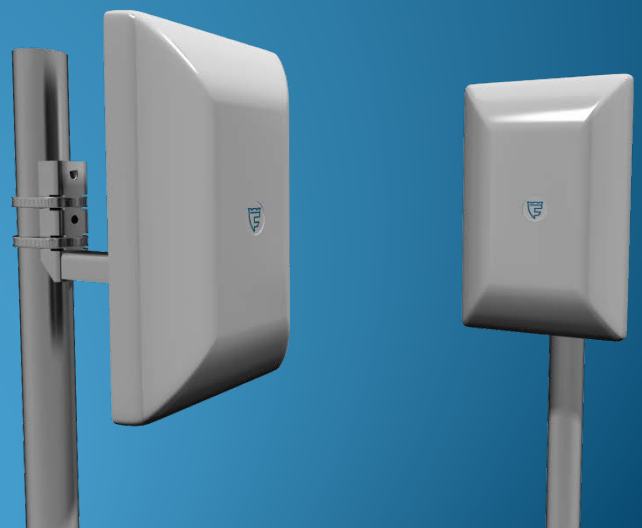
“Perimeter – first line of protection”

Prepared by:
Forteza JSC

FORTEZA

FMC 10 and FMC 24
Microwave bistatic detector



Purpose

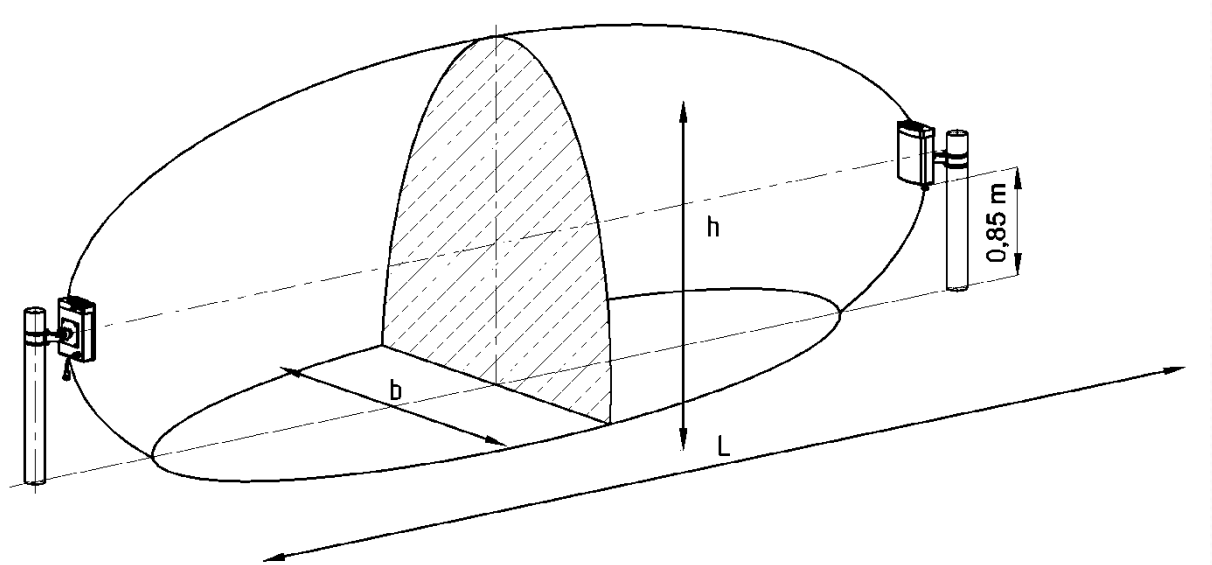
- Detectors are intended for the protection of different sites and for detecting an intruder crossing the detection zone.

Operation principle

- Detectors operation is based on the creating of an electromagnetic field between Rx and Tx. This field provides a volumetric detection zone in the form of a long ellipsoid of rotation.

Detection and Shadow zones

- Detection zone – the spatial part of the section in which offender movement can initiate the alarm.
- Shadow zone (non-sensitive area) - the spatial part near the detectors mounting location for the detection zone where the geometry is not registered offender.



Features

- Sensor may be connected to various information gathering devices, central unit, video recording systems, object processes or security software, because the detectors are triggered by disconnecting contacts of a relay (NC).
- All sensor units are made of light-stabilized plastic that protects them from corrosion.
- Different detection zone lengths up to 50, 100, 200 meters
- The variety of detection zone length modifications lets the customer choose the appropriate sensor for the definite site, optimize the use of technical security equipment and minimize the cost at the expense of the difference of sensors price.
- High noise immunity: snow, rain, small animals in a secured area. The detector maintains stable operation even under influence of strong electromagnetic fields (power lines up to 500 kV).

Distinctive features




- The multi-threshold operation algorithm provides a high resistance to outdoor disturbances;
- 4 independent channels, which allows to avoid the nearby zones affect each other;
- Possible sensor adjustment without tools (using build in switches);
- **Using a computer with software:**

- Interference or environmental visualization and analysis in (vegetation, animals, car, etc.);
- Operating signal (mV) visualization, more detailed positioning of the transmitter and the receiver;
- Flexible sensitivity settings, applying sensors to the existing protection zone;
- You can adjust the speed of movement of the offender in detection zone.

FMC series models

- **FMC 10 (10,525 GHz)**

FMC 10 (200 m) –10…200 m

FMC 10 (100 m) – 10…100 m

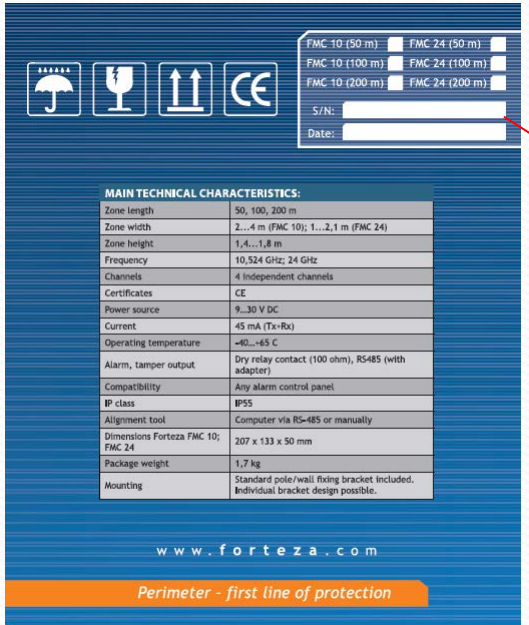
FMC 10 (50 m) – 5…50 m

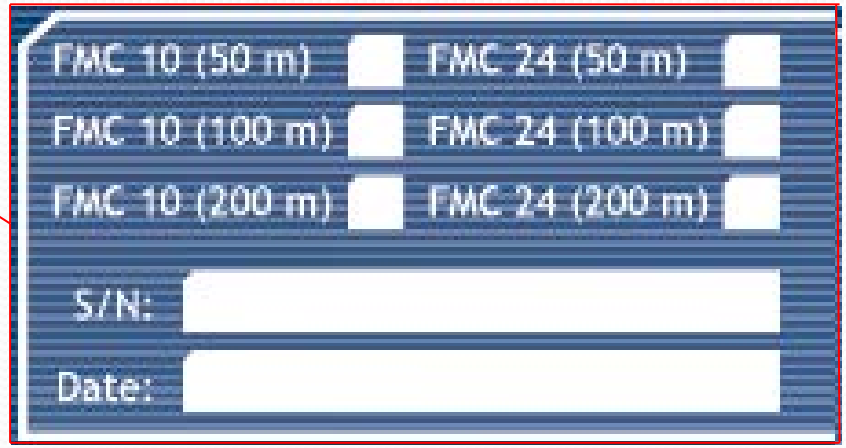
- **FMC 24 (24 GHz)**

FMC 24 (200 m) –10…200m

FMC 24 (100 m) –10…100 m

FMC 24 (50 m) – 5…50 m





The maximum widths/heights of a detection zones:

Model	Width	Height	Shadow zone
FMC 10 (200m)	4	1,8	2-3 m
FMC 10 (100m)	3	1,6	
FMC 10 (50m)	2	1,4	

Model	Width	Height	Shadow zone
FMC 24 (200m)	2,1	1,8	3-5 m
FMC 24 (100m)	1,5	1,6	
FMC 24 (50m)	1	1,4	

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MAIN TECHNICAL CHARACTERISTICS:		
Parameter	FMC 10,524 GHz	FMC 24 GHz
Zone length	50, 100, 200 m	
Zone width	2...4 m	1...2,1 m
Zone height	1,4...1,8 m	
Frequency	10,5 GHz	24 GHz
Channels	4 independent channels	
Certificates	CE	
Power source	10...30 V DC	
Current	45 mA (Tx+Rx)	
Operating temperature	-40...+65˚C	
Alarm, tamper output	Dry relay contact (up to 100 Ω)	
Compatibility	Any alarm control panel	
IP class	IP55	
Alignment tool	Computer via RS-485 or manually	
FMC dimensions	207 x 133 x 50 mm	
Package weight	1,7 kg	

INSTALLATION

The preparation to the sensor operation is the following:

- preparation of the sector;
- layout of transmitters and receivers;
- signal cables and power supply laying;
- Tx and Rx installation;
- sensor connection (connection of power supply and intruder alarm loops);
- alignment of Tx and Rx antennas
- Rx thresholds setting.

