



LB Sky Global

92 Lobachevskogo St, Bld 92, Office 5, Moscow, Russia 119454
Tel/Fax 7(495)229-39-78, E-mail: office@group1b.com,
Site: www.group1b.com



Perimeter security system

T-REX



Table of content

1. Introduction	3
2. Main features of the T-REX system.....	3
3. Structure of the system	5
4. SL-6000 system sensors.....	6
5. Signal processing unit FU-16	7
6. Compensation of weather effect.....	8
7. Information provided by the system.....	9
8. Communication line.....	9
9. Systems for collecting, processing, displaying and storing information.....	10
9.1. Master controller T-REX-6000	10
9.2. Information display and storage subsystem.....	10
10. Main advantages of the T-REX system.....	12
11. Additional features of the system	12

1. Introduction

Perimeter security system T-REX has been designed and produced by holding Group LB. Group LB's specialists have designed and installed security systems in various countries all over the world for more than 20 years.

The T-REX system is a general purpose technical facility that ensures security of the object regardless of its geographical location, types of technical security systems used, land surface pattern, weather conditions, and other factors.

2. Main features of the T-REX system

No.	Description	Value
1	Characteristics	
1.1	Probability of detection of intruder with body weight of 45 kg or more	> 99%
1.2	Number of false trips per 1000 m of the perimeter per year	< 2 Time.
1.3	Weather conditions compensation unit	Integrated weather station
1.4	Length of detection zone (localization zone)	100 m
1.5	Time before stable operation of the detection equipment after switching on power	< 40 sec
1.6	Maximum length of perimeter with the maximum number of connected signal processing units (70 units)	196 000 m
1.7	Integrated standby power supply unit, operation time	> 2 hr
1.8	Seasonal adjustment of the system	Not required
1.9	Service life, minimum	15 years
1.10	Warranty period for the system	10 years

No.	Description	Value
2	The detection equipment ensures the specified interference immunity on exposure to following interference factors	
2.1	Wind gusts	up to 30 m/s
2.2	Ambient temperature without microclimate control	-32°C to +80°C
	Ambient temperature with microclimate control	-70°C to +80°C
2.3	Depth of snow or grass canopy	up to 2 m
2.4	Rain, snowfall or hail intensity	up to 50 mm per hour in water equivalent
2.5	Hoar-frost and atmospheric ice, depth	up to 8 mm
2.6	Lightning discharge at a distance	over 100 m
2.7	Relative humidity (with a hood over the signal processing unit)	100% at 25°C
2.8	Movement of an individual or a group of people at a distance	over 0,05 m
2.9	Moving motor vehicle at a distance from the fence	over 1 m

