providing a SENSOR BUS connector for RSC detectors, i.e. SPEED PLUS modules.

WARNING

The SENSOR BUS connector is composed of 4 terminals, but merely the terminals A, B, - are used. The receiver is equipped with 6-switches dipswitch SW1.

The switches 1 to 4 permit address programming.

The switch 5 permits enabling/disabling of the automatic gain control (AGC) and the switch 6 permits enabling/disabling of tamper switch.

TAB. 5 - DIPSWITCH SW1 - SWITCH 1..4 - ADDRESS BARRIER

1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4					
ON				0				3				6				9				12				15
ON				1				4				7				10				13				14
ON				2				5				8				11				14				

TAB. 6 - DIPSWITCH SW1 - SWITCH 5, 6 - TAMPER + AGC

SWITCH 5	ON = AGC deactivated OFF = AGC active
SWITCH 6	ON = tamper deactivated OFF = tamper active

In addition, the receiver provides a 868MHz wireless transmitter permitting the execution of the functioning test, if used jointly with the external wireless receiver MONITOR 868.

LED SIGNALING

TAB. 7 - RX LED SIGNALING

LED D6 POWER (RED)	POWER SUPPLY On = power supply ok
LED D9 RAD.TX (RED)	WIRELESS TRANSMISSION On = wireless transmission active
LED D10 ALLIN (YELLOW)	ALIGNMENT On = TX and RX aligned
LED D13 COLL.MOD (GREEN)	COMMUNICATION WITH MODULE On = communication between RX and input extension module ok
LED D14 COLL.TX (GREEN)	COMMUNICATION WITH TX On = communication between RX and TX ok

N.B. When the tamper is closed, all the LED are off.

8. TRANSMITTER

The transmitter (TX) can be connected to the receiver (RX) via special low-speed serial bus (SYNC). The connection of the two devices is optional, if it is missing, it is not possible to monitor tamper, fault and power supply signaling.

The transmitter is equipped with 2-switches dipswitch (SW1) for the selection of the transmission channel. According to the channel programmed, different modulated frequencies are used (tab. 3).

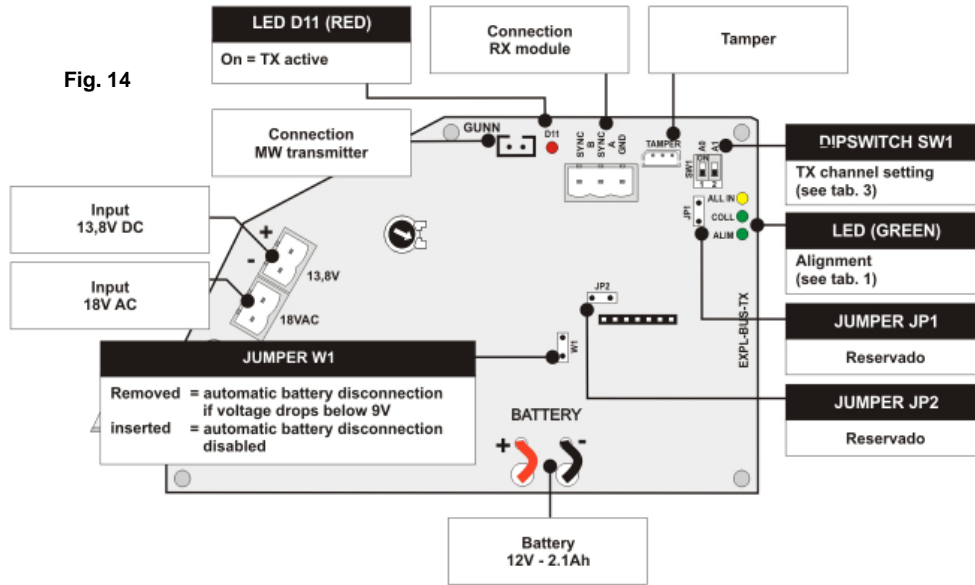
WARNING

If the transmitter and receiver are connected together, transmission channel setting is ignored.

The transmitter is equipped with a special control circuit permitting to verify if the microwave transmitter (GUNN) is connected and operating.