Requirements for the protected sector

- The height of irregularities should not exceed ±0,3 m.;
- The height of the grass should not exceed 0,3 m;
- The height of the snow should not exceed 0,5 m;
- The maximum incline of the sector is 40°;

NOTE: *The requirements is active if the detector is not adjusted with computer software.*


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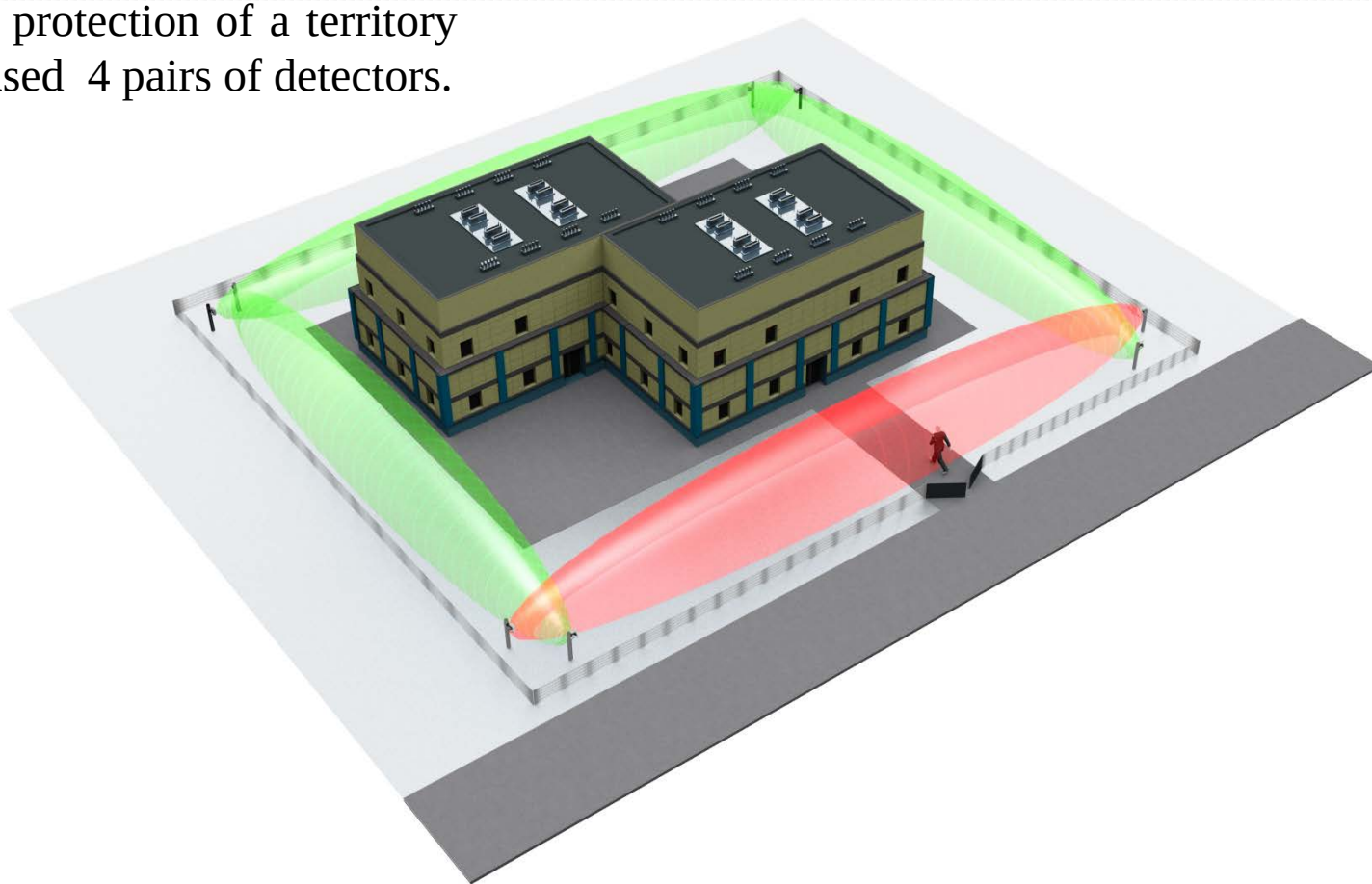
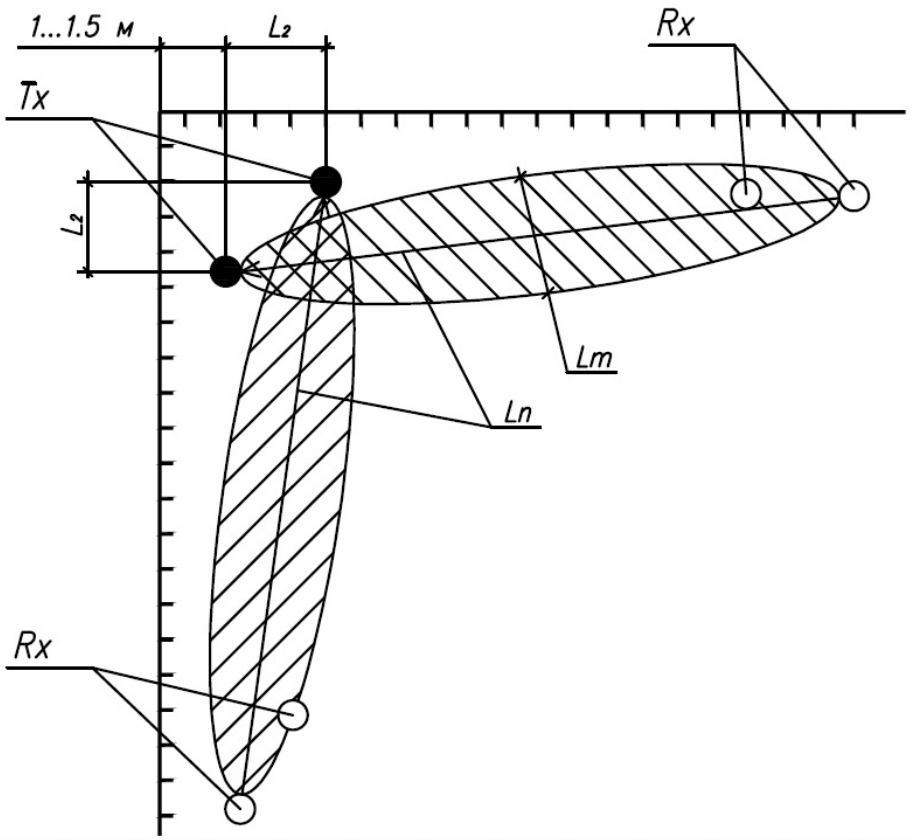
TX and RX locations

A territory is divided into sections. For protection of one section, used one pair of detectors . Usually, for protection of a territory of a correct form , are used 4 pairs of detectors.



Detection zones criss-crossing in the corner



Distance / Sensor	Not less than, m		Range, m		
	L1	L2	Ln	Lm	Lk
FMC 10 (200m)	3	3	10..200	1..4	1
FMC 10 (100m)	2	2	10..100	1..3	1
FMC 10 (50m)	1	1	5..50	1..2	1
FMC 24 (200m)	4	4	10..200	1..2,1	1
FMC 24 (100m)	3,5	3,5	10..100	1..1,5	1
FMC 24 (50m)	3	3	5..50	0,8..1	1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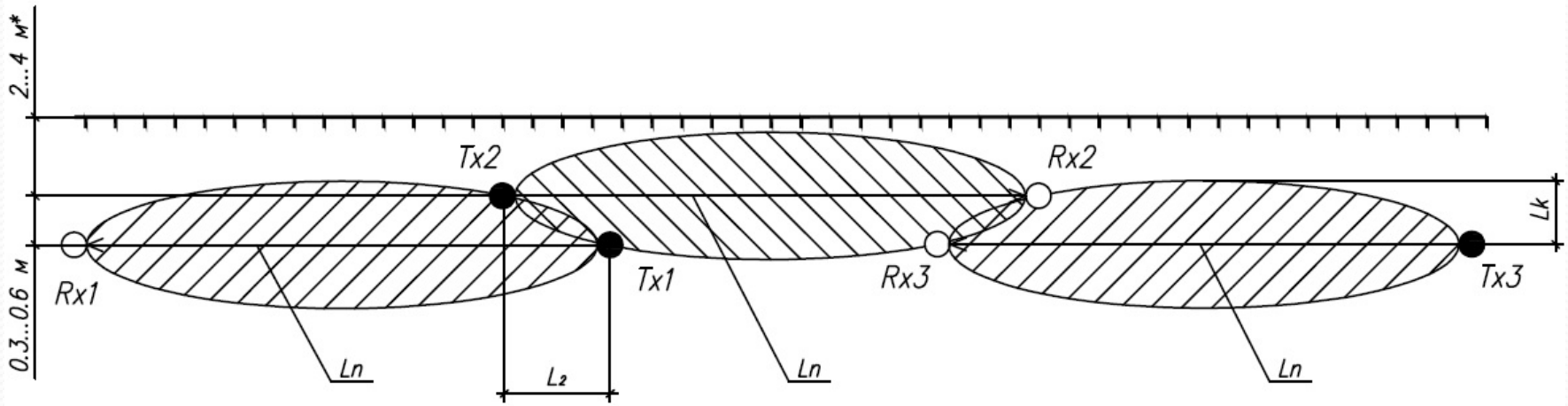
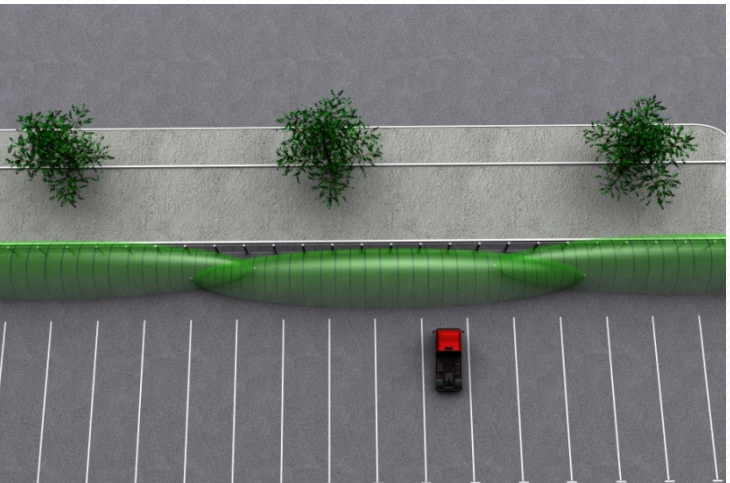
Detection zones criss-crossing in line