3. Structure of the system

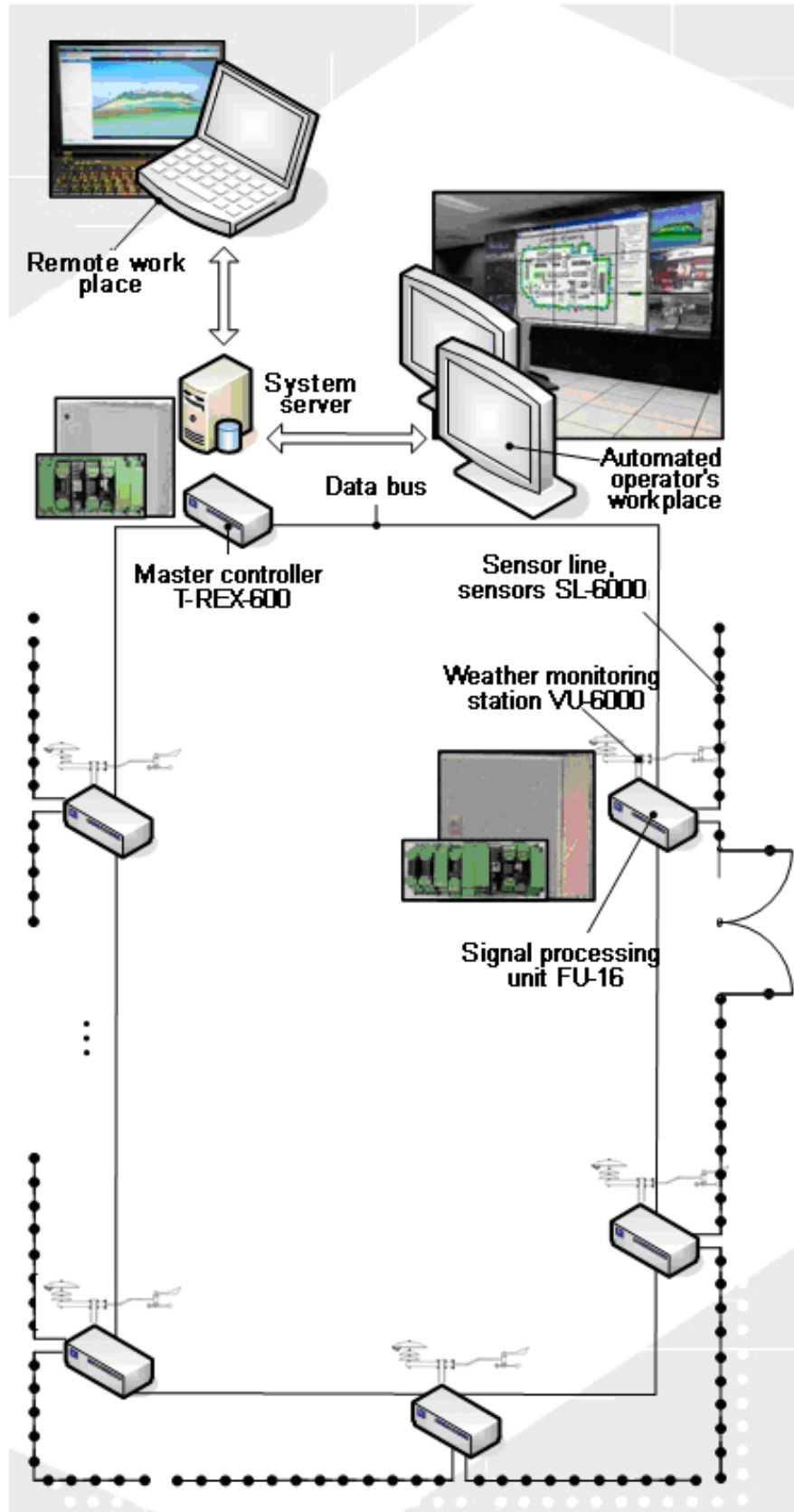


Figure 1. Structure chart of the system.

4. SL-6000 system sensors

SL-6000 system sensors (Figure 2, 3) are omnidirectional high sensitivity vibration annunciators. The sensors are connected to the cable fixed to the fence along the entire length of a protected perimeter. No special adjustment of sensors is required in the process of installation. SL-6000 system sensors detect an intruder in attempting to cross or destroy the fence elements.

SL-6000 system sensors ensure reliable operation of the system with various types of fence.