TAB. 3 - TRANSMISSION CHANNELS	
ON	Channel 1 - Frequency 5KHz
ON	Channel 2 - Frequency 6KHz
ON	Channel 3 - Frequency 7KHz
ON	Channel 4 - Frequency 8KHz

Fig. 14



TRANSMITTER TYPES

There are 3 transmitter types providing different transmission ranges:

- TX EXPLORER BUS 600 - 60 meters range
- TX EXPLORER BUS 1200 - 120 meters range
- TX EXPLORER BUS 2200 - 220 meters range

LED SIGNALING

TAB. 4 - TX LED SIGNALING

LED	ALIGNMENT
LED D6 ALLIN (YELLOW)	On = TX and RX aligned N.B. It is lit only if TX and RX are connected together via SYNC bus.
LED D7 COLL (GREEN)	On = TX and RX connected together
LED D8 ALIM (GREEN)	On = power supply ok
LED D11 GUNN (RED)	On = microwave transmitter active Off = microwave transmitter faulty

N.B. When the tamper is closed, all the LED are off.

Defines the period of time masking of the barrier has to last before signaling is released.

Settings: disabled, 10 seconds, 30 seconds, 60 seconds

ANTIMASKING ACTIVE

Determines if the antimasking control is always enabled or only if the relative program (the zone is included in) is armed.

7. ALIGNMENT AND TEST

For the smooth functioning of the barriers it is indispensable to align the transmitter and the receiver, or rather ensure that one apparatus is right in front of the other so that the axis passing across the center of the parabola of the receiver and the transmitter is one straight line.

First of all, align the barrier visually, i.e. turn one of the two apparatus (RX or TX) so as to determine the angles where the opposite device captures the signal and where it loses it. Then point the device at the mid point between the two.

Repeat the procedure with the other apparatus.

7.1 ALIGNMENT

After visual alignment proceed with the fine alignment. For this, it is indispensable to disable the automatic gain control (AGC) by turning the switch 5 of the dipswitch SW1 to ON.

Fine alignment can be done either manually, using the wireless receiver MONITOR 868 or by PC.

7.1.1 MANUAL ALIGNMENT

After disabling the automatic gain control (AGC), the two green LED on the microwave transmitter and receiver assume the function of alignment LED (tab. 1).

Turn the transmitter or receiver slowly searching the optimal signal.

WARNING

LED signaling on the transmitter is only valid if the two devices (TX and RX) are connected together through SYNC wire.

7.1.2 ALIGNMENT WITH WIRELESS RECEIVER (MONITOR 868)

- Connect the antenna to the jack on the receiver module making sure that it comes out of the casing in order to avoid any attenuation of the signal (fig. 11).
- Press the RADIO ON button on the receiver module until the red RADIO TX LED is lit.

TAB. 1 - ALIGNMENT LED

LED off	= insufficient signal (< 55%)
1 LED on	= reasonable signal (> 55%)
2 LED on	= good signal (> 80%)

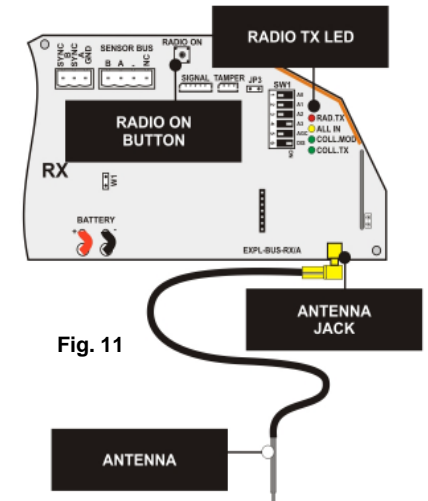
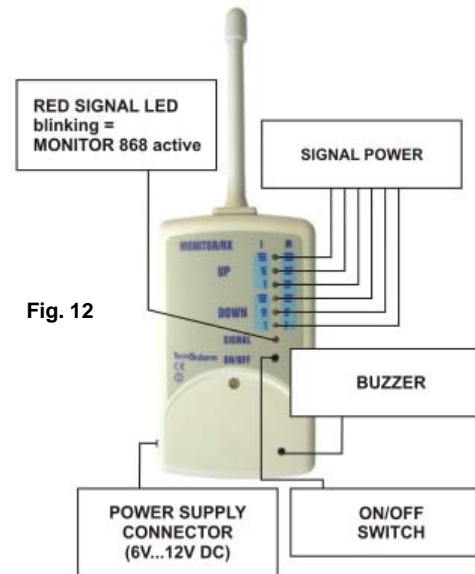