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FMC 24 (200m)	4	4	10..200	1..2,1	1
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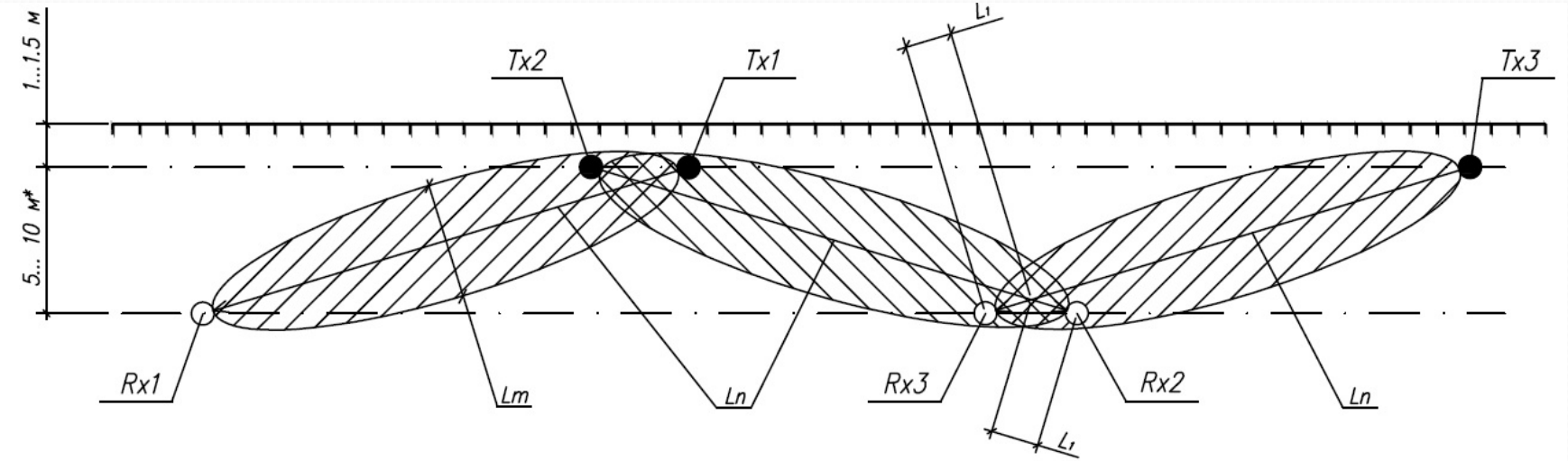
Detection zones criss-crossing



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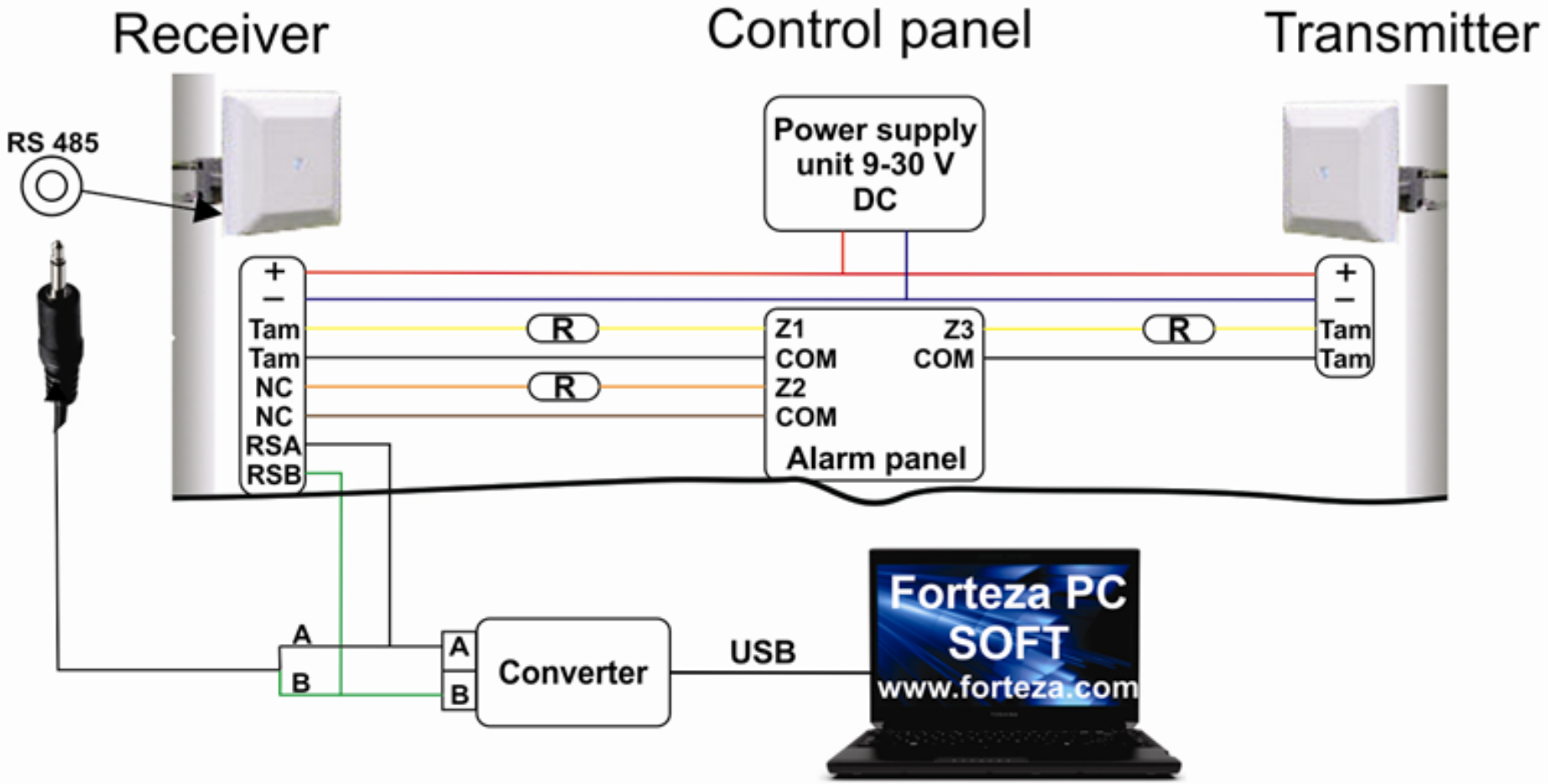
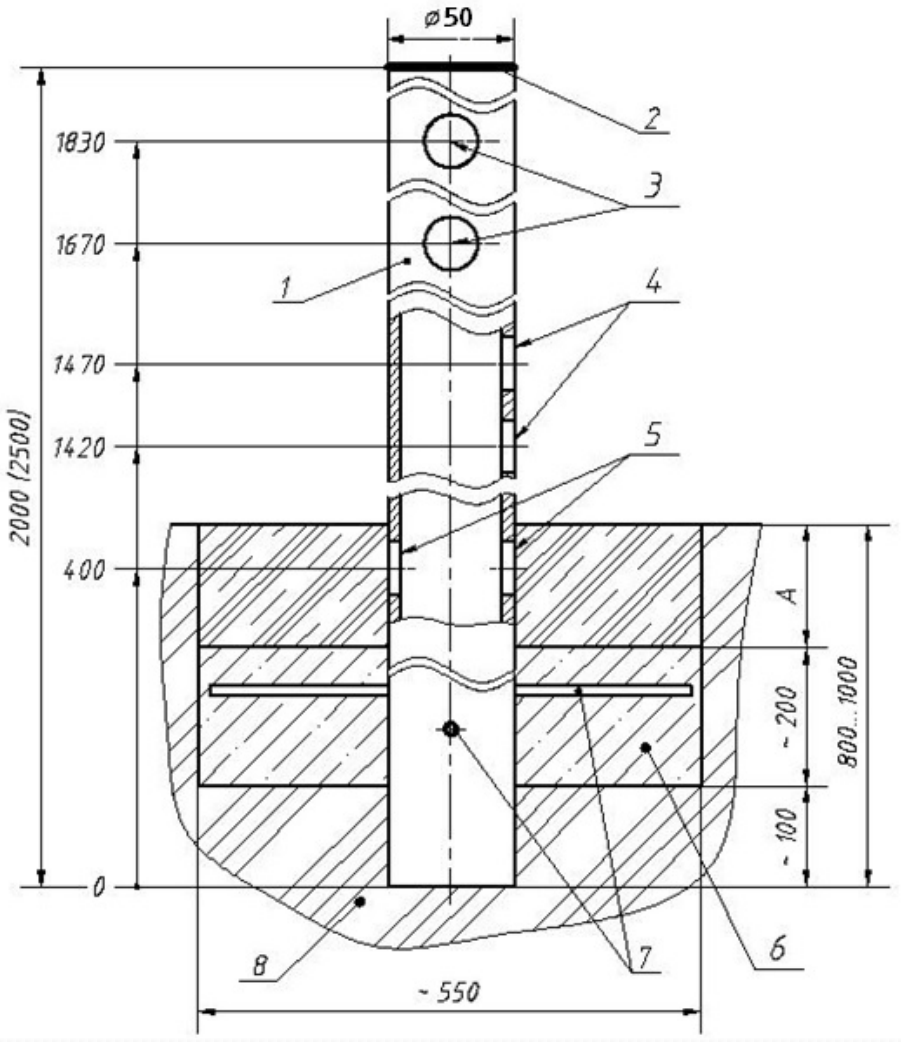
Signal cables and power supply laying