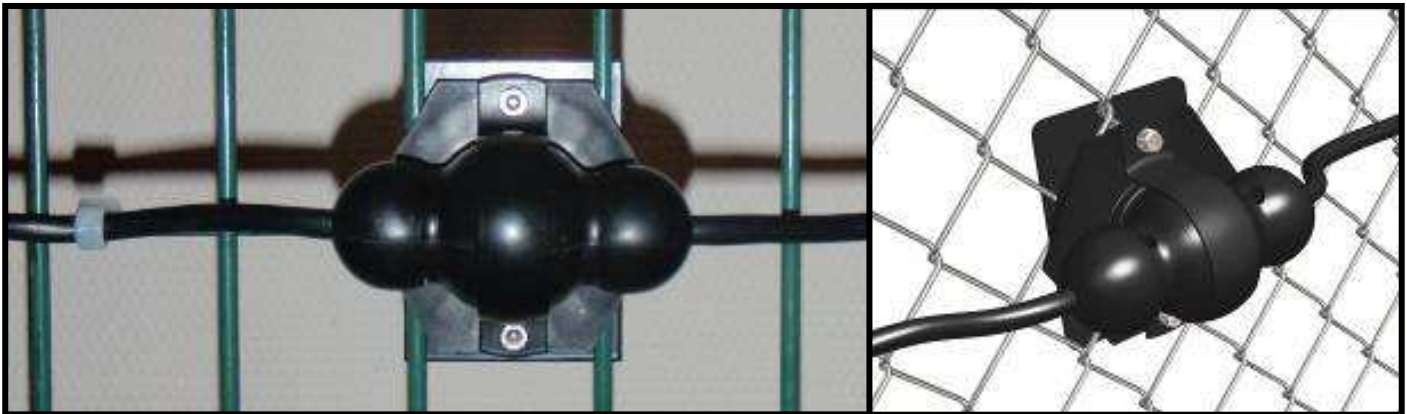


Figure 2. SL-6000 system sensor (view from the protected zone).

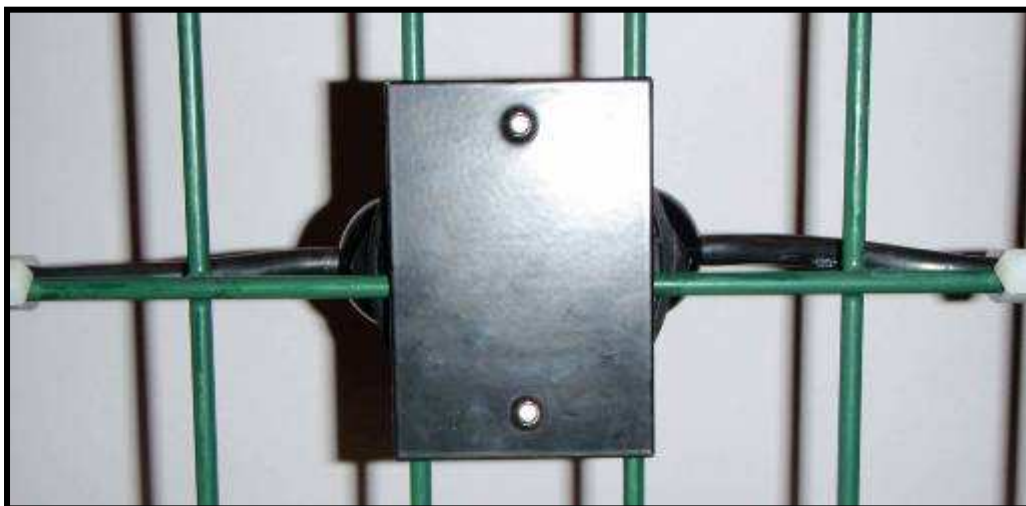


Figure 3. SL-6000 system sensor (view from the intruder's side).

The body of the SL-6000 sensor is air-tight and made of light and heat resistant polymer material. The sensor is unaffected by electromagnetic field or radiation.

All the cable connections for sensors are made at the manufacturing works. This ensures high quality of the manufactured sensor line.

5. Signal processing unit FU-16

Signal processing unit FU-16 receives and processes signals from the sensor line. The signal processing unit is a piece of modular equipment installed in a sealed box made of high resistance plastic. FU-16 unit is installed directly on the perimeter fence (Figure 4) or on an additional post (Figure 5).



Figure 4. FU-16 (on additional post).

Figure 5. FU-16 (on perimeter fence).

Each FU-16 unit ensures:

- Condition monitoring for 16 zones, total length up to 2,800 m
- Controlling 16 built-in multifunctional relays
- Overvoltage protection and lightning discharge protection (four degrees of protection)
- Built-in standby power source (electric battery or solar panel)
- Built-in microclimate control system capable of maintaining the operating temperature (from -60°C to +80°C)

- Possibility of standalone operation
- Using power supply voltage from 6 V to 38 V DC (maximum consumption current 150 mA)
- Integration with any subsystems (video surveying, access control, lighting, etc.) at the hardware level

6. Compensation of weather effect

In order to compensate for weather effect, such as wind, rain, hail, and minimize false trips, the system includes a specialized weather monitoring station VU-6000 (Figure 6).



Figure 6. Weather monitoring station VU-6000.

The weather monitoring station monitors the ambient conditions by three parameters:

- 1) Wind velocity
- 2) Wind direction
- 3) Vibration impact (rain, hail)

The weather monitoring station sends information on the above mentioned current ambient conditions to the signal processing unit. The data received from the weather monitoring station are digitized and used for picking up the alarm signals against the interference caused by weather effect. The signals generated by the real intruder's action on the fence are detected after compensating for the interference component.