Fig. 11

Fig. 12



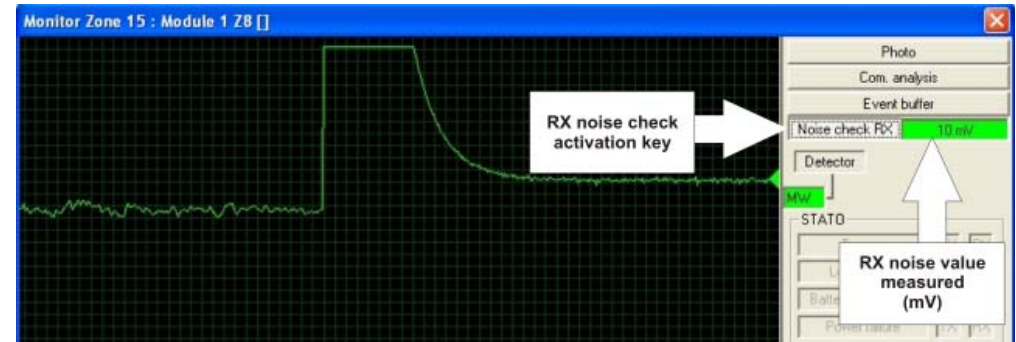
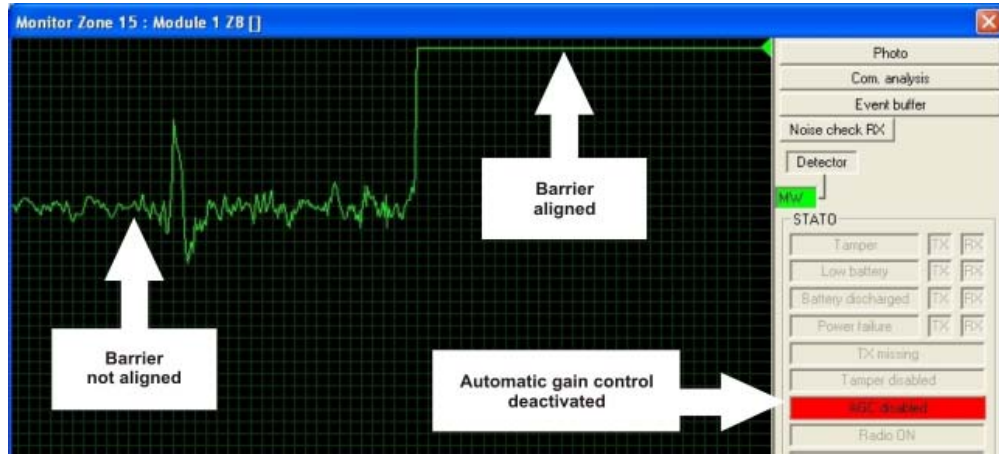
TAB. 2 - MONITOR 868 ALIGNMENT LED

LED off	= no signal (< 15%)
1 LED on	= insufficient signal (> 15%)
2 LED on	= bad signal (> 30%)
3 LED on	= medium low signal (> 45%)
4 LED on	= reasonable signal (> 60%)
5 LED on	= good signal (> 75%)
6 LED on	= optimal signal (> 90%)

Once the automatic gain control (AGC) has been disabled, the 6 LED (3 yellow and 3 green) on the wireless receiver MONITOR 868 (fig. 12) signal alignment (tab. 2). Turn the transmitter or receiver slowly searching the optimal signal.

7.1.3 ALIGNMENT BY PC

Connecting the barrier on the spot to a PC equipped with the Tecnoalarm programming software, it is possible to view the graph illustrating the signal level captured by the receiver (alignment signal).