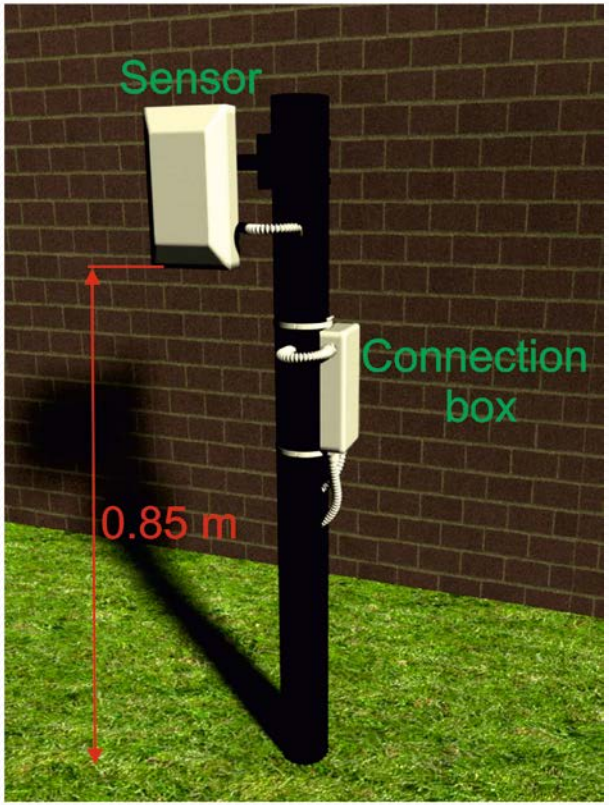


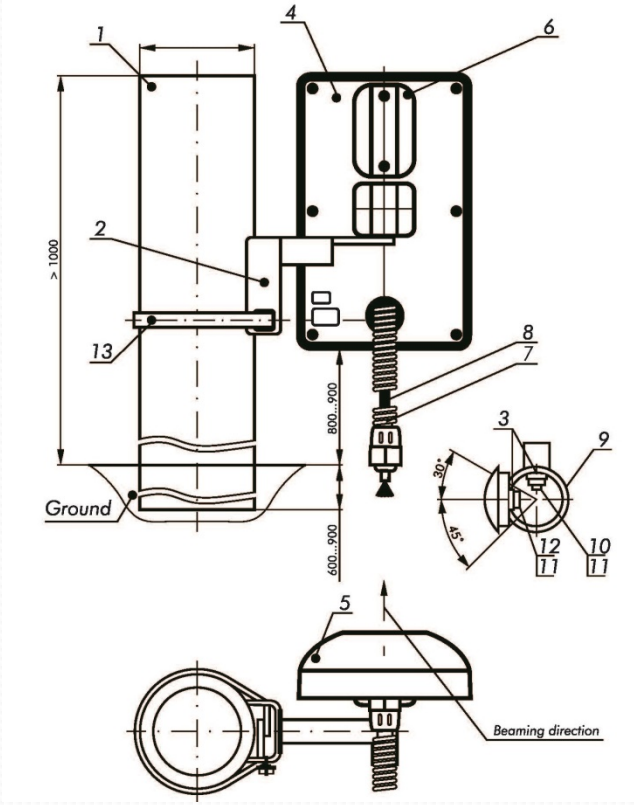
Mount the supports

- 1 - support;
- 2 - plastic plug;
- 3 - hole for the cable input inside the support;
- 4 - hole for the main cable and sensor cable input;
- 5 - hole for the main cable input;
- 6 - concrete (gravel);
- 7-dowels for prevention the unauthorized dismounting of the support;
- 8- ground



Detectors construction and its fastening elements to the support



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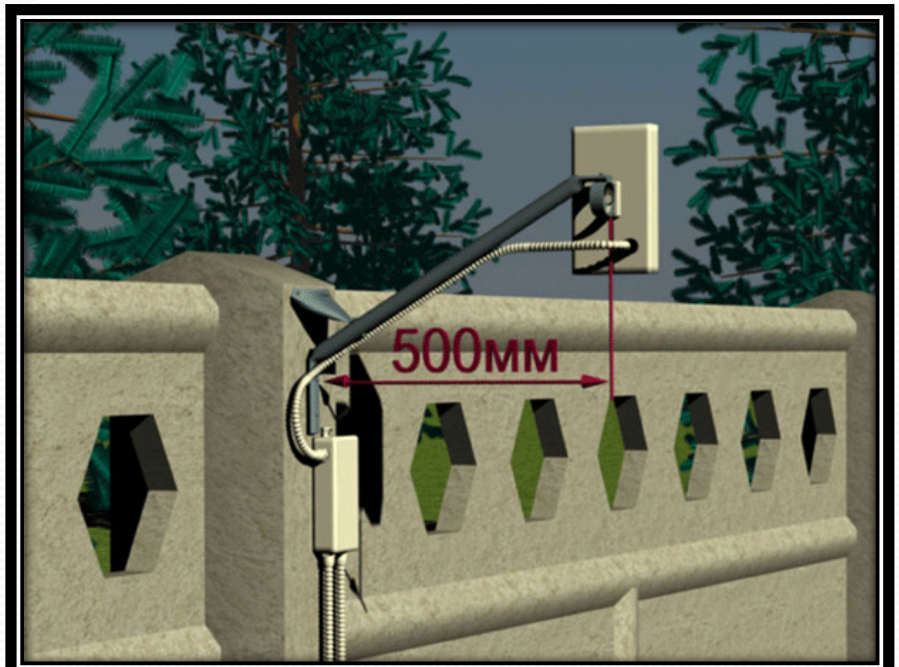
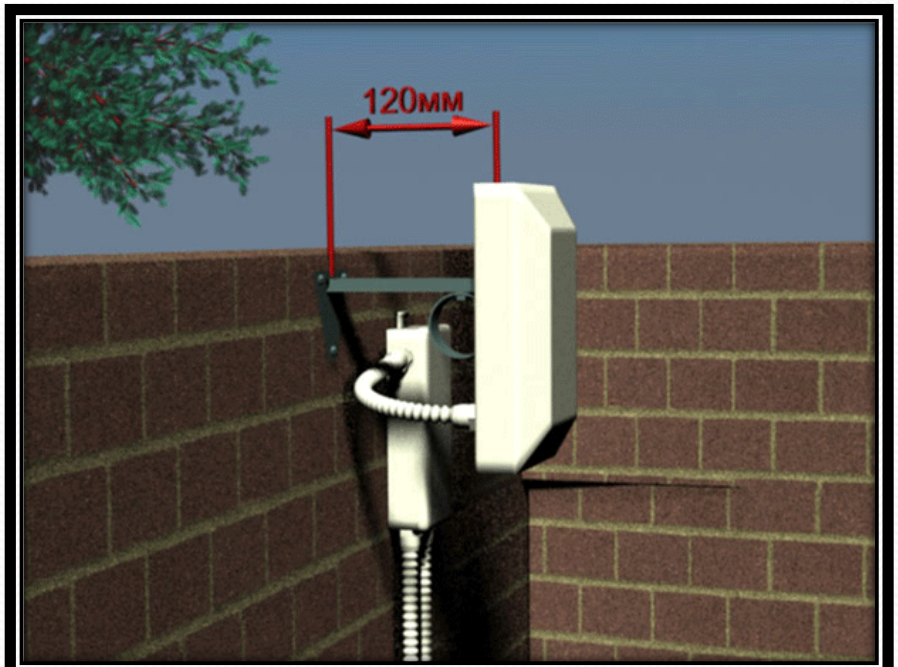
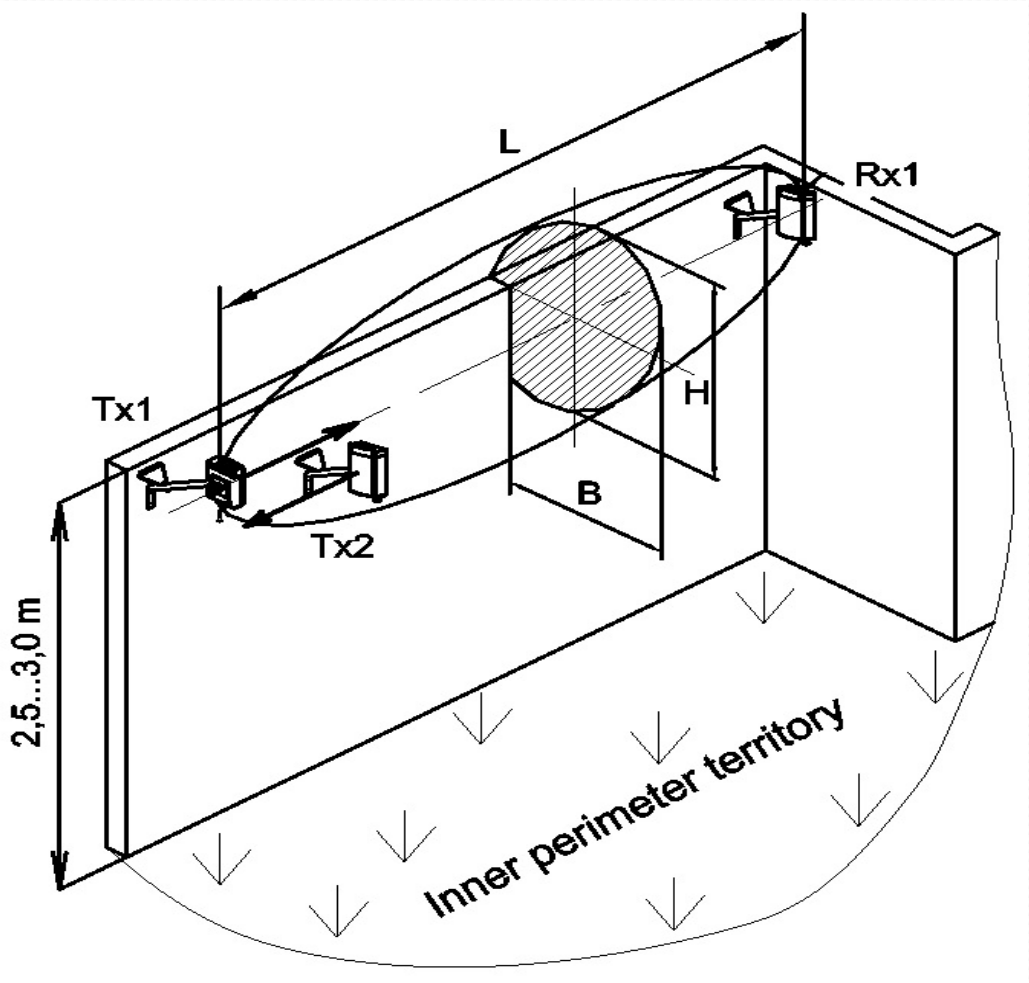
Other variants of the detectors mounting