Sensitivity is corrected separately for each zone of the signal processing unit. The weather monitoring station can be connected to each signal processing unit or to some units arbitrarily.

7. Information provided by the system

The system is capable of detecting and informing the operator of the following types of external impact:

No.	Name	Description
1	Alarm	Disturbance (an attempt to cross or destroy the fence) was detected.
2	Bridge attempt	An attempt to disable the sensor line using a "bridge" (excluding one or a number of sensors from the line circuit).
3	Cut	A cut of the sensor line was detected.
4	Short circuit	A short circuit of the sensor line was detected.

The information provided by the system helps the system operator to take timely and adequate measures in accordance with the events.

8. Communication line

The signal processing units FU-16 are connected to the master controller by a common data bus which can have any topology (star, ring, etc.).

A modification of interface RS-485M is used to transfer the data in the system. The interface permits sending signal to distance up to 3,000 m.

In addition to receiving and transferring the data, each signal processing unit performs correction and amplification of the signal, i.e. acts as an amplifying repeater. This permits to implement the communication line without additional technical facilities from third party manufacturers. Maximum length of the protected perimeter is 196,000 m.

9. Systems for collecting, processing, displaying and storing information

9.1. Master controller T-REX-6000

Data are transferred from the signal processing units to the central system controller T-REX-6000. The central controller can be installed in a special housing unit, telecommunication equipment cabinet, etc.

The T-REX-6000 ensures:

- Controlling 70 signal processing units FU-16 without additional hardware (such as servers, switches, etc.)
- Protection against overvoltage and lightning discharge (four levels of protection)
- Built-in standby power supply (electric battery or solar panel)
- Possibility of uninterrupted standalone operation in the event of server failure
- Use of power supply voltage from 6 V to 38 V DC (maximum consumption current 100 mA)

9.2. Information display and storage subsystem

A specialized industrial computer running OS Windows XP Embedded is used to display the status of the system. The operator's workplace is equipped with a touch-screen display.

The PC monitor shows the information on status of the system in the standby mode of the system. The status information is displayed using a mnemonic map with perimeter section icons. When an alarm signal is received, the monitor automatically displays graphic information indicating the location and zone number of the tripped section. The alarm information is duplicated with a voice message through speakers.

The software implements a hierarchical access structure featuring a number of privilege levels for users of the system. All events occurring in the system, and all operator's activities are recorded in the system data base. A convenient user interface does not require special training of operators. The user interface permits:

- Taking individual zones (perimeter sections, gates, etc.) under security control or releasing individual zones from security control

- Adjusting sensitivity of each zone individually using a number of fixed simplified scenarios
- Changing active operator, including entering a password, etc.

A status display unit can be used additionally or as a substitution for a monitor in the operator's workplace. The status display unit is a map of the object with installed LEDs. LED illumination indicates the current status of the zone to the operator. The alarm signal in a zone is accompanied by alarm sound.



Figure 7. Example of arrangement of the situation center.

10. Main advantages of the T-REX system

- Low level of false alarms (less than 2 events per kilometer per year)
- Probability of intruder detection in a 100 m section over 99 percent (for the intruder weight over 45 kg)
- Weather monitoring station, compensation for interference caused by weather effect
- Guaranteed protection for perimeter up to 196 km
- Operation on various types of fence
- Improved protection against lightning discharge
- High level of provided information
- Built-in standby power supply unit (electric battery or solar panel)
- Possibility of uninterrupted standalone operation (in the event of server failure or communication line failure)
- Built-in microclimate control system
- Does not require seasonal adjustment
- Warranty period for 10 years

11. Additional features of the system

- Integration with the existing or new intruder detection sensors. This feature permits using additional means of security protection based on the system, in order to improve security of certain sections or the entire perimeter (for example, a second protected border).
- Integration with security CCTV systems or sound/light annunciation systems at hardware level.
- Permits to establish additional automated workplaces or remote workplaces.
- Permits to build a completely wireless system using solar panels and wireless telecommunication technologies.