7.2 TEST

The wireless receiver MONITOR 868 beside the usefulness as an alignment instrument permits the execution of the functioning test of the barrier. The receiver module of the barrier is equipped with a 868MHz wireless transmitter to be used jointly with the external wireless receiver MONITOR 868 for the functioning test. To activate the test mode, proceed as follows:

- Connect the antenna to the receiver module of the barrier paying attention that it comes out of the casing in order to avoid any signal attenuation.
 - Press the RADIO ON button on the receiver module until the red RADIO TX LED is lit.
- Once the wireless receiver MONITOR 868 has been activated, it provides the following signaling:
- The buzzer is activated if an alarm condition has been detected.
 - The red LED indicates the presence of the modulation generated by the microwave transmitter and received by the microwave receiver (signal).
 - The yellow and green LED indicate the quality of the signal received. The value signaled is equalized according to the sensitivity programmed.

To deactivate the test mode, press the RADIO ON button on the receiver module of the barrier again.

WARNING

The wireless transmitter of the receiver module only works if the tamper is open. On closing of the tamper, it is automatically deactivated.

7.2.1 NOISE CHECK

With the help of the on the spot programming software, it is possible to check the noise level, i.e. the background noise captured by the microwave receiver.

It is recommended to execute this test every time, you are not sure if the barrier works correctly.

To activate the noise check, click on the **Noise check RX** button.

The microwave transmitter section is deactivated. On the screen is viewed a coloured graph representing the background noise captured and the value expressed in millivolt is shown next to the **Noise check RX** button.

The colour of the item indicates the intensity of the background noise:

- **GREEN** the background noise is moderate (the barrier works correctly)
- **YELLOW** the background noise is acceptable (the noise should not be prejudicial to the correct functioning of the barrier)
- **RED** the background noise is excessive (the noise is prejudicial to the correct functioning of the barrier)

To deactivate the noise check, click on the **Noise check RX** button again or close the window. The microwave transmitter section is activated again.

7.3 GENERAL REMARKS ON ALIGNMENT

Alignment is crucial for the smooth functioning of the barrier. The barriers must in fact be **perfectly** aligned. If alignment has been completed successfully, the yellow LED D10 on the receiver is lit. If the receiver and the transmitter are connected together through the SYNC wire, alignment is signaled on the transmitter, too. If they are not connected together, it will be necessary to select the transmission channel on the transmitter using the dipswitch SW1.

7.4 SENSITIVITY AND RESPONSE TIME SETTING

Sensitivity is set by acting on two parameters, i.e. Sensitivity and Sensitivity-Response time (fig. 13), no matter if setting is made by PC using the Tecnoalarm programming software or by console.

- **Sensitivity**
Permits to increase or reduce coverage of the barrier (i.e. increase/reduce the diameter of the beam).
- **Sensitivity-Response time**
Permits to increase or reduce the sensitivity in terms of response time of the barrier (i.e. detect quicker or slower crossings of the beam).

For a correct sensitivity setting, program the Sensitivity-Response time at minimum and adjust the sensitivity in order to obtain the best possible coverage.

7.4.1 SENSITIVITY CHECK

To check sensitivity, it is recommended to enable the continuous chime function on the zone in question and connect an acoustic signaler (e.g. indoor siren).

WARNING

Bear in mind that chime signaling associated to an output may be delayed by approx. 1 second.

Proceed as follows:

- Make a step and stay still for at least 1 second awaiting acoustic signaling. Then, make another step. Since the receiver is equipped with automatic gain control (AGC), it is recommended to stand still for some seconds between one step and the other, so that the AGC has the time to adjust.
- Once you have set the sensitivity, increase the Sensitivity-Response time and make several test crossings using bigger and smaller targets and make them cross the beam more quickly or more slowly in order to find out the best value. Stand still between one crossing and the other.

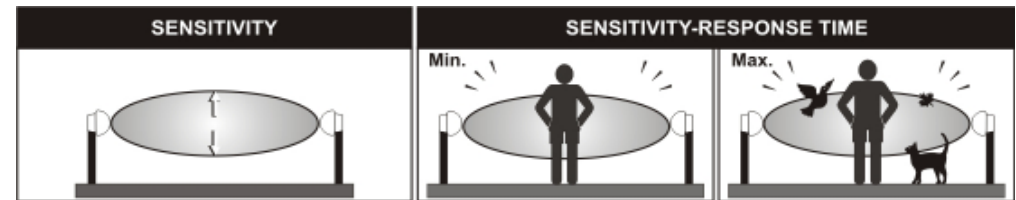


Fig. 13