Detector	Max detection zone length (L), m	Max detection zone width (b), m	Max detection zone height (h), m
FMC 10 (50m)	30	1,5	1,5
FMC 10 (100m)	50	1,5	1,5
FMC 10 (200m)	100	1,5	1,5





Detection zones criss-crossing



Detectors mounting on the fence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Masking of detectors

- If needed, detectors may be hidden inside radio wave permeable objects, such as plastic boxes, polyethylene pipes etc.

Masking of detectors

Masking of detectors

Detectors preparation for operation

- It is necessary to set the different channels to nearby detection zones. FREQ CH switches 

- Direct Rx and Tx against each other.
- Check the right connection of supply circuits and output circuits of the detector.
- Switch ON the power supply.
- When power is supplied to detector Rx and TX units, the “LED” blinking indicates the operation channel and additional information.

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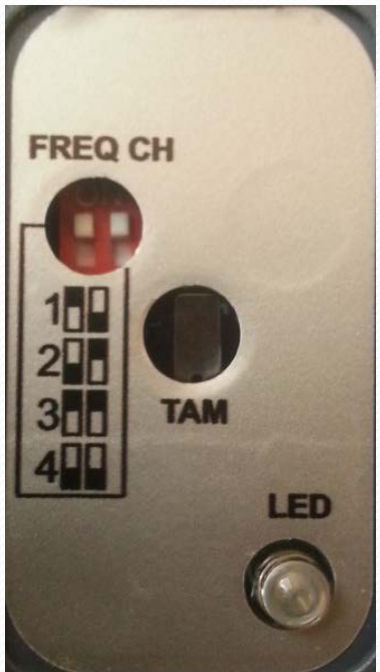
Detectors calibration and adjustment with the built-in adjustment, control and indication parts

When power is supplied to detector Rx and TX units, the “LED” blinking indicates the frequency channel after additional information:

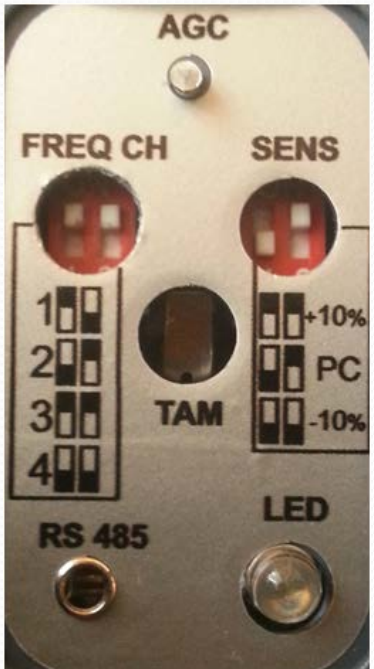
Transmitter TX

LED” blinks once per 2 sec it is means that power is connected and it is acceptable range.



Receiver RX

After 3-5 sec Rx “LED” is switch off which means that detector is in operation mode.



- After 1-2 minutes afters tuning the power supply, check the status of “LED” indicator: the indicator should be off, that informs, detector is in standby mode.
- **Note:** ***In situation, if the indicator Rx continuously on, periodically and briefly goes out or lights up-determine the problem and correct it using*** **TROUBLESHOOTING GUIDE in the manual.**

Detectors calibration

- Performed incrementally and consists of a set of repetitive actions.
- The alignment can be started with both transmitter and receiver.
- In the alignment mode, the detector switch, when you press and hold down the button, "AGC" on receiver. The indicator “LED” and BUZZER is switched ON.
- Tx and Rx are adjusted on the angle of the place and the azimuth according to the buzzer signals and “LED” blinking’s (on the RX).

The calibration includes the following actions:

- Loosen the RX holders bolts;
- Press and hold the button “AGC” on Rx. Rotate Rx horizontally, seeking the maximum signal flashes/beeps, then rotate the Rx vertically, seeking the maximum signal (the most frequent LED indicator flashes/beeps). Release the „AGC“ button;
- Repeat actions upper to calibrate the TX;
- Tighten the bolts.

Sensitivity setting manually

- Standard switches SENS in the position 

this means that sensitivity is set from computer. You can change the sensitivity +10% or -10% percent's using switches if it necessary.

- We offer to set switchers in position – 10% and cross the detection zone in different points. In case if the detector is not generated alarm during the investigator passage, set first switchers to position 

and after that to position + 10% .

Note. If switcher's is in position + 10% , but the detector is not generated alarm during the investigator passage, please use computer to adjust the sensitivity.

Advantages using a computer with software:

- Interference or environmental visualization and analysis in (vegetation, animals, car, etc.);
- Operating signal (mV) visualization, more detailed positioning of the transmitter and the receiver;
- Flexible sensitivity settings, applying sensors to the existing protection zone;
- You can adjust the speed of movement of the offender in detection zone.

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Detectors calibration and adjustment with with PC

Advantages using a computer with software:

- Interference or environmental visualization and analysis in (vegetation, animals, car, etc.);
- Operating signal (mV) visualization, more detailed positioning of the transmitter and the receiver;
- Flexible sensitivity settings, applying sensors to the existing protection zone;
- You can adjust the speed of movement of the offender in detection zone.

Programing Software

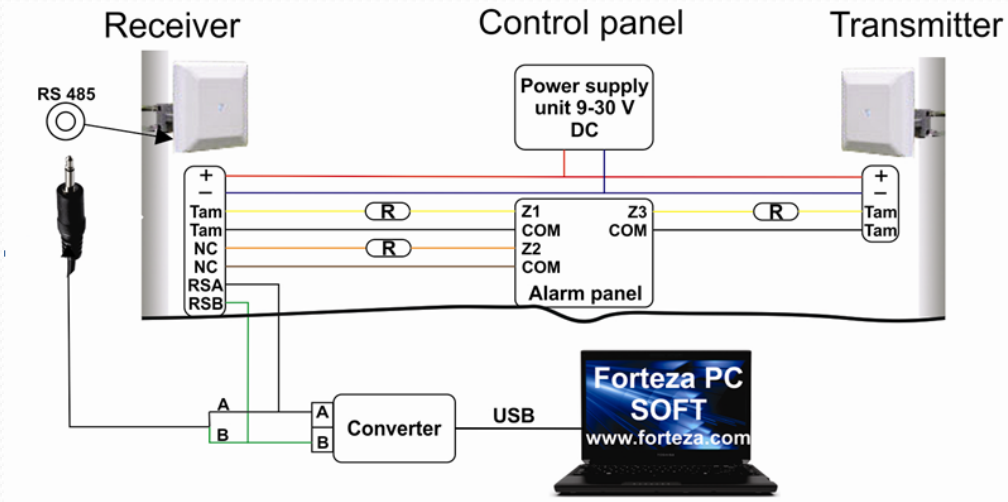
- Is free of charge included to detectors set on USB
- Install the software
- Connect the sensor to PC with RS 485
- Run program
- Set COM port

Sensor Connection with computer

- You can choose 2 variants for connections.

A) Connect the programming extension cable throw converter to the receiver socket “RS-485” using the connection cable from FORTEZA RS- 485/USB kit.

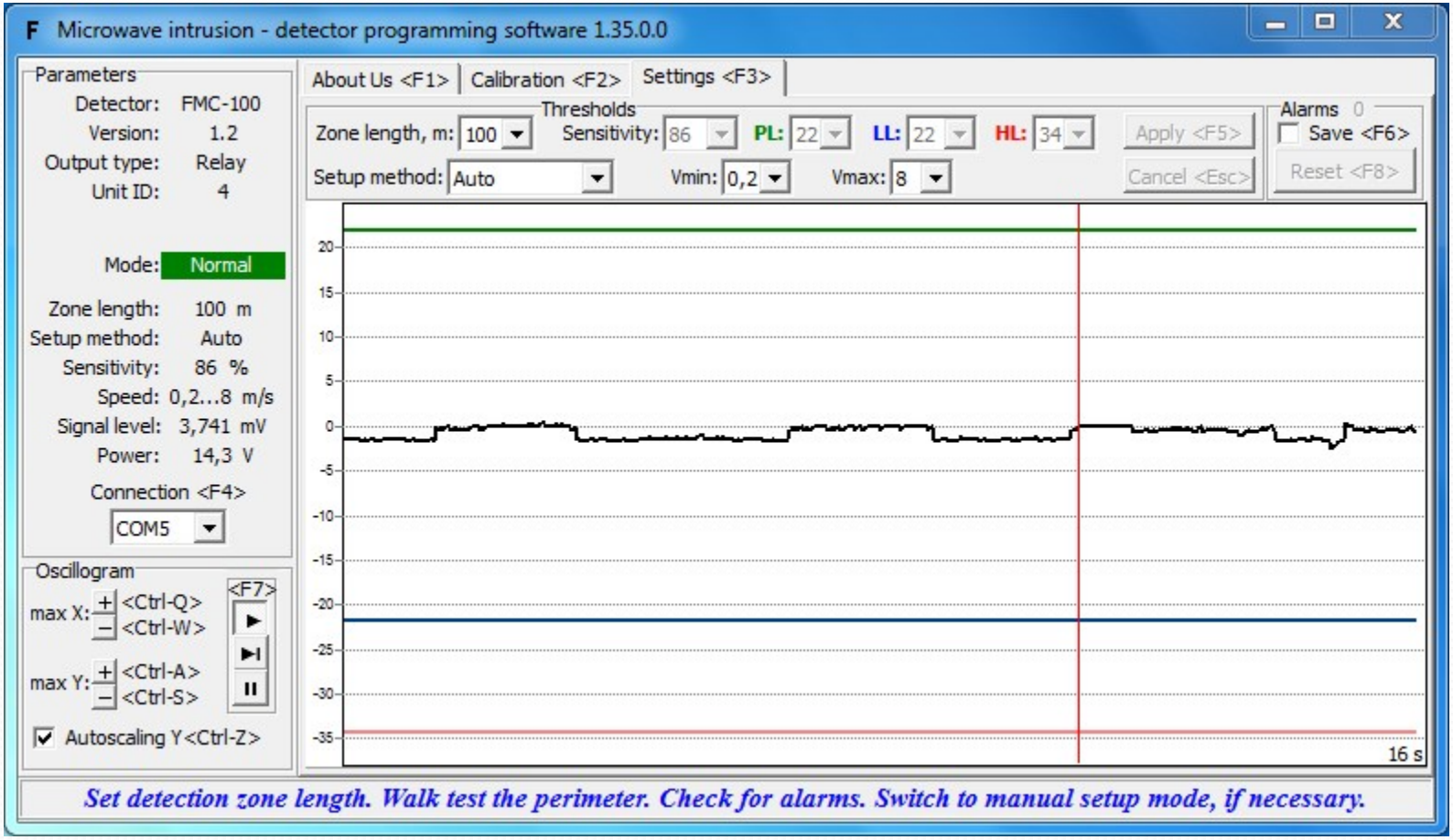
B) Connect the programming converter RS-485 to connection cables RS A or RS B (white and green) from RX 8-cable



Forteza FMC software

- Double click Forteza_FMC.exe, it starts immediately (without any installation)
- Select communication port
- ***Note: You can find the COM port settings in the manual of your converter. Or you can check the used COM port in Start menu / Control panel / System / Hardware / Device manager / COM ports in Windows operation system.***

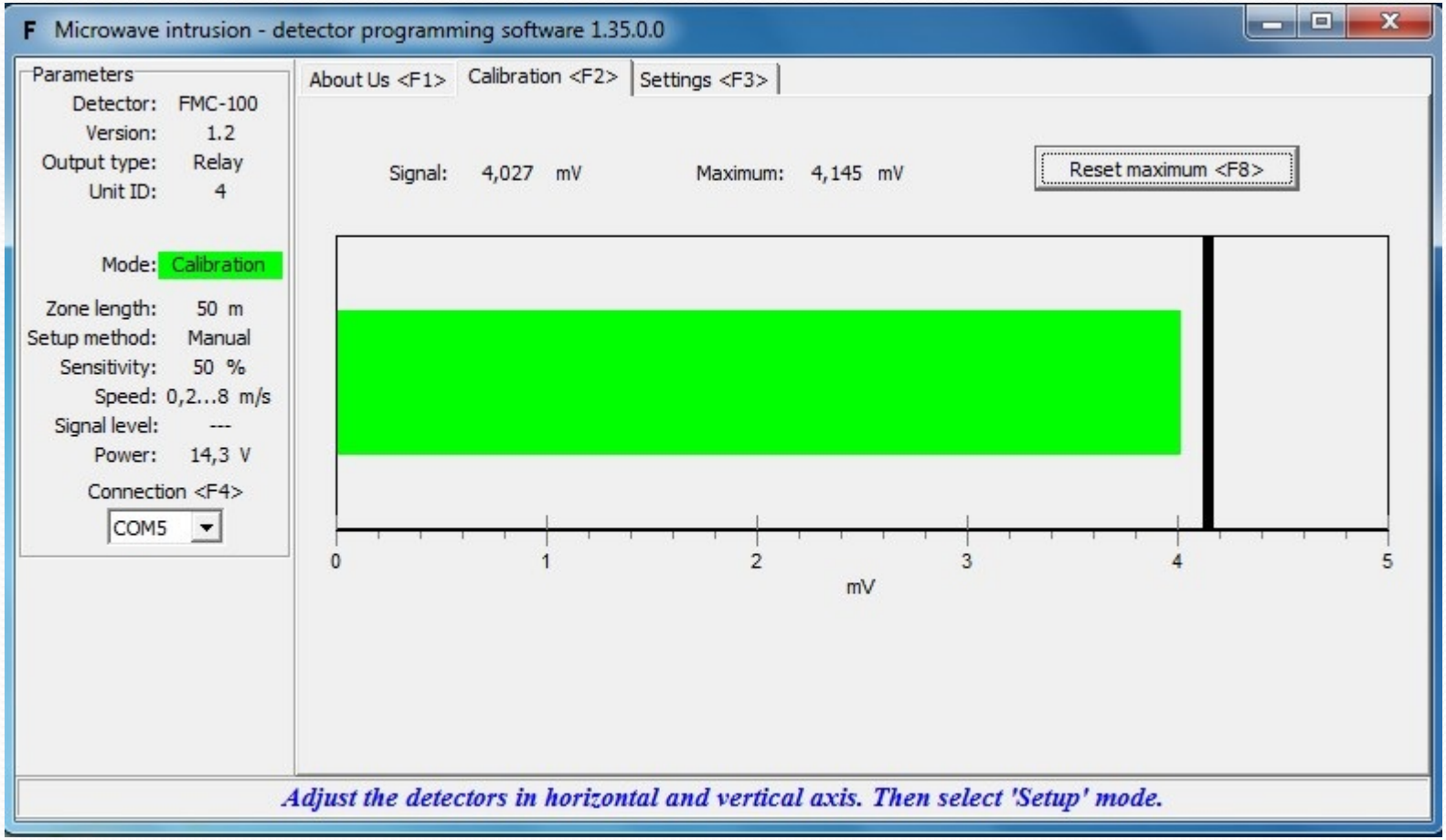
After choosing the proper com port, the communication with the device starts automatically.



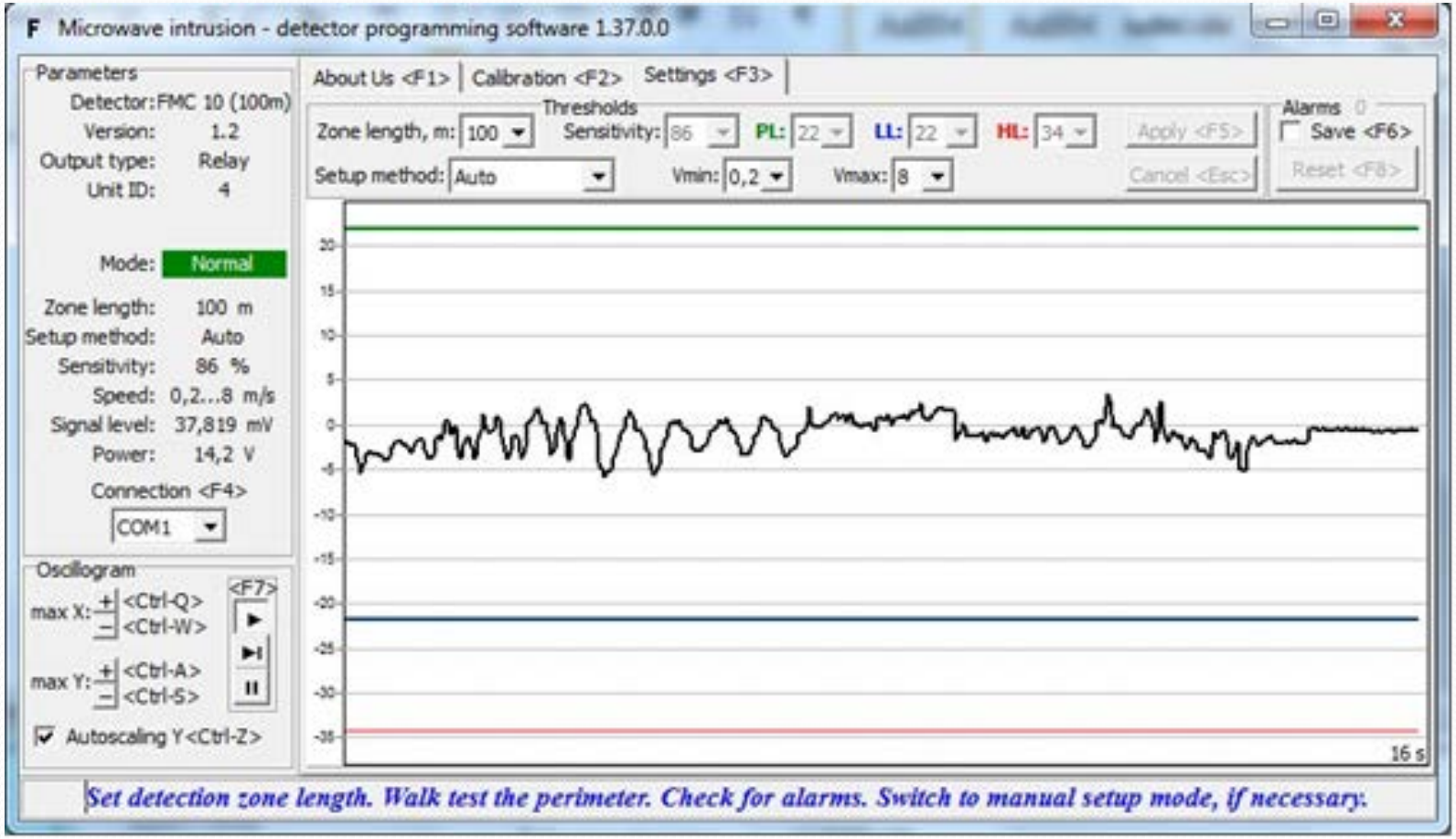
Sensor adjustment with PC

- Calibration
- Interference or environmental visualization and analyse
- Sensitivity method AUTO
- Sensitivity method MANUAL
- Sensitivity method SPECIAL 2

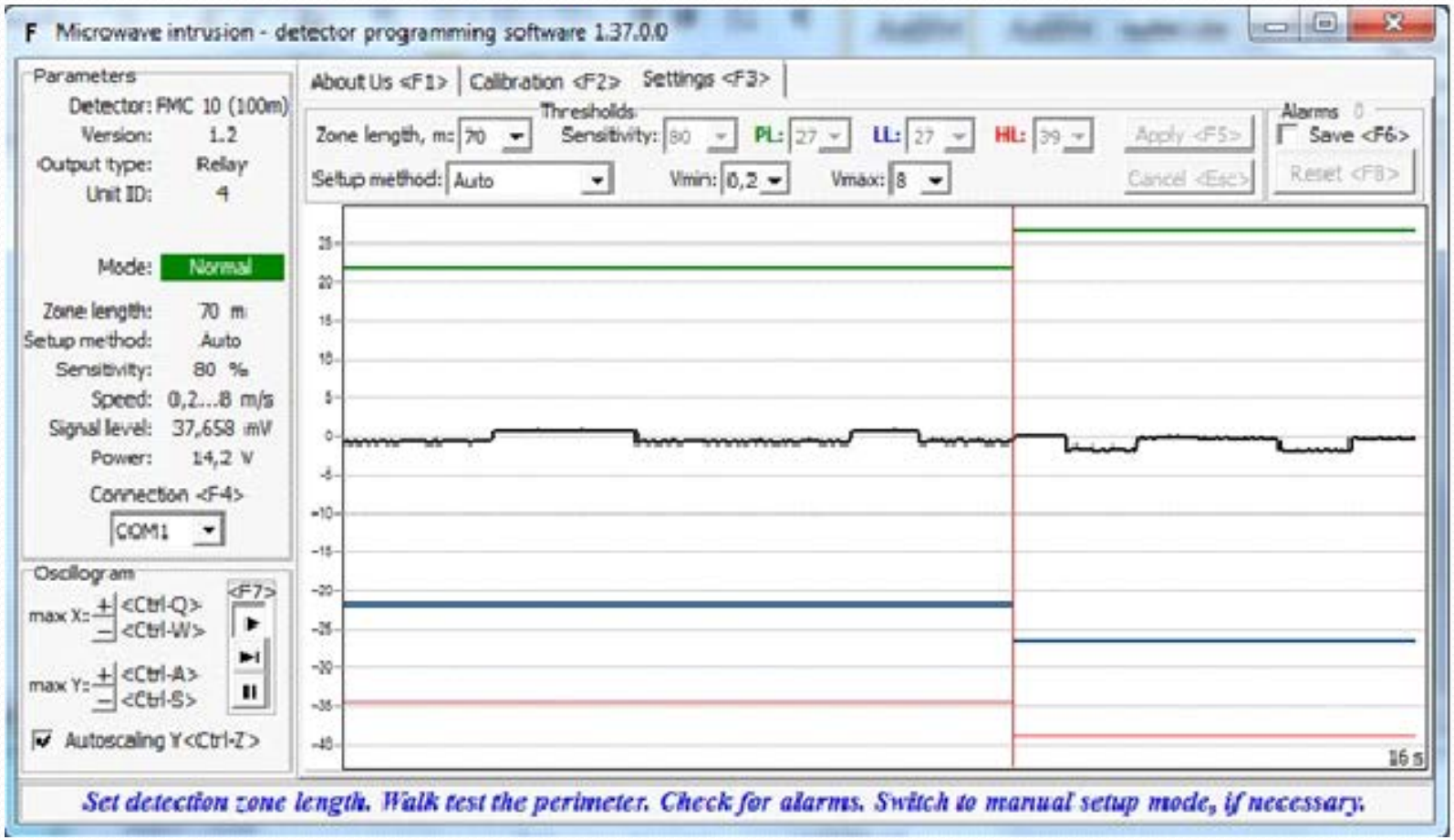
Calibration direct TX to RX



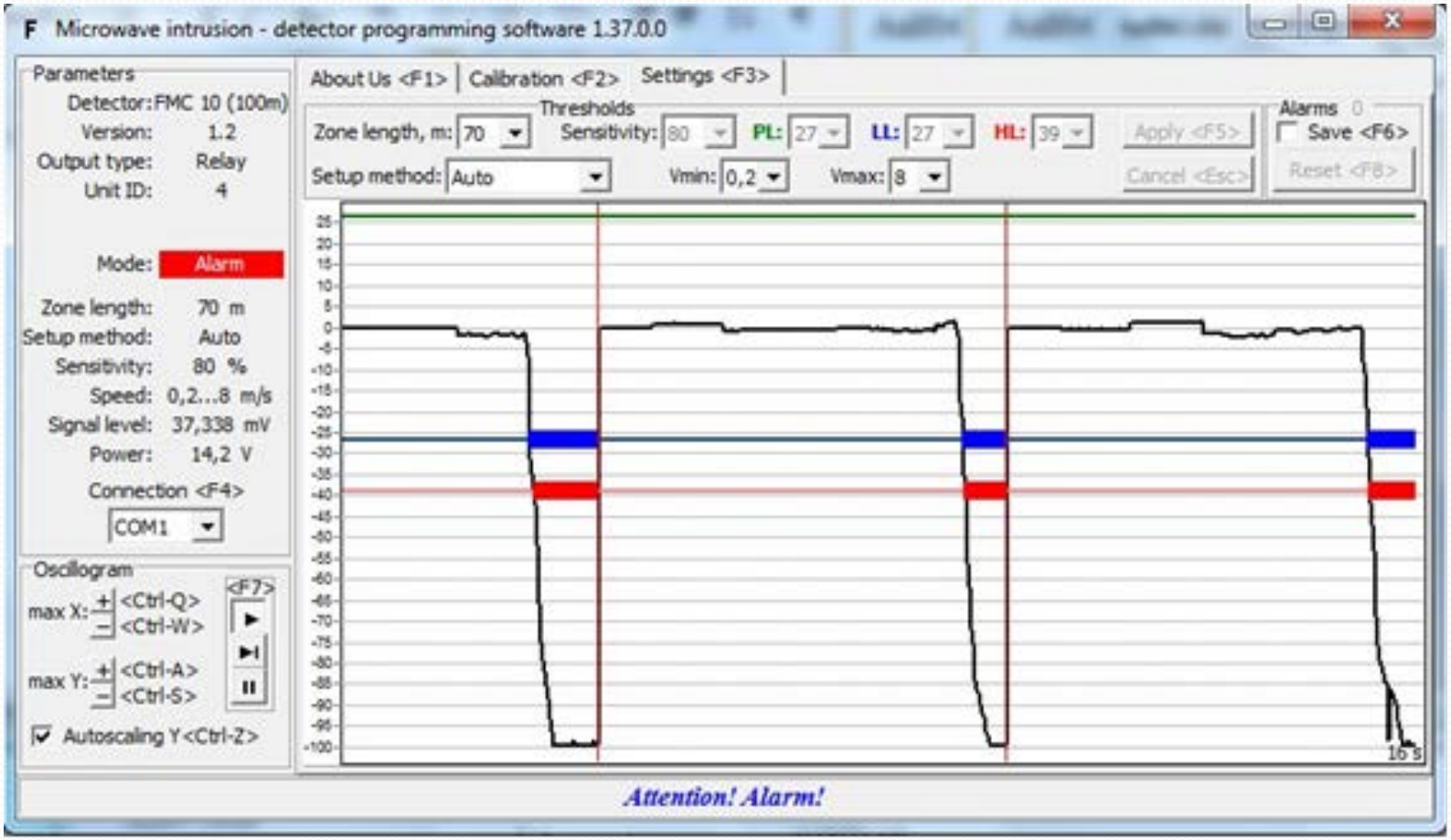
Interference visualization and analyse



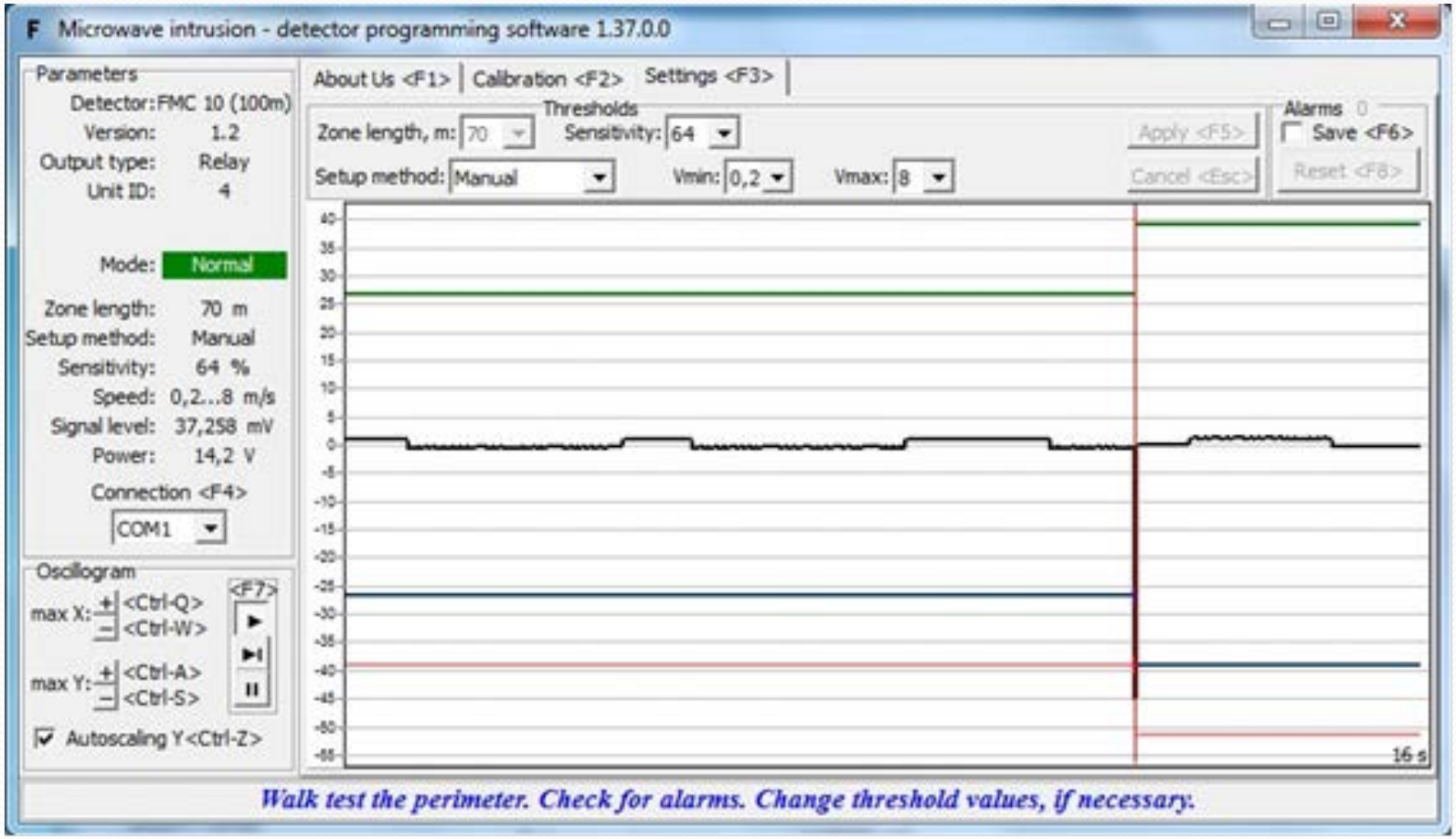
Sensitivity method AUTO



Control passages



Sensitivity method MANUAL



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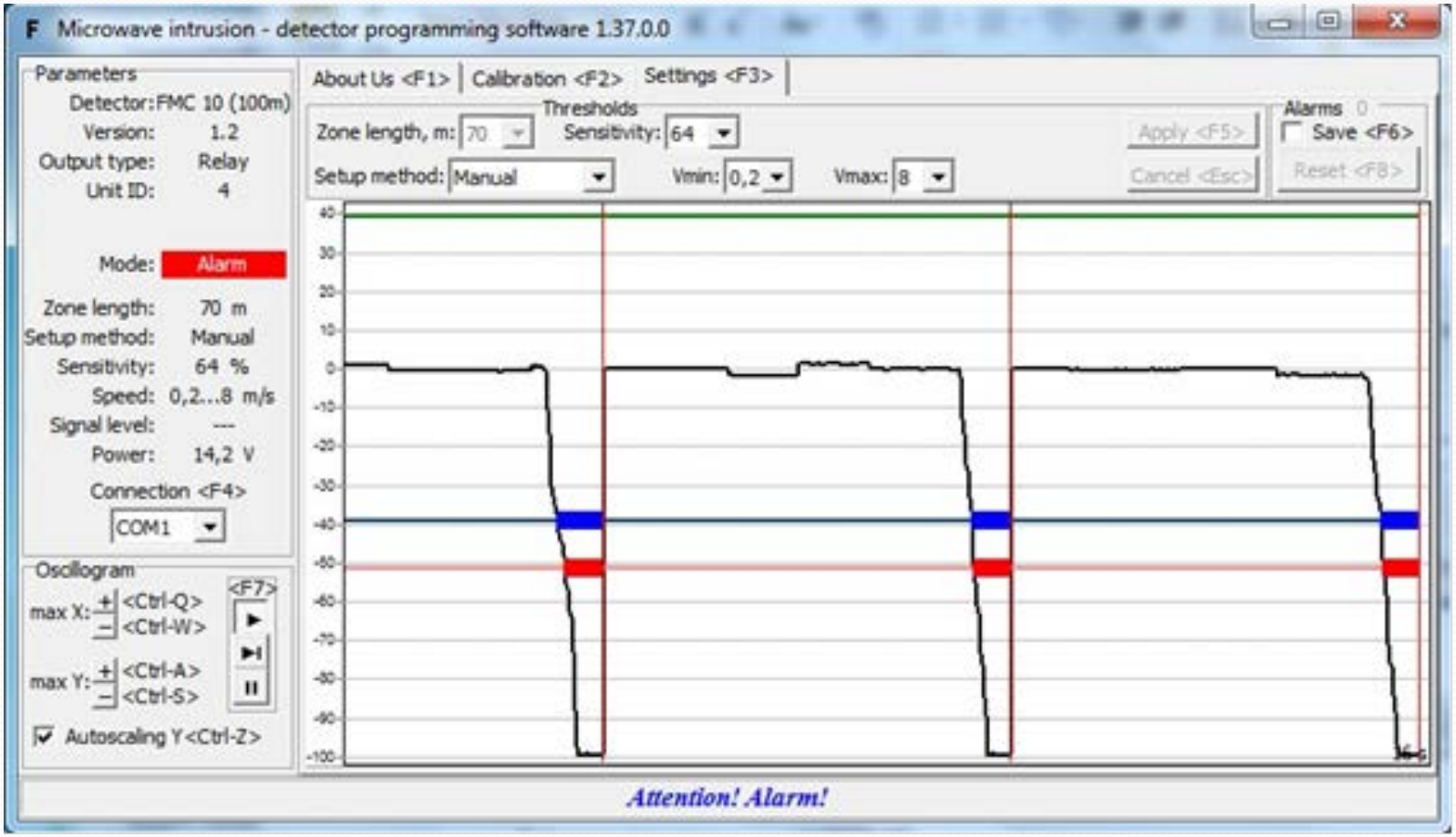

Thank you for attention!